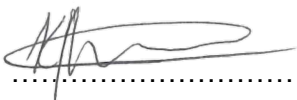

	<b>Scope of Work</b>	<b>Generation</b>
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## 1. INTRODUCTION

The Siemens Teleperm XP (aka. T2000) is a power generation distributed control system (DCS) which was first installed in Eskom Generation in Majuba units 4 to 6 in the mid 1990's. Immediately after that it was installed in Hendrina units 1 to 10 during the refurbishment of the old relay control and pneumatic control system in 1996. The T2000 system was the next generation of DCS after the Teleperm ME and MEA installed in Matimba units 1 to 6 and Majuba units 1 to 3. The T2000 is based on the Simatic S5 technology and it has been declared obsolete and has been superseded by the T3000 DCS which is the current product of Siemens for Power Generation control, and is based on Simatic S7 technology.

The course is provided by an international entity with vast experience in the original rollout, design, implementation, commissioning and O&M support of the control system for most of Siemens' clients globally.

Due to obsolescence status of the Control System, and to sustain the control system for a little longer in the power stations, it is necessary to keep the skills on the system in good status.

## 2. SUPPORTING CLAUSES

### 2.1 SCOPE

#### 2.1.1 Purpose

The purpose of this document is to describe the Scope of Work for training requirements for the T2000 DCS to enable the site Maintenance and Engineering practitioners to keep the system in healthy state for reliable and safe operation of the generating units.

#### 2.1.2 Applicability

This document shall apply throughout Eskom Generation and specifically the relevant power stations for T2000.

### 2.2 DEFINITIONS

None

#### 2.2.1 Classification

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### 2.3 ABBREVIATIONS

Abbreviation	Description
C&I	Control and Instrumentation
DCS	Distributed Control System
Gx	Generation Division
OT	Operational Technology
PLC	Programmable Logic Control
PS	Power Station
T2000	The Siemens Teleperm XP control system

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## **2.4 ROLES AND RESPONSIBILITIES**

- 1) The Service Provider is responsible to provide all training requested in the section 3 below, using the Service Provider's tools.
- 2) The Middle Manager is responsible for ensuring that the budget resources are made available for the training.
- 3) The Employer's Engineering Representative is responsible to make sure that the contents of this document are routinely reviewed and updated to reflect current technology trends and the needs of the organisation.
- 4) The learners (attendees) are responsible to attend as set out by the Service Provider.

## **3. SCOPE FOR T2000 O&M SUPPORT TRAINING**

### **3.1 SCOPE TO BE PROVIDED BY THE EMPLOYER**

The Employer shall provide the following services during the delivery of the course:

- 1) The venue for the course to accommodate the trainees sent by the Employer.
- 2) The venue will have tools like a projector and related equipment and services.
- 3) The training environment must be ergonomically sound to meet at least 8-hour training occupancy.
- 4) Ablution facilities for the occupancy of the training venue.
- 5) Provide refreshments for water/tea/coffee and lunch during the breaks.
- 6) A unit that is off-load to give practical demonstration of some of the Maintenance and Engineering activities that are specified in section 3.2.3 below.

### **3.2 SCOPE TO BE PROVIDED BY THE SERVICE PROVIDER**

#### **3.2.1 General Requirements**

- 1) The course must be delivered in English language.
- 2) The Service Provider must provide training material (in soft copy) required to deliver the training.
- 3) The course must be at least 4 days (8 hours each) of training intervention, excluding the assessment.
- 4) Training material (in soft copy) must be provided to the learners.

#### **3.2.2 Accreditation requirements**

- 1) None.

#### **3.2.3 Practical Demonstration Requirements and Deliverables**

- 1) Practical demonstration on the installed T2000 control system Servers and Engineering Station (the units must be left in the original operational state to enable unit to operate when needed).
- 2) The practical demonstration shall be planned on the following system, provided they are available in the generating unit provided by the Employer:
  - Virtualised ES680
  - PU with CP cards for H1 communication (depends on TXP version 6,7 & 8)

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- ✓ Versions <6 are CP 1413 (ISA Cards - Pentium HW is required)
- ✓ Versions >7 are CP1613 (PCIA Cards)
- ✓ Version 8 - Software driver (can be virtualised)
- SU, OT - can be virtualised
- PG (Programming computer- would be good to verify their status)
  - ✓ It's used for configuration of CP1430 cards (on S5)
  - ✓ Profibus programming
  - ✓ Simadyn programming
  - ✓ and many more tasks
  - ✓ S5 Rack
  - ✓ Network

### **3.2.4 Minimum Training Topics**

#### **3.2.4.1 OM650 – HMI Part of the T2000 system**

This includes:

- 1) PU – Processing Units
- 2) SU – Server Units
- 3) OT – Operator Terminal
- 4) HMI Server, and
- 5) Any OPC servers deployed in the system

#### **3.2.4.2 T2000 System Configuration and Diagnostic Tools**

This includes:

- 1) ES 680 Engineering Station, and
- 2) DS 670 Diagnostic Station

#### **3.2.4.3 T2000 System Communication and Synchronisation infrastructure**

This includes:

- 1) GPS clock – Synchronization of DCS components
- 2) Networking, which includes the following
  - a. The Plant Bus
  - b. Terminal Bus
  - c. Bridge between Power Plant units
  - d. Other Networks like Profibus, and special components like IM 153 module, Y-Link, etc.
  - e. TCP/IP Networks

#### **3.2.4.4 Automation and Field Instrumentation Layer**

This includes:

- 1) The AP – Automation Processor
- 2) I/O interfaces like SIM modules

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- 3) Communication interfaces like Profibus Master or CP1430 modules
- 4) Diagnostic and other essential hardware
- 5) AP-T – Turbine Governor, incl. I/O interfaces, communication interfaces and diagnostic and other essential hardware
- 6) CM – Communication Module
- 7) 95F – Fail Safe Protection, incl. I/O interfaces, communication interfaces and diagnostic and other essential hardware.
- 8) S7-300 – PLC used for Boiler Protection

#### **3.2.4.5 Auxiliary Systems**

This includes:

- 1) Win TS – Windows Turbine Stress Monitoring
- 2) PAS Servers
- 3) VM600 – turbine, pump and generator vibration monitoring system
- 4) Fight Recorder
- 5) Tec4 System

#### **3.2.4.6 Service and Maintenance Systems**

These include:

- 1) PG – Siemens Computer used for advanced diagnostic and configuration
- 2) Other computers used for various purposes

### **4. EMPLOYER'S EXPECTATION AND FURTHER DEVELOPMENT**

The learners are expected to have basic and intermediate knowledge to understand key maintenance (diagnostic and configuration) activities of the T2000 control system. It is understood that advanced knowledge of the system comes through frequent interaction with the system, such as trouble shooting and configuration during modifications, optimisation and commissioning.

### **5. REVISIONS**

Date	Rev.	Compiler	Remarks
21 October 2024	0.1	KF Sobuwa	First Draft Issue for Review
04 November 2024	1	KF Sobuwa	Final version

### **6. ACKNOWLEDGEMENTS**

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