PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. System cleaner.

2. Closed system treatment (water).

3. Steam system

4. Test equipment.

B. Related Sections:

1. Section 23 05 13 - Common Motor Requirements for HVAC Equipment: Product requirements for motors for placement by this section.

2. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for electrical connections specified by this section.

1.02 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 PERFORMANCE REQUIREMENTS

A. Provide system to treat water available at project site to maintain the characteristics of water in closed and open systems required by the equipment and piping material it serves, but not less than the following:

1. Chemical Treatment for Closed Systems:

System	Treatment and Chemical Conditions	Control Level
Hot Water	Buffered sodium nitrite as sodium nitrite	1500 ppm
	pH	7.0-9.0 (2)
Chilled Water	Buffered sodium nitrite as sodium nitrite	500 ppm
	pH	7.0-9.0 (2)

Notes:
1. Apply non-oxidizing Environmental Protection Agency Registered biocides when necessary. (Two biocides must be furnished for alternate applications).
2. Apply acid or alkali, if required to be determined from an analysis of makeup water and local atmospheric conditions.
3. Actual cycles of concentration to be determined from an analysis of the makeup water.

1.04 SUBMITTALS

A. Division01 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

C. Product Data: Submit chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Submit placement of equipment in systems, piping configuration, and connection requirements.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

F. Manufacturers Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

1.05 CLOSEOUT SUBMITTALS

A. Division 01 - Execution and Closeout Requirements: Closeout products.

B. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.

C. Operation and Maintenance Data: Submit data on chemical feed pumps, agitators, and other equipment including spare parts lists, procedures, and treatment programs. Include step by step instructions on test procedures including target concentrations.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with IBC-NJ.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience and with service facilities within 100 miles of Project with water analysis laboratories and full time service personnel.

B. The Water Treatment Company shall be actively engaged in the treatment of water systems and shall employ a full time staff of laboratory personnel who regularly analyze samples in accordance with the standard methods of the American Public Health Association and to the American Society for Testing Materials. The laboratory shall be equipped with Atomic absorption and X-ray spectroscopy equipment for the complete analysis of scale and deposit samples.

C. The technical service shall include monthly service calls during which time the company's field representative will analyze all waters being treated. A service report will be written detailing the chemical levels in each system and detail any necessary chemical or equipment changes that must be made. The field service

representative shall hold a degree in chemistry or in chemical engineering from an accredited college or university, and shall be certified as a Water Technologist by the Association of Water Technologies.

D. Where new water systems are shown to be interconnected with existing systems, the Water Treatment Co. shall modify above specified treatment to match existing chemicals and control levels practiced by the Owner.

1.08 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.09 WARRANTY

A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.

1.10 MAINTENANCE SERVICE

A. Division 01 - Execution and Closeout Requirements: Maintenance service.

B. Furnish monthly technical service visits for one (1) year starting at Date of Substantial Completion, to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements and corrective actions needed. Submit two copies of field service report after each visit.

C. Furnish laboratory and technical assistance services during this maintenance period.

D. Furnish on-site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

1.11 MAINTENANCE MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish chemicals for treatment and testing during warranty period.

PART 2 - PRODUCTS

2.01 SYSTEM CLEANER

A. Product Description: Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodium tri-Poly phosphate and sodium molybdate.

B. Biocide; chlorine release agents including sodium hypochlorite or calcium hypochlorite.

C. Chemical cleaning procedure and chemical deposit shall be in accordance with local code and health regulation.

2.02 CLOSED SYSTEM TREATMENT (WATER)

A. Furnish materials in accordance with IBC-NJ.

B. Sequestering agent to reduce deposits and adjust pH [; polyphosphate].

C. Corrosion inhibitors; liquid boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulfites.

D. Conductivity enhancers; phosphates or phosphonates.

2.03 BY-PASS (POT) FEEDER

A. 6.0 gal (22.7 L) capacity up to 10,000 gallon system capacity, 10 gallon for systems over 10,000 gallon capacity quick opening cap for working pressure suitable for system pressure with a minimum rating of 175 psig.

2.04 CHEMICAL TREATMENT SYSTEM VENDOR

A. Vendor for Chemical Treatment System:

1. Chem Treat Corp., Telephone No. 201-970-6676.

PART 3 - EXECUTION

3.01 PREPARATION

A. Operate, fill, start and vent systems prior to cleaning. Use water meter to record capacity in each system. Place terminal control valves in open position during cleaning.

3.02 CLEANING

A. Concentration:

1. As recommended by manufacturer.

2. One pound per 100 gallons (1 kg per 1000 L) of water contained in the system.

3. One pound per 100 gallons (1 kg per 1000 L) of water for hot systems and one pound per 50 gallons (1 kg per 500 L) of water for cold systems.

4. Fill steam boilers only with cleaner and water.

B. Hot Water Heating Systems:

1. Apply heat while circulating, slowly raising temperature to 160 degrees F (71 degrees C) and maintain for 12 hours minimum.

2. Remove heat and circulate to 100 degrees F (37.8 degrees C) or less; drain systems as quickly as possible and refill with clean water.

3. Circulate for 6 hours at design temperatures, then drain.

4. Refill with clean water and repeat until system cleaner is removed.

C. Chilled Water Systems:

1. Circulate for 48 hours, then drain systems as quickly as possible.

2. Refill with clean water, circulate for 24 hours, then drain.

3. Refill with clean water and repeat until system cleaner is removed.

D. Steam Systems:

1. Flush and clean steam and return piping throughout.

E. Use neutralizer agents on recommendation of system cleaner supplier and acceptance of Architect/Engineer.

F. Flush open systems and glycol filled closed systems with clean water for one hour minimum. Drain completely and refill.

G. Remove, clean, and replace strainer screens.

H. Provide temporary connections, flanges, valves required for flushing, cleaning.

I. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.03 INSTALLATION

A. Install Work in accordance with IBC-NJ.

3.04 CLOSED SYSTEM TREATMENT

A. Provide one bypass feeder on each system. Install isolating and drain valves and interconnecting piping. Install around balancing valve downstream of circulating pumps.

B. Introduce closed system treatment through bypass feeder when required or indicated by test.

C. Install 3/4 inch (19 mm) water coupon rack around circulating pumps with space for 12 test specimens.

3.05 STEAM SYSTEM TREATMENT

A. Provide bypass feeder on feed water line to each boiler.

B. Provide solution pumps to feed sequestering agent and base from solution tank into boiler. Provide minimum of one pump for each boiler when mixing of treatment materials is allowed. Provide agitator in accordance with treatment suppliers recommendations.

C. Activate solution pumps when feed water pumps are running.

D. Provide conductivity controller to sample boiler water and operate solenoid blow-down valve. Provide timer activated sampling with solenoid valve, balancing valve, and conductivity probe. Pipe to blow-down tank.

E. Install 3/4 inch (19 mm) water coupon rack on each feed water pump with space for 12 test specimens.

F. Provide liquid level switch in each solution tank to de-activate solution pump and agitator, and sound local alarm bell.

3.06 OWNER/GENERAL REQUIREMENTS

A. Water treatment company, under the jurisdiction of this Contractor, shall retain title for all equipment and shall provide all apparatus and services to the Owner during the period of his Contract which shall terminate one year after acceptance of entire system. He shall relinquish ownership at the end of one year after acceptance of work and thereon they shall remain the property of the Owner.

B. Appropriate chemicals for cleaning the interior of all systems prior to initial operation, to remove and/or dissolve foreign substances, shall be supplied by the water treatment company.

C. Contractor shall place caution signs in a conspicuous location on each system, indicating that the system water is treated and giving instructions as to handling of wetted parts and possibly toxicity of the treated water.

3.07 DEMONSTRATION

A. Division 01 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Furnish eight-hour training course for operating personnel, instruction to include installation, care, maintenance, testing, and operation of water treatment systems. Arrange course at start up of systems.

END OF SECTION