



**REGIONAL DISTRICT
of Fraser-Fort George**

REQUEST FOR PROPOSALS CS-16-09



**ELECTRICAL EQUIPMENT PURCHASE
FOR AUXILIARY POWER SUPPLY**

**FOR INSTALLATION AT 155 GEORGE STREET,
PRINCE GEORGE, BC**



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1.0 INVITATION AND INSTRUCTIONS

The Regional District of Fraser-Fort George (the “Regional District”) invites proposals from qualified suppliers for the supply and delivery of electrical equipment for a self-contained auxiliary power source (Auxiliary Power Supply) for the Regional District of Fraser-Fort George office located at 155 George Street, Prince George, B.C.

Five (5) complete copies of your proposal must be submitted in a sealed package labeled: “**RFP CS-16-09 Electrical Equipment Auxiliary Power Supply**” to the General Manager of Financial Services, by **11:00 a.m. local time, Monday, August 8, 2016**. The proponent’s name and return address must be clearly marked on the outside of your proposal submission package. Late proposals will not be accepted and will be returned unopened to the proponent. **Proposals received by fax will not be accepted.**

RFP documents may be obtained on, or after, Monday, July 25, 2016:

- a) in a PDF (public document format) file format from the Regional District’s website www.rdffg.bc.ca;
- b) in hard copy from the Regional District Service Centre, 155 George Street, Prince George, BC between 8:00 a.m. and 5:00 p.m., Monday through Friday, excluding statutory holidays; or
- c) on the *BC Bid*[®] website www.bcbid.gov.bc.ca.

The lowest priced, or any proposal, will not necessarily be accepted and the Regional District reserves the right to reject any or all proposals, at its sole discretion without prejudice. Facsimile proposals and electronic proposals will NOT be accepted.

Proposals must be sent to:

General Manager of Financial Services
Regional District of Fraser-Fort George
3rd Floor, 155 George Street
Prince George BC V2L 1P8

Questions relating to RFP CS-16-08 must be directed to:

Michael Higgins, Emergency Services Coordinator
Regional District of Fraser-Fort George
155 George Street
Prince George BC V2L 1P8
Telephone: 250-960-4400 / 1-800-667-1959
Fax: 250-562-8676
Email: mhiggins@rdffg.bc.ca

Questions relating to the Project must be directed to:

Lane R.J. Logan, P. Eng.
Sr. Electrical Engineer/Division Manager
McElhanney Consulting Services Ltd.
12- 556 North Nechako Road
Prince George BC V2K 1A1
Telephone: 778-693-2192
Fax: N/A
Email: llogan@mcelhanney.com

The Regional District reserves the right to waive informalities in proposals, reject any or all proposals or accept the proposal deemed most favourable in the interest of the Regional District. Furthermore, the Regional District reserves the right to negotiate with any proponent at its discretion. The proponents will be competent and capable of performing the work. The proponent may be required to provide evidence of previous experience and financial responsibility before a contract is awarded.

By submitting this proposal the proponent further confirms that neither the proponent (if an individual person) nor any of the directors, officers, principals, partners, senior management employees, shareholders or owners of the proponent is an officer, employee or director of the Regional District, or is a member of the immediate family of an officer, employee or director of the Regional District.

The Regional District will not be responsible for any costs incurred by proponents, which result from the preparation or submission of documents pertaining to this proposal call. The accuracy and completeness of the proposal is the proponent's responsibility. Should errors be discovered, they will be corrected by the proponent at their expense.

2.0 ACKNOWLEDGEMENT LETTER

Upon receipt of these documents, a potential proponent will sign one copy of the [Acknowledgement Letter](#) and email or fax the signed Acknowledgment Letter to the attention of Michael Higgins, Regional District of Fraser-Fort George.

A proponent who signs and returns the Acknowledgement Letter is not obligated to submit a proposal.

Any proponent who does not submit the Acknowledgement Letter will not be sent any amendments or addenda and may be disqualified.

3.0 GENERAL INFORMATION AND INSTRUCTIONS TO PROPONENTS

3.1 Errors, Omissions, Clarifications

All questions and requests for clarification relating to the RFP process, and/or identification of any errors or omissions in the RFP documents, shall be made in writing to the Regional District, Attention: Michael Higgins Emergency Services Coordinator, by mail, hand-delivery, fax to **250-562-8676**, or email to mhiggins@rdffg.bc.ca. **Questions and requests for clarifications will not be accepted over the phone.**

3.2 Proposal Submissions

Five (5) signed copies of each proposal must be submitted. Each copy shall be complete and unabridged and shall not refer to any other copy for additional information, clarification, or details.

3.3 Proposal Format

Proponents are asked to respond in a similar manner. Appendices A - Specifications of Electrical Equipment Purchase – Submittal Procedures, and B – Schedule of Prices must - be submitted on the same form included in this RFP, no exceptions. The required format and sequence should be followed in order to provide consistency in responses and to ensure each proposal receives full and complete consideration. All pages should be consecutively numbered.

- a) Title page including RFP title and number, proponent's name and address, telephone number, fax number, email address, and contact representative.
- b) One-page Letter of Introduction **SIGNED** by the authorized signatory of the proponent which will bind the proposed statement(s) made in the proposal.



- c) Table of Contents including page numbers.
- d) An Executive Summary of the key features of the proposal.
- e) The body of the proposal and Completed Appendix A – Submittal Procedures.
- f) Completed Appendix B – Schedule of Prices.
- g) Complete contact information for three (3) references (see 5.6).

4.0 OWNERSHIP OF PROPOSALS AND FREEDOM OF INFORMATION

Proposals will be received and held in confidence by the Regional District, subject to the provisions of the *Freedom of Information and Protection of Privacy Act*.

All documents, including proposals, submitted to the Regional District become the property of the Regional District. The Regional District will provide a debriefing for individual proponents at their request subject to the *Freedom of Information and Protection of Privacy Act*.

5.0 PROPOSAL EVALUATION AND SELECTION PROCESS

5.1 Proposal Evaluation

All proposals will be initially evaluated by the Regional District to assess the qualifications and capabilities of proponents to meet the minimum standards specified in the RFP.

The proposal evaluation through to proponent selection will be based on the following process as deemed appropriate by the Regional District:

1. Initial proposal evaluation by the McElhanney Consulting Services
2. Follow up question(s) from McElhanney Consulting Services and/or the Regional District to proponent(s). (Optional at discretion of the Regional District.)
3. Further question(s) from McElhanney Consulting Services and/or the Regional District to proponent(s). (Optional at discretion of the Regional District.)
4. Interview(s) of selected proponent(s) by McElhanney Consulting Services and/or the Regional District. (Optional at discretion of the Regional District.)
5. Follow-up interview of selected finalist(s). (Optional at discretion of the Regional District.)
6. RFP criteria scoring by the McElhanney Consulting Services and the Regional District.
7. Recommendations to Board with anticipated award to be made by Board at their meeting on August 18, 2016.

5.2 Initial Proponent Selection Process

As a result of the initial written proposal evaluation, the Regional District may, at its sole discretion, request oral presentations and enter into detailed discussions with initially selected proponents prior to preparing a short-list of qualified proponents.

The Regional District may, at its sole discretion, prepare a “short-list” of proponents which initially appear to have the necessary qualifications, based solely on the information contained in the written proposals and/or additional information that may be obtained by the Regional District. The Regional District will be under no obligation to obtain additional clarification from any proponent(s) prior to preparing an initial “short-list” or before entering into detailed discussions, or negotiations, with any proponent.



5.3 Selected Proponent Negotiations

The Regional District, at its sole discretion, reserves the right to enter into contract negotiations with a selected proponent, or proponents, based only on the evaluation of the written proposal(s), and/or an evaluation of the combination of the written proposals, oral presentations, and/or detailed discussions.

The Regional District reserves the right to enter into negotiations with any proponent without requiring any other proponents to make any presentations, or require any other proponents to enter into detailed discussions with the Regional District.

5.4 Termination of Negotiations and/or RFP Process

The Regional District reserves the right to terminate contract negotiations with any proponent, and to enter into contract negotiations with any other proponent(s) if, in the opinion of the Regional District at any time, the contract negotiations with the initially selected proponent(s) will not be satisfactorily completed in the best interests of the Regional District.

The Regional District may, at its sole discretion, reject any or all proposals at any time throughout the proposal evaluation, proponent selection, or contract negotiation process; the lowest will not necessarily be accepted.

The Regional District reserves the right, in its sole discretion, to waive informalities in quotes, reject any and all quotes, or accept the quote deemed most favourable in the interests of the Regional District.

5.5 Non-Compliance with RFP Requirements

Unless explicitly stated in a proposal, all proposals shall be assumed by the Regional District to be in full compliance with the RFP requirements without exception.

All items in the proposal that are **not** in full compliance, or that vary from the specific RFP requirements, shall be clearly identified in the proposal as non-compliant and/or variant, and shall include specific reference to the relevant section in the RFP and the precise nature of the variance or non-compliance.

Non-compliance or variances with the specific RFP requirements will not necessarily result in rejection of a proposal.

The acceptance or rejection of all non-compliant items, and/or variances to the RFP requirements, shall be at the sole discretion of the Regional District, without any obligation by the Regional District to either request clarifications, enter into detailed discussions, or negotiations with the proponent(s).

All bids must be submitted with completed Appendices "A" and "B" as contained within this RFP in order to be eligible for consideration.

5.6 References

Please include three (3) references that may be contacted for purposes of confirming your company's experience in supplying and delivering this type of Electrical Equipment for Auxiliary Power Supply.

6.0 SUPPLIER SELECTION

The following are the criteria and the percentage of the total score for each criterion that will be used by the Regional District to select a proponent. The list of criteria is not in any particular order of priority. The Regional District, in its sole judgment, will base the selection of a successful proponent on a combination of the following criteria:



Evaluation criteria:

Experience	20%
Compliance with RFP Requirements	30%
Delivery date	5%
Price	35%
Nearest Service Facility	<u>10%</u>
Total	<u>100%</u>

7.0 CONTRACT SCHEDULE

7.1 Award of Contract

The Award of Contract is expected to be made not later than August 18, 2016. All proponents will be advised in writing of the final results of the RFP evaluation process.

The Regional District, in its sole judgment, may delay the Award of Contract date as deemed appropriate by the Regional District.

7.2 Form of Contract

The contract to supply and deliver the Electrical Equipment for Auxiliary Power Supply will be in the form of a letter of proposal acceptance, purchase order, or other format as agreed upon by the Regional District and the successful proponent.

8.0 SPECIFICATIONS

Refer to Appendix A.

9.0 WARRANTIES AND INSURANCE

9.1 Auxiliary Power Source Warranties

1. Furnish a written warranty stating that all material supplied under this Division will be free from defects of material and workmanship for a period of two (2) years from the date of substantial performance.
2. Provide separate price for 5-year service agreement to maintain the generator system. Include a description of all services provided in the tender submission.

9.2 Supplier's Insurance

The Supplier will be expected to satisfy the Regional District that sufficient insurance is provided to protect the Regional District's direct investment in the event the auxiliary power source and/or "can" are damaged or destroyed prior to delivery.

For onsite work the Supplier, without limiting its obligations or liabilities, and at its own expense, must provide and maintain throughout the Contract term, the following insurances with insurers licensed in the Province of British Columbia in forms acceptable to the Regional District. All required insurance (except automobile insurance on vehicles owned by the Supplier) shall be endorsed to show the Regional District as additional insured and provide the Regional District with 30 days' advance written notice of cancellation or material change. The Supplier must provide the Regional District with evidence of the required insurance, in a form acceptable to the Regional District, upon notification of award and prior to the execution and delivery of the Contract:

1. Commercial General Liability (CGL), written on an occurrence based form, in an amount not less than \$3,000,000 inclusive per occurrence insuring against bodily injury and property damage and including liability assumed under the Contract. The Regional District is to be added as an additional insured. Such CGL coverage shall include the following liability extensions: Contingent Employers Liability, Broad Form Products & Completed Operations, Personal Injury, Blanket Contractual, and Cross Liability.
2. Automobile Liability on all vehicles owned, operated, or licensed in the name of the Contractor in an amount not less than \$2,000,000.
3. Non-owned Automobile Liability insurance in an amount not less than \$2,000,000.
4. Equipment insurance on all equipment owned or rented by the Supplier to its full insurable value.

It is the sole responsibility of the Supplier to determine if additional limits of liability insurance coverage are required to protect them from risk.

Notwithstanding the compliance of the Supplier with all the clauses concerning insurance, the Supplier shall indemnify, protect, and save harmless the Regional District, its officers, agents, servants, and employees from and against all actions, claims, demands of any kind or description and all such actions, causes of actions, claims and demands recoverable by any third party from the Regional District or the property of the Regional District, shall be paid by the Supplier. If the Regional District pays, or is required to pay, any damages, costs, or fees on account of the actions, claims and demands herein recited, or if the property of the Regional District shall be charged in any way as a result of the aforesaid actions, causes of actions, claims for demands, then the Regional District shall be entitled to recover from the Supplier all such damages, costs, fees or other charges together with any costs or expenses incurred in so doing.

10.0 DELIVERY AND PAYMENT

10.1 Delivery

Proponents must indicate the anticipated schedule for the delivery of the Auxiliary Power Supply to the Regional District. The actual delivery date of the Auxiliary Power Source and training date(s) of Regional District staff must be coordinated in advance and with sufficient notice in order to accommodate Regional District work schedules.

10.2 Contract Price

All prices for the Auxiliary Power Source shall be stated in Canadian dollars. Any applicable Federal or Provincial taxes or levies must be included in the proposal response, but are to be listed separately from the contract price. Appendix "B" – Schedule of Prices must be completed and included in the proposal package.

10.3 Payment Schedule

Proponents will outline the proposed payment schedule with sufficient detail so as to allow evaluation by the Regional District of when progress payments, if applicable, may become due.

10.4 Holdback on Delivery

In the event it is determined that the Auxiliary Power Source, does not meet the specifications outlined in the contract documents or that the Auxiliary Power Source is deficient in any way, the Regional District may, at the time of delivery, hold back sufficient funds to ensure compliance. The amount of the holdback, if any and the provisions for the release of funds shall be subject to discussion between the Regional District and the supplier. The conclusion of any discrepancies and/or deficiencies must occur within a reasonable period of time.

10.5 Late Delivery

The supplier will be required to notify the Regional District if there is any change in the delivery date provided in the contract and the reason for the change in delivery date.

SAMPLE CONTRACT AGREEMENT

WITNESSETH: That the Supplier and the Regional District undertake and agree as follows:

1. The Supplier will:
 - a) provide the self-contained Auxiliary Power Source, and fulfill everything as set forth in and in strict accordance with the Contract Agreement Documents for the project entitled "CS-16-09 Electrical Equipment Purchase for Auxiliary Power Source", and
 - b) deliver the Auxiliary Power Source on _____.
2. The Regional District will pay to the Supplier as full compensation for the performance and fulfilment of this Contract Agreement, the sum or sums of money specified herein in the manner and at the times specified in the Contract Agreement Documents.
3. The Request for Proposal, Proponent's submission, Contract Agreement including all Appendices, and all addenda are incorporated herein, to the intent and purpose as though recited in full herein, and the whole will form the Contract Agreement and will ensure to the benefit of and be binding upon the parties hereto and their successors, executors, administrators, and assigns.
4. No implied agreement of any kind whatsoever, by or on behalf of the Regional District, will arise or be implied from anything contained in this Contract Agreement or from any position or situation of the parties at any time, it being understood and agreed that the express contracts, covenants and agreements made herein by the parties hereto are and will be the only contract, covenants and agreements on which any rights against the Regional District may be founded.
5. Subject to Section 3, this Agreement will supersede all communications, negotiations, and agreements, either written or verbal, made between the parties hereto in respect of matters pertaining to this Agreement prior to the execution and delivery hereof.

6. All communications in writing between the parties will be deemed to have been received by the addressee if delivered to the individual, or to a member of a firm, or to the General Manager of Community Services of the Regional District for whom they are intended, or if sent by registered mail or by telegram as follows:

The Supplier at _____.

The Regional District of Fraser-Fort George at 155 George Street, Prince George, BC V2L 1P8.

IN WITNESS WHEREOF the parties have duly executed this Agreement.

SIGNED ON BEHALF OF THE
**REGIONAL DISTRICT OF
FRASER-FORT GEORGE**

Chair

Date

Corporate Officer

Date

SIGNED ON BEHALF OF
SUPPLIER

Authorized Signature

Date

(Name and Title) (Please print)

ACKNOWLEDGEMENT LETTER

The undersigned has received the full set of Request for Proposal Documents.

Signature

Company

Name (please print)

Address

Title

City

Phone Number

Email

Fax Number

Date

We presently intend to _____ provide/ _____ not provide a Proposal as requested.

Return immediately to:

Michael Higgins
Emergency Services Coordinator
Regional District of Fraser-Fort George
155 George Street
Prince George BC V2L 1P8
Email: mhiggins@rdffg.bc.ca
Fax Number: 250-562-8676



APPENDIX A – ENGINEERING SPECIFICATIONS

APPENDIX A
ENGINEERING SPECIFICATIONS
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1.0 GENERAL

1.1 Section Includes

1. This Section includes Submittal Procedure requirements.

1.2 Administrative

1. Submit to Regional District of Fraser-Fort George submittals listed for review by Engineer. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
2. Present shop drawings, product data, samples and mock-ups in SI Metric units.
3. Where items or information is not produced in SI Metric units converted values are acceptable.
4. Review submittals prior to submission to Engineer. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
5. Notify Engineer in writing at time of submission, identifying deviations from requirements of Contract Documents and stating reasons for deviations.
6. Verify field measurements and affected adjacent Work are coordinated.
7. Supplier's responsibility for errors and omissions in submission is not relieved by Engineer review of submittals.
8. Supplier's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer review.
9. Keep one reviewed copy of each submission on site.

1.3 Shop Drawings and Product Data

1. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Supplier.
2. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Indicate cross references to design drawings and specifications.
3. Allow ten days for Engineer review of each submission.
4. Make changes in shop drawings as Engineer may require, consistent with Contract Documents. When resubmitting, notify Engineer in writing of any revisions other than those requested.
5. Accompany submissions with transmittal letter, in duplicate, containing:

- Date.

- Project title and number.
- Supplier's name and address.
- Identification and quantity of each shop drawing, product data and sample.
- Other pertinent data

6. Submissions to include:

- Date and revision dates.
- Project title and number.
- Name and address of Supplier and Manufacturer.
- Supplier's stamp, signed by Supplier's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

7. Delete information not applicable to project.

8. Supplement standard information to provide details applicable to project.

9. If upon review by Engineer, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication may proceed.

2.0 PRODUCTS

(Not Applicable)

3.0 EXECUTION

(Not Applicable)

End of Section 01 33 00

1.0 GENERAL

1.1 References

1. Canadian Construction Documents Committee (CCDC)
 - 1 CCDC 2-[94], Stipulated Price Contract.

1.2 Quality

1. Products, materials, equipment and articles shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
2. Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
3. Should disputes arise as to quality or fitness of products, decision rests strictly with Engineer based upon requirements of Contract Documents.
4. Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 Availability

1. Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Engineer of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

1.4 Storage, Handling and Protection

1. Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
2. Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact.
3. Store products subject to damage from weather in weatherproof enclosures.
4. Remove and replace damaged products at own expense and to satisfaction of Engineer.
5. Touch-up damaged factory finished surfaces to Engineer satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 Transportation

1. Pay costs of transportation of products required in performance of Work.
2. Equipment is to be delivered to Regional District of Fraser Fort George yard.

1.6 Quality of Work

1. Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Engineer if required Work is such as to make it impractical to produce required results.
2. Do not employ anyone unskilled in their required duties. Engineer reserves right to require dismissal from site, workers deemed incompetent or careless.
3. Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Engineer, whose decision is final.

1.7 Co-ordination

1. Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.8 Remedial Work

1. Perform remedial work required to repair or replace parts or portions of equipment identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
2. Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of equipment.

2.0 PRODUCTS

2.1 Not Used

3.0 EXECUTION

3.1 Not Used

End of Section 01 61 00

1.0 GENERAL

1.1 Related Sections

1. The General Conditions, Supplements and Amendments shall govern this Section (read in conjunction with Instructions to Tenderers/Bidders). This section covers items common to all Electrical sections and is intended only to supplement the requirements of Division 1.
2. Reference to “Electrical Divisions” shall mean all sections of Divisions 26, in the Master Format of the Canadian Master Specifications.
3. Provide materials, equipment and plant, or specified design, performance and quality, and current models with published certified ratings for which replacement parts are readily available. Provide project management and on-site supervision to undertake administration, meet schedules, ensure timely performance, ensure coordination, and establish orderly completion and the delivery of a fully commissioned installation.
4. The most stringent requirements of this and other electrical sections shall govern.
5. The generators shall be in accordance with the Project Drawings and Specifications and their intent, complete with all necessary components, including those not normally shown or specified, but required for a complete generator supply.
6. Start up, test and commission equipment. Include all field assembly of loosely/separately packaged accessories.

1.2 References

1. Canadian Standards Association (CSA International)
 1. CSA C22.1, Canadian Electrical Code, Part 1 (current edition), Safety Standard for Electrical Installations.
 2. Comply with all electrical CSA standards and electrical bulletins.
 3. CAN3-C235 (current edition), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
2. Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 1. IEEE SP1122- (current edition), The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 Sustainable Requirements

1. In order to satisfy the Sustainable goals for the Project, the suppliers and manufacturers shall comply with all requirements and they shall be fully aware of all required laws and available strategies to achieve sustainable goals, including any applicable exemplary performance levels, for the following:
2. Construction Waste Management / Product Waste Recyclability.
3. NOTE: Any specific products listed herein are approved products, provided they meet with the Sustainable requirements for this project. Any proposed alternative products must meet the Sustainable requirements of the project.

1.4 Design Requirements

1. Operating voltages: to CAN3 C235 (current edition).
2. Motors, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 1. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
3. Language operating requirements: provide identification nameplates and labels for control items in English.

1.5 Definitions

1. Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.
2. The “Supplier” is defined as the provider of the Scope of Work as defined in the Electrical Specifications sections in Division 26.
3. “Provide” is defined as “inspect, test and commission.”
4. “Install” is defined as all work and materials necessary to start up, test, commission, and place the specified item into full operation.
5. “Coordinate” is defined as: to make all arrangements directly with agencies and individuals, confirm schedules, be in attendance at the time work is being carried out, and take full responsibility for having the work carried out correctly and in a timely manner to meet the construction schedule.

1.6 Submittals

1. Submittals: in accordance with Section 01 33 00 - Submittal.
 2. Product Data: submit WHMIS MSDS.
 3. Shop drawings:
 1. Submit drawings stamped and signed by professional engineer registered, or licensed in, the Province of BC, Canada.
 2. Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, wiring, conduit, and other items that must be shown to ensure co-ordinated installation.
 3. Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 4. Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 5. Submit number of copies indicated in Submittals Section 01 33 00 of drawings and product data to the authority having jurisdiction.
 6. If changes are required, notify Engineer of these changes before they are made.
 7. Submit a detail schedule of all shop drawings prior to the first progress draw. Schedule shall include specification section, equipment name, manufacturer’s name, distance from site to final manufacturing location, percent recycled content and delivery date.
 4. Quality Control and Assurance
-

1. Provide CSA certified equipment and material.
2. Where CSA certified equipment and materials are not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
3. Submit test results of installed electrical systems and instrumentation.

5. Manufacturer's Field Reports: submit to Engineer manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.7 Delivery, Storage and Handling

1. Material Delivery Schedule: provide Engineer with schedule of all materials within 2 weeks after award of Contract.
2. Separate waste materials for reuse and recycling.

1.8 System Start-up

1. Instruct Engineer, Owner, Contractor and operating personnel in operation, care and maintenance of systems, system equipment and components.
2. Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.9 Operating Instructions

1. Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
2. Operating instructions to include following:
 1. Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 2. Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 3. Safety precautions.
 4. Procedures to be followed in event of equipment failure.
 5. Other items of instruction as recommended by manufacturer of each system or item of equipment.
3. Print operating instructions and in approved laminated plastic.
4. Post instructions where directed.
5. For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
6. Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.10 Equipment Restraint

1. It is the entire responsibility of the equipment manufacturers to design their equipment so that the strength and anchorage of internal components of the equipment exceeds the force level used to

restrain and anchor the unit itself to the supporting structure.

1.11 Drawings and Measurements

1. Where imperial units have been indicated in brackets [] following the requirements in SI units, the conversion is approximate and provided for convenience. The SI units shall govern.

1.12 Tender Inquiries

1. All Supplier queries during the tender period shall be made in writing to the Engineer. Supplier queries will be collected and suitable addenda will be issued for clarification. No verbal information will be considered valid or issued by the Engineer's office during tender. All tender queries may be emailed, mailed or couriered to the Engineer's office. No telephone queries will be answered.

1.13 Examination

1. Examine the documents for details of work included. Obtain a written clarification in the event of conflict within the specification, between the specification and the drawing, or in the drawing. Obtain written clarification from The Engineer if work affecting the installation is not clear. Where this is not done in advance, allow in the tender sum for providing the more costly alternative.

1.14 Responsibilities

1. Where the Contract Documents do not contain sufficient information for the proper selection of equipment for bidding, notify The Engineer during the tendering period. If clarification is not obtainable, allow for the most expensive arrangement. Failure to do this shall not relieve the Supplier of responsibility to provide the intended equipment.
2. Protect equipment and material from the weather, moisture, dust and physical damage.
3. The specifications and drawings form an integral part of the Contract Documents. Neither to drawings nor the specifications shall be used alone. Work omitted from the drawings but mentioned or reasonably implied in the specifications, and vice versa, shall be considered as properly and sufficiently specified and shall be provided. Misinterpretation of any requirement of either plans or specifications shall not relieve the Supplier of the responsibility of properly completing delivery of equipment and to the approval of The Engineer.

1.15 Standard of Acceptance

1. Standard of Acceptance means that the item named and specified by the manufacturer and/or catalogue number forms part of the specification and sets standard regarding performance, quality of material and workmanship and when used in conjunction with a reference standard, shall be deemed to supplement the standard.
2. A visible manufacturer's nameplate shall indicate manufacturer's name, model number, serial number, capacity data, electrical characteristics and approval stamps.

1.16 Progress Claim and Change Order Breakdowns

1. Ten (10) days after the award of contract, submit price breakdowns.
2. In particular cases, more detail may be necessary to properly assess a change order or progress claims. This additional information could include all suppliers and all trade contractors when requested by The Engineer. Provide details for each section of the electrical work listed for each separate

electrical change order.

3. Mark-up information is required for change orders but is optional on the original tender price.
4. Progress claims will not be certified nor payment made beyond 80% of the overall Electrical contract until commissioning and verification of the systems are complete. This procedure is to allow for any necessary deficiency holdbacks on items which do not become apparent until the systems are commissioned

1.17 Warranty

1. Use of installed equipment during construction shall not shorten or alter the warranty period, (as specified in CS-16-0.9-Section 9).
2. Take note of any extended warranties specified.
3. Furnish a written warranty stating that all equipment supplied under this Division will be free from defects of material and workmanship for a period, as specified in CS-16-0.9-Section 9 from the date of substantial performance.
4. Promptly investigate any electrical or control malfunction and repair or replace all such defective work and all other damages thereby which becomes defective during the time of the warranty.

1.18 Substantial Performance Requirements

1. Refer to each section in specifications for detailed requirements.
2. Before The Engineer is requested to make a review for substantial performance of the work:
 1. Commission all systems and prove out all components, interlocks and safety devices.
 2. Submit a letter certifying that all work is complete for the intended use, operational, clean and all required submissions have been completed.
 3. A complete list of incomplete or deficient items shall be provided. If, in the opinion of The Engineer, this list indicates the project is excessively incomplete, a substantial completion review will not be performed.
3. The work will not be considered to be ready for use or substantially complete until the following requirements have been met:
 1. All reported deficiencies have been corrected.
 2. Operating and Maintenance Manuals completed.
 3. "As Built" Generator Record Drawing ready for review.
 4. Systems Commissioning has been completed and has been verified by The Engineer.
 5. All demonstrations to the Owner have been completed.

1.19 Deficiency Holdback and Deficiency Reviews

1. Work under this Division which is still outstanding when substantial performance is certified will be considered deficient and a sum equal to at least twice the estimated cost of completing that work will be held back.
2. It is expected that outstanding work will be completed in an expeditious manner and the entire holdback sum will be retained until the requirements for Total Performance of work have been met and verified.

2.0 PRODUCTS

2.1 Materials and Equipment

1. Provide material and equipment in accordance with Section 01 61 00 Common Product Requirements.
2. Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
3. Factory-assemble control panels and component assemblies.

2.2 Warning Signs

1. Warning Signs: in accordance with requirements of authority having jurisdiction.
2. Porcelain enamel signs, minimum size 175 x 250 mm.

2.3 Wiring Terminations

1. Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.
2. Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
3. Wording on nameplates and labels to be approved by The Engineer prior to manufacture.
4. Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
5. Disconnects, starters and contactors: indicate equipment being controlled and voltage.
6. Terminal cabinets and pull boxes: indicate system and voltage.

2.4 Wiring Identification

1. Identify wiring with permanent indelible identifying markings, numbered and coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
2. Maintain phase sequence and colour coding throughout.
3. Colour coding: to CSA C22.1 (current edition).
4. Use colour coded wires in communication cables, matched throughout system.

2.5 Finishes

1. Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

3.0 EXECUTION

3.1 Nameplates and Labels

1. Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible.

3.2 Coordination of Protective Devices

1. Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.3 Field Quality Control

1. Conduct following tests:
 1. Power generation system including phasing, voltage, grounding.
 2. Carry out tests in presence of The Engineer.
 3. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
 4. Reports:
 1. Provide written reports in a timely manner upon completion of testing. Indicate date and hour tested.

3.4 Cleaning

1. Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
2. Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION 26 05 00

1.0 GENERAL

1.1 Section Includes

1. Materials and installations for Commissioning.

1.2 Related Sections

1. This section of the specification forms part of the contract documents is to be read, interpreted and coordinated with all other parts.

1.3 References

1. Canadian Standards Association (CSA International)
 1. CSA C22.1 (current edition), Canadian Electrical Code, Part 1.
 2. Guidelines for Commissioning Systems, ASHRAE (Current Edition).

1.4 Sustainable Requirements

1. In order to satisfy the Sustainable goals for the Project, suppliers and manufacturers shall comply with all requirements and they shall be fully aware of all required laws and available strategies to achieve sustainable goals, including any applicable exemplary performance levels, for the following:
 1. Construction Waste Management / Product Waste Recyclability.
 2. VOC/Low-Emitting Materials Compliance.

1.5 Operating and Maintenance Manuals

1. Provide operating and maintenance manuals in accordance with the requirements of this section and Section 26 05 00 - Common Work Results - Electrical.
2. Submit the number of manuals as indicated.
3. Provide the services of manufacturer's representatives and technicians required to provide information which is necessary for the manuals. Note that a substantial completion certificate will not be issued until such a time as the manuals have been submitted in their final accepted form.
4. Operating and maintenance data shall be submitted to The Engineer for review. A list of comments will be generated and returned to the Supplier as necessary. This process will continue until the manuals are acceptable to The Engineer.
5. The manuals shall be set up by the specification section. Provide all information appropriate for each section.
 1. Review Certificates.
 2. Letter of Guarantee.
 3. List of Suppliers and Contacts.
 4. Single Line Diagrams.
 5. System Coordination.
 6. Specialties.

1.6 Data for Operating and Maintenance Manuals

1. Only data associated with actually installed systems should be included in Operating and Maintenance Manuals.
2. Include in operations and maintenance data:
 1. Details of design elements, construction features, component function and maintenance requirements, to permit effective start up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
 2. Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature is not acceptable.
 3. Wiring and schematic diagrams and performance curves.
 4. Names and addresses of local suppliers for items included in maintenance manuals.
 5. Copy of reviewed shop drawings.
 6. Copies of all certificates including:
 1. Commissioning reports.

1.7 General Tests

1. Conduct and pay for tests of the following systems:
 1. Power generation systems and associated controls and components supplied.
2. Give sufficient prior notice to The Engineer of the proposed time of the tests so that he can be represented at the tests if he so decides. Submit all test reports in triplicate to The Engineer for his review and records.
3. Submit test results with all operation and maintenance data.
4. Test all systems in accordance with details in appropriate sections.
5. Testing methods and test results shall be in accordance with CSA, the Electrical Code and regulations of the supply authority, other authorities having jurisdiction and in accordance with other sections of these Specifications.
6. Remove and replace with new materials, all generator conductors that are found to be shorted or grounded.
7. Do di-electric tests in the factory and, insulation resistance tests and ground continuity tests as required by the nature of the power generation systems supplied.
8. With the systems completely connected and lamped, the following tests shall be made:
 1. Control and Switching: Test all circuits for the correct operation of devices, switches and controls.
 2. Polarity Tests: Test all circuits for the correct operation of devices, switches and controls.
 3. Supply Voltage: Measure the line voltage of each phase at the load terminals of the main breakers and report the results in writing to The Engineer. This test shall be carried out with the majority of electrical equipment in use.
 4. Energize and put into operation each generator, remote annunciator panel and associated control and communication devices. Make repairs, alterations, replacements, tests and adjustments necessary for a complete and satisfactory functioning generator and annunciator panel.

9. Test all generation systems and confirm that all components have been installed correctly and that the system is functioning properly. Present certification for each generation system to The Engineer.
10. Provide labour, instruments, apparatus and pay all expenses required for the tests. Engineer reserves the right to demand proof of the accuracy of all instruments used.
11. When the tests are performed, The Engineer may require that equipment, outlets, devices, etc., be opened and/or removed from their housings and/or outlet boxes in order that the interior of the equipment and wiring terminations and connections may be examined. Provide all labour and tools for this purpose.

1. Conduct Visual and Mechanical Review:

1. Inspect panels, doors and latches for fit, dents, corrosion and missing hardware.
2. Inspect insulators and barriers for contamination and broken parts.
3. Check for proper operation of key interlock devices.
4. Check for proper shutter operation and position indicator operation.
5. Check that indicating lights are functional.
6. Verify proper operation of digital metering systems.
7. Clean enclosure by vacuuming and wiping.

2. Complete the following Electrical Testing:

1. Test protective relays.
2. Verify proper tripping operation of breakers using protective devices.
3. Test Ammeters and Voltmeters by applying appropriate signals.

12. Generator

1. Conduct Visual and Mechanical Review
2. Complete Electrical Testing as per manufacturers recommendations.
3. Operate all systems and demonstrate how they conform with specifications. Under supervision, make adjustments and fine tune systems.

- 1.8 Care, Operation, Start-Up and Training of Owner's Personnel

1. Instruct operating personnel in operation, care and maintenance of equipment.
2. Arrange and pay for services of manufacturer's factory service representative to supervise start-up of installation, check, adjust, balance and calibrate components.
3. Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

- 1.9 Training of Owner Personnel

1. Supplier:

1. The Supplier shall have the following training responsibilities:

1. Provide The Engineer with a training plan two weeks before the planned training.
2. Provide designated Owner Representative with comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of commissioned

- electrical equipment or system.
3. Training shall start with classroom sessions, if necessary, followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including start-up, shutdown, power failure, etc.
 4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M Manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
 5. The appropriate manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment or the manufacturer's representative. Practical generator operating expertise, as well as in-depth knowledge of all modes of operation of the specific piece of equipment, is required.
 6. The training sessions shall follow the outline in the Table of Contents of the O&M Manual and illustrate wherever possible the use of the O&M Manual for reference.
 7. Training shall include:
 1. Use the printed installation, operation and maintenance instruction material included in the O&M Manuals.
 2. Include a review of the written O&M manual instructions, emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shutdown, seasonal changeover and any emergency procedures.
 3. Discuss relevant health and safety issues and concerns.
 4. Discuss warranties and guarantees.
 5. Cover common troubleshooting problems and solutions.
 6. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Classroom sessions shall include the use of overhead projections, slides, and video and audio taped materials as might be appropriate.
 8. Hands-on training shall include start-up; operation in all modes possible, including manual; shutdown; and any emergency procedures and maintenance of all pieces of equipment.
 9. The trainer shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.
 10. Training shall occur after functional testing is complete, unless approved otherwise by the Project Manager.
2. Duration of Training:
1. The supplier shall provide training on each piece of equipment.

END OF SECTION 26 05 03

1.0 GENERAL

1.1 Section includes

1. Material and installation of Diesel Electric Generating Units – Liquid Cooled.

1.2 Related Sections

1. This section of the Specifications forms part of the contract documents and is to be read, interpreted and coordinated with all other parts.

1.3 References

1. Canadian Standards Association (CSA International)
 1. CSA C22.1 (current edition), Canadian Electrical Code, Part 1
 2. CSA B139 (current edition), Installation Code for Oil Burning Equipment.
 3. CAN3 Z299.3 (current edition), Quality Assurance Program Category 3.
2. Canadian Environmental Protection Act (CEPA)
 1. CCME PN 1326- (current edition) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
3. International Organization for Standardization (ISO)
 1. ISO 3046 1 (current edition), Reciprocating internal combustion engines - Performance - Part I: Declarations of power, fuel and lubricating oil consumptions, and test methods - Additional requirements for engines for general use.
 2. ISO 3046 4 (current edition), Reciprocating internal combustion engines - Performance - Part 4: Speed governing.
4. National Electrical Manufacturers Association (NEMA)
 1. NEMA MG1 (current edition), Motors and Generators.
5. Underwriters' Laboratories of Canada (ULC)
 1. CAN/ULC S601 (current edition), Standard for Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids.

1.4 Sustainable Requirements

1. Materials and products in accordance with Section 26 05 00 - Sustainable Requirements: Construction.

1.5 Submittals

1. Submit submittals in accordance with Section 01 33 00 Submittal.
2. Product Data:
 1. Provide manufacturer's printed product literature, specifications and data sheets for generating units and include product characteristics, performance criteria, physical size, finish and limitations.

3. Include following:

1. Engine: make, model, rating and performance curves.
2. Starter motor, make model.
3. Generator: make, model and rating complete with generator saturation curves, heat damage curves, reactive capability and special data.
4. Voltage regulator: make, model, type.
5. Governor: type, model.
6. Battery: make, type, voltage, capacity.
7. Charger: make, model, input and output rating.
8. Submit general outline drawing of complete assembly showing engine, radiator and generator mounting, exhaust, recirculating and intake air louvre arrangement, exhaust gas silencer and pipe arrangement, locations of fuel and lubricating oil filters, fuel supply and return line connections, lubricating oil drain valve, radiator and coolant drain valves, air cleaner, engine instrument panel, starting motor, power and control junction boxes, engine and generator mounting feet. Indicate on drawings:

1. Horizontal and vertical dimensions.
2. Minimum door opening required for moving unit.
3. Head room required for removal of piston and connecting rod.
4. Weight of engine, generator, baseplate, radiator and exhaust silencer.

9. Identify exact locations and details where necessary of interconnecting services to permit final engineering.
10. Baseplate construction details and materials.
11. Transfer and bypass system: make, model, type.
12. Outline and layout of panels.
13. Schematic and wiring diagrams of engine, generator and control panel. complete with interconnecting wiring diagrams.
14. Single line diagram showing all breakers, switches, metering and protective relays.
15. Field wiring diagrams.
16. Complete bill of materials, including manufacturer's name, catalogue numbers and capacity.

4. Lubricating oil system: where oil pump not provided, submit certification to The Engineer ensuring oil pump is not required and will not detract from service life of engine.

5. Closeout Submittals

1. Provide maintenance data for diesel generating units for incorporation into manual.
2. Provide in English for incorporation into instruction manuals as follows:
 1. Complete set of reviewed shop drawings.
 2. Factory test data of engine, generator, exciter, control logic, metering and other pertinent test data.
 3. Maintenance and operation bulletins for:
 1. Engine and Accessories.
 2. Generator.
 3. Voltage Regulator and Accessories.
 4. Exciter.
 5. Permanent magnet generator if installed.
 6. Battery charger.
 7. Speed Governor.

8. Starting Motor.
9. Batteries.
10. Ventilating Equipment.
11. Timers, Relays, Meters.
12. Power Circuit Breakers.
13. Controller, Contactors.
14. Remote Annunciator Panel.
15. Other Accessories.

4. Submit original brochures; photocopies are not acceptable.
 1. Include technically relevant data.
 5. Complete sequence of system operation.
 6. Complete bill of materials including nameplate data of equipment and accessories.
3. Forward, two weeks prior to factory tests, one copy of instruction manual for each unit of different ratings.
4. Forward, within two weeks after factory tests, three copies of instruction manuals, with updated drawings, for each unit of different ratings.
 1. Submit one set of along with manuals.
6. Maintenance Material Submittals
 1. Provide maintenance materials in accordance with Section 26 05 00.
 1. Extra Material/Spare Parts: provide the following:
 1. One spare control circuit breaker per rating.
 2. One spare control relay and socket per rating and contact arrangement.
 3. One spare contactor operating coil.
 4. One set of contacts (3) for transfer contactor.
 5. Two fuel filter elements for each type of fuel filter/water separator.
 6. Two lubricating oil filter elements.
 7. Two air cleaner elements.
 2. Provide conclusive evidence that Canadian distributor has been established and will stock in Canada spare parts likely to be required during normal life of engine.
7. Tools:
 1. Supply suitable engine barring device and battery manufacturer's standard set of tools for battery service.
 1. Battery service tools to include hydrometer, one plastic bottle for topping up purposes and one insulated battery terminal wrench.
 2. Provide complete set of specialized tools required for proper care, adjustment and maintenance of equipment supplied.

1.6 Delivery, Storage and Handling

1. Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
2. Deliver, store and handle materials in accordance with manufacturer's written instructions.
3. Handle materials with suitable lifting equipment.
4. Store materials in heated, dry, weather-protected enclosure

1.7 Description of System

1. Materials assembly to include:
 1. Provide automatic, unattended standby power supply system consisting of:
 1. Liquid cooled diesel electric generating unit.
 2. Accessories and equipment specified in this specification.
 3. Automatic Transfer switch.
 4. Walk-in enclosure.
 2. Provide design, fabrication, testing, transportation, demonstration and equipment warranty.
2. Integration with Building Management System (BMS)
 1. Product protocol shall be able to natively communicate with process control system.
 2. Provide all wiring and devices required for the installation, programming, commissioning and documents of commissioning to prove correct circuitry and performance.

2.0 **PRODUCTS**

2.1 Engine

1. The engine shall be water cooled with radiator and fan and all required shrouding, flanges and duct connections to connect to ventilation ductwork. Provide 120 VAC circulating block heater and oil heaters with remote sensing thermostat to control block heater based on outside air temperature. Block heater shall be sized to provide reliable starting down to -40°C.
2. The engine shall be equipped with lube oil, intake filters, lube oil cooler, regulator, service meter, gear driven water pump and instruments, including water temperature gauge and lubricating oil pressure gauge. Supply all engine oil and lubricants necessary to put the unit into operation.

2.2 Governor

1. The engine governor shall maintain isochronous frequency regulation from no load to full rated load. Steady state operating shall be within 0.2 Hz of nominal.

2.3 Mounting

1. The engine generator set shall be mounted on a structural steel sub-base and shall be provided with suitable spring type vibration isolators.

2.4 Protective Devices

1. Pre-alarms provided for low jacket water temperature, low lube oil pressure and high jacket water temperature. Safety shutoffs for high water temperature, low oil pressure, electrical overspeed, engine overcrank and emergency stop pushbutton shall be provided.

2.5 Engine Oil Sump

1. The engine can be either wet or dry sump with provision for maintaining oil temperature at 80 - 90°C to allow for rapid engine warm-up.

2.6 Generator

1. To be rated for continuous standby service at minimum 225 kW (180 kVA at 0.8 pf), 347/600 V, three phase, four wire, 60 Hz, 1200 or 1800 RPM.
2. The generator shall be three-phase, single-bearing, rotating field and built to NEMA standards. Class F insulation. The generator shall incorporate a resettable thermal protector and fuse for exciter/regulator protection against extended low power factor loads and faults. The generator rotors shall be dynamically balanced and shall sustain 25% overspeed.
3. The alternator shall utilize Permanent Magnet Generator System (PMG) and shall be rated for 125 Dec C temperature rise.

2.7 Exciter/Regulator

1. An automatic volts-per-hertz type, solid-state exciter/regulator shall be included and shock mounted inside the generator. Voltage regulation shall be 1% tolerance from no load to full rated load. Readily accessible voltage drop, voltage level and voltage gain controls shall be included in the module. Voltage level adjustment shall be a minimum of 10% above and below normal.
2. The module shall include the following protective features:
 1. Current limit switches shall restrain the exciter field current while allowing full forcing voltage to be applied to obtain rapid response during transient conditions or service overloading on the generator.
 2. A time delay circuit shall sense the current limit operation and cut off all field current to the generator after 10 seconds.

2.8 Fuel System

1. The engine-generator set is to be supplied for operation on diesel fuel, complete with all ancillary equipment.
2. The fuel tank shall have 72 Hr. capacity at full load, minimum.

2.9 Exhaust System/Silencer

1. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.
2. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system. The manufacturer shall supply a critical grade exhaust silencer as standard.

3. The engine intake air is to be filtered with engine mounted, replaceable, dry element filters.

2.10 Automatic Starting System/Starting Motor

1. The engine shall be equipped with a battery powered starting system with positive engagement drive and of sufficient capacity to crank the engine at a speed that will start the engine under operating conditions. The starting pinion will disengage automatically when the engine starts.

2.11 Starting Controls

1. Fully automatic generator set start-stop controls in the generator control panel shall be provided for the unit. Controls shall provide shutdown for low oil pressure, high water temperature, overspeed, overcrank and one auxiliary contact for activating accessory items. Controls shall include cyclic cranking, initially set for one 30-second cranking cycle, with lockout and manual reset features.

2.12 Batteries and Battery Charger

1. A lead/acid storage battery set of the heavy duty starting type shall be provided. Battery voltage shall be compatible with the starting system.
2. Batteries shall be capable of cranking engine at rated ambient for a minimum of five minutes.
3. A current limiting, float-equalize charger shall be furnished to automatically recharge batteries.

2.13 Sub-base Fuel Tank

1. The packaging shall include a double wall, sub-base mounted ULC listed fuel tank. The tank shall be sized to provide 72 hours of run time at full load (minimum).
2. The tank shall include fuel suction and return connections, normal and emergency vents, secondary containment emergency vent and rupture basin sensor, mechanical fuel level indication and a stub-up area convenient for electrical conduit entry.
3. The fuel tank shall use an electric fuel sensor to provide an analog indication of fuel level. The controller shall have a warning indication on low fuel level and provide optional shutdown functionality for low, low fuel level. An overflow alarm shall be provided with dry contacts for connection to remote annunciation.
4. The fuel tank shall have a sloped bottom. The sloped bottom allows the water and other impurities in the fuel to collect near the back of the tank away from the fuel suction point.
5. The fuel tank must be supplied by the engine-generator set manufacturer.
6. The installation of pipe to exterior of building/enclosure for filling sub-base tank is to be included.

2.14 Mainline Circuit Breaker

1. One mainline molded case, three pole, single throw circuit breaker rated shall be installed for three phase overloads and/or short circuit protection, sized as indicated on drawings. This rating shall apply for operating temperature rise over 104°F (40°C). It shall operate both manually for normal switching functions and automatically during overload and short circuit conditions.

2.15 Generator Control Panel and Annunciator

1. A wall-mounted or set-mounted CEMA 1-type dead front, 14 gauge steel control panel shall be provided and shall contain but not be limited to, the following equipment:
 1. AC voltmeter, analog
 2. AC ammeter, analog
 3. Ammeter phase selector switch
 4. Three current transformers
 5. Frequency meter
 6. Adjustable 2 to 30 minute time delay on retransfer of load to normal with 5 minute cool-down time wherein the generator sets run unloaded after retransfer to normal source.
 7. Alarm/Trouble lights, LED
2. Provide a remote annunciator equal to ComAP IGL-RA15 surface mount, or approved equal.

2.16 Walk-In Generator Enclosure

1. Sound Attenuation
 1. Custom fabricated, NEMA 3R walk-in enclosure to be sound attenuated to 65-70dBA @ 7m in free field conditions.
2. Building
 1. Walls shall be 4" thick, made of formed 12 gauge satin coat panels to ASTM A653.
 2. Walls shall be insulated with mineral wool insulation to R16 insulation value and lined with 22 gauge galvanized steel perforated sheets (liner to be reveted, teck screws are not permitted).
 3. Walls shall be stitch welded and caulked before paint.
 4. Roof shall be fully seam welded, 4" thick, 12 gauge satin coat to ASTM A653.
 5. Roof shall be insulated with mineral wool insulation to R16 insulation value and lined with 22 gauge galvanized steel perforated sheets.
 6. Roof shall have a 2" slope to reduce ponding of water.
 7. Enclosure to be designed as walk-in with 1 metre clearance at rear and 1m on both sides.
 1. Side clearance to be from edge of skid, not including radiator, batteries or breaker.
 8. Enclosure to be designed to meet British Columbia Building Code.
 9. Walk-in Enclosure shall come with two (2) only man doors c/w freezer-style panic door hardware, bulb seal and drip-edge rain gutter.
 10. Two (2) OSHA Compliant Stair Sets c/w Landing, Platform and Hand Railing (if required).
 11. All fabrication shall be performed in a CWB Certified facility by CWB Certified Welders.
3. Ventilation
 1. Intake hood shall be lined, complete with motorized (power close, spring open), insulated dampers and bird screen at opening.
 2. Discharge hood shall be lined, complete with thermostatically controlled recirculation air system and discharge snow hood.
 3. Snow Hood included, removed for shipping.

4. Electrical

1. House electrical loads shall be powered via one (1) only 18CCT, 120/208V, three phase, 100 Amp distribution panel board connected to the following items:
 1. Six (6) only 120V vapor proof fluorescent lights c/w two (2) only 3-way light switches.
 2. Two (2) only 120V, 20A GFCI convenience receptacles installed inside enclosure.
 3. Two (2) only 4kW fan-forced space heaters.
 4. Two (2) only exterior LED lights c/w photocell
 5. Circuits for block heater(s), anti-condensation heater & battery charger.
2. Two- only combination exit/emergency lights c/w 2hr battery back-up, installed inside enclosure at each door.
2. All electrical enclosure wiring is in surface mount EMT, up to 6' away from the genset, where liquid tight flex will be used to provide a non-rigid connection between the engine and the enclosure.
3. All components are CSA or ULC listed and bear the CSA or ULC Label.
5. All electrical work to be performed by ticketed (journeyman) electricians.

5. Heated & Insulated Fuel Tank Base

1. Fuel tank, sized for 72hrs of run-time at 100% load, shall be double-walled and CAN/ULC S601 certified complete with the following:
 1. Emergency relief fittings.
 2. Normal vents, extended 12' above grade for code compliance.
 3. Fuel supply (with check valve) and return lines.
 4. Mechanical fuel gauge.
 5. Float switches for high/low fuel level and leak detection.
 6. 2" Camlock fill with 5 gallon spill containment bucket.
 7. Electrical stub-up area(s).
 8. Lifting eyes.
 9. 75mm containment still around the perimeter.
 10. Genset Support Rails shall be provided, running longitudinally with engine skid.
2. Fuel tank base shall serve as the floor of walk-in enclosure, therefore there shall be no generator mounted cross-members allowed across enclosure floor – this is to prevent tripping hazards.
3. Fuel tank base shall be manufactured in Canada by the same manufacturer as the enclosure package to ensure optimal QA/QC and integration between fuel tank base and generator.
4. Fuel tank shall be insulated to R21 insulation value with 3" fire retardant spray foam insulation.
5. Fuel tank sides shall be covered with bolt-on skirting plates.
6. Fuel tank shall be heated with six (6) only Kim Hotstart immersion fuel tank heaters.

4. Paint System

1. Enclosure (Satin Coat Galvanized) Surface Preparation shall be SSPC-SP1.
2. Fuel Tank Base Surface Preparation shall be to SSPC-SP1.
3. Primer shall be International Paints Epoxy.
4. Top Coat shall be International Paints Polyurethane, enclosure exterior colour to be determined by customer, colour matching to be available if required.

5. Exhaust System

1. Hospital Plus grade silencer shall be installed inside enclosure c/w flex, exhaust piping, roof penetration and rain cap.
2. Insulation blankets shall be installed on interior-mounted silencer and interior exhaust piping.

6. Manufacturing

1. All major components in the enclosure manufacturing process (enclosure, hoods and fuel tank/base) must be designed and manufactured by a single company.

7. Packaging

1. 225kW, 347/600 Volt, 3Ph Standby SIMMAX Generator set to be installed in enclosure on SIMMAX supplied vibration isolators.
2. Radiator flexible coupling shall be installed between radiator and air discharge duct.
3. Battery charger shall be wall-mounted inside enclosure and wired to distribution panel.
4. Generator heaters (block heater, anti-condensation heater etc.) shall be wired to distribution panel.
5. Fuel tank alarms (level and leak float switches) shall be wired to the generator control panel.
6. Free-issued 600 Amp, Thompson Power Systems TS873 Automatic Transfer Switch is installed inside enclosure (wall-mounted) and wired back to genset-mounted circuit breaker via: DLO cable in overhead cable tray.

8. Quality Control, Testing & Project Management

1. Structural Design by Structural P.Eng Licensed in British Columbia.
2. All fabrication and packaging to be performed by an ISO 9001:2008 certified company.
3. Fabrication to be performed by CWB Certified Welders IAW CWB Standards.
2. Mechanical Installations to be inspected by In-House Project Manager
3. All Electrical Installations shall be by Licensed Electricians, supervised by in House Electrical Engineer.
6. QA Inspection reports to be provided if required.
7. Progress reporting shall be provided as required, complete with digital pictures and MS project schedule.

2.17 Quality of Work

1. Manufacture and construct equipment free from blemishes, defects, burrs and sharp edges; accuracy of dimensions and marking of parts and assemblies; thoroughness of welding, brazing, painting and wiring, alignment of parts and tightness of assembly screws and bolts.

2.18 Quality Control

1. General: before acceptance, assemble and set up the unit, complete with specified equipment, for tests at the supplier's plant. The tests shall include:
 1. Confirmation of automatic start.
 2. A one hour full load test (minimum), utilizing an adjustable load.
 3. During test the following parameters shall be recorded at 30 minute intervals:
 1. Speed and frequency.
 2. Voltage and current per phase.
 3. Loads.

4. Coolant temperatures.
 5. Lubricating oil pressure.
 6. Fuel consumption for the duration of the test shall be noted.
 7. Engine oil pressure.
 8. Engine operating pressure.
4. Provide strip chart recording.
 5. Record the battery charge rate 1 minute after start at 5 minute intervals for the first 15 minutes and at 15 minute intervals thereafter.
2. Product examination: complete mechanical and electrical examination to determine compliance with specification and drawings with respect to materials, workmanship, dimensions and marking.
 3. Non operational tests and checks: perform following tests and checks before starting the unit:
 1. Shaft alignment, end float, angular and parallel.
 2. Cold resistance of generator windings.
 3. Belt tensioning.
 4. Equipment grounds.
 5. Electrical wiring.
 6. All grease lubricating points.
 7. Personnel safety guards.
 8. Air cleaner.
 9. Coolant.
 10. Lubricating oil type and level.
 11. Type of fuel.
 12. Vibration isolator adjustment.
 13. Temperature and pressure sensors.
 14. Engine exhaust system.
 15. Tools.
 16. Spares.
 4. Operation test and check: on completion of non operational tests and checks, start unit cold. Provide multi channel recorder and record following :
 1. Time for unit to start and reach settled voltage and frequency.
 2. Time from initiation of start to full load application, with voltage and frequency settled.
 3. Voltage and frequency transient and steady state limits for full load to no load, 3/4 load to no load, 1/2 load to no load, 1/4 load to no load and vice versa. Measure machine vibration levels under the same load conditions.
 4. Record battery voltage drop during cranking.
 5. Protection and control demonstration: on completion of operation test and check, demonstrate following:
 1. Overheat protection.
 2. Low oil pressure protection.
 3. Cranking cut out.
 4. Overcrank protection (3 tries).
 5. Overspeed protection.
 6. Under and over frequency
 7. Under and over voltage.
 8. Electrical fault protection:
 1. Failure to close breaker

2. Failure to build up voltage.
 3. Generator short circuit and overcurrent.
9. All control functions.
6. Load tests: load test the unit for 8 hours at full rated load and further 1 hour at 110% rated load in ambient room temperature of 40 degree C. Take following data at start of load test and every one hour interval thereafter:
1. Frequency.
 2. Voltage.
 3. Current.
 4. Kilowatts.
 5. Generator winding temperature.
 6. Generator frame temperature.
 7. Engine coolant temperature.
 8. Oil temperature and pressure.
 9. Manifold pressure.
 10. Ambient room temperature.
 11. Generator cooling air outlet temperature.
 12. Exciter field current and voltage.
 13. Vibration displacement.
 14. Ambient air temperature inside panel with doors closed.
7. Miscellaneous: provide accurate means for determining fuel and lubricating oil consumption.
1. Provide strip chart recorders for monitoring frequency, voltage and load.
 2. Provide recorder with ability to select speeds to allow accurate measurement of voltage, frequency and time during tests.
 3. Calibrate recorder by the recorder manufacturer or designated representative within three months of factory testing.
8. Interpretation of ambient room temperature: consider ambient room temperature as that temperature, which is lowest temperature registered out of a group of three thermometers when placed in engine room as follows:
1. One thermometer located on each side of engine block, approximately two thirds of length of block back from front (radiator) end of block, 900 mm out from block and at height equal to height of block.
 2. Locate third thermometer over end of exciter on unit centre line, approximately 150 mm above top of exciter.
 3. Take thermometer showing lowest temperature to give true ambient air temperature.
 4. Adjust temperature to maintain this thermometer at 40 degree C during heat test.
9. Voltage and frequency regulation tests: on completion of load tests take hot resistance reading of generator windings.
1. Subject the unit to hot voltage and frequency regulation tests for full load to no load, 3/4 load to no load, 1/2 load to no load, 1/4 load to no load and vice versa.
10. Panel performance and functions: check sequence of operation under service conditions.
1. Make provision for supplying and connecting required levels of voltage for primary circuits.

2. Test overcurrent relays by impressing current in secondary circuits.

11. Record test data on appendix forms, recording charts and manufacturers' test forms complete with diagrams and description of test results, deficiencies and corrective actions.

3.0 EXECUTION

3.1 Examination

1. Verification of Conditions:

1. Verify that substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of liquid cooled diesel electric generating units.
2. Inform The Engineer of unacceptable conditions immediately upon discovery.
3. Proceed with installation only after unacceptable conditions have been remedied.

3.2 Installation

1. Installation will be performed by the Contractor.

3.3 Closeout Activities

1. Demonstration and Training:

1. As directed by The Engineer and in accordance with Section 26 05 00 - Demonstration and Training (Division 01) carry out demonstrations of complete standby power system for Project Acceptance Board.
2. Provide familiarization training of operating and maintenance staff.
3. Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.
4. Fuel required for performing site test and top-up after acceptance test completion will be provided by the Contractor.

END OF SECTION 26 32 13.04

1.0 GENERAL

1.1 Section Includes

1. Materials and installation for Automatic Transfer Switches.

1.2 Related Sections

1. This section of the specification forms part of the contract documents and is to be read, interpreted and coordinated with all other parts.

1.3 References

1. Canadian Standards Association (CSA International)
 1. CSA C22.1 (current edition), Canadian Electrical Code, Part 1
 2. CSA C22.2 No.5-09, Moulded-Case Circuit Breakers, Moulded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, NMX J 266 ANCE-2010).
 3. CSA C22.2 No.178.1-2007, Automatic Transfer Switches.
 4. CAN/CSA C60044-1-07, Instrument Transformers.
2. National Electrical Manufacturers Association (NEMA)
 1. NEMA ICS 2-1996(R2009), Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC, Part 8: Disconnect Devices for Use in Industrial Control Equipment.

1.4 Sustainable Requirements

1. Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.
2. Do verification requirements in accordance with Section 01 47 17 - Sustainable Requirements: Contractor's Verification.
3. Waste Management and Disposal
 1. Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
 2. Avoid using landfill waste disposal procedures when recycling facilities are available.
 3. Place materials defined as hazardous or toxic waste in designated containers.
4. In order to satisfy the Sustainable goals for the Project, the Construction Manager and all Trade Contractors, suppliers and manufacturers shall comply with all requirements and they shall be fully aware of all required laws and available strategies to achieve sustainable goals, including any applicable exemplary performance levels, for the following:
 1. Construction Waste Management / Product Waste Recyclability.
 2. Recycled Content.
 3. Local and Regional Materials.
 4. Certified Wood.
 5. Construction Indoor Air Quality (IAQ) management.
 6. VOC/Low-Emitting Materials Compliance.
5. NOTE: Any specific products listed herein are approved products, provided they meet with the

Sustainable requirements for this project. Any proposed alternative products must meet the Sustainable requirements of the project.

1.5 Submittals

1. Submit in accordance with Section 01 33 00 Submittal Procedures.
2. Product Data:
 1. Submit manufacturer's instructions, printed product literature and data sheets for transfer switches and include product characteristics, performance criteria, physical size, finish and limitations.
 2. Provide manufacturer's printed product literature, specifications and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.
 3. Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 47 15 - Sustainable Requirements: Construction and Section 02 81 01 - Hazardous Materials and include: product characteristics, performance criteria, physical size, horsepower, watt rating, limitations and finish.
 4. Shop Drawings:
 1. Submit drawings:
 1. Indicate on drawings:
 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
3. Quality Assurance:
 1. The Engineer reserves the right to witness standard factory testing.
 2. Submit site tests results of installed electrical systems and instrumentation.
4. Closeout Submittals:
 1. Provide maintenance data for materials for incorporation into manual specified in Section 26 05 00.
 2. Data necessary for maintenance of materials.
 3. Manufacturers recommended list of spare parts.
 4. Operation and Maintenance Data: submit operation and maintenance data for transfer switches for incorporation into manual.
 5. Detailed instructions to permit effective operation, maintenance and repair.
 6. 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.

1.6 Delivery, Storage and Handling

1. Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product

Requirements and with manufacturer's written instructions.

2. Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
3. Storage and Handling Requirements:
 1. Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 2. Store and protect transfer switches from nicks, scratches, and blemishes.
 3. Replace defective or damaged materials with new.

1.7 Description of System

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

1.8 Pre-approved Manufacturers

1. Thomson Power Systems.
2. Eaton.
3. Approved equal.
4. All Contractors must submit proposed equipment prior to tender close.

2.0 **PRODUCTS**

2.1 Materials

1. Instrument transformers: to CAN/CSA C60044-1.
2. Contactors: to NEMA ICS2.

2.2 Contact Type Transfer Equipment

1. Contact Type Transfer Equipment: to CSA C22.2 No.178.1.
2. Three pole contactors mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, motor operated, with CSA enclosure.
3. Rated: 600 V, 60Hz, 800 A. four wire, solid neutral.
4. Main Contacts: Silver surfaced, protected by arc disruption means.

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. Auxiliary Contact: Silver plated, to initiate standby generator start-up on failure of normal power.
7. Fault withstand rating: 25 kA symmetrical.
8. Lever to operate switch manually when switch is isolated.
9. Neutral bar, solid rated: 600 A.

2.3 Controls

1. Selector switch four position "Test", "Auto", "Manual", "Engine start".
 1. Test position normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.
 2. Auto position normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
 3. Manual position transfer switch may be operated by manual handle but transfer switch will not operate automatically and engine will not start.
 4. Engine start position engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.
2. Control transformers: dry type with 120 V secondary to isolate control circuits from:
 1. Normal power supply.
 2. Standby power supply.
3. Relays: continuous duty, industrial control type, with wiping action contacts rated 10 A minimum:
 1. Voltage sensing: single-phase for normal power, solid state type, adjustable drop out and pick up, close differential, 2 V minimum under voltage and over voltage protection.
 2. Time delay: normal power to standby, adjustable solid state, 0 to 60 seconds.
 3. Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 60 seconds delay.
 4. Time delay on retransfer from standby to normal power, adjustable 0 to 60 seconds.
 5. Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state, 20 second intervals to 10 minutes.
 6. Time delay during transfer to stop transfer action in neutral position to prevent fast transfer, adjustable, 5 second intervals to 180 seconds.
 7. Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.
 8. Neutral position delay: allow time for motors to delay between live sources, adjustable, 0 to 5 s.

2.4 Accessories

1. Ensure pilot lights indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel.
2. Plant exerciser: 168 hours timer to start standby unit once each week for selected interval transfers load to standby supply and retransfers to normal supply on standby unit shutdown. Timer adjustable 0 168 hours in 15 minute intervals.

3. Auxiliary relay to provide 2 N.O. and 2 N.C. contacts for remote alarms.
4. Instruments:
 1. Digital true RMS, indicating type 2% accuracy, flush panel mounting:
 1. Voltmeter: ac, scale 0 to 600 V.
 2. Ammeter: ac, scale 0 to 600 A.
 3. Frequency meter: scale 55 to 65 Hz. Voltmeter selector switch: rotary, maintained contacts, panel mounting type, round notched handle, four position, labelled "OFF Phase A Phase B".
 5. Potential transformers dry type for indoor use:
 1. Ratio: 600 to 120.
 2. Rating: 600 V, 60Hz.
 6. Ammeter selector switch: rotary, maintained contacts, panel mounting type, designed to prevent opening of current circuits, round notched handle, four position labelled "OFF Phase A Phase B".
 7. Current Transformers Dry Type For Indoor use:
 1. Ratio: 600 to 5.
 2. Rating: 600 V, 60Hz.
 3. Positive action automatic short circuiting device in secondary terminals.
 8. Manual bypass and isolator: to both supplies.

2.5 Equipment Identification

1. Identify equipment in accordance with Section 26 05 00 - Common Work Results for Electrical.
2. Control panel:
 1. For selector switch and manual switch: Size 4 nameplates.
 2. For meters, indicating lights, minor controls: use Size 2 nameplates.

2.6 Source Quality Control

1. Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of The Engineer.
2. Notify The Engineer five days minimum in advance of date of factory test.
3. Tests:
 1. Operate equipment both mechanically and electrically to ensure proper performance.
 2. Check selector switch, in 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.

3.0 EXECUTION

3.1 Examination

1. Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for transfer switches installation in accordance with manufacturer's written instructions.
 1. Visually inspect substrate in presence of The Engineer.
 2. Inform The Engineer of unacceptable conditions immediately upon discovery.
 3. Proceed with installation only after unacceptable conditions have been remedied to the satisfaction of Regional District of Fraser-Fort George.

3.2 Installation

1. Locate, install and connect transfer equipment as indicated.
2. Check solid state monitors and adjust as required to ensure correct operation.
3. Install and connect remote alarms. Allow for connection of two remote alarm points.

3.3 Field Quality Control

1. Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
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 should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 minutes, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown. Repeat, at 1 hour intervals, 3 times, complete test with selector switch in each position, for each test.

3.4 Maintenance – Clearances

1. Provide clearance around systems, equipment and components for observation of operation, review, servicing, maintenance and as recommended by manufacturer and CEC, Part 1.

3.5 Cleaning

1. Proceed in accordance with Section 01 74 11 – Cleaning.
2. On completion and verification of performance of installation, remove surplus materials, excess

materials, rubbish, tools and equipment.

3. Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 1. Leave Work area clean at end of each day.
4. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION 26 36 23

APPENDIX B - SCHEDULE OF PRICES

Price submitted below reflects the full cost, excluding taxes, of the self-contained Auxiliary Power Source delivered to 155 George Street as specified in RFP CS-16-09. This price sheet must accompany the bid package submitted.

Price (not including taxes)	\$ _____
GST	\$ _____
PST	\$ _____
Other (please specify)	\$ _____
TOTAL	\$ _____
5 Year Service Agreement	\$ _____
Delivery Date	_____
Nearest Service Facility	_____
GST Registration No.	_____

_____ Authorized Signatory Signature	_____ Name of Tenderer
_____ Name (Please print)	_____ Address
_____ Title	_____ City, Province, Postal Code
_____ Phone Number	_____ Fax Number
_____ Email	_____ Date