

CITY OF PAMPA

REQUEST FOR BIDS

Water Treatment Emergency Generator Project



BID NO. 21.02.G

SUBMISSION DEADLINE:

April 15, 2021

By 1:30 PM

Room 205, City Hall

200 W. Foster

Pampa, TX 79065

CONTACT

Gary Turley

DIRECTOR OF Public Works

806-669-5750

NOTICE TO BIDDERS

The City of Pampa, Texas will receive Sealed Bids until 1:30 P.M., April 15, 2021 for the following:

City of Pampa Water Treatment Emergency Generator Project

Bids will be purchase and installation of 500kw, 3 phase diesel backup generator for use at the City of Pampa Water Treatment Plant. Bid Packets may be obtained from Mr. Gary Turley at gturley@cityofpampa.org or hard copy mail from the Office of the City Secretary by calling 806-669-5750. Tax-Exemption Certificates shall be furnished upon request.

Sealed Bids may be mailed to the Office of the City Secretary, P.O. Box 2499, Pampa, Texas 79066-2499 or 200 W Foster Pampa, TX 79065. Sealed envelope should be plainly marked **“City of Pampa Water Treatment Emergency Generator Project, Bid No. 21.02.G”** and shall reflect the date and time of the bid opening. Any bid received after the specified bid opening time and date shall be rejected. **Facsimile and Email bids will not be accepted.**

Bids will be opened and read in the 2ND Floor Conference Room, Room 202, City Hall, 200 W. Foster, Pampa, Texas.

The City of Pampa reserves to right to accept or reject any or all bids submitted and to waive any formalities or technicalities.

The City Commission will consider bids for award at their April 26, 2021 Regular Commission Meeting.

**12. THIS PROPOSAL IS FOR CITY OF PAMPA WATER TREATMENT
EMERGENCY GENERATOR PROJECT.**

The undersigned hereby offers to furnish and deliver the articles or services as specified above at the prices and terms therein stated and in strict accordance with the specifications and general conditions of bidding, all of which are made a part of this offer.

Name of Business

By: _____ Business Telephone: _____
Name, Authorized Representative

Signature, Authorized Representative

NOTICE OF AWARD
(This Section for City Use)

Date of Award: _____

The attached proposal is accepted with the following conditions:

Dollar Value: _____

By: _____
Director of Public Works

INSTRUCTIONS TO BIDDERS

City of Pampa, Texas

Preparation of Bids

- a. Any explanation desired by a bidder regarding the meaning or interpretation of the invitation, drawings, specifications, etc. must be requested in writing to City of Pampa with sufficient time allowed for a reply to reach bidders before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective bidder concerning an invitation will be furnished to all prospective bidders as an amendment to the invitation, if such information is necessary to bidders in submitting bids on the invitation or if the lack of such information would be prejudicial to uninformed bidders.
- b. Each bidder is to furnish the information requested. Alternate commodities or services, trade-ins, etc. will be considered only if asked for in the invitation.
- c. **EACH BID MUST BE SIGNED TO BE CONSIDERED.** The bidding firm will be responsible for assuring that only authorized persons sign bids.
- d. Bids submitted on other than the attached bid sheets or with different terms or provisions will not be considered as responsible bids. Bidders are invited to attach any additional information, but we will give first consideration to the information on our bid sheets, in the format we requested.
- e. If an amendment to the Bid Invitation is required it will be necessary to advise all prospective bidders, and it may be necessary to delay the bid opening.
- f. **Bid must be submitted on the attached bid sheets. Bid submitted on any other form will not be considered.**
- g. **The City reserves the right to postpone award of contract if only one bid is received.**

Information Required

Each bidder shall furnish the information required by the invitation. The bidder shall sign the Bid Form, and when appropriate, Specifications. Erasures or other changes must be initialed by the person signing the offer. Bids signed by an agent are to be accompanied by evidence of his authority unless such evidence has been previously furnished to the City of Pampa.

- a. The bidder should quote its lowest and best price, F.O.B. destination on each item. If delivery and shipping quantities affect unit bid price, multiple bids may be so as to indicate "price break" quantities in order for the City to determine maximum economic

benefits. Pricing should include packaging and transportation unless otherwise specified. Pricing shall be entered on the Bid Sheet in ink or typewritten. Totals shall be entered in the "Total Price" column of the Bid Form. In case of discrepancy between unit price and extended price, the unit price will be presumed to be correct.

- b. Bids must be firm. If the bidder, however, believes it necessary to base its price on price adjustment, such a bid may be considered, but only as an alternate bid.
- c. Transportation Charges. If the quoted price does not include transportation charges, such charges must be itemized separately; provided, however, that the City shall have the right to designate what method of transportation shall be used to ship the goods.
- d. Taxes. The City does not have to pay Federal Excise, State and local retail sales and/or use taxes. Tax exemption certificates can be provided upon request.
- e. Time, if stated as a number of days, will include Saturdays, Sundays, and holidays. Time of delivery is part of the bid and very important. The required delivery date indicated is at point of destination.
- f. If the bid invitation indicates "approved equal" products are acceptable, the seller may offer an "equal" product as an alternate bid. Final "approved equal" determination remains with the City.
- g. Bids submitted on other than City forms or with different terms or provisions may not be considered as responsive bids.

Submission of Bids

- a. Bids should be returned in an envelope marked on the outside with the Contractor's name and address. Address to:

City of Pampa
Office of the City Secretary
P.O. Box 2499
200 W Foster
Pampa, TX 79066

BID NO. 21.02.G

Submission Deadline: April 15, 2021, 1:30 P.M.

- b. Bids may be delivered in person to the 2nd Floor, City Hall, Office of the City Secretary, Room 205, 200 W. Foster.

- c. Bids must be returned in sufficient time so as to be received and time stamped at the above location on or before the published bid opening date and time shown on the bid invitation. Bids received after the published time and date cannot be considered.

Modification or Withdrawal of Bids

Bids may be withdrawn or modified by written or email notice received by the City prior to the exact hour of the deadline. A bid may also be withdrawn in person if the identity of the person can be established and a receipt is signed for the bid. No bid can be withdrawn or modified after the exact hour designated for the deadline.

Evaluation Factors

- a. Most Advantageous Bid (Best Value Method). The City will award purchase orders and contracts to the lowest and best responsible bidder which represents the most advantageous bid to the City, price and other factors considered. In determining the “most advantageous” bid or proposal, price, quantifiable factors, and other factors are considered. This would include specifications, delivery requirements, the initial purchase price, life expectancy, cost of maintenance and operation, operating efficiency, training requirements, disposal value, and other factors contributing to the overall acquisition cost of an item. Consideration may be given, but not necessarily limited to conformity to the specifications, product warranty, a bidder’s proposed service, ability to supply and provide service, delivery to required schedules, and past performance in other contracts with the City including timely delivery and history of equipment service.
- b. Partial Awards. Bidders may furnish pricing for all or any portion of the bid invitation. Unless the bidder specifies otherwise in his bid, the City may award the contract for any item or group of items shown on the bid invitation.
- c. Reservations. The City expressly reserves the right to:
 - 1. Waive as an informality, minor deviations from specifications at a lower price than the low bid meeting all aspects of the specifications and consider it, if it is determined that total cost is lower and the overall function is improved or not impaired;
 - 2. Waive any defect, irregularity or informality in any bid or bidding procedure;
 - 3. Reject or cancel any or all bids
 - 4. Reissue a bid invitation
 - 5. Extend the bid opening time and date;
 - 6. Procure any item by other means;

7. Increase or decrease the quantity specified in the bid invitation, unless the bidder specifies otherwise;
8. Consider and accept an alternate bid as provided herein when most advantageous to the City.

Acceptance

Acceptance of bidder's offer for an open market purchase will be in the form of a purchase order. Acceptance of bidders offer for supply agreements will be the Award portion of the Bid Invitation. Subsequent purchase orders and release orders may be issued as appropriate.

STANDARD PURCHASE TERMS AND CONDITIONS

City of Pampa, Texas

Seller and City agree as follows:

1. **SELLER TO PACKAGE GOODS** Seller will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently marked as follows: (a) Seller's name and address; (b) Consignee's name, address and purchase order or purchase release number and the supply agreement number if applicable; (c) Container number and total number of containers, e.g. box 1 of 4 boxes; and (d) the number of the container bearing the packing slip. Seller shall bear cost of packaging unless otherwise provided. Goods shall be suitably packed to secure lowest transportation costs and to conform with requirements of common carriers and any applicable specifications. City's count or weight shall be final and conclusive on shipments not accompanied by packing lists.
2. **SHIPMENT UNDER RESERVATION PROHIBITED** Seller is not authorized to ship the goods under reservation and no tender of a bill of lading will operate as a tender of goods.
3. **TITLE & RISK OF LOSS** The title and risk of loss of the goods shall not pass to City until City actually receives and takes possession of the goods at the point or points of delivery.
4. **DELIVERY TERMS AND TRANSPORTATION CHARGES F.O.B.** destination unless delivery terms are specified otherwise in bid. City agrees to reimburse Seller for transportation costs in the amount specified in Seller's bid, or actual costs, whichever is lower, if the quoted delivery terms do not include transportation costs, provided City shall have the right to designate what method of transportation shall be used to ship the goods.
5. **NO REPLACEMENT OF DEFECTIVE TENDER** Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. If a tender is made which does not fully conform, this shall constitute a breach and Seller shall not have the right to substitute a conforming tender, provided, where the time for performance has not yet expired, the Seller may seasonably notify City of his intention to cure and may then make a conforming tender within the contract time but not afterward.
6. **PLACE OF DELIVERY** The place of delivery shall be that set forth in the block of the purchase order entitled "Delivered to." Any change thereto shall be effected by modification as provided for in Clause 20 hereof entitled "Modifications." The terms of this agreement are "no arrival, no sale."
7. **INVOICES & PAYMENTS**
 - a. Seller shall submit separate invoices, in duplicate, on each purchase order or purchase release after each delivery. Invoices shall indicate the purchase order or purchase release number and the supply agreement number if applicable. Invoices shall be itemized and transportation charges, if any, shall be listed separately. A copy of the bill of lading, and the freight waybill when applicable, should be attached to the invoice. Mail to: Director of Public Works, City of Pampa, P. O. Box 2499, Pampa, Texas 79066-2499. Payment shall not be due until the above instruments are submitted after delivery.
 - b. City's obligation is payable only and solely from funds available for the purpose of this purchase. Lack of funds shall render this contract null and void to the extent funds are not available and any delivered but unpaid for goods will be returned to the Seller by City.
 - c. Do not include Federal Excise, State or City Sales Tax. City shall furnish tax exemption certificates upon request.
8. **GRATUITIES** The City may, by written notice to the Seller, cancel this contract without liability to Seller if it is determined by City that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the Seller or any agent or representative of the Seller, to any officer or employee of the City with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determination with respect to the performing of such a contract. In the event this contract is cancelled by City pursuant to this provision, City shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.
9. **SPECIAL TOOLS & TEST EQUIPMENT** If the price stated on the face hereof includes the cost of any special tooling or special test equipment fabricated or required by Seller for the purpose of filling this order, such special tooling equipment and any process sheets related thereto shall become the property of the City and to the extent feasible shall be identified by the Seller as such.
10. **WARRANTY-PRICE**
 - a. The price to be paid by the City shall be that contained in Seller's bid which Seller warrants to be no higher than Seller's current prices on orders by others for products of the kind and specification covered by this agreement for similar or like conditions and methods of purchase. In the event Seller breaches this warranty, the prices of the items shall be reduced to the Seller's current prices on orders by others, or in the alternative, City may cancel this contract without liability to Seller for breach or Seller's actual expenses.
 - b. The seller warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees of bona fide established commercial or selling agencies maintained by the Seller for the purpose of securing business. For breach or violation of this warranty the City shall have the right in addition to any other right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or
11. **WARRANTY-PRODUCT** Seller shall not limit or exclude any implied warranties and any attempt to do so shall render this contract voidable at the option of the City. Seller warrants that the goods furnished will conform to the specifications, drawings, and descriptions listed in the bid invitation, and to the sample(s) furnished by Seller, if any. In the event of a conflict between the specifications, drawings, and descriptions, the specifications shall govern.
12. **SAFETY WARRANTY** Seller warrants that the product sold to City shall conform to the standards promulgated by the U.S. Department of Labor under the Occupational Safety and Health Act (OSHA). In the event the product does not conform to OSHA standards, City may return the product for correction or replacement at the Seller's expense. In the event Seller fails to make the appropriate correction within a reasonable time, correction made by City will be at Seller's expense.
13. **NO WARRANTY BY CITY AGAINST INFRINGEMENTS** As part of this contract for sale Seller agrees to ascertain whether goods manufactured in accordance with the specifications attached to this agreement will give rise to the rightful claim of any third person by way of infringement or the like. City makes no warranty that the production of goods according to the specification will not give rise to such a claim, and in no event shall City be liable to Seller for indemnification in the event that Seller is sued on the grounds of infringement or the like. If Seller is of the opinion that an infringement or the like will result, he will notify City to this effect in writing within two weeks after the signing of this agreement. If City does not receive notice and is subsequently held liable for the infringement or the like, Seller will save City harmless. If Seller in good faith ascertains that production of the goods in accordance with the specifications will result in infringement or the like, this contract shall be null and void except that City will pay Seller the reasonable cost of his search as to infringements.
14. **RIGHT OF INSPECTION** City shall have the right to inspect the goods of delivery before accepting them.
15. **CANCELLATION** City shall have the right to cancel for default all or any part of the undelivered portion of this order if Seller breaches any of the terms hereof including warranties of Seller or if the Seller becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which City may have in law or equity.
16. **TERMINATION** The performance of work under this order may be terminated in whole, or in part by the City in accordance with this provision. Termination of work hereunder shall be effected by the delivery to the Seller of a "Notice of Termination" specifying the extent to which performance of work under the order is terminated and the date upon which such termination becomes effective. Such right of termination is in addition to and not in lieu of the rights of City set forth in Clause 15 herein.
17. **FORCE MAJEURE** Neither party shall be held responsible for losses resulting if the fulfillment of any terms or provisions of this contract is delayed or prevented by any cause not within the control of the party whose performance is interfered with, and which by the exercise of reasonable diligence said party is unable to prevent.
18. **ASSIGNMENT-DELEGATION** No right or interest in this contract shall be assigned or delegation of an obligation made by Seller without the written permission of the City. Any attempted assignment or delegation by Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.
19. **WAIVER** No claim or right arising out of a breach of this contract can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party.
20. **MODIFICATIONS** This contract can be modified or rescinded only by a writing signed by both of the parties or their duly authorized agents.
21. **INTERPRETATION-PAROL EVIDENCE** This writing is intended by the parties as a final expression of their agreement and is intended also as a complete and exclusive statement of the terms of their agreement. No course of prior dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this agreement. Acceptance or acquiescence in a course of performance rendered under this agreement shall not be relevant to determine the meaning of this agreement even though the accepting or acquiescing party has knowledge of the performance and opportunity for objection. Whenever a term defined by the Uniform Commercial Code is used in the agreement, the definition contained in the Code is to control.
22. **APPLICABLE LAW** This agreement shall be governed by the Uniform Commercial Code. Wherever the term "Uniform Commercial Code" is used, it shall be construed as meaning the Uniform Commercial Code as adopted in the State of Texas as effective and in force on the date of this agreement.
23. **ADVERTISING** Seller shall not advertise or publish, without City's prior consent, the fact that City has entered into this contract, except to the extent necessary to comply with proper request for information from an authorized representative of the federal, state or local government.
24. **RIGHT TO ASSURANCE** Whenever one party to this contract in good faith has reason to question the other party's intent to perform he may demand that the other party give written assurance of his intent to perform. In the event that a demand is made and no assurance is given within five (5) working days, the demanding party may treat this failure as an anticipatory repudiation of the contract.

STANDARD PURCHASE TERMS AND CONDITIONS
City of Pampa, Texas

**CHANGES TO STANDARD PURCHASE TERMS AND CONDITIONS APPLICABLE
TO THIS CONTRACT**

1. N/A

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

BID

Bid Due Date:

Project (Brief Description Including Location):

BOND

Bond Number

Date (Not later than Bid due date):

Penal sum _____

(Words)

(Figures)

Surely and Bidder, intending to be legally bound herby, subject to the terms printed on the reserve side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent or representative.

BIDDER

SURETY

_____(Seal)
Bidder's Name and Corporate Seal

_____(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title

By : _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

PERFORMANCE BOND

STATE OF TEXAS

COUNTY OF _____

ALL MEN BY THESE PRESENTS: That _____ of
the City of _____, County of _____ and State of
_____ as principal, and _____

authorized under the laws of the State of Texas to act as surety on bonds for principals, are held and
firmly bound unto _____ (OWNER), in the penal sum of
Dollars (\$ _____) for the payment whereof, the said Principal and surety bind
themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally,
by these presents: WHEREAS: the Principal has entered into a certain written contract with the
Owner, dated the _____ day of _____, 20____ to which contract is hereby
returned to and made part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION IS SUCH, that if the
said Principal shall faithfully perform said Contract and shall in all respects duly and
faithfully observe and perform all and singular the covenants, conditions and agreements in
and by said contract agreed and covenanted by the Principal to be observed and performed,
and according to the true intent and meaning of said Contract and the Plans and
Specifications hereto annexed, then this obligation shall be void; otherwise to remain in full
force and effect:

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter
2253 of the Government Code of Texas, as amended, and all liabilities on this bond shall be
determined in accordance with the provisions of said Chapter to the same extent as if it were
copied at length herein.

Surety, for value received, stipulates, and agrees that no change, extension of time, alteration,
or addition to the terms of the contract or to the work performed thereunder, or the plans,
specifications or drawings accompanying the same, shall in any way affect its obligation on
this bond, and it does hereby waive notice of any such change, extension of time, alteration
or addition to the terms of the contract or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____

Principal

By: _____

Title: _____

Address: _____

Surety

By: _____

Title: _____

Address: _____

The name and address of the Resident Agent of Surety is:

**CITY OF PAMPA
BID SHEET**

Item No.	Quantity	Unit	Description of Item and Unit Price	Unit Price	Total Amount Bid
1			Wire and Conduit	\$ _____	\$ _____
2	1	LS	ATS Switch	\$ _____	\$ _____
3	1		500KW Generator	\$ _____	\$ _____
	1	LS	Materials and Equipment Total	\$ _____	\$ _____
4			Master Electrician	\$ _____	\$ _____
5			Journeyman Electrician	\$ _____	\$ _____
6			Laborer	\$ _____	\$ _____
			Labor Costs Total	\$ _____	\$ _____
7			Other Costs Total	\$ _____	\$ _____

Total Price Proposed:

Please Complete the Following:

_____ Date

_____ Payment Terms

_____ Signature

_____ Typed/Printed Name

_____ Company

Bidders must include the following documentation as required in the proposal packet:

1. Rate Schedule for Labor, Machinery, etc.

EXCEPTIONS TO SPECIFICATIONS FORM
City of Pampa, Texas

In the interest of fairness and sound business practice, it is mandatory that you state any exceptions taken by you to our specifications.

If your bid does not meet all our specifications, you must state so on the spaces provided below:

Bids on equipment, vehicles, supplies, service and materials not meeting specifications may be considered by the City, however, all deviations must be listed above.

Signed: _____
I DO meet specifications.

Signed: _____
I DO NOT meet specifications, as listed on this bid. Exceptions are stated in the spaces provided.

Your bid may be rejected if you do not sign and submit this page.

**STATE OF AUTHENTICITY AND CORRECT IDENTITY OF
CONTRACT BIDDERS AND PROPOSALS
City of Pampa, Texas**

WHEREAS, the City of Pampa requires as a condition of due diligence and contracting accuracy, that each bidding party for work, services, or delivery of products described by written agreements, certify the following:

That the bid, offer, sale conveyance, or delivery of products below by the contracting Party represents the actions of the true and correct Party and not an Assignee, Trustee in Bankruptcy, Debtor in Possession, or Receiver with respect to:

(Description of Activity Attached)

<hr/> Contract No.	<hr/> Date	<hr/> Amount
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Failure to alert the City of this circumstance may constitute a material breach of contractual representation, and allow rescission or other remedial actions. The City will not unreasonably discriminate against those parties so involved, if it received prior warning and notification, but reserves all right under Texas Law to protect the rights and property of taxpayers.

Executed the _____ day of _____, 20_____

By: _____
Signature Title

Firm/Company/Organization

This certification is made a part of the documentation for each transaction and shall be construed as part of said documentation and all terms thereby.

Summary of Project Tasks

Open Bids

Open and present bids to City Commission

Award Bid

Communicate Award to Vendors

Project Planning with Vendor

Planning and Scheduling Install with Vendor

Site Prep

Prep Conduit, Wiring, forms, etc. for pad installation

Pad Construction

Pour cement pad

Wiring & Electrical Access

Complete Pre wiring for Automatic Transfer Switch (ATS) and Generator

Set the Generator

Set and secure generator to cement pad

Install Automatic Transfer Switch (ATS)

Complete wiring for Automatic Transfer Switch (ATS)

Securing Generator

Complete any fencing or assess changes

Programming Automatic Transfer Switch (ATS)

Program Automatic Transfer Switch (ATS) (auto test,)

Startup & Testing Automatic Transfer Switch (ATS) & Generator

Run and test generator and Automatic Transfer Switch (ATS)

Training

Vendor Trains Staff on Generator and Automatic Transfer Switch (ATS) operation and Troubleshooting

Maintenance review

Vendor Trains Staff and maintenance vendors review maintenance schedule and maintenance processes

Certification and Closeout of Project

Issue of Certificate of Completion and Initial generator operating testing results sent to State.

Project Task	Description
Send out Bid Package	<i>Complete Specifications for Bid Package & Send out RFQ</i>
Open Bids	<i>Open and present bids to City Commision</i>
Award Bid	<i>Communicate Award to Vendor</i>
Project Planning with Vendor	<i>Planning and Scheduling Instal with Vendor</i>
Site Prep	<i>Prep Conduit, Wiring, forms, etc for pad installation</i>
Pad Construction	<i>Pour Cement</i>
Wiring & Electrical Access	<i>Complete Pre wiring for ATS and Generator</i>
Set the Generator	<i>Set and secure generator to generator pad</i>
Install ATS	<i>Complete wiring for ATS</i>
Securing Generator	<i>Complete any fencing or</i>
Programming ATS	<i>Program ATS (auto test,)</i>
Startup & Testing ATS & Generator	<i>Run and test generator and ATS</i>
Training	<i>Vendor Trains Staff on Generator and ATS operaton and Troubleshooting</i>
Maintenance review	<i>Vendor Trains Staff and maintenance vedosreviews maintenance schedule and process</i>
Certification and Closeout of Project	<i>Issue of Certificate of Completion and Initial generator operating testing results sent to State.</i>

Milestone (Task Completion Metric)

Completed Specifications for Bid Package & Sent RFQ	Day 1 to Day 90
City Commission approval	Day 1 to Day 90
Award Communicated to Vendor	Day 1 to Day 90
Project & Site Plan	Day 91 to Day 180
Inspect Conduit & Initial Wiring	Day 181 to Day 270
Pad Inspection by City Engineer	Day 181 to Day 270
Wiring inspected by _____	Day 271 to Day 360
Generator inspected by City Engineer	Day 271 to Day 360
Verified by Project Manager	Day 271 to Day 360
Verified by Project Manager	Day 271 to Day 360
Verified by Project Manager	Day 271 to Day 360
Verified by Project Manager	Day 361 to Day 450
Verified by Project Manager & Public Works Director	Day 450 to Day 540
Maintenance Schedule delivered and reviewed with PM and PW Director	Day 450 to Day 540
Project Manager	Day 450 to Day 540

SECTION 26 32 13.13
DIESEL ENGINE GENERATOR SET

PART 1 GENERAL

1.01 SUMMARY

A. Water Treatment Plant: Furnish a complete self-contained generator package system with all requirements as indicated within this Specification.

1.02 SUBMITTALS

A. Action Submittals: Engine, generator, fuel tank and enclosure complete with all appurtenances shall be submitted under one cover. Piecemeal submittals of various components will not be accepted for review. Catalog cut sheets describing all components, accessories and appurtenances shall be submitted for all items. Each cut sheet shall be clearly marked to show the item submitted. Submittals without cut sheets or with cut sheets not clearly marked will be rejected and returned without review.

1. Dimensioned outline drawing showing plan and elevations of engine generator set and drive system.
2. Paragraph by paragraph specification compliance statement, describing differences between specified and proposed equipment.
3. Engine and generator weight, and anchoring requirements.
4. Catalog information and technical description; include materials for block, heads, valves, rings, cylinders, pistons, crankshaft, and major bearings and wear surfaces.
5. Complete list of accessories provided.
6. Performance curves showing engine efficiency (fuel consumed per kWh output), gross fuel consumption rate, and kW output at design rated output, one-half load, and one-quarter load. Account for design altitude, temperature corrections, and engine parasitic loads.
7. Transient and subtransient reactances per unit.
8. Output waveform and telephone interference factor (TIF).
9. Circuit breaker data, including make model, catalog number, settings, and time current curves.
10. Control panel instrument identification inscriptions.
11. Guarantee.
12. Project Specific Electrical schematic and point-to-point wiring diagrams for the following; all wiring shall be labeled and these designations shall appear on the electrical wiring diagrams and schematics.
 - a. Generator control panel.
 - b. Main generator.
 - c. Voltage regulator.

- d. Battery charging system.
- e. Governing system.
- f. Enclosed electrical components.

- 13. Engine generator set motor starting capability and percent voltage dip curve.
- 14. Block heater size and voltage.
- 15. Heated fuel strainer system size and voltage.
- 16. Jacket water heater size and voltage.
- 17. Fuel transfer pump size and voltage.
- 18. Subbase tank size and dimensions.
- 19. Noise data for enclosed engine generator at 50 percent, 75 percent, and full load.
- 20. Load bank data.
- 21. Electrical conduit stub-up locations.

B. Letter of Compliance: Submit a letter with the Submittal certifying full and complete compliance with the Specifications, Drawings, and other related project requirements, and the generator submitted shall start and carry all the required loads under the condition stated in the Contract Documents. The letter shall list any exceptions or deviations from specified requirements, if any, and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

C. Informational Submittals:

- 1. Certified factory Test Report.
- 2. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 3. Description of parts and service availability.
- 4. Manufacturer's Certificate of Proper Installation, in accordance with Division 1, General Requirements.
- 5. Manufacturer's published warranty documents for all components whether or not originally manufactured by the Seller.
- 6. Air quality permit.

1.03 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

- 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
- 2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

B. Manufacturer Special Requirements:

1. Generator set shall be listed to UL 2200 or submitted to an independent third party certification process to verify compliance as installed.
2. Manufacturer of generator set shall be certified to ISO 9001 and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.04 SPECIAL GUARANTEE

A. Provide manufacturer's guarantee or warranty with no deductibles and including travel time, service hours, repair parts and expendables (oil, filters, antifreeze and other items required for the complete repair) with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction of the Work specified in this Specification section found defective during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The generator set specified in this section shall be products of:

1. Cummins.
2. Caterpillar.
3. Kohler Power Series.
4. Other national known Manufactures

A. Ambient Temperature at Air Intake: 122 degrees F maximum.

B. Ambient Temperature at Engine Generator Set: 122 degrees F maximum.

2.03 GENERAL

A. Ratings:

1. Operate at 1,800 rpm.
2. Minimum rating shall be as shown on Drawings, with minimum 0.8 PF. Size of generator shall be adjusted upward as required to meet the performance requirements specified herein.
3. Voltage: 480Y/277 volts, three-phase, 4-wire, 60-Hz.
4. Rated based on standby service.

B. Emissions: Engines shall meet emission requirements specified in 40 CFR Chapter I Part 89 for off-highway Internal Combustion (IC) engines.

2.04 ENGINE

A. General:

1. Manufacturer's standard design, unless otherwise specified.
2. Engine parts designed with adequate strength for specified duty.

B. Type:

1. Diesel fueled, Tier 2, 4-stroke type with unit mounted radiator and fan cooling.
2. Minimum displacement shall be 1,860 cubic inches or as recommended by generator manufacturer.
3. Minimum number of cylinders shall be 12 or as recommended by generator manufacturer.

C. Starting System:

1. Type: Automatic, using 24-volt battery-driven starter acting in response to control panel.
2. Starter shall be capable of three complete cranking cycles without overheating.
3. Batteries:
 - a. Sized as recommended by engine manufacturer.
 - b. Lead-acid type.
 - c. Capable of providing 15 seconds minimum of cranking current at 0 degree C and three complete 15-second cranking cycles at 50 degrees C.
 - d. Housed in acid-resistant frame isolated from engine generator main frame.
 - e. Located such that maintenance and inspection of engine is not hindered.
 - f. Complete with battery cables and connectors.

4. Battery Charger:

- a. UL 1236 listed and labeled.
- b. 10-amp automatic float, taper and equalize charge type, with plus or minus 1 percent voltage regulation over a plus or minus 10 percent input voltage variation.
- c. Temperature compensated to operate over an ambient range of minus 30 degrees C to 50 degrees C.
- d. Locate charger in generator enclosure. Generator manufacturer shall coordinate location.
- e. Include:
 - 1) Ammeter and voltmeter.
 - 2) Fused ac input and dc output.

- 3) Power ON pilot light.
- 4) AC failure relay and light.
- 5) Low and high dc voltage alarm relay and light.
- f. Alarm relay dry contacts rated 4 amps at 120V ac.

D. Fuel System:

1. Engine driven, mechanical, positive displacement fuel pump.
2. Fuel filter with replaceable spin-on canister element.
3. Fuel Connections to Engine: Flexible hose, suitable for application.
4. Location of fuel filter shall be in an easily accessible location along the side of the engine. Do not locate on top or over the top of the engine.

E. Governing System:

1. Isochronous electronic governor, or as recommended by the engine manufacturer.
2. Regulates speed as required to hold generating frequency within tolerable limits and within 5 percent of nominal design speed.
3. Accessories: Positive overspeed trip switch.

F. Jacket Water Cooling System:

1. Radiator:
 - a. Consisting of engine drive jacket water pump, fan assembly, fan guard, and duct flange outlet.
 - b. Cooling System: Rated for full load operation in 122 degrees F (50 degrees C) ambient as measured at alternator air inlet.
 - c. Fan: Suitable for use in a system with 0.5 in H₂O restriction.
 - d. Sized based on a core temperature that is 20 degrees F higher than rated operation temperature.
2. Engine Thermostat: As recommended by manufacturer to regulate engine water temperature.
3. Jacket Water Heater: Thermostatically controlled.
4. Engine Cooling Liquid: Fill cooling system with a 50/50-ethylene glycol/water mixture prior to shipping.

G. Lubrication System:

1. Type: Full-pressure.
2. Accessories:
 - a. Pressure switch to initiate shutdown on low oil pressure.
 - b. Oil filter with replaceable element.
 - c. Bayonet type oil level stick.
 - d. Valved oil drain extension.
3. Oil Cooling System: Water-cooled heat exchanger utilizing jacket water.

H. Exhaust System:

1. Muffler: Rated for as recommended by generator manufacturer to meet noise requirements specified in Article Outdoor Weather-Protective Enclosure. Locate muffler inside the generator enclosure.
2. Wrap exposed length of exhaust pipe and silencer with thermal insulating wrap.
3. Exhaust Pipe: ASTM A335, Grade P11, standard wall, with fittings selected to match piping materials.
4. Pipe Connections: Welded.
5. Engine Connection:
 - a. Flanged, flexible, corrugated, Type 321 stainless steel expansion fitting, specifically suited for diesel exhaust service.
 - b. Length as required for flexibility and expansion in piping arrangement shown on Drawings.

I. Air Intake System: Equip with dry type air cleaner with filter service (restriction) indicator.

J. Engine Manufacturer:

1. Caterpillar.
2. Cummins.
3. Detroit Diesel.
4. Other Nationally known Manufacturers

2.05 GENERATOR

A. General:

1. Meet applicable requirements of NEMA MG 1.
2. Synchronous type with 2/3 pitch, revolving field, drip-proof construction, air cooled by a direct drive centrifugal blower fan.
3. Stator Windings:
 - a. Skewed for smooth voltage waveform.
 - b. Reconnectable, 12 lead, factory connected 3-phase, 4 wire, 480Y/277 volt solidly grounded.
4. Overspeed Capability: 125 percent.
5. Waveform Deviation from Sine Wave: 5 percent maximum.
6. Telephone Interference Factor: 50 maximum.
7. Total Harmonic Current and Voltage Distortion: 5 percent maximum, measured at generator main circuit breaker.

B. Insulation System:

1. Class H, with a maximum rise of 130 degrees C over 40 degrees C ambient in accordance with NEMA MG 1.
2. Vacuum pressure impregnated (VPI).

C. Excitation System:

1. Field brushless type or permanent magnet generator (PMG) exciter.
2. PMG and Controls: Capable of providing regulated current, at a rate of 300 percent of nameplate current, to a single-phase or three-phase fault for 10 seconds.

D. Voltage Regulation:

1. Solid state, three-phase sensing type.
2. Adjustable output voltage level to plus or minus 5 percent.
3. Provisions for proper voltage regulation for existing or future adjustable frequency drives as part of generator load.
4. Conformal coating environmental protection.

E. Voltage and Frequency Regulation Performance:

1. Steady State Voltage Regulation: Less than plus or minus 0.5 percent from no load to continuous rating point.
2. NEMA MG 1 Defined Transient Voltage Dip:
 - a. Less than 15 percent based on load profile of the facility.
 - b. Recovery to rated voltage and frequency within 2 seconds following each load step.
3. Frequency dip shall be less than 5 percent.
4. Steady State Frequency Regulation: Plus or minus 0.25-Hz overload range.

F. Motor Starting Capability: Loads can be applied at any order. Apply loads as shown on Drawings, assuming 40 kVA base load.

G. Short Circuit Capabilities: Sustain 300 percent of rated current for 10 seconds for external three-phase bolted fault without exceeding rated temperatures.

H. Main Circuit Breaker: Adjust the following ratings upward if a larger size generator is required.

1. Type: Molded case 100 percent rated.
2. Current Rating: As required for the generator.
3. Interrupt Rating: 42,000 amps RMS symmetrical at 480 volts.
4. Short time protection.
5. Trips:
 - a. Solid state, RMS sensing.
 - b. Adjustable Functions:
 - 1) Long-time current pickup.
 - 2) Long-time delay.
 - 3) Short-time delay.
 - 4) Ground fault.
6. Enclosure:
 - a. Rating: NEMA 250, Type 1.
 - b. Mounted with vibration isolation from engine generator set.
7. Surge Protective Devices: Three-phase capacitors and arresters mounted in terminal compartment.
8. Breaker shall be Square D PJ Series. Micrologic 5.0 trip unit. Type E

plug, or approved equal.

2.06 BASE SKID

A. The engine generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall accommodate all required and specified accessories including but not limited to battery, battery tray with hold down clamps, battery charger, engine and generator controls, and generator output protective devices. The fuel tank shall be mounted in the base of the steel base. The base shall be constructed to support the specified weather proof sound attenuating enclosure. Also, the base shall be sized to accommodate the load bank circuit breaker and controls.

2.07 INTEGRAL SUBBASE FUEL TANK

A. General:

1. Full load operation of generator set for 48 hours.
2. UL 2085 listed and labeled, or as required by City of Pampa, TX for this type of operation.
3. Installation shall be in compliance to NFPA 37.
4. Double-walled, steel construction and shall include the following features:
 - a. Emergency tank and basin vents.
 - b. Mechanical level gauge.
 - c. Fuel supply and return lines, connected to generator set with flexible fuel lines as recommended by engine manufacturer and in compliance to UL 2200 and NFPA 37 requirements.
 - d. Leak detection provisions, wired to generator set control for local and remote alarm indication.
 - e. High and low level float switches to indicate fuel level. Provide fuel gauge with full, half full, and empty readings. Fuel tank gauge shall be visible from the tank fill port to avoid overfilling the tank. Wire switches to generator control for local and remote indication of fuel level.
 - f. Basin drain.
 - g. Integral lifting provisions.
 - h. Updraft and emergency venting systems shall be provided by tank manufacturer per UL 142 requirements. The normal vent shall extend thru the enclosure roof with a watertight penetration. The normal vent shall be secured to the enclosure.

2.08 VIBRATION ISOLATORS

- A. Performance: To meet all appropriate code requirements.
- B. Provide vibration isolators, spring/pad type.

C. Include seismic restraints if required by Site location.

2.09 CONTROL SYSTEM

A. Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control panel shall provide all operating, monitoring, and control functions for the generator set. The control panel shall provide real time digital communications to all engine and regulator controls via SAE J1939. The programmable logic controller, if used, shall be Allen-Bradley Control Logix.

B. The generator set control shall be tested and certified to the following environmental conditions:

1. Minus 40 degrees C to plus 70 degrees C operating range.
2. 95 percent humidity non-condensing, 30 degrees C to 60 degrees C.
3. IP22 protection.
4. 5 percent salt spray, 48 hours, plus 38 degrees C, 36.8V system voltage.
5. Sinusoidal vibration 4.3G's RMS, 24-1,000 Hz.
6. Electromagnetic Capability (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2).
7. Shock: Withstand 15G.

C. The following functionality shall be integral to the control panel.

1. The control shall include a minimum 64 by 240 pixel, 28mm by 100mm, white backlight graphical display with text based alarm/event descriptions.
2. The control shall include a minimum of 3-line data display.
3. Audible horn for alarm and shutdown with horn silence switch.
4. Standard ISO labeling.
5. Multiple language capability.
6. Remote start/stop control.
7. Local run/off/auto control integral to system microprocessor.
8. Cool-down timer.
9. Speed adjust.
10. Lamp test.
11. Push button emergency stop button.
12. Voltage adjust.
13. Voltage regulator V/Hz slope – adjustable.
14. Password protected system programming.

D. The controls shall provide the following digital readouts for the engine and generator. All readings shall be indicated in either metric or English units.

E. Engine controls and metering shall include as a minimum the following:

1. Engine oil pressure.
2. Engine oil temperature.
3. Engine coolant temperature.
4. Engine rpm.
5. Battery volts.
6. Engine hours.
7. Engine crank attempt counter.
8. Engine successful start counter.
9. Service maintenance interval.
10. Real time clock.
11. Oil filter differential pressure.
12. Fuel temperature.
13. Fuel pressure.
14. Fuel filter differential pressure.
15. Fuel consumption rate.
16. Total fuel consumed.
17. Engine crankcase pressure.
18. Air filter differential pressure.
19. Boost pressure.
20. Fuel tank level.

F. The generator control and metering shall include as a minimum the following:

1. Generator AC volts (Line to Line, Line to Neutral and Average).
2. Generator AC current (Avg and Per Phase).
3. Generator AC Frequency.
4. Generator kW (Total and Per Phase).
5. Generator kVA (Total and Per Phase).
6. Generator kVAR (Total and Per Phase).
7. Power Factor (Avg and Per Phase).
8. Total kW-hr.
9. Total kVAR-hr.
10. % kW.
11. % kVA.
12. % kVAR.

G. Voltage Regulation functions shall include, as a minimum, the following:

1. Excitation voltage.
2. Excitation current.

H. The control panel shall monitor and provide alarm indication and subsequent shutdown for the following conditions. All alarms and shutdowns are accompanied by a time, date, and engine hour stamp that are stored by the control panel for first and last occurrence.

I. The engine shall shut down if any of the following occur:

1. Low oil pressure alarm/shutdown.

2. High coolant temperature alarm/shutdown.
 3. Loss of coolant shutdown.
 4. Overspeed shutdown.
 5. Overcrank shutdown.
 6. High crankcase pressure alarm/shutdown.
 7. Emergency stop depressed shutdown.
 8. Low coolant temperature alarm.
 9. Low battery voltage alarm.
 10. High battery voltage alarm.
 11. Control switch not in auto position alarm.
 12. Battery charger failure alarm.
- J. The generator shall shut down if any of the following occur:
1. Generator over voltage.
 2. Generator under voltage.
 3. Generator over frequency.
 4. Generator under frequency.
 5. Generator reverse power.
 6. Generator overcurrent.

- K. The generator shall shut down if any of the following occur:
1. Loss of excitation alarm/shutdown.
 2. Instantaneous over excitation alarm/shutdown.
 3. Time over excitation alarm/shutdown.
 4. Rotating diode failure.
 5. Loss of sensing.
 6. Loss of PMG.

L. The control panel shall include the ability to accept eighteen programmable digital input signals. The signals may be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.

M. The control panel shall include the ability to operate fourteen programmable relay output signals, integral to the Controller. The output relays shall be rated for 2A at 30V dc and consist of six Form A (Normally Open) contacts and ten Form C (Normally Open and Normally Closed) contacts.

N. The control panel shall include the ability to operate two discrete outputs, integral to the Controller, which are capable of sinking up to 300 mA.

O. All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be integral to the generator set control:

1. Engine running hours display.
2. Service maintenance interval (running hours or calendar days).
3. Engine crank attempt counter.
4. Engine successful starts counter.
5. 20 events are stored in control panel memory.

6. Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use fourteen user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:

- a. Day of week.
- b. Time of day to start.
- c. Duration of cycle.

P. The control shall include Modbus RTU communications as standard via RS-485 half duplex with configurable baud rates from 2.4k to 57.6k.

Q. Provide a local, control panel-mounted annunciator to meet the requirements of NFPA 110, Level 1:

1. Annunciators shall be networked directly to the generator set control.
2. Local Annunciator shall include a lamp test pushbutton, alarm horn and alarm acknowledge pushbutton.
3. Provide the following individual light indications for protection and diagnostics:
 - a. Over-crank.
 - b. Low coolant temperature.
 - c. High coolant temperature warning.
 - d. High coolant temperature shutdown.
 - e. Low oil pressure warning.
 - f. Low oil pressure shutdown.
 - g. Over-speed.
 - h. Low coolant level.
 - i. EPS supplying load.
 - j. Control switch not in auto.
 - k. High battery voltage.
 - l. Low battery voltage.
 - m. Battery charger AC failure.
 - n. Emergency stop.
 - o. Spare.

R. All interconnecting wiring shall be labeled with machine-printed heat shrink or slip on wire labels. Labels using adhesives are unacceptable. Submit Shop Drawings showing point-to point wiring diagrams to include all terminal block designations and wire label numbers. Provide Shop Drawings showing the locations of all electrical panels and components.

2.11 ELECTRICAL SERVICE FOR GENERATION

A. A 208/120 volts, 3-phase, 4-wire service shall be extended, by other, to a load center or panelboard furnished and installed with the generator.

B. The panelboard shall be rated at 208/120 volts, 3-phase, 4-wire with main circuit breaker. Reference Section 26 24 16, Panelboards for panelboard

requirements.

C. All electrical equipment furnished and installed at the generator, including battery charger, heaters, lights, etc. shall be pre-wired to the panelboard.

2.12 FACTORY FINISHING

A. Engine Generator Set and Instrument Panel: Factory-applied primer and two finish coats of manufacturer's standard heat-resistant engine paint.

2.13 FACTORY TESTS

A. General: Conform to NFPA 110.

B. Steady Load Test: Test engine generator set at steady load run of 4 hours minimum duration at 100 percent full-rated load at rated power factor.

C. Transient Load Test: Conduct transient load test to demonstrate ability to meet load pickup and load release requirements specified.

D. Harmonic Test: Conduct at full load conditions.

E. Record and Report: Provide a certified test report to include the following:

1. Strip chart recording and full harmonic analysis measuring up to 50th harmonic for both voltage and current and three phases simultaneously.

2. Transient response.

3. Load/speed stability.

4. Engine fuel consumption.

5. Power output.

6. Harmonic analysis.

PART 3 EXECUTION

3.01 INSTALLATION

A. Level and securely mount engine generator set in accordance with manufacturer's recommendations.

B. Install in accordance with NECA 404.

C. Where applicable, mount engine generator set on vibration isolators in accordance with isolator manufacturer's recommendations.

D. All conduits shall enter through an electrical stub-up located directly under the generator terminal box and control enclosure.

E. Install engine or radiator exhaust pointing anyway from residential area.

3.02 FIELD FINISHING

A. Touchup damaged coating with paint system compatible to existing.

3.03 FIELD TESTS

A. General:

1. Conform to NFPA 110.
 2. Contractor shall provide all recording instrumentation to document test results. Provide test report and raw data to Owner.
 3. Owner will fill fuel tank for testing.
- B. Performance Test:
1. Perform upon completion of installation.
 2. Operate 4 hours minimum using resistive load bank.
3. Manufacturer's representative shall make necessary adjustments.
 4. Demonstrate ability of engine generator set to start and carry specified loads. Owner will start/stop loads (pump, etc.) in any order. Contractor shall provide all required instruments to record generator voltage, current, frequency on a recording device that records the 60-Hz wave forms and amplitude for detail analysis.
 5. Demonstrate engine generator set safety shutdowns.
- C. Test Report: Record and report the following:
1. Electric load on generator.
 2. Fuel consumption.
 3. Exhaust temperature.
 4. Ambient air temperature.
 5. Safety shutdown performance results.
 6. Noise levels at Property line.
- D. Post-test Requirements:
1. Make final adjustments.
 2. Replace fuel and oil filters.
 3. Check belt drive tensions.
 4. Demonstrate proper operation of equipment, including automatic operation with control from automatic transfer switch, to Engineer and Owner.
 5. Contractor shall provide fuel to re-fuel engine fuel tank to full.

3.04 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative: Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time included, for the following services:
1. Installation assistance and inspection.
 2. Functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
 3. Facility startup
 4. Post-startup training of Owner's personnel.

LOW VOLTAGE AUTOMATIC TRANSFER SWITCHES

PART 1 GENERAL

1.01 SUMMARY

A. Furnish and install an open transition low voltage automatic transfer switches having the ratings, features/accessories and enclosures as specified herein and as shown on the Contract Drawings. The assembly shall have a breaker section and an automatic transfer control section.

1.02 SUBMITTALS

A. The following information shall be submitted to the Engineer:

1. Front view and plan view of the assembly.
2. Schematic diagram.
3. Conduit space locations within the assembly.
4. Assembly ratings including:
 - a. Withstand and Closing rating.
 - b. Voltage.
 - c. Continuous current rating.
 - d. Short-Time rating if applicable.
 - e. Short-circuit rating if ordered with integral protection.
5. Cable terminal sizes.
6. Product Data Sheets.

B. Letter of Compliance: Submit a letter with the Submittal certifying full and complete compliance with the Specifications. Drawings and other related project requirements. The letter shall list any exceptions or deviations from specified requirements. If any, and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

C. Where applicable, the following additional information shall be submitted to the Engineer:

1. Busway connection.
2. Connection details between close-coupled assemblies.
3. Composite front view and plan view of close-coupled assemblies.

1.03 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.

C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of 5 years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton's Cutler-Hammer.
- B. ASCO.
- C. Russell electric.

2.02 RATINGS

- A. Open Transition: 480V, three-phase, four-wire, four-poles.
- B. Transfer switch ampere rating shall be as shown on Drawings.
- C. The transfer switch shall have a three cycle withstand and closing rating of 65 kA at 480 volts.
- D. The transfer switch shall be 100 percent equipment rated for continuous duty.
- E. The voltage rating of the transfer switch shall be no less than the system voltage rating. The continuous current rating of the transfer switch shall be no less than the maximum continuous current requirements of the system.
- F. The transfer switch shall be 100 percent equipment rated for continuous duty as shown on Drawings and shall conform to the applicable requirements of UL 1008 for emergency system total load.
- G. The automatic transfer switches shall be fully rated to protect all types of loads, inductive and resistive, from loss of continuity of power, without derating, either open or enclosed.

2.03 OPERATING CONDITIONS

- A. Ambient temperature at average 104 degrees F with a 4 hours' high of 110 degrees F.

2.04 CONSTRUCTION

A. Breaker Section:

- 1. The breaker section shall be of dead front distribution switchboard type construction with two breakers. The breakers shall be controlled by the automatic transfer control system in the automatic transfer section of the automatic transfer switch assembly.
- 2. Type: Molded case 100 percent rated.
- 3. Current Rating: As shown on Drawings (adjust upward if a larger generator is required).
- 4. Interrupt Rating: 42,000 amps RMS symmetrical at 480 volts.
- 5. Short time protection.
- 6. Trips:
 - a. Solid state, RMS sensing.
 - b. Adjustable Functions:
 - 1) Long-time current pickup.
 - 2) Long-time delay.
 - 3) Short-time delay.
 - 4) Ground fault.
- 7. Breaker Manufacturer:

- a. Eaton.
- b. Square D.
- c. General Electric.
- B. The switching panel shall consist of a separate control or transformer panel. Control power for all transfer operations shall be derived from the line side of the source to which the load is being transferred.
- C. Each transfer switch shall be positively interlocked both mechanically and electrically to prevent simultaneous closing of both sources under either automatic or manual operation. Main contacts shall be mechanically held in position in both normal and emergency positions.
- D. Transfer switches will be supplied with a manual-operating handle. Manual operation shall only be performed with the switch de-energized.
- E. The transfer switch shall have a multi-tap voltage transformer for ease of voltage adjustment in the field.
- F. The transfer switch shall be capable of isolating the sensing circuit for a Delta Wye application.
- G. One Form C contacts for NORMAL Source Available. The contacts shall be rated for 10-amp, 1/3 hp at 250V ac and 10-amp at 30V dc.
- H. One Form C contacts for STANDBY Source Available. The contacts shall be rated for 10-amp, 1/3 hp at 250V ac and 10-amp at 30V dc.

2.05 MICROPROCESSOR-BASED CONTROLLER

A. The microprocessor-based logic controller shall be door mounted and shall provide the operator with an overview of the transfer switch status, parameters, and diagnostic data. The controller shall have a voltage range of 0 volts to 790 volts (50/60-Hz) and an accuracy of plus or minus 1 percent of nominal input voltage. The controller shall have a frequency range of 40-Hz to 70-Hz and an accuracy of plus or minus 0.3-Hz. Control power input range from 65V ac to 145V ac RMS 50/60-Hz. The controller shall be listed under UL Standard 1008 and shall be Cutler-Hammer type ATC-600, or approved equal.

- 1. The microprocessor-based logic controller shall have an operating environmental range of:
 - a. Operation minus 20 degrees C to plus 70 degrees C.
 - b. Storage minus 30 degrees C to plus 85 degrees C.
 - c. Relative humidity (noncondensing) 0 percent to 95 percent.
 - d. The microprocessor-based controller display shall be UV resistant and include a backlit LCD display, two-line, 16 character and shall be capable of displaying the following:
 - 1) Connected Source voltages on all phases.
 - 2) Connected Source frequency.
 - 3) Real time clock for Time/Date stamp.
 - 4) Historical data.
 - 5) Programming and set point information.
 - 6) Password entry.
 - 7) Timer countdown for each timer while functioning.

- 8) Help function for detailed description of displayed messages.
2. The microprocessor-based controller shall include five individual LED's for indicating the following:
 - a. Unit Status.
 - b. Mimic Diagram showing Availability status of NORMAL source.
 - c. Mimic Diagram showing Availability status of EMERGENCY source.
 - d. Mimic Diagram showing Connection status of NORMAL source.
 - e. Mimic Diagram showing Connection status of EMERGENCY source.
 - f. The microprocessor-based controller shall contain the following features:
 - 1) Password programming protection.
 - 2) Set points shall be stored in nonvolatile memory, and use of an external battery source to maintain operation during "dead" periods shall not be required.
 3. Historical Data Storage to include:
 - a. Engine Run Time.
 - b. NORMAL source Available time.
 - c. EMERGENCY source Available time.
 - d. NORMAL source Connected time.
 - e. EMERGENCY source Connected time.
 - f. LOAD Energized Time.
 - g. Number of Transfers.
 - h. Date, Time and Reason for Last Sixteen transfers.
 - i. Monitor Mode Event.
 - j. Fail Safe Event.
 - k. Aborted Test.
 4. The microprocessor-based controller shall contain the following voltage and frequency features:
 - a. The voltage of each phase of the NORMAL source and the EMERGENCY source shall be monitored, with under-voltage dropout adjustable 78 percent to 97 percent of nominal and pickup adjustable from dropout setting plus 2 percent to 99 percent of nominal.
 - b. The frequency of the NORMAL source and the EMERGENCY source shall be monitored, with under-frequency dropout adjustable from 90 percent to 97 percent of nominal and pickup from dropout setting plus 1-Hz, 99 percent of nominal.
 - c. The voltage of each phase of the NORMAL source and the EMERGENCY source shall be monitored, with over-voltage dropout adjustable from 105 percent to 110 percent of nominal and pickup adjustable from the dropout setting minus 2 percent to 103 percent of nominal.
 - d. The frequency of the NORMAL source and the EMERGENCY

source shall be monitored, with over-frequency dropout adjustable from 103 percent to 105 percent of nominal and adjustable pickup from the dropout setting minus 1-Hz, 101 percent of nominal.

e. The voltage of each phase of the NORMAL source shall be monitored, with Phase Unbalance dropout adjustable from 5 percent to 20 percent of nominal and pickup adjustable from 3 to (Dropout setting minus 2 percent).

f. The voltage of each phase of the EMERGENCY source shall be monitored, with Phase Unbalance dropout adjustable from 5 percent to 20 percent of nominal and pickup adjustable from 3 to (Dropout setting minus 2 percent).

g. The voltage of each phase of the NORMAL source shall be monitored, with Phase Reversal protection.

h. The voltage of each phase of the EMERGENCY source shall be monitored, with Phase Reversal protection.

5. The microprocessor-based controller shall contain the following time delay features:

a. A time delay shall be provided on transfer to EMERGENCY source, adjustable from 0 seconds to 1,800 seconds. TDNE – Time Delay Normal to Emergency.

b. A time delay shall be provided to override a momentary power outage or voltage fluctuation, adjustable from 0 seconds to 120 seconds. TDES – Time Delay engine Start.

c. A time delay shall be provided on retransfer from EMERGENCY source to NORMAL source, adjustable from 0 seconds to 1,800 seconds. TDEN – Time Delay Emergency to Normal.

d. A time delay shall be provided after retransfer that allows the generator to run unloaded prior to shutdown, adjustable form 0 seconds to 1,800 seconds. TDEC – Time Delay Engine Cool down.

e. A time delay shall be provided for engine failure to start, fixed setting of 6 seconds. TDEF – Time Delay Engine Fail.

f. All delays shall be field adjustable from the microprocessor-based controller without the use of special tools.

6. The microprocessor-based controller shall contain the following features, pushbuttons and selector switches:

a. “HELP”, “INCREASE”, “DECREASE”, “DISPLAY SELECT” and “STEP” pushbuttons.

b. Plant exerciser, selectable – disabled, 7, 14, 28-day interval, adjustable 0 minutes to 600 minutes, load or no load with Failsafe.

c. System Test Pushbutton.

d. Bypass Time Delay Emergency to Normal (TDEN) Pushbutton.

e. Bypass Time Delay Normal to Emergency (TDNE) Pushbutton.

f. Maintenance Electrical Operator Isolator Switch. Provide a 2-Position Selector Switch, maintained contact, marked: “OPERATE” and “DISABLE.”

g. Alternative Transfer Mode of Operation Switch. Provide a 2-Position Selector Switch, maintained contact, marked: "AUTOMATIC" and "NON-AUTOMATIC." Transfer Switch will be labeled as UL Non-Automatic.

7. The microprocessor-based controller shall contain the following input/output contacts:

a. One Form C contact for closure of the Generator start circuit. The contacts shall be of silver alloy with gold flashing. The contacts shall be rated for 5-amp at 250V ac and 5-amp at 30V dc.

b. One Form C contact for PRE-TRANSFER SIGNAL. The contacts shall be rated for 10-amp at 250V ac and 10-amp at 30-V dc.

2.06 AUTOMATIC TRANSFER CONTROL SYSTEM

A. Dual Source, No Tie, Open Transition Automatic Transfer Control System:

1. The logic of the transfer control system functions shall be provided via a microprocessor. The set points shall be field adjustable without the use of special tools.

2. A digital readout shall display each option as it is functioning. The readout shall display actual line-to-line voltage, line frequency and timers. When timers are functioning, the microprocessor shall display the timer counting down. All set points shall be capable of being reprogrammed from the front of the logic panel when the transfer control system is in the program mode. A test pushbutton shall be included as part of the microprocessor. The microprocessor shall be compatible with a twisted pair communication over a network to a computer for control or printer.

3. The transfer control system includes the following features:

a. Time delay normal to alternate, adjustable.

b. Time delay alternate to normal, adjustable.

c. Delayed transition time delay, adjustable from 0 seconds to 120 seconds, to allow disconnection of the load during transfer in either direction to prevent excessive inrush currents due to out-of-phase switching of large inductive loads.

d. LEDs to indicate normal and alternate position.

e. LEDs marked "Source 1" and "Source 2" to indicate that respective source voltages are available.

f. LEDs to indicate which source is preferred.

g. LED to indicate the load energized.

h. Historical transfer information via the front panel.

i. Two-position selector switch permitting two modes of transfer control system operation: AUTO-MANUAL.

4. When the alternate source is an engine generator, the following features shall also be provided:

a. Adjustable time delay engine start.

b. Adjustable time delay engine cool down.

c. Engine start contact.

d. Frequency/voltage relay for alternate source, frequency adjustable

from 45-Hz to 60-Hz and voltage fixed at 90 percent pickup, 70 percent dropout.

e. Plant exerciser with no load and load selector switch.

5. Sequence of Operation – Automatic Mode:

a. The transfer control system shall automatically transfer its load circuit to an emergency or alternate power supply upon failure of its normal or preferred source.

b. Upon loss of phase-to-phase voltage of the normal source to 80 percent of nominal, and after a time delay, adjustable from 0.5 to 15 seconds, to override momentary dips and/or outages, a 10-ampere, 30V dc contact shall close to initiate starting of the emergency or standby source power plant. Transfer to the alternate source shall take place immediately upon attainment of 90 percent of rated voltage and frequency of that source. For systems not involving engine generator sets as the alternate source, transfer shall occur after an adjustable time delay of 1 second to 60 seconds to override momentary dips and outages.

c. When the normal source has been restored to 90 percent of rated voltage, and after a time delay, adjustable from 0.5 minute to 32 minutes (to ensure the integrity of the normal power source), the load shall be retransferred to the normal source.

d. A time delay, adjustable from 0.5 minute to 32 minutes, shall delay shutdown of the emergency or standby power source after retransfer to allow the generator to run unloaded for cooldown, after which the generator shall be automatically shut down.

e. If the emergency or standby power should fail while carrying the load, transfer to the normal power supply shall be made instantaneously upon restoration of the normal source to satisfactory conditions.

6. Sequence of Operation – Manual Mode:

a. While in manual mode, capable of transferring in either direction under loaded or unloaded conditions.

b. Electrical interlocking shall be provided to prevent the closing of both mains simultaneously.

7. Provide a control power transformer for each source with control power transfer scheme.

8. Provide a microprocessor-based automatic transfer controller.

2.07 WIRING/TERMINATIONS

A. Terminal blocks shall conform to NEMA ICS 4. Terminal facilities shall be arranged for entrance of external conductors from the side or bottom of the enclosure. The main transfer switch terminals shall be suitable for the termination of conductors shown on Drawings. Top entry is prohibited.

2.08 ENCLOSURE

- A. Type: In accordance with Drawing and related Specification. Enclosure shall be nonventilated with enclosure grounding terminal.
- B. Dead front, front accessible wall or floor mounted cabinet with 14-gauge welded steel construction.
- C. Continuously hinged single door, with handle and lock cylinder.
- D. Finish: Baked enamel applied over rust-inhibiting, phosphated base coating.
 - 1. Exterior and Interior Color: Provide gray.
 - 2. Unpainted Nonexposed Metal Parts: Plated for corrosion resistance.

PART 3 EXECUTION

3.01 FACTORY TESTING

- A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.
 - 1. Insulation check to ensure the integrity of insulation and continuity of the entire system.
 - 2. Visual inspection to ensure that the switch matches the specification requirements and to verify that the fit and finish meet quality standards.
 - 3. Mechanical tests to verify that the switch's power sections are free of mechanical hindrances.
 - 4. Electrical tests to verify the complete electrical operation of the switch and to set up time delays and voltage sensing settings of the logic.
- B. The manufacturer shall provide a certified copy of factory test reports.
- C. Transfer switch shall include a label indicating order number, catalog number and date.

3.02 INSTALLATION

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the Contract Drawings.
- B. All necessary hardware to secure the assembly in place shall be provided by the Contractor.
- C. The switch shall be set at manual mode for manual operation. However, Contractor shall furnish and install all control wirings between the ATS' and generator for automatic operation at a future time.

3.03 FIELD QUALITY CONTROL

- A. Provide the services of a qualified factory-trained manufacturer's representative to assist the contractor in installation and start-up of the equipment specified under this section for a period of 2 working days. The manufacturer's representative shall provide technical direction and assistance

to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

3.04 MANUFACTURER'S CERTIFICATION

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

B. The Contractor shall provide a copy of the manufacturer's representative's certification.

3.05 TRAINING

A. The Contractor or Manufacturer's qualified representative shall conduct a training session for up to five owner's representatives for 1 normal workday at a jobsite location determined by the owner. The training program shall consist of the instruction on the operation of the transfer switch and the major components within the assembly.

3.06 FIELD SERVICE ORGANIZATION

A. The manufacturer of the ATS shall also have a national service organization that is available throughout the contiguous United States and is available on call 24 hours a day, 365 days a year.