BID DOCUMENT AND SPECIFICATIONS

BID DOCUMENT AND TITLE:  RFB 0910-19 BACKUP GENERATOR AND TRANSFER SWITCHES FOR ITS DATA CENTER

PLACE OF OPENING:  BARLOW RM 205i
CLACKAMAS COMMUNITY COLLEGE
19600 MOLALLA AVENUE
OREGON CITY, OR 97045

TIME OF OPENING:  2:00 PM, JUNE 21, 2010

TO BE OPENED BY:  YASSAMIN ALAYAN
PURCHASING AGENT
503-594-3089
yassamina@clackamas.edu

NO FAXED OR ELECTRONIC BIDS WILL BE ACCEPTED

NAME OF BIDDER:  ________________________________

PURCHASING DEPARTMENT
19600 MOLALLA AVE.
OREGON CITY, OR 97045
503-594-3089
FAX 503-650-6647
1. **BIDDING INSTRUCTIONS**

1.1 **Instructions to Bidders**

Each vendor is invited to bid on any of the items described under the general specifications or on any number of items described therein, or on all of the items described therein. Each line item will be considered separate unless otherwise specified herein.

**IMPORTANT NOTICE:** State of Oregon Statutes requires that Clackamas Community College go through a prescribed bid process. The College takes that bid process seriously, and it is our intent to solicit bids that are accurate and that each bidder intends to honor. As a bidder you are expected to submit bids that are accurate, complete, and contain all terms and conditions which you feel are necessary. If after submitting your bid you find changes are necessary you may change or withdraw your bid at any time up to the time of the bid opening. However, after the bid opening, the bid may not be changed or altered in any way. If accepted, your bid is considered a binding contract that you, as the bidder, will be expected to honor. No bidder may withdraw his bid after the time set for the bid opening or before the award of the contract, unless said award is delayed for a period exceeding 30 days. If for any reason you do not perform according to the terms of the bid document and specifications, the College can be expected to take whatever action it feels appropriate, including but not limited to removal of your name from future bid lists.

Pages are not to be removed from this document. Indicate by a horizontal line through the "Price" space for individual items not bid, or by a vertical line through the "Price" column for individual items not bid. Also, each full page on which no bid appears must be lined out.

Bid prices entered shall represent the bidder’s net price per unit after all trade-in allowances, trade and cash discounts, excess tax and other state or federal taxes have been deducted. Prices must include the cost of delivery to the College campus in Oregon City, Oregon.

**All bids must be sealed in an opaque envelope and addressed as follows:**

Clackamas Community College  
Attention: Yassamin Alayan  
19600 Molalla Avenue  
Oregon City, OR 97045

In addition, the name and address of the bidder, and the bid number and title as it appears on the cover page of these specifications must appear on the outside of said envelope. Bids will be accepted at the Purchasing Office of Clackamas Community College, Barlow Building Room 205i no later than the time set forth as the time of the opening on the cover of this document. It is entirely the responsibility of the bidder to ensure that his bid is received on time. Bids which
are received after the time of opening will not be considered and will be returned to the bidder unopened.

The proposal sheet of these specifications must be signed with ink as follows:

1.1.2 In the case of an individual bidder, but such individual.

1.1.3 In the case of a partnership, the name of the partnership must appear on the proposal sheet, and it shall be set forth under the signature of such officer the name of the office he/she holds or the capacity in which he/she acts for the corporation.

1.1.4 In the case of a corporation, the corporation name must appear on such proposal; and it shall be signed by the president or other officer who is authorized to submit bids for the corporation. There shall be set forth under the signature of such officer the name of the office he/she holds or the capacity in which he/she acts for the corporation.

1.2. Federal, State, and Local Statutes and Regulations
All materials and/or equipment delivered to the College shall conform to applicable requirements of federal, state, and local statutes and regulations. This includes, but is not limited to, OSHA and fire regulations. All electrical equipment purchased by the College shall comply with the Bureau of Labor Electrical Safety Law (ORS 479.510). All motorized tools, machines, and equipment shall be grounded according to Chapter 4, Section 1-12, of the Oregon Safety Code for Places of Employment.

1.3 Equal Employment Compliance Requirements
By submitting this bid, the bidder certifies compliance with the applicable Federal Acts, Executive Orders, and Oregon Statutes and Regulations concerning affirmative action toward equal employment opportunities. All information and reports required by the Federal or Oregon Governments having responsibilities for the enforcement of such laws shall be supplied to the College upon request, for purposes of investigation to ascertain compliance with such acts, regulations, and orders.

1.4 Resident Bidder
All bids must contain a statement as to whether the bidder is a resident bidder as defined in ORS 279A.120, "Resident Bidder" means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a "resident bidder" pursuant to this subsection". It is understood that, in the selection of equipment and supplies listed herein, preference will be given to articles manufactured or produced within the State of Oregon, price and quality being equal, and time required for delivery being satisfactory to the college.
1.5 Transfer or Assignment
Neither this contract, nor any interest therein, shall be transferred to any other party or parties without written consent of the College. In case the contractor assigns all or any part of any moneys due or to become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due to the contractor shall be subject to prior liens of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this contract.

1.6 Prohibited Interests
No official of the College who is authorized in such capacity and on the behalf of the College to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction, or material supply contract, or any subcontract in connection with the furnishing of items or service for the College, shall become directly or indirectly interested personally in this contract or any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the College who is authorized in such capacity and on behalf of the College to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction or in any part thereof, items, contract, subcontract, insurance contract, or any other contract pertaining thereto, shall become directly or indirectly interested personally in this contract or any part thereof. This is not intended to prohibit bidding by College employees who are in no way involved in the decision-making process concerning this bid.

1.7 Responsibility of the Bidder
All ordered supplies are the responsibility of the bidder until accepted by the College. Shipped items, which are damaged or lost enroute, must be replaced by the bidder within thirty (30) days. The bidder is responsible for prosecuting all damage claims with freight companies. Payment for damaged goods will be withheld until the damaged items are replaced.

Bidders are considered to be held responsible for procurement and delivery of items upon which they successfully bid. In the event that one of their suppliers does not ship as specified and agreed to in the bid, and in the Purchase Order as accepted, then the bidder will assume the responsibility for procuring a suitable alternate source who will make delivery of those items not provided by the original supplier.

The foregoing does not apply in the event delivery is directly affected by strikes, natural disaster, an act of God, or other circumstances beyond the control of the bidder, and approved in writing by the College.

Out-of-area bidders must, upon request, provide a toll-free telephone number or authorization to call collect with respect to items for which the vendor is the successful bidder.
1.8 **All or None Bids**

This invitation to bid may contain groupings of items for which a bid is required for each and every item within these groupings, but for which award will be made on an "all items or none" basis. No bids for the provision of single items within these groups will be considered unless otherwise stated. The unit prices required will apply if the quantity of an individual item is increased or decreased as provided for in the general specifications.

Bidders may clearly label other groups of items of their choice for which they may choose to bid on an "all or none" basis. However, in such case the College reserves the right to award these items individually to various vendors or to accept the "all or none" bid-whichever is determined to be in the best interests of the College.

1.9 **Product Identification**

Brand name and model number must be indicated for each item bid. The catalog numbers submitted must be only those numbers, which are in their standard catalog for the current year.

The use of the name of a manufacturer, or any specific brand or make, in describing any item in this bid does not restrict bidders to that manufacturer or specific article unless so stated. A brand name may be used simply to indicate the quality and utility of the article desired. The goods on which proposals are submitted must, in all cases, be equal in quality and utility to those referred to. The College reserves the right to make final judgment regarding quality and utility of items proposed.

1.10 **Purchase Orders, Delivery and Invoice Specifications**

Purchase orders will be issued to the successful bidders and will include bid specifications by reference, items awarded, price bid, and delivery date. Any qualification made by the bidder to any bid specifications, which is found acceptable to the College will also be included.

The purchase order number must be included on all packages, invoices, and shipping notices. A packing list is required with each delivery. Cartons are to be labeled clearly with the purchase order number, delivery address, and the "Attention" information from the purchase order, and delivered to the Shipping and Receiving are, Lewelling Building, on the campus unless otherwise indicated. Payment will made after satisfactory delivery and acceptance of the merchandise by the College, upon presentation of invoices by the vendor. Invoices must be submitted in duplicate and addressed to the Accounts Payable Office at the College address. Payment will ordinarily be made within thirty (30) days after delivery and acceptance of goods, or receipt of invoice, whichever is later.
1.11 **Interpretation of Specifications**
No officer or employee of Clackamas Community College has any authority to place any interpretation, either verbal or written, upon the foregoing or annexed specifications. Any clarification, which may be required, must be obtained from the Purchasing Office.

1.12 **Requirements Contracts**
1.12.1 Requirements contracts only shall be valid for one year from the date of issuance of the purchase order (or letter of notice to proceed) inaugurating the contract, unless otherwise indicated in the appropriate purchase order.

1.12.2 Requirements contracts may be renewed for two additional one-year periods provided that the Contractor's performance is acceptable and that pricing changes proposed by the Contractor for renewal periods are within the accepted norms and are acceptable to the College. Initial pricing benchmarks are required; proposed price increases shall be gauged against the benchmarks and other pertinent criteria such as increasing the Consumer Price Index.

1.13 **Reservations**
The Board of Directors of Clackamas Community College herein expressly reserves the following rights:

1.13.1 To award a contract for any one of the items described under the general specifications, or upon any number or all of the items described therein.

1.13.2 To increase or decrease quantity by fifteen percent (15%) of any item, with the understanding that bid price per unit will apply on the revised quantity.

1.13.3 To purchase additional items, as awarded, throughout the fiscal year (July 1 through June 30), with price subject to increase or decrease in the same proportion as changes in the manufacture's price list, discount schedule, or other basis change in manufacturing price structure. The written request for price change shall be accompanied by the manufacture's price list or other positive means of substantiation. All manufacture's price decreases must be offered for use on effective date.

1.13.4 To require a signed statement from the bidder that the materials or services proposed do fully meet all of the specifications published in this document.

1.13.5 In the event that two or more bids shall be for the same amount for the same item, to award the contract for such item by drawing lots between such bidder or divide the quantity of such items equally between all such bids.

1.13.6 In the event only one bid is received, to return the bid unopened, at the discretion of the Purchasing Agent.
1.13.7 To reject any and all bids as permitted by Oregon Statute or Administrative Rule or Community College Rules of Procurement.

1.13.8 To waive minor irregularities when, in the opinion of the Purchasing Agent, it is in the best interests of the College to do so, and when doing so in no way creates an unfair situation for other bidders.

1.14 Protest of Bid
Protest of bid specifications or contract terms shall be presented to the Owner in writing five (5) calendar days prior to bid opening. Such protest or request for change shall include the reason for the protest or request, and any proposed changes to specifications or terms. No protest against award because of the content, of bid specifications or contract terms shall be considered after the deadline established for submitting such protest. Where applicable, the provisions of OAR 137 shall prevail.

1.15 Protest of Award
Any actual bidder or proposer who is adversely affected by the Owner's notice of award of the contract to another bidder or proposer on the same solicitation shall have seventy two (72) hours from the notice of award to submit to the Owner, a written protest of the notice of award. In order to be adversely affected or aggrieved, bidder or proposer must be next in line for award. Where applicable, the provisions of OAR 137 shall prevail.

1.16 Final Award
The written notice of award of the contract shall constitute a final decision of the Owner to award the contract if no written protest of the notice of award is filed with the Owner within the designated time.

1.17 Other Government Agency Participation
The bidder submitting this proposal agrees to extend identical prices and services under the same terms and conditions to all regional public agencies. Quantities stated in this proposal reflect Clackamas Community College only. Each participating agency will execute its own contract with the lowest responsible/responsive bidder for its requirements. Any bidder, by written notification included with their bid, may decline to extend the prices and terms of this proposal to any, and/or all public agencies.
2. GENERAL SPECIFICATIONS

Clackamas Community College requests bids for 0910-19 BACKUP GENERATOR AND TRANSFER SWITCHES FOR ITS DATA CENTER. Sealed bids will be accepted at the Office of Purchasing on the main campus. Sealed bids must be received by the Office of Purchasing before 2 p.m., June 21, 2010. Late bids will not be accepted. It is entirely the responsibility of the bidder to submit the bid on time.

2.1 Please indicate with Y for Yes or N for No whether the item you are bidding meet each specification:

(LIST SPECIFICATIONS HERE) (Y/N)

2.2 Your bid price must be the total delivered (FOB Destination) price, including freight, rebates, and all incidental costs necessary for delivery to the college campus.

2.3 Questions must be faxed to Yassamin Alayan before 2 p.m. June 17th. If needed, an addendum will be issued.

2.5 Award will be made at the July meeting of the Board of Education on.. A purchase order will be faxed on the following day.
263213 - ENGINE GENERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.2 DESCRIPTION

A. This specification is for an Owner direct pre-purchase of a generator and transfer switch. The materials specified in these sections shall be turned over to the installing Contractor at the time the installation portion of the Contract is awarded.

B. Bidders shall be required to furnish the Automatic Transfer Switch specified in Section 263600. Provide separate pricing for the ATS.

C. Bidders shall provide indoor, weather tight storage of the generator and the ATS if the installing Contractor is not in position to accept delivery. This will be up to the discretion of the Contractor.

D. Selling distributor shall be the service, startup, and warranty supplier for the generator set. Reassignment of these responsibilities is prohibited.

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. LP: Liquid petroleum.

1.4 TO QUALIFY AS AN ACCEPTABLE MANUFACTURER AND/OR SUPPLIER

A. Fulfill the following requirements:
   1. Shall have been in the business of distributing and/or installing and maintaining the specific type of engine-generation equipment under the present firm name for at least five years.
   2. Shall be the authorized distributor of the represented generator set package for the geographic area for which it is being installed.
   3. Shall have the capability of dispatching a maintenance or repair truck with a qualified factory trained repairman and spare parts to the job site within four (4)
hours of a request for service on the equipment. Service dispatch shall be available 24 hours a day, everyday, including weekends and holidays.

4. Equipment shall be the product of a firm which has regularly assembled and/or manufactured such equipment for at least five years.

B. Bidders will not be considered unless there is a local office (within 75 miles of project site), with factory-trained representatives who have been under their direct employment for a period of at least one year. All bidders shall maintain a stock of spare parts which would minimize system down time in case of a component failure.

1.5 ADDITIVE ALTERNATE PRICING

A. Provide a separate pricing line item for the following additive alternates:
   1. 3-year maintenance contract with load bank testing once/year.
   2. 5-year maintenance contract with load bank testing once/year.
   3. Rental of a temporary 150kW, 480V, 3-phase, 4-wire generator.

1.6 APPLICABLE CODES AND STANDARDS

A. The engine-generator set and accessories shall comply with the requirements of the National Electrical Code, NFPA 37 Combustion Engines and Gas Turbines, and NFPA 110 for Level 2 Emergency Power System Set shall comply with NEMA Standards for all other requirements, not specified herein and shall be UL listed and labeled under standard 2200.

B. Engine-generators manufactured after April 1, 2006 shall be certified to meet the Environmental Protection Agency (EPA) 40 CFR 89 Tier 2 minimum air quality performance standard.

1.7 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
   1. Thermal damage curve for generator
   2. Time-current characteristic curves for generator protective device
   3. Type of exciter and voltage regulator
   4. Type and manufacture of engine governor
   5. Certified of factory vibration test report and torsional analysis

B. Drawings and/or literature describing the accessories including:
   1. Engine generator control and monitoring panel and wiring diagrams.
   2. Batteries and rack
   3. Battery charger and wiring diagrams
   4. Jacket water heater(s)
   5. Silencer, exhaust adapter and other exhaust system components
   6. Control wiring diagrams
   7. Outdoor enclosure
   8. Engine emissions information
C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
   2. Wiring Diagrams: Power, signal, and control wiring.

D. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic. Include the following:
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
      a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Source quality-control test reports.
   1. Certified summary of prototype-unit test report.
   2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
   4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
   6. Report of exhaust emissions showing compliance with applicable regulations.

F. Field quality-control test reports.

1.8 Operation and Maintenance Manuals:

A. O & M manuals shall be submitted to the engineer for review thirty (30) days prior to installation of the unit.

B. Shall contain step by step instructions for startup and shutdown. The first page shall contain the name, address and phone number of the local representative to be called for service or parts. This shall be followed by complete parts lists by actual ordering catalog numbers. Also shall contain four copies each of test record forms and service record forms for Owner use. These forms shall show the proper interval for test, servicing and replacement of all components, lubrication, filters, anti-freeze, etc., including recommended specifications for all lubricants.

C. Shall contain a list of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices and source of supply.
D. Warranty: Special warranty specified in this Section.

E. The final reviewed manuals shall be turned over to the Owner prior to conducting the instruction and demonstration session. Obtain a receipt for the manuals and forward a copy of the receipt to the Engineer.

1.9 QUALITY ASSURANCE

A. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with ASME B15.1.

D. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.10 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
   1. Ambient Temperature: -15 to 40 deg C.
   2. Relative Humidity: 0 to 95 percent.
   3. Altitude: Sea level to 1000 feet.

1.11 RATING

A. The engine-generator set rating shall be based on operation of the set when equipped with all the necessary operating accessories (radiator fan, exhaust silencer, air cleaners, lubricating oil pump, lubricating oil filters, fuel priming pump, fuel injection pump, jacket water pump, governor, alternating current generator and exciter regulator).

B. The engine-generator set shall be capable of producing not less than 150 KW (with a 0.8 power factor load) continuously for standby power applications at the altitude and ambient temperature conditions as noted above.

C. Motor starting capability shall be a minimum of 500 kVA.

D. On closing of the starting contact, each engine generator shall be capable of accepting full rated load and stabilizing at rated voltage plus or minus (+/-) 5 percent of rated frequency, within 10 seconds (including transfer switch transfer time).
E. The engine-generator set shall be capable of accepting suddenly applied 50 percent rated load at 0.8 power factor with a voltage dip not exceeding 20 percent and returning to plus or minus (+/-) 2.0 Hertz rated frequency in 5 seconds.

F. The engine-generator set shall be capable of accepting full rated load and stabilizing at rated voltage, within plus or minus (+/-) 5 percent of rated frequency, within 6 seconds, and shall be capable of accepting the following loads with no more than 20% voltage dip.

1.12 WARRANTY

A. The complete generator set (generator set, controls, and associated accessories), as provided by the single source manufacturer shall be warranted by said manufacturer against defects and workmanship for a period of five years or 1000 hours, whichever occurs first from the date of system, start up. Such coverage shall include parts, labor, travel expenses, and labor to remove/reinstall said equipment, per the manufacturer's standard published limited warranty.

1.13 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.14 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
   2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
   3. Filters: One set each of lubricating oil, crankcase, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide
   1. Caterpillar
      a. Bob Tanzer - 503.288.6411 / btanzer@haltonco.com
2. Cummins Power Generation  
a. Jim Butler - 5032865938 / jim.butler@cummins.com

3. Kohler  
a. Rob Jackson - 360.906.8298 / rjackson@pacificpowergen.com

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation.
   1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

C. Capacities and Characteristics:
   1. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.
   2. Output Connections: Three-phase, four wire.
   3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:
   1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
   2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
   3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
   4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
   5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
   6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
   7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
   8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:
   1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.
a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.

3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.

4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.

7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.

8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.

9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.
   a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

11. Load Bank Connection: Provide connection point on the generator system for a load bank system.

2.3 ENGINE

A. Fuel: Natural gas.

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:
   1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
   2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
   3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:
   1. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system with integral thermostatic switch to maintain engine jacket water temperature which will allow the engine-generator set to meet the 10 second acceptance of full rated load in the ambient temperature listed in Project Conditions. The heater shall operate on 120 volts.

G. Governor:
1. The engine speed shall be controlled by an electronic isochronous type governor with +/- .25% stability at any constant load from no load to full load, 0% to 5% (adjustable) droop from no load to full load, maximum transient of 3%, and recovery time of .5 seconds upon activation or removal of full load.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
   a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and non-collapsible under vacuum.
5. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
6. The radiator shall be provided with core guard, belt guard, fan guard, duct flange and mounting hardware with flexible pipe connections between the engine and the radiator.

I. Muffler/Silencer: Furnish the engine with a muffler(s) and stainless steel flexible exhaust adaptor(s). The muffler(s) shall be protected by a high temperature corrosion resistant coating and be arranged for horizontal mounting above the engine, have provisions for supports separate from the engine and be fitted with a drain.
1. Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
   a. Minimum sound attenuation of 25 dB at 500 Hz.
   b. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85dBA or less.

J. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

K. Starting System:
1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding. Motor voltage shall be as recommended by engine manufacturer.
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Extra flexible, multi-strand copper insulated conductors. Size as recommended by engine manufacturer for cable length required with ring type terminal for engine, battery cable clamps for battery.
6. Battery Box: High density white or gray polyethylene seamless box (1/4" thick minimum) with removable polyethylene cover. Provide with seismic restraint battery hold down clamps or straps.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating or as required by the manufacturer. Alternator shall have adequate capacity to recharge and maintain battery and to provide power to all engine-generator controls and accessories when engine is running.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:
   a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
   b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
   c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
   e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
   f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet. When located on generator mount via vibration isolators.

L. Crankcase Ventilation Filter:
   1. Provide recirculation filter with replaceable filter element. Nelson EcoVent or equivalent by Racor.

2.4 CONTROL AND MONITORING

A. The generator set shall be provided with a microprocessor based control system to provide automatic starting, monitoring and control functions for the generator set.

B. Engine Controls. Engine mode selector switch labeled Run-Off-Auto:
   1. When the engine selector switch is placed in the "Run" position, the engine shall start and come up to speed. It shall continue to run until the selector switch is
2.

When the engine selector switch is placed in the "Off" position the generator shall be locked out and initiate a Generator Controls Not In Auto alarm. Whenever the switch is placed in the "Off" position while the engine is running it shall be immediately shutdown.

3.

When the engine selector switch is placed in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Emergency Stop Switch. Red "mushroom head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from starting. Also initiate a Generator Controls Not in Auto alarm.

E. Automatic Starting Controls. The control system shall include a engine cranking system which allows for user selected crank time, rest time and # of cycles. Initial settings shall permit at least 3 cranking attempts of 15 seconds (adjustable) duration with 15 second (adjustable) rest period between cranking attempts.

F. Engine Cool down: The control system shall include time delay stop function (adjustable 0-600 seconds) after removal of engine start signal.

G. Generator Monitoring and Controls: As required by NFPA 110 for Level 2 system, and the following:
   1. AC voltmeter (3 phase, line-to-line, and line to neutral).
   2. AC ammeter.
   3. AC frequency meter.
   4. DC voltmeter (alternator battery charging).
   5. Engine-coolant temperature gage.
   6. Engine lubricating-oil pressure gage.
   7. Running-time meter.
   9. Generator-voltage adjusting rheostat.

H. Generator Alarms: Alarm system shall be provided with LED indicators to indicate the nature of the alarm. The alarm horn shall sound upon occurrence of any of the alarms described below. To reset the engine generator after a failure while in automatic operation the engine mode selector switch shall be rotated to the "stop" position then back to the "auto" position.
   1. If the alarm horn is silenced for a failure, the next failure or alarm shall re-energize the alarm horn.
   2. Alarm panel shall be provided with horn silence button and lamp test switch (or push to test indicator lights).
   3. Terminal strip connections shall be provided for the remote annunciator panel and other remote alarm connections.
   4. The following fail circuitry and alarms shall be provided.
Low Coolant Temperature Amber alarm only
Low Coolant Level Amber alarm only
Approach High Coolant Temperature Amber alarm only
High Coolant Temperature Red shutdown and alarm
Approach Low Oil Pressure Amber Alarm only
Low Oil Pressure Red Shutdown
Overcrank Red shutdown & alarm
Overspeed Red shutdown & alarm
Overcurrent (circuit breaker trip) Red Shutdown and alarm
Under frequency Red Shutdown and alarm
Battery Charger Failure Amber alarm only
Control Not In Automatic Red Immediate shutdown & alarm

Connection to Building Management System: Generator set control and monitoring system shall provide Modbus-RTU / RS485 output for all alarms. Provide separate connection point.

2.5 GENERATOR OVERCURRENT PROTECTION

A. Generator shall be protected from overloads by a circuit breaker.

B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
2. Trip Unit: 250amp.
3. Trip Unit Settings: To be determined.
4. Selective Coordination: Generator Circuit Breaker shall be selectively coordinated with all downstream overcurrent protective devices in accordance with NEC 700.27 and 701.18.
5. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
6. Zone selective interlocking functionality
7. Modbus communication capable
8. Metering of:
   a. Line-to-neutral voltages (VAN, VBN, VCN)
   b. Line-to-line voltages (VAB, VBC, VCA)
   c. Current on each phase (IA, IB, IC)
   d. Current in the neutral conductor (IN) (optional)
   e. Active power KW per phase and total
   f. Reactive power, KVAR per phase and total
   g. Apparent power, KVA per phase and total
   h. KW demand and maximum KW demand
2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. The generator shall be 3 phase, 4 wire, 60 Hertz, rated not less than the KW size and voltage noted or as determined under RATING above at 0.8 power factor. The generator rating shall be applicable for continuous service in standby power applications. The temperature rise of the generator shall not exceed 130 degrees C based on operation at 40 degrees ambient when producing its full rated output continuously per NEMA MG1.

B. The generator shall be a single bearing, rotating field, synchronous type built to NEMA standards with class H insulation rating limited to 130 degrees C above ambient. The excitor shall be brushless rotating full wave rectification excitor with solid state components. The generator shall be coupled directly to the engine flywheel through a flexible driving disc to assure positive alignment.

C. The generator shall be a 12 lead type.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Voltage Regulator: Solid-state type, three phase voltage sensing, separate from exciter, providing performance as specified with volts per hertz performance in transient conditions exceeding 5% engine speed variation. Provide with build in electromagnetic interference suppression. Provide fuse protection against overvoltage and overcurrent and protection of the regulator from under voltage and under frequency. Provide protection for the load and generator against loss of voltage sensing.
   1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

H. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

J. Subtransient Reactance: 8 percent, maximum.
2.7 OUTDOOR WEATHER PROTECTIVE SOUND ATTENUATING ENCLOSURE

A. The generator set shall be provided with a sound-attenuated weather protective exterior housing which allows the generator set to operate at full rated load in the ambient conditions previously specified.

B. The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 49 dBA measured at the property line in a free field environment. Housing configuration and materials used may be of any suitable design which meets application needs, except that acoustical materials used shall be oil and water resistant. No foam materials shall be used unless they can be demonstrated to have the same durability and life as fiberglass.

C. The enclosure shall include hinged doors for access to both sides of the engine and alternator, and the control equipment with key-locking and pad lockable door latches for all doors. Door hinges shall be stainless steel.

D. The enclosure shall be provided with an exhaust silencer which is mounted inside the enclosure, and allows the generator set package to meet specified sound level requirements. Silencer and exhaust shall include a raincap and rain shield.

E. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer’s standard color. All surfaces of all metal parts shall be primed and painted. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.

2.8 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.
   2. Durometer Rating: Minimum 60.
   3. Number of Layers: Multiple layers to be separated by steel shims as required by the supported load.

2.9 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
PART 3 - EXECUTION

3.1  INSTRUCTION AND DEMONSTRATION

A.  The Contractor shall (after one week (minimum) written notification to Owner/Engineer) conduct a 4 hour instruction and demonstration session during which all maintenance and operational aspects of the system will be described and demonstrated to personnel selected by the Owner. The session shall be conducted by a Contractor's representative thoroughly familiar with the characteristics of the system and the suppliers representative. This instruction session shall also include step by step instruction on the sequence of startup and shutdown of the unit, following the written operating instructions listed in the O & M manual, and shall include procedures to be followed in the event of audible/visual fault conditions occurring on generator annunciators.

B.  Instruction on maintenance procedures shall include proper interval for system tests and duration, replacement interval for fuel, oil and air filters; lube oil and coolant change; interval for fluid level checks (i.e. fuels, oil, lube oil, coolant and battery levels) as contained in the O & M manual test and service record forms.

C.  Upon completion of the instruction period, the Owner's representative shall complete his portion of the Job Completion Form, copies of which shall be included with the O & M manual and forwarded to the Engineer.
   1.  Job Completion Form to be issued under a future contract.

D.  Instructions shall be coordinated with those furnished under Section 263600, Bypass/Isolation Transfer Switches.

End of Section
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION

A. This specification is for an Owner direct pre-purchase of a generator and transfer switch. The materials specified in these sections shall be turned over to the installing Contractor at the time the installation portion of the Contract is awarded.

B. Bidders shall provide indoor, weather tight storage of the generator and the ATS if the installing Contractor is not in position to accept delivery. This will be up to the discretion of the installing Contractor.

C. Provide all automatic transfer switches complete with bypass isolation switches and closed transition automatic transfer switch operation, fully operational and fully tested.

D. Provide transfer switch control and monitoring network for transmission of ATS data and status to and control from the Remote Operator Interface.

1.3 REFERENCED STANDARDS

A. Underwriters Laboratories, Inc. (UL)
   1. UL 1008 Standard for Transfer Switch Equipment

B. National Fire Protection Association (NFPA)
   1. NFPA 70 - National Electrical Code
   2. NFPA 99 - Essential Electrical Systems for Health Care Facilities
   3. NFPA 110 - Emergency and Standby Power Systems

C. National Electrical Manufacturers Association (NEMA)

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain transfer switches through one source from a single manufacturer.

B. Product Selection for Restricted Space: Maximum 92 inches high (not including base channels). Length and depth: 36 inches wide and 24 inches deep.
1.5 SUBMITTALS

A. Prepare and submit detailed shop drawings for review prior to manufacture described in this section.

B. Include the following information:
   1. Wiring diagrams,
   2. Dimensions,
   3. Front view,
   4. Catalog information indicating complete electrical and mounting details,
   5. AIC rating,
   6. Control system information

1.6 WARRANTY

A. The manufacturer shall warranty the transfer switches against failures which result, under normal use and service, from defects in workmanship and materials. Warranty shall be for parts and labor for two years from date of "Notice of Completion" and for parts for an additional three years after the expiration of the first two year period.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Contactor Transfer Switches:
      a. Asco
      b. Russelectric, Inc.

2.2 TYPE

A. Provide minimum 260-amp, 3-phase, 4-pole transfer switch as specified herein.

B. Transfer and retransfer to normal source shall be automatic. Automatic transfer switches shall be electrically operated, mechanically held and supplied with positive mechanical interlocking.

C. The automatic transfer switch shall transfer the load without interruptions (closed transition) by momentarily connecting to both sources of power only when both sources (voltage and frequency) are present and in acceptable range. Maximum source interconnection time shall be 100 milliseconds. The automatic transfer switch shall operate as a conventional break-before-make (open transition) switch when the power source serving the load fails.
2.3 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

B. Tested Fault-Current Closing and Withstand Ratings: 3 cycle and 30 cycle ratings adequate for duty imposed by protective devices at installation locations in Project under a 40,000A fault current, based on testing according to UL 1008.
   1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

C. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

D. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
   1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
   2. Switch Action: Double throw; mechanically held in both directions.
   3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

E. Neutral Switching: Provide four-pole switch with neutral pole switched simultaneously with phase poles.

F. Neutral Terminal: Solid and fully rated, unless otherwise indicated.

G. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.

H. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations.
   1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
   2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
   3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

I. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated. Provide with front opening lockable door.

2.4 AUTOMATIC TRANSFER SWITCH CONTROLS

A. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
B. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

C. Sensing and control logic shall utilize a microprocessor based control system, to provide all the operational functions of the automatic transfer switch. Each controller shall include the following:
1. Password protection required to limit access to qualified and authorized personnel.
2. 20 character, LCD display, with a keypad, which allows access to the system.
3. All setup parameters required by the controller for power monitoring shall be stored in non-volatile memory and retained in the event of a control power interruption
4. The controller shall be capable of storing the following records in memory for access either locally or remotely:
   a. Number of hours transfer switch is in the emergency position (total since record reset).
   b. Number of hours emergency power is available (total since record reset).
   c. Total transfer in either direction (total since record reset).
   d. Date, time, and description of the last four source failures.
   e. Date of the last exercise period.
   f. Date of record reset.

D. Data Logging: The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:
1. Event Logging
   a. Date and time and reason for transfer normal to emergency.
   b. Date and time and reason for transfer emergency to normal.
   c. Date and time and reason for engine start.
   d. Date and time engine stopped.
   e. Date and time emergency source available.
   f. Date and time emergency source not available.
2. Statistical Data
   a. Total number of transfers.
   b. Total number of transfers due to source failure.
   c. Total number of days controller is energized.
   d. Total number of hours both normal and emergency sources are available.

2.5 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

C. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

D. Automatic Transfer-Switch Features:
1. Undervoltage Sensing for Each Phase of Normal Source: Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

2. Time Delay Before Engine Starting: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second. Include two auxiliary contacts, 1 normally open and 1 normally closed contact.

3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 15 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

5. Test Switch: Simulate normal-source failure.

6. Switch-Position Pilot Lights: Indicate source to which load is connected.

   a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

E. Automatic Closed-Transition Transfer Switches: Include the following functions and characteristics:

1. Fully automatic make-before-break operation.

2. Load transfer without interruption, through momentary interconnection of both power sources not exceeding 100 ms.

3. Source Differential Sensing: Provide source differential sensing for the closed transition operation mode. The sensor shall enable transfer/re-transfer between live sources in the closed transition mode only when the two sources have a maximum voltage differential of 5%, maximum frequency differential of 0.2 Hz and are within 5 electrical phase degrees of each other.

4. Failure to Synchronize: Provide an adjustable time delay (0 to 5 minutes) on failure to synchronize normal and emergency sources prior to closed transition transfer. Upon activation after the time delay period, a "Failure to Synchronize" alarm signal shall be sent to the Generator Paralleling Switchgear.

5. Open transition load transfer operation: If the transfer switch fails to synchronize and transfer in the closed transition mode, the override open transfer load transfer operation shall be field selectable to be automatic or manually initiated. If automatic open transition is selected it shall be initiated when the Failure to Synchronize alarm signal is initiated. If manual override is selected, manual open transition override load transfer shall be performed at the transfer switch location.
6. Failure of power source serving load shall initiate automatic break-before-make transfer.

2.6 BYPASS/ISOLATION SWITCHES

A. Description: A bypass/isolation switch shall be provided with all transfer switches to conveniently electrically bypass and isolate the automatic transfer switch. Include the following features for each combined automatic transfer switch and bypass/isolation switch:
   1. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. While isolated, interlocks prevent transfer-switch operation, except for testing or maintenance.
   2. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations.
   3. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
   4. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
   5. Operability: Constructed so load bypass and transfer-switch isolation can be performed by 1 person in no more than 2 operations in 15 seconds or less.
   6. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
   7. Indicating lights shall be provided to show the bypass/isolation switch in the bypass position, and in the fully isolated position.
   8. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.

B. Interconnection of Bypass/Isolation Switches with Automatic Transfer Switches: Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.

2.7 NAMEPLATES

A. Provide engraved phenolic nameplates. Include name, voltage, phase, source (switchboard fed from) and load served.

2.8 ACCESSORIES

A. Phase Reversal Relay: Sensing relay to prevent transfer to new source when phases are reversed from designed phasing.

B. Fused ac inputs and dc outputs.

C. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.

D. Push-button programming control with digital display of settings.
E. Integral battery operation of time switch when normal control power is not available.

F. Provide exerciser clock for programming automatic testing and exercising of the generator and control system.

2.9 REMOTE MONITORING AND CONTROL

A. Functional Description: In addition to control and monitoring functions specified elsewhere in this section, each transfer switch shall communicate via Modbus/RTU and/or RS485 with the Operator Interface system to annunciate the following. Provide contact closure output or digital communications output as appropriate to indicate the following transfer switch position, or function.

B. Transfer Switch Annunciation
   1. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
   2. Switch position (normal, emergency, neutral (load shed).
   3. Switch in auto (normal condition)
   4. Switch in bypass to normal position
   5. Switch in bypass to emergency position
   6. Switch in test mode.
   7. Switch failure (transfer switch locked out)
   8. Failure of communication link.
   9. Failure to synchronize (exceeded time delay for synchronization between normal and emergency sources during closed transition transfer operation.)

C. Transfer Switch Controls
   1. Remote Test Switch: to initiate transfer switch-test.
   2. Control of switch operation in either direction.
   3. Control of time-delay bypass for transfer to normal source.

D. Malfunction of annunciation and control panel or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to stand-alone, self-contained operation. Automatic transfer-switch sensing, controlling, or operating function shall not depend on remote panel for proper operation.

2.10 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
   2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
      a. Check for electrical continuity of circuits and for short circuits.
      b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
      c. Verify that manual transfer warnings are properly placed.
   5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
      a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
      b. Verify time-delay settings.
      c. Verify pickup and dropout voltages by data readout or inspection of control settings.
      d. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
      e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
      f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

C. Remove and replace malfunctioning units and retest as specified above.

D. Final testing to be completed off hours and scheduled with the Owner 48 hours in advance.

3.2 INSTRUCTION AND DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below.
B. After one week (minimum) written notification to Owner/Engineer conduct an instruction session of no less than 1 hour during which all maintenance and operational aspects of the system will be described and demonstrated to personnel selected by the Owner in conjunction with instruction period for Section 263213 - Engine Generators. The session shall be conducted by a Contractor's representative thoroughly familiar with the characteristics of the system. O & M manual information regarding the system shall be turned over to the Architect prior to scheduling the instruction session.

3.3 OPERATION AND MAINTENANCE MANUALS

A. Manuals shall contain the following information:
1. Recommended test intervals.
2. Recommended service intervals.
3. Test and service record forms showing proper intervals for tests.
4. Recommended maintenance.
5. The first page of the manual shall contain the name, address and phone number of the local representative to be called for service and parts.

End of Section
RFB 0910-19 BACKUP GENERATOR AND TRANSFER SWITCHES FOR ITS DATA CENTER

BID FORM
(Use this form when submitting your bid)

SECTION 263213 ENGINE GENERATOR.
PRICE OF ENGINE GENERATOR $______________________________

SECTION 263600 TRANSFER SWITCHES
PRICE OF TRANSFER SWITCHES $______________________________

PLEASE FOLLOW ALL REQUIREMENTS AND SPECIFICATIONS IN EACH SECTION TO GENERATE YOUR BIDS.

NAME OF BIDDER ____________________________________________________________

BY: _________________________________________________________
Typed or Printed Name and Title

ADDRESS _____________________________________________________________

TELEPHONE ___________________________________________________________

DATE ________________________________________________________________
TO THE BOARD OF EDUCATION
CLACKAMAS COMMUNITY COLLEGE
19600 Molalla Avenue
Oregon City, OR 97045

The undersigned hereby proposes to furnish, within the time specified, the several items and/or services hereinbefore listed, to be delivered in accordance with the foregoing specifications hereto attached.

SIGNATURE FOR INDIVIDUAL (signed by individual)

Address __________________________  X __________________________

City/State __________________________

Zip __________________________ Tel ____________ FAX ____________

(Signature of one partner required)

Name of Partners: (please print) Name of Partnership:

Address __________________________

City/State/Zip __________________________

Tel ____________ FAX ____________

X __________________________

SIGNATURE FOR CORPORATION (as indicated)

Address __________________________ (Corporate Name)

City/State/Zip __________________________

Tel ____________ FAX ____________ (Signature of Officer or Agent)

_______________________________________________________________
(Typed or Printed NAME and TITLE of Officer or Agent)

Are you a resident as defined in ORS 279.029? ______ Yes ______ No

“Resident bidder” means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission off the bid, has a business address in this state and has stated in the bid whether the bidder is a resident bidder pursuant to this subsection.

RECEIPT ACKNOWLEDGED OF ADDENDA: #1 _____ #2 _____ #3 ______