PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Pinellas County School Board Bidding Requirements and Contractual Conditions and the general conditions in Section 00 00 00 Procurement and Contracting Requirements shall apply to this Section.

B. The requirements of applicable Sections 23 00 00 Heating, Ventilation & Air Conditioning (HVAC) and Section 26 00 00 - Electrical shall apply to this Section.

PART 2 - SCOPE

2.1 INTENT OF WATER TREATMENT SERVICE

A. The Intent of this water treatment service is to protect all heating, ventilating, air conditioning and related equipment (including piping, fittings, valves, gauges, connections, nipples and all accessories and boilers, air handling and unit ventilator equipment, chillers, thermal storage equipment, etc.) against damage or unduly shortened "life expectancy" or ineffectiveness due to causes of any kind attributable to water introduced into or circulated in open and closed systems.

B. Evidence of failure to comply with this Intent shall be rust, corrosion, deposits, deterioration, damage, failure, evidence of unsatisfactory water, bacteria, ammonia or other improper chemicals or ingredients, dirt, installation or construction residue, or analysis of water in or taken from the system(s), or metallurgical testing. See referenced limits established elsewhere in this Specification section.

2.2 WORK INCLUDED

A. Provide all equipment called for in the Specifications or shown on the Drawings or otherwise required, to properly and fully accommodate a proper and complete water treatment program to meet the Intent of these Specifications, as set forth in PART 4.

B. Provide all neces­sary or useful installation diagrams and instructions for equipment furnished, including wiring diagrams, motor characteristics and piping sizes and diagrams.

C. Provide knowledgeable on-site supervisory assistance to mechanical contractor (or subcontractor) installing equipment furnished under this Section, and supervisory assistance to the mechanical contractor (or subcontractor) in the cleaning and startup.

D. Provide all water treatment chemicals required for complete purging of the systems and complete cleanup of the systems, upon completion of the Heating, Ventilation and Air Conditioning Systems (HVAC), for boiler systems, for thermal storage systems, for closed systems and for open (cooling tower) systems. Provide and install the chemicals for and start-up of the systems. Provide supervisory assistance to the mechanical contractor.

E. Provide all required water treatment chemicals necessary to provide the water treatment services as identified in these specifications to the date of final Substantial Completion of this project.

F. The responsibility for water treatment is to be assumed by the PCSB annual water treatment contractor the day following final substantial completion.

2.3 WORK BY THE MECHANICAL CONTRACTOR

A. The Mechanical Contractor (sub-contractor) shall furnish all water treatment equipment via the Water Treatment Contractor (as his subcontractor) and shall install all such equipment, in accordance with the direction of the Water Treatment Company.

B. The mechanical contractor (subcontractor) shall provide all water treatment chemicals required for complete purging of the systems and complete cleanup of the systems, upon completion of the HVAC systems, for boiler systems, for thermal storage systems, for closed systems and for open (cooling tower) systems, via the Water Treatment Contractor (as his subcontractor). The mechanical contractor (subcontractor) shall install the chemicals in accordance with the direction of the Water Treatment Company.

C. The mechanical contractor (subcontractor) shall purge, flush and clean the systems in accordance with the direction of the Water Treatment Company.

2.4 COMPLIANCE WITH CODE AND REGULATIONS

A. Work under this Section shall be done in compliance with:

1) Florida Department of Environmental Regulation.

2) Pinellas County Department of Environmental Regulation.

3) Southwest Florida Water Management District.

4) Pinellas County or pertinent City Sewage or Waste Water discharge regulations, where applicable.

5) State Requirements for Educational Facilities (SREF)

B. All electrical equipment and motors shall be UL approved.

2.5 SUBMITTALS FOR EACH PROJECT

A. Submit manufacturer's data, catalog, cut-sheets, brochures, excerpts, shop-drawings, wiring diagrams, etc. to the Project Architect/Engineer (PA/E) for review, as set forth in Division One.

B. Submit all certifications, Proof of Insurance, and other documentation set forth in this Section to PA/E for review with the Facilities Design and Construction Project Coordinator.

C. At the same time of submittal of items, submit full identification of all proposed programs and chemicals for each task, for approval by the Project Architect/Engineer.

2.6 QUALIFICATIONS OF WATER TREATMENT CONTRACTORS

A. The water treatment contractor shall submit sworn written certification, witnessed by a Notary Public, establishing the firm presently has the required personnel with qualifications set forth below, and that such persons (or equal replacements) will continue throughout this Contract and will be personally involved with and responsible for this Project:

1) The persons in management and supervisory control roles shall have individual personal successful experience in treatment of water for equipment and systems such as described above. State names, residential addresses, responsibilities and period of employ in these and other pertinent roles with this firm, and with other firms.

2) One (1) or more persons in direct employ of this Contractor shall be a Chemist holding a degree of Ph.D. in chemistry from an accredited university or college (evidence of this Chemist's, or these Chemists', compliance with this requirement, his/her name, and residential address shall be submitted). This or these person(s) will hereinafter be called the "Chemist."

3) That this Chemist(s) has a full time trained staff and a full time laboratory capable of doing:

1. Routine water analysis
2. Corrosion test strip analysis
3. X-ray diffraction analysis
4. Complete microbiological examinations
5. Metallographic analysis
6. Atomic absorption analysis
7. Name and address of this laboratory and evidence of this laboratory and staff's capability shall be submitted as part of this certification.

4) That this Contractor provides twenty four (24) hour a day, 365 days a year answering service or dependable point of contact.

5) That this Contractor shall not subcontract to others for the work or services to be contracted for or performed under this Contract.

6) That this Contractor has, and shall continue to have, a minimum of two (2) qualified service representatives covering the Pinellas County area, and that each such representative shall:

a) Have a Bachelor's degree from a four (4) year accredited college or university in either engineering, or in a physical or biological science. Proof of such qualifications shall be submitted as part of this certification.

b) Have worked for this Contractor for a minimum of two (2) years or has a minimum of five (5) years experience in the water treatment field.

c) Live within seventy-five (75) miles of the school or facility to be serviced.

B. Names, titles and addresses of such representatives, as well as the extent and limitations of their authority, shall be submitted as part of this certification. (Their authority, in any event, shall not be less than the authority to commit and cause this Contractor to do all things to effectively meet the Intent of this Water Treatment Service, including the modifying or improving the Program to satisfactorily accomplish this Intent.) The service representatives named shall be the same ones who perform the on-site work for this Contractor.

C. This Contractor shall provide written references from at least five (5) locations (customers) in Florida who are currently on a similar specified program for water treatment. These references shall be on the appropriate stationary of such private or governmental entity and the name of the project, the name and title of the signing individual with mailing address and telephone number. The references shall be persons with sufficient knowledge of their facilities and the success of their programs. Unsatisfactory references or responses shall be grounds for disapproval of this Contractor.

D. The Contractor shall schedule a meeting to review this entire Water Treatment System and Service Specification with a designated representative of the Facilities Design and Construction Department. Particular emphasis shall be given to the compliance with the timelines for start-up, warranty and furnishing of chemicals and services between start-up of HVAC equipment and the date of Substantial Completion.

2.7 APPROVED WATER TREATMENT CONTRACTORS

A. The only water treatment contractor approved to execute the requirements of Section 23 25 00 HVAC Water Treatment, shall be the water treatment contractor currently under contract with the PCSB for annual water treatment service at the time of this project’s bidding. The current Water Treatment Service contractor’s name will be verified with purchasing and provided to the bidders by the Project Coordinator.

B. The water treatment contractor identified in Paragraph A above, who is approved to perform the water treatment service for this project, shall execute the requirements of this section for this project until it is substantially complete and has been turned over to the Owner as required in these specifications.

2.8 TERMINATION

A. If this Contractor fails to perform in a manner producing the results set forth in The Intent of the Water Treatment Service, the Owner shall have the authority to and may, at the Owner's option, require the termination of this Water Treatment Contractor and replacement by another water treatment contractor qualified under paragraph 8 above, at no additional expense to the Owner.

B. Whether or not the Owner exercises this agreed upon right to require termination of this Water Treatment Contractor, the Owner shall not be required to waive any other right of recovery of damages to which the Owner may be entitled.

C. The Owner may seek advice and counsel of the Project Architect and his/her mechanical engineer as to the advisability of requiring termination and replacement of this Water Treatment Contractor but shall retain the authority to make the decision whether to terminate on basis of facts, without jeopardizing the Owner's rights. It is recognized that the interests and liabilities of the Owner differ from those of the Project Architect and his mechanical engineer. The Owner has a large investment in this and other equipment, its expected efficiency, cost of maintenance and life expectancy.

D. It shall be recognized and agreed to by the firm holding a contract with the Owner in privity, by the mechanical contractor (or subcontractor) and by this Water Treatment Contractor, that the sometimes typical weeks and months of time consumed in establishing responsibility for matters is intolerable in matter of water treatment because of continuing damage to equipment and systems. Therefore it is agreed that should the contracting parties fail to seize the leadership to resolve these matters immediately, the Owner may do so without invalidating warranties or exposing the Owner to additional costs or relieving the contracting parties of any obligations or liabilities.

E. It is important that this Water Treatment Contractor does not bid or contract to provide these services without capability in all respects to meet the Intent of the Water Treatment Services as set forth in paragraph 6 above AND THE WILLINGNESS AND COMMITMENT REQUIRED. It is important that should this Contractor become unable to properly perform, that this Contractor notify all parties, in writing, including the Owner, recommending termination and replacement. Should this latter occur and should it be applied for sufficiently early, this Contractor may reasonably escape liability for additional damages.

PART 3 - EQUIPMENT AND CHEMICAL REQUIREMENTS

3.1 EQUIPMENT

A. Valves:

Install meter with by-pass assembly complete with three (3) valves, and back-flow preventer when required.

B. Electrical items:

C. Feed and Control Equipment, Open System -- Cooling Towers/Evaporate Condensers:

1) For each system, one (1) water meter complete with electric contacting register sized to meter one and one-half the maximum normal make-up rate for each system. Provide a timer with an accumulator for corrosion and scale inhibitor.

2) Timers and feed equipment shall be of size, function, quality and installation to allow two (2) liquid biocides to be fed via individual timers capable of activating pumps in multiples of fifteen (15) minute increments at any period in a twenty four (24) hour day, seven (7) days a week.

3) A conductivity monitor/controller capable of providing a linear, temperature compensated measurement over the range of 0 - 5,000 micromhos with conductivity read-out directly in micromhos shall be provided. A brass or bronze solenoid valve sized for one and one-half times the expected bleed rate shall be provided and installed. Furnish one (1) only pre-piped bleed-off assembly consisting of inlet, shut off valve, wye strainer, and balancing valve.

4) Manual-off-automatic switches shall be provided to control operation of the bleed-off valve, inhibitor feed and biocide feeds.

5) Provide three (3) each pumps sized to deliver proper amounts of scale/corrosion inhibitor and both biocides. These pumps shall be capable of feeding acid and shall be equipped with a four-function anti-siphon/pressure relief valve, dual controls for speed and stroke capability.

6) Corporation or sample stop injectors shall be provided and installed at all points where chemical is fed into a line.

7) A PVC corrosion coupon rack fitted with a minimum of one (1) test station and strainer shall be provided.

8) Three 120 volt, single phase, 60 hertz (GFI) duplex receptacles shall be provided and installed by Electrical Division 16 for connection to chemical control equipment. Equipment furnished under this Section shall match.

9) Provide electrical, flow or pressure interlock to conducting controller to guarantee flow before chemical injection.

D. Feed and Control Equipment, Closed Systems -- water loops:

1) For each closed system, provide and install one (1) each five (5) gallon one-shot pot feeder with quick opening screw cap for working pressure of 175 psi, and a bleed-off valve. Locate pot feeder where it does not deliberately or inadvertently feed inadequately diluted chemicals directly to the pumps (i.e­. -- a minimum of five (5) feet).

2) A valved sample point with tap or faucet device shall be provided and installed remote from the pot feeder, in each closed system.

3) Provide corrosion coupon rack, in each closed system, complete isolation valves.

4) Provide side stream bag or cartridge filter sized to handle two (2%) percent of system flow for each closed system.

E. Feed and Control Equipment, Steam Boilers: (Not applicable Pinellas County School Board)

F. Feed and Control Equipment, Cooling Thermal Storage Systems:

A two gallon pot feeder shall be installed on the chilled water loop. It shall have a quick-opening screw cap and be suited to a pressure of 175 PSI. It shall also be equipped with a manual drain.

G. Chemical pumps and sample stream piping:

1) Components shall be neatly mounted, pre-plumbed, and pre-wired to form an operational and ready to use system. Discharge side of sample stream shall be of Schedule 80 PVC.

2) Provide positive displacement chemical feed pumps with ball type check valves and acid resistant discharge tubing. Pumps and piping shall be capable of feeding acid and shall be sized to deliver proper amounts of chemicals and biocides for the system. Submit supporting data submittal to the Project Architect/Engineer for review.

H. Strainers:

Furnish and install strainers where indicated on the Drawings. Strainers are to be full line size with stainless steel baskets, and so designed that the basket may be removable for cleaning. In addition, the strainer design shall permit the temporary installation of fine mesh screens during the initial operation in order to thoroughly clean the circulating system.

3.2 ACIDS AND CHROMATES

A. Chemicals containing acids or chromates shall not be used under this Contract through the "Switch Over Date" as defined in paragraph 13, except as follows:

B. Acids may be used if approved by the Facilities Design and Construction department in writing.

C. Bids shall be based upon assumption of no acid being used. If acid is decided upon later, the contract sum will be modified by Change Order.

3.3 CHEMICALS – GENERAL

A. Biocide chemicals shall be properly registered with the EPA and the registration number shall be clearly shown on all containers. All chemical products shall be provided in liquid form for direct feed from the shipping container to the systems; maximum of 30 gallon container will be used.

B. CHEMICALS CONTAINING ACIDS OR CHROMATES OR INGREDIENTS THAT ARE HARMFUL TO SYSTEMS' MATERIALS SHALL NOT BE USED.

3.4 PROGRAM LIMITS AND CHEMICAL INVENTORY

A. It is imperative that recommendations not be limited to chemical treatment but shall include other factors affecting energy and equipment management.

PART 4 - SERVICES AND PROCEDURES

4.1 BASIC CLEANING PROCEDURES -- ALL SYSTEMS

A. It is the responsibility of this Contractor to supervise the thorough flushing and cleaning of the systems. Each system shall be specifically flushed and cleaned as specified in the appropriate paragraph.

B. Underground pipe flushing procedure.

1. The intent of the underground flushing process is to create a high velocity/high flow rate flush without re-circulating any water. Side stream or slip stream flushing will not be acceptable. All flushing processes shall be coordinated at preconstruction meeting with PAE; project coordinator; and piping inspector.
2. After pressure test is complete prior to any connections to pumps, AHU’s, chillers, etc., the underground piping system shall be flushed in accordance with the following:
3. Provide temporary pump connection to supply water pipe. Connect all supply and return water pipes at each penetration above grade with shutoff valve (line size).

1. Provide valve at open ended return water pipe. Provide temporary line size pipe to drain area.
2. Provisions shall be made to collect and sample water coming out of the pipe.
3. Piping system shall be fully opened while filling with fresh water.

1. Once system is full and air bled, close valve at return water discharge. Open closest supply and return bypass valve. Utilize purge to build up pressure to max acceptable amount. Open return water value to drain and flush. Continue process of close valve; building up pressure; and opening value until water is clear.

1. Close bypass and proceed to next closest bypass loop until all pipe has been flushed.

1. Once all underground piping has been flushed and witnessed by piping inspector and water treatment contract or report shall be created with a summary of the procedure and signed by the mechanical contractor; piping inspector; and water treatment contractor. Report shall be submitted with other inspection request reports as well as water treatment certification.
2. Once all the underground pipe is flushed proceed to insertion of chemical cleansing agent for re-circulation in system, 24 to 48 hours of recirculation.
3. Drain and refill system and re-test water.
4. Provide scale & corrosion inhibitor as directed by water treatment contractor.
5. Once all AHU’s and chillers and pumps have been installed proceed to basic cleaning procedures as described in next section.

C. Basic cleaning procedures for all systems shall be as follows:

1) After the Pressure Test of the completed closed loop systems, supervise the performance of the following:

a) Open all control valves within the system on heat exchangers, cooling coils, heating coils, etc.

b) Open fully all hand valves at the heat exchangers, cooling coils, heating coils, etc.

c) Install construction (fine mesh) screens in all strainers and suction diffusers.

d) Fill the system with water and circulate, drain the system. Clean tower and strainers.

e) Refill the system with water and bleed all air pockets. Circulate water for forty-eight (48) hours. Flushing of the system shall be performed with all valves open and in the by-pass position.

f) Repeat the above process until water is sufficiently clean.

g) Insert chemical cleansing agents.

h) Run the pumps for twenty four (24) to forty eight (48) hours to fully disperse the cleaning agent throughout the piping and system.

i) Drain, flush, and refill the system.

j) Visually inspect and test the water. If the water is not clean and free of chemicals, repeat the draining, flushing and refilling process until it is clean.

k) Test for system sterility. Add non-oxidating biocide chemical treatment until system is sterile.

l) Add scale corrosion inhibitor chemical.

m) Install size fifty (50) micron filter in the filter units and open the by-pass to provide the required water flow.

n) Operate all the pumps for forty eight (48) continuous hours at full flow.

o) Remove the size fifty (50) micron filters and install new size twenty five (25) micron filters.

p) Operate all pumps for forty eight (48) continuous hours.

q) Remove the size twenty five (25) micron filters and install new size five (5) micron filters.

r) Operate all the pumps for forty eight (48) continuous hours.

s) Check water samples for:

* Clarity
* pH
* Color
* Chemical level

2) If debris remains in the system, repeat the above procedure and continue repeating until clean.

3) Provide an original certification, sworn to and signed by an officer of the mechanical subcontractor's firm and by this Contractor's Service Representative with signatures witnessed by a Notary Public, that the water cleaning has been performed in accordance with the requirements of these Specifications.

4.2 CHEMICAL TREATMENT

A. Cooling Tower System:

1) Cleaning:

a) Follow the same procedures (as set forth above for all systems) for cooling towers except for side stream filters and other filters.

b) The system shall be cleaned with a liquid blend of inorganic phosphate, an organic corrosion inhibitor, a dispersant, and an oil emulsifier. The chemical must clean and passivate in one (1) step. An appropriate antifoam shall also be used.

c) Prior to cleaning, tower and lines shall be flushed thoroughly to remove all debris. Cleaning shall be done only under "no load" conditions.

d) Chemical shall be added to proper levels and circulated 24-48 hours. System shall be bled until no chemical remains and water is clean. Biocide shall be fed in a killing dose, and then recommended treatment program shall be initiated.

2) Maintenance:

Rust and Corrosion Inhibitor:

(1) The program shall be a one-drum program containing a scale inhibitor, corrosion inhibitor, and non-ionic biodispersent. It shall provide ferrous and non-ferrous metal corrosion protection. The Program be capable of operating at 500 ppm total alkalinity and 900 ppm calcium hardness. Given these constraints, the Program shall be run to minimize water usage. However, no acid or heavy metals may be used.

(2) Two (2) liquid biocides shall be fed: one oxidizing and one non-oxidizing. The oxidizing biocide shall be fed a minimum of twice weekly. It shall be chlorine based with a chlorine stabilizer capable of stabilizing in the storage drum and in the tower. The non-oxidizing biocide shall be fed a minimum of once weekly and shall contain no chlorophenate, carbamate, or cyanide compounds. All biocides shall be EPA registered. The registration number shall be displayed on the drums.

B. Closed Loop Systems:

1) Cleaning:

Systems shall be cleaned either with the same product described in paragraph A above or with another alkaline cleaner capable of removing oil, mill scale, and grease. Chemical be circulated for twenty four (24) to forty eight (48) hours and then system be flushed until no chemical remains. System shall test sterile before removing corrosion inhibitor.

2) Maintenance:

Systems shall be charged with a nitrite-based corrosion inhibitor containing silicate and borate. Treatment shall be maintained at a minimum of 250 ppm (as NO2 for chilled systems and 500 ppm (as NO2) for hot systems.

C. Thermal Storage Systems:

1) Cleaning

Clean and pretreat both closed loop and slush or ice pack portions of the system with an inorganic phosphate, organic corrosion inhibitor, dispersant, and oil emulsifier blend. Procedures for cleaning shall be the same as those described herein.

2) Maintenance

a) Closed System - This system will be treated with a nitrite-based corrosion inhibitor compatible with glycol or other coolant used in the system.

b) Ice or Slush Pack System - Treat with a liquid scale and corrosion inhibitor designed specifically for thermal storage system treatment. The treatment shall be a one-drum blend of molybdate, phosphonate, antifoam, and copper corrosion inhibitor. Feed a non-ionic biocide if bacteria levels exceed 103 org/ml.

4.3 PROGRAM MONITORING

A. Reports of all monitoring results shall be provided to each of the following within ten (10) days:

1) The Facilities Design and Construction via the Manager of the Construction Section.

2) The Director of Maintenance.

3) The Owner's school or facility based personnel via the Head Plant Operator (with one copy left immediately).

4) The Project Architect (PA/E).

5) The PA/E's Mechanical Engineer.

6) The prime Contractor holding a contract in privity with the Owner.

7) The mechanical contractor or subcontractor.

B. Reports shall be on forms provided by the Facilities Design and Construction or suitable forms furnished by this Contractor but approved by the Facilities Design and Construction department.

C. Corrosion coupons:

1) A mild steel and a copper corrosion coupon study shall be done by this Contractor a minimum of twice a year each in the tower systems. Corrosion rates as determined by an accredited lab, shall be < 2 mpy on mild steel and < 0.2 mpy on copper. Corrosion studies shall be done on the closed loops at the same frequency. Metal loss in closed systems shall be < 0.5 mpy on mild steel and < 0.2 mpy on copper.

2) Microbiological counts shall be taken by this Contractor a minimum of twice annually in the tower and chilled loops. Tower counts shall be < 104/ml; chilled loops shall be sterile.

3) This Contractor shall run a minimum of one energy analysis every six (6) months with the aid of a micro or mainframe computer on the chiller to ensure optimum efficiency.

4.4 TECHNICAL CORRESPONDENCE

A. This Contractor shall issue complete written directions for the application of all materials and specify the amount of bleed.

B. A service report be prepared by this Contractor on site at the time of each service visit and include test results, recommendations for corrective action.

C. This Contractor shall provide copies of findings of inspections and testing immediately following each such inspection and test. Copies of such findings shall be sent to the following: Manager of the Construction Section, Facilities Design and Construction Department, c/o Walter Pownall Service Center, 1111 Belcher Road, Largo, Florida, 33773; and to others shown in paragraph 17 above.

1) Findings of inspections and tests shall be upon forms approved by (or provided by) the Facilities Design and Construction, as follow:

a) Personal Service Report:

(1) On-site water analysis, of all parameters necessary to properly maintain program with samples taken from cooling tower, from closed circuits, from steam boilers (boiler, condensate and feed water), and from thermal storage system.

(2) Water analysis shall indicate the findings PPM for hardness (total acid, total Sol, calcium Sol, calcium hardness); total alkalinity, TDS (umho), pH, chemical, concentration ratio and dissolved solids -- as may be applicable to determine if the Intent of these Water Treatment Specifications is met.

(3) Recommended readings for each of above shall be also set forth.

(4) Present Dosages: Where applied specific chemicals.

b) Present Program and Feed Rates:

(1) Indicate where treatment was applied (cooling tower, etc.)

(2) Indicate corrosion scale, inhibitor and fouling control treatment.

(3) Indicate changes in the Program for each of the above.

(4) Provide a listing of the full on-site inventory of chemicals.

c) Performance parameters:

(1) Makeup-water (GALS)

(2) Water temperature

(a) Condenser

(b) Chiller water

(3) Condenser Pressure

2) Distribution:

a) Indication with whom a copy of the Report was left.

b) Signature of the on-site recipient of the Report.

3) Summary and Recommendation.

4) Immediate Action Report:

(Urgent report when a situation exists when immediate action is essential or safety is involved.)

PART 5 – RESPONSIBILITIES

5.1 OWNER'S RIGHTS AND RESPONSIBILITIES

A. The Owner shall designate representatives to participate in this Contractor's on-site training program. Such Owner's representatives shall include:

1) On-site Plant Operators and the Head Plant Operators of the school or facility.

2) A representative of the Pinellas County School Board (PCSB's) Maintenance Department, and of the Facilities Design & Construction Department.

B. The Owner shall be responsible to require the on-site representatives perform the duties required of the Owner by the Program --- (subject to this Contractor's monitoring of the Owner's on-site representatives as set forth in paragraph 20 and notification to the Owner of any deficiencies in the Owner's performance).

C. The Owner's other responsibilities as to this water treatment Section shall be:

1) To pay for properly due and properly certified pay requests in a timely fashion to the firm contracting in privity to the Owner.

2) To make decisions upon questions of the Contractor via the "chain of command" through the Project Architect, in a timely fashion.

3) To review and respond to the program for the water treatment services, in a timely fashion.

4) To alert and inform this Contractor directly (and via the "chain of command") of any concerns which the Owner's representatives may have.

D. In the event of dispute between the Water Treatment Contractor and the Mechanical Contractor (subcontractor) or for other reasons, the Owner shall be entitled to pay the Water Treatment Contractor directly and to deduct such costs from the prime contract.

5.2 THIS CONTRACTOR'S RESPONSIBILITIES

A. This Contractor shall be responsible that the Intent of this Water Treatment Service as set forth herein.

B. This Contractor shall be responsible for sufficiently frequent monitoring of the water treatment system. As a minimum such on-site monitoring and service shall include:

1) Once a month, for facilities with open systems or steam boiler systems, or thermal storage systems.

2) Once every two (2) months for closed systems.

3) If excessive water loss occurs in a closed system and Owner's staff notifies this Contractor, additional inspections shall be provided by this Contractor.

5.3 TRAINING PROGRAM

A. This Contractor's Service Representative shall schedule and provide an on-site training program for the Owner's on-site personnel. This training shall orient the school personnel with the operation of the system.

B. The Owner's on-site operating personnel shall also be trained in the methods of predicting potential problem areas, and methods of avoiding problems.

C. The training shall also include hazards and safe handling of all chemicals.

D. Material safety data sheets for all chemicals and reagents shall be provided and be posted by this Contractor.

5.4 TIMELINE LIMITS OF RESPONSIBILITIES

A. Upon completion and starting up of all heating, ventilating and air conditioning (HVAC) equipment (including the water treatment equipment), this Contractor shall fully participate in and shall direct the cleaning and flushing of the systems. This Contractor shall direct the initial charging of the system with appropriate water treatment chemicals.

B. This Contractor shall anticipate in his lump bid price the providing of chemicals and services, and the extension of the warranty, for a period of three (3) months from the start-up time until Substantial Completion. Any longer time shall also be covered but shall entitle the Water Treatment Contractor to additional compensation from the Mechanical Contractor (subcontractor) and, if applicable from the prime or general contractor. Such additional costs shall not be borne by the Owner.

C. This Contractor shall remain fully responsible from the time of starting up the HVAC equipment, through the date of (final) Substantial Completion of the Project (the total construction of work under the Contract with the Owner), on to and including the date of switching over the water treatment responsibilities to the water treatment company employed by the Pinellas County School Board's (PCSB) Maintenance Department, which date shall herein­after be referred to as the "Switch Over Date", which shall be set forth in writing.

D. At Substantial Completion an on-site inspection of condition of piping and equipment shall be scheduled. Such inspection shall be witnessed by representatives of: the Facilities Design and Construction Department, the PCSB Maintenance Department, this Contractor, the Mechanical subcontractor, the Contractor holding the contract in privity with the Owner and (at the Owner's option) representatives of an independent testing laboratory. If test results indicate failure of the water treatment program to meet the Intent of these Specifications, the Project Architect/Engineer (PA/E) shall be empowered, at his option, to require that selected valves, fittings, piping and equipment shall be disassembled by the mechanical subcontractor for examination. Such work shall be reassembled and retested for pressure. If, and as may be necessary, the system(s) shall be drained, refilled, re-clean­ed and recharged with chemicals. This process shall be repeated until the Intent of these Specifications is met. The costs of these procedures shall be considered as included in the original bid.

E. The intended Switch Over Date shall be scheduled to occur on the day after the Date of (final) Substantial Completion.

F. The Switch Over Date shall be established depending upon written declaration by the Project Architect/Engineer (PA/E) that the systems piping and equipment appear clean, free of rust, corrosion, or other signs of deterioration, and examination and testing of the water in the systems is found to be in proper condition, as set forth in other requirements of this specification.

**END OF SECTION**