100536 APPENDIX A – TECHNICAL SPECIFICATIONS

RIDENOUR WTP - VERTICAL TURBINE HIGH SERVICE PUMP

PART 1 GENERAL

1.01 SCOPE

JEA is interested in testing a new vertical turbine pump with the intent to add it to the Standards Approved Manufacturer's List after a successful trial period of one (1) year.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American Iron and Steel Institute (AISI): Type 1045 Carbon Steel.
2. American Water Works Association (AWWA): E101, Vertical Turbine Pumps-Line Shaft and Submersible Types.
3. ASTM International (ASTM):
   a. A48, Standard Specification for Gray Iron Castings.
   b. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   c. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
   d. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
   e. B148, Standard Specification for Aluminum-Bronze Sand Castings.
   f. B584, Standard Specification for Copper Alloy Sand Castings for General Applications.
4. Institute of Electrical and Electronics Engineers (IEEE): 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
5. National Electrical Manufacturer’s Association (NEMA): MG 1, Motors and Generators.

1.02 DEFINITIONS

A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards and of AWWA E101, American National Standard for Vertical Turbine Pumps.

1.03 SUBMITTALS

A. Bid Submittal (Due at the time of bid)

1. Electronic copy of the pump performance curve including efficiency and horsepower. The efficiency shall reflect any down-rating due to the number of stages or the impeller material.

2. The specified guarantee point (6,000 gpm at 150 feet) shall fall within the Preferred Operating Range (POR) of the pump and be presented in terms of percentage of the Best Efficiency Point (BEP). The guarantee point shall be no less than 90% of the BEP and no more than 120% of the BEP. Pump shut-off head shall be no less than 280 feet.

B. Record Submittals: (Due within two weeks of purchase order issuance)

1. Make, model, weight, and horsepower of each equipment assembly.

2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.

3. Performance data curves for the proposed impeller trim showing head, capacity, horsepower demand, pump efficiency and NPSH over the entire operating range of the pump, from shutoff to maximum capacity. Eighth or tenth order submittal curves are preferred to definitively depict dips in the curve or other aberrations that may impede acceptance of the certified curve.

PART 2 PRODUCTS

2.01 GENERAL

A. High service pumps shall be vertical line shaft turbine type with an electric vertical hollow shaft motor, operating at a nominal 1,800 rpm. The pump shall be water lubricated type suitable for finished water service in a potable water application. All materials and coatings used in manufacture shall be compliant with NSF standards. No materials which come in direct contact with the fluid pumped shall include any measurable lead content.

B. Operating conditions will be as listed in Attachment 1.

2.02 PUMP, MOTOR, AND ACCESSORIES

A. Discharge Head:

1. A fabricated discharge head shall be furnished

2. The stuffing box shall be made of cast iron with Type 316 stainless steel split-type packing gland, studs, and nuts, and furnished with five rings of graphited synthetic fiber packing. The bearing shall be bronze, Type C89835 or equal. A

rubber slinger shall be furnished with the stuffing box for securing to the shaft above the packing gland to protect the motor from excess spray.

3. The pump shall be furnished with a two-piece top shaft. The head shaft passing through the stuffing box shall be made of Type 416 stainless steel meeting ASTM 582. Shaft shall be precision ground, balanced, and polished with a surface finish better than 40 rms. Shaft length shall be sized to accommodate the length of top column pipe plus the height of the head through the stuffing box, so that the couplings are easily accessible at the head and the first column pipe joint.

B. Column Assembly:

1. The 14-inch diameter column pipe shall be furnished in a 45 inch custom fabricated flanged spool piece with a bolt pattern designed to match the discharge head. Column pipe shall be sized to fit within the dimensions shown on the attached drawing (Attachment 3, Pump 7).

2. The 1-11/16 inch lineshaft shall be made of Type 416 stainless steel meeting ASTM 582. Shaft shall be 45 inches long, precision ground, balanced, and polished with a surface finish better than 40 rms. The shaft shall be straight, not exceeding 0.005 inch out in total indicator reading.

3. Bearing retainers (spider) shall be furnished for the single column and shaft section. The spiders shall be made of 316 or 316L stainless steel and designed to drop in the column couplings and be retained by the butted ends of the column pipe. Shaft bearings shall be a cutlass neoprene rubber retained in the spider by a shoulder on each end of the bearing, designed for water lubricated operation with the appropriate shaft diameter. Vesconite HiLube shaft bearings shall also be acceptable.

C. Pump Construction:

1. Bowl assembly shall consist of flanged type bowls constructed of close grained cast iron conforming to ASTM A48 Class 30. The bowls shall be free of blow holes, sand holes, or other faults and accurately machined and fitted to close tolerances, and capable of meeting or exceeding the hydrostatic pressure ratings of the Hydraulic Institute. The intermediate bowls shall have enamel lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. A discharge bowl shall be sized and threaded to connect the bowl assembly to the discharge column.

   All the bowls, including the suction and discharge bowl, shall be fitted with Vesconite HiLube composite sleeve bearings by Vesco Plastics. The bowls shall be assembled using all Type 316 stainless steel bolting. A stainless steel nameplate with the operating conditions and bowl and impeller date stamped into

it shall be attached to the bowl with noncorrosive fasteners. The bowl suction and discharge sizes shall be compatible with the column pipe specified for each pump.

2. Impellers shall be constructed of 316 or 316L stainless steel. No bronze alloy impellers shall be allowed. Impellers shall be free from defects and accurately cast, machined, filed, polished and statically balanced for premium efficiency and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as a minimum. The pump curves and efficiencies provided shall include any derating for stainless steel if appropriate. Impellers shall be secured to the bowl shaft with tapered split Type 316 stainless steel bushing (collets). The impeller trim for multiple stage pumps shall be identical for each stage. A letter shall be submitted with the pumps at delivery, confirming the impeller trim.

3. The bowl shaft shall be constructed from Type 416 stainless steel meeting ASTM 582. It shall be precision ground, balanced, and polished with a surface finish better than 40 rms.

4. The pumps can be comprised of up to three stages as indicated in Attachment 1 – Pump Data Sheet

5. The pump operating conditions shall be as outlined in Attachment 1 – Pump Data Sheet.

D. Pump Motor:

1. Squirrel-cage induction type motor meeting requirements of NEMA MG 1.
2. 60 Hertz.
3. Voltage
    a. 460 Volts for motors 100 HP and greater
    b. 230/460 Volt dual wound for motors under 100 HP
4. 1.15 Service Factor.
5. Motor shall be Weather Proof 1 (WP1).
6. 1800 RPM Synchronous Speed.
7. Motors shall be inverter duty rated.
8. Motor horsepower shall not be exceeded at any point on the design curve.
9. 120 volt single phase space heater.
10. A motor nameplate shall be affixed that includes the following:
    a. Manufacturer
    b. Model
    c. Horsepower
    d. Serial number
    e. Weight
    f. Date of Manufacture
11. Motor Manufacturer shall be US Motors or approved equal.
12. Motor shall be equipped with non-reverse ratchets.

E. Pre-approved Vertical Turbine Pump Manufacturers
Manufacturers that are already on JEA's Standards Approved Manufacturer's List need not submit a bid as this is a trial period for addition to the Standards Approved Manufacturer's List. The intent of this solicitation is to test new vertical turbine pumps to add to the JEA Standards listing. If the Proposer is already approved on the JEA Standards list for vertical turbine pumps as of the RFP Due Date, JEA will deduct 10 points from the evaluation total.

F. Warranty

1. The complete system and all components shall carry a 24 month "Full Replacement Warranty" that shall begin from the date of acceptance following successful pump start-up.

G. Factory Performance Testing

1. The pump manufacturer shall perform certified factory performance testing in accordance with Hydraulic Institute standards. The test shall be witnessed by and test results certified by a test lab manager employed by the pump manufacturer.

2. Hydraulic and electrical performance testing shall measure head, power, current, speed and voltage at a minimum of six evenly spaced flow rates. All electronic meters, transducers, gauges and test instruments shall have been calibrated and accuracy verified within the manufacturer's recommended timeframe.

3. The NPSH shall be measured at the design flow rate of 6,000 gpm.

4. A certified pump performance curve including all testing data in tabular form shall be submitted and approved prior to pump shipment.

2.03 FINISHING

A. Each piece of equipment in the pumping system including pump, support system, motor and associated equipment shall be prepared, shop-primed and finish coated in accordance with the Manufacturer's standard practice prior to shipment.

B. All interior and exterior wetted surfaces including discharge head and exterior of bowl assemblies shall be cleaned of all rust, mill scale, dirt and other foreign matter and coated with Manufacturer's standard epoxy coating, minimum 10 mils DFT. Coatings in direct contact with potable water shall be in conformance with ANSI/NSF 61 Annex G and ANSI/NSF 372.

C. Column pipe shall be coated, inside and outside.

2.04 SUPPLEMENTS

A. The following Attachments are part of this Specification.

1. Attachment 1, Pump Data Sheet – Vertical Turbine Pump.
2. Attachment 2, Price Sheet – Vertical Turbine Pump.
3. Attachment 3, Drawing – Vertical Turbine Pump Specifications.

ATTACHMENT 1

PUMP DATA SHEET - VERTICAL TURBINE PUMP

	Pump 1
Flow (gpm)	6,000
Head (feet)	150
Stages	2 or 3
Bowl Diameter	20” maximum
RPM (Nominal)	1,800
Inverter Duty Rated Motor HP	350 maximum
Number of pumps	1 each
Minimum efficiency at design flow/head	80%
416 SS Lineshaft (45 inches)	1-11/16 inch
Column Pipe** (45 inches)	14-inch
Cast Discharge Head	16-inch discharge

Additional Equipment to be provided (for each pump)

- 316 or 316L SS bearing retainers (sufficient quantity for the column/shaft provided)

- A letter certifying the impeller trim diameter provided to meet the design flow/head conditions shall be submitted for each pump supplied.

** Steel column pipe shall be schedule 40 (0.500 inch wall thickness for 14” diameter column)

ATTACHMENT 2

PRICE SHEET - VERTICAL TURBINE PUMP

Delivery time of pump, motor and all specified equipment in weeks from issuance of Purchase Order. (_____weeks)
(Note that delivery time greater than 14 weeks may not be acceptable.)

QUOTES: All manufacturers shall quote prices, F.O.B. destination, for the purchase and delivery of the complete pump system to the Ridenour Water Treatment Plant, 102 Kernan Blvd. North, Jacksonville, Florida 32225.

RESERVED RIGHTS: JEA reserves the right to accept or reject any and/or all quotes, to waive irregularities and technicalities, and to request resubmission of quotes. JEA also reserves the right to accept all or any part of the quote and to increase or decrease quantities to meet additional or reduced requirements of JEA.

SHIPPING: Pump and equipment shall be shipped on an open flat-bed trailer to facilitate offloading. A covered trailer may be utilized with prior approval providing that equipment is at or near the open end. Call Michael Richardson at (904)665-6819 to coordinate delivery time and to ensure someone is available to assist with offloading pump equipment at least 4 hours prior to arrival at the Ridenour WTP.

ATTACHMENT 3

DRAWING – VERTICAL TURBINE PUMP SPECIFICATIONS

***Replacing Pump 7**