

SECTION 40 70 00 – ELECTRICAL SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

1.01 SUMMARY:

- A. ^{A17}**Scope:** Scope of work shall be in accordance with Paragraph 1.01 D. of Section 01 81 26 (Communications, Control, Safety, and Security Systems), as required, for expanding the Employer's "Sección de Generación" (EAEG) SCADA system to electrical substations as part of the Works.^{A17} This Section of the Employer's Requirements shall be read in conjunction with the Sections listed in Table 40 70 00-1.

B. **Related Sections:**

Table 40 70 00-1: Related Sections	
1.	Section 01 81 26 - Communications, Controls, Safety and Security Systems.
2.	Section 27 11 16 - Cabinets, Racks, Frames, and Enclosures.
3.	Section 33 72 00 - Electrical Substations.
4.	Section 40 00 00 - Process Systems Integration.
5.	Section 40 91 00 - Primary Process Measurement Devices.

1.02 REFERENCE:

- A. **Applicable Publications:** Refer to Section 01 81 26 (*Communications, Controls, Safety and Security Systems*), Paragraph 1.02.

1.03 REQUIREMENTS:

A. **General:**

1. The Contractor shall meet all applicable requirements of Section 01 81 26 (*Communications, Controls, Safety and Security Systems*), Paragraph 1.03.
2. SCADA equipment shall be independent of process control system (PCSs) specified in other Sections of Division 40 (*Process Integration*).

B. **Communications:**

1. Remote SCADA equipment shall communicate with EAEG's SCADA master station using DUG DNP3 and Modbus RTU, and shall be capable of being modified to handle IEC 60870-5 and [Siemens](#) Telegyr G8979 protocols.
2. Communications interface shall be 100/1,000 Mbps Ethernet in accordance with IEEE 802.3. Communications lines shall also be configurable for TCP/IP communications.

C. Interoperability and Coordination:

1. Master Station:

- a. ^{A8}Remote SCADA equipment shall be compatible with EAEG's SCADA master station in use at the time of installation. In FY2008, the Employer plans to replace a [Siemens](#) Telegyr Energy Management System (EMS) master station. As of the Base Date, new items planned include Dell model Power Edge 2850 servers, Microsoft Windows Server 2003 operating system, and Survalent Technology (www.survalent.com, Mississauga, ON, Canada) WorldView software version 1.07.0918.^{A8}
- b. The Contractor shall request updated information from the Employer's Representative to ensure compliance with interoperability and compatibility requirements.

2. Relays:

- a. Relays for control output points shall be of the plug-in type, with a transparent dust cover, and have one or more sets of dry form "C" (normally open, normally closed, and common terminals) or form "X" relay contacts.
- b. Contact rating shall be 3 Amperes at 24 VDC, 2 Amperes at 120 VAC, and 10 Amperes at 125 VDC, or better.

3. **Sequence of Events (SOE):** Remote SCADA equipment shall support SOE for all status inputs.

D. Equipment and Materials:

1. Remote Terminal Units (RTUs):

- a. Input points to the RTU shall include accumulator points types A, B, and C, XYZ alarm/status digital input (DI) points, and analog input (AI) points, as required.
- b. Output points from the RTU shall include analog outputs (AO), digital output (DO) or control points operating supplier-furnished interposing relays, and setpoints, as required.
- c. AIs and AOs shall be 0-1 mA for unipolar variables, and 0+1 mA for bipolar variables.

2. Cabinet Racks:

- a. Cabinets shall be in accordance with Section 27 11 16 (*Cabinets, Racks, Frames, and Enclosures*) and have front and rear access swing doors with key locked provisions and internal lighting.

3. **Data Concentrators:** Shall be furnished instead of most of RTUs components whenever possible. Units shall allow communications to EAEG's SCADA system and the locks' electrical distribution control system (EDCSs), and control from EAEG's SCADA only.
 4. **Transducers and Intelligent Electronic Devices (IEDs):** Shall be in accordance with Section 40 91 00 (*Primary Process Measurement Devices*). The Employer strongly prefers using IEDs instead of RTUs.
 5. **Transformers:** Current transformers (CTs) and potential transformer (PTs) shall be in accordance with Section 40 91 00 (*Primary Process Measurement Devices*), and furnished as required.
- E. **Software:** Remote SCADA equipment software and all other software shall be furnished as required.
- F. **Installation:**
1. **General:**
 - a. ^{A17}Items shall be installed in all new electrical substations servicing the Works.^{A17}
 - b. The Contractor shall make SCADA data base changes and additional custom display pages in the master station at Balboa Building 731, as required for the new equipment to be provided.
 2. **Remote Terminal Units (RTUs):** If any, RTUs shall be connected to the same LAN where IEDs are connected.

1.04 DESIGN CRITERIA/SYSTEM PERFORMANCE:

- A. **General:**
1. **Problem to be Solved:**
 - a. ^{A17}To seamlessly integrate the new locks' electrical substation(s) with the existing Employer SCADA system, using DNP3 protocol as much as possible.^{A17} As a minimum, this includes Agua Clara Substation in accordance with Section 33 72 00 (*Electrical Substations*).
 - b. To use as many standard products as used at existing locks while avoiding obsolescence. This is desirable to leverage existing inventory and training related with these products.
 2. **Restrictions to be Considered:** (Reserved)

B. Design Criteria:

1. I/O points for transmission and distribution lines shall include, but not be limited to, the following: Voltage, current, watts, VARs, VA, and [MWh](#).
2. SCADA points for transformers shall include lockouts, oil level, and temperature alarms.
3. SCADA points for circuit breakers shall include status input and control output. In case of SF₆ breakers, gas pressure alarm shall also be provided.
4. SCADA points for emergency generators shall include on/off status.

C. System Performance: EAEG's SCADA system performance with new remote SCADA equipment shall not be any slower or have fewer functions than with existing RTUs elsewhere in the Employer's EAEG's SCADA system at the time of installation.

1.05 SUBMITTALS: Shall be in accordance with Section 40 00 00 (*Process Systems Integration*), Paragraph 1.05.

1.06 QUALITY ASSURANCE: Shall be in accordance with Section 40 00 00 (*Process Systems Integration*), Paragraph 1.06.

END OF SECTION