

SECTION 16216

TRAILER MOUNTED DIESEL ENGINE DRIVEN GENERATORS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install, put into operation, and field test 4 trailer mounted portable diesel engine driven generator units and appurtenances for North Bay Village as specified herein. Each trailer mounted unit shall be dedicated to its own pumping station and provided with a permanent label for each station as noted below:
1. Main Pump Station
 2. Hispanola Pump Station
 3. Village Hall Pump Station
 4. Treasure Hall Pump Station
- B. These Specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, the shop testing, delivery, and field testing, of all materials, equipment and appurtenances for the complete units as herein specified, whether specifically mentioned in these Specifications or not.
- C. There shall be furnished and installed all necessary and desirable accessory equipment and auxiliaries whether specifically mentioned in these Specifications or not. This installation shall incorporate the highest standards for the type of service. The Contractor is responsible for field testing of the entire installation and in instruction of the regular operating personnel in the care, operation and maintenance of all equipment.
- D. The standby electric power system shall include the following:
1. Portable diesel engine driven electric sets to provide standby power.
 2. An engine start-stop control system mounted on the electric set.
 3. Trailer and weatherproof enclosure.
 4. Accessories as specified.

1.02 DESCRIPTION OF SYSTEMS

- A. The generator unit shall be trailer mounted and shall be arranged for manual starting and stopping.
- B. The portable diesel engine driven generator set shall be of the latest commercial type and design. The unit shall include all standard accessories. Workmanship shall conform to modern practices and shall include static and dynamic balancing of rotating parts of the generator set. Only new and current model will be considered. The unit offered under these Specifications shall be covered by the manufacturer's standard warranty and shall meet the requirements of the Specifications set forth herein. Major exceptions to specifications will be considered sufficient cause for rejection of the machine.

1.03 QUALIFICATIONS

- A. The engine-generator set shall be the standard product, as modified by these Specifications, of a manufacturer regularly engaged in the production of this type of equipment. The unit to be furnished shall be of proven ability and shall be designed, constructed, and installed in accordance with best practices and methods. To qualify as a manufacturer, the engine must be the principal item manufactured and the completed engine generator set shall be supplied by that manufacturer's authorized distributor only.
- B. The generator manufacturer shall have a minimum of 30 years of manufacturing and producing generators in the U.S.
- C. The unit shall be shipped to the jobsite by an authorized engine distributor having a parts and service facility within a 50 mile radius of the jobsite. In addition, and in order not to penalize the Owner for unnecessary or prolonged periods of time for service or repairs to the emergency system, the engine generator set supplier must have no less than eighty percent (80%) of all engine replacement parts locally available at all times. Certified proof of this requirement shall be furnished to the Engineer upon request.
- D. All equipment furnished under this Specification shall be new, unused, and the standard product of a manufacturer having a successful record of manufacturing

and servicing the equipment and systems specified herein for a minimum of 30 years.

- E. The Generator Units shall be as manufactured by Kohler, Caterpillar, Cummins, or FDDA.

1.04 SUBMITTALS

- A. Submit to the Engineer for approval in seven (7) copies of complete sets of equipment drawings, schematics, and wiring diagrams which shall show details of installation and connections to the work of other Sections, and brochures covering each item of equipment.
- B. In the event that it is impossible to conform with certain details of the Specifications due to different manufacturing techniques, describe completely all nonconforming aspects.
- C. The submittal data for each unit shall include, but not necessarily be limited to the following:
 - 1. Equipment drawings showing plan and elevations of the complete generator unit; exhaust silencer; starting battery; battery charger; fuel tank; and all other items.
 - 2. Engine Data:
 - a. Manufacturer
 - b. Model
 - c. Number of cylinders
 - d. RPM
 - e. Bore x stroke
 - f. BMEP at full rated load
 - g. Piston speed, FPM
 - h. Make and model and descriptive literature of electric governor (where required)
 - I. Fuel consumption rate curves at various loads
 - j. Engine maximum continuous pump drive duty rating (w/fan) HP (See 2.01)

- k. Gross engine horsepower to produce generator standby rating (including fan and all parasitic loads) HP

3. Generator Data:

- a. Manufacturer
- b. Model
- c. Rated KVA
- d. Rated kw
- e. Voltage
- f. Temperature rise above 40 degree C ambient

- 1) Stator by thermometer
- 2) Field by resistance
- 3) Class of insulation

- 7. Generator efficiency including excitation losses and at 80 percent power factor.

- 1) Full load
- 2) $\frac{3}{4}$ load
- 3) $\frac{1}{2}$ load

4. Generator Unit Control Data:

- a. Actual electrical diagrams including schematic diagrams, and interconnection wiring diagrams for all equipment to be provided.
- b. Legends for all devices on all diagrams.
- c. Sequence of operation explanations for all portions of all schematic wiring diagrams.

5. Generator Unit and Accessories:

- a. Weight of skid mounted unit
- b. Overall length
- c. Overall width
- d. Overall height
- e. Exhaust pipe size
- f. CFM of air required for combustion and ventilation

- g. Heat rejected to jacket water and lubricating oil, BTU/hr.
 - h. Heat rejected to room by engine and generator, BTU/hr.
- 6. Optional System Service Contract:
 - a. Equipment Supplier Company
Name
Address
City/State
Phone Number
 - b. Attach the number of copies required of System Service Contract to submittal.
- 7. Furnish the number of copies required of the manufacturers certified shop test record of the complete engine driven generator unit.

1.05 OPERATING INSTRUCTIONS

- A. Operating and maintenance manuals shall be furnished. 1 hard copy and 1 electronic copy is required. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment.
- B. A factory representative of the generator unit manufacturer, who has complete knowledge of proper operation and maintenance, shall be provided for one day per unit supplied to instruct representatives of the Owner and the Engineer on proper operation and maintenance. With the Owner's permission, this work may be conducted in conjunction with the inspection of the installation and test run as provided under PART 3 - EXECUTION. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner.

1.06 SPECIAL TOOLS AND SPARE PARTS

- A. The manufacturer shall furnish two (2) complete spare replacement sets of all filter elements, belts and fuses required for each generator unit.

1.07 PRODUCT HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. All equipment and parts must be properly protected against any damage during a prolonged period at the site. Parts and components shall not be dismantled for shipment.
- C. Factory assembled unless permission is received in writing from the Engineer.
- D. Finished surface of all exposed openings (exhaust, etc.) shall be protected by wooden blanks, strongly built and securely bolted thereto.
- E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.
- F. Proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.

1.08 WARRANTY

- A. The generator unit and fuel tank shall be warranted for a period of 5 years by the contractor and the equipment manufacturers. The trailer shall be warranted for a period of 1 year. Warranty period shall commence at the time of final acceptance by the Owner and shall be for all parts and labor.
- B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the Owner.
- C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

PART 2 - PRODUCTS

2.01 RATINGS

- A. The rating of the generator set shall not exceed the manufacturer's published standby rating. The gross engine horsepower required to produce the standby rating shall not exceed the manufacturer's published continuous duty rating by more than 150 percent. Continuous duty rating shall be as defined in BS649 or DIN6270 but in no case shall it exceed the manufacturer's published continuous duty rating for the engine as used in continuous rated pump drive applications at 1800 rpm output speed. The gross engine horsepower described above shall include all parasitic demands such as generator inefficiencies, fuel pumps, water pumps, radiator fan and all accessories necessary to the unit's proper operation while operating at rated load and at a rotative speed not to exceed 1800 rpm.
- B. The diesel engine driven generator set shall be capable of producing the specified standby kw rating for continuous electrical service during interruption of the normal utility source and shall be certified to this effect by the manufacturer for the actual unit supplied. The engine shall be a permanent magnetic generator.
- C. The diesel electric sets shall be capable of producing a 0.8 power factor when operating at sea level and 100 feet. The generator shall be capable of the voltage connections and ratings as listed below for each station.

Hispanola Pump Station

The Diesel Engine/Generator Unit at for a minimum of 120KW (277/480 volts, 3-Phase, 60 Hertz) at 0.8 power factor with fan and shall be suitable for starting the following loads:

- Step 1-5KVA of Miscellaneous and Lighting loads
- Step 2-70HP submersible pump motor-Code H (VFD)

Main Pump Station

The Diesel Engine/Generator Unit at for a minimum of 145KW (277/480 volts, 3-Phase, 60 Hertz) at 0.8 power factor with fan and shall be suitable for starting the following loads:

- Step 1-5KVA of Miscellaneous and Lighting loads
- Step 2-90HP submersible pump motor-Code H (VFD)

South Treasure Drive Pump Station

The Diesel Engine/Generator Unit at for a minimum of 45KW (120/240-volts, 3-Phase, 60 Hertz) at 0.8 power factor with fan and shall be suitable for starting the following loads:

Step 1-5KVA of Miscellaneous and Lighting loads

Step 2-5HP submersible pump motor-Code H (across the line)

Step 3-5HP submersible pump motor-Code H (across the line)

Village Hall Pump Station

The Diesel Engine/Generator Unit at for a minimum of 145KW (277/480-volts, 3-Phase, 60 Hertz) at 0.8 power factor with fan and shall be suitable for starting the following loads:

Step 1-5KVA of Miscellaneous and Lighting loads

Step 2-90HP submersible pump motor-Code H (VFD)

2.02 ENGINES

- A. The engine shall be Tier 4 Final EPA Certified for Nonroad applications, single acting, solid injection turbo charged water cooled, not less than four (4) cylinder, either vertical or "V" type. Speed shall not exceed 1800 revolutions per minute at normal full load operation. The engine electronic governor shall maintain frequency regulation not to exceed +/- .25 percent from no load to full rated load and shall have a Vernier control with positive locking mechanism for manual operation and adjustment.
- B. The engine shall be capable of satisfactory performance on No. 2 fuel oil (ASTM Designation D396). Diesel engines requiring a premium fuel will not be considered.
- C. The engine shall be capable of operating at light loads for extended periods of time and shall provide a means to reduce carbonization. Periodic cleaning of exhaust ports shall not be required.
- D. The engine shall be equipped with fuel filters, lube oil filters, intake air filters, lube oil cooler, fuel pump, engine driven water pump, and unit mounted instruments. Unit mounted instruments shall include a start-stop switch, water temperature gauge, battery charge ammeter and lubrication oil pressure gauge. The engine shall

be provided with over crank, low oil pressure, high water temperature, low coolant level and overspeed safety shutdowns of the manual reset type.

- E. Injection pumps and injection valves shall be a type not requiring adjustment in service and shall be of a design allowing quick replacement by ordinary mechanics without special diesel experience. The engines shall have an individual mechanical injection pump and injection valve for each cylinder, any one of which may be removed and replaced from parts stock. Fuel injection pumps shall be positive action, constant-stroke pumps, activated by a cam driven by gears from the engine crankshaft. Fuel lines between injection pumps and valves shall be of heavy seamless tubing.
- F. The fuel system shall be equipped with fuel filters have replaceable elements. Filter elements shall be easily removable from their housing for replacing without breaking any fuel line connections, or disturbing the fuel pump, or any other part of the engine. All fuel filters shall be conveniently located in one accessible housing, ahead of the injection pumps so that the fuel will have been thoroughly filtered before it reaches the pump. No screens or filters requiring cleaning or replacement shall be used in the injection pump or injection valve assemblies. The engines shall be equipped with a built-in gear-type, engine-driven fuel transfer pump, capable of supplying fuel through the filters to the injection pump at constant pressure.
- G. In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter and a water separator in the fuel inlet line to the engine.
- H. The engine shall have a gear-type lubricating oil pump for supplying oil under pressure to main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings, valve rocker mechanism and governor. Effective lubricating oil filters shall be provided and so located and connected that all oil being circulated is continuously filtered and cleaned. Filters shall be accessible, easily removed and cleaned and shall be equipped with a spring loaded by-pass valve as an insurance against stopping of lubricating oil circulation in the event the filters become clogged. The engine shall have a suitable water cooled lubricating oil cooler.
- I. The engine shall be provided with one or more engine mounted dry type air cleaners with restriction indicators and with of sufficient capacity to protect effectively the working parts of the engine from dust and grit.

- J. The engine shall be equipped with an electric motor starting system which shall include an engine-driven generator, regulator, batteries, and a float charger. Batteries shall be 12 volt, Exide or approved equal. The float charger is to be of the automatic SCR voltage regulated type with maximum charge rate as recommended by the manufacturer but not less than two (2) amperes shall be provided to maintain batteries at full capacity during standby conditions. An ammeter shall indicate the charge rate and the circuit shall be protected by either fuses or circuit breakers. The charger shall be so designated that it will not be damaged during the engine cranking. The charger shall operate on 120 V.A.C., single (1) phase power and shall be permanently installed within the generator set weather protective enclosure. The battery charger shall be installed in the enclosure and shall be wired directly to the batteries via the 15-amp shore power connector in the customer connection panel. Thirty (30) feet of weatherproof cable shall be provided to allow charging of the batteries. The battery charging cable shall be connected at each end by weatherproof receptacle/plug combination. The battery charger cord shall be OSHA approved.

2.03 COOLING SYSTEMS

- A. The engine shall be furnished with a unit mounted radiator-type cooling system having sufficient capacity for cooling the engine when the diesel generator set is delivering full rated load in an ambient temperature not to exceed 120 degrees F. The engine shall be provided with a thermostatic valve placed in the jacket water outlet, between the engine and the cooling source. This valve shall maintain the proper jacket water temperature under all load conditions.
- B. Closed circuit jacket water systems shall be treated with a rust inhibitor as recommended by the engine manufacturer.
- C. The engine shall have a 1500 watt, 120 V thermostatical, controlled immersion jacket heater. Thirty (30) feet weatherproof cable (3#10) shall be provided and connected to the generator and the source voltage via receptacle plug combinations and a weatherproof cable via the 15-amp shore power connector in the customer connection panel.

2.04 EXHAUST SYSTEMS

- A. A suitable silencer for critical silencing applications shall be furnished and mounted inside the engine. Silencers shall be constructed with inlet and outlet, required

number of appropriate mounting brackets and 1/2-inch N.P.T. drain connection. Silencers shall be critical grade. All exhaust equipment must be rated to withstand temperatures of approximately 1,000 degrees F. A flexible stainless steel pipe connection shall be provided between the engine exhaust stack and exhaust piping. One silencer raincap with counter weight shall be provided for the unit. Provide insulation (lagging) the muffler installed within the weatherproof enclosure to protect the enclosure from radiant heat. All exhaust openings shall be suitably sealed to prevent rain from entering the enclosure.

2.05 GENERATOR

- A. The generators shall be dual voltage heavy duty three-phase, 60 Hertz, ball bearing construction, rotating field, synchronous type built to NEMA standards. A voltage regulator shall be provided to match the characteristics of the generator and engine. Voltage regulation shall be $\pm .25\%$ from no load to full rated load. Readily accessible voltage droop, voltage level and voltage gain controls shall be provided. Voltage level adjustment shall be a minimum of $\pm 5\%$. Generator and exciter shall be inherently capable of parallel operation with other power sources of equivalent electrical characteristics. The generator shall be a single bearing type, 4 pole revolving field, connected directly to the flywheel housing, brushless type, temperature rise not to exceed 130°C over a 40°C ambient when operating at its rated capacity as specified herein.
- B. The generator shall be of open dripproof construction, self ventilated and air cooled. A single row ball bearing sized for a minimum of 40,000 hours and to be furnished with a grease fitting.
- C. Other features shall include volts per Hertz regulator, TIF less than 50, provide 300 percent short circuit sustaining capability, suitable for external SCR controlled equipment, and a large terminal box with bus bar terminal strips for load lead connections.

2.06 GENERATOR AND ENGINE CONTROL PANEL

- A. A generator mounted NEMA 1, #14 gauge steel control panel, shall be furnished for the engine and generator unit. The panel shall contain, but not be limited to, the following equipment:
 - 1. Frequency Meter
 - 2. Voltmeter

3. Ammeter
4. Ammeter phase selector switch.
5. Voltmeter selector switch (4 position) line-to-line.
6. Starting controls as specified.
7. Voltage level adjustment rheostat.
8. Panel light.
9. Individual fault indicator lights for low oil pressure, high water temperature, overspeed, low coolant level and overcrank.
10. Three position function switch marked "manual," "off/reset," and "stop."
11. Oil pressure and water temperature gauges.
12. Panel lights, transformers, fuses, etc., as required.
13. Provide the following circuit breaker protected convenience receptacles in addition to the receptacles required for the battery charger and jacket heater.
 - a) 120V, 20 amp duplex.
 - b) 240V, 30 amp twist lock

2.07 TRAILER AND ACCESSORIES

- A. The generator set shall be mounted and fully housed on a factory fabricated trailer with hinged side panels.
- B. The trailers for the 145KW and 120KW generators shall be the two axle and the trailer for the 45KW shall be single axle. Trailers shall be tandem type with the I.C.C. package and shall be of adequate size for the weight of the generator set, batteries, etc., and shall contain a double walled, fuel tank with mechanical fuel gauge and 3-way valve to allow connection of auxiliary fuel tank. The trailer shall be furnished with all standard accessories which shall include flat fenders welded to body, heavy duty jack stand with pneumatic tire for tongue, hydraulic surge brakes, retractable jacks for rear corners, 10 ply high speed tires, tail lights, stop lights, turn lights, license plate holder with light, safety chains with grab hooks, heavy duty bumper, side reflectors, and towing bar and ring with accessories necessary for attachment to the transporting vehicle. Storage tray capable of securely storing two 50' portable cables shall be provided.
- C. 480-volt, 3-phase wye operation provide one (1) 200A, 4-pole, 4-wire camlock receptacles on the rear of the trailer connected to the load side of a 200A breaker with 200A conductors, including ground wire. This applies to the following Pump Station portable generators:
 1. Main Pump Station
 2. Hispanola Pump Station

3. Village Hall Pump Station

D. 480-volt, 3-phase operation, provide one (1) 4 conductor portable cable with a #2 ground. Cable shall be rated 200 amps and shall be provided with a 200A Crouse Hinds AP20468-S22 (Reverse Service) plug on each end and camlock plugs on the other end. The camlock plugs shall pair with the camlock receptacles that are provided on the generator. Each cable shall be a minimum of 50 feet in length. This applies to the following Pump Station portable generator cords:

1. Main Pump Station
2. Hispanola Pump Station
3. Village Hall Pump Station

D. 120/240-volt, 3-phase operation provide 200-amp, 4-pole, 4-wire camlock receptacles on the rear of the trailer connected to the load side of a 200A breaker with 200A conductors, including ground wire. This applies to the following Pump Station portable generators:

1. South Treasure Drive Pump Station

E. 120/240-volt, 3-phase operation, provide one (1) 4 conductor portable cable with a #2 ground. Cable shall be rated 200 amps and shall be provided with a 200A Russellstoll#JP2044FR (Reverse Service) plug on each end and 240-volt camlock plugs on the other end. The camlock plugs shall pair with the camlock receptacles that are provided on the generator. Each cable shall be a minimum of 50 feet in length. This applies to the following Pump Station portable generator cords:

1. South Treasure Drive

F. The trailer shall conform to all local, state, and federal highway and safety regulations.

G. The trailer hitch shall have a 2-5/16-inch ball coupler with safety chain.

2.08 TRAILER MOUNTED WEATHERPROOF ENCLOSURE

A. The complete engine-generator set shall be enclosed in a modular weatherproof shelter. The shelter shall be constructed of removable side panels and end panels and shall be skid base. The weatherproof enclosure shall be sound attenuated (74

dB(A @ 23 feet). Engine exhaust shall discharge and be redirected by duct work to exhaust vertically.

- B. The top and end panels shall be made from galvanized steel, and the side panels from galvanized steel. The design of the enclosure shall prevent rodents from entering the unit. The unit shall have hinged side doors on each side and double hinged doors at the control end equipped with key expanded metal grating in front for the radiator grill and fixed key locks for ease of engine maintenance. There shall be louvered air intake ports on the shelter sides and rear for proper air circulation within the shelter. The complete generator set and shelter shall be prime painted and have two finish coats of protective enamel paint. Paint color shall be as selected by the Engineer. Provisions shall be available for crane unloading by providing lifting eyes and spreader bar reinforcement.

2.09 SCHEDULED OIL SAMPLING

- A. In order to forecast and minimize engine failure, the supplier of the equipment must provide an oil sampling analysis kit which operating personnel shall utilize for scheduled oil sampling.
- B. The laboratory to which oil samples will be sent shall be located at and be a part of the local generator set supplier's facility, and shall be open to inspection during normal working hours. Independent laboratories not a part of the engine supplier's facility are disallowed as to conformance with this Specification.
- C. Scheduled oil sampling shall be of the atomic absorption spectrophotometer method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:
 - 1. Iron
 - 2. Chromium
 - 3. Copper
 - 4. Aluminum
 - 5. Silicon
 - 6. Lead - In addition, the sample shall be tested for the presence of water, fuel dilution, and anti-freeze.
- D. All equipment needed to take oil samples shall be provided in a kit at the time of acceptance and shall include the following:

1. Sample extraction gun (1)
2. Bottles (10)
3. Written instructions (1)
4. Metal storage box (1)

2.10 FUEL SYSTEM

- A. Base and Mounting - Provisions for crane unloading of the complete package shall be designed into the base of the unit.
- B. Base Tank - Each generator shall be equipped with a double in-base fuel tank. Provide the following fuel tank sizes:
 1. 276 gallon minimum for the 145KW
 2. 192 gallon minimum for the 120 KW
 3. 77 gallon minimum for the 45KW
- C. The units shall be supplied with a lockable exterior located fill cap. All necessary fuel and vent lines for proper engine performance shall be provided as well as means to readily the fuel level in the tank without the use of a measuring stick.
- D. The fuel tank dimensions shall be full size of the generator base and be formed from steel of a minimum metal thickness of 0.25 inch (1/4 inch) and shall be fitted with low fuel level inner wall leak alarm contact for local annunciation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The generator manufacturer shall supply the services of a factory representative to check over the completed generator installation, who will certify to the Engineer that the installation meets the approval of the manufacturer. A minimum of two (2) days are required. One day will be required specifically for training plant personnel in system operation and maintenance.
- B. The Equipment Supplier shall install suitable jacket water additives as recommended by the engine manufacturer and approved by the Engineer, for prevention of both scale formation and corrosion in the water jackets and cooling system

components which are in contact with the engine jacket water. These additives shall be added to the cooling system prior to running the field acceptance test.

- C. The Equipment Supplier shall install the complete exhaust system, together with the silencer, the piping and insulation, and the complete supporting system.

3.02 PAINTING

- A. The engine generator set and associated equipment shall be shop primed and finish coated in accordance with the manufacturer's standard practice prior to shipment. Color shall be selected by the Engineer and an adequate supply of touch-up paint shall be supplied by the manufacturer.

3.03 INSPECTION AND TESTING

- A. Prior to acceptance of the installation, equipment shall be tested to show it is free of any defects and subjected to full load test through the use of portable dry type load banks supplied for this purpose at the jobsite by generator set supplier.
- B. The load bank will be capable of definite and precise incremental loading and shall not be dependent on the generator control instrumentation to read amperage and voltage of each phase. Rather, the test instrumentation will serve as a check of the generator set meters. Readings will be taken and recorded at 30 minute intervals during the test and at each occurrence of a load change.
- C. Salt water brine tanks or those load banks requiring water as a source for cooling are not acceptable for this purpose and shall not be utilized for this test.
- E. Load bank testing shall be done in the presence of the Owner and the Engineer only after the unit is accepted by the Engineer in accordance with the Specifications. TESTING SHALL BE FOR A PERIOD OF FOUR HOURS UNDER FULL LOAD. Furnish three copies of test data to Engineer which shall include voltage, amperage, frequency, oil pressure, coolant temperature, voltage switching and other items which are part of the manufacturer's standard start-up and tests request.
- F. CONTRACTOR shall provide fuel for load bank testing. CONTRACTOR shall provide a full fuel tank upon completion and acceptance of the generator system.

3.04 SYSTEM SERVICE CONTRACT

- A. The supplier of the standby power system must provide a copy of and make available to the OWNER his standard service contract which, at the OWNER's option, may be accepted or refused. This contract will accompany documents, drawings, catalog cuts, specification sheets, wiring or outline drawings, etc., submitted for approval to the designing ENGINEER. The contract shall be for the complete services rendered over a period of one (1) year.

3.05 WARRANTY

- A. Equipment furnished under this Section shall be guaranteed against defective parts and workmanship under terms of the MANUFACTURER'S and dealer's warranty. But, in no event, shall it be for a period of less than 3 years (3000 Hour comprehensive) from date of substantial completion and shall include labor, parts and travel time for necessary repairs at the job site. Submittal data received without written warranties as specified will be rejected in their entirety. Warranties requiring a deductible are not acceptable.
- B. Warranty shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
- C. All of the generator system equipment furnished shall be guaranteed against defects in material, parts, and workmanship. The generator system equipment warranty and associated coverage shall be for a period of 3 years. The warranty shall be comprehensive covering all furnished system equipment including, but not limited to, the complete generator sets and furnished diesel fuel oil sub base tank system equipment. The warranty shall commence on the date of satisfactory completion of generator system startup and load bank testing on site, and shall include labor, parts, travel time, expenses and expendable items (lubricating oil, coolant, filters, and other service items made unusable by the defect) necessary for repairs at the job site. The furnished generator set batteries are considered a consumable item and shall be warranted against defects in material and workmanship for a period of two (2) years from generator set startup, with no prorating.
- D. The generator system supplier shall be directly capable, without subcontracting, and to be solely responsible to maintain and provide qualified Factory trained servicemen, the required stock and availability of replacement parts, technical

assistance, and complete equipment warranty administration on direct behalf of the generator equipment Manufacturers. Subcontracting or rerouting of these services by the generator supplier is not acceptable. Generator Supplier written certification of compliance to the specified warranty requirements shall be included in the furnished generator system Submittals and equipment parts and operation manuals furnished to Engineer and Owner for review and approval.

- E. The generator system Submittals and furnished generator system parts, operation and maintenance manuals shall include written warranties and supporting documentation clearly indicating and certifying complete compliance by the generator supplier to provision to the Owner of these specified warranty requirements for all furnished generator system equipment.
- F. The generator system supplier's failure to furnish the specified warranty coverage for the entire generator system shall be sufficient cause for Engineer / Owner complete rejection of the generator system supplier's submitted/furnished the generator system equipment. The CONTRACTOR and the generator system supplier shall be responsible for all project delays, costs, Engineer fees, and Owner revenue losses associated with any partial or complete rejection of the generator system supplier's submitted and/or furnished equipment.

END OF SECTION