

## **PART 1 GENERAL**

### **1.1 Summary**

- .1 This section of specification is an integral part of the Contract Documents and shall be read accordingly.
- .2 Comply with general conditions, supplementary conditions of the contract, and section 260100-Electrical General Requirements.
- .3 Refer to all other Divisions of the Specifications and these documents to determine their effect upon the work of this section.
- .4 Furnish all labour, materials, supervision, equipment and services specified, indicated or requested to supply and install the medium-voltage circuit protection devices described herein.
- .5 Contractor is to coordinate and provide all work such that the proposed substation will provide the required electrical service to the proposed building, and complies with ESA Inspection Authority and Power Supply Authority requirements as Service Entrance rated.
- .6 Contractor to provide an engineered concrete foundation design, to provide a fully self-supported pre-cast concrete pole structure. Prepare a shop drawing submission of the pole foundation design, stamped by a Professional Engineer in Ontario.
- .7 Reference Section 260100, Electrical General Requirements.

### **1.2 Shop Drawings**

- .1 Submit shop drawing in accordance with Section 260100, Electrical General Requirements.

### **1.3 Conflicting Requirements**

- .1 Any ambiguities in, or contradictions between, sections of this Specification, or between this Specification and the local codes, must be resolved by the equipment manufacturer to the satisfaction of the Engineer.

### **1.4 Codes and Standards**

- .1 Materials and workmanship shall comply with codes and standards of the province in which the work is located, and local codes, regulations and standards.

### **1.5 Source Quality Control (Testing)**

- .1 Conduct equipment inspection. Provide field inspection, testing and start-up as per Section 260100 – Electrical General Requirements.
- .2 Provide manufacturer's type test certificates, and in accordance with the latest CSA, ANSI, IEEE, NEMA and EEMAC standards.
- .3 Manufacturer to provide a standard factory testing of the complete unit substation including operation of switches, set-points, interlocks and controls.

- .4 Submit certified written test results to Engineer prior to shipment.

## **1.6 Spare Parts and Tools**

- .1 Provide an itemized list of spare parts and tools as recommended for start-up.

## **PART 2 PRODUCTS**

### **2.1 Medium-Voltage (44kV) Primary Fusible Switch**

- .1 S&C fusible Alduti-Rupter Switch for outdoor installation.
- .2 Three-pole, double-air, load breaking style complete with fuses, fuse holder, handle mechanism and accessories.
- .3 Vertical mounting configuration. Provide sufficient 1" diameter IPS galvanized extension piping to interconnect switch mechanism.
- .4 Nominal voltage rating: 46kV.
- .5 Maximum voltage rating: 48.3kV.
- .6 BIL rating: 250kV.
- .7 RMS continuous interrupting rating: 600 amperes.
- .8 Include a disconnect operating handle mechanism with 180-degree operation. Include sufficient length of 2"-diameter IPS galvanized piping, and all necessary accessories and mounting hardware for pole height.
- .9 Fuses: include three fuses for switch plus three spare fuses (6 in total). Fuse rating will be based on final coordination study.
- .10 Fuse holders: SMD-2C Fuse Mounting.
- .11 End Fittings; complete with cyproxy insulators and ED-381-S6L-T206 operating mechanism.
- .12 Provision only for key interlock, single lock for "locked-open" application.
- .13 S&C switch mounting frame for single concrete pole installation. Mounting frame to be hot-dipped galvanized steel. Fusible switch must be completely assembled (except the operating handle extension piping) on a common mounting frame and aligned at the manufacturer's facility. Coordinate mounting frame with concrete pole manufacturer to ensure pre-drilling of concrete pole matches required attachment heights and mounting of primary switch.
- .14 Acceptable manufacturer: S&C Electric Alduti-Rupter.

## 2.2 Pre-cast Concrete Pole

- .1 Free-standing, self-supporting pre-cast concrete pole, c/w cross arm and pre-assembled for easy erection on site.
- .2 Type: Spun Concrete Pole, class and height of pole shown on drawings.
- .3 Incoming lines: 1000lb per conductor rated pull, with lines approaching at a maximum angle of 30 Degrees from perpendicular.
- .4 Dead load: Self weight of structure plus 1/2" thickness of ice all over surface.
- .5 Equipment Load: Actual weight of equipment plus 50% increase for ice coating.
- .6 Grounding: standard ground with hand-hole cover plate, with ground conductor bonded to re-bar inside pole.
- .7 Acceptable manufacturer: StressCrete.

## 2.3 Concrete Foundation Design for Pole

- .1 Provide an engineered concrete foundation design, to provide a fully self-supported pre-cast concrete pole structure for the 44kV Primary Fusible Switch assembly and overhead line attachment from the Power Supply Authority. Include all necessary re-bar and concrete requirements in the design.
- .2 Coordinate and identify all conduit and grounding sleeve connections and openings, accordingly.
- .3 Prepare shop drawings for submission of the foundation design, stamped by a Professional Engineer in Ontario.

## 2.4 Pole Assembly Accessories

- .1 Cable terminations: 3M cold shrink silicone rubber termination kit, 46kV rated.
- .2 Lighting Arrestors: Hubbell/Ohio Brass Intermediate Class, 48kV rated, 39MCOV duty cycle.
- .3 Dead-end Strain Insulators: Intermediate Class, 48kV, 355kV ICF.
- .4 Cross Arm: hot-dipped galvanized steel as per CSA Standard G164, hollow construction with welded end caps and lifting eye, size as noted on drawings.
- .5 Grounding gradient control mat: 1000x2000mm hot-dipped galvanized steel mesh. Refer to Section 16450 for additional grounding requirements and specifications.
- .6 Cable "U" Guards: hot dipped galvanized, 14-gauge, bottom flared design, minimum 2.5m (8'), diameter size to suit installation.
- .7 Mounting hardware: hot-dipped galvanized steel support brackets, washers, nuts, bolts, spools and eyes.

- .8 Kirk Keys: provide two kirk keys, one for primary switch and one at HV box on transformer.
- .9 Provide #4/0AWG Cu Bare Copper conductor for connection to Fusible Switch from overhead ACSR, and from underground cable.
- .10 Ground rods: to Section 26 05 26 – Grounding.

### **PART 3 EXECUTION**

#### **3.1 General**

- .1 Supply and install the termination pole assembly as indicated on drawings. Supervise all excavation and assembly work, including grounding requirements.
- .2 Obtain final approval from local ESA inspection authorities prior to energization, and arrange the connection order.
- .3 Contractor to coordinate interconnection point with Power Supply Authority.
- .4 Obtain fuse size, speed and rating from coordination study prepared by Engineer prior to ordering. Final fuse size to be confirmed by Engineer during shop drawing review. Also, contractor to coordinate final 44kV fuse size with testing company noted in Section 26 24 01 Clause 3.1 so it is included in the overall coordination study.

#### **3.2 Inspection, Testing and Commissioning**

- .1 Perform inspection, testing, commissioning and training in accordance with Section 260100, Electrical General Requirements.
- .2 Contractor to provide pre-service testing on new high voltage switch prior to energizing including:
  - .1 Insulation resistance.
  - .2 Ductor switch contacts, all fuses, and all connection points.
  - .3 Check alignment of all 3-phase on opening and closing of switch. Ensure all 3-phases touch at the same time and clear at the same time.
- .3 Submit report to engineer for review.

#### **3.3 Warning Signs**

- .1 Provide warning signs to meet requirements of Ontario Electrical Safety Code. Include decal signs with minimum size 175x250mm.
- .3 Provide a single line diagram as a “lamacoid” label/plaque at the primary switch pole. Diagram must be weatherproof, and UV resistant.

**END OF SECTION 26 18 00**