

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            This section includes the specific technical clauses for the execution of the cathodic protection system elements.

**1.2                RELATED SECTIONS**

- .1            Section 01 11 00 – Work related general information
- .2            Section 01 61 00 – Common Product Requirements
- .3            Section 05 12 23 – Metal Fabrications

**1.3                REFERENCES**

- .1            Contractor must comply with the codes, standards and regulations, as well as with the good practice rules as recommended by the following associations, related to the Work to be executed. The federal laws and regulations prevail on the other codes and standards.

- ANSI, American National Standards Institute
- API, American Petroleum Institute
- ASME, American Society of Mechanical Engineers
- ASM, American Society for Metals
- ASTM, American Society for Testing and Materials
- AWS, American Welding Society
- AWWA, American Water Works Association
- BNQ, Bureau de Normalisation du Québec
- CEMA, Canadian Electrical Manufacturers Association
- CEQ, Quebec Electrical Code
- CGSB, Canadian Government Standard Board
- CPQ, Quebec Plumbing Code
- CSA, Canadian Standards Association
- CSST, Code de sécurité pour les travaux en construction
- MENVIQ, Ministère de l'Environnement du Québec
- NACE, National Association of Corrosion Engineers
- NBC, National Building Code
- NFPA, National Fire Protection Association
- SSPC, Steel Structures Painting Council
- ULC, Underwriters Laboratory of Canada

- .2 The edition prevailing for the above-mentioned standards, laws and regulations is the one in force at the time of the Call for Tenders. However, the Contractor must not restrict himself to the application of the above-mentioned standards only, but he must rather comply with all the standards to which his work could be related to.

#### **1.4 CONTRACTOR'S COMPETENCE**

- .1 Contractor should have personnel being qualified for the equipment's fabrication and for the Cathodic Protection system installation.

#### **1.5 WARRANTY OF THE WORK**

- .1 Regardless of general contract's clauses during warranty period, if due to a malfunction of the system there is a shutdown partly or in totality of the Cathodic Protection system, the shut off period will be added to the warranty period, so the owner get a full two years of warranty of good working of the Cathodic Protection system.
- .2 While on warranty period after informing the Contractor, the Department's Representative can make modifications to the Cathodic Protection system adjustment without changing the warranty conditions.

#### **1.6 VERIFICATION OF BASIC DATA FOR THE PROJECT REALIZATION**

- .1 Contractor must verify himself the basic data required for the project whole realization. He must ensure he has on hand all the information required for the installation and good operation of the system. The Owner will supply only him all the data available. If they are required, all additional tests, site visits or other actions necessary to the project realization will be at the Contractor's charge.
- .2 The approximate bathymetry is indicated on the plans. Before starting the installation, Contractor should verify the bathymetry to have the precise measurements of the equipment location and check if any obstacles prevent any work execution on the worksite. Afterwards, the bathymetry results will be submitted for approval to Department Representative.

#### **1.7 SHOP DRAWINGS**

- .1 Ten (10) days after award of contract, the Contractor must give to the Department Representative the list of shop works he intends to make before beginning the work *in situ*.
- .2 The Department Representative will proceed to various inspections of these shop works. The Contractor should give all the facilities to the Department's representative so they have access and can properly examine the components and assemblies at various stages upon the Department Representative's request.
- .3 The inspections do not reduce in any way the Contractor's responsibility regarding the quality of his materials and workmanship.

#### **1.8 WORKS DESCRIPTION**

- .1

No being restrictive, works to be done are:

- .1 The Cathodic Protection consist in sacrificial anodes system. The anodes will be installed in the concave part of the sheet pilings. Installation's details are shown on the drawings. The Contractor shall check himself the quantity of anodes needed as shown on the drawings.
- .2 Corrosion's coupons. The Contractor must install the corrosion's coupons on the sheet pilings as shown on the drawings. Their installation should be done only after checking the electrical continuity of the coupons with the fixing assembly, as shown on the drawings.

## **1.9 MINIMUM REQUIREMENTS**

- .1 The specifications and plans give the minimum requirements for the Work execution. The Work should be executed in accordance with the other regulations and codes in force in the province of Quebec.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 All the materials used for the installation of the wharf cathodic protection system should be designed for a marine environment.

### **2.2 SACRIFICIAL ANODES**

- .1 The anodes dimensions and fabrication details are indicated on the plans.
- .2 The anode steel core should be made so that the anode is adequately adhered to the core. Before commencing the anodes fabrication, manufacturer must submit for approval the manufacturing details of the central core. The core must be made out of carbon steel that can be welded.
- .3 Particular attention should be brought upon the anodes casting to avoid formation of internal gas pouches so that the anodes do not tend to come up to the water surface. Shrinkage filling after solidification is now allowed. A maximum tolerance of 2% in weight is acceptable. All the anodes must be inspected before delivery on the worksite. The anodes with gas pocket will be rejected.
- .4 The chemical composition of the anodes should correspond to:

Zn: 2,8% to 6,5%  
In: 0,01% to 0,02%  
Si: 0,08% to 0,2%  
Cu: 0,006% max  
Fe: 0,12% max  
Al: balance

The mercury activated anodes are not accepted. Manufacturer must provide, upon inspection, the chemical analysis and the weight certificate.

- .5 The anodes open circuit potential must be 1,08 V with respect to the silver – silver chloride electrode. Provide the laboratory certificate.
- .6 Only the surface of each anode corresponding to the sheet pile face will be covered with an epoxy paint layer. The paint should be compatible with the anode aluminum surface and resist to sea-water immersion. Before the paint application, manufacturer should submit for approval the system he intends to use. Manufacturer should prepare the surfaces according to the paint manufacturer instructions. The paint application should also be submitted for Department Representative's approval with a sample of such. The paint application will be shop made according to the moisture and temperature conditions prescribed by paint manufacturer. In all cases, the surfaces should be prepared by sandblasting in order to get a proper adherence and cleaned with a compatible solvent. The drying time will comply with the paint technical data. Upon transportation, the painted surfaces should be protected against scratches.

### **2.3 CORROSION COUPONS**

- .1 The coupons are made of 350W steel. The coupons supports must be in electrical contact with the coupons through the connections bolts. The electrical continuity must be verified.
- .2 The surfaces of the coupons must be polish and free from oxide.

### **2.4 OTHER EQUIPMENT**

- .1 All the other equipment must be made according to the standards in force.

### **2.5 MATERIALS USED**

- .1 It is not allowed to use materials other than those CSA approved. The electrical equipment must comply with the Quebec Electrical Code.
- .2 All the materials should be designed for marine environment.

## **Part 3 Execution**

### **3.1 ANODES PREPARATION**

- .1 The anodes will be shop made. Anodes should be carefully inspected by Contractor before delivery on the site.

### **3.2 ANODES INSTALLATION**

- .1 The anodes will be installed in the concave part of the sheet piles as indicated on the plans.

**3.3           INSTALLATION OF THE OTHER EQUIPMENT**

- .1       The other components and equipment will be installed according to the rules of good practice and to the standards and codes in force.

**3.4           PROTECTION OF THE PUBLIC**

- .1       During the works, the Contractor must prevent the public to have access to the hazardous sites. He must provide protected working zones.
- .2       All the electrical components must be installed so that the public cannot have access to said components.

**END OF SECTION**