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TECHNICAL PROVISIONS FOR CORROSION-SCALE INHIBITORS, MICROBIOCIDES, AND WATER ANALYSIS SERVICES FOR COOLING TOWERS

1. SCOPE

This specification covers the materials, field service, lab service, and technical assistance required for first class treatment of water used in open recirculating condenser systems.

2. MATERIAL DESCRIPTION

.1 The treatment shall be a one (1) component system for the control of scale, corrosion, and fouling caused by air borne debris. The chemical treatment level in the bleed-off shall meet the criteria established by the State of Ohio for discharge directly into streams. The supplier must supply BOD and COD information. The treatment shall be a synthetic organic containing no inorganic pollutants such as chromates, zinc, and phosphates. The treatment shall contain not only a scale inhibitor, but shall contain an antifoulant to keep suspended matter in suspension. The treatment shall have no detrimental affect on wood and shall not require the addition or use of acid to reduce the pH and total alkalinity.

.2 The treatment shall provide corrosion protection for copper, admiralty brass, steel, and galvanized steel, with corrosion rates not to exceed 1 mil per year when applied at "use" concentrations in local city water.

.3 The material shall not deteriorate, breakdown in any way, or precipitate when stored for a period of one (1) year. No deposits shall appear in the line from the drum to the pump and from the pump to where material is introduced into the water being treated.

.4 All material bid shall have the following physical characteristics:

Appearance	Color Optional
Form	Free Flowing Liquid
Freezing Point	5 degrees F.
Flash Point	None
Density	10 Pounds Per Gallon Minimum

.5 Type of Container: The material is to be furnished in 30 gallon drums of steel or suitable plastic. The drums shall have 2" and 3/4" top bung. The supplier

shall furnish product number, brand name, and weight of 30 gallon drum for all products quoted.

.6 The selection and application of chemicals for water treatment shall be based on the most efficient use of energy, water, equipment, manpower, and materials. Heat exchange surfaces will be maintained with minimum resistance to heat transfer. Solids will be maintained in suspension for maximum concentration without deposit build-up. The supplier will make specific recommendations regarding the type and quantity of his products to be used to meet the requirement of this paragraph and other applicable sections of this specification.

.7 The treatment in the cooling tower water shall inhibit the formation of deposits in the heat exchanger in which it is flowing, when the material on the other side of the exchanger is as high as 275 degrees F.

.8 The chemical treatment shall be a proven, commercially available product.

.9 The supplier shall furnish a sufficient number of corrosion test coupons to test each tower. They shall be a mild steel. They shall be inserted into the systems at points being representative of conditions within the system. The contractor is to determine these locations, which shall be approved by The Ohio State University.

The coupons shall be of standard size, have identification numbers stamped into the surface, have mounting holes, and be supplied with insulated mounting plugs. They shall be preweighed to the nearest 0.1 milligram. The corrosion rate shall not exceed 1 mil per year. Corrosion test results must contain a photograph of test strip and the formula used in the calculations for determining the mils per year corrosion rate. Corrosion strips must be supplied preweighed, with weight supplied for each fresh strip. The coupons or strips are to be checked at 60 day intervals, or more frequent if there is reason to suspect high corrosion rate. The maximum time permitted for corrosion results to be returned to the University is forty (40) days from the date of removal from system. The coupons are to be provided at no cost to the University.

.10 Two completely different non-oxidizing microbiocides shall be supplied for an alternating program of microorganism control. They shall be broad spectrum microbiocides. The microbiocides shall be non-foaming and shall not affect or reduce the operating efficiency of the system. The microbiocides shall be effective within the 30-80 p.p.m. range, with dosage not to exceed 200 p.p.m. In the event that microbiocides do not produce microorganism control, non-foaming alternates must be supplied at no cost to the University.

.11 The micro biocides can be in briquette form or liquid or a combination of briquette and liquid.

.12 Product bulletins or brochures shall be furnished for each product recommended. OSHA safety data sheets shall be submitted for each product quoted. These data sheets shall accompany the bid documents.

3. WATER ANALYSIS AND SERVICE

.1 Furnish a one year service program by a qualified service person, performing service on a full time basis. Service calls will be scheduled on a twice a month schedule coordinated with the University as to the day of the month that service will be performed. Upon arriving on campus, the service person will contact the University Representative. Upon completion of the service call, a copy of the service report will be given to that representative. Response to emergency service calls shall be less than 24 hours. The University shall make the equipment available to the service person so as not to cause delays.

Wexner Medical Center:

1. Service calls will be scheduled on a twice a month schedule coordinated with lead Med Center Facility technician as to the day of the month that service will be performed.

2. The company should come in to test and provide a report of the system monthly for the following: Hardness, p & M Alkalinity, Chloride, pH, TDS or conductivity, iron, copper, inhibitor levels being used, make up water used and at least a quarterly bacteria and legionella test, along with any issues that they observe.

.2 The chemical company shall supervise the installation wiring and operation of the chemical feed equipment.

.3 The mechanical contractor shall notify the chemical company one week prior to system start up. The system is not to be started unless chemicals are on hand.

.4 As soon as it can be coordinated with the University maintenance personnel, a minimum of four hours training session of theory and operation of the chemical treatment system will be scheduled.

.5 The electrical contractor will furnish and install all necessary wiring. Power for condenser water treatment shall be 120V single phase taken from auxiliary contacts on the condenser pump starter. Wiring and proper operation will be under the supervision of the chemical company.

.6 If condenser tubes are not free of scale at the end of the operating year, the chemical company will clean the system at no cost to the University.

.7 It will be the responsibility of the chemical company to service the tower and set all controls for a period of one year from start up. It will not be the responsibility of The Ohio State University to maintain this operation.

4. WATER ANALYSIS – Contact FOD Energy Services & Sustainability (ESS) for current water quality report.

END OF APPENDIX K