



## SECTION 15XXX/23 25 00 – WESTERN WATER SPEC CW1SB1LOOP1

(CSI format for traditional chemical towers w/algaecide, traditional steam boiler-loops-cleanouts)

### WATER TREATMENT

#### PART1 - GENERAL

##### 1.1 DESCRIPTION

###### 1.1.1 Work Included

1.1.1.1 Provide all equipment, apparatus, materials and supervision necessary to fit and apply chemical treatments to the water systems prior to loading of the mechanical systems involved.

1.1.1.2 Provide a water management program for a period of one year from the date of substantial completion.

1.1.1.3 Mechanical contractor to install all equipment under this section. All labor to be only by the mechanical contractor who holds the qualified insurance pertaining to this job. All labor to be by qualified pipe fitters, welders, or as the specialty work requires.

###### 1.1.2 Work Described Elsewhere

1.1.2.1 Mechanical equipment piping systems - other sections of Division 15.

1.1.2.2 Required electrical power supplies and interconnecting wiring provided under Division 16 - Electrical.

##### 1.2 QUALITY ASSURANCE

###### 1.2.1 Qualifications of Supplier

1.2.1.1 Work required under this section shall be done by a single firm (for undivided responsibility). The manufacturer of the water treatment formulations shall supply all equipment and testing apparatus as specified for these systems identified in this section.

1.2.1.2 The water treatment chemical and service provider shall be a recognized specialist, active in the field of industrial water treatment.

1.2.1.3 The water treatment provider shall have available independent laboratories for use of all wet analyses and deposit analyses required.

1.2.1.4 The indoctrination of the water management program shall be conducted by a qualified full time representative.

- 1.2.1.4 Supplier shall meet all detailed aspects of this specification. Where multiple suppliers are identified preference will be the first named.
- 1.3 **SUBMITTALS**
- 1.3.1 **Requirements**
- 1.3.1.1 Refer to Mechanical section under GENERAL.
- 1.3.2 **Alternates**
- 1.3.2.1 Any substitutions or deviations from the specified supplier must be approved in writing by the design engineer separately and by at least 30 days prior to the established bid date. The letter must have explanation in detail of all differences between the submitted item and the specified item. The Architect and Engineer will not assume any responsibility for differences concealed in features, performance, or code for substituted materials or suppliers. The Contractor will be required to correct any deficiencies or differences resulting from the substitution at a later date, and assume responsibility for any delays, damage, or expenses incurred by others due to such action.
- 1.3.3 **Shop Drawings**
- 1.3.3.1 Submit shop drawings on complete systems describing equipment, apparatus, material, and application of treatment. Include wiring diagrams for electrically operated apparatus or equipment.
- 1.3.4 **Operation and Maintenance Data**
- 1.3.4.1 Submit on system and components at time of equipment shipment.
- 1.3.5 **Chemicals**
- 1.3.5.1 Submit product data bulletins and MSDS on each chemical.
- 1.4 **GUARANTEE**
- 1.4.1 **Extent**
- 1.4.1.1 All work and materials provided there under shall be guaranteed for a period of (1) year from the date of system substantial completion. Individual component warranties are described under equipment/apparatus.
- 1.4.1.2 All specified and supplied equipment to be the property of the owner. No leased items are to be supplied and no items are to be removed at the end of the warranty period.
- 1.5 **EXTRA STOCK**
- 1.5.1 **Chemicals / Test Kits**
- 1.5.1.1 Provide a supply of treatment chemicals sufficient for startup. All formulations to be in liquid form.

- 1.5.1.2 Provide a complete supply of treatment chemicals for all systems for a period of one year. Chemicals to be shipped as needed so the facility will not need to inventory water treatment surplus.
- 1.5.1.3 Provide facility with a permanent set of all testing apparatus necessary to monitor inhibitor levels of each system. Include a pH test kit and a Myron L specific conductance meter.
- 1.5.1.4 Provide facility with a one year supply of all necessary reagents for each test kit.

**PART 2 - PRODUCTS**

2.1 **SERVICE AND PRODUCTS**

2.1.1 **Suppliers**

- 2.1.1.1 Treatment equipment, apparatus, materials, and services to be provided by:
  - 1) Western Water Associates, Inc. (westernwaterinc.com).
  - 2) Betz (betz.com)
  - 3) Nalco (nalco.com)

- 2.1.1.2 All products and services in the Water Treatment section to be provided by a single company in order to create a single responsible party for all heating and cooling related water treatment.

2.2 **CLEANOUT COMPOUNDS**

2.2.1 **Towers**

- 2.2.1.1 Provide WWA Labspec 6000 in liquid form. TSP will not be acceptable.

2.2.2 **All Closed Loops and Steam Boilers**

- 2.2.2.1 Provide WWA Labspec 6000 in liquid form. TSP will not be acceptable.

2.3 **CLOSED LOOPS**

2.3.1 **Equipment / Apparatus**

- 2.3.1.1 Provide 5 gallon bypass feeder with quarter twist top wide mouth. One filter-feeder unit for each separate closed loop system. Installer to provide permanent drain pipe from pot feeder to drain, copper with air gap at drain.

- 2.3.1.2 Provide WWATK3300-Z test kit in a portable case.

2.3.2 **Chemicals**

- 2.3.2.1 Provide WWA Labspec 3000 corrosion inhibitor.

2.4 **COOLING TOWERS**

2.4.1 **Equipment / Apparatus**

- 2.4.1.1 Automatic controller(s) are to be provided for each separate condenser water system. Provide prefabricated automatic control system to monitor and control cooling water conductivity (and pH if necessary). The control shall include both control features in a single easy to remove panel housed in a NEMA 4X enclosure that is UL approved. The system shall have the controller, chemical pumps, injectors, flow switch, check valve, and all sensor tees factory mounted, preplumbed, and electrically connected inside a prefabricated wall mountable enclosure. The enclosure material shall be painted steel and include a viewing window. Controller to have BacNet capabilities. Controller to have wireless remote monitoring capabilities where alarm conditions signals are sent to Technician through email.
- 2.4.1.2 Provide chemical metering pumps and wall bracket for each chemical. Metering pumps to have two adjustment knobs for speed and volume. Discharge valve to have three way port return to primary tank for priming and pressure relief. Where a halogen is in use provide degas head.
- 2.4.1.2 Provide automatic bleed valve Model 4160 with manual flow stem accessibility from the top. Valve shall have a removable seat and be completely serviceable from the top without removing the body from system. Piping shall be completely separate from the controller sample lines and include a bypass isolation network around the bleed valve. See drawings for correct sizing.
- 2.4.1.4 Provide Model 750 wall mountable test cabinet, enamel painted cabinet with fluorescent light and precision burette apparatus for testing hardness, alkalinity, and chloride. Unit to be fully stocked. Mount on wall near a sink or drain.
- 2.4.1.5 Provide test kits Model 5B test kit, Model WWATK1023, WWATK1058, in portable cases.
- 2.4.1.6 Provide Model 9000 corrosion coupon rack and flow regulator. Rack shall be prefabricated with its own backboard. The rack supply line and return line shall be separate from controller sample lines and bleed line.
- 2.4.1.7 Provide a water meter for the tower make up. Unit shall have electrical contacting head for two wire feed to the controller. Carlon meter or equal sized on drawings.
- 2.4.1.8 Provide double containment pallet for all chemicals in use. Secondary containment to have minimum capacity to hold 150% of the largest primary tank in use. Non-compatible chemicals to have separate pallet. Installer to provide rain shield over pallet. Secure tanks with chain and Unistrut or equal.
- 2.4.1.9 Corporation stops to be used for each separate chemical injection. Unit to provide capability for injector removal for cleaning without the need for system shutdown.

2.4.1.10

**2.5 BYPASS TOWER FILTRATION SYSTEM**

- A. Provide an integrated Bypass Tower Filtration treatment skid as shown and detailed

on the contract documents equal to the **PF Series** manufactured by Puroflux Corporation. Sweeper System using eductors to move debris in the basin to be picked up by the filtration unit shall be provided.

B. System Description:

1. System shall consist of a Centrifugal Separator, Pump and Motor, Pump Suction Strainer, Control Panel.
2. Automatic purge, electrically actuated ball valve. Adjustable timer. HOA switch on front panel for pump and purge.
3. Basin Sweeper Eductors and Sweeper system design drawings will be provided by the Cooling Tower Manufacturer.
4. Air bleed and accumulator cleanout capabilities to be provided..

C. Separator

1. A Centrifugal vortex style, solids from liquid separator shall be employed to remove particles from the cooling tower basin.
2. Separator normally will be equipped with a timer controlled motor-operated purge valve to periodically flush solids collected in the separator down the service drain.
3. Performance to be minimum 98% of particulate 74 microns and larger.

D. A basket strainer with 0.25 inch perforated 304 stainless steel screen shall protect the pump inlet.

2.6.2 Chemicals

2.6.2.1 Provide WWA Labspec 1000 liquid corrosion inhibitor for control of corrosion and scale.

2.6.2.1 Provide two separate biocides, WWA Labspec 7.1 and WWA Labspec 545 for prevention of bacteria and algae growths and related fouling. Current EPA registered products only for condenser use. Chlorine is not acceptable for alkaline programs.

2.6.2.2 Biocide dosing control shall be through the conductivity controller which shall have bleed valve lockout and biocide retention programming features.

2.6.2.3 Biocide drum shall be double contained and have a chemical metering pump sized to be able to dose the full system in under 1 hour. The injector shall be a

corporation stop to allow full removal without system shutdown. Locate drum close to conductivity controller.

**PART 2 – EXECUTION**

**2.1 EXAMINATION**

2.1.1 Verify field conditions and suitability for installation according to manufacturer's published installation data.

2.1.2 Where the design of the system is such that there is an area of relatively tranquil water where solids (both blow-in and bulk-solution precipitates) can settle, contact the Representative to determine the proper form and fit for this particular installation.

**2.2 INSTALLATION**

2.2.1. Install per Manufacturers IOM.

**2.3 CONNECTIONS**

2.3.1. Connect per manufacturers IOM.

**2.4 FIELD QUALITY CONTROL**

2.4.1 Engage a factory-authorized service representative to perform startup service.

2.4.2 Inspect field-assembled components and equipment installation, including piping and electrical connections. Report results to customer in writing.

2.4.3 Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, filled with water, and are fully operational before turning on electrical power.

2.4.4 Place Cooling Tower water-treatment system into operation and calibrate controls during primary phase of Cooling Tower water-treatment system's startup procedures.

**2.5 STEAM BOILERS**

**2.5.1 Equipment / Apparatus**

2.5.1.1 Provide Model 2EZ TDS controller for automatic surface blowdown control for each boiler. Controller shall be housed in a NEMA 12 enclosure and shall be equipped with cycle and sample time adjustment controls. The display shall be LCD with high s/c alarm feature and a manual blowdown feature shall be provided. The blowdown valve will be a motorized ball valve connected to the controller. Blowdown piping shall be prepiped at the manufacturers facility and include the electric valve and needle valve.

2.5.1.2 See drawings for chemical injection points. Sulfite and polymer to be fed to DA or feedwater tank, Phosphate to be fed to feedwater line close to boiler, and amine to be fed directly to

common area of stem header. All injection points to use 316 stainless steel injection quills with integral check valves.

- 2.5.1.3 Provide one 30 gallon double containment system for each different chemical in use. Size secondary container for 110% of primary vessel as a minimum. Only designed integral double containment allowed molded chemical drip return burn. Tank to be natural, unpigmented white to enable viewing of any leaked liquid from the primary vessel. Drum-in Drum method is not acceptable here. Use 20 gallon size for rooftop applications and for systems under 100 HP.
- 2.5.1.4 Provide chemical metering pumps with appropriate operating pressure ratings for each chemical injection point: WWA Labspec 4040B – 100 psi, WWA Labspec 4500B and WWA Labspec 4300C – 250 psi. Pulsafeeder Series A plus. Chemical pumps to be mounted on top of chemical drums for neat feed direct to application. Provide local power outlet for each pump. Outlet to be energized simultaneously with demand for boiler feedwater (coordinate with electrical installer).
- 2.5.1.5 Stainless steel manifolded sample cooler station shall be supplied for each boiler, feedwater, and steam system. Coolant to be ambient temperature soft water full flow to drain. Sample lines to be 3/8" stainless steel. Mount station near sink. Plumb sample effluent and coolant water to drain.
- 2.5.1.6 Provide Model 1000 wall mountable test cabinet, 2'x 3' enamel painted cabinet with fluorescent light and precision burette apparatus for testing pH, hardness, alkalinity, chloride, sulfite, and phosphate. Unit to be fully stocked. Mount near a sink or drain.
- 2.5.1.7 Installation shall include stainless steel tubing from the chemical to the injectors. Install in-line check valves and shut off valves as needed.
- 2.5.2 Chemicals
- 2.5.2.1 Recommended formulations are WWA Labspec 4040B, WWA Labspec 4500B, and WWA Labspec 4300C.

**PART 3 - EXECUTION**

- 3.1 PREPARATION
- 3.1.1 Coordination
- 3.1.1.1 Examine the drawings for installation of each system to be treated, note extent, materials, etc. Coordinate location and installation of chemical feed station, system connections and apparatus with the installer.
- 3.1.1.2 Prepare to supply all materials and labor requisite to timely execution of this work. All cleanouts shall be done at the time of initial water charge.
- 3.1.1.3 Insure that all piping systems affected have been flushed and cleaned as specified.

3.1.1.4 All chemical tanks to be secured with metallic hold down straps, chains, and/or Unistrut type restraints..

3.1.1.5 Provide circulation pumps to circulate entire system, with no dead legs, for entire cleanout process. If main circulation pumps cannot be used then provide looped plumbing with temporary pump which will operate at 6 ft/second flow as a minimum at all locations in the system.

3.2 **PRETREATMENT CLEANING – TOWERS & CLOSED LOOPS**

3.2.1 **Systems**

3.2.1.1 Products specified in part 2 above and execution as specified below shall be applied to each of the following (Single circuit) systems:

- a) Cooling tower systems, condenser side.
- b) Chill loops (CHW)
- b) Hot loops (HHW) (heat to 160°F)

3.2.2 **Execution**

3.2.2.1 \*Check with all regulating agencies for any discharge restrictions.

- 1) Immediately following hydro testing - Close all valves to heat exchangers. Run -Flush system with full flow circulation until effluent is clear.
- 2) Add calculated amount of WWA Labspec formula 6000 series into the system immediately after the hydro testing is completed.
- 3) Circulate for a period 72 hours (with no dead legs).
- 4) Run- flush system with make up valve fully open. Rapid flush effluent from lowest point in system necessary to remove heavy debris.
- 5) Continue to flush system until TDS of effluent is equal to TDS of influent. Effluent should be clear at end of process.
- 6) Initiate automatic conductivity and bleed control immediately following flush process (same day). Inject closed loop inhibitor via pot feeders immediately following final flush.

3.3 **CLEANOUT - STEAM BOILERS**

3.3.1 **Systems**

3.3.1.1 Products specified in part 2 above and execution as specified below shall be applied to each of the following systems:

- a) Steam boilers (Heat to 180°F min)

3.3.2 **Execution**

3.3.2.1 \*Check with all regulating agencies for any discharge restrictions.

- 1) Mechanical contractor to add calculated amount of WWA Labspec formula 6000 series into the system immediately after the hydro testing or performance testing is completed.
- 2) Heat boilers to 180°F for 8 hours.

- 3) Every hour bottom blow down boiler for 10 seconds.
- 4) Drain and flush system. Refill and drain.
- 5) Continue to flush system until TDS of effluent is equal to TDS of influent. Effluent should be clear at end of process.
- 6) Initiate automatic feeding of inhibitors immediately following flush (same day).
- 7) Run system steam with condensate going to drain for 8 hours.

3.4 **EQUIPMENT START UP**

3.4.1 **Execution**

3.4.1.1 Mechanical contractor shall read all start up and calibration sections of each separate equipment manual to successfully operate all systems to specifications. Installation shall be neat and organized. Prime all metering pumps, and place in service.

3.5 **INDOCTRINATION**

3.5.1 **Training**

3.5.1.1 Provide three (3) hours of training to the owners operating personnel, instructing them clearly and fully on equipment installation, maintenance, operation, safety, testing, and water treatment fundamentals.

3.5.2 **Other**

3.5.2.1 Provide owners personnel with:  
a) Product bulletins on each product in use  
b) 1 year supply of log sheets for operator use.

3.6 **WATER MANAGEMENT PROGRAM**

3.6.1 **Extent**

3.6.1.1 Refer to part 1 above

3.6.2 **Program**

3.6.2.1 Provide monthly in plant services for one year, including complete testing of each system, and consultation with operating personnel. Field service engineer must be available in the local vicinity for on call response in the event immediate attention is required. Provide written reports to owner on each service.

3.6.2.2 Provide all necessary laboratory and technical support relative to the above.

3.6.2.3 END