

1-05-OP01-P079

# SCADA AND RTU DATABASE CONFIGURATION MANAGMENT PROCEDURE

This procedure is in line with the organisation's 1-05-OP01 Asset Data Management Policy

Document Control				
Approved By	Position	Senior Manager Network and Asset Management	Name	Michael Dobbin
Contact Position	Position	Network Engineer	Name	Armstrong Apollo
Contact Details	<a href="mailto:apollo.armstrong@electranet.com.au">apollo.armstrong@electranet.com.au</a>			
First Release Date	02/03/2017			
Date of Last Review	02/03/2017			

Revision Record					
Date	Ver.	Description	Author	Checked By	Approved By
13/04/16	A-1	SAPN Initial Draft	Michael Cook	Nasir Ahmed Bronwyn Holloway Sharon Willis Armstrong Apollo	Michael Dobbin
20/04/16	A-2	SAPN Final Draft	Michael Cook	Nasir Ahmed Bronwyn Holloway Sharon Willis Armstrong Apollo	Michael Dobbin
02/03/17	A-3	Final for approval	M Cook	A Apollo	M Dobbin

WHEN PRINTED THIS DOCUMENT IS UNCONTROLLED

COPYRIGHT AND DISCLAIMER

Copyright of this material is owned by or licensed to ElectraNet. Permission to publish, modify, commercialise or alter this material must be sought directly from ElectraNet.

Reasonable endeavours have been used to ensure that the information contained in this document is accurate at the time of writing. However, ElectraNet gives no warranty and accepts no liability for any loss or damage incurred in reliance on this information.

## CONTENTS

<b>1. PURPOSE</b> .....	<b>3</b>
<b>2. SCOPE</b> .....	<b>3</b>
<b>3. TERMS AND ACRONYMS</b> .....	<b>3</b>
<b>4. PROCEDURE DETAILS</b> .....	<b>3</b>
4.1 RTU CONFIGURATION CHANGE.....	4
4.1.1 <i>Creation of a System Change Notification (SCN)</i> .....	5
4.1.2 <i>Creation of a Global Setting Request</i> .....	5
4.1.3 <i>Creation of a RTU Setting Request</i> .....	5
4.1.4 <i>Development and Authorisation</i> .....	5
4.1.5 <i>Apply and Validate</i> .....	6
4.2 NOTIFICATIONS AND TIMING.....	7
<b>5. PROCEDURE RESPONSIBILITIES</b> .....	<b>7</b>
<b>6. EVALUATION AND REVIEW</b> .....	<b>8</b>
6.1 REVIEW.....	8
<b>7. ASSOCIATED DOCUMENTS</b> .....	<b>8</b>
7.1 RELEVANT LEGISLATION.....	8
7.2 POLICIES.....	8
7.3 GUIDELINES.....	8
7.4 PROCEDURES.....	8
7.5 FORMS.....	8
7.6 PROCESS MAPS.....	8
<b>8. APPENDICES AND REFERENCES</b> .....	<b>8</b>
<b>APPENDIX A</b> .....	<b>9</b>
A1 IED CONFIGURATION CHANGE PROCESS.....	9
A2 RTU CONFIGURATION FILE NAMING CONVENTION.....	10
A3 IPS-EPIS RSR INTERACTION DIAGRAM.....	11

## TABLE OF FIGURES

No table of figures entries found.

## 1. Purpose

This procedure describes how ElectraNet business groups, processes and procedures are required manage database configuration files for RTUs and HMIs and the associated key activities and interfaces.

## 2. Scope

This procedure is applicable to all ElectraNet business Groups personnel and contractors involved in any activity that interacts with the RTU and HMI configuration files, be this engineering design, project management asset performance, commissioning, or operations and maintenance activities.

## 3. Terms and Acronyms

Term/Acronym	Definition
AMC	Asset Management Committee
Endorser	Responsible for training new users and nominating the level of group access: For Engineering – Senior Engineer Protection For Network and Asset Performance - Principal Engineer Protection and Control For Asset Management – Network Engineer For other groups – any of the nominated endorsers
EPIS	Enterprise Protection Information System The suite of IPS modules for protection relay management
GSR	Global Setting Request
HMI	Human Machine Interface (also previously known as Local Control facility (LCF))
IED	Intelligent Electronic Device
IEPD	IPS-EPIS Protection Database
NAP	Network and Asset Performance
RSR	RTU Setting Request
RTU	Remote Terminal Unit
SCN	System Change Notification
SMNAM	Senior Manager Network and Asset Management

## 4. Procedure Details

The Process map 1-16-OP01-P018-PM02 IED Configuration Change Process (See Appendices) provides guidance through the interaction process. The steps contained in the process map shall be followed to ensure correct and consistent interaction with the IEPD.

The key business groups and activities involved in the interaction are as follows:

**Network and Asset Management:** Interaction management governance, monitoring, ongoing operation and maintenance and development of IEPD and related future IPS Asset Management and other software modules and programs.

**Secondary Systems:** SCADA System and RTU configuration design including authorisation.

**Network Delivery:** Identifying operational SCADA issues and requirements and initiating and managing SCADA sub-projects within CAPEX and more significant OPEX Projects and Contractor Management and Network Operations roles.

**Network and Asset Performance:** Network asset issues and incident investigation, performance improvement requirements identification and initiating and authorising OPEX minor Projects SCADA system and RTU configuration changes.

**D&C and Maintenance Contractors:** Design, implementation and testing and commissioning of SCADA systems and RTU configurations for CAPEX and OPEX projects under direction of Network Services.

## 4.1 RTU Configuration Change

The IEPD provides a fully auditable setting change process and includes the following objects:

- System Change notification (SCN). The SCN represents any reason for a configuration change that maybe due to a new project, to a maintenance activity, refurbishment, etc. The SCN includes such data as:
  - Creating person or Authoriser;
  - Assigned person or group;
  - Relevant documents e.g. single line diagrams, wiring diagrams; and
  - SCN workflow definition

An SCN can include one or more Global Setting Request.

- Global Settings request (GSR). The GSR represents one or more relay setting request. A GSR includes such data as:
  - Workflow type
  - Location
  - Assigned person
  - Setting creation instructions
  - GSR workflow definition

Typically all the relay settings changes required at a single substation would be recorded under one GSR. A GSR can include one or more RSR.

- RTU Settings Request (RSR). The RSR represents one setting request for a single RTU configuration file.

IPS-EPIS tracks the workflow and provides alerts by email to inform relevant staff or external contractors of tasks to be completed. In addition all steps in the process are recorded in the IPS-EPIS database for quality assurance and review purposes.

Different workflows can be setup within IEPD for different types of SCNs, GSRs and RSRs. These are set up within IEPD by the system administrator and can be adjusted as business requirements change.

The Setting Workflow Management module is described in section 17.1 of the User manual.

#### 4.1.1 Creation of a System Change Notification (SCN)

The requirement for an SCN is triggered by the identification of any RTU configuration change. Any authorised staff with access and initiates the cause to create new or alter an RTU configuration should create the SCN.

In IEPD, the workflow for the SCN will lead to the creation of a GSR.

The SCN can only be closed once all the GSRs are resolved.

#### 4.1.2 Creation of a Global Setting Request

The requirement for a GSR is triggered by the creation of an SCN. Only ElectraNet's staff with access can create a GSR.

In IEPD, the GSR creator will assign the GSR to the required RSR implementers. A selection of users or groups is readily available. An email will automatically be sent to the nominated setter including the assigned group or individual, once the GSR is completed.

The workflow for the GSR will lead to the requirement to develop one or multiple RSRs.

The GSR can only be closed once all relevant RSRs have been closed by the nominated approving authority.

#### 4.1.3 Creation of a RTU Setting Request

An SCN and a GSR are required before an RSR is created. The RSR is the management tool for all RTU configuration changes and integration with IEPD.

This may be triggered amongst other by:

- Creation of a new RTU asset;
- Configuration change to an existing RTU asset;
- Change of an RTU asset; and
- An identified correction.

Regardless of the trigger, once it has been identified that an RTU is affected, an RSR must be raised in IEPD by the GSR and SCN creator by default. An RSR is presented in a Workflow Diagram in IEPD (See appendices).

When a new RSR is created and assigned for development, a new set of "Provisory" settings with status "Being Prepared" is added under the Relay Settings Tab in IEPD. The Setting Developer could be from Engineering, Network and Asset Performance (NAP) or from a third party contractor depending on the nature of the request. IEPD will automatically send an email to the nominated setting developer containing the details of the request and the actions to be undertaken.

#### 4.1.4 Development and Authorisation

Once the scope of the RSR has been created, the setting Developer must upload the configuration file in IEPD. Depending on the SCADA system different files will be required. The files required for each RTU Configuration types are described below:

**GE D20/D25 RTU:** For D20 RTU systems an archived version of the configuration file from Config Pro 4 is required. Additionally exports from the DPA table are required for the following four data types – DIs, DOs, AIs and AOs. The DPA table will be converted to a suitable format using the RTU file conversion tool.

**Foxboro C50 RTU System:** For Foxboro systems a main setting will contain the relevant autobuild content along with the EMS. The individual CFG files for each bay RTU with their equivalent RPT files generated from the *riaf* command are also required.

**SIEMENS PAS:** For Siemens PAS SCADA systems the zipped PAS configuration file will be attached with the only viewable file attached being the EMS.

**SEL RTAC:** For SEL Axion systems the setting file will be attached along with the EMS.

**SIEMENS PASCC HMI:** For Siemens PASCC HMI Systems the zipped WINCC configuration file will be attached with no viewable files.

**CITECT HMI:** For Citect HMI Systems the two .ctz files along with the citect.ini file will be attached with no viewable files.

Naming conventions for various configuration files are found in the appendices.

RTU attributes will also be required to be updated as necessary. Examples include serial numbers and firmware etc.

Once the RTU configuration has been uploaded into IPS, the setting developer must flag the date setting in IPS as "Verified". The setting developer's name will be identified and an automatic email will be sent to the authoriser for approval.

Regardless of the trigger for the RSR, the Authoriser will always be an ElectraNet person with the relevant authority, as described in procedure 1-16-OP01-P010.

The Authoriser will be advised via an email from IEPD of the newly revised configuration and will need to go into IPS to review and authorise the use of the configuration file. Once approved, the new setting shall be flagged as "Issued" with the date and user name of the Authoriser.

#### 4.1.5 Apply and Validate

Once the configuration file has been authorised, IEPD will notify via email the nominated SCADA Engineer. In most cases this will be a third party contractor.

A task to record a comparison between the as-found configuration file on site against the active configuration file in IEPD is required. If the result of comparison failed beyond normal, the Setter should abort to continue and inform the authoriser how to proceed. The authoriser can authorise to proceed to the next task of updating the RTU or to develop a new setting. If the differences found are minor, the Engineer can make appropriate changes on site.

When the result of as-found comparison is normal as required, the SCADA Engineer will apply the new configuration in accordance with current applicable procedures and processes for SCADA Commissioning.

Once the new points have been commissioned, the contractor must conduct another comparison between the new configuration and the authorised configuration in IEPD. This is known as the "As-left" comparison. It is to validate that the configuration downloaded to the RTU is the same as the one authorised. If changes were made, the contractor should ensure that those changes are recorded for the authoriser to review. Setting status in IEPD shall change from "Being Prepared" to "In Service". A new email will be sent to the authoriser to verify and confirm the setting updates and comparison records.

In the unlikely event that a design error is found at this stage, a new setting will be opened in IEPD and a new cycle of configuration development to RTU commissioning will take place. Otherwise, if everything goes as expected, the authoriser will "Seal" the settings in IEPD and flagged as "Proper" and "In service" and the active box should be ticked. Previous configurations will be flagged as "archived".

## 4.2 Notifications and Timing

Automatic notifications will be set up by personnel with Administrator rights, in accordance with section 9.6 of the user manual.

IEPD will send automatic email notifications to the responsible person for each step of the process in accordance with RSR Workflow Definition in SWM Module of IPS-Energy.

Notifications can be sent from templates, or altered as necessary by the sender in order to ensure that the receiver has all the required information to allow them to complete their component/next step of the process.

There is a list of defined events that will trigger an email notification to be sent.

Staff must respond to all notifications. Timing of response is dependent on the actions required:

- Development – in line with design;
- Authorisations – within 10 business days;
- Testing commissioning and maintenance – in line with construction/commissioning program; and
- Verification after the configuration is applied on site – within 5 business days.

## 5. Procedure Responsibilities

<b>Responsible Position</b>	<b>Responsibilities</b>
<b>Senior Manager Network and Asset Management</b>	Owens, manages and approves the procedure. Ensure Employees and other relevant Stakeholders have awareness of and comply with the procedure.
<b>Network Engineer – Network and Asset Management</b>	Facilitate the review and publication of the procedure and verify user group requirements for new users.
<b>Endorsers</b>	Ensure that new users are appropriately trained in the use of IPS-EPIS according to their required level of access.
<b>IT Service Centre</b>	Ensure that endorsed new users are qualified to have access to the network including EPIS set up for production and test versions.
<b>All Employees, Contractors, Consultants and Outsourced Providers</b>	Comply with and act in accordance with the requirements of the procedure, and be familiar with the required sections of the IPS-EPIS User Manual.

## 6. Evaluation and Review

### 6.1 Review

This procedure will be reviewed every 2 years in accordance with 2-FR01-P001 Policy Development & Review Procedure.

## 7. Associated Documents

### 7.1 Relevant Legislation

None

### 7.2 Policies

1-05-OP01 Asset Data Management

### 7.3 Guidelines

None

### 7.4 Procedures

1-05-OP01-P001 Secondary System Data Configuration Governance and Administration

1-05-OP01-P003 Secondary System Data Management

1-16-OP01-P010 Technical Authority Framework

### 7.5 Forms

None

### 7.6 Process Maps

1-16-OP01-P018-PM02 IED Configuration Change Process

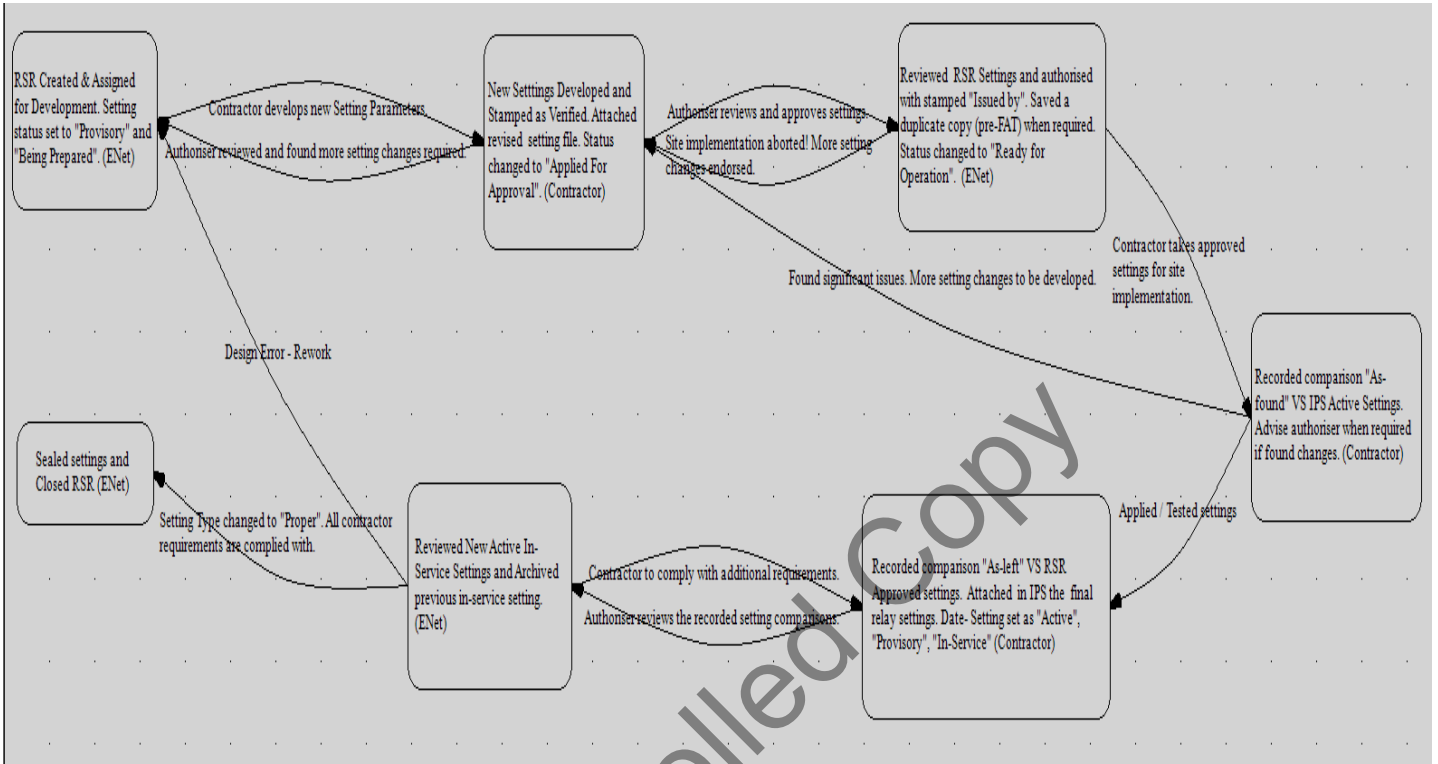
## 8. Appendices and References

IPS-EPIS Protection Database User Manual 2010



# Appendix A

## A1 IED Configuration Change Process



Uncontrolled Copy

## A2 RTU Configuration File Naming Convention

Naming convention for all RTUs shall begin with the six character substation name, followed by a number representing the RTU number on site, followed by the RTU Type, followed by the revision. Note that for C50 RTU's the individual bay RTUs are stored as attachments and therefore the bay RTU name is included before the revision.

RTU Type	Attachment Name Example	File Name
GE D20	TAIL_B-1-D20-A	The file name for D20 files is restricted to 8 characters. The first 3 digits shall be the substation SSD and the next 2 being the RTU number. The last 2 being the revision e.g. Rev A becomes _A or Rev AA becomes AA. e.g. 11401_G.zip
Foxboro C50	TAIL_B-2-C50-C10Q20-A	The file name for C50 files are restricted to 8 characters and will follow the current standard as will the converted report file. e.g. C1Q10_A.CFG and C1Q10_A.RPT
Siemens PAS	TAIL_B-3-PAS1-A	File name is not restricted and will follow the attachment name.
SEL RTAC	TAIL_B-4-RTAC1-A	File name is not restricted and will follow the attachment name.

HMI Type	Attachment Name Example	File Name
Siemens PASCC	TAIL_B-1-PASCC-A	File name is not restricted and will follow the attachment name.
Citect	TAIL_B-2-CITECT-A	File name is not restricted and will follow the attachment name.

**A3 IPS-EPIS RSR Interaction Diagram**

