

LIFETIME MANAGEMENT OF SUBSTATION CONTROL SYSTEMS

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PURPOSE AND SCOPE

This Procedure describes the processes involved and the stakeholder responsibilities in the lifetime management of Substation Control Systems (including METRO).

Key elements of the life cycle are summarised as:

- Type Registration.
- Investment Application.
- Data Management.
- Investment Implementation.
- Commissioning (covered in TP106)
- Post Commissioning Support (covered in PS(T)066).
- De-commissioning (covered in TP106)

PART 1 – PROCEDURAL

1 RESPONSIBILITIES

This procedure is applicable to Substation and Overhead Line Projects, Asset Management, Market Operation (MO), Technical Assurance and their respective Contractors' staff who are engaged in the provision and lifetime management of Substation Control Systems (SCS). It also identifies the interfaces with SCS Suppliers who are responsible for the actual SCS and database provision.

1.1 ETAM Investment Management

To develop and manage the capital plan including Substation Control System replacements/upgrades/extensions and new Substation Control System requirements generated by new Substation builds. ETAM Investment Management will seek inputs from the relevant Construction Delivery Unit (CDU) at the appropriate stage.

Responsible for the formulation of strategies and sponsorship of investments to ensure the timely replacement of ageing assets in the medium term. The strategies take account of prioritised candidates identified by the asset health review process, business needs, replacement volumes, customer needs and system strategies. Responsible for the management of the Investment Process (TP500).

1.1.1 Asset Policy

Responsible for ensuring that all asset related Policy, Guidance and specifications are in place and maintained for the complete asset life cycle. To ensure a clear accountability for technical developments and their application to processes and assets. Developing the policy for assets to drive investment decisions encompassing the whole life cycle, from system level down to individual asset level.

a) Type Registration

Initial registration of products and product changes/enhancements, and maintenance of the Type Registration List.

b) Formal Documents

Control and issue of standard documentation in support of this procedure.

c) Generic Equipment Models (GEMs)

The Type Registration process will include the provision of GEMs for use in either the construction or modification of an SCS database. Asset Policy will submit draft GEMs to Design Assurance (Database Co-ordinator) who will manage the GEM approval process. GEMs produced by Suppliers during the course of an SCS Database construction will also be subject to the approval process.

d) Master Alarm List (MAL)

Market Operation have maintained and released the Master Alarm List and Asset Policy have published the MAL on National Grid's intranet and extranet sites providing access to all users of the data. It is intended that the Master Alarm List (MAL) will be subject to further revision/update.

Informative note. All new alarm information will be incorporated into the appropriate Generic Equipment Model. It is intended that this will be a subset of the revised MAL.

e) Technical Advice.

Input to the Network Development Process and response to technical queries, including response to GEM related queries.

f) Type Fault Progression

Analysis of fault reports leading to amendment and subsequent re-registration of the corrected products.

1.1.2 Delivery

a) Commissioning Support

b) Provide site roles (Senior Authorised Personnel, Commissioning Engineer) in support of the commissioning activity.

c) Generic Equipment Models

Provide input as required to Asset Policy to facilitate the production of Generic Equipment Models, using the MAL as the reference source.

d) Maintenance

To provide a maintenance and support service as defined in the support agreement. To provide input to the SCS Database Co-ordinator in respect of SCS database issues.

e) Site Based Records

Management of as installed information.

1.2 Global Procurement

Manage the Post Delivery Support Agreements (PDSAs). See PS(T)066 and NCT112.

1.3 Construction Delivery Unit (CDU)

1.3.1 To implement cost effective solutions and carry out detailed design and delivery of investments within the development plan.

a) Provide new or modified Substation Control Systems to support the needs of the modified power system or asset replacement investment.

b) Ensure that all new equipment installed is adequately supported by existing PDSAs and where this is not the case make provision (Capital and Revenue) in the Investment Development for the purchase of appropriate spares and a new or revised PDSA contract. New equipment will not be accepted without a properly funded life time support arrangement.

c) Ensure SCS expansion and database modifications are carried out in support of primary and/or secondary system modifications. This activity extends to Overhead Line work where circuit re-rating may lead to modified metering arrangements being required.

d) Utilise the contractual arrangements put in place by National Grid with all SCS Suppliers for SCS/database modifications. This utilisation involves the engagement of these SCS suppliers via National Grid Technical Assurance.

- e) Ensure that items on the exceptions database (see Technical Assurance) are incorporated into database changes being carried out for investment works. Incorporation of outstanding (exceptions) database work in this manner ensures optimum efficiencies in the production of modified SCS databases. Where significant costs arise in the rectification of issues recorded on the exceptions database, the CDU should consult Technical Assurance and agree an appropriate strategy/funding of those works. Where exceptions database works are of a minor nature it is expected that the CDU will deliver these works without further compensation. Where outstanding database issues are rectified via a CDU project, the CDU will advise the National Grid Database Co-ordinator that the outstanding work has been completed.
- f) Record on the exceptions database any database issues that have been agreed can be left until the next planned SCS database modification. This does not include items recorded on NCR registers during the delivery of a major investment that will be rectified during the ongoing investment works.
- g) Where ATCC and/or ARS functions are being provided, obtain appropriate parameters from Technical Assurance.

1.4 Technical Assurance

1.4.1 Design Assurance

- a) Investment Development
Provide input to the Investment Development process to allow sanction to take place.
- b) Commissioning
Adhere to the requirements of TP106.
- c) Data Management
Support the control and management of the flow of information to support the engineering schedule including the remote control point interface.

Provide guidance where necessary to ensure National Grid's requirements are met by SCS databases.
- d) Generic Equipment Models

Jointly approve, act as custodians and publish via National Grid's Intranet/Extranet sites.
- e) Handbooks

Produce working level documentation for best practice guidance to encourage project consistency.
- f) SCS Database Co-ordination

Provide a database support activity for all National Grid managed investments, controlling/progressing SCS database changes post commissioning, including the management of the SCS Database Call-Off Contracts and the Exceptions Database. The Exceptions Database contains a record of all outstanding work required on SCS databases. Technical Assurance will ensure that each time work is to be carried out on an SCS database, the SCS supplier consults the Exceptions Database and implements any outstanding work. Technical Assurance will ensure that details of exceptions (outstanding work) is provided to the appropriate SCS Supplier.

This activity can include the procurement, on behalf of a CDU, of a modified SCS database to meet the needs of the CDU project. Where this is considered appropriate, the Database Coordinator will agree, with the CDU, a specification/scope, delivery timescales and funding for the works, and will then utilise the existing Database modification Call-Off contract.

The Database Co-ordinator will be the focal point for the GEM approval process seeking advice from the approval parties. When a new GEM has been approved, the Database Co-ordinator will ensure that the new GEM is published on the Intranet/Extranet.

- g) SCS database configuration (DBC) (i.e. 300 Sheets/T101 Excel spreadsheet)

Issue 300 Sheets (for GI74) or the Excel spreadsheet (for T101) to the IEMS Modelling Team as required by TP106. Issue to be accompanied by the Provision/Modification of Remote Operation Facilities Certificate (see TP106) and the Transfer Form (Appendix B of this Procedure).

- h) Liaise with both Market Operation and CDUs, in respect of ATCC and ARS parameters where necessary.

1.5 Market Operation

1.5.1 IEMS Modelling Team

- a) SCS Database Configuration (DBC)

Receive 300 Sheets or T101 spreadsheets issued by Technical Assurance (or CDU on behalf of Technical Assurance), for both new and modified SCS databases.

- b) IEMS Database Changes

Co-ordinate the IEMS changes necessitated by the database change and/or Operation Diagrams and raise IEMS Change Requests to ensure that the IEMS database is consistent with the SCS database. A full description of the IEMS Change Management process is provided in NOBP1233. This activity includes the building and testing of new IEMS databases based on the issued DBC and the raising of a notification of database changes required (form C of this Procedure) in connection with issues/errors uncovered during the build/test process.

- c) COMMIT (DSS) Programme

Maintain an agreed programme of IEMS (and associated Site Database Changes) COMMIT activities. This programme is produced in conjunction with the (Technical Assurance) SCS Database Co-ordinator.

1.5.2 Control Support & Review

- a) Voltage Control Equipment, Operational Parameters.

Provide operational parameters as required for Voltage Control Equipment, eg. ATCC. ARS

- b) Generic Equipment Models

Provide input as required to Asset Policy/Technical Assurance Design Assurance to facilitate the production of Generic Equipment Models and jointly approve new GEMs.

- c) Maintain a list of approved text fragments for use on the IEMS. These text fragments will be used as ADR texts within the GEM approval process. Any new text fragments must be approved by Control Support & Review. Currently this list is part of DH20. (Note: This will be superseded by the updated MAL)

2 PROCEDURE

The procedure is described by means of a flowchart (Appendix D) detailing the life cycle of the SCS. This is reinforced by the following text which provides additional detail. This section makes reference to the Network Development Process (TP500 stages).

2.1 General

Type Registered products are identified in the Type Registration List held by Asset Management. (See 1.1.1a).

The Master Alarm List is the responsibility of Market Operation and Asset Policy, and will be revised/updated as needed. The agreed Master Alarm List and Generic Equipment Models are available on both National Grid's Intranet and Extranet sites (See Technical Assurance Design Assurance responsibilities).

Where a new SCS is to be installed, or new equipment is to be added to an existing SCS, approved generic models are to be used.

New equipment for which no Generic Equipment Model exists shall be reviewed by Asset Management (Asset Policy), Technical Assurance (Design Assurance) and Market Operation (Control Support & Review) who will jointly validate/approve a proposed model submitted by the CDU/equipment supplier as part of Type Registration. Where a CDU or Supplier encounters existing equipment for which there is no approved GEM, the CDU/Supplier will propose a GEM and seek approval for its use via Technical Assurance (Design Assurance). Verification/approval of the proposal will be provided by Asset Policy.

2.1.1 Evaluate Options (Stage 4.2.2) and Project Development (Stage 4.3.1)

As part of an investment, ETAM Investment Management will consider the control system requirements for all investments. This process will identify, at the earliest opportunity, where equipment proposals require any new or revised Control System functionality (including consideration of accelerated replacement or provisions for future replacement requirements). Any such requirements will be discussed within the Investment Team process, and be specified in line with TP500. This will permit the early identification of potential Type Registration issues, which can then be pursued, or alternative strategies to be adopted where Type Registration timescales would be an impediment to timely Project delivery.

This process is followed up during Project Development (Stage 4.3.1) by Capital Delivery Project Development in more detail to review the assumptions and findings of stage 4.2.2.

2.1.2 Project Execution – Detailed Design (Stage 4.4.2)

Provision of a new SCS will always originate from a sanctioned investment. Changes or extensions to an SCS can originate from a sanctioned investment, Asset Management amendment or Market Operation amendments.

During the development of the detailed design (Stage 4.4.2) additional functionality or equipment not previously type registered may be identified (where this was not identified during the development phase). The CDU will consult with Technical Assurance and Asset Policy to identify jointly the optimum solution. The method and presentation of any new functionality to be added shall be assessed by Asset Policy and agreed with Market Operation. Asset Policy shall assess any non compliances against the NGTS, and agree with Market Operation and ETAM their acceptability. The programme for registration shall be