EVAPORATIVE COOLING WATER TREATMENT SYSTEM

A. GENERAL

1. DESCRIPTION

a. Work Includes:

1) Furnish all labor, materials, tools, equipment and services for condenser water treatment system as indicated, in accordance with provisions of the contract documents.

2) Completely coordinate with work of all other trades.

3) See Division 1 for General Requirements.

4) Manufacturer's representative company will provide automatically controlled water treatment program and equipment as specified herein.

5) Provide monthly service for the condenser water treatment program designed to minimize corrosion, scale formation and biological growth in the following mechanical systems:

a) Condenser Water Piping System

b. Description of System:

1) Purification Chamber with shielded cable by equipment manufacturer.

2) Skid mounted bio-control feeder(s) (by equipment manufacturer) capable of feeding granular biocide without supplemental makedown water.

3) Conductivity controller and bleed valve as specified below.

2. SUBMITTALS (See Division 1)

a. Submit per the requirements Division 1.

b. Shop drawings: Show all water treatment equipment, including the following:

1) Piping diagrams of all skid mounted components.

2) Conductivity control panel and wiring diagrams (show all field wiring required). Include bill of materials showing model number, manufacturer, physical layout drawings, panel and equipment catalog cuts.

c. Operation and maintenance manuals: Include testing procedures for each of the treated systems.

d. List of chemicals and methods to be used for each system: Use generic names. Provide Material Safety Data Sheets (MSDS) for each chemical used.

e. Laboratory analysis of project site make-up water: Submit a copy of a laboratory analysis documenting the quality of the project's make-up water. Make-up water analysis to include the following analytes as a minimum:

Calcium Hardness (as ppm CaCO3)

Total Hardness (as ppm CaCO3)

Total Alkalinity or m-Alkalinity (as ppm CaCO3)

pH

Silica (as SiO2)

Specific Conductivity (micro S/cm)

Sulfate (as SO4)

Chloride (as Cl-)

Phosphate (as PO4)

3. QUALITY ASSURANCE

a. The water treatment supplier shall:

1) Obtain water samples from the site and furnish a laboratory analysis of the water supply with submittal.

2) Review the make-up water analysis to ensure compatibility with the water treatment program.

3) Propose water treatment methods and appropriate non chemical treatment required to minimize scale, corrosion and biological growth. Submit all of the above with shop drawings and other required submittals.

b. Methods selected shall comply with all the requirements of the American Public Health Association (APHA), the Environmental Protection Agency (EPA) and local environmental agencies.

4. PERFORMANCE CRITERIA

a. Maintain the conditions listed below in the water system(s):

1) pH range of 7.0 to 8.8

2) Local environmental regulations may dictate the highest pH permitted for blowdown. The conductivity setting can be adjusted up or down to change the pH by the balancing of fresh make-up water.

3) Total bacteria count (TBC) of less than 10,000 CFU/ml.

4) Keep condenser water system scale free and corrosion to levels acceptable by AWT guidelines.

B. PRODUCTS

1. WATER TREATMENT SYSTEM

a. Acceptable Products:

1) Hybrid Water Treatment System

a) Purification chamber

b) Electrical Pulse Panel

c) Conductivity controller, motorized bleed valve and toroidal probe

d) Skid mounted biocide feeder(s)

b. Furnish a hybrid chemical water treatment system for each independent condenser water loop. System shall be rated to handle the maximum flow per condenser water loop. System shall be Pulse~Pure® PLUS by EVAPCO. System shall have a 12 month money back guarantee if the system fails to perform as outlined below.

c. Electrical Requirements:

1) The system shall have a maximum power draw of 6.3 Amps.

2) The system shall operate on a 120 VAC, single phase input as standard.

3) The system shall have a Total Harmonic Distortion (THD) of less than 15%.

4) The system shall meet UL and cUL specifications for electrical components.

5) The system shall have a 15' shielded cable to minimize susceptibility to external electro-magnetic field interference.

6) The system shall meet FCC requirements for electromagnetic emissions per Title 47 CFR part 18 for Industrial, Scientific and Medical Equipment.

7) The coil assemblies shall be enclosed in a NEMA 4x water resistant shell and be provided with indicator lights that signify the system is on and operational.

8) All water sensors for conductivity shall be toroidal type.

d. Construction Requirements:

1) The electrical Pulse Panel shall be a NEMA 4x enclosure. The use of cooling fans to remove heat from the electrical pulse panel shall not be acceptable.

2) The system shall have remote start-up and monitoring capabilities via a control relay wired from the pump or through the building management system using a MODBUS protocol.

3) The chamber shall contain two separate coil sections housing a minimum of four low frequency and two high frequency coils per chamber. Chamber shall be factory mounted by the evaporative cooling system manufacturer.

4) The conductivity controller shall have a local 60 day downloadable USB port for retrieving operational data of:

a) Bleed Valve

b) System Conductivity

c) Output contact

d) Make-up/bleed metering

This single control panel per chamber shall have the capability of receiving input from local make-up and bleed water meters and activating a 120 VAC contact.

e. Water treatment biocide: Calculate and furnish 1-year supply of the recommended product for supplemental control of microbiological growth. The one year supply of chemistry shall be calculated based on the most efficient cycles of concentration the make-up water quality will allow. Biocide product recommended shall be properly registered with the Environmental Protection Agency and EPA registration number shall be clearly shown on all product literature and package labels. To ensure operator safety, all chemical products shall be provided in solid or granular form for reduced material handling.

f. Testing equipment: Provide water test kits and equipment necessary to control the condenser water systems treatment program. Test kits to include the following as a minimum:

1) Reagents and apparatus for determination of pH, total alkalinity, conductivity, chloride, calcium hardness, and total hardness.

2) Apparatus for determination of microbiological colony population and biocide effectiveness.

C. EXECUTION

1. INSTALLATION AND SERVICES

a. Installation of water system will include:

1) For open tower systems, remote sump condensers or remote sump closed circuit coolers the components shall be mounted by the mechanical contractor.

2) Supply all components (coils, transformers, conductivity meters, blow down valves etc) necessary for a completely automated stand-alone system. Blow down valves shall be motorized ball valves power open, spring return factory mounted during unit construction.

3) Any system requiring field installation shall consult first with a factory authorized Pulse~Pure® PLUS representative.

4) Immediately after hydrostatic testing of piping is completed the mechanical contractor shall drain, flush, clean and passivate all systems. Subsequent to the cleaning process, each system shall be re-filled with clean water prior to the system being placed into operation. Once filled the condenser water pump and cooling tower fans shall be operated until conductivity set point is achieved.

b. Provide all consulting services, for a period of 1-year from start-up of the cooling system, which will include:

1) Installation and system start-up procedure recommendations.

2) Pre-operation system clean-out procedure supervision.

3) Initial water analysis and recommendations.

4) Training of operating personnel on proper feeding and control techniques.

5) Monthly field service visits during wet operation.

6) Any necessary log sheets and record forms.

c. All services will be provided by a factory authorized service provider of the evaporative condenser or closed circuit cooler manufacturer.