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Date: November 15, 2021

Project: City of Stevenson (City)
Wastewater Treatment Plant Improvements – Major Equipment Procurement

Subject: Section 43 11 33 - Rotary Lobe Blower Bids Evaluation

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The purpose of this technical memorandum is to summarize and evaluate the bids for the Rotary Lobe Blowers for the City of Stevenson Wastewater Treatment Plant Improvements Project. Bids were received from the following Bidders:

- Aerzen USA Corporation, Coatesville, PA (Aerzen)
- APSCO, LLC, Redmond, WA representative of Kaeser Compressors (APSCO/Kaeser)
- Howden Roots, Springfield, MO (Howden/Roots)

Table 1 below includes the summary of the bids. Table 2 provides the summary of Bid completeness. All Bidders completed the Bid Form properly and submitted the Bids by the proper deadline.

Table 1. Summary of Bids

	Aerzen	APSCO/Kaeser	Howden/Roots
Base Bid Price	$176,284.00	$162,375.00	$307,056.64
Sales Tax (7.7%)	$13,573.87	$12,502.88	$23,643.36
Total Base Bid Price	$189,857.87	$174,877.88	$330,700.00

Table 2. Summary of Bid Completeness

	Aerzen	APSCO/Kaeser	Howden/Roots
Bid Form Complete and Addendums Acknowledged	✓	✓	✓
Bid Security	✓	✓	✓
Evidence of Authority to do Business in Washington	✓	✓	✓
Bidder Qualification Statement Form	✓	✓	✓
Specification Section 01 33 00, Submittals			
Paragraph 2.03.B.2: Mechanical drawings including equipment layout drawings and equipment dimensions.	✓	✓	✓
Paragraph 2.03.C.1: Manufacturer's catalog information.	(1)	✓	✓
Paragraph 2.03.C.2: Manufacturer's specifications for materials and manufacturing.	✓	✓	✓
Paragraph 2.03.C.6: Design calculations and performance curves demonstrating compliance with the performance and design criteria of the specifications.	✓	✓	✓
Paragraph 2.03.C.15: List of all variances from the Specifications.	✓(2)	✓(2)	✓

Notes:
(1) Not submitted with Bid. Previously submitted to Engineer during design and can be furnished to City upon request.
(2) Variances submitted with Bid are attached to this memo.

Recommendation of Award: All three bidders included variances from the specifications in their bids, although the Aerzen variances are relatively minor in comparison. The lists of variances for the two lowest Bidders are attached to this memo for reference.

For the APSCO/Kaeser product, the motor proposed by APSCO/Kaeser is inverter-rated in lieu of the specified inverter-duty motor. Inverter-duty motors are designed to run at lower speeds without overheating than inverter-rated motors, and they are capable of withstanding higher voltage spikes without the motor insulation failing. The inverter-rated motor proposed by APSCO/Kaeser in combination with the proposed blower is only capable of a 2.5:1 speed turn-down resulting in a minimum air flow of 560 SCFM, whereas the Aerzen motor/blower combination is capable of 3.7:1 speed turn-down resulting in a minimum air flow of 300 SCFM. This lower airflow is closer to the airflow that will be required under average conditions at start-up of the new aeration system and will reduce the on-off cycling of the blowers resulting in longer motor life and better overall treatment efficiency.

The Kaeser motor is also a maximum 3,600 RPM motor in lieu of the specified maximum 1,800 RPM motor and has a NEMA A torque rating (high starting current and normal locked rotor torque) instead of the specified NEMA B torque rating (low starting current and high locked rotor torque). The lower speed and NEMA B torque rating will result in a more robust and longer lasting motor.

APSCO/Kaeser has also called out a number of variations related to the service factor of the v-belt drive and the various gauges and instrumentation supplied with the proposed system.

The specified requirements for the blowers will result in the most reliable and maintenance-free system for the City, and the proposed Aerzen blower packages most closely match the specifications and performance needs of the project. For these reasons, it is recommended that the contract be awarded to Aerzen with the lowest, responsive Bid.

The City staff concurred with this recommendation during the equipment bids review meeting on 11/2/2021.

Documentation:

- Submittal
- O&M manual
- Motor batch test report
- Seismic anchorage and bracing calculations

Equipment Delivery:

- Estimated Delivery 19-21 weeks from approved submittal
- FOB factory with freight allowed to job site

Warranty:

- 24 months from startup/30 months from shipment for complete package
- 60 months from startup/66 months from shipment for blower block

Exceptions to Specification:

- It is our understanding that the proposed equipment manufactured by Kaeser meets the intent of the specification. The comments below detail the design differences between the basis of design and the Kaeser blower equipment.
- 43 11 33-1.04-A-2 – Kaeser standard performance curves to be provided.
- 43 11 33-1.04-A-6 – Silencer information is proprietary and will not be provided by Kaeser. Noise data is listed on sizing sheet. Additional information is not provided by Kaeser.
- 43 11 33-2.05-B – Motor to be TEFC and inverter rated.
- 43 11 33-2.05-D – Speed maximum to be 3,600 rpm.
- 43 11 33-2.05-F – Motor Torque rating to be NEMA A.
- 43 11 33-2.05-J – Motor frame type/size to be IEC standard suitable for overhung belt drive.
- 43 11 33.2.06-B – Drive shall be designed for a minimum service factor of 1.2 times the maximum operation BHP.
- 43 11 33-2.010-C – Discharge stub and flex connector to be removed to access check valve.
- 43 11 33-2.011-A – The inlet filter differential pressure gauge shall measure the pressure difference from ambient to the back side of the filter that is integral to the blower package's inlet silencer. When the filter starts to become dirty, the resistance shall be shown on a resettable red dial indicating when the filter shall be changed.
- 43 11 33-2.011-B – The discharge pressure gauge shall be a dual unit (English – PSI / Metric – Bar) with a range of 0 – 23 psi (0 – 1.6 bar). Minimum dial diameter shall be 2 ½", made with a stainless steel case and be glycerin filled for pulsation dampening.
- 43 11 33-2.011-C – The discharge pressure switch shall be field adjustable. The discharge pressure switch shall be a SPDT switch, Voltage rating up to 250v, 1A. Connection of the switch to the control system is not part of the blower manufacturer's scope of supply. The switch shall be wired to shut down the blower package when actuated.
- 43 11 33-2.012-A – The discharge temperature gauge shall be dual unit and include an adjustable set point dial. Minimal dial diameter shall be 2 ½", made with a black plastic case and have a liquid filled measuring system that is converted by a Bourdon tube into a rotary movement of the pointer. The rotary movement of the pointer spindle shall operate a SPDT microswitch through a lever system. Voltage rating up 220v, 5amps. The high temperature set point shall be as recommended by the blower manufacturer. Connection of the switch to the control system is not part of the blower manufacturer's scope of supply.

The switch shall be wired to shut down the blower package when actuated.

- 43 11 33-2.014-J – An oil drain from the blower drive-end and gear-end lubricating oil sumps shall be separately piped to the front of the blower base with flexible tubing. The drive-end and gear-end oil chambers must not be interconnected and each oil chamber shall have a domed design sight glass to allow visual inspection of oil level and oil condition, viewable from the front of the blower and read when the blower is not in operation.
- 43 11 33-2.015 – Cast parts are to be painted with a two part gray epoxy primer and two part top coat. Fabricated parts are to be painted with a two part top coat. Sound enclosure parts are to be powder coated. Panels and base paint finish shall be pretreated by de-greasing and phosphate cleaning, then powder coated to a thickness of 70 µm -100 µm on both sides. The blower package to be painted the blower manufacturer's standard colors.

Exclusions:

- Installation of equipment
- Field Alignment
- Pressure monitoring devices
- Field painting
- Concrete work, foundations, piping, or piping fittings
- Valves, gauges, meters, or other fittings except as described herein
- Hatches, hoists or davit cranes unless noted above
- Anchor bolts or special tools
- Guide rails
- Conduit, wiring or cable except as noted herein
- Process instrumentation, controls, or electrical wiring unless included above
- Field testing and equipment unless noted above
- Video taping of training
- Taxes of any kind

Terms:

- Payment Terms: 100% Net 30 Days

Quote Validity:

- 60 Days

Price:

- ..... See Billboard

Attachments:

- Kaeser Data Sheets
- APSCO Terms and Conditions

Contacts:

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10-04-21

Thank you for the opportunity to bid the referenced project. The Aerzen scope of supply is compliant with the plans and specification as well as the requirements for power and flow. The following comments are for clarification of supplied scope:

BLACK = SPEC CONTENT
Black Italic = Aerzen Questions/ Comments to Engineer

Section 40 05 93 - Common Motor Requirements for Procurement

2.013.A.3 Minimum 100,000 hours L10 bearing life for ball and roller bearings as defined in ABMA 9 and ABMA 11.
The motor is being quoted with a L-10 bearing life of 50,000 hours. However, if routine maintenance is performed, it is likely that the motor will have a bearing life of about 135,000 hours.

2.019.A.16 20s safe stall time.
Motor meets 26s cold and 16s hot safe stall time.

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2.105.F 500 hr salt spray test.
Aerzen is providing their 80 um standard powder coated sound enclosure. However, Aerzen cannot provide a 500 hr salt spray test. Therefore, it has not been included in the scope/pricing. Aerzen has numerous packages in successful operation, without issues, in much more corrosive environments than Stevenson, WA.

3.01.C Perform factory noise test in accordance with ISO-2151.
Aerzen is guaranteeing a free field sound level of 75 dBA based on ISO-2151 empirical data that was gathered in an ISO-3745 test facility. Aerzen will use their standard factory, project specific sound test and convert it to free field sound level but it cannot be guaranteed since the sound test will not be performed in an ISO-3754 test facility.

3.04.A.8 Measure air flow in field.
Aerzen cannot measure air flow in the field, nor can air flow be accurately measured in the field.

3.04.C Field noise test.

No blower manufacturer can guarantee installed noise levels as there are factor outside of the blower manufacturer's control that can adversely affect the installed noise level readings (i.e. other machinery running, facility layout, external piping configuration).