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CSOB COOLING TOWER & BOILER REPLACEMENT  
OMB/DFM CONTRACT # MJ1002000041R  
ADDENDUM #3

SUBSTITUTION REQUESTS

1. The Radius Systems substitution request approval has been revised to the following:
  - a. The components installed must be compatible with the Tridium Niagara system that resides on the AX server. This system must integrate with the existing building automation system in a manner that allow the complete controls system to be viewed and adjustable points to be modified through one building automation system interface.

It is the contractor’s responsibility for any costs associated with deviating from the basis of design that subsequently become apparent or that are apparent now. Costs associated could include but are not limited to additional structure, space constraints for equipment service, electrical power requirements (breaker/fuse sizing and wire sizing changes), and piping connection location modifications. The contractor shall ensure approved as equal equipment meets or exceeds all requirements found both on the drawings and in the specifications provided for this project. Any approved as equal equipment submitted may be rejected that does not satisfy the specifications. The engineer has not redesigned the project around this substitution.

SPECIFICATION REVISIONS:

- 00 43 13: Replace section in its entirety.
- 00 61 13.13: Replace section in its entirety.
- 00 43 13: Replace section in its entirety.
- 23 65 33: Replace section in its entirety.

Addendum #3

1. Addendum #3 Summary (this document) (1 page)
2. Specification (12 pages)
  - a. 00 43 13
  - b. 00 61 13.13
  - c. 00 61 13.16
  - d. 23 65 33

Summarized By: DEDC, LLC  
Matt Lano  
Date: October 19, 2020

**SECTION 00 43 13  
BID BOND**

TO ACCOMPANY PROPOSAL  
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: \_\_\_\_\_  
\_\_\_\_\_ of \_\_\_\_\_ in the County of \_\_\_\_\_  
\_\_\_\_\_ and State of \_\_\_\_\_ as **Principal**, and \_\_\_\_\_  
\_\_\_\_\_ of \_\_\_\_\_ in the County of \_\_\_\_\_  
and State of \_\_\_\_\_ as **Surety**, legally authorized to do business in the State of Delaware  
("State"), are held and firmly unto the **State** in the sum of \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_), or \_\_\_\_\_ percent not to exceed \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_)  
of amount of bid on Contract No. MJ1002000041R, to be paid to the **State** for the use and benefit of the  
Office of Management and Budget for which payment well and truly to be made, we do bind ourselves, our  
and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole  
firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bonded **Principal**  
who has submitted to the Office of Management and Budget a certain proposal to enter into this contract for  
the furnishing of certain material and/or services within the **State**, shall be awarded this Contract, and if said  
**Principal** shall well and truly enter into and execute this Contract as may be required by the terms of this  
Contract and approved by the Office of Management and Budget this Contract to be entered into within  
twenty days after the date of official notice of the award thereof in accordance with the terms of said  
proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with \_\_\_\_\_ seal and dated this \_\_\_\_\_ day of \_\_\_\_\_ in the year of our Lord two  
thousand and \_\_\_\_\_ (20\_\_\_\_).

SEALED, AND DELIVERED IN THE  
Presence of

\_\_\_\_\_  
Name of Bidder (Organization)

Corporate  
Seal

By:

\_\_\_\_\_  
Authorized Signature

Attest \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Surety

Witness: \_\_\_\_\_

By:

\_\_\_\_\_

\_\_\_\_\_  
Title

**END OF SECTION**

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**SECTION 00 61 13.13  
PERFORMANCE BOND**

Bond Number: \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS, that we, \_\_\_\_\_, as principal (“**Principal**”), and \_\_\_\_\_, a \_\_\_\_\_ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the Office of Management and Budget (“**Owner**”), in the amount of \_\_\_\_\_ (\$\_\_\_\_\_), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. MJ1002000041R dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ (the “Contract”), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse **Owner** sufficient funds to pay the costs of completing the Contract that **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

**Surety**, for value received, hereby stipulates and agrees, if requested to do so by **Owner**, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause **Principal** fails or neglects to so fully perform and complete such work.

**Surety**, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

**Surety** hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: \_\_\_\_\_

Witness or Attest: Address: \_\_\_\_\_

\_\_\_\_\_  
Name:

(Corporate Seal)

By: \_\_\_\_\_(SEAL)

Name:  
Title:

SURETY

Name: \_\_\_\_\_

Witness or Attest: Address: \_\_\_\_\_

\_\_\_\_\_  
Name:

(Corporate Seal)

By: \_\_\_\_\_(SEAL)

Name:  
Title:

END OF SECTION

**SECTION 00 61 13.16  
PAYMENT BOND**

Bond Number: \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS, that we, \_\_\_\_\_, as principal (“**Principal**”), and \_\_\_\_\_, a \_\_\_\_\_ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the Office of Management and Budget (“**Owner**”), in the amount of \_\_\_\_\_ (\$\_\_\_\_\_), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. MJ1002000041R dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ (the “Contract”), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him, her, them or any of them, for all such materials, labor and service for which **Principal** is liable, shall make good and reimburse **Owner** sufficient funds to pay such costs in the completion of the Contract as **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

**Surety**, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

**Surety** hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

**PRINCIPAL**

Name: \_\_\_\_\_

Witness or Attest: Address: \_\_\_\_\_

\_\_\_\_\_  
Name:  
  
(Corporate Seal)

By: \_\_\_\_\_ (SEAL)  
Name:  
Title:

**SURETY**

Name: \_\_\_\_\_

Witness or Attest: Address: \_\_\_\_\_

\_\_\_\_\_  
Name:  
  
(Corporate Seal)

By: \_\_\_\_\_ (SEAL)  
Name:  
Title:

**END OF SECTION**

**SECTION 23 65 33**  
**LIQUID COOLERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Liquid cooler.
- B. Controls.
- C. Ladder and Handrails.
- D. Inside Sump.
- E. Discharge hood.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 10 05 - Plumbing Piping.
- B. Section 23 05 13 - Common Motor Requirements for HVAC Equipment.
- C. Section 23 21 13 - Hydronic Piping.
- D. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- E. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. ASME PTC 23 - Atmospheric Water-Cooling Equipment; The American Society of Mechanical Engineers; 2003.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, dimensions, weights and point loadings, accessories, required clearances, electrical requirements and wiring diagrams, and location and size of field connections. Submit schematic indicating capacity controls.
- C. Shop Drawings: Indicate suggested structural steel supports including dimensions, sizes, and locations for mounting bolt holes.
- D. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201.
- E. Certificates: Certify that liquid cooler performance, based on ASME PTC 23 meet or exceed specified requirements and submit performance curve plotting leaving water temperature against wet bulb temperature.
- F. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.
- G. Operation and Maintenance Data: Include start-up instructions, maintenance data, parts lists, controls, and accessories. Include cleaning methods and cleaning materials recommended.
- H. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in State of Delaware OMB - Division of Facilities Management's name and registered with manufacturer.
- I. Maintenance Materials: Furnish the following for State of Delaware OMB - Division of Facilities Management's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Fan Belts: Two sets, matched, of each type and size.
  - 3. Extra Spray Nozzles: Two.
  - 4. Extra Float Valves: One.



### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Factory assemble entire unit. For shipping, disassemble into as large as practical sub-assemblies so that minimum amount of field work is required for re-assembly.
- B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

### 1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for liquid cooler package, labor.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Baltimore Aircoil Company: [www.baltimoreaircoil.com](http://www.baltimoreaircoil.com). Model (PT2)
- B. EVAPCO, Inc: [www.evapco.com](http://www.evapco.com). Basis of design (Model AT)
- C. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 MANUFACTURED UNITS

- A. Description: Factory assembled and tested, induced draft counter flow cooling tower complete with fan, fill, louvers, accessories and rigging supports
- B. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) Regulations for seismic loads up to 1.0 g or wind loads up to 119 psf.

### 2.03 COMPONENTS

- A. Pan and Casing:
  - 1. All cold water basin components including vertical supports, air inlet louver frames and panels up to rigging seam shall be constructed of 316 stainless steel.
  - 2. Upper Casing, channels and angle supports shall be constructed of heavy gauge mill hot-dip galvanized steel. Fan cowl and guard shall be constructed of galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.
- B. Fill Media: Fill media shall be constructed of Polyvinyl Chloride (PVC) of cross-fluted design and suitable for inlet water temperatures up to 130 F. The bonded block fill shall be bottom supported and suitable as an internal working platform. Fill shall be self-extinguishing, have a flame spread of 5 under A.S.T.M. designation E-84-81a, and shall be resistant to rot, decay and biological attack.
- C. Distribution Section: Spray nozzles shall be precision molded ABS, large orifice spray nozzles utilizing fluidic technology for superior water distribution over the fill media and to minimize water distribution system maintenance. Spray header, branches, and riser shall be Schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance. Branches shall have threaded end caps to facilitate debris removal.
- D. Drift Eliminators: The eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate.
- E. Bleed-off Valve: Unit shall have a waste water bleed line with adjustable valve provided.

- F. Air Inlet Louvers: The air inlet louvers shall be constructed from UV inhibited polyvinyl chloride (PVC) and incorporate a framed interlocking design that allows for easy removal of louvers for access to the entire basin area for maintenance. The louvers shall have a minimum of two changes in air direction and shall be of a non-planar design to prevent splash-out, block direct sunlight and debris from entering the basin.
- G. Electronic water level control package shall have five (5) stainless steel water level sensors (one (1) high level, one (1) high level alarm, one (1) low level, one (1) low level alarm and one (1) ground) with a NEMA 4X enclosure mounted in a cleanable Schedule 40 PVC external standpipe with slow closing solenoid valve(s) and "y" strainer(s). Components must be field mounted. Valves shall be sized for 25 psig (172 kPa) minimum to 125 psig (862 kPa) maximum pressure. Standpipe requires heat tracing in cold weather applications.
- H. Pan strainer: Pan Strainer shall be all type 304 stainless steel construction with large area removable perforated screens.
- I. Discharge Damper w/ Insulation (If applicable): Coolers shall utilize integral water re-distribution basin as heat loss protection. All coolers that utilize a discharge hood with dampers shall be provided with factory supplied insulation the discharge hood. These dampers shall be coordinated with the building automation systems (BAS) contractor for actuator compatibility. Actuators are to be supplied by the BAS contractor.

#### **2.04 MOTORS AND DRIVES**

- A. Fans: Shall be high efficiency axial propeller type with aluminum wide chord blade construction. Each fan shall be statically balanced and installed in a closely fitted cowl with venturi air inlet for maximum fan efficiency.
- B. Fan Motors: Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.
- C. Fan Drive: The fan drive shall be multigroove, solid back V-belt type with taper lock bushings designed for 150% of the motor nameplate horsepower. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Fan and motor sheave shall be aluminum alloy construction. Belt adjustment shall be accomplished from the exterior of the unit.
- D. Fan Shaft: Shaft shall be Solid, ground and polished steel. Exposed surface coated with rust preventative.
- E. Shaft Bearings: Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on access door frame. Bearings shall be designed for a minimum L-10 life of 100,000 hours.

#### **2.05 COOLING TOWER CONTROL PANEL**

- A. The cooling tower control panel shall include complete Variable Frequency Drive (VFD) fan control and incorporate control of spray pumps and basin heaters when applicable. The NEMA-3R cooling tower Starter/VFD panel shall be provided by unit manufacturer to include complete Variable Frequency Drive (VFD) for fan and incorporate spray pump motor starter and basin heater contactors. The Variable Frequency Drive shall be provided by ATC Contractor and in conformance to section 23 09 69. ATC vendor shall provide VFD to Unit Manufacturer for Mounting & Wiring into Single Point Power Panel Supplied by Vendor. The Variable Frequency Drive shall be in conformance to section 23 09 69.
- B. A single point power connection for all controlled motors will be included. UL 489 breaker shall include thermal and magnetic trip mechanisms.
- C. The control panel shall include manual bypass functionality which isolates the VFD.
- D. VFD operator controls shall include a VFD/Off/Bypass switch and HOA switch mounted on the enclosure door.'

- E. The control panel shall include all necessary terminal inputs to control the sequence of operations from a Building Management System including at a minimum: VFD start command, VFD reference speed, spray pump operation, basin heater operation.
- F. If Basin Heater is Present, the control panel shall also include a basin heater contactor with Off/Auto switch installed and mounted on the enclosure door.
- G. Terminal inputs shall be provided for Vibration Cut Out Switch.
- H. All internal power and control wiring to be installed and tested in the factory.
- I. A Five Year Warranty shall be provided as standard by panel manufacturer.

## **2.06 MAINTENANCE ACCESS**

- A. Fan Section: Access door shall be hinged and located in the upper casing for fan drive and water distribution system access.
- B. Basin Section: Framed removable louver panels shall be on all four sides of the unit for pan and sump access.
- C. Internal Working Platform: Internal working platform shall provide for easy access to the fans, belts, motor, sheaves, bearings, all mechanical equipment and complete water distribution system. The fill shall be an acceptable means of accessing these components.
- D. An OSHA approved external service platform shall be provided at the motor access door of the tower extending the full length of the of the access door. Each platform shall have at least a 36" walking surface. The platforms shall be galvanized steel grating, supported by galvanized steel framework attached to the tower and surrounded by a sturdy handrail, knee rail and kick plate system. Mounting channels shall be the same material as the casing section (galvanized or stainless steel). A vertical ladder shall be provided to the platform. This ladder shall extend down to the roof.
- E. This tower will be mounted on steel, ladder extension to be coordinated with final installation height.
- F. The unit shall be equipped with a mechanical equipment removal davit. The motor shall be lowered from the mechanical equipment supports down to grade.

## **2.07 ACCESSORIES**

- A. Electric Immersion Heaters: Cold water basin shall be fitted with copper-element, electric immersion heater(s) with a separate thermostat and low water protection device. Heaters selected to maintain +40 F pan water at 0 F ambient temperature.
- B. Time Delay Relay: Limits fan motor starts to not more than six per hour.
- C. Control Box Enclosure: The cooling tower shall be provided with a NEMA 3R weatherproof and ventilated control box enclosure that will house all of the electronics for the cooling tower.
  - 1. NEMA 1 extended enclosure, to house additional equipment within the VFD enclosure.
  - 2. NEMA 12 FVFF (Forced Ventilation inlet Filter and outlet Filter) enclosures with filters and blower.
  - 3. NEMA 3R enclosures for outdoor installations. For installation in ambient temperature environment above 104°F, de-rate VFD 20% to increase ambient temperature rating to 122°F. For installation in sustained ambient temperature environment below 14°F, include panel space heater.
- D. Sump Sweeper Piping
  - 1. Cold water basin shall be fitted with schedule 80 PVC sump sweeper piping complete with high-flow eductor nozzles to facilitate basin cleaning. The system shall contain one inlet connection and one outlet connecting per basin.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that openings are ready to receive work.
- B. Verify that required utilities are available, in proper location, and ready to use.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install cooler on structural steel beams as instructed by manufacturer.
- C. Connect cooler water piping with flanged connections to cooler.
- D. Connect make-up water piping with flanged or union connections to cooler. Pitch to cooler. Pipe drain, overflow drain, and bleed lint to nearest grade.

**3.03 FIELD QUALITY CONTROL**

- A. Provide the services of the manufacturer's field representative to inspect each tower after installation and submit report prior to start-up, verifying installation is in accordance with specifications and manufacturer's recommendations.

**3.04 SYSTEM STARTUP**

- A. Prepare and start systems.
- B. Allow one eight hour day per cooler for start-up and instructions of State of Delaware OMB - Division of Facilities Management's operating personnel.

**3.05 ADJUSTING**

- A. Adjust temperature controls and verify operation.

**END OF SECTION**

