

City of Prescott

Invitation for Bids

1000 kW Standby Generator Set and Automatic Transfer Switch

Standard Specifications and Bid Documents



SOLICITATION NUMBER: 09-720-5855-8910

BID OPENING: November 19, 2009 at 2:00 PM
City of Prescott Council Chambers
201 South Cortez Street
Prescott, Arizona

PREPARED BY: City of Prescott Public Works
Utilities Operations Division
433 N. Virginia Street
Prescott, Arizona

November 2009

City of Prescott
Purchasing Services
216 S. Marina Street, Suite 202
Prescott, AZ 86303-3929

Bid

1000 kW Standby Generator Set and Automatic Transfer Switch

The City of Prescott is soliciting bids for the purchase of one (1) Standby Generator Set and one (1) Automatic Transfer Switch. Sealed Bids [one (1) original and two (2) copies] shall be opened on Thursday, November 19, 2009 at the time and place indicated in Section 2.2.

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1.0 Solicitation Specifications/Scope of Work

1.1 Introduction

- A. The City of Prescott owns and operates a 6.0 MGD Wastewater Treatment Facility that requires a standby generator set in the event of a power failure to maintain a continuous operation of critical process equipment. There is currently one (1) 300 kW diesel powered standby generator set in service that was installed in 1980 during an expansion phase that supplies power to an absolute minimum of process equipment. Several processes have been added to the facility requiring additional standby generator power to maintain normal operations.
- B. Primary power to the facility is supplied by a power utility company through a 12,470 volt transmission line and reduced to 480 volts through a transformer to operate facility equipment. Power from the primary source is distributed throughout the facility to seven motor control centers. The motor control centers supply power to some of the major pieces of equipment, one power panel and six lighting panels.
- C. The existing diesel engine powered generator provides a backup power source for a minimum of critical loads in the event that primary power is lost. Automatic transfer switches in motor control centers will transfer the load to the generator when primary power is lost and retransfer when primary power is restored.
- D. It is the intention of the City to purchase one (1) complete diesel powered 1000 kW standby generator set with one (1) automatic transfer switch, not to include installation.

1.2 General Specifications

- A. The Emergency Power System Supplier shall furnish a complete standby power generation set with load management power distribution and control system.
- B. The Emergency Power System shall consist of the following as applicable:
 - 1. Generator Set
 - 2. Generator Control Switchgear (with associated monitoring and distribution equipment)
 - 3. Automatic Transfer Switch (ATS)
 - 4. Uninterruptible Power Supply Systems
 - 5. Load Banks
 - 6. Battery System
- C. The Emergency Power System Supplier shall be an authorized service provider for all components of the Emergency Power System. In order to assure maximum equipment uptime and best service response to the owner, the Emergency Power System Supplier shall be a factory-authorized dealer with complete Emergency Power System parts and service available on a 24 hour emergency basis within a 100 mile radius of the project site.
- D. The Standby Generator Set shall be powered by one (1) diesel fueled engine operating at an altitude of 5,250 ft with a maximum ambient temperature of 100 degrees Fahrenheit. The electrical generator shall be nominally sized at 1000kW / 60Hz / 480 volts and have a permanent magnet exciter.
- E. The Automatic Transfer Switch shall be Delayed Transition, have a Nema 4 enclosure and shall include all necessary relays for overcurrent and ground fault protection.
- F. The generator enclosure shall be weatherproof; sound attenuated to 73 decibels at 7 meters and shall include a sub base fuel tank capacity for a continuous 24 hour full load run time. A choice of paint color shall be offered to match existing structures at the facility.

1.3 Technical Specifications

The Emergency Power System shall meet or exceed the applicable requirements for the following standards as applicable:

- A. UL
- B. CSA
- C. IEC
- D. NFPA 70
- E. NFPA 99
- F. NFPA 110

1.4 Installation

The project includes supplying a complete integrated generator system. The installation will be performed by others. The system shall consist of a diesel powered generator set with related component accessories and automatic transfer switch specified under a separate section.

1.5 System Test

A complete system load test shall be performed after equipment installation is complete as specified in the guidelines of the Start-up Section.

1.6 Requirements, Codes and Regulations

The equipment supplied and installed shall meet the requirements of the NEC and all applicable local codes and regulations. All equipment shall be of new and current production by a MANUFACTURER who has 25 years of experience building this type of equipment. Manufacturer shall be ISO9001 certified.

1.7 Substitution

Proposed deviations from the specifications shall be treated as follows:

A. Substitution Time Requirement

Requests for substitutions shall be made a minimum of ten (10) days prior to bid date. Manufacturers catalog data shall accompany each request and authorized acceptance shall be by addenda only.

B. Substitution Responsibility

The power system shall be designed to the specified manufacturer's electrical and physical characteristics. The equipment sizing, spacing, amounts, electrical wiring, ventilation equipment, fuel, and exhaust components shall all be sized and designed around manufacturers supplied equipment. No substitutions shall be made without approval from the BUYER.

1.8 Submittals

A. Engine-generator submittals shall include the following information:

1. Factory published specification sheet.
2. Manufacturer's catalog cut sheets of all auxiliary components such as battery charger, control panel, enclosure, etc.
3. Dimensional elevation and layout drawings of the generator set, enclosure and automatic transfer switch and related accessories.
4. Weights of all equipment.
5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.
6. Interconnect wiring diagram of complete emergency system, including generator, transfer switch, day tank, remote pumps, battery charger, control panel, and remote alarm indications.
7. Engine mechanical data, including heat rejection, exhaust gas flows, combustion air and

ventilation air flows, fuel consumption, etc.

8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.
9. Generator resistances, reactance's and time constants.
10. Generator locked rotor motor starting curves.
11. Manufacturer's documentation showing maximum expected transient voltage and frequency dips, and recovery time during operation of the generator set at the specified site conditions with the specified loads.
12. Manufacturers and dealers written warranty.

B. Submittals for Review / Approval

The following information shall be submitted to the buyer:

1. Master drawing index
2. Front view elevation
3. Floor plan
4. Top view
5. Single line diagram
6. Controls One-Line diagram
7. Nameplate schedule
8. Component list
9. Conduit entry/exit locations
10. Assembly ratings including:
 - Short-circuit rating
 - Voltage
 - Continuous current
 - Basic impulse level for equipment over 600 volts
11. Major component ratings including:
 - Voltage
 - Continuous current
 - Interrupting ratings
12. Breaker Schedule
13. Cable terminal sizes
14. Product data sheets
15. Sequence of operation description
16. Where applicable the following additional information shall be submitted to the buyer:
 - Busway connection
 - Connection details between close-coupled assemblies
 - Composite floor plan of close-coupled assemblies
 - Key interlock scheme drawing and sequence of operations
 - Descriptive bulletins

C. Submittals for Record

The following information shall be submitted for record purposes:

1. Wiring diagrams
2. Installation information including equipment anchorage provisions
3. Seismic certification as applicable

4. The final (as-built) drawings shall include the same drawings as the construction drawings and shall incorporate all changes made during the manufacturing process.

1.9 System Responsibility

A. Generator Set Distributor

The completed engine generator set shall be supplied by the Manufacturer's authorized distributor only.

B. Requirements, Codes and Regulations

The equipment supplied shall meet the requirements of NEC and all-applicable local codes and regulations. All equipment shall be of new current production. There shall be one source responsibility for warranty, parts and service through a local representative with factory trained service personnel.

C. Automatic Transfer Switch

The automatic transfer switch specified in another section shall be supplied by the generator set manufacturer in order to establish and maintain a single source of system responsibility and coordination.

1.10 Warranty

A. Two Year Generator Set Warranty

The manufacturer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to 500 hours annually for the system warranty by both the manufacturer and servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.11 Parts and Service Qualifications

A. Service Facility

The engine-generator supplier shall maintain 24-hour parts and service capability within 100 miles of the project site. The distributor shall stock parts as needed to support the generator set package for this specific project. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24 hours and 95% within 48 hours.

B. Service Personnel

The dealer shall maintain qualified factory trained service personnel.

1.12 Product Support

A. Standby Generator Set Extended Service Coverage

Extended Service Coverage shall be provided for a period of 5 years, and shall include no deductible. Extended Service Coverage shall provide for 100 percent of usual and customary parts and labor costs for failures due to defects in materials and workmanship to the "as shipped consist" from the factory, excluding filters, fluids, V- belts, hoses, power take-offs, paint, batteries and clutches. Extended Service Coverage shall provide for a rental power unit due to unscheduled failures causing unexpected downtime to the customer in excess of 48 hours from the time of diagnoses. All repairs will be performed by factory trained dealer service personnel, and allows for repairer travel and mileage for all repairs up to 8 hours and 320 miles per incident.

B. Extended Service Coverage for Automatic Transfer Switch

Extended Service Coverage shall be provided for a period of 5 years, and shall include no deductible. Extended Service Coverage provides for 100 percent of all parts and labor costs for failures due to defects in materials and workmanship to the "as shipped consist" from the factory.

All repairs will be performed by factory trained dealer service personnel, and allows for repairer travel and mileage for all repairs up to 8 hours and 320 miles per incident.

1.13 Genset Requirements

The generator set shall be Standby Duty rated at 1,000.0 ekW, 1,250.0 kVA, 1800 RPM, 0.8 power factor, 480 Volt, 3-Phase, 60 hertz, including radiator fan and all parasitic loads. Generator set shall be nominally sized to operate at the specified load at a maximum ambient of 100F (37.8C) and altitude of 5,250.0 feet (1,615.4 m).

A. ESP Power Rating:

1. Power is available for the duration of an emergency outage
2. Average Power Output = 70% of ESP rating
3. Load = Varying
4. Typical Hours/Year = 50 hours
5. Maximum Expected Usage = 200 hours/year
6. Typical Application = Building Service Standby

B. Standby Power Rating:

1. Power is available for the duration of an emergency outage
2. Average Power Output = 70% of standby power
3. Load = Varying
4. Typical Hours/Year = 200 Hours
5. Maximum Expected Usage = 500 hours/year
6. Typical Application = Standby

1.14 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 five (5) years. When requested by the User / Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. The equipment and major components shall be suitable for and certified to meet all applicable seismic requirements of International Building Code (IBC) for zone 4 application. Guidelines for the installation consistent with these requirements shall be provided by the switchgear manufacturer and be based upon testing of representative equipment. The test response spectrum shall be based upon a 5% minimum damping factor, IBC a peak of 2.45g's (3.2 – 11 Hz), and a ZPA of 0.98g's applied at the base of the equipment. The tests shall fully envelop this response spectrum for all equipment natural frequencies up to at least 35 Hz.
- E. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
 1. The Manufacturer shall provide equipment anchorage details, coordinated with the equipment mounting provision, prepared and stamped by a licensed civil engineer in the state. Mounting recommendations shall be provided by the manufacturer based upon approved shake table tests used to verify the seismic design of the equipment.
 2. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.

3. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

1.15 Delivery, Storage and Handling

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.
- B. Shipping groups shall be designed to be shipped by truck, rail, or ship. Indoor groups shall be bolted to skids. Breakers and accessories shall be packaged and shipped separately.
- C. Automatic Transfer Switch shall be equipped to be handled by crane. Where cranes are not available, unit shall be suitable for skidding in place on rollers using jacks to raise and lower the groups.
- D. Automatic Transfer Switch being stored prior to installation shall be stored so as to maintain the equipment in a clean and dry condition. If stored outdoors, outdoor gear shall be covered and heated, and indoor gear shall be heated.
- E. Operation and Maintenance Manuals shall be provided with each assembly shipped, and shall include instruction leaflets and instruction bulletins for the complete assembly of each major component.

1.16 Materials and Parts

All materials and parts comprising the unit shall be new and unused.

A. Engine

The engine shall be diesel fueled, four (4) cycle, water-cooled, while operating with nominal speed not exceeding 1800 RPM. The engine will utilize in-cylinder combustion technology, as required, to meet applicable EPA non-road mobile regulations and/or the EPA NSPS rule for stationary reciprocating compression ignition engines. Additionally, the engine shall comply with the State Emission regulations at the time of installation/commissioning. Actual engine emissions values must be in compliance with applicable EPA emissions standards per ISO 8178 – D2 Emissions Cycle at specified kW / bHP rating. Utilization of the "Transition Program for Equipment Manufacturers" (also known as "Flex Credits") to achieve EPA certification is not acceptable. The in-cylinder engine technology must not permit unfiltered exhaust gas to be introduced into the combustion cylinder. Emissions requirements / certifications of this package: EPA T2

B. Engine Governing

The engine governor shall be an electronic Engine Control Module (ECM) with 24-volt DC Electric Actuator. The ECM shall be enclosed in an environmentally sealed, die-cast aluminum housing which isolates and protects electronic components from moisture and dirt contamination. Speed droop shall be adjustable from 0 (isochronous) to 10%, from no load to full rated load. Steady state frequency regulation shall be +/- 6 RPM. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. The ECM shall adjust fuel delivery according to exhaust smoke, altitude and cold mode limits. In the event of a DC power loss, the forward acting actuator will move to the minimum fuel position.

C. Generator Specifications

The generator shall be a synchronous, three phase, four pole, 2/3 pitch, random wound, single or double bearing, and IP23 drip proof. Bearing(s) shall be double shielded and maintenance free. The insulation system shall meet NEMA MG 1 and UL1446 standards for Class H insulation. Generator temperature rise shall be limited to NEMA MG1 temperature limit of 80, 105, 125, 150C at a 40C ambient. The self-excited, brushless exciter shall consist of a three-phase armature and a three-phase full wave bridge rectifier mounted on the rotor shaft. Surge

suppressors shall be included to protect the diodes from voltage spikes.

D. Digital Voltage Regulator

The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output voltage within +/- 0.25% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode. The voltage regulator shall include a VAR/Pf control feature as standard. The regulator shall provide an adjustable dual slope regulation characteristic in order to optimize voltage and frequency response for site conditions. The voltage regulator shall include standard the capability to provide generator paralleling with reactive droop compensation and reactive differential compensation.

The voltage regulator shall communicate with the Generator Control Panel via a J1939 communication network with generator voltage adjustments made via the controller keypad. Additionally, the controller shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through the controller. A PC-based user interface shall be available to allow viewing and modifying operating parameters in a windows compatible environment.

E. Motor Starting

Provide locked rotor motor starting capability of 1,993.4 skVA at 30% instantaneous voltage dip as defined per NEMA MG 1. Sustained voltage dip data is not acceptable.

F. Circuit Breaker Specifications (EPMCP11+P controller on NEMA/60Hz C32 Packages)

Provide a generator mounted 100% circuit breaker, insulated case, electrically operated 1,600 amp trip, 3 pole, NEMA 1/IP22. Breaker shall utilize a solid state trip unit. The breaker shall be UL/CSA Listed, connected to engine/generator safety shutdowns, and automatically controlled by the package mounted generator set controls. Breaker shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

G. Controls – Generator Set Mounted

Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control 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.

H. Environmental

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

1. - 40° C to +70° C Operating Range
2. 0 - 95% humidity non-condensing, 30° C to 60° C
3. IP22 protection for rear of controller; IP55 when installed in control panel
4. 5% salt spray, 48 hours, +38° C, 36.8V system voltage
5. Sinusoidal vibration 4.3G's RMS, 24-1000Hz
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

I. Functional Requirements

The following functionality shall be integral to the control panel.

1. The control shall include a minimum 64 x 240 pixel, 28mm x 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

J. Digital Monitoring Capability

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

1. Engine

- Engine oil pressure
- Engine oil temperature
- Engine coolant temperature
- Engine RPM
- Battery volts
- Engine hours
- Engine crank attempt counter
- Engine successful start counter
- Service maintenance interval
- Real time clock
- Oil filter differential pressure
- Fuel temperature
- Fuel pressure
- Fuel filter differential pressure
- Fuel consumption rate
- Total fuel consumed
- Engine intake manifold temperature
- Engine intake manifold pressure
- Engine crankcase pressure
- Air filter differential pressure
- Boost pressure
- Oil filter differential pressure
- Engine exhaust stack temperature
- Engine main bearing temperature

2. Generator

- Generator AC volts (Line to Line, Line to Neutral and Average)
- Generator AC current (Avg and Per Phase)
- Generator AC Frequency
- Generator kW (Total and Per Phase)
- Generator kVA (Total and Per Phase)
- Generator kVAR (Total and Per Phase)
- Power Factor (Avg and Per Phase)
- Total kW-hr
- Total kVAR-hr
- % kW
- % kVA

- % kVAR
- Generator bearing temperature
- Generator stator winding temperature

3. Voltage Regulation

- Excitation voltage
- Excitation current

4. Alarms and Shutdowns

The control 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.

5. Engine Alarm/Shutdown

- Low oil pressure alarm/shutdown
- High coolant temperature alarm/shutdown
- Loss of coolant shutdown
- Overspeed shutdown
- Overcrank shutdown
- High intake manifold temperature alarm/shutdown
- High exhaust manifold temperature alarm/shutdown
- High crankcase pressure alarm/shutdown
- High air inlet temperature alarm/shutdown
- Emergency stop depressed shutdown
- Low coolant temperature alarm
- Low battery voltage alarm
- High battery voltage alarm
- Control switch not in auto position alarm
- Battery charger failure alarm

6. Generator Alarm/Shutdown

- Generator over voltage
- Generator under voltage
- Generator over frequency
- Generator under frequency
- Generator reverse power
- Generator overcurrent

7. Voltage Regulator Alarm/Shutdown

- Loss of excitation alarm/shutdown
- Instantaneous over excitation alarm/shutdown
- Time over excitation alarm/shutdown
- Rotating diode failure
- Loss of sensing
- Loss of PMG

8. Programmable Digital Inputs

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

9. Programmable Relay Outputs

The control shall include the ability to operate programmable relay output signals, integral to the controller. The output relays shall be rated for 2A @ 30VDC and consist of six (6) Form

A (Normally Open) contacts and two (2) Form C (Normally Open & Normally Closed) contacts.

10. Programmable Discrete Outputs

The control shall include the ability to operate two (2) discrete outputs, integral to the controller, which are capable of sinking up to 300mA.

11. Maintenance

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:

- Engine running hours display
- Service maintenance interval (running hours or calendar days)
- Engine crank attempt counter
- Engine successful starts counter
- 20 events are stored in control panel memory
- Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use 14 user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:
 - Day of week
 - Time of day to start
 - Duration of cycle

12. Remote Communications

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

13. Remote Monitoring Software

The control shall provide Monitoring Software with the following functionality

- Provide access to all data and events on generator set communications network
- Provide remote control capability for the generator set
- Ability to communicate via Modbus RTU or remote modem

14. Local Annunciator (NFPA 99/110, CSA 282)

- A. The annunciator shall be a local, control panel mounted, annunciator to meet the requirements of NFPA 110, Level 1.
- B. Annunciator shall be networked directly to the generator set control
- C. Local Annunciator shall include a lamp test push button, alarm horn and alarm acknowledge pushbutton
- D. Provide the following individual light indications for protection and diagnostics:
 - Overcrank
 - Low coolant temperature
 - High coolant temperature warning
 - High coolant temperature shutdown
 - Low oil pressure warning
 - Low oil pressure shutdown
 - Overspeed
 - Low coolant level
 - EPS supplying load
 - Control switch not in auto
 - High battery voltage
 - Low battery voltage
 - Battery charger AC failure

- Emergency stop
- Spare

15. Remote Annunciator (NFPA 99/110, CSA 282)

- A. The annunciator shall be a remote annunciator to meet the requirements of NFPA 110, Level 1
- B. The annunciator shall provide remote annunciation of all points stated above and shall incorporate ring back capability so that after silencing the initial alarm, any subsequent alarms will sound the horn.
- A. The annunciator shall have the ability to be located up to 800 ft from the generator set.

16. Remote System Monitoring and Data Management

There shall be a monitoring and data management system available on a 24/7/365 basis, which interfaces with the asset (generator set, switchgear, etc.) via a serial and/or direct I/O connection.

- A. The system shall monitor the asset continually.
- B. It will provide automated alarm notification via alphanumeric pager, cellular phone and/or e-mail. These alarms will also be displayed by a web-based system which will be updated automatically.
- C. Asset functions being monitored will be displayed by a web-based system which will be updated automatically.
- D. Standard reports which can be created by the user from the web-based system shall include:
 - 1. Site Run Summary report that shows key items associated with generator set runs including the start/stop time and the run duration all within a user defined timeframe.
 - 2. Alarm History report that shows a table listing alarms/events, their change in status, time-stamped within a user defined timeframe.
- E. The web-based software shall be secure, requiring a registered user name and password structure for access.
- F. The system will allow for the aggregation of multiple assets and/or sites to be viewed on one display and/or report.
- G. General operations assistance shall be available 24/7/365, by trained personnel via a direct toll-free phone call.
- H. All data from site shall be uploaded to a centralized database.
 - 1. The centralized database shall be capable of storage and on-line access of data for at least 13 months.
 - 2. The centralized database shall have a hot backup to ensure access to data is not lost and that Operations Center functions may continue in the event of a server outage.
 - 3. The system will offer the user the option of having alarms and/or events handled by trained Operations Center personnel on a 24/7/365 basis.
 - 4. The trained Operations Center personnel shall follow a user-defined procedure for handling alarms and/or events.

1.17 Cooling System

The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 110° F ambient air entering the room or enclosure (If an enclosure is specified). The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

1.18 Fuel System

The fuel system shall be integral with the engine. In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter/water separator in the fuel inlet line to the engine.

All fuel piping shall be black iron or flexible fuel hose rated for this service. No galvanized piping will be permitted. Flexible fuel lines shall be minimally rated for 300 degrees F and 100 psi.

1.19 Fuel Sub Base Tank

Provide a double wall sub-base tank constructed to meet all local codes and requirements. A fuel tank base of 24 hour capacity shall be provided as an integral part of the enclosure. It shall be contained in a rupture basin with 110% capacity. The tank shall meet UL142 standards. A locking fill cap, a mechanical reading fuel level gauge, low fuel level alarm contact, and fuel tank rupture alarm contact shall be provided.

1.20 Silencer

A residential grade silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished and installed according to the manufacturer's recommendation. Mounting shall be provided by the contractor as shown on the drawings. The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth due to thermal expansion be imposed on the engine. Exhaust pipe size shall be sufficient to ensure that exhaust backpressure does not exceed the maximum limitations specified by the engine manufacturer.

1.21 Starting Motor

A DC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.

1.22 Jacket Water Heater

Jacket water heater shall be provided and shall be sized to insure that genset will start within the specified time period and ambient conditions.

1.23 Batteries

Batteries - A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system.

1.24 Battery Charger

A UL listed/CSA certified 10 amp voltage regulated battery charger shall be provided for each engine-generator set. Input AC voltage and DC output voltage shall be as required. Chargers shall be equipped with float and equalize charge settings, with provisions to automatically switch between the two modes. It shall maintain its rated output voltage within $\pm 0.2\%$ with AC input variation of $\pm 10\%$. Operational monitors shall provide with individual form C contacts rated at 4 amps, 120 VAC, 30VDC for remote indication of battery charger malfunction, low battery voltage and high battery voltage. Charger shall include an Analog DC voltmeter and ammeter and fused AC input and DC output, and shall be wall mount type in a NEMA 1 enclosure.

1.25 Generator Set Start Module

Module shall be supplied with an AC source from a UPS, the Generator Set Start Module will supply 1725 cold cranking amps @ 24 VDC to assist and backup the generator set starting batteries for improved system reliability. Generator Set Start Module shall have operating temperatures of (-20deg C to 50deg C). Generator Set Start Module to be supplied from generator set equipment supplier. This will ensure system integration.

1.26 Installation

Equipment shall be installed by others in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

1.27 Start-Up and Testing

Coordinate all start-up and testing activities with the buyer. After installation is complete and normal power is available, the manufacturer's local dealer shall perform the following:

Perform a 4 hour load bank test at a 0.8 PF at full nameplate rating. Load bank, cables and other equipment required for this test to be supplied by the genset supplier.

1.28 Operation and Maintenance Manuals

Provide two (2) sets of operation and maintenance manuals covering the generator, automatic transfer switch, and auxiliary components. Include final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

1.29 On-Site Training

Provide on-site training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

1.30 Generator Enclosure

A. Weatherproof Sound Attenuated Generator Enclosure

1. The enclosure assembly shall be mounted to the perimeter of the unit's sub base fuel tank. Enclosure must be assembled on a formed 6" frame or square steel tube frame to allow the housing to be removed as a single unit while maintaining structural integrity via four roof mounted lifting points. Construction without an enclosure frame, which will require enclosure assembly other than exhaust components for removal, will not be accepted.
2. The common enclosure shall have two (2) side walls and two (2) end walls and roof using 14 gauge galvaneal modular panel construction as described below. All wall fasteners are to be on the exterior. All fasteners must be tamper proof stainless steel square neck carriage bolts or stainless steel mono bolts.
3. The enclosure shall be rated to reduce the generator system average sound pressure level to 73 decibels at 7 meters while operating at 100% load as measure in field environment. Environmental and source variables will affect results. The enclosure air intake shall consist of exterior mounted sound louvers with an exterior sound control section. The intake system shall be sized to provide adequate cooling without exceeding 1,050 fpm face velocity. The unit shall exhaust thru an interior sound control section and exterior mounted weather louver.
4. There shall be two (2) double 36" x 78" and two (2) single 48" x 78" doors. They shall be equipped with exterior latching hardware capable of accepting padlocks supplied by the owner. Hinges shall be stainless steel. The doors shall provide 3-point locking mechanisms with interior release safety handles capable of being opened from the interior even when the exterior handles are padlocked. Doors shall have exterior mounted hold open door props.
5. Aluminum drip rails are to be installed over all door openings that extend a minimum of 2.5" beyond the sides of the door opening.
6. Acoustic insulation shall be mineral wool type with a thickness required to meet the system's sound attenuation requirements. All insulation must be covered with galvanized perforated liner or similar material on walls and ceiling interior. All edges of the liner on doors and door openings must be covered to conceal sharp edges and burrs. Foam insulation materials will not be accepted.
7. The enclosure frame outside footprint dimensions shall match the perimeter of the sub-base fuel tank.
8. The system shall be delivered pre-piped to fuel tank with accessories pre-wired to the system support distribution panel requiring only load and control connections. Transportation size or weight requirements may require exhaust or other components to

ship loose. It will be the responsibility of the installing contractor to reattach these components.

9. The cooling air intake opening(s) shall be equipped with corrosion resistant bird screen and fixed vane louvers.
10. The engine combustion exhaust silencer must be mounted within the enclosure. Thermal insulation is required on exterior installations. The silencer outlet shall exit the enclosure through the roof. Roof exits require a rain collar and balanced exhaust flap type rain cap.
11. There shall be a stainless steel bellows type flexible connector between the engine and silencer.
12. There shall be a pre-wired 120/208/240 single phase main lug distribution panel with branch breakers wired to a minimum of four (4) 100 watt incandescent lights in vapor-tight fixtures with 3-way switches at each personnel door, two (2) GFCI duplex receptacles with one located at each end of the unit, battery charger and the engine block heater. All wiring shall be mounted in EMT conduit except where flexible conduit is required. All circuits must be individually grounded to the distribution panel via grounding wire sized per NEC. Conduits or enclosure structure will not be an acceptable ground source.
13. The enclosure roof shall have interlocking standing seams designed to be leak-proof up to 4" of water per hour. Exterior finish shall be two-part polyurethane with epoxy primer in the color chosen by BUYER to match existing structures.

B. Sub Base Fuel Supply Tank

1. The sub base fuel supply tank must be Underwriters Laboratory Listed, UL142 with sufficient fuel capacity for 24 hours run time at 100% load. The sub base tank shall be the mounting foundation for the generator and enclosure. It will be the responsibility of the BUYER to obtain installation permits from the authority having jurisdiction as well as conveying to the system supplier and the specifying party any special requirements not identified within this written specification.
2. The sub base fuel tank shall be a secondary containment double wall design. Both the primary and secondary tanks must be pressure tested for leaks. Closed top diked designs with open or covered secondary containment area are not acceptable.
3. Primary tank construction is to be 10-gauge steel, rectangular with fully welded corners and structural internal baffles. The primary tank shall be subject to an air tight production pressure test to a minimum of 3-psi as per UL142 guidelines. The primary tank shall be enclosed within the secondary containment tank with annular space on all sides and bottom. The secondary containment tank is to be fully welded around the primary tank and subject to the same production pressure test and standards as the primary tank.
4. The sub base tank shall have a tube steel structure beneath the flooring top surface spanning the width of the sub base tank for support of the generator and installed equipment. The structure shall be attached only to the sub base outer rails for weight transfer to the foundation pad. The sub base outer rails shall have provisions for overhead lifting with a crane rated for the complete systems dry weight. The system manufacturer must include a lifting diagram detailing point dimensions and weights.
5. All tank fittings shall be threaded NPT with all required venting devices installed and steel plugs in all spare ports. Tank fittings are to include:
 - Supply and return engine connections with bottom siphon tubes sized per the engine manufacturer's recommendations.
 - Low level dry contact float switch set to show low level condition at 1/3 of the tanks capacity.
 - Tank fill shall have pad-lockable fill cap.
 - Primary tank normal vent with a minimum 5" riser pipe.
 - Primary tank emergency vent sized per NFPA 30 using the tanks wetted surface area.

- Secondary containment tank emergency vent.
- Two inch (2") spare port with plug.
- Dry contact leak detection float switch located in the lowest point in the secondary containment annular space.
- Direct reading mechanical level gauge located adjacent to the fill port.
- The sub base underside shall be painted with an alkaline resistant undercoating material. All exterior coating shall be semi gloss black, two part polyurethane topcoat with epoxy primer.
- It will be the responsibility of the seller to supply all fuel needed for system testing and filling the tank when testing is complete.

1.31 Automatic Transfer Switch (ATS) - Medium Voltage

The Automatic Transfer Switch specified in this section shall be medium voltage Delayed Transition. The Automatic Transfer Switch shall be by the same manufacturer as the generator set and furnished with the generator set by the Emergency Power System Supplier (EPSS) as a total system.

It is the intent of this specification to secure a transfer switch that has been prototype tested, factory built, production tested and site tested. A delayed transition transfer switch with the number of poles, voltage and current ratings shown on the plans and specified herein shall be provided.

The switchgear and circuit breakers utilized in the Automatic Transfer Switch shall be the same manufacturer as the circuit breakers provided in the assemblies for the normal and emergency distribution as specified under other sections of the specifications.

The Automatic Transfer Switch specified shall include overcurrent and protective devices. The Emergency Power System Supplier shall provide a Short Circuit and Coordination Study, performed by a qualified professional engineer, as specified in the contract documents and described in Part 3 below.

A. General ATS Requirements

The transfer switch shall be installed by others as shown on the plans, in accordance with the manufacture's recommendations and all applicable codes.

B. Codes and Standards

The automatic transfer switch shall conform to the requirements of:

- UL 1008: Underwriters Laboratories standard for automatic transfer switches at 480 VAC
- CSA: C22.2 No. 178 certified at 600 VAC
- IEC: 947-6-1 certified at 480 VAC
- NFPA 70: National Electrical Code including use in emergency and standby systems in accordance with Articles 517, 700, 701, 702
- NFPA 99: Essential electrical systems for health care facilities
- NFPA 101: Life safety code
- NFPA 110: Standard for emergency and standby power systems
- IEEE 241: I.E.E.E. recommended practice for electrical power systems in commercial buildings
- IEEE 446: I.E.E.E. recommended practice for emergency and standby power systems
- NEMA ICS10: AC automatic transfer switch equipment (supersedes ICS2-447)
- UL 50/508: Enclosures
- ICS 6: Enclosures
- ANSI C33.76: Enclosures
- NEMA 250: Enclosures
- IEEE 472: (ANSI C37.90A): Ringing wave immunity
- EN55022 (CISPR11): Conducted and radiated emissions (Exceeds EN55011 & MILSTD 461 Class 3)
- EN61000-4-2: (Level 4): ESD immunity test Class B:
- EN61000-4-3: (ENV50140): Radiated RF, electromagnetic field immunity test

- EN61000-4-4: Electrical fast transient/burst immunity test
- EN61000-4-5: IEEE C62.41: Surge immunity test (1.2 x 50µs, 5 & 8 kV)
- EN61000-4-6: (ENV50141): Conducted immunity test
- EN61000-4-11: Voltage dips and interruption immunity
- IEEE-693-2005: Seismic certified at high level with 2.5 amplification factor
- IBC-2003: At $I_p = 1.5$ for z/h less than or equal to 1 (in accordance with ICC-ES-AC156)

C. Approved Manufactures

The Automatic Transfer Switch shall be of the same manufacturer as the power system unless a request for approval is submitted to the BUYER. Manufactures shall submit a request two weeks prior to bid and include a written list of deviations from this specification to be considered for approval.

D. Performance and Construction

1. The Delayed Transition Automatic Transfer Switch shall be operated by a reliable dual-solenoid driven mechanism. There shall be direct mechanical couplings to facilitate transfer in 6 cycles or less. The ATS shall have capability to operate in the delayed transition mode (with 'center-off' or 'neutral' switch position) on transfer from a failed source or when pre-selected to do so.
2. For switches installed in systems having ground fault protective devices, and/or wired so as to be designated a separately derived system by the NEC, a 4th pole shall be provided. This additional pole shall isolate the normal and emergency neutrals. The neutral pole shall have the same withstand and operational ratings as the other poles and shall be arranged to break last and make first to minimize neutral switching transients. Add-on or accessory poles that are not of identical construction and withstand capability will not be considered.
3. The contact structure shall consist of a main current carrying contact, which is a silver alloy with a minimum of 50% silver content. The current carrying contacts shall be protected by silver tungsten arcing contacts on all sizes above 400 Amps.
4. The transfer switch manufacturer shall submit test data for each size switch, showing it can withstand fault currents of the magnitude and the duration necessary to maintain the system integrity. Each ATS shall be in strict accordance and listed to UL 1008 withstand standards, including "Any Breaker" ratings. Minimum UL listed withstand and close into fault ratings shall be as follows:

<u>Size (Amps)</u>	<u>Any Molded Case Breaker* (RMS Symmetrical)</u>
100 - 400	35,000
600 - 1200	50,000
1201 - 4000	100,000
<u>Size (Amps)</u>	<u>Specific Coordinated Molded Case Breaker</u>
600 - 800	65,000
801 - 1200	85,000
1201 - 4000	100,000
<u>Size (Amps)</u>	<u>Current Limiting Fuse</u>
Up to 4000	200,000

(All values at 480V RMS symmetrical, less than 20% power factor)

5. ATS's which offer only 'specific coordinated breaker' ratings (as opposed to "any breaker" ratings) do not meet this specification and are not acceptable.

6. A dielectric test at the conclusion and closing tests shall be performed.
7. The automatic transfer switch manufacturer shall certify sufficient arc interrupting capabilities for 50 cycles of operation between a normal and emergency source that are 120 degrees out of phase at 480 volts, 600% of rated current at .50 power factor. This certification is to ensure that there will be no current flow between the two isolated sources during switching.
8. All relays shall be continuous duty industrial type with wiping contacts. Customer interface contacts shall be rated 10 amperes minimum. Coils, relays, timers and accessories shall be readily front accessible. The control panel and power section shall be interconnected with a harness and keyed disconnect plugs for maintenance.
9. Main and arcing contacts shall be visible without major disassembly to facilitate inspection and maintenance.
10. A manual handle shall be provided for maintenance purposes with the switch de-energized. An operator disconnect switch shall be provided to defeat automatic operation during maintenance, inspection or manual operation.
11. Switches composed of molded case breakers, lighting contactors or components thereof will not be acceptable.
12. The current rating shall be a continuous rating when the switch is installed in an enclosure, and shall conform to NEMA temperature rise standards.
13. The unit shall be rated based on all classes of loads, i.e., resistive, tungsten, ballast and inductive loads.
14. Temperature rise tests in accordance with UL 1008 shall have been conducted after the overload and endurance tests to confirm the ability of the units to carry their rated currents within the allowable temperature limits.
15. Unless specified otherwise on the drawings, the switch shall be mounted in a NEMA 4x enclosure.
16. The automatic transfer switch must be equipped with a solenoid production scheme that removes any attempts of operating the solenoids after (3) consecutive trials until manual intervention by an operator.

E. Microprocessor Control

The control panel shall be isolated from electrical noise and provided with the following inherent control functions and capabilities:

1. Easy-to-view, backlit LCD display with long lasting LED indicators.
2. Control panel shall display voltage and frequency of both sources.
3. The user shall be able to view the last 16 recorded events.
4. Capability for optional external communication and network interface.
5. Adjustments to all settings shall be made from the front of the panel without opening the door.
6. The transfer switch controller shall be microprocessor based. The control panel shall perform the operational and display functions of the transfer switch. The display functions of the control panel shall include ATS position, source availability, sequence indication and diagnostics.
7. All programmable and control functions shall be pass code protected and accessible through the keypad.
8. The control panel shall be provided with a simple user interface for transfer switch monitoring, control and field changeable functions and settings.

9. Touch pad test switch with Fast Test/Load/No Load selection capability to simulate a normal source failure. Transfers between live sources in the test mode shall be accomplished in a closed transition fashion.
10. The controller shall include a built in synchroscope to display the phase angle differential and ensure disturbance-free transfer operation between sources.
11. The controller shall provide digital timer adjustments with 1-second resolution. Voltage and Frequency shall be adjustable to 1% resolution to facilitate accurate transfer.
12. To ensure reliable and consistent user operation the controls must be equipped with nonvolatile memory and allow automatic daylight savings time adjustment.
13. Real time display of transfer status and active timers must be supplied.

F. Sequence of Operation

1. The Delayed Transition Switch shall transfer the load with an adjustable time delay after the opening of the closed contacts and before the closing of the open contacts. A delayed transition transfer shall occur only when a failure or interruption of the normal power source is sensed. The transfer switch shall operate in a closed transition mode when the power source servicing the load fails.
2. The ATS shall incorporate adjustable three phase under/over voltage and frequency sensing on the normal source.
3. When the voltage of any phase of the normal source is reduced to 80% or exceeds 110% of nominal voltage, or frequency is displaced 2Hz from nominal, for a period of 0-10 seconds (programmable), a pilot contact shall close to initiate starting of the engine generator.
4. The ATS shall incorporate adjustable three phase under/over voltage and frequency sensing on the emergency source.
5. When the emergency source has reached a voltage value of +/- 10% of nominal and achieved frequency within +/- 5% of the rated value, and upon completion of an adjustable 0 to 5 minute time delay on transfer to emergency (factory set at 1 second), the load shall be transferred to a center-off (neutral) position for an adjustable period of 0 to 10 minutes (factory set at 5 seconds). Upon completion of this 'center-off' time delay, the ATS shall complete its transfer to the emergency source.
6. When the normal source has been restored to not less than 90% and not more than 105% of nominal voltage on all phases, and upon completion of a time delay on retransfer to normal of 0 to 60 minutes (programmable; set at 30 minutes), the load shall be transferred to the normal source in a closed transition fashion. The generator shall run unloaded for 5 minutes (programmable) and then automatically shut down. The generator shall be ready for automatic operation upon the next failure of the normal source.
7. If the engine generator should fail while carrying the load, retransfer to the normal source shall be made instantaneously upon restoration of proper voltage (90%) on the normal source.
8. During closed transition operation, the control circuit shall monitor interconnect time. Should connection exceed 100 ms, the set of power contacts last closed shall reopen and an alarm circuit shall be energized. If the main contacts fail to open, the control system shall energize a 24 VDC shunt trip circuit to the standby feeder breaker to disconnect this source and the alarm circuit shall be closed. 24 VDC from the engine batteries shall be supplied for the shunt trip and alarm backup circuits.
9. A sync check function shall be provided for closed transition operation. The monitor shall control transfer and retransfer between live sources and operate by sensing the zero voltage point. It shall be factory set to accomplish transfer within 5 electrical degrees and +/-5%

voltage differential. If closed transition transfer is not accomplished within 60 seconds, an alarm message shall be displayed to indicate the failure.

10. Closed transition transfer in conjunction with over/under-voltage, phase rotation and angle sensing shall be accomplished when both sources are within specified parameters without any power interruption through passive synchronization. To ensure the utmost in compatibility, the ATS must be supplied by the same manufacturer of the engine generator set.

G. ATS Features

In addition to the operational elements required to satisfy the sequence of operation and other functions specified herein, the following ATS features shall be provided:

1. Adjustable time delay to override momentary normal source failure prior to engine start. Field programmable 0-10 second's factory set at 3 seconds.
2. Adjustable time delay on retransfer to normal source, programmable 0-60 minutes factory set at 30 minutes. If the emergency source fails during the retransfer time delay, the transfer switch controls shall automatically bypass the time delay and immediately retransfer to the normal position.
3. A time delay on transfer to emergency, programmable 0-5 minutes, factory set at 1 second.
4. To facilitate delayed transition operation when appropriate or pre-selected, an adjustable time delay shall be provided on transfer to either source to allow the ATS to dwell in a center-off position. This time delay must be adjustable through a range of 0 to 10 minutes and be factory set at 5 seconds. A selector switch shall be included to pre-select either closed transition or delayed transition operation. ATS designs which do not afford this capability are not acceptable.
5. An exerciser timer with momentary test pushbutton shall be incorporated within the microprocessor and shall be capable of starting the engine generator set and transferring the load (when selected) for exercise purposes on a daily, weekly or monthly basis. The exerciser shall contain a battery for memory retention during an outage.
6. Provide a momentary pushbutton to bypass the time delays on transfer and retransfer and programmable commit/no commit control logic.
7. A set of customer contacts shall be provided to indicate both emergency and normal source position.
8. An adjustable over/under frequency and voltage sensor for both emergency and normal sources.
9. Visual indication of switch position and source acceptability shall be provided for both emergency and normal sources.
10. An engine start contact shall be provided with an adjustable cool down timer.
11. A three phase Voltage Imbalance Monitor shall detect an imbalance and initiate a transfer to the alternate source. Adjustable 5-20% of nominal with a time delay of 10-30 seconds for nuisance conditions.
12. Phase rotation sensing and display shall be provided to monitor both sources.
13. Programmable Clock Exerciser shall be included (CDP) – This will replace the timer exerciser and allow for a 365 day cycle.
14. Universal Motor Load Disconnect (UMD) - Auxiliary contacts opens 0 – 5 minutes prior to transfer in either direction, re-closes after transfer. Can be configured for pre-transfer, post transfer or both.
15. Communications interface card – RS-485 Modbus
16. Test Switch (6A) - Maintained

17. A Digital Meter shall be included that measures and displays true RMS volts, amps Watts, KVA, KVAR, PF, THD plus unbalance, 256 samples/cycle data logging, waveform capture, sag/swell capture, Modbus RS485 port, frequency and large graphical screen display with Ethernet communications port.
18. Alarm panel (CTAP) – Alarm on transfer to emergency w/silence button & light.
 - Disconnect Switch (DS) - Inhibits transfer in either direction when in inhibit.
 - Protective Cover (OCVR) - Lockable see-through microprocessor and meters cover for NEMA 4x.
19. Battery Charger (B9) – 5 amp float charger. Specify input/output voltage.
20. Fan Contact (F) – Contact closes when engine runs.
21. Analog Metering - Individual 2% ammeter, voltmeter or frequency meters with selector switches as specified.
22. Inhibit transfer (Q3) – Provides additional relay (specify voltage) to inhibit transfer to Emergency.
23. Inhibit transfer (Q7) – Provides additional relay (specify voltage) to inhibit transfer to Normal.
24. Load Shed (R15) – Provisions to transfer source 2 or Emergency to normal or neutral (delayed switches only) position. Specify voltage.
25. Keyed Engine Mode Switch (SW1K) – Three position keyed engine selector switch (auto/test/off).
26. Prime Source Selector (SW3K) – Provide a keyed source selector switch that selects source 1 or source 2 as the preferred source.
27. Automatic or Manual Selector (S12) – Provide ability to manually transfer to Normal or Emergency sources.

H. Factory Tests

The transfer switch manufacturer shall perform a complete functional test on the switch, controller and accessories prior to shipping from the factory. A certified test report shall be available upon request.

I. Field Quality Control and Startup

1. 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 3 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.
2. The manufacturer's representative shall provide inspection of the final installation. The manufacturer's representative shall perform site start-up and functional checkout of the Switchgear. Upon completion of the manufacturer's start-up and checkout, the manufacturer shall demonstrate to the customer all the automated sequences of operation as specified herein.
3. Functional Testing shall include testing of the following as a minimum:
 - Pre-startup inspection of the generator, DC system, control wiring, power cables, and switchboard/switchgear
 - Crank and run engine/generator at the local engine control panel.
 - Crank and run engine/generators from the HMI touch screen.
 - Verify engine/generator alarms and shutdowns to HMI.

- Verify protective relay/breaker trip units are set to coordination study if applicable.
 - Test all modes of operation.
 - Verify and test all system alarms to HMI.
 - Test with EPS with Load.
4. Upon completion of the manufacturer's start-up and checkout, the manufacturer shall demonstrate to the customer all the automated sequences of operation as specified herein.

J. Training

1. The Supplier shall provide a training session for up to five (5) owner's representatives for 1 normal workday at a jobsite location determined by the owner.
2. Upon successful completion of a demonstration of the automated sequences of operation by the manufacturer and acceptance by the customer, the manufacturer shall provide an eight-hour "hands-on" training course for the customer's operating personnel which shall cover the following topics:
 - a. Overall System Description and Theory of Operation
 - b. Modes of Operation as listed in the Sequence of Operations to include at a minimum:
 - Automatic Operation
 - Manual Operation
 - c. Engine Safeties and Protective Relaying
 - d. Recommended System Check Lists and Log Sheets
 - e. Recommended Preventive Maintenance
3. The training session shall be conducted by a manufacturer's qualified representative. Training program shall include instructions on the assembly, circuit breaker, protective devices, and other major components.

K. Field Adjustments

1. The relays shall be set in the field by a qualified representative of the Emergency Power System Supplier, retained by the Contractor, in accordance with settings designated in a coordinated study of the system as required elsewhere in the contract documents.
2. The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operation condition. The settings shall be in accordance with the approved short-circuit study, protective device evaluation study and protective device coordination study
3. Necessary field settings of devices and adjustments and minor modifications to equipment to accomplish conformance with an approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the owner.

L. Service

The supplier of the ATS shall be the same as that of the engine generator set and shall maintain a national service organization that is factory trained and certified for transfer switch equipment. In addition, the power system dealer organization shall be available 24 hours per day, 365 days per year.

M. Warranty

The automatic transfer switch shall be warranted against defective workmanship for a period of two years, including both parts and labor.

2.0 Solicitation Process Requirements

- 2.1 Proposal Attachments: At a minimum, the following information must be included in your proposal:
- A. Proposer shall define the capability of his organization to meet the intended objectives of this IFB. The responses should be specific and complete in detail.
 - B. Specifications including all drawings for the standby generator set and automatic transfer switch, including prices and conditions.
 - C. Warranty submissions. Submissions that are other than the national published warranty must be signed by the manufacturers Chief Executive Officer (CEO) to be accepted.
- 2.2 Proposal Evaluation: The following elements shall be used for evaluation:
- A. Overall generator set and transfer switch specifications, drawings and pricing.
 - B. Manufacturer's warranty and written performance guarantee.
 - C. Manufacturer's qualifications.
 - D. Presence of local sales representative, manufacturer's offer of long term maintenance and customer reference responses.
- 2.3 Proposal Format: Proposals shall include:
- A. Current product literature which details a complete description of the standby generator set and transfer switch proposed. It must include detailed physical, construction, performance, and warranty information, suitable for evaluation purposes.
 - B. Customer reference listing. List should include a minimum of six (6) utility type organizations using the same type of standby generator set proposed and operating for a minimum of five (5) years.
 - C. Communications with the City: All communications regarding this solicitation must be directed in writing to the Purchasing Division. Unless authorized by the Purchasing Manager, no other City official or employee is empowered to speak for the City with respect to this solicitation. Bidders are advised that the City shall not be bound by information, clarifications, or interpretations from other City officials or employees. Bidders are cautioned against contacting any City official or employee other than the Buyer for this solicitation. Failure to observe this requirement may be grounds for rejection of Bidder's bid. The City's buyer for this solicitation is:

Dawn M. Foster, Purchasing Manager
City of Prescott
Purchasing Services Division
Fax: 928-777-1234
E-mail: purchasing@prescott-az.gov

2.4 Schedule

- 2.4.1 **Solicitation Advertisement**
Tuesday, October 27, 2009
- 2.4.2 **Deadline for Questions and Requests for Addenda**
Tuesday, November 10, 2009 COB
- 2.4.3 **Deadline for Issuance of Addenda via fax or e-mail**
Friday, November 13, 2009 COB
- 2.4.4 **Bids Due [one (1) original and two (2) copies]**
Thursday, November 19, 2009 at 2:00 pm

Purchasing Manager, City Hall
201 S. Cortez Street

Prescott, AZ 86302

2.4.5 Bid Opening

Thursday, November 19, 2009 at 2:00 pm

City of Prescott
City Council Chambers
201 S. Cortez Street
Prescott, AZ 86302

2.5 Questions and Requests for Addenda

Bidders who have questions about or suggestions for changes to this solicitation may direct them to the City's Buyer in writing by fax or email. Questions and requests for addenda must be received by the City's Buyer no later than the date and time listed in Section 2.2. Questions received after this time will not be considered or answered. Failure by a Bidder to request clarification of any inadequacy, omission or conflict shall not relieve the Bidder of the responsibility of being in compliance with the solicitation.

2.6 City Answers and Addenda

Changes to this solicitation will be made only by addenda issued by the City's Buyer and posted to the City website at www.prescott-az.gov/business/bids. It is the bidder's responsibility to check the website for any addenda prior to submitting a bid. All addenda issued by the City shall become a part of the specifications of this solicitation, and will be made part of the resulting agreement.

2.8 Proprietary Material

A Bidder shall clearly mark any proprietary information contained in its bid with the words "proprietary information." Bidder shall not mark any Solicitation Form as proprietary. Marking all or nearly all of a bid as proprietary may result in rejection of the bid. Bidders should be aware that the City is required by law to make its records available for public inspection. The Bidder, by submission of materials marked proprietary, acknowledges and agrees that the City will have no obligation to advocate for non-disclosure in any forum or any liability to the Bidder in the event that the City must legally disclose these materials.

2.9 Multiple Bids

A Bidder may submit multiple bids for any solicitation however, each bid must be submitted separately (in its own complete package) from the others.

2.10 Delivery of Bids

Sealed bids [one (1) original and two (2) copies] must be received at the Office of the City Clerk, no later than the date and time listed in Section 2.2. The bids will be opened and read publicly in the Council Chambers at that time.

If the bid is delivered by the U.S. Postal Service, the bid should be addressed to:

Dawn Foster, Purchasing Manager
City of Prescott
PO Box 2059
Prescott, AZ 86302

If the bid is delivered by an entity other than the U.S. Postal Service, the bid should be addressed to:

Dawn Foster, Purchasing Manager
City of Prescott
201 S. Cortez Street
Prescott, AZ 86303

Bidder shall enclose bid [one (1) original and two (2) copies] in a sealed envelope. The envelope should identify the Bidder's name, mailing address, Solicitation # 09-720-5855-8910 and Title (1000

kW Standby Generator Set and Automatic Transfer Switch), and the time and date of opening. The City shall not consider late bids, telegraphic (fax) or telephone bids. Bidder is solely responsible for ensuring that bids are delivered on time. Delays caused by any delivery service, including the U.S. Postal Service, will not be grounds for an extension of the deadline for receipt of bids. Bids received after the deadline will be returned unopened.

2.11 Cost of Bids

The City shall not be liable for any costs incurred by Bidder in the preparation and submittal of a bid(s) in response to the solicitation or in the participation of any part of the acquisition process.

2.12 Errors in Bids

Bidder is responsible for all errors or omission in their bids, and any such errors or omission will not serve to diminish their obligations to the City.

2.13 Withdrawal of Bids

A bid may be withdrawn by written request of the Bidder prior to the bid due date and time listed in Section 2.2. No bid may be withdrawn for a period of 120 calendar days after the bid due date and time.

2.14 Changes in Bids

Prior to the bid due date and time listed in Section 2.2, a Bidder may make changes to its bid provided the change is initialed and dated by the Bidder. Corrections and/or modifications received after the closing time specified will not be accepted.

2.15 Rejection of Bids

The City reserves the right to reject any and all bids and to waive any immaterial defects and irregularities in bids.

2.16 Disposition of Bids

All materials submitted in response to the solicitation, including samples, shall become the property of the City upon delivery to the City.

2.17 Incorporation of Solicitation and Response in Agreement

This solicitation, including all attachments and addenda, and all promises, warranties, commitments and representations in the successful bid shall be binding and shall become obligations of the agreement.

2.18 Protests

Any protest of a notice that a bid is non-responsive must be filed by 5:00 p.m. on the third business day after such notification. All such protests shall be in writing, contain a complete statement of the grounds for protest, and be filed with the Purchasing Manager, PO Box 2059, Prescott, AZ 86302, FAX 928-777-1234. Protesting parties must demonstrate as part of their protest that they made every reasonable effort within the schedule and procedures of this solicitation to resolve the basis or bases of their protest during the solicitation process, including asking questions, seeking clarifications, requesting addenda, and otherwise alerting the City to perceived problems so that corrective action could be taken prior to the selection of the Apparent Successful Bidder(s). The City will not consider any protest based on items which could have been or should have been raised prior to the deadline for submitting questions or requesting addenda. The filing of a protest shall not prevent the City from executing an agreement with any other bidder.

2.19 Bid Submittal

Bid [one (1) original and two (2) copies] must be sealed and the envelope must clearly indicate the information as described in Section 2.9. Bidder must fully complete and submit the following documents:

- Bid Form A – Bidder Response Cover Sheet
- Bid Form B – Price Sheet
- Bid Form C – Bid Certification
- Bid Form D – Non-Collusion Certificate

3.0 General Bid Terms and Conditions

- 3.1. **Entire Agreement:** This Bid, including all attachments referenced herein, constitutes the entire agreement between the City and the Vendor. The City's Invitation for Bid (IFB), all addenda to the IFB, and the Vendor's response to the IFB are explicitly included in this Bid. Where there is any conflict among or between any of these documents, the controlling document shall be the first listed in the following sequence: the most recently issued Bid amendment; the Bid; the most recently issued addendum to the City's IFB; the City's IFB; and the Vendor's response to the IFB.
- 3.2. **Term:** The term of this Bid shall commence on the date the City's Purchasing Agent signs the same and shall expire as stated within the Bid.
- 3.3. **Freight:** Prices include freight prepaid and allowed. The Vendor assumes the risk of every increase, and receives the benefit of every decrease, in delivery rates and charges.
- 3.4. **Title:** Prices are F.O.B. destination. Title to items and risk of loss remain with Vendor until City receives items at the delivery point.
- 3.5. **Overages/Undergoes:** Shipments shall correspond with the Bid; any unauthorized advance or excess shipment is returnable at Vendor's expense.
- 3.6. **Schedule:** Unless the City's Purchasing Agent requests a change in schedule, the Vendor shall deliver the items or render the services as stated in the Bid. At the City's option, the Vendor's failure to timely deliver or perform may require expedited shipping at the Vendor's expense, or may be cause for termination of the Bid and the return of all or part of the items at the Vendor's expense. If the Vendor anticipates difficulty in meeting the schedule, the Vendor shall promptly notify the City's Purchasing Agent of such difficulty and the length of the anticipated delay.
- 3.7. **Payment:** Invoices will be paid according to early payment discount terms, or if no early payment discount is offered, thirty (30) days after the City's receipt and acceptance of the goods or completion and acceptance of the services. Payment periods will be computed from either the date of delivery of all goods ordered, the completion of all services, or the date of receipt of a correct invoice, whichever date is later. This section is not intended to restrict partial payments that are specified in the Bid. No payment shall be due prior to the City's receipt and acceptance of the items identified in the invoice therefore.
- 3.8. **Unlawful Overcharges:** The Vendor assigns to the City all claims for anti-trust violations and overcharges relating to items purchased by the City.
- 3.9. **Price Warranty:** The Vendor warrants that the prices for the items sold to the City hereunder are not less favorable than those currently extended to any other customer for the same or similar items in similar quantities. The Vendor warrants that prices shown on this Bid are complete, and that no additional charge of any type shall be added without the City's express written consent.
- 3.10. **Warranties:** The Vendor warrants that all goods are merchantable, fit for the City's intended use; all goods comply with all applicable safety and health standards established for such products; all goods are properly packaged; and all appropriate instructions or warnings are supplied.
- 3.11. **Publicity:** The Vendor shall not advertise or publish the fact that the City has contracted to purchase items from the Vendor without the City's prior written approval.
- 3.12. **Proprietary and Confidential Information:** The Vendor acknowledges that the City is required by law to make its records available for public inspection, with certain exceptions. City staff believes that this

legal obligation would not require the disclosure of proprietary descriptive information that contains valuable designs, drawings or formulas. The Vendor, by submission of materials marked proprietary and confidential, nevertheless acknowledges and agrees that the City will have no obligation or any liability to the Vendor in the event that the City must disclose these materials by law.

- 3.13. Indemnification: To the extent permitted by law, the Vendor shall protect, defend, indemnify and hold the City harmless from and against all claims, demands, damages, costs, actions and causes of actions, liabilities, judgments, expenses and attorney fees, resulting from the injury or death of any person or the damage to or destruction of property, or the infringement of any patent, copyright, or trademark, arising out of the work performed or goods provided under this Bid, or the Vendor's violation of any law, ordinance or regulation, except for damages resulting from the sole negligence of the City.
- 3.14. Compliance with Law: The Vendor, at its sole cost and expense, shall perform and comply with all applicable laws of the United States and the State of Arizona; the Charter, Municipal Code, and ordinances of The City of Prescott; and rules, regulations, orders, and directives of their respective administrative agencies and officers.
- 3.15. Taxes: The Vendor shall pay, before delinquency, all taxes, levies, and assessments arising from its activities and undertakings under this Bid; taxes levied on its property, equipment and improvements; and taxes on the Vendor's interest in this Bid.
- 3.16. Adjustments: The City's Purchasing Agent at any time may make reasonable changes in the place of delivery, installation or inspection; the method of shipment or packing; labeling and identification; and ancillary matters that Vendor may accommodate without substantial additional expense to the City.
- 3.17. Amendments: Except for adjustments authorized above, modifications or amendments to the Bid may only be made by a change order or by written document signed by or for both parties. Unless Vendor is otherwise notified, the City's Purchasing Agent shall be the City's authorized agent.
- 3.18. Assignment: Neither party shall assign any right or interest nor delegate any obligation owed without the written consent of the other, except Vendor may assign the proceeds of this Bid for the benefit of creditors upon 21 days advance written notice to the City.
- 3.19. Termination:
 - A. For Cause: Either party may terminate this Bid in the event the other fails to perform its obligations as described herein, and such failure has not been corrected to the reasonable satisfaction of the other in a timely manner after notice of breach has been provided to such other party.
 - B. For Reasons Beyond Reasonable Control of a Party: Either party may terminate this Bid without recourse by the other where performance is rendered impossible or impracticable for reasons beyond such party's reasonable control such as but not limited to an act of nature; war or warlike operations; civil commotion; riot; labor dispute including strike, walkout, or lockout; sabotage; or superior governmental regulation or control.
 - C. Notice: Notice of termination shall be given by the party terminating this Agreement to the other not less than ten (10) working days prior to the effective date of termination.

4.0 Standard Bid Information

- 4.1. Default by Bidder: In case of default by the bidder, the City of Prescott may procure the items or service from other sources and may deduct from any monies due or that may thereafter become due to the bidder the difference between the price named in the Bid or purchase order and the actual cost thereof to the City of Prescott. Prices paid by the City shall be considered the prevailing market price at the time such purchase is made. Periods of performance may be extended if the facts as to the cause of delay justify such extension in the opinion of the Purchasing Agent.
- 4.2. Warranty: Manufacturer's warranties shall remain in effect. All equipment purchased shall be purchased from one (1) vendor. That one vendor shall be fully responsible for all warranty performance relating to any part of component of the purchased equipment. The vendor's

responsibility shall include all warranty involving sub-contractors. The vendor shall supply a warranty on all parts and workmanship from the initial delivery date. The vendor shall guarantee further that the equipment to be supplied complies with all applicable regulations.

- 4.3. Litigation: The parties hereto expressly covenant and agree that in the event of a dispute arising from this Agreement, each of the parties hereto waives any right to a trial by jury. In the event of litigation, the parties hereby agree to submit to a trial before the Court. Neither party shall be entitled to an award of attorneys' fees, either pursuant to the Bid or another other state or federal statute.
- 4.4. Cooperative Use of Bid: This Bid may be extended for use by other municipalities, school districts and government agencies in the State of Arizona with the approval of the contracted vendor. Any such usage by other entities must be in accordance with the statutes, codes, ordinances, charter and/or procurement rules and regulations of the respective government agency.
- 4.5. Brand Names: Brand names are only used for reference to indicate character or quality desired unless otherwise indicated.

5.0 Instructions for Submittal Forms

- 5.1. Form A - Solicitation Response Cover Sheet: Bidder shall complete, sign, and submit Form A as the first page of the bid package.
- 5.2. Form B - Price Sheet: Bidder shall complete, sign, and submit Form B.
- 5.3. Form C - Bid Certification: Bidder shall complete, sign, and submit Form C.
- 5.4. Form D - Non-Collusion Certificate: Bidder shall complete, sign, and submit Form D.

Form A – Solicitation Response Cover Sheet

**City of Prescott
Solicitation Response**

Solicitation Number: 09-720-5855-8910

Description: 1000 kW Standby Generator Set and Automatic Transfer Switch

Please note all that apply:

- Total Price \$ _____
- Addenda Number(s) Received (if any) _____
- Original Forms A through D plus two (2) photocopies

Business Name: _____

Business Address: _____

Business Phone: (_____) _____

Business Contact: _____

Supplier Comments: _____

Form B – Price Sheet

1000 kW Standby Generator Set and Automatic Transfer Switch

<u>Item</u>	<u>Quantity</u>		
1000 kW Standby Generator Set	1	Unit Price	\$ _____
Automatic Transfer Switch	1	Unit Price	\$ _____
		Subtotal	\$ _____
		Tax	\$ _____
		Total	\$ _____

Delivery after award of bid : _____ days (not to exceed 180 days)

Payment Terms: _____

Company

Name (Printed) Signature

Title

Dated this _____ day of _____ 2009

Form C – Bid Certification

Bidder: _____

The Bidder hereby certifies the following:

C.1 That he/she has read The City of Prescott's solicitation documents, its appendices and attachments, and the following Addenda, and to the best of his/her knowledge, has complied with the mandatory requirements stated therein.

Addendum	Issue Date
_____	_____
_____	_____

C.2 That he/she has had opportunity to ask questions regarding the solicitation, and that such questions having been asked, have been answered by the City.

C.3 All specifications and requirements of this IFB have been met. Yes _____ No _____

Exceptions: _____

C.4 That the Bidder's bid consists of the following:

1. Form A – Solicitation response package cover sheet
2. Form B – Price Sheet
3. Form C – Bid Certification
4. Form D – Non-Collusion Certificate

C.5 That the Bidder's bid is valid for 120 days

Company

Signature

Title

Dated this _____ **day of** _____ **2009**

Form D – Non-Collusion Certificate

Bidder Name: _____

The undersigned Bidder hereby certifies as follows:

To the best of his/her knowledge, the person, firm, association, partnership or corporation herein, has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive pricing in the preparation and submission of a bid to The City of Prescott for consideration in the award of this solicitation.

Company

Signature

Title

Dated this _____ day of _____ 2009