

**ADDENDUM NO. 3
500 KW WATER PLANT EMERGENCY
POWER GENERATOR
TO SERVE
HARRIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 222
CITY OF HOUSTON E.T.J.
HARRIS COUNTY, TEXAS**

January 28, 2010

LJA JOB NO. 0461-2235W

The following changes will be considered part of the Construction Plans, Bid Proposal and Contract Documents:

- 1.) Reference: **Contract Documents – Bid Proposal**
Replace: Pages 5 and 6 of 7 (attached).

- 2.) Reference: **Technical Specifications – Section 16612 – Standby Power Generator System – Diesel Supplementary Specification**
Replace: Pages 1 through 5 of 5 with revised Page 1 of 5 (attached).

There are no other changes or revisions to the Construction Plans, Bid Proposal and Contract Documents at this time.



PROPOSAL BIDDING SHEET

**500 KW WATER PLANT EMERGENCY
POWER GENERATOR
TO SERVE
HARRIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 222
CITY OF HOUSTON E.T.J.
HARRIS COUNTY, TEXAS
LJA JOB NO. 0461-2235W**

ALTERNATE BID ITEMS

ITEM NO.	QTY.	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
1.	1	LS	Used Refurbished 500 KW Diesel Onan Generator with Cummins Engine, with Less Than 20 Hours of Run Time, includes New Fuel Tank, Proper Disposal of Existing Fuel Tank, Sound Enclosure, Fuel Management System, Concrete Foundation, Electrical Components and All Appurtenances, In Lieu of Base Bid Item No. 1. Unit Price Bid shall also include any and all modifications required to meet Technical Specifications Sections 16213, 16612 and 16612 S, Complete in place	\$ _____	\$ _____
2.	1	LS	On-Site Inductive Load Bank Test for the Used Generator by Cummins Southern Plains, LLC Prior to Purchase, Successful Testing in accordance with Technical Specification Section 16612 S, Paragraph 7.A.1. shall be required for acceptance of Alternate Bid Item No. 1, Complete in place	\$ _____	\$ _____
3.	1	LS	Stainless Steel Exhaust System for New Generator per Technical Specifications Section 16612 S Paragraph 2, Complete in place	\$ _____	\$ _____
4.	1	LS	Stainless Steel Exhaust System for Used Generator per Technical Specifications Section 16612 S Paragraph 2, Complete in place	\$ _____	\$ _____
SUBTOTAL ALTERNATE BID ITEMS				\$ _____	

Contractor is required to bid Alternate Bid. OWNER retains the right to evaluate the bid based on the base bid alone, considering one Alternate or more than one Alternate, whichever is deemed most advantageous to the OWNER.

**PROPOSAL BIDDING
SUMMATION SHEET**

**500 KW WATER PLANT EMERGENCY
POWER GENERATOR
TO SERVE
HARRIS COUNTY MUNICIPAL UTILITY DISTRICT NO. 222
CITY OF HOUSTON E.T.J.
HARRIS COUNTY, TEXAS
LJA JOB NO. 0461-2235W**

BASE BID

SUBTOTAL BASE BID ITEMS \$ _____
SUBTOTAL MISCELLANEOUS ITEMS \$ _____
TOTAL AMOUNT BASE BID \$ _____

ALTERNATE BID ITEMS

ITEM NO. 1 USED GENERATOR \$ _____
ITEM NO. 2 INDUCTIVE LOAD BANK TEST \$ _____
ITEM NO. 3 SS EXHAUST FOR NEW GENERATOR \$ _____
ITEM NO.4 SS EXHAUST FOR USED GENERATOR \$ _____

It is understood that in the event the successful bidder fails to enter into the Contract and to furnish a Performance Bond and Payment Bond in the amount of 100 percent of the Contract and for all parts of the work, as specified in the Instructions to Bidders, the Bidder will forfeit the Cashier's Check OR Bid Bond, as provided in the Contract Documents.

The undersigned proposes, if awarded the Contract, to begin work as stipulated in the written Notice to Proceed issued by the Engineer, and to substantially complete the work within 150 calendar days after the date the work commences and to complete the project within 160 calendar days after the date of work commences.

This bid proposal shall be considered part of the contract.

(Signature)

(Company Name – Bidder)

(Type Name)

(Address)

(Title)

(City) (County) (Zip)

(Attest)

(Phone No.)

(Seal, If Bidder is a Corporation)

(Fax No.)

(E-mail Address)

STANDBY POWER GENERATOR SYSTEMS - DIESEL

SECTION 16612 S

Supplementary Specification

STANDBY POWER GENERATOR SYSTEMS – DIESEL

The following supplement modifies Section 16612 – Standby Power Generator Systems – Diesel. Where a portion of the Specification is modified or deleted by this Supplementary Specification, the unaltered portions of the Specification shall remain in effect.

1. Provide "base type" fuel tank for generator and enclosure being supplied for this project including the project specific requirements as noted below:

A. Fuel Tank: Sub-base (**special**)

1. **Usable Capacity:** 72 hours (3 days) capacity tank @ 100% Load.
- 2) UL-142 Double Wall Carbon Steel Tank
- 3) Fuel Tank footprint to be the same length and width as enclosure.
- 4) Tank to be manufactured with alternating flow control openings in baffle walls to allow for serpentine fuel flow without non-circulating (dead) areas.
- 5) Tank to include an extra set of suction and return dip tubes located in the opposite corner of the end compartments. Both dip tubes shall be ½-inch SS and shall be continuous to the point(s) of connections. Suction Dip tube shall have 45-degree mitered end which shall extend to tank bottom. Discharge Dip tube shall have a 90-degree bend at fuel tank bottom and a flared end section. These dip tubes to be utilized for a proposed Acoustical Control Systems Mfg Model No. FMS 3.6 fuel management system (See Specification 16213). Return fuel dip tubes to be positioned to direct returning fuel toward flow control opening to start serpentine flow. Provide ½" diameter 316 stainless steel tubing extensions, from dip tubes to terminate below proposed fuel management system. Provide full bore 316 stainless steel ball isolation valves mounted at end of 316 stainless steel ½" tubing below Fuel Management System. Fabricated tank to be pressure tested for leakage prior to tank coatings being applied.
- 6) Tank shall be supported above concrete foundation with Korfund sandwich type isolation pads along the outside edges as well as the center of the fuel tank to prevent external containment tank sag and subsequent contact with concrete foundation. Minimum spacing between tank and foundation to be ½" for air circulation. Sufficient quantity of Korfund Isolation pads to be provided by generator vendor to support generator, enclosure, fuel tank and fuel as well as clearance requirements. Tank shall have a uniform 15mils epoxy coating applied to the tank bottom and 6 inches up sides. Finish coatings to match coating type, texture and color of generator enclosure.
- 7) Contractor is responsible for ensuring the protection of all equipment coatings including those applied to the bottom of the tank from damage from handling as well as during transportation. Contractor shall repair any damaged coatings to like new condition as directed by Engineer or Owners Representative. Reference: ASTM, NACE International Book of Standards, SFPC Vol. 1 - Good Painting Practices & SFPC Vol. 2 - Paint Systems and Specifications.
- 8) Contractor to deliver generator to client with full fuel tank of #2 off-road diesel fuel at completion of project.

2. ENGINE EXHAUST SYSTEM - (FOR ALTERNATE BID ITEM NOS. 3 or 4 ONLY)

- A. Silencer: Critical service type. Provide 316 SS exhaust system downstream of turbocharger(s) through muffler rain flapper, including all applicable welds. Provide 316 Stainless steel supports between painted steel enclosure and heated exhaust system components. Size silencer and exhaust system for 84dB @ 3 feet from all sides and outlet.

STANDBY POWER GENERATOR SYSTEMS - DIESEL

- B. Condensate Drain for Muffler: 316 stainless steel pipe connected to each muffler drain outlet through a 316 stainless steel full port ball valve. Provide and label ball valve drain operating instructions with engraved nameplate.
- C. Connections from Engine to Exhaust System: Flexible section of corrugated 316 stainless-steel pipe.
- D. Connection from Exhaust Pipe to Muffler: 316 Stainless-steel expansion joint with liners.
- E. Supports for Muffler and Exhaust Piping: Spring hangers and all-thread rods and vibration hangers.

3. GENERATOR SET PERFORMANCE REQUIREMENTS

- A. Steady-State Voltage Operational Bandwidth: 4 percent of rated output voltage from no load to full load.
- B. Steady-State Voltage Modulation Frequency: Less than 1 Hz.
- C. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage recovers to remain within the steady-state operating band within three seconds.
- D. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
- E. Steady-State Frequency Stability: When system is operating at any constant load within rated load, there are no random speed variations outside the steady-state operational band and no hunting or surging of speed.
- F. Transient Frequency Performance: Less than 5 percent variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within five seconds.
- G. Output Waveform: At no load, harmonic content measured line-to-line or line-to neutral does not exceed 5 percent total and 3 percent for single harmonics. The telephone influence factor, determined according to NEMAMG 1, shall not exceed 50.
- H. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, the generator and its protective devices will supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to any generator system component.
- I. Start Time: Comply with NFPA 110, Type 10, system requirements.

4. ENGINE COOLING SYSTEM

- A. Description: Closed loop, liquid cooled, with radiator factory mounted on engine generator-set skid and integral engine-driven coolant pump.
 - 1. Radiator Core Tubes: Nonferrous-metal construction other than aluminum.

STANDBY POWER GENERATOR SYSTEMS - DIESEL

5. GENERATOR OVERCURRENT AND FAULT PROTECTION CONTROLS

- A. Generator Circuit Breaker: Molded-case, thermal-magnetic type complying with NEMA AB 1 and UL 489.
 - 1. Tripping Characteristic: Designed specifically for generator protection.
 - 2. Trip Rating: Matched to generator rating.
 - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 - 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B. Generator Circuit Breaker: Molded-case, electronic-trip type; complying with UL 489.
 - 1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
 - 2. Trip Settings: Matched to generator thermal damage curve as closely as possible.
 - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 - 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- C. Microprocessor-based unit that continuously monitors current level in each phase of generator output, integrates generator heating effect over time, and predicts when thermal damage of the alternator will occur. When signaled by the protector or other generator-set protective devices, a shunt-trip device in the generator molded case circuit breaker shall open the switch to disconnect the generator from the load circuits. Protection circuits shall perform the following functions:
 - 1. Initiates a generator overload alarm when the generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 - 2. Under single or three-phase fault conditions, regulates the generator to 300 percent of rated full-load current for up to 10 seconds.
 - 3. As heating effect on the generator of overcurrent approaches the thermal damage point of the unit, the protector switches the excitation system off, opens the generator disconnect switch, and shuts down the generator set.
 - 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid exceeding operational limits.

6. IDENTIFICATION

- A. Identify system components according to Division 16 Section "Electrical Identification."
- B. Provide engraved nameplates for all user replaceable maintenance items such as fuel, air and coolant filters. Locate nameplates near replaceable item.
- C. Install "Hearing Protection Required" warning signs outside of doors on all applicable generator enclosure sides.

7. QUALITY CONTROL

A. Manufacturer's Factory Testing:

- 1. **Provide minimum six (6) hour inductive load bank test consisting of: 1 hour @ 25%, 1 hour @ 50%, 1 hour @ 75%, and 3 hours @ 100%. Include three (3) 100% step tests a completion of 6 hour test. Provide owner with (2) bound copies of test results, and (1)**

STANDBY POWER GENERATOR SYSTEMS - DIESEL

CD containing a copy of the test data, logged on a 1-second interval. Notify engineer or owners representative 2 weeks prior to testing.

- B. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect field-assembled components, equipment installation, (including piping and electrical connections) and to supervise testing. Report results in writing. **Field testing shall include the following:**
1. **International Electrical Testing Association Tests:** Perform each visual and mechanical inspection and electrical and mechanical test stated in NETA ATS for emergency engine generator sets, except omit vibration baseline test. Certify compliance with test parameters for tests performed.
 2. **NFPA 110 Acceptance Tests:** Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, the following:
 - a. **Single-step full-load pickup test.**
 3. **Battery Tests:** Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery. Verify acceptance of charge for each element of battery after discharge. Verify measurements are within manufacturer's specifications.
 4. **Battery-Charger Tests:** Verify specified rates of charge for both equalizing and float-charging conditions.
 5. **System Integrity Tests:** Methodically verify proper installation, connection, and integrity of each element of engine generator installation before and during system operation. Check for air, exhaust, and fluid leaks.
 6. **Exhaust-System Back-Pressure Test:** Use a manometer with a scale exceeding 40-inch wc (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
 7. **Noise Level Tests:** Measure A-weighted level of noise emanating from the generator-set installation, including engine exhaust and cooling air intake and discharge, at four locations on the property lines, and compare measured levels with required values.
 8. **Additional tests as recommended by manufacturer.**
- C. **Retest:** Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- D. **Report results of tests and inspections in writing.** Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations.
- E. **Test instruments shall have been calibrated within the last 12 months, traceable to NIST standards, and adequate for making positive observation of test results.** Make calibration records available for examination on request.

8. ADDITIONAL ACCESSORIES/FEATURES:

- A. **Generator Set Main Breaker auxiliary contact, wired into a control panel input, activating the Common Alarm Output when the main breaker is in the "OFF" or "Tripped" position (i.e. Not in the "ON" position).**
- B. **Common Remote Generator Annunciator with Audible Alarm**

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Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil low-pressure prealarm.
7. Fuel tank low level.
8. Overcrank shutdown.
9. Coolant low-temperature alarm.
10. Control switch not in auto position.
11. Battery-charger malfunction alarm.
12. Battery low-voltage alarm.
13. Secondary containment liquid alarm
14. Genset Breaker Not in On Position

Mount and connect generator annunciator panel into door of automatic transfer switch.

- C. Provide Racor see-thru fuel/water separator with blocked fuel indicator for engine fuel system.
- D. Provide 3-sided platform to provide engine maintenance and service access to enclosure doors, if door sill height exceeds 20" minimum. Platform to be constructed of carbon steel with removable open serrated grating, rated at 100 lb/sq. ft. loading. Provide steps with 6" rise and 9" tread minimum, and include OSHA required handrails and toe-boards. Match handrail to existing design, where applicable. Hot dip galvanize all components after fabrication.
- E. Install remote generator annunciator on front door of existing automatic transfer switch.
- F. Provide block filter indicators on all air and fuel filters under engine operating conditions.
- G. Provide marine battery enclosure(s) for all starter storage batteries.
- H. Contractor to connect relay signal contacts in automatic transfer switch and general alarm contact in remote generator annunciator to existing automatic telephone dialer. Provide relays for output signal contacts as required. Provide automatic telephone dialer expansion I/O board as required. Required inputs are as follows:
 - 1) Generator Running
 - 2) Generator Circuit Breaker Not In "On" Position

END OF SECTION