



CITY OF BISHOP

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Request For Bids

Trailer Mounted 300kVA Diesel Generator

Release: Thursday 18 January 2007

Closes: Wednesday 31 January 2007

Contact: David Grah, Director of Public Works

General: The City of Bishop requests bids for the purchase of a Trailer Mounted 300kVA Diesel Generator. Bids shall be delivered to Bishop Public Works at City Hall at 377 West Line Street, Bishop, California 93514. Bids shall be accepted until 1500 on the closing day of this Request for Bids. The City intends to purchase the generator from the bidder with the lowest responsive bid considering bid evaluation factors and the expected useful life of the generator.

The generator shall be used as back up power for City domestic water wells and waste water treatment plant. All equipment and parts supplied with the generator shall be new and shall be as described on the bid form.

Bid Requirements:

1. The bid shall be delivered in a sealed envelope marked "Trailer Mounted 300kVA Diesel Generator Bid".
2. The bid shall reference and include all documentation necessary to demonstrate minimum requirements are met.
3. The bid shall include the total cost of the generator, delivered to Bishop, including all applicable taxes, fees, and warranties.
4. The bid shall include a delivery schedule from bid opening through completion of any warranty periods.
5. The bid shall provide detailed information on equipment warranty program.
6. The bid shall include three references from comparable public agencies that operate comparable equipment. The purpose of the references will be to

gather information on the performance of the proposed equipment and on the service of the potential vendor.

Bid Evaluation:

Bids shall be evaluated on the basis of:

1. Conformance to bid requirements.
2. Price.
3. Delivery.
4. References.

Technical Specifications

PORTABLE EMERGENCY POWER SYSTEM Trailer Mounted 300kVA Diesel Generator

PART 1.00 GENERAL

This specification outlines the requirements for providing a complete, operable and tested mobile diesel engine generator. The portable generator shall be sound attenuated with a self-contained fuel system and voltage changeable distribution. Equipment and materials shall be of current design and ready for delivery, connection and operation.

The engine shall be equipped with the necessary devices to meet current EPA regulations for the operation of a portable diesel generator. In addition, the engine generator shall have been factory tested to ensure reliable operation at rated power.

The generator supplier shall have available factory test results and factory published Operators Manual for the engine-generator set. The engine shall be filled with crankcase lube oil and radiator coolant as recommended by the engine manufacturer and/or as specified herein.

The engine generator set shall have posted operating instructions near the control panel and operating devices. Warning placards shall be visible at locations of customer access, to live voltage parts and other electrical connection points.

APPLICABLE DOCUMENTS

The following documents shall apply to the specified equipment.

NEMA MG1	Motors and Generators
EGSA 100	Performance Standards for Engine Generators
JIS	Performance Standard for Engine Generators
JES	Electrical Performance Standards
SAE	Society of Automotive Engineers

PART 2.00 EQUIPMENT

MANUFACTURING STANDARD

Subject to compliance with requirements, provide a portable, sound attenuated, diesel engine generator with certifications and tests.

The generator supplier shall be capable of providing equipment as specified, maintaining service parts inventory and service.

RATINGS

The portable sound attenuated generator set shall be rated for continuous, Prime Power operation at 240 KW, 300 KVA, 0.80 P.F., 3 phase 4 wire, 60 Hz. The following manually selectable voltages shall be available:

- 277/480V, 3-phase, 4-wire
- 139/240V, 3-phase, 4-wire
- 120/208V, 3-phase, 4-wire
- 120/240V, 1-phase, 3-wire

In addition, the following performance ratings shall apply:

- Frequency regulation shall be isochronous under varying loads from no load to full load.
- Frequency variation shall not exceed $\pm 0.25\%$ from no load to full load.
- Voltage regulation shall not exceed $\pm 1.5\%$ from no load to full load.
- Voltage variation shall not exceed $\pm 0.5\%$ from no load to full load.
- Telephone influence factor shall be less than 50.

The generator set shall be capable of picking up 100% load in one step in accordance with NFPA 110.

The sound level shall not exceed 71dB(A) @ 23 feet at full load operation.

ENGINE AND EQUIPMENT

The diesel engine shall be 4-cycle, direct connected to the generator by a semi-flexible coupling and both shall be mounted on a common sub-base. The engine shall have sufficient power to produce the specified rating when operating at generator synchronous speed with all accessories required for normal operation including exhaust, fuel, cooling, and battery charging systems. The engine, with attached cooling system and the generator shall be mounted on the sub-base with heavy duty, resilient mounts that provide vibration isolation. The engine shall be EPA certified for Mobile Off-Highway use and the supplier shall make available, the Federal EPA Certificate of Conformance to substantiate certification.

Maximum engine speed shall be 1800 RPM. The complete diesel engine generator set shall be free of critical speeds from either a major or minor order, and torsional vibrations from 10% below idling to 10% above synchronous speed. Engine shall be equipped with protective controls and sensors for shutdown for low oil pressure, high temperature and overspeed.

The engine shall be equipped with a fuel system suitable for operation on No. 2 diesel fuel oil meeting the requirements of ASTM-975. The fuel system shall include an engine driven transfer pump and replaceable filters.

The engine driven fuel pump shall be positive displacement and capable of providing 110% of

the prime power rating with all filtering equipment in operation.

The engine shall be equipped with a positive displacement, full pressure, lubrication oil pump with full flow replaceable spin-on canister oil filters and a dipstick. Provide replaceable dry element air cleaner with restriction indicator. Provide engine-mounted battery charging alternator, 35 ampere minimum and solid-state voltage regulator.

Provide electronic isochronous governor, consisting of magnetic pickup speed sensor, adjustable electronic control, and an actuator-mounted integral with the fuel pump. Frequency regulation shall be isochronous under varying loads from no load to full load. Frequency variation for constant loads shall not exceed ± 0.25 percent of rated speed.

The cooling system shall include a belt-driven pusher fan and water pump, and a thermostat for temperature control. The cooling system shall be rated for full rated load operation in 95° F ambient conditions. Guard rotating parts against accidental contact. Cooling system shall be filled with minimum 50% mixture of coolant/anti-freeze. Include coolant overflow tank level for monitoring coolant level.

Provide thermostatically controlled, tank type, jacket water heater for quick starting. Jacket water heater shall be rated 120VAC, 1500 watt. The heater AC input shall be connected to a NEMA 5-20P flush mounted male input plug located on the generator receptacle panel.

ENGINE STARTING SYSTEM

Provide a solenoid operated positive engagement gear driven electric starter for operation on 24 volts DC. Provide automatic cranking controls with three crank attempts with rest periods in between. Failure to start, after three cranking attempts, shall shut down and lockout the engine control.

Provide 24 VDC lead acid battery with sufficient capacity to provide 100 seconds engine cranking. Insulated stranded copper conductors shall connect the battery to the generator starter. Battery shall be mounted in a corrosion resistant tray with hold-downs to secure the battery.

Provide a UL Listed battery float charger with a minimum ampere rating of 6A, 24VDC output, 120VAC input. Charger shall be automatic voltage regulated within 1% of the correct temperature compensated value from no load to full load. Boost charging shall be automatic. Include AC and DC fuses protection and a DC charge ammeter. The charger shall be mounted inside the generator enclosure and the AC input shall be connected to a NEMA 5-20P flush mounted male input plug located on the housing exterior.

GENERATOR

The generator shall be three phase, 60 hertz, single bearing, four pole-revolving field, drip-proof, and air-cooled. The rotor shall have amortisseur windings and be dynamically balanced. Generator windings shall be re-connectable, allowing the following voltage connections:

- 277/480V, 3-phase, 4-wire

- 139/240V, 3-phase, 4-wire
- 120/208V, 3-phase, 4-wire
- 120/240V, 1-phase, 3-wire

The insulation system shall vacuum impregnated with a second finish of epoxy varnish that is fungus resistant. The temperature rise for rotor and stator at full load shall not exceed the allowable temperature use for Class F insulation. THD shall not exceed 5% of rated voltage at full load and no single harmonic shall exceed 3% of rated voltage at full load.

The excitation system shall be brushless utilizing full wave silicon diodes with surge and excitation overload protection. The excitation system shall be powered by a three phase, open delta design for maximum motor starting capability and isolation from non-linear loads. Provide permanent magnets in the construction for rapid voltage build up and sustained 300% short circuit current. Electronic current boost methods or CT boost methods are not acceptable.

The voltage regulator shall be of solid-state construction and temperature compensated. Voltage regulation from no load to full load shall not exceed $\pm 1.5\%$. Regulator shall utilize pulse width modulation and be capable of performing in the presence of non-linear loads. The regulator shall be volts/hertz with frequency compensation to allow frequency to decline in an adjustable manner before correcting the output voltage in a linear manner.

ENGINE GENERATOR CONTROL PANEL

The engine generator control panel shall be an integral part of the generator housing to completely isolate it from engine vibration. The panel shall be recessed into the housing with sealed construction and a gasketed door with viewing window for splash proof operation. All switches, lights, and other devices shall be clearly labeled on the panel face.

Provide a three position panel mounted switch (STOP-MANUAL-AUTO) to stop the engine in the STOP position, start and run the engine in the MANUAL position, and allow the engine to start and run by closing a remote contact and stop by opening the remote contact in the AUTO position.

Provide the following panel mounted accessories:

- 2-wire control for Auto Start-Stop operation
- Panel lighting with ON/OFF switch.
- Running time meter in hours and tenths of hours
- Voltage adjustment rheostat $\pm 15\%$
- Engine idle switch
- Engine pre-heat switch

Provide flush mounted analog meters (2%) for the following:

- AC ammeter
- Phase Selector switch shows phase amperage
- AC voltmeter
- Phase Selector switch shows phase voltage

- Frequency meter

Provide engine indicating meters and devices:

- Water temperature gauge
- Oil pressure gauge
- DC charge meter

Controls shall shut down and lock out the engine upon:

- Failure to start after specified time (Overcrank)
- Overspeed
- Low oil pressure
- High engine temperature

Provide DC powered engine monitor with the following lights on the control panel:

- | | | |
|--------------------|-----------|-------------|
| ▪ Engine Running | Green LED | (indicated) |
| ▪ Low oil pressure | Red LED | shutdown |
| ▪ High engine temp | Red LED | shutdown |
| ▪ Overcrank | Red LED | shutdown |
| ▪ Overspeed | Red LED | shutdown |

POWER OUTPUT CONNECTIONS

Provide UL489 listed, electronic trip, circuit breaker, rated 800 amperes, located in control panel dead front behind removable cover. The circuit breaker shall be sized to operate at the highest rated ampacity (Low Wye voltage). A dedicated, UL listed, inverse time delay, over-current relay shall be provided to monitor and protect alternator output, at the lowest rated ampacity (High Wye voltage). In the event of an overload or short circuit, the over-current relay shall activate the circuit breaker shunt trip and open the circuit breaker. The over current relay shall be factory set and tested prior to shipment. Output shall be cable connected to a power output reconnection bus bar. Cable entrance to the power output terminals shall be through a cable entrance panel. Mechanical lugs shall be provided for each phase, neutral and ground. Connection diagrams for the various voltage selections and safety placards shall be clearly displayed.

Provide a customer entry panel as an integral part of the generator housing, to completely isolate it from engine vibration. The panel shall be recessed into the housing with seamless construction with a hinged cover to shield interior from falling water. The bottom of the customer panel area shall be sloped downward for cable entry and to eliminate water accumulation.

The panel shall contain three, 50A-240V twist lock female receptacles and two, 120V single-phase duplex NEMA 5-20R GFCI receptacles. The 50A receptacles and the GFCI convenience receptacles shall be energized regardless of the voltage connection. All receptacles shall be flush mounted and shall be individually protected with UL listed circuit breakers flush mounted within the panel area and clearly labeled which breaker feeds which receptacle. In addition, the panel shall contain the flush mounted male plugs for the AC input power to the water jacket heater and battery charger, and include the automatic Start-Stop terminal connection block.

HOUSING

The engine generator set and all components shall be enclosed in a factory fit, sound attenuated housing with access doors on each side and a door over the control panel. The housing shall be designed so the exhaust system is contained within the enclosure and both the radiator and exhaust discharge vertically in the same duct.

The doors shall be arranged so all filters, battery, water jacket heater and other maintenance items can be easily accessed. The control panel door shall have a Plexiglas window for unobstructed viewing of the engine control panel. All doors shall be gasketed and the handles shall be recessed latching type with provisions for pad-locking. The enclosure shall be equipped with a single point lifting bail on the top.

The housing shall be factory treated with a zinc phosphate process prior to finish painting. The primer coat shall be electrostatic spray-on, urethane modified, epoxy resin paint. Finish paint shall consist of a multi-coat, electrostatic spray-on, alkyd melamine resin paint. Color shall be factory white. The interior of the housing and all intake and discharge ducts shall be lined with sound absorbing, high temperature foam, per UL94 standards. The housing and exhaust system shall be designed to limit the noise level to 71 dB(A) at 23 feet when operating at full rated load.

EXHAUST SYSTEM

The exhaust system shall be designed so that the muffler is mounted inside the housing, completely concealing all components. Exhaust components mounted on the outside the housing is not acceptable. Provide critical silencer as recommended by the generator set manufacturer to meet overall specified sound level and size to assure full load operation without exceeding the engine manufacturer's recommended back pressure. Provide steel flexible connection between the engine and exhaust line as required for pipe expansion and contraction.

FUEL STORAGE SYSTEM

The engine generator shall be fitted with a factory installed, in-housing fuel tank with a minimum capacity of 129-gallons which can be used to provide fuel for the engine generator when removed from the trailer assembly. When mounted on the trailer, the unit shall be provided with a 250-gallon in-trailer fuel tank. The two tanks shall be plumbed together to provide a minimum fuel capacity of 379-gallons. The trailer tank shall be steel and all penetrations shall be on top of the tank only. Tank construction shall include interior baffles to contain fuel oscillations when in transit.

Provide properly sized flexible fuel lines for supply and return and a drop tube for fuel pick-up. Galvanized or copper components shall not be allowed.

TRAILER

Trailer shall be low center of gravity, low bed type with triple axle, towing coupler, and screw jack. The trailer shall meet or exceed the following specifications:

- Axle Capacity Sized by the trailer manufacturer to meet full GVWR requirements
- Number of Axles Three
- Suspension Torsion or Leaf Spring Type
- Jackstand 5,000 lbs.
- Brakes Surge Hydraulic on all axles
- Note: Electric brakes shall be provided if required by federal, state or local codes

Trailer shall be equipped with highway legal fenders and a front adjustable leveling stand with footpad. Unit shall be wired, 12-volt, to comply with Federal highway laws.

Tire and wheel size shall be OEM type; sized per the trailer manufacturer to meet the full load GVWR requirements of the trailer with generator, fuel tank, fuel and all loaded accessories.

Coupler shall be the Lunette eye type; 3-inch diameter.

Provide safety chain and breakaway cable to meet D.O.T. requirements. Safety chain shall be anchored to the trailer by use of a loop of cold-rolled steel, or equivalent solid connection. It shall be lap-welded, not butt-welded, to the trailer. Connection of the chain to the loop shall be a double-clevis connecting link for use on trailer safety chains and shall have a strength rating at least equal to the chain. Connection of the chain to the tow vehicle shall be a 1/4 inch latching clevis-type hook for use on trailer safety chains with a strength rating equal to the chain.

All bolts shall be minimum SAE Grade 5 or SAE Grade 8 where applicable and shall be easily identifiable. All nuts used for load bearing structural applications, unless otherwise specified shall be SAE stover (top lock) grade "B" lock nuts. Only flat washers shall be used with lock nuts. Lock Tite shall be used on any bolts that are torqued into a blind hole. All fasteners shall allow accessibility using standard mechanics tool.

Trailer lighting shall conform to the latest edition of the Federal Motor Vehicle Safety Standard (FMVSS) No. 108. Provide individual stop and directional tail lamps, each with running lights. Provide license plate holder and light. The wiring shall be securely attached to substantial supports along its entire route. At no time shall the route come near to or be a part of any heat source, exhaust system or exhaust support. Where installed wiring is required to pass through any body panel or partition, the wiring shall be protected with an insulating grommet at the point of passage.

Trailer connector shall be 4-pin, suitable for use with surge hydraulic brakes. All terminal and connectors shall conform to SAE standards. All low-tension primary cable shall be color coded in accordance with SAE J-1128 as follows:

- White Ground connection
- Black Clearance, marker, running and tail lights
- Yellow Left turn indicator lights
- Green Right turn indicator lights
- Note: Provisions for connection of electric brakes shall be provided if required

by federal, state or local codes.

Trailer shall be painted black and comply or conform to federal requirements. Prime coat trailer and any areas susceptible to corrosion. Prime coat must be compatible with finish top coat and applied as per manufacturers recommendations.

PART 3.00 EXECUTION

DELIVERY AND HANDLING

Deliver equipment properly packaged and mounted to facilitate handling. Deliver with recommended lube oil and coolant installed.

Handle equipment carefully to prevent physical damage. Do not install damaged equipment; remove from site and replace damaged equipment with new.

GROUNDING

Provide equipment grounding connections and material for the diesel generator in accordance with NFPA 70 for a separately derived system. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounding.

PRODUCTION TESTS

Provide certified factory production tests on the equipment performed at rated load.

Tests shall include:

- Steady-state voltage and frequency analysis
- Rated load at rated PF
- Maximum power analysis

PARTS AND OPERATIONS MANUALS

Provide 3 sets of O&M manuals at time of generator shipment. Manuals shall be shipped in suitable 3-ring binders with manufacturers name, address, phone number and points of contact included. Include sales, parts department, service department and emergency (off hours) phone number.

WARRANTY

The entire engine-generator assembly shall be covered by a manufacturer's express written warranty, not less than one year from the date of final installation by end-user. The written warranty shall be included with the O&M manuals.