CITY OF HOUSTON

Strategic Purchasing Division
Administration and Regulatory Affairs
Department

Bill White
Mayor

Calvin D. Wells
City Purchasing Agent
P.O. Box 1562
Houston, Texas 77251-1562

F. 713.247.1811
http://purchasing.houstontx.gov

Date: June 18, 2008

Subject: Letter of Clarification No. 3 for Installation of a Variable Frequency Drive for Sludge Transfer Pumps for the Public Works & Engineering Department

Reference: Bid Inv. No: S30-C22903

To: All Prospective Contractors:

This Letter of Clarification is issued for the following reasons:

Remove pages 6, 7, and 8 of 20 and replace with pages 6, 7, 8, marked revised June 18, 2008

Questions and Answers are attached.

This clarification will be considered part of the solicitation.

Furthermore, it is the responsibility of each Contractor to obtain any previous Letter of Clarification associated with this solicitation.

Richard Morris
Senior Procurement Specialist
713-247-2136

Attachments: Pages 6, 7, and 8, of 20 marked Revised June 18, 2008
Questions and Answers

Council Members: Toni Lawrence Jarvis Johnson Anne Clutterbuck Wanda Adams Mike Sullivan M.J. Khan, P.E. Pam Holm Adrian Garcia James Rodriguez Peter Brown Sue Lovell Melissa Noriega Ronald C. Green Jolanda "Jo" Jones Controller: Annise D. Parker

Specifications
for

INSTALLATION OF A VARIABLE FREQUENCY DRIVE FOR SLUDGE TRANSFER PUMPS

AT THE SOUTHWEST WASTEWATER TREATMENT PLANT LOCATED AT 4211 BEECHNUT

1.0 Summary of Work

1.10 All work performed by the Contractor will be in accordance with the latest City of Houston Building, Electrical, Plumbing Codes and other related City of Houston Standard Construction Specifications. In the event that more than one Code or Standard addresses a construction issue, the most stringent requirement shall prevail. It is the responsibility of the Contractor to obtain and pay for any necessary permits.

1.11 The Contractor shall provide all materials, labor, equipment, transportation, insurance, bonds, permits, and other services necessary to install the variable frequency drive in accordance the specifications and drawings.

1.12 Toshiba G3 Plus Pack (B411KCB) – recommended unit

1.13 Two year equipment warranty for 24 months starting from certified equipment start -up and warranty shall include parts, labor, travel time, and expenses.

1.14 Quote to include start-up services from supplier for motor drive unit

1.15 Quote to include a minimum half day's time for field service engineer for training. The training is to cover operation and maintenance of VFD units for plant operators, instrumentation, electricians and engineers. The instruction is to include the theory of VFD unit operations, trouble shooting and maintenance requirements.

1.16 Quote to include the drive unit(s) complete installation to ready to use condition

1.17 The drive shall be manufactured in the United States

1.18 Drive to come with recommended list of spare parts

2.0 Quality Assurance Standards

2.10 Institute of Electrical and Electronic Engineers (IEEE) Standard 519-1992, IEEE Guide for Harmonic Content and Control

2.11 Underwriters Laboratories UL 508

2.12 National Electrical Manufacturer's Association (NEMA(ISC6, Enclosures for Industrial Controls and Systems.

2.13 IEC 801-2, 801-4, 255.4

2.14 NFPA 70, National Electrical Code

3.0 Submittals

3.10 Certificate of Unit Responsibility: attesting that the VFD manufacturer has accepted unit responsibility for the proper functioning of each VFD in conjunction with its respective motor and pump.

3.20 Prior to installation, the VFD manufacturer shall provide an estimated total harmonic distortion (TDH) caused by the VFDs. The results shall be based on a computer aided circuit simulation of the total actual system using information obtained from the power provided and the user.

3.30 VFD manufacturer shall provide calculations specific to the installation showing total harmonic voltage distortion is less than 5%.

4.0 Variable Frequency Drive (VFD)

4.10 Drive design for continuous use 100 hp motor, 130 full load amps, F class insulation.

4.11 Main drive input power 3 phase 460V/60 Hz and 146 amps

4.12 Main drive output power 3 phase 0 to 460V/0 to 90 Hz, 133 amps

4.13 Main drive output frequency of 0.01 Hz to 299 Hz or better

4.14 Drive speed regulation shall be 3% and 0.1 to 0.5% in true torque control mode

4.20 Drive designed for ambient temperature operating range 0^0 to 122^0 F

4.21 Drive capable of operating in relative humidity 100%

4.21 Drive shall be supplied with cooling fan and/or optional heat sink unit

4.30 Drive tolerance for voltage ±10% and frequency of ±2Hz

4.31 Drive shall have constant V/Hz second order non-linear automatic torque boost and true torque control plus automatic energy-saving control/torque boost adjustment

4.33 Drive shall be capable of setting both upper and lower limit frequencies
4.34 Drive to include preset macros for pumps
4.35 Drive shall have capability of taking custom user settings
4.36 Drive overload current capability shall be 100% continuous and 120% for one minute
4.40 Drive shall have RS232C serial communication capability
4.41 Drive shall accept 4 to 20 mA (Zin:500Ω) and ± 0 to ±10 Vdc (Zin:67Ω) input signals and eight programmable digital inputs with analog input signal capable of being inverted such that the minimum reference corresponds to maximum speed.
4.42 Drive shall contain separate acceleration/deceleration times with auto tuning ability
4.43 Drive shall be capable of jogging the motor up to 20 Hz then stopping
4.44 Drive shall be capable of running 4 groups of 8 patterns using 15 preset speed values for a maximum of 32 different patterns
4.45 Control ability shall be activated from keypad, terminal inputs and host computer/PLC
4.46 Digital display shall be 40-character LCD display (2 lines – 20 characters/line) plain English and not code number(s) and letter(s)
4.50 Drive shall be capable of re-setting faults remotely and locally
4.51 Drive shall have programmable trip alarms that shall include; over current, voltage and motor overload, low current, communication error, and short circuit trip detect.
4.52 Drive shall have two programmable 4-20 mA analog outputs and three programmable relay outputs
4.53 Drive shall have ability for automatically restart after an over current, overload etc. trip out and this capability should be adjustable by operator.
4.54 Drive communication options shall include remote I/O and profibus
4.60 Drive shall be equipped with an elapsed run time meter which can be displayed
4.61 Drive shall be wired with 3-position Hand-Off-Auto switch and speed potentiometer. When in "Hand", the VFD will be started and the speed controlled from the speed potentiometer which shall have a control limit from 35 Hz to 60 Hz.. When in "Auto", the VFD shall be equipped with capability to be started via an external contact closure with the motor speed controlled via an external speed reference input.
4.70 Input 3% AC line reactor is to be sized, supplied, and installed inside equipment enclosures on the input side to help ensure compliance with IEEE standard 519-192, Guide for Harmonic Control and Reactive Compensation for Static Power Converters.

4.80 The VFD shall have a 6-pulse or greater rectifier input section.
4.80 VFDs shall be UL listed.

5.0 Enclosure & Support Platforms

5.10 Enclosure to be included and rated NEMA 3R for Outdoor installation
5.11 Enclosure shall have locking key entry
5.13 Enclosure shall be of 12-gauge Stainless Steel construction or City approved better.
5.14 Enclosure dimensions shall be approximately 78" ~~45~~"H X 26"W X 31 ~~19~~"D with maximum width of 32"; the enclosure must be capable of fitting to specified platform with adequate space for access (see Toshiba drawing 18084A31).
5.15 Grounding posts are to be provided inside the enclosures.
5.16 The contractor shall clearly label each cabinet so as to be able to easily identify which wasting pump the cabinet is connected.
5.17 Contractor shall refurbish an existing support platform for the VFD and shall supply a second supporting platform which will be a copy of the existing unit. Alternatively, contractor may elect to supply two new platforms.
5.18 Both platforms shall be cleaned, sand blasted to remove any paint and rust and the units shall be galvanized prior to installation.
5.19 A single fault red light beacon will be provided on the top of each enclosure and wired to VFD to indicate system failure.
5.20 A door interlock disconnect switch which will disconnect all input power shall be included. The disconnect handle shall be though-the-door type and it shall be padlock capable in the "Off" position.

6.0 Installation

6.10 The Contractor shall be responsible for unbolting, removal, and transporting the existing VFD support platform for refurbishment.

6.11 The Contractor shall deliver the existing VFD to the City of Houston for possible reuse.

6.12 The Contractor shall install both the refurbished and new platform, one on either side of the panel cover similar to existing installation; however reinstallation of the north platform shall be approximately one foot east of the existing location (see sketch for details). Both platforms shall be secured to the concrete using 3/8" or better concrete anchors (three on each side). Note changed 3/9 to 3/8

6.13 Contractor to include in his proposal the cost of a crane to lift and position the support platforms and new VFDs.

6.14 Contractor shall install and complete all necessary power and control wiring and enclose all wiring in conduit. The contractor shall complete all wiring in accordance with the recommendations of the VFD manufacturer as outlined in the installation manual and in accordance with quality assurance section below.

6.15 Installation is to include two small concrete pads (2.9 ft3 & 10.5 ft3) extensions for the VFD platforms – see attached sketch for location details.

6.16 Installation sequence shall have a new VFD installed prior to the disconnection of the existing unit.

~~6.17 Contractor shall provide an installed electrical by-pass of the VFDs to the existing starters feeding excess sludge pumps #1 & #2 such that in the event of a VFD failure the excess sludge pumps will still be operational.~~

6.18 New conductors will be spliced from the incoming power to the input circuit breakers of the new VFDs.

6.19 New conductors will be provided from each VFD output terminal block and spliced to the existing motor leads to the motor starters.

6.20 The electrician shall follow all applicable NEC regulations and rules when wiring the new VFDs.

6.21 Contractor shall maintain a clean work site and he/she is responsible for removal and disposal of any construction related waste generate on the site.

6.22 The contractor shall complete the installation of one new VFD to full functionality and usable condition prior to removing existing VFD.

6.23 The contractor shall label each VFD cabinet with the corresponding motor identification.

7.0 Performance Time

7.10 The project is to be completed within 100 ~~30~~ calendar days after receipt of the notice-to-proceed.

Photo of existing unit to be replaced

Questions and Answers:

1. Do the enclosures for the VFD's need to be NEMA 4X rather than NEMA 3R? Toshiba will only supply a NEMA 3R enclosure.
2. The dimensions for the Toshiba required VFD enclosures are 83.5"H x 37"W x 38"D which conflicts with the dimensions requested of 45"H x 26"W x 19"D per section 5.14 of the specifications. With this conflict in dimensions, the size of the concrete pads and the steel platforms would need to be revised. See Toshiba drawing number 18084A31 – there is no conflict with the width, height is greater and depth is slightly more thus the cabinet should work with existing dimensions.
3. One-line drawings were not included in the bid package, Toshiba therefore had insufficient information to perform a preliminary harmonic analysis prior to quotation. Toshiba is supplying the 3% AC reactor as specified. They cannot guarantee this will result in compliance with IEEE-519-1992. If additional harmonic attenuation equipment is required, it will be quoted separately, at an additional cost. The addition of a harmonic filter would also increase the enclosure width to approximately 61 inches which increases the concrete pads and steel platforms even more. In discussions with Toshiba they have indicated that everything will fit in the cabinet (Toshiba drawing number 18084A31).
4. It is not stated whether the existing starters are equipped with overload relays. Toshiba has included three contactors in each VFD assembly to enable interface with the existing starters. Is this required? Specification 6.17 has been eliminated to facilitate expediency and resolve a number of issues including cabinet size, thus the contactors referenced in #4 should no longer be required.
5. Toshiba is also making the following exceptions: Existing starters are equipped with overload relays
   Toshiba cannot provide drives in short enough time to enable the project to be completed in 30 calendar days after receipt of the notice to proceed. There delivery schedule is as follows:
   1. Approval drawings – 5 to 6 weeks after receipt of order and all required information.
   2. Return of Approval Drawings – This time period is determined by the reviewing Engineer.
   3. Delivery of VFD's will be 16 to 18 weeks after receipt of approval and release to manufacture, subject to stock availability.
      Note the schedule has been revised and augmented; however Toshiba has indicated that the max time for delivery is 10 weeks and not 16 to 18 weeks
6. The steel vendor I am using also requires 2 weeks for measuring the existing platforms and getting design drawings, 2 weeks for the details and 4 weeks to fabricate and deliver the new platforms. This will also have an impact on the 30 calendar day completion date required. Note the schedule has been revised and augmented