REQUEST FOR PROPOSALS
RFP-MCC-2427

PARRSBORO WELLFIELD
EMERGENCY STANDBY GENERATOR

MUNICIPALITY OF THE COUNTY OF CUMBERLAND
UPPER NAPPAN SERVICE CENTRE
1395 BLAIR LAKE ROAD
AMHERST N.S B4H 3Y4

September 25, 2024

CLOSING: October 9, 2024
2:00 PM

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1.0 INTRODUCTION

1.1 GENERAL REQUIREMENTS

The Municipality of the County of Cumberland (Municipality) invites Proposals for supply and install of a diesel powered standby emergency generator installed at the Parrsboro wellfield.

The following is a list of the basic requirements, please see Schedule A for more detailed information.

a) 40kW/50KVA 600/347V, 3 phase, exterior diesel fueled, engine driven generator set c/w sound attenuated enclosure and sub-base fuel tank.
b) Alternator to NEMA MG1, permanent magnet type.
c) Sub-base diesel fuel tank to be double walled, min. 24 hour capacity, spill and overflow protection, leakage detection and low fuel level alarm.
d) Weather resistant with exterior enclosure to be painted aluminum, min 75dbA at 7m.
e) Enclosure to be c/w integral panel with block heater, battery charger, etc. wired to panel.
f) Hardwired connection to controller for monitoring by the Plant PLC otherwise, typical system status via dry contacts (run, faults, etc.)
g) Concrete slab base, with underground conduit connection to building.
h) Automatic Transfer Switch: 100A, 600/347V, 3 phase, 4 wire (solid neutral), contact type, open transition with in-phase monitoring, dry contacts for monitoring by the Plant PLC, installed in weather tight enclosure mounted to exterior of building.
i) Obtain all required permits and schedule inspections with NSPI.

The Proponent must either be a Manufacturer, a factory branch, or a dealer engaged in the business of selling, dealing and servicing the generator proposed upon and must maintain a full stock of parts and service. A dealer with full stock of parts and factory certified technicians shall perform all Warranty service.

1.2 INSTRUCTION TO PROPONENTS

This request for proposals (RFP) is not a tender call, and the submission of any response to this RFP does not create a tender process. This RFP is not an invitation for an offer to contract, and it is not an offer to contract made by the Municipality.

Though the Municipality fully intends at this time to proceed through the RFP, in order to select the generator, the Municipality is under no obligation to proceed with the purchase, or any other stage. The receipt by the Municipality of any information (including any submissions,

ideas, plans, drawings, models or other materials communicated or exhibited by any intended Proponent, or on its behalf) shall not impose any obligations on the Municipality. There is no guarantee by the Municipality, its officers, employees or Managers, that the process initiated by the issuance of this RFP will continue, or that this RFP process or any RFP process will result in a contract with the Municipality for the purchase of the equipment, service, or Work.

It is the responsibility of each Proponent to ensure their Proposal arrives on time. Any late Proposals will not be accepted. Proposals may be withdrawn at any time prior to opening. Proposals received after the Closing Time or in locations other than the address indicated will not be accepted and will be returned unopened.

Any Proposals submitted by facsimile or telephone will not be accepted under any circumstances. Any corrections or additions to any submitted Proposal will not be accepted unless it is initialed by the person signing the Proposal. All Proposals must be firm for 60 calendar days after the closing date.

Price to include any/all delivery charges to Parrsboro, Nova Scotia. Any Proposals that do not meet these criteria may be rejected. The Municipality reserves the right to waive technicalities, reject any or all proposals, or any portion thereof, to advertise for new Proposals, to proceed to do the work otherwise, or to abandon the work, if in the best interest of the Municipality. All Proposals shall be submitted on the Proposal Form supplied with this document.

This Proposal is not intended to exclude standard equipment or materials except where specified.

This Proposal is not intended to favor any particular equipment, manufacturer or contractor. Any names or figures the same or similar to any specific equipment, manufacturer or contractor is purely coincidental. The phrase “or equivalent” shall apply where a particular specification, equipment, manufacturer or contractor is mentioned. All goods shall be free from design deficiencies that may affect their operation or serviceability. Materials not defined here shall be of the best commercial quality and suitable for the purpose intended.

WORKERS’ COMPENSATION

A certificate of good standing with the Workers’ Compensation Board of Nova Scotia **must** be provided by the successful bidder prior to execution of the Articles of Agreement.

INSURANCE CERTIFICATE

A valid certificate showing at least $5,000,000 liability, **with the Municipality of Cumberland named under additional insured, must** be provided by the successful bidder prior to the execution of the Articles of Agreement.

It is recommended that prior to any proposal preparation and submission interested proponents make a site visit to the Parrsboro Wellfield. With advance notice, a Municipal representative can be available to conduct a site tour, answer questions and provide other project related

information. To schedule a site visit, please contact Andrew Thomas at 902-664-1083 or by email at athomas@cumberlandcounty.ns.ca

1.3 CLARIFICATION AND ADDENDA

Notify the Municipality not less than three (3) working days before Proposal closing of omissions, errors or ambiguities found in this document. If it is considered that correction, explanation or interpretation is necessary; a written addendum will be issued. All Addenda become part of the Proposal documents.

Additional information, clarifications or instructions provided to a Proponent that may, in the opinion of the Municipality, be of general interest and any other information or instructions that the Municipality may deem to be appropriate in the circumstances may be incorporated in an Addendum to the Proposal that will be distributed to all Proponents.

Direct all Proposal questions and queries to:

Contact: Shelby Hum
Email: shelbyhum@cumberlandcounty.ns.ca

It is the responsibility of the Proponent to ensure all addenda have been received. Addenda will be posted on the Municipality website at www.cumberlandcounty.ns.ca. The Municipality will not bear any responsibility for the failure of potential Proponents to obtain all documents before submitting a proposal.

2.0 SCOPE OF WORK

1) Supply and install a suitable standby generator, automatic transfer switch, and all necessary associated equipment at the Parrsboro Wellfield in Parrsboro, Nova Scotia as detailed in the General Requirements section of this RFP or as proposed by Proponent.
2) Provide Water Treatment Operators training and instructions for the safe and correct operation of the standby generator and all associated equipment.
3) Provide all necessary operation and maintenance manuals to the Cumberland County Water Utility.
4) Provide a recommended list of spare parts and maintenance materials required/recommended for the first year of operation.
5) Provide shop drawings for all components.
6) Coordinate with NSPI for permits and inspections.

   The contractor must obtain Municipality of Cumberland approval of proposed construction procedures and schedules prior to beginning construction and installation.

3.0 PROPOSALS

3.1 PROPOSAL CLOSING

Proposals must be received at the Upper Nappan Service Centre no later than **October 9, 2024, at 2:00 P.M. ATLANTIC TIME.**

Late proposals will not be accepted and will be returned unopened.

3.2 PROPOSAL OPENING

Proposals will be opened publicly, on the Proposal Closing date at the Upper Nappan Service Centre, 1395 Blair Lake Road, Upper Nappan, NS, immediately following closing.

3.3 PROPOSAL SUBMISSION

The following is to be used in the preparation and submission of a proposal for **"PARRSBORO WELLFIELD EMERGENCY STANDBY GENERATOR"**

1. Completed vendor proposals and other correspondence should be submitted to:

MUNICIPALITY OF CUMBERLAND
UPPER NAPPAN SERVICE CENTRE
1395 BLAIR LAKE ROAD
UPPER NAPPAN, NS
B4H 3Y4

ATTENTION: Justin Waugh-Cress
Director of Public Works

Any proposals submitted by fax or telephone will not be accepted under any circumstances.

2. Proposals may be submitted in a sealed envelope clearly marked **"PARRSBORO WELLFIELD EMERGENCY STANDBY GENERATOR"**

3. Please provide **two (2) hard copies** and **one (1) PDF electronic copy** of your proposal.

4. Proposals may be submitted electronically, in a PDF document, to the below email. It is the responsibility of the vendor to confirm receipt of their proposal by the Municipality. This email address is for document submission only.

procurement@cumberlandcounty.ns.ca

The vendor agrees that the electronic signatures of the vendor on this document is intended to have the same force and effective as manual/original signatures. Delivery of an executed

copy of a proposal by electronic means permitted in this request for proposals constitutes valid and effective delivery.

3.4 PROPOSAL ACCEPTANCE

The Municipality reserves the right to reject any or all proposals. The Municipality reserves the right to accept a proposal that is not the lowest price or to accept any proposal which it may consider to be in its best interests. The Municipality reserves the right to waive formality, informality, or technicality with the acceptance of proposals for this work. Any proposal not supported by the information requested in this RFP may be rejected. The Municipality reserves the right to negotiate with any Proponent who has submitted a proposal as deemed in the best interest of the Municipality. The Consultant whose proposal is accepted by the Municipality is hereafter referred to as the "Successful Proponent".

3.5 EVALUATION OF PROPOSAL

PROPOSAL REQUIREMENTS
Please provide the information requested below in the proposal submission. Please be brief and concise in your response.

a) **Qualifications, Reference of the Supplier**
- Provide a general description of your company.
- Indicate the qualifications of the team to be assigned to the work including the names of any subcontractors that would be utilized.
- Detail the extent of the team's relevant experience.
- Please list your major municipal clients and references that would relate to this project.
- Provide a list of similar installations of the proposed suppliers equipment.

b) **Conformance to Specifications**
- Indicate how proposed equipment meets the specifications laid out in this RFP.
- Indicate how installation of the proposed equipment will meet current Electrical Code requirements.

c) **Work Plan and Schedule**
- Provide a detailed plan for completing the project, with a schedule that will meet the completion date identified below.
- Identify key components of the project and time spent on each major component of the work plan.
- Indicate delivery times for key components. Time is of the essence, and "in-stock" equipment will score higher than those with longer lead times.
- Proponents should assume that the project will take place during the 2024 construction season

d) **Project Fees**

- Fill out the Proposal Form in Section 3.6 to provide pricing for project components.

Selection of the successful Proponent will be based on the following point system. Each Proposal received will be evaluated and scored using the scoring system below. The highest score will be the preferred Proposal.

Criteria	**Score**	**Weighting**	**Weighted Score**
Qualifications and references of Proponent	___/10	10%	
Conformance to Specification and work plan	___/10	15%	
Schedule	___/10	25%	
Cost	___/10	50%	
TOTAL			

3.6 PROPOSAL FORM

	Item	Pricing
1	Proposed Generator	
2	Automatic Transfer Switch	
3	Concrete Slab base, duct bank	
4	Cable, Conduit and Panels	
5	Installation and commissioning	
6	Books, manuals, technical info. & misc. items.	
7	Fenced compound around generator (optional)	
	Subtotal	
	15% HST	
	Total	

Proponent agrees to deliver within _____ weeks of written notification of award.

Addenda No. ___ to ___ inclusive were carefully examined.

SIGNATURES DATED THIS _____ DAY OF _____, 2024.

[Seal]

Name of Firm Proposing	Signature of Signing Officer
	Name and Title of Signing Officer (Printed)
Witness	Name and Title (Printed)
Witness	Name and Title (Printed)
Company Address	Telephone No.
	E-mail

**NOTE: *Proposals submitted by or on behalf of any Corporation must be signed and sealed in the name of such Corporation by a duly authorized officer or agent.*

SCHEDULE A

Municipality of the County of Cumberland

Standby Diesel Generator and Automatic Transfer Switch

Issued for Pricing

September 2024

Municipality of the County of Cumberland

Standby Diesel Generator and Automatic Transfer Switch

Rev.	Issue	Reviewed By:	Date	Issued By:
	Issued for Pricing	J.K.	Sep. 23/24	D. A-D.

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CBCL Project No. 230808.00

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PART 1 - GENERAL

1.1 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker, quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common trip breakers: with single handle for multiple applications.

.3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 5 to 10 x current rating.

.4 Circuit breakers with interchangeable trips on units over 200A.

.5 Circuit breakers to have interrupting rating (momentary RMS symmetrical) as indicated.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping.

.2 Provide ground fault interrupter type (5mA maximum) for circuits so marked.

2.3 MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

2.4 SOLID STATE TRIP BREAKERS

.1 Moulded case circuit breaker to operate by means of a solid state trip with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload conditions, and long time, short time and instantaneous tripping for phase and ground fault (where indicated) short circuit protection. Trip unit to have independent adjustable long time and short time pick-up, ground fault pick-up, ground fault delay.

2.5 OPTIONS

.1 Provide enclosures for individual circuit breakers.

.2 The circuit breaker must be 100% rated.

2.6 MANUFACTURERS

.1 Acceptable manufacturers: Eaton, Schneider Electric, Siemens.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Installation of circuit breakers will be by other unders a separate contract.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 The Work of this Section includes the design, fabrication, warranty, and supply of a packaged diesel generator as specified and includes furnishing all materials, labour, tools, equipment and performing all operations necessary including supervision of installation, field testing and commissioning.

1.2 REFERENCES

.1 ANSI/NEMA MG 1-17, Motors and Generators.

.2 ASTM D975-21, Standard Specification for Diesel Fuel

.3 ISO 3046-1-02, Reciprocating Internal Combustion Engines: Performance - Part 1: Declarations of Power, Fuel and Lubricating Oil Consumptions, and Test Methods - Additional Requirements for Engines for General Use.

.4 CSA C22.1-24, Canadian Electrical Code.

.5 ULC 142.18-95, Rectangular Steel Aboveground Tanks for Flammable and Combustible Liquids.

1.3 RELATED WORK

.1 Automatic Load Transfer Equipment: Section 26 36 23

.2 Moulded Case Circuit Breakers: Section 26 28 21

1.4 DESCRIPTION OF SYSTEM

.1 The set must be of proven standard design with a record of satisfactory performance; prototypes will not be accepted. Where any provision of this specification causes a deviation from the Manufacturer's normal practice such as to materially impair performance, price or delivery of the equipment, the Manufacturer must call attention to this in their quotation and offer their normal standard equipment as an alternative.

.2 Generating system consists of:

.1 Diesel engine.

.2 Alternator.

.3 Alternator control panel.

.4 Battery charger and battery.

.5 Fuel supply system.

.6 Exhaust system.

.7 Steel mounting base.

.8 Automatic engine room ventilation system.

.9 Block heater.

.10 Non-walk in sound attenuated enclosure.

.11 Fuel tank.

.3 System designed to operate as emergency standby unattended.

1.5 SHOP DRAWINGS

.1 Submit shop drawings electronically in pdf file format.

.2 Include:

.1 Engine: make and model, with performance curves.

.2 Alternator: make and model.

.3 Voltage regulator: make, model and type.

.4 Battery: make, type and capacity.

.5 Battery charger: make, type and model.

.6 Alternator control panel: make and type of meters and controls.

.7 Governor type and model.

.8 Cooling air requirements in m^3/s.

.9 British standard or DIN rating of engine.

.10 Flow diagrams for:

.1 Fuel.

.2 Cooling air.

.11 Dimensioned drawing showing complete generating set mounted on steel base, including vibration isolators, exhaust system, radiator, drip trays, and total weight.

.12 Continuous full load output of set at 0.8 PF lagging.

.13 Description of set operation including:

.1 Automatic starting and transfer to load and back to normal power, including time in seconds from start of cranking until unit reaches rated voltage and frequency.

.2 Manual starting.

.3 Automatic shut down and alarm on:

.1 Overcranking.

.2 Overspeed.

.3 High engine temp.

.4 Low lube oil pressure.

.5 Short circuit.

.6 Alternator overvoltage.

.7 Lube oil high temperature.

.8 Over temperature on alternator.

.4 Manual remote emergency stop.

.14 Sub-base mounted fuel tank system including all associated instrumentation.

.15 Sound attenuated weather proof enclosure.

1.6 OPERATION AND MAINTENANCE DATA

.1 Provide electronic copies of operation and maintenance data for diesel generator.

.2 Include in Operation and Maintenance Manual instructions for particular unit supplied and not general description of units manufactured by supplier and:

.1 Operation and maintenance instructions for engine, alternator, control panel, battery charger, battery, fuel system, engine room ventilation system, block heater, exhaust system and accessories, to permit effective operation, maintenance and repair.

.2 Technical data:

.1 Illustrated parts lists with parts catalogue numbers.

.2 Schematic diagram of electrical controls.

.3 Flow diagrams for:

.1 Fuel system.

.2 Lubricating oil.

.3 Cooling system.

.4 Certified copy of factory test results.

.5 Maintenance and overhaul instructions and schedules.

.6 Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.

1.7 MAINTENANCE SPARES

.1 Include:

.1 Two (2) fuel filter replacement elements.

.2 Two (2) lube oil filter replacement elements.

.3 Two (2) air cleaner filter elements.

.4 Two (2) sets of fuses for control panel.

.5 Special tools for unit servicing as recommended by the manufacturer.

1.8 SOURCE QUALITY CONTROL

.1 Factory test generator set including engine, alternator, control panels, transfer switch and accessories.

.2 Provide an electronic copy of factory test results and include in the Operations and Maintenance Manual.

.3 Test procedure:

.1 Prepare blank forms and check sheet with spaces to record data. At top of first sheet record:
  .1 Date.
  .2 Generator set serial no.
  .3 Engine, make, model, serial no.
  .4 Alternator, make, model, serial no.
  .5 Voltage regulator, make and model.
  .6 Rating of generator set, kW, kVA, V, A, r/min, Hz.

.2 Mark check sheet and record data on forms in duplicate as test proceeds.

.3 Signature of manufacturer's Quality Control representative on completed forms to indicate concurrence in results of test.

.4 Tests:

.1 Standard Factory Tests as recommended by manufacturer and as per CSA C282..

.5 Demonstrate:

.1 Automatic shutdown of engine on resumption of normal power.

.2 That battery charger reverts to high rate charge after cranking.

.3 Automatic startup of genset upon signal from automatic transfer switch.

.6 Demonstrate low oil pressure and high engine temperature shutdown devices operation without subjecting engine to these excesses.

1.9 EXTENDED WARRANTY

.1 Diesel engine generator set must be warranty covered for 60 months or 1500 operating hours, whichever occurs first from the date of delivery.

.2 The warranty must be comprehensive. No deductibles will be allowed for travel time, expenses, parts and labour.

1.10 SERVICE AND SUPPORT

.1 The manufacturer of the generator set to maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

.2 The generator set must be serviced by a local service organization that is trained and factory certified in generator set service. The Supplier must maintain an inventory of critical replacement parts at the local service organization and in service vehicles. The service organization must be on call 24 hours per day, 365 days per year.

.3 Manufacturer to maintain model and serial number records of each generator set provided for at least 20 years.

PART 2 PRODUCTS

2.1 GENERATOR SET

.1 Ratings:

.1 Generator set to operate at 1800 rpm and at a voltage of 600 Volts AC, 3-phase, 4-wire, 60 Hertz.

.2 Generator set to be rated at the minimum 40 kW/ 50kVA rating at 0.8 PF, based on site conditions of: Altitude 18 meters, ambient temperatures up to 40 degrees C.

.3 The generator set rating will be based on emergency/standby service.

.2 Performance:

.1 Voltage regulation to be plus or minus 0.5 percent for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load not to exceed plus or minus 0.5 percent.

.2 Frequency regulation to be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load must not exceed plus or minus 0.25%.

.3 The diesel engine-generator set must be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.

.4 The generator set must be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.

.5 Alternator to produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic. Telephone influence factor must be less than 40.

.3 Construction:

.1 Mount the engine-generator set on a heavy-duty steel base to maintain alignment between components. Base to incorporate a battery tray with hold-down clamps within the rails

.2 All switches, lamps, and meters in the control system must be oil-tight and dust-tight, and the enclosure door must be gasketed. There must be no exposed points in the control (with the door open) that operate in excess of 50 volts.

.4 Connections:

.1 Generator set load connections to be composed of silver flashed or tin plated copper bus bars, drilled to accept mechanical or compression terminations. Provide sufficient lug space.

.2 Power connections to auxiliary devices shall be made at the devices.

.3 Make generator set control interfaces to other system components on a common, permanently labelled terminal block assembly.

2.2 ENGINE AND ENGINE EQUIPMENT

.1 Diesel engine: to ISO 3046/1.

.1 Engine: standard product of current manufacture, from company regularly engaged in production of such equipment.

.2 Turbo charged, synchronous speed 1800 r/min, four cycle engine, radiator and fan cooled.

.3 The horsepower rating of the engine at its minimum tolerance level must be sufficient to drive the alternator and all connected accessories.

.4 Cooling System:

.1 Liquid cooled: heavy duty industrial radiator mounted on generating set base with engine driven pusher type fan to direct air through radiator from engine side with ethylene glycol anti-freeze non-sludging above minus 46°C.

.2 To maintain manufacturer's recommended engine temperature range at 10% continuous overload in ambient temperature of 50°C.

.3 Coolant heater: thermostatically controlled liquid coolant heating system, sized in accordance with manufacturer's recommendations and complete with thermostat and single point AC power connection heater (120 VAC single-phase, powered from local distribution panel). Provide shut-off valve directly on engine block.

.5 Fuel: Grade No. 2 diesel to ASTM D975.

.6 Fuel system: engine driven solid injection, mechanical positive displacement fuel pump, replaceable fuel filters, fuel rack solenoid energized when engine running, flexible supply and return fuel lines.

.7 Governor:

.1 Steady state speed band of plus or minus 0.5%.

.2 Speed regulation no load to full load 5% maximum.

.3 Electronic type, electric actuator, speed droop externally adjustable from isochronous to 5%, temperature compensated with steady state speed maintenance capability of plus or minus 0.25%.

.8 Lubrication system:

.1 Pressure lubricated by engine driven positive displacement mechanical oil lubrication pump.

.2 Lube oil filter: replaceable, full flow type, removable without disconnecting piping.

.3 Lube oil cooler.

.4 Engine sump drain valve.

.5 Oil level dip-stick.

.9 Starting system:

.1 Positive shift, gear engaging starter 24 Vdc.

.2 Cranking limiter to provide 3 cranking periods of 15 s duration, each separated by 15 s rest without overheating.

.3 24 Vdc starting batteries with sufficient capacity to crank engine for 1 min at 0°C without using more than 25% of ampere hour capacity. Mount batteries in battery tray with hold down clamps within the rails, off the concrete floor slab and complete with battery cables and connectors.

.4 Battery charger: constant voltage, solid state, two stage from trickle charge at standby to boost charge after use. Regulation: plus or minus 2% output for plus or minus 10% input variation. Equipped with dc voltmeter, dc ammeter and on-off switch. Charger shall be suitable for connection to 15A, 120 V, 1-phase, 60 Hz supply (powered from local distribution panel). Provide charger complete with "alarm" lights (loss of AC power, low battery voltage, high battery voltage), "power on" light and a dry form 'C' contact (rated 4A, 120V) for each alarm condition for remote monitoring.

.10 Provide vibration isolators, spring/pad type, quantity as recommended by the generator set manufacturer.

.11 Guards to protect personnel from hot and moving parts. Locate guards so that normal daily maintenance inspections can be undertaken without their removal.

.12 Drip tray.

.13 Replaceable dry element air cleaner with restriction indicator.

2.3 ALTERNATOR

.1 Alternator: to NEMA MG1.

.2 The alternator must be capable of delivering rated output (KVA/KW) at rated frequency and power factor, at any voltage not more than 5% above or below rated voltage.

.3 Capacity:

.1 No less than 40kW at 0.8 pf rated continuous power at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation.

.4 Output at 40°C ambient:

.1 100% full load continuously.

.2 110% full load for 1 h.

.3 150% full load for 1 min.

.5 Four-pole, 2/3 pitch, revolving field, brushless, single pre-lubricated sealed bearing.

.6 Drip proof construction.

.7 Amortisseur windings.

.8 Synchronous type.

.9 Exciter: permanent magnet.

.10 All insulation system components must meet NEMA MG-1 temperature limits for class H insulation.

.11 Digital voltage regulator: microprocessor based, programmable operating characteristics, overexcitation protection, fault detection logging, digital display, remote communication capability, adjustable overvoltage and undervoltage protection, true RMS 3-phase voltage monitoring, rotating diode monitor, underfrequency protection, and solid state voltage buildup.

.1 Regulation: ±1% no load steady state to full load steady state.

.2 Regulation temperature drift: less than 0.5% for any 33°C change over the operating temperature range.

.3 Programmable V/Hz characteristic: two (2) slope ranges adjustable from 1-10V/Hz.

.4 Regulator response time: maximum of 10ms.

.5 Regulating sensing: Trus RMS 3-phase with variable sense range from 90 to 600 Vac.

.6 Regulator stability: stable for total harmonic distortion of the generator output voltage waveform up to 20%.

.7 Voltage adjust range: -10% to 10% of regulator sensing voltage.

.8 Regulator voltage gain: 0-10%.

.9 Reactive droop adjustment: 0-10%.

.12 Alternator: capable of sustaining 300% rated current for period not less than 10s permitting selective tripping of down line protective devices when short circuit occurs.

.13 The subtransient reactance of the alternator must not exceed 12%, based on standby rating of the generator set.

2.4 GENERATOR SET CONTROL

.1 Provide the generator set with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system must also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification. Mount the control on the generator set. The control must be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration

conditions encountered. Generator set mounted control to include the following features and functions:

.1 Control switches:
  .1 Mode Select Switch: initiate the following control modes. When in the RUN or Manual position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
  .2 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 automatic restarting.
  .3 RESET switch: used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
  .4 PANEL LAMP switch: causes the entire panel to be lighted with DC control power. The panel lamps will automatically be switched off within a preset time delay after the switch is depressed, or after the switch is depressed a second time.

.2 Generator Set AC Output Metering.
  .1 Provide the generator set with a metering set including the following features and functions as a minimum:
    .1 Digital metering set, 0.5% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage must be available in line-to-line and line-to-neutral voltages, and display all three phase voltages (line to neutral or line to line) simultaneously.

.3 Generator set alarm and status display:
  .1 Provide the generator set with alarm and status indicating lamps to indicate non-automatic generator status, and existing warning and shutdown conditions. Lamps to be high-intensity LED type. The lamp condition must be clearly apparent under bright room lighting conditions. Generator set control to indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:
    .1 Low oil pressure (alarm)
    .2 Low oil pressure (shutdown)
    .3 Oil pressure sender failure (alarm)
    .4 Low coolant temperature (alarm)
    .5 High coolant temperature (alarm)
    .6 High coolant temperature (shutdown)
    .7 Engine temperature sender failure (alarm)
    .8 Low coolant level (alarm or shutdown--selectable)
    .9 Fail to crank (shutdown)
    .10 Fail to start/overcrank (shutdown)

.11 Overspeed (shutdown)
.12 Low DC voltage (alarm)
.13 High DC voltage (alarm)
.14 Weak battery (alarm)
.15 High AC voltage (shutdown)
.16 Low AC voltage (shutdown)
.17 Under frequency (shutdown)
.18 Over current (warning)
.19 Over current (shutdown)
.20 Short circuit (shutdown)
.21 Over load (alarm)
.22 Emergency stop (shutdown)

.2 Make provisions for indication of four (4) customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions to be of the same type and quality as the above specified conditions. The non-automatic indicating lamp must be red and flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

.4 Engine status monitoring:

.1 The following information must be available from a digital status panel on the generator set control:

.1 Engine oil pressure (psi or kPA)
.2 Engine coolant temperature (degrees F or C)
.3 Engine oil temperature (degrees F or C)
.4 Engine speed (rpm)
.5 Number of hours of operation (hours)
.6 Number of start attempts
.7 Battery voltage (DC volts)

.2 The control system must also incorporate a data logging and display provision to allow logging of warning or shutdown indications (minimum of last 10) on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

.5 Engine control functions:

.1 Control system provided to include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings will be for three (3) cranking periods of 15 seconds each, with 15-second rest period between cranking periods.

.2 Control system to include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.

.3 Control system to include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. Governor control to include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke

while the unit is starting. The governor control must be suitable for use in paralleling applications without component changes.

.4 Control system to include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.

.5 Control system to include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

.6 Alternator control functions:

.1 Generator set to include an automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It must be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. Equip the voltage regulation system with three-phase RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. System to include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below a threshold of [58-59] HZ. Voltage regulator to include adjustments for gain, damping, and frequency roll-off. Adjustments must be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.

.2 Provide controls to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. Controls to shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided must be in compliance to the requirements of NFPA 70 article 445.

.3 Provide controls to individually monitor all three phases of the output current for short circuit conditions. Control/protection system to monitor the current level and voltage. The controls will shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). Provide protective functions in compliance to the requirements of NFPA 70 article 445.

.4 Provide controls to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls to include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.

.5 Provide an AC over/under voltage monitoring system that responds only to true RMS voltage conditions. System to initiate shutdown of the generator set when alternator output voltage exceeds 110% of the

operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown to occur when the output voltage of the alternator is less than 85% for more than 10 seconds.

.6 Provide a battery monitoring system which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine cranking (starter engaged), the low voltage limit will be disabled, and if DC voltage drops to less than 14.4 volts for more than two seconds a "weak battery" alarm will be initiated.

.7 Control interfaces for remote monitoring: All control and interconnection points from the generator set to remote components will be brought to a separate connection box. No field connections will be made in the control enclosure or in the AC power output enclosure. Provide the following features in the control system:

.1 Provide Form "C" dry contact set rated 15A @ 120V (minimum) to indicate each of the following: generator common alarm and generator not-in-auto.

.2 Provide four (4) N.O. generator run isolated contacts, rated 5A @ 120V (minimum) and wired to terminals for connection to ventilation systems and/or remote monitoring system.

.2 Locate the generator control panel on the generator.

2.5 STEEL MOUNTING BASE

.1 Complete generating set mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or strain during transportation, installation and under operating conditions on suitable level surface.

.2 Assembly fitted with vibration isolators and control console resiliently mounted.

.1 Spring type isolators with adjustable side snubbers and adjustable for levelling.

.3 Sound insulation pads for installation between isolators and concrete base.

.4 Provide a double wall, sub-base tank. The fuel tank base capacity must permit the unit to operate at 100% load for a period of 24 hours and be provided as an integral part of the enclosure. Install the fuel tank in a rupture basin with 110% capacity. The tank must be manufactured and certified to meet ULC S601. Provide a locking fill cap, a mechanical reading fuel level gauge, low fuel level alarm contact and fuel tank rupture alarm contact. Connect the low fuel level and rupture basin contacts to the generator set control panel to give alarm on these two conditions. Control panel to have a dry contact rated 5A @ 120VAC for remote annunciation for these alarm conditions.

.5 Provide fuel tank overfill protection and a fuel fill box to prevent spillage.

2.6 EXHAUST SYSTEMS

.1 Heavy duty critical type horizontally mounted exhaust silencer with condensate drain, plug and flanged couplings.

.2 Heavy duty stainless steel exhaust piping, with flanged connections, size and material as per manufacturer's specifications.

.3 Fittings and accessories as required.

.4 Expansion joints: stainless steel, corrugated, of suitable length, to absorb both vertical and horizontal expansion.

.5 Through wall steel thimble of suitable length to pass through wall and to absorb both vertical and horizontal expansion.

.6 Insulate all exhaust components with high temperature (calcium silicate) insulation to 50 mm thickness.

.7 Support exhaust system from roof structure using vibration isolating pipe hangers.

2.7 CIRCUIT BREAKER

.1 Provide integral moulded case circuit breaker to Section 26 28 21, complete with thermal magnetic overcurrent trip unit. Factory wire the circuit breakers to the generator complete with enclosure mounted on the generator skid.

.2 Provide circuit breakers complete with provision to padlock in the off position.

2.8 SOUND ATTENUATED ENCLOSURE

.1 Standard non walk-in sound attenuated enclosure:

.1 Weather resistant, sound attenuated enclosure of aluminum with electrostatically applied powder coated baked polyester paint complete with integral fuel tank.

.2 Sound pressure level not to exceed 85 dBA at 1 meter, and 75 dBA at 7.0 meters from the enclosure at full load.

.3 Enclosure to consist of a roof, side walls and end walls.

.4 All fasteners must be either zinc plated or stainless steel.

.5 Enclosure to have the number of doors required so that all normal maintenance operations may be accomplished without disassembly of any enclosure components.

.6 Fabricate access doors of the same material as the enclosure walls and reinforce for rigidity. Handles to be key lockable, all doors keyed alike, and hinges to be zinc die cast or stainless steel.

.7 Air intake silencer.

.8 Exhaust air silencer.

.9 Extend lube oil and coolant drains to the exterior of the enclosure and terminate with drain valves and capped with pipe nipples on flanged connectors.

.10 Radiator access will be through a hinged, lockable cover on enclosure.

.11 Fully guard the cooling fan and charging alternator to prevent injury.

.12 Enclosure sound attenuation: provide acoustical foam between all supports and inside doors and sound baffles on air intake and air discharge.

.13 A critical type silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished. Enclosure manufacturer to internally mount the exhaust silencer(s) and maintain the weather resistant integrity and aesthetic appearance of the system. Externally mounted silencers will not be permitted.

.14 Lifting points on base frame suitable for lifting combined weight on base fuel tank, generator set and enclosure. Provide a tested and certified single point lifting facility to aid in generator placement.

.15 Provide a 15A, 120V GFCI duplex service receptacle (CSA 5-15R configuration) in the enclosure.

.16 Wire the packaged generator for a single point 120/208VAC, single phase, 3 wire, 60 Hz power circuit (amperage as required by the manufacturer), minimum 10 kA interrupting rating. The generator package must provide all necessary wiring, receptacles fusing and circuit breakers to distribute power to the various auxiliary devices (i.e., battery charger, block heater, receptacle, etc.).

2.9 FINISHES

.1 Provide factory applied, manufacturer's standard epoxy paint finish.

.2 Alternator control cubicle: paint inside, exterior to match engine and alternator.

.3 Other ducts and racks grey.

.4 Supply 0.25 L of touch-up enamel.

2.10 EQUIPMENT IDENTIFICATION

.1 Control panels: complete with Generator voltages, kW and kVA rating and breaker sizing.

2.11 FABRICATION

.1 Shop assemble generating units including:

.1 Base.

.2 Engine and radiator.

.3 Alternator.

.4 Control panel.

.5 Battery and charger.

2.12 ACCEPTABLE MANUFACTURERS

.1 Kohler, Caterpillar, MTU, Cummins, or approved equivalents.

PART 3 EXECUTION

3.1 DELIVERY

.1 Ship equipment to the Site pre-assembled where possible.

.2 Coordinate delivery with Owner.

3.2 INSTALLATION

.1 Installation will be by others in a separate contract.

3.3 INSPECTION, TESTING AND START-UP

.1 Provide the services of competent servicemen, mechanics or other trained personnel of the equipment supplier's or manufacturer's to check the complete installation and be present for start-up of the equipment. Submit a written report signed by the equipment manufacturer's representative stating the following:

.1 That a satisfactory installation of equipment has been performed and outlining any modifications that have been made as a result of the commissioning or testing of the equipment at no additional cost.

.2 That the equipment is now ready for permanent operation;

.2 The equipment manufacturer's representative shall fully instruct the permanent operator of the equipment in the proper operation and maintenance of all equipment at no additional cost.

.3 Replace defective material and equipment with new. Bear costs including re-testing and repairing.

3.4 FIELD QUALITY CONTROL

.1 Demonstrate:

.1 Unit start, transfer to load, retransfer to normal power, unit shut down, on "Automatic" control.

.2 Unit start and shut down on "Manual" control

.3 Unit start and transfer on "Test" control.

.4 Unit start on "Engine start" control.

.5 Operation of automatic alarms and shut down devices.

.2 Provide resistive load bank and temporary connecting cables sized for full rating of generator for testing.

.3 Run unit on 100% load for minimum period of four (4) hours to show load carrying ability, stability of voltage and frequency, and satisfactory performance of heat exchanger system to provide adequate engine cooling.

.4 During full load test, also measure sound levels and demonstrate conformance to specifications.

.5 At end of test run, check battery voltage to demonstrate battery charger has returned battery to fully charged state.

.6 Submit start up report within five (5) days of successful commissioning of system.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 CSA C61869-5, 2019, Instrument Transformers, Part 5.

.2 CSA-C22.2 No. 178.1-2022, Automatic Transfer Switches.

1.2 SCOPE OF SUPPLY

.1 Provide one (1) automatic transfer switch at the control building.

1.3 SYSTEM DESCRIPTION

.1 Automatic load transfer equipment to:

- .1 Monitor voltage on all phases of normal and emergency power supply.
- .2 Initiate cranking of standby generator unit on normal power failure, abnormal voltage on any one phase below preset adjustable limits for adjustable period of time or from a remote signal.
- .3 Transfer load from normal supply to standby unit when standby generator reaches rated frequency and voltage pre-set adjustable limits.
- .4 Transfer load from standby generator to normal power supply when normal power restored, confirmed by sensing of voltage on all phases above adjustable pre-set limit for adjustable time period.
- .5 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.

1.4 SHOP DRAWINGS

.1 Submit shop drawings electronically in pdf file format.

.2 Include:

- .1 Make, model and type.
- .2 Single line diagram showing controls and relays.
- .3 Description of equipment operation including:
  - .1 Automatic starting and transfer to standby unit and back to normal power.
  - .2 Test control.
  - .3 Manual control.
  - .4 Automatic shutdown.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for automatic load transfer equipment for incorporation into manual.

.2 Detailed instructions to permit effective operation, maintenance and repair.

.3 Technical data:

.1 Schematic diagram of components, controls and relays.

.2 Illustrated parts lists with parts catalogue numbers.

.3 Certified copy of factory test results.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Instrument transformers: to CSA C61869-5.

.2 Transfer switch must meet or exceed the requirements of CSA-C22.2 No. 178.1.

.3 Transfer switch to be mechanically interlocked to ensure only two possible positions, normal or emergency.

.4 Provide all transfer switches and controllers from a single manufacturer.

.5 Busbars and main connections: 99.3% copper, tinplated.

.6 Main operators that include overcurrent disconnect devices, linear motors and gears shall not be accepted.

.7 Designs utilizing components of moulded case circuit breakers or switches shall not be accepted.

2.2 CONTACTOR TYPE TRANSFER EQUIPMENT

.1 Two (2) 3-phase contactors mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, solenoid operated. Include a microprocessor controller to provide automatic operation. The operating time must not exceed 8 cycles including the power failure sensing.

.2 Install equipment in a NEMA type 1 enclosure, wall mounted or free standing floor mounted.

.3 Open transition type switch with a fully rated solid neutral.

.4 Rated: continuous ampere rating at 100A, 600V, 60 Hz, 3 phase, 4 wire.

.5 Switch and relay contacts, coils, spring and control elements accessible for inspection and maintenance from front of panel without removal of switch panel or disconnection of drive linkages and power conductors.

.6 Minimum 18kA momentary (rms symmetrical) fault withstand rating. Transfer switch to be suitable for connection to standby generator as indicated.

2.3 MICROPROCESSOR CONTROLLER

.1 Controller's sensing and logic to be provided by a built-in microprocessor for maximum reliability.

.2 Connect the controller to the transfer switch by an interconnecting wiring harness. Harness to include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance.

.3 LCD display and keypad to be an integral part of the controller for viewing all available data and setting desired operational parameters.

.4 Controller to initiate cranking of stand by generator unit on normal power failure, abnormal voltage on any one phase below preset adjustable limits for adjustable period of time or from a remote signal.

.5 Controller LCD display to include a "System Status" screen. Screen to display a clear description of the active operating sequence and switch position.

.6 Controller to contain a diagnostic screen for the purpose of detecting system errors. Screen to provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

.7 Controller to have the ability to log data and to maintain the last 99 events, even in the event of a total loss of power. The following events will be time and date stamped and maintained in a non volatile memory.

.1 Event Logging:
- .1 Date, time, and reason for transfer normal to emergency.
- .2 Date, time, and reason for transfer emergency to normal.
- .3 Date, time, and reason for engine start.
- .4 Date, time, engine stopped.
- .5 Date, time, emergency source available.
- .6 Date, time, emergency source not available.

.2 Statistical Logging:
- .1 Total number of transfers.
- .2 Total number of transfers due to source failure.
- .3 Total number of days controller is energized.
- .4 Total number of hours both normal and emergency are available.

2.4 VOLTAGE, FREQUENCY AND PHASE ROTATION SENSING

.1 Voltage and frequency on both the normal and emergency sources (as noted below) must be continuously monitored, with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified).

Parameter	Sources	Dropout	Pickup
Undervoltage	N & E, 3Ø	70-98%	85-100%
Overvoltage	N & E, 3Ø	102-115%	2% below trip
Under Frequency	N & E	85-98%	90-100%
Over Frequency	N & E	102-110%	2% below trip
Voltage Unbalance	N & E	2-20%	1% below DO

.2 Voltage and frequency settings must be field adjustable in 1% increments locally with the display and keypad and remotely via serial communications port access.

.3 The controller must be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source will be considered unacceptable if the phase rotation is not the preferred rotation selected.

.4 Provide source status screens for both normal and emergency to provide digital readout of voltage on all 3 phases, frequency, and phase rotation.

2.5 TIME DELAYS

.1 Provide an adjustable time delay of 0 to 6 seconds to override momentary normal outages and delay all transfer and engine starting signals.

.2 Provide a time delay on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

.3 Provide two (2) time delay modes (which are independently adjustable) on re-transfer to normal. One delay will be for actual normal power failures and the other for the test mode function. The time delays must be adjustable from 0 to 60 minutes. Time delay must be automatically bypassed if the emergency source fails and the normal source is acceptable.

.4 Provide a time delay on shutdown of engine generator for cool down, adjustable from 0 to 60 minutes.

.5 All time delays must be adjustable in one second increments.

.6 All time delays must be adjustable by using the LCD display and keypad and through a serial communications port.

2.6 ACCESSORIES

.1 Provide an inphase monitor in the controller. The inphase monitor will compare both the normal and emergency sources and signal the transfer switch to operate at an advance angle as determined by the frequency difference between the two sources at the time of transfer. It will automatically adjust the phase advance angle at which the transfer operation is initiated to permit the load to be reconnected, so that inrush currents are limited to no more than normal starting current.

.2 Provide a set of DPDT gold-flashed contacts rated 10 amps, 32 Vdc for a low-voltage engine start signal.

.3 Provide the following LED indicating lights (16 mm industrial grade type 12): one (1) to indicate when the transfer switch is connected to the normal source (green) and one (1) to indicate when the transfer switch is connected to the emergency source (red).

.4 Provide LED indicating lights (16 mm industrial grade type 12) and energize by controller outputs. Lights to provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

.5 Provide two (2) auxiliary contacts (rated 10A, 250 VAC), closed when the transfer switch is in normal position.

.6 Provide two (2) auxiliary contacts (rated 10A, 250 VAC), closed when the transfer switch is in emergency position.

.7 Provide a pre-transfer signal prior to transfer occurring in either direction. The contact will close for an adjustable period of 0 to 15 seconds prior to transfer. The circuit will reset immediately after transfer.

.8 Provide the ability to select "commit/no commit to transfer" to determine whether the load should be transferred to the emergency generator if normal source restores before the generator is ready to accept the load.

.9 Provide terminals for a remote contact which opens to signal the transfer switch to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or re-transfer to normal. Both inhibit signals will be activated through the keypad and serial port.

.10 Wire all customer connections to a common terminal block to simplify field wiring connections.

.11 Provide a three position momentary type test switch for the Test/Automatic/Reset modes. The test position will simulate a normal source failure. The reset position will bypass the time delays on either transfer to emergency or re-transfer to normal.

.12 Engine exerciser: controller to provide an internal engine exerciser. It must be possible to program up to seven (7) different exercise routines. For each routine, it must be possible to:

.1 Enable or disable the routine

.2 Enable or disable transfer of the load during routine.

.3 Set the start time: time of day, day of week, week of month (1st, 2nd, 3rd, 4th, alternate or every).

.4 Set the duration of the exercise. At the end of the specified duration the switch will transfer the load back to normal and run the generator for the specified cool down period.

2.7 EQUIPMENT IDENTIFICATION

.1 Control panel:

.1 For selector switch and manual switch: size 5 nameplates.

.2 For meters, indicating lights, minor controls: size 3 nameplates.

2.8 SOURCE QUALITY CONTROL

.1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested to applicable standards.

.2 Provide two (2) copies of written factory tests for review.

.3 Tests:

.1 Operate equipment both mechanically and electrically to ensure proper performance.

.2 Check selector switch, in all modes of operation Test, Auto, Manual, Engine Start and record results.

.3 Check voltage sensing and time delay relay settings.

.4 Check:

.1 Automatic starting and transfer of load on failure of normal power.

.2 Retransfer of load when normal power supply resumed.

.3 Automatic shutdown.

.4 In-phase monitor operation.

2.9 ACCEPTABLE MATERIALS

.1 Acceptable materials: ASCO 7000 series, generator manufacturer or approved equivalent.

PART 3 EXECUTION

3.1 DELIVERY

.1 Ship equipment to the Site pre-assembled where possible.

.2 Coordinate delivery with Owner.

3.2 INSTALLATION

.1 Installation will be by others under a separate contract

3.3 FIELD QUALITY CONTROL

.1 Assist the installing contractor in perform tests as specified herein.

.2 Energize transfer equipment from normal power supply.

.3 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.

.4 Set selector switch in "Manual" position and check to ensure proper performance.

.5 Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.

.6 Set selector switch in "Auto" position and open normal power supply disconnect. Standby genset should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 min, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.

.7 Repeat, at 15 minute intervals, four (4) times, complete test with selector switch in each position, for each test.

.8 After completion of tests above, and a five minute cooling period, load test engine for a minimum of four (4) hours using and equivelent building load. Co-ordinate testing with Owner/Installer. Record the following at 5 minute intervals for the first 15 minutes and at 15 minute intervals thereafter: voltage, frequency, amperes, engine oil pressure and temperature. Tabulate results and submit to Owner for review and approval.

.9 Arrange and pay for a factory certified representative to set up and commission transfer switch for proper operation to the satisfaction of the Owner. Document all testing and set up and submit to Owner.

.10 The factory certified representative shall fully instruct the plant operators in the proper operation and maintenance of the automatic transfer switch and controls at no additional cost.

END OF SECTION