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September 4, 2020

**ADDENDUM #3
TO THE CONTRACT DOCUMENTS FOR THE CITY OF PALM BAY**

Project Name & Number:

IFB #73-0-2020/SB SRWTP Expansion 4 MGD to 6 MGD

FROM: City of Palm Bay
120 Malabar Road SE
Palm Bay, FL 32907
TO: All Parties Holding Specifications

The purpose of this addendum is to provide the following changes, modifications and/or additions to the contract documents and technical specifications.

Q1. They want 18-pulse on this, and the drawings show two different HP's for these four VFD's. On E-116 it shows them as 300 HP and 60 HP, but on E-123 if you look at the motor, it shows them as 300 HP and 125 HP.

Can you provide confirmation as to what size of VFD's are required?

A1. The VFDs shall be 300 hp and 125 hp as shown on Drawing E-123. The 60 hp callout for the high service pumps on Drawing E-116 shall be removed and replaced with a 125 hp callout.

REFERENCE SECTION 11250 Reverse Osmosis Treatment System for Questions 2-7

Q2. In 1.01, C.1.I; The Avg system flux is required to be 15 GFD max. This is not possible with the array and membranes specified. We assume the membranes are to be 440 ft² and not the 400 ft² as specified. Please confirm or clarify.

A2. Confirmed. The RO membranes shall be 440 square feet. Section 11250, 1.01, C, 3, d, shall be revised as follows:

d. Membrane Element Area ~~400 sf~~ **440 sf**

- Q3. In 1.01, C.1.j; Permeate back pressure is required to be no more than 25 PSIG. Is this the design permeate back pressure anticipated for the common trains permeate header? Or is it the max for any stage allowed? If it's the max permeate pressure allowed for any stage, please remove this constraint to the design as it restricts the stage flux control capability and limits the operational range of the system. If it is the system common permeate header back pressure we are to include in our membrane projections, please clarify.**
- A3. Under Section 11250, 1.01, C, 1.j is referring to the maximum design system permeate backpressure (total permeate or combined permeate leaving the skid) that is to be used for membrane projections. The existing system uses permeate throttling in the first stage, which shall be allowable for the expanded skids as well. A first stage throttling pressure of 25 psi shall not be exceeded in the membrane projections.
- Q4. In 1.01, C.1.m; Minimum second stage flux is specified as 10 GFD. Is the 2nd stage minimum average flux specification or element min flux? In either case we suggest it's a bit restricting for optimizing the membrane system performance under varying conditions and all allowed membrane manufacturers and therefore request it be removed or lowered.**
- A4. Under Section 11250, 1.01, C, 1, m is referring to the minimum average second stage permeate flux rate. This is the same design criteria that has been in operation for the existing SRWTP system.
- Q5. 2.01, A.1.d; Specifies 20 GFD as the max element flux rate in the system. This is also restrictive for optimizing design for some membrane manufacturers and hence ask that it be removed as well or left as "per the membrane manufacturers design limits".**
- A5. Section 11250, 2.01, A, 1, d, shall be revised as follows:
- d. No single membrane element within the RO membrane system shall exceed a flux of ~~20 gfd or the manufacturer's maximum flux rate~~, **22.5 gfd or 90-percent of the manufacturer's published maximum recommended flux rate for brackish groundwater**, whichever is lower.
- Q6. The permeate quality specifications are constraining, in particular the constituents with range targets as in Alkalinity (20-40 mg/L as CaCo3) and Total Hardness (40-100 mg/L as CaCo3). Most membrane suppliers find it challenging to stay in the range and would normally produce better quality than the low level target given. They won't be responsible for a warranty claim for producing better permeate quality than specified. In this case, is a higher feed blend percentage not possible? In any case, please clarify the specific performance warranty obligations around these parameters with a minimum target levels.**

Response on following page:

A6. Design permeate water quality for total alkalinity and total hardness can be removed. Section 11250, 1.01, C, 1, a, shall be revised as follows:

a. Design Water Quality:

Constituent	Design Raw Water Quality (mg/L)	Design Permeate Water Quality (mg/L) ¹
pH (before acid addition)	7.8	-
pH (acid addition) ²	6.8	-
Total Alkalinity (as CaCO ₃)	167	20-40
Total Dissolved Solids	1,803	<400
Total Hardness (as CaCO ₃)	614	40-100
Total Iron (Fe)	0.03	<0.1
Barium (Ba)	0.11	≤1.6
Strontium (Sr)	17	<4
Calcium (Ca)	124	<24
Magnesium (Mg)	74	≤15
Sodium (Na)	389	<130
Potassium (K)	9	2.3
Chloride (Cl)	790	<170
Sulfate (SO ₄)	198	<50
Fluoride (F)	0.47	≤0.8
Nitrate (as N)	BDL	<1
Silica (as SiO ₂)	20	<6
Sulfide	2.6	

Notes:

(1) Permeate Design Water Quality based on 5-year warranty period, with maximum salt passage allowance of 15% per year.

(2) OEM to design for a feed pH of 7.8 (no acid addition) and 6.8 (acid pretreatment).

Q7. In 1.01, A.9; It states:

“RO Equipment must be fully assembled at the factory and fully tested. The RO equipment shall be completely pre-assembled (except for below grating piping) including the frames, piping, valves, instruments, sample lines with carrier pipes, and sample panels, at the OEM’s fabrication facility and tested prior to shipment to the project site. Each RO system treatment unit shall include the skid, pressure vessels, support structures, membrane elements, valves, interconnecting piping and wiring, instrument and sample panels, conduit, tubing, fasteners, and instrumentation. The system shall be sized for orientation and function as indicated in the mechanical process construction drawings.”

However, Section 2.01, A.2 suggests the system is to be a tree frame design (as do the drawing depictions) which are not normally fully assembled at factory first as it’s just not necessary. As tree frame systems are not designed for transport forces, as there are no ring frame member supports for structural integrity during transport, they must ship disassembled. To completely assemble and disassemble a tree frame system design for shipping would be

just a complete waste of time and materials. Fit up or tolerance control is inherent in the design and engineering practice in concert with proper QC measurement and inspections for tree frame systems.

Section 1.01, A.9 seems to describe a box frame system fully capable of shipping assembled. Box frame systems are meant to eliminate or significantly reduce any field assembly and therefore needs factory assembly. Tree frames systems cannot transport assembled, and therefore are not meant for factory assembly.

Please remove this requirement for factory assembly and testing. There aren't any test requirements as there are no controls for these skids (only a terminal or marshalling panel for instruments and control signals). Component testing will be as specified and as customarily performed before shipping. Header pressure testing is done independently as spools and then again as an assembly at site.

For an example, Biwater supplied the San Antonio 12 MGD BWRO system trains in the same manner as described herein under Tetra Tech's specifications and approvals.

A7. Section 11250, 1.01, A, 9, shall be revised as follows:

9. ~~The RO equipment shall be completely pre-assembled (except for below grating piping) including the frames, piping, valves, instruments, sample lines with carrier pipes, and sample panels, at the OEM's fabrication facility and tested prior to shipment to the project site.~~ **The RO equipment shall be assembled on-site with the appropriate structural supports. The membrane OEM shall install piping, wiring, and appurtenances for final connection to the contractor-installed piping and electrical wiring.** Each RO system treatment unit shall include the skid, pressure vessels, support structures, membrane elements, valves, interconnecting piping and wiring, instrument and sample panels, conduit, tubing, fasteners, and instrumentation. The system shall be sized for orientation and function as indicated in the mechanical process construction drawings. **Contractor and OEM shall coordinate all piping connections.**

Q8. **Pumps specification 11215 – Vertical Turbine RO Feed Pumps specifies a WP-1 motor enclosure design in paragraph 2.02.D.5 and a TEFC motor design in Table 11215-B. Can you please clarify that the intent is to specify and purchase TEFC motors for the RO Feed Pumps?**

Response on following page:

A8. Provide TEFC motors in accordance with Table 11215-B. Section 11215, 2.02.D.5 shall be revised as follows:

5. Enclosure:

a. Use enclosure type as follows:

- i. ~~WP-I design.~~ **Totally Enclosed Fan Cooled (TEFC).**
- ii. Motor frames and end shields shall be heavy fabricated steel on such design and proportions as to hold all motor components rigidly in proper position and provide adequate protection for the type of enclosure employed. Openings for ventilation shall be uniformly spaced around the motor frame.
- iii. ~~Motors shall have drain openings and plugs suitably located for the type assembly being provided.~~

End of Addendum #3