

Note to Generator Suppliers:

This is a two-part process; Part 1 is a Request for Qualifications from Generator Suppliers (ROQ due May 13, 2016) and Part 2 is only for Bidders that have been prequalified in the Part 1 process (bids due May 31, 2016).

PART 1: REQUEST FOR QUALIFICATIONS (RFQ)

BY CITY OF GOLDSBORO

Informal Bid # 2016-001: Neuse River Pump Station Emergency Generator Project

Issue Date: May 3, 2016
Submittal Deadline: May 13, 2016

SOLICITATION

The City of Goldsboro is soliciting Applications for Bidder Prequalification for the purpose of obtaining a qualified Generator Supplier for the Neuse River Pump Station Emergency Generator Project, hereinafter called the "Project."

Only applicants that have been prequalified in accordance with this RFQ (Request for Qualifications) will be allowed to submit bids for this contract. Bids received by those who have not been prequalified under the terms of this RFQ will not be considered and will be returned unopened.

A complete copy of the RFQ and generator system bid specifications are posted on the City of Goldsboro web site at www.goldsboronc.gov under 'Business' tab → 'Bids' or may be obtained by request by emailing Karen Brashear, City of Goldsboro, Public Utilities Director at kbrashear@goldsboronc.gov. The Application for Bidder Prequalification (also referred to as the Application) and the associated forms contained in this RFQ will be the only acceptable application format.

The completed Application must be delivered to Karen Brashear, Public Utilities Director at City of Goldsboro, P.O. Drawer A, Goldsboro, NC 27533-9701, or emailed to kbrashear@goldsboronc.gov no later than 2:00 P.M. on Friday, May 13, 2016. No applications will be accepted after the deadline. The outside of the envelope must be marked, "ROQ for IFB 2016-001".

The City of Goldsboro plans to complete the prequalification process by May 20, 2016. Prequalification results will be posted on the City of Goldsboro web site. Generator system bids will only be accepted from Generator Supplier that have been prequalified by the City of Goldsboro. Generator System bids by these prequalified Generator Suppliers are due on May 31, 2016, no later than 2:00 PM (Bidding-Part 2). The Notice to Proceed is projected for July 2016. This schedule is subject to change.

The Project consists of providing a 475 kW emergency generator and ATS system. The Project scope is subject to change. The Project includes, but is not limited to, the furnishing of the generator and ATS according to the bid specifications. This equipment shall be accepted at the Neuse River Pump Station for installation by an electrical contractor.

The project will require close coordination with the City of Goldsboro. The Generator system Supplier will also be responsible for coordination with the City of Goldsboro for all permits or fees that may be required or any other required permits from the City and coordinating with the Installation Contractor.

CITY OF GOLDSBORO
Karen Brashear, Public Utilities Director

Part 1-GENERAL

The Project is located in Goldsboro, North Carolina and is briefly described in the Solicitation. Close coordination of construction activities with City of Goldsboro's staff through a designated Construction Manager may be required. The successful bidder will be required to furnish all materials and equipment services and incidentals to complete the Work in accordance with the Specifications and Drawings.

The City of Goldsboro shall not be responsible for any cost incurred by Applicants because of participation in this prequalification process. Each Applicant shall bear its own expense in connection with the preparation and submission of materials and the provision of any supplemental information requested. The City of Goldsboro shall have no liability for cost incurred by applicants in connection with the review and evaluation of prequalification materials and any findings and determinations made therefrom. All materials and information submitted during the prequalification process will become the property of City of Goldsboro and will not be returned to the Applicant.

The City of Goldsboro policy allows a bidder that has been denied prequalification to appeal. A decision by the City of Goldsboro to prequalify or not to prequalify an Applicant following appeal is final. The decision to prequalify an Applicant shall not constitute a determination that the Applicant is responsible, and such Applicant may be subsequently rejected as non-responsible on the basis of subsequently discovered information. The City of Goldsboro's action in rejecting an Applicant as nonqualified in this regard is final.

APPLICATION REQUIREMENTS

If submitting hard copy: The Applicant must complete and submit an **one original and one copy (for a total of two sets)** of the application and all associated forms and attachments, which together comprise the Application for Bidder Prequalification (referred to herein as the "application or "submittal"). The application shall be signed where indicated and submitted in a sealed envelope to the City of Goldsboro. The Applicant's name, North Carolina Contractor No., and the project name should be clearly displayed on the outside of the envelope.

The time and date of receipt shall be indicated on the sealed envelope by the City of Goldsboro. Timely submission is the sole responsibility of the Applicant. **Electronic copies (in pdf format) will be acceptable for this RFQ as long as all required information is provided.** Fax copies and responses received after the specified time will not be considered.

Responses to the RFQ must be typed or neatly printed. The information presented should be clear, complete, and concise. All attachments submitted shall be identified with the name of the Applicant. Failure to submit a response on the official City of Goldsboro forms provided for that purpose may be considered just cause for rejection of the response. Modification of any portion of the solicitation may be cause for rejection of the response. The City of Goldsboro reserves the right to decide, on a case-by-case basis, at its sole discretion, whether to reject such an application as non-responsive.

CONFIDENTIAL / PROPRIETARY INFORMATION

Submitters should give specific attention to the identification of those portions of their Statement of Qualifications which they deem to be confidential, proprietary information or trade secrets, and provide any justification of why such materials, upon request, should not be disclosed by the City of Goldsboro under North Carolina public records laws. Submitters must clearly indicate each and every section that is deemed confidential, proprietary or a trade secret as required by statute. It is NOT sufficient to preface your entire Statement of Qualifications with a proprietary statement.

If the City of Goldsboro determines that a document that the Applicant has designated "confidential" or "trade secret" is not entitled to protection from public disclosure, the City of Goldsboro will provide notice of that determination to the contact person designated by the Applicant, in any reasonable manner that the City of Goldsboro can provide such notice, at least five business days prior to its public disclosure of the document. If the Applicant does not designate anyone to receive such notice the City of Goldsboro will not have any obligation to provide any notice of a determination of non- confidentiality. If the Applicant does not designate anyone to receive such notice, or if, within five business days after the designated person receives such notice, the Applicant does not initiate judicial proceedings to protect the confidentiality of the document, the City of Goldsboro will not have any obligation to withhold the document from public disclosure.

By submitting to the City of Goldsboro a document that the Applicant designates as "confidential" or "trade secret", the Applicant agrees that in the event a third party brings any action against the City of Goldsboro or any of its officials or employees to obtain disclosure of the document, the Applicant will indemnify and hold harmless the City of Goldsboro and each organization's affected officials and employees from all costs, including attorney's fees incurred by or assessed against any defendant, of defending against such action. The Applicant also agrees that at the City of Goldsboro's request the Applicant will intervene in any such action and assume all responsibility for defending against it, and that the Applicant's failure to do so will relieve the City of Goldsboro of all further obligations to protect the confidentiality of the document.

EVALUATION

The City of Goldsboro reserves the right to waive any and all irregularities or informalities in the submittal, to reject any and all applications, and to accept the application(s) most favorable to the City of Goldsboro. In evaluating each application, the City of Goldsboro will consider, by way of illustration and not limitation, the criteria included in this section.

A. NON-POINT RATING ITEMS

An unsatisfactory rating on any item in the category titled "non-point rating items" will be considered sufficient cause to determine that an Applicant is not qualified to bid. The following are non-point criteria:

1. **Responsiveness to RFQ** - Only responsive applications will be considered and evaluated. A responsive application must be completed according to the instructions, include all required attachments and requested information and is comprised of, but is not limited to the following:
 - Application For Bidder Prequalification
 - Attachment A: Applicant Information
 - Attachment B: Details Of Past Projects
 - Attachment C: Applicant Affidavit
 - Attachment D: All Additional information as needed to provide a complete response to the RFQ

2. **Debarment Status** - By submitting an application, the Applicant certifies that neither it nor any affiliated entity is currently debarred from submitting bids or has otherwise agreed not to submit bids on contracts with any government or business entity. If the Applicant experiences a material change in its debarment status after the application is submitted and prior to the award of the contract for the project, the Applicant shall notify the City of Goldsboro of the change in writing at the time the change occurs or as soon thereafter as is reasonably practicable. If at any time during the evaluation process the Applicant is issued a debarment judgment, then this will be considered grounds for automatic disqualification.
3. **Contractor's License** - The Applicant must provide a copy of their license from the North Carolina Licensing Board for General Contractors, or provide a statement indicating that they are able to acquire one in a timely fashion consistent with the project schedule.
4. **Bonding Capacity/Statement** - Applicants must provide a signed statement from their Surety stating that, based on present circumstances, the surety will be willing to provide bid, performance and payment bonds for the Applicant in connection with the Project.
5. **Minimum Relevant Experience** - The minimum experience requirement for prequalification is successful completion as the provider of similar size and type of emergency generator equipment in a timely manner.
6. **Past Safety Performance** – If the Applicant has been found to have past unacceptable safety performance problems, the City of Goldsboro reserves the right to disqualify the Applicant.

B. POINT-RATING ITEMS

In considering a prospective bidder for prequalification, the City of Goldsboro shall be the sole judge of the firm's financial soundness, history of satisfactory project performance, whether or not the Applicant possesses a sufficient number of experienced qualified personnel at its management and supervisory level and has demonstrated a commitment on their projects to accommodating changes and disruptions in the work, all of which indicate the ability to successfully complete the Project at the lowest possible cost to City of Goldsboro in accordance with the Project schedule. *[Weighting factors for the point-rated items are shown in brackets]*

1. **Past Project Performance [25%]** - During evaluation of project performance, emphasis will be placed on recent completed projects of a similar size and nature to the Project, including Applicant's ability to meet scheduled completion dates. Preference will be given to firms with similar experience on projects performed in similar topography and site conditions to this project in Goldsboro, North Carolina. See Attachment D for Additional Information/site map.
2. **Personnel Qualifications/Experience [30%]** - The project manager and superintendent designated for this project must have experience on projects of similar size and scope. Applicant must dedicate the proposed personnel to the project and may not make changes without written approval from City of Goldsboro. The qualifications of other personnel will also be considered in this evaluation.
3. **References [Designers – 5%; Owners - 15%]** - City of Goldsboro intends to contact references listed in the application and may contact other potential references if referred to them in the course of this evaluation. City of Goldsboro reserves the right to contact any party it deems appropriate and by submitting a response to this RFQ, the Applicant releases City of Goldsboro and any references from all liability concerning this exchange of information.
4. **Financial Data [5%]** - Financial data will be reviewed and compared to industry standards.

5. **Claims/Final Resolution/Judgments [10%]** - Evaluation of this data will be based on the number of affirmative answers to the questions and the details provided in the explanation for each occurrence.
6. **Failure to Complete - Applicant [5%]** - Evaluation of the Applicant's failure to complete projects will primarily be based on the number of occurrences and the explanations for the failure to complete in conjunction with the references on those projects.
7. **Failure to Complete - Partner/Officer [5%]** - Evaluation of the Applicant's partners and/or officers to complete projects will be primarily based on the number of occurrences and the explanations for the failure to complete in conjunction with the references on those projects.
8. **Other Relevant Criteria [25%]** - Any other relevant criteria deemed to be in the best interest of City of Goldsboro may be evaluated in determining whether or not to accept an Applicant's submission. This includes, if equipment is to be supplied for the project, that it meets the minimum equipment requirements. See Attachment D.

MINORITY PARTICIPATION

The City of Goldsboro has adopted a ten percent (10%) goal for participation by minority businesses in the total value of the work for this project.

PROCUREMENT LAW

Prequalification and bidding procedures will be governed by, and administered in accordance with, applicable law in the jurisdiction of North Carolina.

ADDENDA AND INTERPRETATIONS

All requests for interpretation of the RFQ and the associated application and attachments must be emailed to Karen Brashear, Public Utilities Director, at kbrashear@goldsboronc.gov. To be given consideration, such requests must be received not later than 7 days prior to the date fixed for submittal of the application. Any and all such interpretations and any supplemental instructions or changes will be in the form of written addenda which, if issued, will be sent to all prospective applicants at the addresses furnished for such purposes, not later than 5 days prior to the date fixed for submittal of the application. Failure of any applicant to receive any such addenda shall not relieve such applicant from any obligation under its application as submitted. All addenda so issued shall become part of the RFQ and must be signed by all applicants and returned to the City of Goldsboro with the application.

NOTICE OF SUBSTANTIAL CHANGES

If the Applicant experiences a material change in its debarment status, financial condition, corporate structure or personnel after the application is submitted and prior to the award of the contract for the project, the Applicant shall notify the City of Goldsboro of the change in writing at the time the change occurs or as soon thereafter as is reasonably practicable.

Failure to notify the City of Goldsboro of any material change in the Applicant's debarment status, financial condition, corporate structure or personnel may constitute grounds for rescinding a "qualified to bid" rating or for rejection of a bid.

MISREPRESENTATION

If any applicant knowingly makes a misrepresentation in submitting information to the City of Goldsboro, or fails to provide all required information, such misrepresentation or omission will be sufficient grounds for rescinding a "qualified to bid" rating or for rejection of a bid submitted as a result of this prequalification.

COLLUSION AMONG APPLICANTS

More than one response from an individual, firm, partnership, corporation, or association under the same or different name will be rejected. Any or all responses will be rejected if there is any reason for believing that collusion exists among the applicants. Participants in such collusion may not be considered in future bids for the same work. Each prospective applicant, by submitting a response, certifies that they are not a party to any collusive action or to any action that is otherwise unlawful. Nothing in this section will preclude a firm acting as a subcontractor to be included as a subcontractor for two or more prime contractors submitting a response for the Work.

**Part 1- APPLICATION FOR BIDDER PREQUALIFICATION
COVER PAGE**

A complete set consists of this page (“Application for Bidder Prequalification Cover Page”) and Attachments A, B, and C.

1. Applicant Name: _____

Provide all names under which the Applicant does business:

Is the Applicant related to another firm as a parent, subsidiary, or affiliate? Yes___No___
If yes, attach names and addresses for all affiliated, parent and/or subsidiary companies, and state the nature of each affiliation.

2. Address: _____

3. Tax Identification Number (EIN/SSN): _____

4. Is Applicant a corporation? Yes _____ , No _____

If yes, what is the State of incorporation? _____

5. If not incorporated, specify method and date of organization: _____

If a partnership, attach partnership details (such as partner's names and individual contact information for each partner). If a Joint Venture (JV), attach the JV agreement and provide details of the intended role of each JV member, including appropriate additional attachments (at a minimum an Attachment D for each JV member).

6. Initial if: Minority Owned: _____, Women Owned: _____, Neither: _____

If so, provide certification(s) from either NCDOT or NC DOA HUB Office.

7. Specify the portions of the Work that the Applicant expects to subcontract:

8. Provide contact information including name, title, phone number and email address of the person who can respond authoritatively to any questions regarding this response:

Signed by: _____

Printed name: _____

Title: _____

Phone: _____

Email: _____

**ATTACHMENT A
APPLICANT INFORMATION**

A. NON-POINT RATING ITEMS

1. **Responsiveness to RFQ** - Responsiveness is defined in the RFQ section titled Evaluation.

2. **Debarment Status** - Has the Applicant, or any affiliate, ever been the subject of any of the following actions:
 - a. Debarment.....Yes ___ No ___
 - b. Deletion from a Prequalified Bidders ListYes ___ No ___
 - c. Other action which resembles debarmentYes ___ No ___

If yes, provide details on a separate sheet for each instance.

3. **Contractor's License** - Attach a copy of the Applicant's license from the North Carolina Licensing Board for General Contractors, or attach a statement about Applicant's ability to acquire one in a timely fashion consistent with the project schedule.

4. **Bonding Capacity/Statement** - Attach a signed statement from Applicant's Surety stating that, based on present circumstances, the surety will be willing to provide bid, performance and payment bonds for the Applicant in connection with the Project.

Total bonding capacity \$ _____

Available bonding capacity \$ _____

5. **Minimum Relevant Experience** - Include information within the list required by B.1.b below.

B. POINT RATING ITEMS

1. **Past Project Performance**
 - a. Using a separate copy of Attachment B for each project, provide details of the five or more projects that are most similar in size and scope to the Project.
 - b. Attach a list of all projects completed within the past seven years. Include the following data: project name, owner, engineer and/or construction manager, completion date, percent of work performed by your own forces, original and final contract values, and data pertinent to the Minimum Relevant Experience criterion

2. **Personnel Qualifications/Experience** - Submit a copy of the Applicant's corporate organizational chart. Provide the quantity of employees identified by discipline and project with names and titles down through field superintendents. Provide the proposed organizational chart **for this particular project** and attach resumes of key assigned personnel. Emphasize years of construction experience, last employer, last position, and experience on similar projects.

3. **References** - Reference information is addressed on Attachment B.

4. **Financial Data**

- a. Submit your organization's most recent audited financial statements for a **three-year period**. Complete balance sheets and income statements must be included. The statements shall be enclosed in a separate sealed envelope and included in the application package and it should be noted if the statement is for a parent company.
- b. Has the Applicant, or any affiliate, ever been denied bonding or had bonding revoked? Yes____No_____

If yes, provide details on a separate sheet for each instance.

5. **Claims/Final Resolution/Judgments** - Have any of the following actions occurred on, or in conjunction with, any project performed by the Applicant, any affiliate, or their officers, partners or directors in the last five years?

- a. Legal Action Implemented by Contractor against Owner.....Yes__No__
- b. Legal Action Implemented by Contractor against Subcontractor...Yes__No__
- c. Legal Action Implemented by Owner.....Yes__No__
- d. Legal Action Implemented by Subcontractor.....Yes__No__
- e. Settlement or Close Out Agreement in effect with Owner.....Yes__No__
- f. JudgmentsYes__No__
- g. Arbitrations.....Yes__No__

If the answer to any of items a. through g. above is yes, provide details on a separate sheet for each instance.

6. **Failure to Complete - Applicant** - Has your organization ever failed to complete any work awarded to it? This includes termination for the convenience of the Owner or any other reason for failing to complete a project. Yes_____No_____

If yes, provide details on a separate sheet for each instance.

7. **Failure to Complete – Partner/Officer** - Has any officer or partner of your organization ever been an officer or partner of some other organization that failed to complete a construction contract or failed to complete a construction contract handled in his or her own name? This includes termination for the convenience of the Owner or any other reason for failing to complete a project. Yes__ No__

If yes, provide details on a separate sheet for each instance.

**ATTACHMENT B
DETAILS OF PAST PROJECTS**

(Using a separate copy of this form for each project, provide details of **five** or more projects that are most similar in size and scope to the Project.)

1. Contractor Name: _____

If Contractor's Name is not the same as Applicant's name, state relationship (i.e. parent company, subsidiary, JV etc.): _____

Project Manager: _____

Superintendent: _____

2. Project Name: _____

Project Location: _____

Contract # _____ Project# _____

3. Owner: _____

Address: _____

Contact Person: _____

Contact Title & Phone # _____ () _____

4. Engineer: _____

Address: _____

Contact Person: _____

Contact Title & Phone# _____ () _____

5. Construction Manager (if any): _____

Address: _____

Contact Person: _____

Contact Title & Phone # _____ () _____

6. Contract Dates (completion dates should reflect substantial completion - if not indicate)

Notice to Proceed: _____

Contractual Completion: _____

Actual Completion: _____

7. Description of Project (see Minimum Relevant Experience and Past Project performance evaluation criteria): _____

8. Original Contract Value: \$ _____
Final Contract Value: \$ _____
Value of Change Orders to Date: \$ _____
Outstanding Claims to Date: \$ _____

9. Bonding Company: _____
Address: _____
Contact Person: _____
Contact Title & Phone # _____ () _____

10. List the three largest subcontractors on this project in terms of percentage of participation. Attach additional information regarding subcontractors, regardless of the value of the work, whose involvement in this project would demonstrate experience with construction activities to be expected in an urban setting.

a. Subcontractor: _____
Trade: _____ Participation: _____ %
Address: _____
Contact Person: _____
Contact Title & Phone # _____ () _____

b. Subcontractor: _____
Trade: _____ Participation: _____ %
Address: _____
Contact Person: _____
Contact Title & Phone # _____ () _____

c. Subcontractor: _____
Trade: _____ Participation: _____ %
Address: _____
Contact Person: _____
Contact Title & Phone # _____ () _____

**ATTACHMENT C
APPLICANT AFFIDAVIT**

The undersigned hereby attests under penalty of perjury and by personal knowledge to the following:

1. The contents of the Application for Bidder Prequalification (including all submitted attachments and other documentation) are true and correct.
2. To the best of my knowledge neither the Applicant, nor its agents, affiliates, partners, employees, officers, directors or other associates of any kind, have colluded with any individual or entity on behalf of the Applicant, or themselves, to produce an unfair advantage over others or to gain favoritism in the award of any contract resulting from this RFQ.
3. By responding to this RFQ and submitting the Application for Bidder Prequalification also referred to as the submittal), the Applicant agrees to indemnify and hold harmless all parties to this RFQ, including, but not limited to, the Owner, Engineer and Construction Manager for any conceivable damages arising therefrom; and affirms that no compensation is expected as a result of the preparation of said response.
4. Applicant agrees to use the submitted personnel for the duration of this project. Any changes in the submitted personnel must be approved in writing by the City of Goldsboro.

Applicant's Name: _____

Officer's Signature: _____

Printed name and title: _____

Telephone No: _____

Affix Corporate Seal

Witnessed by: _____

Witness printed name and title: _____

Date Signed: _____

ATTACHMENT D
ADDITIONAL REQUIRED INFORMATION

A. Description of Additional Required Information for the completion RFQ:

CITY OF GOLDSBORO
PART 2: ADVERTISEMENT TO BIDDERS*

*Bidders must have been previously prequalified
by the City of Goldsboro through the Part 1 ROQ process.

Pursuant to General Statutes of North Carolina, Section 143-129, sealed bids are invited and will be received by the City of Goldsboro until 2:00 p.m. on Tuesday, **the 31st day of May, 2016**, at which time a meeting in the Large Conference Room, City Hall, 200 North Center Street, Goldsboro, NC, the sealed proposals will be publicly opened for the provision of the following:

**INFORMAL BID #2016-001_
NEUSE RIVER PUMP STATION EMERGENCY GENERATOR PROJECT**

Bids must be enclosed in a sealed envelope addressed to the City Finance Department, P.O. Drawer A, City of Goldsboro, North Carolina 27533-9701. The outside of the envelope must be marked "Informal Bid #2016-001".

**BID REQUEST # IFB 2016-001, "NEUSE RIVER PUMP STATION EMERGENCY
GENERATOR PROJECT".**

All proposals must be made on the blank forms provided for that purpose. Scope of works will be on file in the office of the Finance Department, Goldsboro, North Carolina and on the City of Goldsboro website www.goldsboronc.gov under the Bid Listings link. The right is reserved to reject any or all bids, to add or delete work, to waive informalities, and to award contract which, in the opinion of the City, appears to be in its best interest. The right is reserved to hold any or all proposals for a period of sixty (60) days from the opening thereof.

The City of Goldsboro has an affirmative policy of fostering, promoting and conducting business with women and minority owned enterprises. Women and minority contractors are encouraged to participate in the pre-qualification process.

This the 3rd day of May, 2016.
THE CITY OF GOLDSBORO, NC
Kaye Scott
Finance Director

Bid No. IFB 2016-001



Part 2: REQUEST FOR BIDS

NEUSE RIVER PUMP STATION EMERGENCY GENERATOR PROJECT

The City of Goldsboro is soliciting separate bids to purchase a 475kW emergency generator and Automatic Transfer Switch to be delivered to the Neuse River Pump Station, Goldsboro, North Carolina. All bids should be submitted to **Finance Director, Attention: Kaye Scott, P.O. Drawer A, Goldsboro, NC 27533-9701 no later than 2:00 PM on May 31, 2016**. Bids will be opened at 2:00 PM on May 31, 2016 in the upstairs Large Conference Room, Room 206 at the Goldsboro City Hall, 200 N. Center Street, Goldsboro, NC.

Scope of Work:

The terms and conditions are listed herein for the purchase of a 475 kW emergency generator and Automatic Transfer Switch (ATS) system. The generator set system Supplier shall deliver all equipment to the to the Neuse River Pump Station site in Goldsboro, NC after coordinating with the Owner (City) and the Installation Contractor. If you have questions, contact Karen Brashear, Public Utilities Director, (919) 735-3329, ext. 101 or by e-mail kbrashear@goldsboronc.gov

Term of Contract:

BIDDER QUALIFICATIONS

Only bids from Contractors established in performing this type of service and qualified to handle jobs of this type may be considered. All Bidders for this project shall have already been prequalified by the City of Goldsboro and previously submitted an Application for Prequalification and the required information requests. Only those bidders that have been prequalified by the City will have their bid proposals considered for this project. Prior to award the City of Goldsboro reserves the right to investigate a bidder's ability to fulfill the requirements of the contract.

BID SECURITY

The required security must be in the form of a certified check made payable to the City of Goldsboro or a bid bond issued by a surety licensed to conduct business in North Carolina and named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Department. The Bid Security of the successful Bidder will be retained until he has executed the Contract and furnished the required Contract Security, whereupon it will be returned; if he fails to execute and deliver the Contract and furnish the required

Contract Security within ten (10) days of the Notice of Award, the City of Goldsboro may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. The Bid Security of any Bidder whom the City of Goldsboro believes to have a reasonable chance of receiving the award may be retained by the City until the earlier part of the seventh day after the executed Contract is delivered by Owner to Contractor and the required Contract Security is furnished or the sixty-first day after the Bid opening. Bid Security of other Bidders will be returned within seven days of the Bid opening except that Bid Bonds will only be returned upon request. Revised Bids submitted before the opening of Bids, if representing an increase in excess of two percent (2%) of the original Bid, must have the Bid guaranty adjusted accordingly; otherwise, the Bid will not be considered.

INTERPRETATIONS AND ADDENDA

All questions about the meaning or intent of the bidding documents are to be submitted to the Public Utilities Director in writing. The person submitting the request shall be responsible for its prompt delivery. Interpretations or clarifications considered necessary in response to such questions will be issued by Addenda and e-mailed all bidding documents holders. Questions received less than 7 days prior to the date for opening bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretation or clarifications will be without legal effect. Addenda may be issued to clarify, correct, or change the bidding documents as deemed advisable by the City of Goldsboro. Failure of Bidder to receive any Addenda shall not relieve Bidder from any obligation of the bid as submitted.

EQUAL OR EQUIVALENT ITEMS; ALTERNATES

Bidding documents have been prepared using specified manufacturers (brand names) for certain materials and equipment. The manufacturers named are used only to denote the quality standards for the materials or equipment desired and do not restrict Bidders to a specific manufacturer or specific name; They are used only to set forth and convey to Bidders the general style, type, character, and quality of materials or equipment desired. Bids shall be based on the named brand materials, or those approved by ENGINEER and identified by Addendum prior to opening of Bids as equal or equivalent items. Written request for pre-approval must be submitted to and received by the Public Utilities Director at least 14 calendar days prior to the date for receipt of Bids. Each such written request shall be by completion of a REQUEST FOR USE OF EQUAL OR EQUIVALENT ITEM form (p. 14) as included at the end of these Instructions to Bidders. The decision of approval or disapproval of the proposed item will be final. Items acceptable to the Public Utilities Director will be described to all bidding documents holders by Addendum issued at least 7 days prior to the date of the receipt of Bids. Bidders shall submit alternate Bids for providing a particular manufacturer's material or equipment under the contract in accordance with the requirements on the Bid form.

SUBCONTRACTORS

Contractor shall not award work to Subcontractors in excess of 50% of the contract price. The City of Goldsboro shall require a list of the identity(ies) of any Subcontractors with proposed Contracts for work totaling \$10,000 or more to be submitted to the Public Utilities Director at the time of the Bid submittal with an experience statement with pertinent information regarding similar projects and other evidence of qualification for each Subcontractor. If City of Goldsboro, after due investigation, has reasonable objection to any proposed Subcontractor, City may, before the Notice of Award is given,

request apparent Successful Bidder to submit a substitute, without an increase in Bid price.

AFFIDAVIT OF COMPLIANCE WITH NORTH CAROLINA E-VERIFY STATUTES

“E-Verify” means the federal E-Verify program operated by the United States Dept. of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law. A North Carolina E-Verify form is included at the end of these Instructions of Bidders and is to be completed and submitted with the bid proposal for the Contractor and any Subcontractors.

MODIFICATION AND WITHDRAWAL OF BIDS

Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

OPERATION OF TOOLS AND EQUIPMENT

The Contractor shall operate the tools and equipment in a safe manner and at such times so as not to create a hazard. The City of Goldsboro will not be held responsible for equipment or materials left at the sites unattended.

PROSECUTION OF THE WORK

If the Contractor fails to prosecute the work as directed or fails to perform the work in a manner satisfactory to the City of Goldsboro, the work may be performed with other forces. The cost of the work so performed will be deducted from any monies due the Contractor. The work shall include furnishing all equipment, implements, tools, materials, transportation, labor and supervision necessary for the prosecution and completion of the work as described in the Technical Specifications for this project. It shall be constructed in compliance with all OSHA, local, state, and federal codes and regulations. Work shall begin as soon as possible after award of bid, contract execution, and issuance of a Notice to Proceed. The work must be completed within one hundred and fifty (150) days.

Once construction begins, there may be days that are unsuitable for work within the cut-off channel due to unsuitable conditions such as rainfall events exceeding ½” within the daylight work period or water levels that overtop the existing flood control structure at 56 feet MSL elevation (see a). The days that are unsuitable for construction will not be counted as part of the 150 day construction period.

INSPECTION/ CANCELLATION

All work shall be subject to inspection by the Public Utilities Director or Inspections Division of the City of Goldsboro, or contracted construction inspector at any time. Routinely, periodic inspections will be done of the completed work. If the Contractor consistently performs unsatisfactory work the contract may be canceled upon fifteen (15) days written notice.

INSURANCE AND INDEMNITY

The Contractor shall indemnify and save harmless the City of Goldsboro and its officers, agents, and employees from all suits, actions or claims of any character brought for any injury or damages received or sustained by any person, persons, or property by reason any act of the Contractor, its agents or employees, in the performance of the contract. The Contractor shall furnish a Certificate of Liability Insurance from an insurance company, licensed to do business in the State of North Carolina within ten (10) days after award of the contract.

AFFIRMATIVE ACTION

The Contractor will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped and concerning the treatment of all employees with regard to discrimination by reason or race, color, religion, sex, national origin, or physical handicap. The City of Goldsboro invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled and disabled business enterprises.

IRAN DIVESTMENT ACT CERTIFICATION

The Contractor certifies that it is not on the Final Divestment List as created by the State Treasurer pursuant to N.C.G. S. Chapter 147 Article 6E. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. §147 Article 6E Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List. The Bidder will be responsible for an online search of the most current **Final Divestment List** and **Iran Parent and Subsidiary Guidance List** and certifying the form included in bid package. The list can be found at www.nctreasurer.com and listed on the right-side of page under "Current Features" click Iran Divestment Act Resources.

INVOICING/PAYMENT

Upon completion of the project, Contractor shall submit to the City of Goldsboro an invoice for payment. Please indicate separately sales tax for materials. Payment shall be made within thirty (30) days.

Bid No. IFB 2016-001

COST PROPOSAL SHEET FOR CITY OF GOLDSBORO

NEUSE RIVER PUMP STATION EMERGENCY GENERATOR PROJECT

Lump Sum for generator and ATS system
as described in the bid specifications:

\$ _____

Estimated date to begin project: _____

Estimated date of completion: _____

(Printed name)

(Signature)

(Date)

Company: _____

Address: _____

Phone No. : _____

e-mail: _____

Acknowledge of Receipt of Addenda

<u>Addenda #</u>	<u>Addendum Date</u>	<u>Signature Acknowledging Receipt</u>
• Addendum 1	_____	_____
• Addendum 2	_____	_____
• Addendum 3	_____	_____

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify on its bid (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. Also, list the good faith efforts (Affidavit A) made to solicit minority participation in the bid effort

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (B) to that effect in lieu of Affidavit (A) required above. The MB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit D is not necessary;

OR

If less than the 10% goal, Affidavit (D) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract

NOTE: Bidders must always submit with their bid the Identification of Minority Business Participation Form listing all MB contractors, vendors, and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A or Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina

**--AFFIDAVIT B-- Intent to Perform Contract
with Own Workforce.**

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____
_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20_____

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by Minority Firms

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the _____
 (Name of Bidder)

(Project Name)

Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets if required

Name and Phone Number	*Minority Category	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

(Project Name)

Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of ____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

(Attach additional sheets if required)

Name and Phone Number	*Minority Category	Work Description	Dollar Value

*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (D)

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

Bid Bond

A (certified check) (bid bond) in the amount of _____dollars (\$_____) the total of such amount being not less than five percent (5%) of the total amount of the bid submitted under this Proposal, as required by the Invitation to Bid, is hereto attached in the space provided below:

(PIN CERTIFIED CHECK OR BID BOND IN THIS SPACE)

The undersigned hereby certifies that he is licensed as a General Contractor under the provisions of the Act of the North Carolina Legislature, Session of 1925, regulating the practice of General Contracting, and that the number of his license under which he is now operating is _____. It is further agreed that the Bidder is to complete work included in the award within the time and under the conditions set forth, and that if default is made in such completion and conditions, the City shall deduct as liquidated damages the sum of Five Hundred Dollars (\$500.00) per day for each and every calendar day that the completion of the contract is delayed and above the contract time or conditions not met as set forth below. The undersigned agrees to begin work on a date to be set by the Engineer after contract award has been made and to complete all work included in the project within sixty (60) days from the date of Notice to Proceed. Time is of the essence in the completion of this contract. The schedules set forth above will be strictly enforced by the City due to the inconvenience and expense any delays will cost the City and abutting property owners. The City reserves the right to terminate this contract as provided for in GC 1-48, if the Contractor fails to complete any segment of said work in accordance with the above schedule.

The receipt of the following Addenda is hereby acknowledged:

Number _____ Date _____
Number _____ Date _____
Number _____ Date _____

Respectfully submitted the _____ day of _____,
2012.

Signature of Person, Firm, or Corporation Making Bid

By: _____

(CORPORATE SEAL) Address: _____

REQUEST FOR USE OF OR EQUAL OR EQUIVALENT ITEM

(To be submitted to and received by the Public Utilities Director at least 14 calendar days prior to the date for receipt of Bids.)

TO: _____ DATE: _____

PROJECT: _____

RE: _____ SECTION NO: _____

SECTION TITLE: _____ PAGE: _____ PARAGRAPH: _____

- A. The undersigned request consideration of the following as an equal or equivalent to the above in accordance with the Instruction to Bidders (Section "EQUAL OR EQUIVALENT ITEMS; ALTERNATES").

Description: _____

Manufacturer: _____

Address: _____

Phone: _____

- B. Attached data includes item description, specifications, drawings, photographs, references, past problems and remedies, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
- C. Attached data includes a description of changes to the Contract Documents to accommodate the proposed item.
- D. The undersigned certifies:
1. Proposed item has been fully investigated and determined to be equal or equivalent in all respects to those specified.
 2. Proposed item does not affect dimensions and functional clearances.
 3. Use of proposed item will not affect interchangeability and compatibility, nor limit competitive bidding on future works.



STATE OF NORTH CAROLINA

CITY OF GOLDSBORO

AFFIDAVIT of COMPLIANCE
with N.C. E-Verify Statutes

I, _____ (hereinafter the “Affiant”), duly authorized by and on behalf of _____ (hereinafter the “Employer”) after being first duly sworn deposes and says as follows:

1. I am the _____ (President, Manager, CEO, etc.) of the Employer and possess the full authority to speak for and on behalf of the Employer identified above.
2. Employer understands that “E-Verify” means the federal E-Verify program operated by the United States Dept. of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §143-133.3 (c)(2).
3. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in the State. (mark Yes or No)
 - a. YES _____, or
 - b. NO _____
4. All subcontractors engaged by or to be engaged by Employer have or will have likewise complied with the provisions of NCGS §143-133.3 (c) (2).
5. Employer shall keep the City of Goldsboro informed of any change in its status pursuant to Article 2 of Chapter 64 of the North Carolina General Statutes.

This the _____ day of _____, 20_____.

Signature of Affiant
Print or Type Name: _____

STATE OF NORTH CAROLINA
COUNTY OF _____

Sworn to and subscribed before me, this the _____
day of _____, 20_____.

Notary Public
My commission expires: _____

(Affix Official/Notarial Seal)



City of Goldsboro

Name of Counterparty: _____
(Vendor or Bidder) _____

**IRAN DIVESTMENT ACT CERTIFICATION
REQUIRED BY N.C.G.S. Chapter 147 Article 6E**

As of the date listed below, the vendor or bidder listed above is not listed on the Final Divestment List created by the State Treasurer pursuant to N.C.G. S. Chapter 147 Article 6E

The undersigned hereby certifies that he or she is authorized by the vendor or bidder listed above to make the foregoing statement.



Signature Date

Printed Name Title

NEUSE RIVER PUMP STATION ENGINE GENERATOR SYSTEM

REV: 2-29-16-A

PART 1 GENERAL

1.1 SUMMARY

- A This section includes the following items from a single supplier:
 - 1. Engine Generator Set.
 - 2. Enclosure
 - 3. Fuel Tank
 - 4. Related Accessories as specified
- B Related Requirements
 - 1. It is the intent of this specification to secure an engine-driven generator set system that has been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation. Installation will be performed by others hereinafter called Installation Contractor.
 - 2. Any exceptions to the published specifications shall be subject to the approval of the Owner and submitted minimum 10 days prior to the closing of the bid with a line by line summary description of all the items of compliance, any items that have been omitted or have been taken exception to, and a complete description of all deviations.
 - 3. It is the intent of this specification to secure a generator set system that has been tested during design verification, in production, and at the final job site. The generator set system will be a commercial design and will be complete with all of the necessary accessories for complete installation as specified herein. The equipment supplied shall meet the requirements of the National Electrical Code and applicable local codes and regulations.
- C All equipment shall be new and of current production by an international, power system manufacturer of generators, transfer switches, and paralleling switchgear. The manufacture shall be a supplier of a complete and coordinated system. There will be single-source responsibility for warranty, parts, and service through a factory-authorized representative with factory-trained technicians.
- D Bidders shall include with their bid documents manufacturer's specification sheets, dimensional data and a statement indicating any deviations and/or exceptions this specification.

1.2 SUBMITTALS

- A Action Submittals
 - 1. Product Data
 - a The submittal shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specific
- B Informational Submittal
 - 1. Certificates
 - a The generator set shall be listed to UL 2200 or submitted to an independent third party certification process to verify compliance as installed.
 - 2. Test and Evaluation Reports
 - 3. Manufacturer's Instruction
 - 4. Source Quality Control Submittals
 - 5. Field or Site Quality Control
 - 6. Manufacturer's Report
 - 7. Special Procedure Submittal
 - 8. Qualification Statement
- C Closeout Submittal
 - 1. Maintenance Contracts
 - 2. Operation And Maintenance Data

3. Warranty Documentation
 4. Record Documentation
 5. Software
- D Maintenance Material Submittals
1. Provide (3) three copies in binders and (3) three digital copies of the following documents and manuals for the engine, the alternator, and the generator set accessories:
 - a) Operation Manuals
 - b) Parts Catalogs
 - c) Service Manuals
 - d) Installation Manuals
 - e) Wiring Diagrams
 - f) NFPA-110 Startup and Test Procedure.

1.3 Quality Assurance

- A Regulatory Agency
1. The generator set shall conform to the requirements of the following codes and standards:
 - a CSA C22.2, No. 14-M91 Industrial Control Equipment.
 - b EN50082-2, Electromagnetic Compatibility-Generic Immunity Requirements, Part 2: Industrial.
 - c EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
 - d IEC8528 part 4, Control Systems for Generator Sets.
 - e IEC Std 61000-2 and 61000-3 for susceptibility, 61000-6 radiated and conducted electromagnetic emissions.
 - f IEEE446 Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
 - g NFPA 70, National Electrical Code, Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
 - h NFPA 99, Essential Electrical Systems for Health Care Facilities.
 - i NFPA 110, Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit. Component level type tests will not substitute for this requirement.
 2. Qualifications
 - a The equipment shall be produced by a manufacturer who is ISO 9001 certified for the design, development, production and service of its complete product line.
 - b The power system shall be produced by a manufacturer who has produced this type of equipment for a period of at least 10 years and who maintains a service organization available twenty-four hours a day throughout the year.
 3. Manufactures
 4. The power system shall be furnished by a single manufacturer who shall be responsible for the design, coordination, and testing of the complete system. The entire system shall be installed by others as specified elsewhere.

1.4 Delivery, Storage, and Handling

- A Delivery and Acceptance Requirements: The generator set system supplier shall deliver all equipment to the site after coordinating with the Owner and Installation Contractor.
- B Storage and Handling Requirements shall be the responsibility of the Installation Contractor.
- C Packaging Waste Management shall be removed from the site and properly disposed by the Installation Contractor.

1.5 Field or Site Conditions

- A Ambient Conditions
1. Engine- generator set shall operate in the following conditions without any damage to the unit or its loads.
 - a Ambient Temperature: 77 °F
 - b Altitude : 500 ft
 - c Relative Humidity: 95%

- B Existing Conditions: The Installation Contractor shall visit the site prior to bidding to assess the site conditions.

1.6 Warranty and Maintenance

- A Manufacture Warranty
 - 1. The generator set shall include a standard warranty covering two (2) years or 2000 hours, whichever occurs first, to guarantee against defective material and workmanship in accordance with the manufacturer's published warranty from the date of initial startup.
- B The generator set manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall regularly engage in maintenance contract programs to perform preventive maintenance and service on equipment similar to that specified. A (2) Two Year, Semi-annual service agreement in accordance with manufacturer's recommendations shall be included and shall include system operation under simulated operating conditions; adjustment to the generator set, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and functional tests performed on all systems.

PART 2 PRODUCTS

2.1 Equipment

- A Equipment
 - 1. Caterpillar, Cummins and Kohler Generator Systems will be acceptable provided they comply with this specification. The generator set shall be equal to a Kohler model 500REOZJ with a 5M4024 alternator. It shall provide 593.75 kVA and 475.00 kW when operating at 277/480 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 77 °F and a maximum elevation of 500 ft above sea level. The standby rating shall be available for the duration of the outage.
- B Engine
 - 1. The minimum 13.5 liter displacement engine shall deliver a minimum of 755 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - a. Electronic isochronous governor capable of 0.25% steady-state frequency regulation
 - b. 24-volt positive-engagement solenoid shift-starting motor
 - c. 60-ampere automatic battery charging alternator with a solid-state voltage regulation
 - d. Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain
 - e. Dry-type replaceable air cleaner elements for normal applications
 - f. Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel
 - g. The turbocharged engine shall be fueled by diesel
 - h. Replaceable sleeved cylinders
 - i. The engine shall have a minimum of 6 cylinders and be liquid-cooled
 - 2. The engine shall be EPA certified from the factory
 - 3. The generator must accept rated load in one-step.
- C Cooling System
 - 1. The engine shall be liquid-cooled by a closed loop, unit mounted radiator rated to operate the generator set at full load at an ambient temperature of 50 degrees C (122 degrees F). The radiator fan and other rotating engine parts shall be guarded against accidental contact.
- D Standard Air Cleaner
 - 1. The air cleaner shall provide engine air filtration which meets the engine manufacturer's specifications under typical operating conditions.
- E Battery
 - 1. Each genset requires a BCI group 31 batteries which must meet the engine manufactures' specifications for the ambient conditions specified in Part 1 Project Conditions and shall comply with the NFPA requirements for engine cranking cycles. Each battery shall be rated according to SAE Standards J-537 with a minimum cold cranking amp of 950 amps and a minimum reserve capacity of 185 Minutes at 80F. The battery plates shall be constructed of a Calcium-Lead alloy to provide long waterless operation and extended battery life. The battery elements must be anchor-locked with full-frame grids and tight-packed commercial plates to resist the effects of vibration. The battery must contain a handle to aid in lifting and the case must be

constructed of polypropylene to resist breakage and extend service life. Removable cell covers shall be provided to allow for checking of electrolyte specific gravity.

2. Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.

F Generator Set System Enclosure

1. Sound Attenuated Enclosure

- a The generator set shall be supplied with a Sound Attenuated Enclosure, providing a sound level of 76 dB(A) at 7 meters (23 feet) using acoustic insulation and acoustic-lined inlet hoods, and using acoustic insulation and acoustic-lined inlet hoods, constructed from a minimum of 0.125 inch thick formed heavy duty aluminum panels. The acoustic insulation used shall meet UL 94 HF1 flammability classification. The enclosure shall be manufactured from bolted panels to facilitate service, future modifications, or field replacement. The enclosure shall use external vertical air inlet and outlet hoods with 90 degree angles to discharge air up and reduce noise. The enclosure shall have an integral rodent guard and skid end caps and shall have bracing to meet 241 kph (150 mph) wind loading.
- b The enclosure components and skid shall be cleaned with a two-stage alkaline cleaning process to remove grease, grit, and grime from parts. Components shall then be subjected to a Zirconium-based conversion coating process to prepare the metal for electro coat (e-coat) adhesion. All enclosure parts shall receive a 100% epoxy primer electro coat (e-coat) with high-edge protection. Following the e-coat process, the parts shall be finish coated with powder baked paint for superior finish, durability, and appearance with an industrial finish that provides heavy duty durability in harsh conditions, and is fade-, scratch- and corrosion-resistant.
- c The enclosure must surpass a 3,000 hour salt spray corrosion test per ASTM B-1117.
- d Enclosures will be finished in the manufacturer's standard color.
- e The enclosures shall allow the generator set to operate at full load in an ambient temperature of 50°C with no additional derating of the electrical output of the generator set.
- f Enclosures shall be equipped with sufficient side and end doors to allow access for operation, inspection, and service of the unit and all options. Minimum requirements are two doors per side. When the generator set controller faces the rear of the generator set, an additional rear facing door is required. Access to the controller and main line circuit breaker shall meet the requirements of the National Electric Code.
- g Doors shall be fitted with hinges, hardware, and the doors shall be removable.
- h Doors shall be equipped with lockable latches. Locks shall be keyed alike. Door locks shall be recessed to minimize potential of damage to door/enclosure.
- i A duct between the radiator and air outlet shall be provided to prevent re-circulation of hot air.
- j The complete exhaust system shall be internal to the enclosure.
- k The critical silencer shall be fitted with a tailpipe and rain cap.
- l The generator set enclosure shall be furnished with two-(2) DC lights powered by the starting battery on a fused circuit with a 0-60 minute "No-Lock-On" timer.
- m The generator set enclosure shall be furnished with a 30 Amp, 480vac disconnect and transformer (480 to 240 volt, single phase) to power the load center from an existing feeder located inside the existing building.
- n The generator set enclosure shall be furnished with a load center 120/240VAC single phase, 100 amp max with main and 12(minimum) branch circuits. Branch circuit breakers shall be sized to power the enclosure loads.
- o Light switch controls located on both sides of enclosure at doorways.
- p AC lights (minimum 2) vapor tight and gasketed shall be wired into the load center.
- q Duplex GFI receptacles, one on both sides of enclosure shall be wired into the load center.
- r The battery charger shall be wired into the load center.
- s The block heater(s) shall be wired into the load center.

G Fuel oil storage

1. Double Wall Secondary Containment Sub-base Fuel Tank

- a The generator set shall be supplied with a sub-base fuel tank of sufficient usable capacity to provide 72 hours (min 2644 gallons) at generator set full rated load operation.
- b The sub-base fuel system shall be listed under UL 142, subsection entitled Special Purpose Tanks EFVT category, and will bear their mark of UL Approval according to their particular classification.
- c .3. The above ground steel secondary containment rectangular tank for use as a sub base for diesel generators is manufactured and intended to be installed in accordance with the Flammable and Combustible Liquids Code—NFPA 30, the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines—NFPA 37, and Emergency and Standby Power Systems—NFPA 110.
- d The primary tank shall be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.

- e Steel Channel Support System. Reinforced steel box channel for generator support, with a load rating of 5,000 lbs. per generator mounting hole location. Full height gussets at either end of channel and at generator mounting holes shall be utilized.
 - f Exterior Finish. The sub-base tank exterior finish shall be a polyurea-textured rubberized coating.
 - g Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4" (3 cm.) nominal inside diameter.
 - h The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. The vent is to be spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. The emergency relief vent is to be sized to accommodate the total venting capacity of both normal and emergency vents.
 - i There shall be a 2" NPT opening within the primary tank and lockable manual fill cap.
 - j A direct reading, UL listed, magnetic fuel level gauge with a hermetically sealed, vacuum tested dial, to eliminate fogging, shall be provided.
 - k A float switch for remote or local annunciation of a (50% standard) low fuel level condition shall be supplied.
 - l Alarm fuel tank panel shall be installed that will display high, low, and fuel leak.
 - m Fuel in basin switch shall be installed in the containment basin of the fuel tank. This switch will close a set of contacts if fuel leaks from the main tank and into the containment basin.
 - n High fuel level switch shall be installed in the tank and the contacts will close when the fuel level reaches 90%.
 - o Five (5) Gallon Fill/Spill Containment- Tank Mounted fill/spill container, contains fuel overflow spills that may occur during fill-up.
 - p Fuel fill option – The fuel fill shall be equipped with a 5 gallon above ground fill/spill container that contains fuel overflow spills that may occur during fill-ups and the normal vent will be extended to 12' above the grade.
 - q Unit shall have stairs and platform for generator access on both sides and back when a rear enclosure door is included.
- H Controller
1. Generator Set Controller
 - a. The generator set controller shall be a microprocessor based control system that will provide automatic starting, system monitoring, and protection. The controller system shall also provide local monitoring and remote monitoring. The control system shall be capable of PC based updating of all necessary parameters, firmware, and software.
 - b. The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.
 2. Codes and Standards
 - a. The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.
 - b. The controller shall meet NFPA 99 and NEC requirements.
 - c. The controller shall be UL 508 listed.
 - a. The UL controller shall be a standard offering in the manufacturer's controller product line.
 - b. The controller shall support 12-volt and 24volt starting systems.
 - c. The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
 - d. The controller shall mount on the generator or remotely within 40 feet with viewable access.
 3. Controller Buttons, Display and Components
 - a. The generator set controller shall include the following features and functions:
 1. Push button Master Control buttons. The buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - a. Run Mode: When in the run mode the generator set shall start as directed by the operator.
 - b. Off/Reset Mode: When in the Off/Reset mode the generator set shall stop, the reset shall reset all faults, allowing for the restarting of the generator set after shutdown.
 - c. Auto Mode: When in Auto the mode the generator set shall be ready to accept a signal from a remote device.

2. Emergency Stop Switch. Both controller mounted and remote (Exterior mounted on Generator Set Enclosure as directed by the Owner) stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for any automatic remote starting.
 3. Push Button/Rotary Selector dial. This dial shall be used for selection of all Menus and sub-menus. Rotating the dial moves you through the menus, pushing the dial selects the menu and function/features in that menu. Pushing the button selects the feature/function and sub-menus.
 4. Digital Display. The digital display shall be alphanumeric, with 2 lines of data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall display status of all faults and warnings. The display shall also display any engine faults. While the generator set is running, the display shall scroll all-important information across the screen for ease of operator use. The scroll can be stopped by pushing the rotary dial. The display shall fall asleep when the generator set is not running and will wake-up when the generator set starts or the rotary dial is depressed.
 5. Fault Light. The controller shall have an annunciator fault light that glows red for faults and yellow for warnings. These faults and warnings shall be displayed in the digital display. The fault light will also glow yellow when not in AUTO.
 6. Alarm Horn. The controller shall provide an alarm horn that sounds when any faults or warnings are present. The horn shall also sound when the controller is not in the AUTO mode.
 7. Alarm Silence/Lamp Test Button. When this button is depressed, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not AUTO.
 8. USB Connection. The controller shall have a USB connection on the face of the controller. This connection shall allow for updating of all software and firmware. This port shall also allow for all servicing of generator set parameters, fault diagnostics and viewing of all controller information via use a laptop computer.
 9. Dedicated user inputs. The controller shall have dedicated inputs for remote emergency stop switch, remote 2-wire star for transfer switch and auxiliary shutdown.
 10. The controller shall have auto resettable circuit protection integral on the circuit board.
4. System Controller Monitoring and Status Features and Functions
- a. The generator controller shall display and monitor the following engine and alternator functions and allow adjustments of certain parameters at the controller:
 1. Overview menu
 - a. Active shutdowns and warnings shall be displayed if present and without the need of operator interface
 - b. Engine runtime with total hours
 - c. Average line to line voltage
 - d. Coolant temperature
 - e. Fuel level or pressure
 - f. Oil pressure
 - g. Battery voltage
 - h. Software version
 - i. Frequency
 - j. Average current
 2. Engine metering menu.
 - a. Engine speed
 - b. Oil pressure
 - c. Coolant temperature
 - d. Battery voltage
 3. Generator metering menu.
 - a. Total power in VA
 - b. Total power in W
 - c. Rated power % used
 - d. Voltage L-L and L-N for all phases
 - e. Current L1, L2, L3
 - f. Frequency

4. Generator set information.
 - a. Generator set model number
 - b. Generator set serial number
 - c. Controller set number
 5. Generator set run time.
 - a. Engine run time total hours
 - b. Engine loaded total hours
 - c. Number of engine starts
 - d. Total energy in kW
 6. Generator set system
 - a. System voltage
 - b. System frequency 50/60Hz
 - c. System phase, single/three phase
 - d. Power rating kW
 - e. Amperage rating
 - f. Power type standby/prime
 - g. Measurement units, metric/English units adjustable
 - h. Alarm silence, always or auto only
 7. Generator set calibration, the following are adjustable at the controller.
 - a. Voltage L-L and L-N all phases
 - b. Current L1, L2, L3
 - c. Reset all calibrations
 8. Voltage regulation, +/-0.5% regulation, the following is adjustable at the controller.
 - a. Voltage Adjustable +/- 10%
 9. Digital and Analog Inputs and outputs
 - a. Displays settings and status
 10. Event Log
 - a. Stores event history, up to 1000 events
5. Controller Engine control features and functions
 - a. Automatic restart - the controller has automatic restart feature that initiates the start routine and re-crank after a failed start attempt.
 - b. Cyclic cranking - the controller shall have programmable cyclic cranking
 - c. Engine starting aid - the controller shall have the capability of providing control for an optional engine starting aid.
 - d. The control system shall include time delays for engine start and cool down.
 - e. The control system shall interface with the engine ECM and display engine fault codes and warnings. The ECM shall also include sender failure monitoring to help distinguish between failed senders and actual failure conditions.
 - f. The controller shall monitor and display engine governor functions with include steady state and transient frequency monitoring
 6. Controller Alternator control features and functions
 - a. Integrated hybrid voltage regulator. The system shall have integral microprocessor based voltage regulator system that provides +/- 5% voltage regulation, no-load to full load with three phase sensing. The system is prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum +/- 10% adjustable of nominal voltage.
 - b. AC output voltage regulator adjustment. The system shall allow for adjustment of the integral voltage regulator with maximum of +/- 10% adjustment of the system voltage.
 - c. Alternator thermal overload protection. The system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
 - d. Power metering. The controller digitally displays power metering of kW and kVA.
 7. Additional control features and functions
 - a. Event logging. The controller keeps a record of up to 1000 events, for warning and shutdown faults. This fault information becomes a stored record of systems events and can be reset.
 - b. Historical data logging. The controller total number of generator set successful start shall be recorded and displayed.
 - c. Programmable access. The control system shall include a USB port that gives service technicians the ability to provide software and firmware upgrades. The system shall also be capable of allowing setting of all critical parameters using the service software and a laptop

computer. All parameters and setting should be capable to being stored on a laptop for future upgrades of printing for analysis.

8. Generator Set Warning, Shutdown Alarm and Status

- a. The generator set shall have alarms and status indication lamps that show non-automatic status and warning and shutdown conditions. The controller shall indicate with a warning lamp and or alarm and on the digital display screen any shutdown, warning or engine fault condition that exists in the generator set system. The following alarms and shutdowns shall exist as a minimum. Additionally, a factory installed common alarm output rated 10 Amps, Normally Open, for connection to the Owner's SCADA System shall be included. Items marked with (RA) shall be included for SCADA connection by the Installation Contractor).

1. Engine functions

- a. Critical high fuel level (alarm)
- b. ECM communication loss (shutdown)
- c. ECM diagnostics (alarm & shutdown)
- d. Engine overspeed (shutdown)
- e. Engine start aid active
- f. Engine under speed (shutdown)
- g. Fuel tank leak (alarm & shutdown)
- h. High DC battery voltage (alarm)
- i. High coolant temperature (alarm & shutdown)
- j. High fuel level (alarm) (RA)
- k. Low DC battery voltage (alarm) (RA)
- l. Low coolant level (shutdown)
- m. Low coolant temperature (alarm)
- n. Low cranking voltage (alarm)
- o. Low engine oil level (alarm & shutdown)
- p. Low fuel level (alarm & shutdown) (RA)
- q. Low fuel pressure (alarm)
- r. Low oil pressure (alarm & shutdown)
- s. No coolant temperature signal (shutdown)
- t. No oil pressure signal (shutdown)
- u. Overcrank (shutdown)
- v. Speed sensor fault (alarm)

2. Generator functions

- a. AC sensing loss over & under current (alarm & shutdown)
- b. Alternator protection (shutdown)
- c. Ground fault input (alarm)
- d. kW overload (shutdown)
- e. Locked rotor (shutdown)
- f. Over-frequency (shutdown)
- g. Over AC voltage (shutdown)
- h. Under-frequency (shutdown)
- i. Under AC voltage (shutdown)
- j. Emergency stop (shutdown)

3. Other General functions

- a. Battery charger fault (alarm) (RA)
- b. Common fault (shutdown) (RA)
- c. Common warning (alarm) (RA)
- d. Master switch not in auto (alarm)
- e. Generator running
- f. Input/Output fault (alarm)

4. The generator set controller shall also be capable of meeting all necessary NFPA 110 level 1 requirements that include several of the above along with; EPS supplying load, Master switch "not in auto", and contacts for local and remote common alarm.

9. Communications

- a. If the generator set engine is equipped with an ECM (engine control module), the controller shall communicate with the ECM for control, monitoring, diagnosis, and meet SAE J1939 standards.
- b. The controller shall have the capability to communicate to a personal computer (IBM or compatible) and appropriate application software

- c. A variety of connections shall be available based on requirements:
 - 1. A single control connection to a PC via USB
 - 2. Internet connection via Ethernet
- d. Generator and transfer switch controls shall be equipped with communications modules capable of connecting to the same communication network.

I Generator Overcurrent and Fault Protection

- 1. The generator shall be provided with a factory installed, 100% rated line circuit breaker rated at 1,000.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC. Set to 900 AMPS
- 2. The circuit breaker(s) shall incorporate an electronic trip device with the following characteristics:
- 3. Adjustable long time delay
- 4. Adjustable short time delay [*As applicable*]
- 5. Instantaneous
- 6. Load side lugs shall be provided from the factory. The line circuit breaker shall include auxiliary contacts, shunt trip, undervoltage trip, alarm switch, and overcurrent switch functionality. Load side breaker connections made at the factory shall be separated from field connections.
- 7. The shunt trip device shall be connected to trip the generator breaker when the generator-set is shut down by other protective devices.
- 8. When GFI is required per the NEC, additional neutrals shall be factory installed, and the alarm indication shall be integrated with the generator-set alarms.
- 9. Barriers to provide segregation of wiring from an emergency source to emergency loads from all other wiring and equipment, if required by the NEC, shall be provided.

J Alternator

- 1. The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid-state, voltage regulator capable of maintaining voltage within $\pm 0.25\%$ at any constant load from 0% to 100% of rating with $< 0.5\%$ drift due to temperature variation. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
- 2. The alternator shall have dual maintenance-free bearings, designed for 40000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
- 3. The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
- 4. Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 1,350.00 LRVVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.

K Vibration Isolation

- A Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base.

2.2 Accessories

- A. Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.
- B. The generator set shall be supplied with a 10-ampere automatic float/equalize battery charger capable of charging both lead-acid and ni-cad type batteries, with the following features:
 - i. Automatic 3-stage float to equalization charge
 - ii. Voltage regulation of 1% from no to full load over 10% AC input line voltage variations
 - iii. Battery charging current Ammeter and battery voltage voltmeter with 5% full-scale accuracy
 - iv. LED lamp for power ON indication
 - v. Current limited during engine cranking, short circuit, and reverse polarity conditions
 - vi. Temperature compensated for ambient temperatures for -40°C to 60°C

- vii. Alarm circuit board featuring alarm contacts for low battery voltage, high battery voltage, and battery charger malfunction.
 - viii. UL 1012 Listed
 - ix. CSA Certified
- C. The air cleaner restriction indicator shall indicate the need for maintenance of the air cleaners.
- D. The generator set shall be provided with a run relay which shall provide a three-pole, double-throw relay with 10-amp/ 250 VAC contacts to indicate that the generator is running. The run relay dry contacts can be used for energizing or de-energizing customer devices while the generator is running (e.g. louvers, indicator lamps, etc.)
- E. Supply flexible fuel lines to provide a flexible connection between the engine fuel fittings and the fuel supply tank piping and for the fuel return lines from the injector pump per engine manufacturer's recommendations. Flex line shall have a protective steel wire braid to protect the hose from abrasion.
- F. Block Heater - The block heater shall be thermostatically controlled, 2,500 watt, with isolating valves, to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA 99 and NFPA 110, Level 1.

2.3 Source Quality Control

A. Non-Conforming Work

1. To ensure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.

a. **Design Prototype Tests.** Components of the emergency system, such as the engine/generator set, transfer switch, and accessories, shall not be subjected to prototype tests because the tests are potentially damaging. Rather, similar design prototypes and preproduction models shall be subject to the following tests:

- i. Maximum power (kW)
- ii. Maximum motor starting (kVA) at 35% instantaneous voltage dip.
- iii. Alternator temperature rise by embedded thermocouple and/or by resistance method per NEMA MG1-32.6.
- iv. Governor speed regulation under steady-state and transient conditions.
- v. Voltage regulation and generator transient response.
- vi. Harmonic analysis, voltage waveform deviation, and telephone influence factor.
- vii. Three-phase short circuit tests.
- viii. Alternator cooling air flow.
- ix. Torsional analysis to verify that the generator set is free of harmful torsional stresses.
- x. Endurance testing.

b. **Final Production Tests.** Each generator set shall be tested under varying loads with guards and exhaust system in place. Tests shall include:

- i. Single-step load pickup
- ii. Safety shutdown device testing
- iii. Rated Power @ 0.8 PF
- iv. Maximum power
- v. Upon request, a witness test, or a certified test record sent prior to shipment.

c. **Site Tests.** The manufacturer's distribution representative shall perform an installation check, startup, and building/site load test. The Owner's regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:

- i. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected. The fuel tank will be filled by the Owner upon installation completion. All fuel consumed in testing will be replenished by the generator set system supplier. Fuel for replenishment shall be obtained from an Owner designated fuel vendor.
- ii. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery chargers, alternator strip heaters, remote annunciators, etc.
- iii. Generator set startup under test mode to check for exhaust leaks, path of exhaust gases outside the enclosure/building, cooling air flow, movement during starting and stopping, vibration during operation, normal and emergency line-to-line voltage and frequency, and phase rotation.
- iv. Automatic start by means of a simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator set voltage,

amperes, and frequency shall be monitored throughout the test.

- B Non-Conforming Work/Equipment as identified by the Owner shall be corrected.
- C Coordination of Other Site Tests, Inspections, Demonstration and Training shall be scheduled with the Owner and the Installation Contractor.

PART 3 EXECUTION

3.1 Installers

- A Installer –Under separate contract, an Installation Contractor will be selected by the Owner.

3.2 Examination

- A Verification of Site Conditions- Generator Set System Pre-approved Bidders will be granted a site visit up to seven days before scheduled bid time. Bidder shall contact the Owner to request a site visit.

3.3 Preparation

- A Protection of In-place Condition- Installation Contractor responsibility.
- B Surface Preparation- Installation Contractor responsibility.
- C Demolition/Removal- Installation Contractor responsibility.

3.4 Closeout Activities

- A Demonstration and Training of Owner Personnel; a minimum four hours shall be provided on two separate sessions as scheduled by the Owner.
- B Spares- Provide the following spares in factory packaging:
 1. Voltage Regulator, generator
 2. Fuel Filters, (2) Sets
 3. Lube Oil Filters, (2) Sets
 4. Fuse, (5) Five Sets, each size/type
 5. Lamps, (5) Five Sets, each size/type

END OF SECTION

NEUSE RIVER PUMP STATION AUTO TRANSFER SWITCH SYSTEM

REV: 3-1-16

1 PART 1 - GENERAL

1.1 SUMMARY

The intent of this specification to secure a Three Source Automatic Transfer Switch System consisting of (2) Two Auto Transfer Switches that have been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation. Three Sources are as follows: 1-Utility, 2-New Generator Set (Specified Elsewhere) and 3-Existing Generator Set.

Any exceptions to the published specifications shall be subject to the approval of the Owner and submitted minimum 10 days prior to the closing of the bid with a line by line summary description of all the items of compliance, any items that have been omitted or have been taken exception to, and a complete description of all deviations.

Bidders shall include with their bid documents, manufacturer's specification sheets, dimensional data and a statement indicating any deviations and/or exceptions this specification.

The Three Source Automatic Transfer Switch System and the New Generator Set System (Specified Elsewhere) shall be furnished by the same supplier.

Installation will be performed by others hereinafter called Installation Contractor.

A. Section includes:

- *Specification for (2) Two Automatic Transfer Switches (ATS) for use in a Three Source configuration for installation and operation on legally required standby applications for emergency power systems as defined by the National Electrical Code (NEC)*
- *It is intended for the Automatic Transfer Switch to operate in the following modes:*
 - a. The ATS shall continually monitor the condition of the utility supply voltage/frequency and shall automatically respond to a utility power failure condition by issuing an engine start signal to the New Emergency standby generator. In the event of the New Generator Set failure the Existing Generator Set will be signaled to start.
 - b. The ATS shall automatically transfer the emergency load to the generator supply in the event of a utility supply failure and return the load to the utility supply upon restoration.
 - c. When an On Load test mode is activated, the ATS shall automatically transfer the emergency load to the generator supply and return the load to the utility supply upon test completion.

- d. The ATS shall perform a closed transition fast power transfer between operating generator and the utility supply once the utility power source has been restored.
- B. The automatic transfer switch shall be manufactured in accordance with this specification and applicable UL, CSA, NEMA, and ANSI standards.
- C. The ATS Supplier shall be responsible for ensuring the compatibility of all components and furnish the Automatic Transfer Switches in accordance with local bylaws, the National Electrical Code (NEC) and specifications.
- D. Installation will be performed by others selected by the Owner. The Installation Contractor shall install the Automatic Transfer Switches in accordance with local bylaws, the National Electrical Code (NEC) or Canadian Electrical Code (CEC) specifications.
- E. Include all components, commissioning and services specified or as required to provide and a complete and operable automatic transfer switch.
- F. The Automatic Transfer Switch package shall include the following main components:
 - *ATS Enclosure*
 - *Power Switching Mechanism*
 - *Automatic Transfer Switch Controller:*
 - a. Operator Interface Display
 - b. Source Voltage & Frequency Sensors
 - c. ATS control logic c/w Integrated Time Delays, Inputs & Outputs
 - d. Engine Start Output Contact

1.2 APPROVAL SUBMITTALS

- A. Three sets of the following information shall be supplied for ATS approval submittal:
 - *ATS Physical Layout (Plan view)*
 - a. ATS Ratings
 - b. Anchoring Details

- c. Cable Entry/Exit Locations
 - d. Cable Connection Sizes
 - e. Nameplate Information
 - *ATS Schematic Drawings*
 - f. Customer Input/output Electrical Connections
 - g. Device settings
 - *ATS Product Datasheets*
- B. The following shall be assembled in Three Ring Hard Back Binders, (3) each and shipped with the equipment:
- *As - Built Drawings, Hard Copy and Digital Copy*
 - *Certified Factory Test Reports for the transfer switch, Hard Copy and Digital Copy*
 - *Installation Guides, Hard Copy and Digital Copy*
 - *Operation and Maintenance Manuals, Hard Copy and Digital Copy*

1.3 CODES & STANDARDS

- A. The Automatic Transfer Switch shall be designed, manufactured, tested and listed to the following safety standards:
- *UL 1008 Edition 7 Automatic Transfer Switches For Use in Emergency Systems*
 - *UL 869A Reference Standard Service Equipment*
 - *CSA- C22.2 No 178.1-12 Automatic Transfer Switches*
- B. The ATS Controller shall be designed in accordance with the following performance standards:
- *Immunity Testing;*
- a. EN 61000-4-2:2009, ESD
 - b. EN 61000-4-3: 2006 RF Immunity

- c. EN 61000-4-4: 2006 EFT
- d. EN 61000-4-5: 2006 Surge Voltage
- e. EN 61000-4-6: 2009 RF Common Mode
- f. EN 61000-4-11: 2004 Voltage Dips and Interruptions
- g. EN 61000-4-8: 2010 Power Frequency Magnetic Field Immunity
- h. ANSI C62.41.2: 2002 Surge 100kHz Ring Wave & Combination Wave, Category C
 - *Emissions Testing:*
- i. FCC CFR Part 15, Subpart B, Class A (Radiated & Conducted Emissions)
- j. ICES-001 Issue 4, Class A (Radiated & Conducted Emissions)
- k. EN 61000-6-4:2007 (Radiated & Conducted Emissions, Harmonics, Flicker)

1.4 QUALITY ASSURANCE

- A. The Transfer Switch shall be designed and manufactured in a facility, which is registered to an ISO 9001:2008 quality system. The supplier shall have a minimum of 30 years experience designing and manufacturing automatic transfer switches.
- B. Only new materials and components shall be used and of current manufacture.
- C. The unit shall be manufactured in accordance with this specification and applicable UL, CSA, and NEMA standards.

1.5 WARRANTY

- A. The equipment shall be free of defects in material, workmanship and operation.
- B. The Transfer Switch shall be warranted against defective components, workmanship and operational flaws for the period of Two years from the date of startup, not to exceed 30 months after shipment.
- C. Date of startup shall be when the manufacturer's representative completes the site startup or when the equipment is put into operation, whichever occurs first.
- D. The ATS manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall regularly engage in maintenance

contract programs to perform preventive maintenance and service on equipment similar to that specified. A (2) Two Year, Semi-annual service agreement in accordance with manufacturer's recommendations shall be included and shall include system operation under simulated operating conditions; adjustment to the generator set, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and functional tests performed on all systems.

1.6 ENVIRONMENTAL CONDITIONS

- A. The Transfer Switch shall be installed with ambient temperatures between +5° to +122° Fahrenheit (-15° to +50° Celsius) relative humidity from 0-95% non-condensing, and altitude not exceeding 6600 ft. (2200M).

2 PART 2 – PRODUCTS

2.1 MANUFACTURERS

The following manufacturers will be acceptable provided they comply with this specification.

- A. Thomson Power Systems
- B. Caterpillar
- C. Cummins

2.2 RATINGS & CONSTRUCTION

- A. Rating of the automatic transfer switch shall be 1000 AMP, 480 VAC, 60 Hz, 3 PHASE, 3 WIRE (Verify existing site is configured for 3 Wire system and match accordingly.)
- B. The transfer switch shall comprise of 3 switching poles (and solid neutral when existing site is configured for 4 Wire system).
- C. The automatic transfer switch assembly shall be rated for 100% continuous load without de-rating. The automatic transfer switch shall be suitable for control of motors, electric discharge lamps, tungsten filament lamps, and electric heating equipment where the sum of motor full-load ampere ratings and the ampere ratings of other loads do not exceed the ampere rating of the switch and the tungsten load does not exceed 30 percent of the switch rating.
- D. Short Circuit fault withstand current rating of the complete assembly shall be 50 Kamps RMS for up to 3 Cycles. The interrupting and closing rating shall be equal to or exceed the required withstand rating. This rating shall be obtained with standard upstream over current protection devices.
- E. The automatic transfer switch must be listed or certified to the following safety standards:

UL 1008 Edition 7 Automatic Transfer Switches For Use in
Emergency Systems
CSA- C22.2 No 178.1-12 Automatic Transfer Switches

- F. The complete ATS assembly shall be mounted in a NEMA 3R rated enclosure suitable for outdoor application.
- G. Dimensions: Overall height, maximum 91 5/8" (2330mm) (including base channels). Individual cubicle width, maximum 36" (915mm) for transfer switches rated up to 3000A.
- H. The rear section shall contain bussing and provisions for customer incoming and outgoing line and load cables. Access shall be from the rear by removable rear covers.
- I. Ground Lugs/Bus: Adequate size and quantity of ground lugs shall be provided and shall conform to NEC/CEC guidelines. Where a ground bus is provided, it shall be a full length copper ground bus bonded to the frame with adequate size and quantity of ground lugs and shall conform to NEC/CEC guidelines.
- J. Busbars: Where load bus bars are utilized, they shall be tin plated round-edge high conductivity copper and be sized for 100% continuous load rating of the transfer switch, in accordance with NEMA, CSA and UL guidelines. The short circuit withstand rating of the completed bus assembly shall be not less than the short circuit fault current of the system.
- K. Cable Connections: Provision shall be made to terminate all incoming and outgoing power cables and grounding conductors. Connections shall be via screw type cable lugs.
- L. The automatic transfer switch shall be constructed to accommodate bottom entry of incoming generator power cables, incoming utility power cables and bottom exit of outgoing load cables. Cable type shall be copper conductors sized in accordance with local codes.
- M. The power switching units shall be fix-mounted, utilize fully enclosed contacts and their withstand/closing rating shall be equal to or exceed the required withstand rating of the complete mechanism.
- N. All materials and parts used in the unit shall be new, of current manufacture, of best industrial grade, and free from defects and imperfections.
- O. The transfer switch mechanism shall provide a simple means of manual operation.
- P. All internal control devices used in the automatic transfer switch shall be capable of being de-energized and isolated from the system by use of an accessible isolation plug for servicing procedures as required.
- Q. The automatic transfer switch design shall provide front accessible components

and wiring for easy serviceability. Power or control connections, which are not readily serviceable while the transfer switch is mounted in its enclosure, are not acceptable.

R. All power contacts used shall operate in a quick-make / quick-break manner, the speed of which shall be independent of supply voltage and / or speed of operation by manual means.

S. The enclosure shall consist of a 14 gauge steel angle or channel framework and be of adequate strength and rigidity to endure normal conditions of use and to support all equipment mounted within. Bolt-on steel panels and hinged doors shall form the outer shell of the enclosure.

T. SEISMIC ANCHORING

- *The Transfer Switch shall be designed and constructed to withstand seismic events when correctly anchored to the building structure.*
- *The Transfer Switch shall successfully withstand a seismic event with a spectral acceleration of minimum 200%.*
- *Specific Transfer Switch anchoring detail drawings shall be furnished by the Transfer Switch supplier to the Owner and Installation Contractor for compliance of seismic ratings.*
- *Transfer Switch supplier shall provide a seismic certificate of compliance upon request.*

U. ENCLOSURE FINISH

- *The surface shall be free of nicks and abrasions and all sharp edges broken in preparation for painting the surface. The surface shall then be prepared with iron phosphate treatment and primer. The final coat to be UL approved electrostatically applied powder coat ASA 61 Grey.*

2.3 AUTOMATIC TRANSFER SWITCH FEATURES

A. The transfer switch shall be supplied with multi-voltage capability to allow use on a variety of standard system voltage levels without replacement of components. The transfer switch shall be field configurable to operate on the following nominal system voltages; 208V, 240V, 380V, 480V, 600V.

B. Transfer switch control power shall be obtained from the source being transferred to. The controls shall not require any connection to external power sources for normal automatic operation. Transfer switches requiring control power solely from the engine starting (or other) batteries are not acceptable.

- C. A control circuit isolation plug shall be provided to isolate all control circuitry inside the transfer switch to facilitate maintenance procedures. When isolated, there shall be no voltage present on the control circuitry.
- D. The transfer switch shall have control plugs for all interconnection to provide superior serviceability. Separate plugs shall be provided for voltage sensing, ATS controller, engine start outputs, programmable I/O and communications. All plugs shall be keyed to prevent incorrect installation.
- E. The automatic transfer switch shall include a fully integrated microprocessor-based Transfer Switch Controller which shall provide the following key features:
- *Graphical 7" Color Touch Screen Operator Interface Display*
 - *Open and/or Closed Transition Transfer Control*
 - *Utility/Gen Voltage and Frequency Metering*
 - *Modbus™ RTU Serial Communication*
 - *8 Programmable Relay Output Contacts*
 - *16 Programmable Digital Inputs*
 - *Engine Start Output Contact*
- F. The transfer switch controller shall include an operator interface graphical color touch screen display which shall be door mounted. The display shall contain the following features:
- *7.0 inch Diagonal Color Display Screen*
 - *Capacitive Touchscreen*
 - *Resolution 800 x 480 (WVGA)*
 - *Wide Viewing Angle*
 - *Serial, Ethernet, USB Ports*
 - *SD Card Memory Card*
- G. The transfer switch controller display shall provide easy to navigate software menu screens for all ATS system information and control. The following information shall be displayed within the software menuing system:
- *System Time/Date*

- *ATS Power Mimic Bus*
- *Source Available/ATS Position Indication*
- *Utility supply metering – 3 phase voltage and frequency*
- *Generator supply metering – 3 phase voltage and frequency*
- *ATS Load metering – 3 phase voltage*
- *Timer countdown display*
- *ATS Control Modes (Auto/Off/Manual/Engine Start)*
- *Data Logging of Events*
- *Alarm Summary*
- *Alarm Logs*
- *Event Logs*
- *Virtual Synchroscope*
- *Calendar-Based Exercise Scheduler*

- H. The Transfer Switch Controller shall be an Intelligent Electronic Device (IED) which shall have a unique Internet Protocol (IP) Address for programming/configuring and remote communication.
- I. The Transfer Switch Controller shall be capable of operating in conjunction with other ATS controllers on a common Ethernet communication network.
- J. Password Security: The transfer switch controller software program shall include a three (3) level security password system for access to all programming functions. Specific password levels shall be provided for “read only”, “read/write” and “administrator”. Password security shall allow for users to be named with individual user names and login passwords.
- K. All programming/configuring of the transfer switch controller set points including voltage, frequency and time delays shall be software programmable from the front door mounted graphical display screen.
- L. Utility/Gen Metering: Digital and Analog (i.e. graphical representative) metering shall be provided by the transfer switch controller for the Utility and Generator supplies. The transfer switch controller shall have an accuracy of $\pm 0.5\%$ (Full Scale) for all voltage and frequency readings. The following standard metering features shall be provided for the utility and generator supplies;

- *Digital and graphical analog display of AC voltages*
- *Three phase or single phase voltages (Line to Line & Line to Neutral)*
- *Phasor diagram showing graphical phase relationship and voltage magnitude*
- *Symmetrical Component Diagrams (Positive, Negative & Zero sequence display)*
- *Voltage phase rotation indication*
- *Frequency display to 0.1Hz resolution*

M. Voltage/Frequency Sensing: The ATS controller shall provide the following voltage and frequency sensing control features for the utility and generator supplies:

- *The Transfer Switch controller shall have fully integrated 120-600V, 3 phase true RMS AC voltage sensing on the Utility Supply, generator supply and ATS Load bus for operation and monitoring. Programmable set points shall be provided for utility/generator source under voltage, overvoltage and phase unbalance.*
- *AC voltage sensing shall utilize advanced symmetrical component algorithms to determine positive, negative and zero sequence voltages. This shall provide the capability to detect true phase loss/unbalance (i.e. single phasing) protection on 3 phase systems where re-generative phase voltages maybe present due to failed 3 phase transformers or motor loads.*
- *AC Voltage sensing shall be fully configurable to allow operation on 3 phase 3 wire or 3 phase 4 wire systems without use of additional potential transformers on systems 600VAC or below.*
- *Phase Sequence & Phase Reversal Protection: Phase Sequence/Phase reversal protection shall be provided to inhibit transfer between alternate sources should an incorrect phase sequence condition exist between connected sources. The Transfer Switch controller shall provide capability to program either A-B-C or C-B-A phase rotation.*
- *Under Voltage Sensing: Three phase under voltage sensing shall be provided for both utility and generator supplies. Activation of an abnormal under voltage condition on any phase shall initiate a load transfer to the alternate source or shall inhibit a transfer to a source until its voltage levels are within normal limits. The under voltage sensor shall be user adjustable from 70-100% of nominal and shall be based on a falling (i.e. drop-out) voltage. The under voltage sensor shall be factory set for drop-out at 85% nominal voltage. The under voltage sensor shall reset (i.e. pick-up) 5% above the dropout setting and shall be adjustable. The under voltage sensor shall*

include an adjustable transient time delay feature.

- *Over Voltage Sensing: Three phase over voltage sensing shall be provided for both utility and generator supplies. Activation of an abnormal over voltage condition on any phase shall initiate a load transfer to the alternate source or shall inhibit a transfer to a source until its voltage levels are within normal limits. The over voltage sensor shall be user adjustable from 100-130% of nominal and shall be based on a rising (i.e. pick-up) voltage. The over voltage sensor shall be factory set for pick-up at 115% nominal voltage. The over voltage sensor shall reset (i.e. drop-out) 5% below the pick-up setting and shall be adjustable. The over voltage sensor shall include an adjustable transient time delay feature.*
- *Phase Unbalance/Phase Loss Sensing: Voltage phase unbalance/phase loss sensing shall be provided for the generator and utility supplies. Activation of an abnormal utility phase unbalance condition shall initiate the generator to start and to transfer on load. The voltage phase unbalance sensor shall be user adjustable from 3-30% of nominal and shall be factory set for pick-up at 5% nominal voltage. The voltage phase unbalance sensor shall include an adjustable transient time delay feature.*
- *Under Frequency Sensing: Under frequency sensing shall be provided for both utility and generator supplies. Activation of an abnormal under frequency condition shall initiate a load transfer to the alternate source or shall inhibit a transfer to a source until its frequency levels are within normal limits. The under frequency sensor shall be user adjustable from 70-100% of nominal and shall be based on a falling (i.e. drop-out) frequency. The under frequency sensor shall be factory set for drop out at 80% nominal frequency. The under frequency sensor shall reset (i.e. pick-up) 10% above the dropout setting and shall be adjustable. The under frequency sensor shall include an adjustable transient time delay feature.*
- *Over Frequency Sensing: Over frequency sensing shall be provided for both utility and generator supplies. Activation of an abnormal over frequency condition shall initiate a load transfer to the alternate source or shall inhibit a transfer to a source until its frequency levels are within normal limits. The over frequency sensor shall be user adjustable from 100-130% of nominal and shall be based on a rising (i.e. pick-up) frequency. The over frequency sensor shall be factory set at 115% nominal voltage. The over frequency sensor shall reset (i.e. drop-out) 5% below the pick-up setting and shall be adjustable. The over frequency sensor shall include an adjustable transient time delay feature.*

N. Time Delays: The following time delay functions shall be provided within the transfer switch controller:

- *Engine Start - A time delay on engine start shall be provided to delay the engine start signal after failure of the utility source. The time delay shall be user adjustable 0 - 60 seconds, factory set at three (3) seconds.*

- *Engine Warmup - A time delay for engine warm up shall be provided which permits transfer to the generator supply after generator voltage and frequency have reached acceptable limits. The time delay shall be user adjustable 0 - 60 minutes, factory set at two (2) seconds.*
- *Utility Return - A time delay for return to utility shall be provided which permits a re-transfer back to the utility supply only after stable voltage and frequency condition exists for the specified time period. The time delay shall be user adjustable 0 - 60 minutes, factory set at two (2) minutes.*
- *Engine Cooldown - A time delay for engine cooldown shall be provided which delays the engine stop signal after load has re-transferred back to the utility source. The time delay shall be user adjustable 0 - 60 minutes, factory set at two (2) minutes.*
- *Neutral Delay - A time delay for neutral position shall be provided in the open transition mode to minimize the effect of out-of-phase transfer due to connected motor load. The time delay shall be user adjustable 0 - 120 seconds, factory set at three (3) seconds.*
- *Gen Commit to Transfer Delay - A time delay for Gen Commit to Transfer position shall be provided. Should the generator fail to transfer on load with the "commit to transfer" feature enabled, the ATS shall automatically re-transfer back to the utility supply if within nominal limits following expiry of the "Gen Commit to Transfer" timer. The time delay shall be user adjustable 0 - 600 seconds, factory set at three hundred (300) seconds.*
- *Transfer Fail Delay - A time delay for Transfer Fail delay shall be provided. The timer shall activate a fail alarm condition if the transfer switch fails to successfully transfer within the transfer fail time delay setting. The time delay shall be user adjustable 0 - 600 seconds, factory set at thirty (30) seconds.*

O. **Timer Bypass:** The transfer controller shall provide a timer bypass function to automatically bypass unwanted delays during testing or maintenance procedures. The timers shall automatically reset on the next operation sequence to their original setting. The following time delays shall have a user initiated bypass feature:

- *Engine Warmup Delay*
- *Utility Return Timer*
- *Engine Cooldown Timer*
- *Neutral Delay Timer*

P. **Real-Time Clock:** The transfer controller shall provide a real-time clock to display system time and date for use by event logging and the ATS exercise scheduler.

The real-time clock shall have automatic shifting of date/time for daylight savings and leap year occurrences. The real-time time clock shall be powered by an independent 10 year life battery to maintain all time/date settings upon loss of control power.

Q. ATS Status Indication: The transfer switch controller shall provide the following indication lights/icons on a common screen for simple visual indication of ATS status:

- *Utility/Gen Source available*
- *Load Bus Energized*
- *ATS Position: Utility or Generator Source Connected to Load*
- *Engine Start Signal Initiated*
- *ATS in TEST or Exercise Mode*
- *Load Shed is active*
- *Current ATS Operating Mode (Auto/Off/Man/Test)*
- *Common alarm (Flashing Icon)*
- *Security Access Locked/Unlocked*

R. Alarm Annunciation: The transfer switch controller shall provide an alarm annunciation screen to indicate the status of all individual alarm conditions on the ATS. The alarm screen shall have an alarm reset function.

S. Alarms Log: The transfer switch controller shall provide an alarm log screen to indicate a history of recent alarms. All alarm logs shall be provided with a time/date stamp and the name of user who reset the alarm. Alarm logs can be filtered by calendar date.

T. Events Log: The transfer switch controller shall provide an event log screen to indicate a history of recent events. All event logs shall be provided with a time/date stamp and the name of user who activated/deactivated a specific event. Event logs can be filtered by calendar date.

U. Virtual Synchroscope: For transfer switches equipped with open transition -fast transfer or closed transition transfer mechanisms, the transfer controller display shall indicate the operating status of the "in-sync" transfer operation. Operating status shall include the following display features:

- *Virtual Synchroscope showing graphical phase degree and speed (slow-fast) representation between the two sources prior to transfer operation.*

- *Voltage Difference meter displayed in % system voltage*
- *Slip Frequency meter displayed in % of system frequency*
- *Generator and Utility Phase A-N voltage*
- *Generator and Utility frequency*

V. **ATS Control Mode:** The transfer switch controller shall provide 7 selectable operating modes available from the main operating screen. The following operating modes shall be provided:

- *Auto: ATS shall operate automatically during a utility power failure*
- *Off: ATS shall not start engine or transfer load during a utility power failure*
- *Manual: ATS can be operated manually to the desired source.*
- *On Load Test: ATS shall be selected to operate in On-Load test mode and permit load transfer*
- *Off Load Test: ATS shall be selected to operate in Off-Load test mode and shall not permit load transfer*
- *Timed Test: ATS shall be selected to operate in a Timed test mode*
- *Closed Transition: ATS shall be selected to operate in a Closed Transition Transfer mode*

W. **Utility Retransfer Operation Selection:** The operator interface display shall provide a selection for Utility Re-transfer operation. The utility re-transfer operation shall be user selectable for Automatic, or Manual re-transfer operation. When Manual re-transfer mode is selected, the user can initiate when the re-transfer to utility power shall occur.

X. **Test Modes:** The transfer switch controller shall provide the following user selectable test modes and features:

- *On Load/Off Load: The operator interface shall provide selection of "OFF-LOAD" testing (i.e. load does not transfer to generator) or "ON-LOAD" testing (i.e. load transfers to generator) modes.*
- *Automatic Timed Test Modes: Automatic timed test mode shall be provided to allow for tests to be manually initiated and automatically terminated. Timed test modes shall be user adjustable (0-999 minutes). The load shall automatically re-transfer back to the utility supply should the generator fail on load.*
- *Automatic Gen Exerciser: A calendar based automatic exercise time*

function shall be provided for generator testing. The Exercise scheduler shall be fully programmable for; start/stop date & time, duration of the test and type of test mode (i.e. On-Load or Off-Load). The exercise timer shall utilize the transfer controller's internal time clock for referencing all timing functions. The transfer switch shall automatically re-transfer back to the utility supply if the generator set fails during an exercise period.

Y. Scheduler: A calendar based scheduler shall be provided by the transfer switch controller. The scheduler shall operate based on the transfer switch controller real-time clock. The scheduler shall allow users to program over 25 specific event schedules to be added. Each event can be edited individually and its operating status can be monitored. The scheduler shall allow the following programming functionality:

- *Schedule Event Start Date/Time*
- *Event Period (Day/Week/Month/Year)*
- *Schedule Event Stop Date/Time*
- *Event Duration (mins/hours)*
- *Event Operation Type (Off-Load Test, On-Load Test)*
- *Number of Re-occurring Events (one-time or number of events)*

Z. Transfer Switch Fail Logic: The following transfer switch failure logic and alarming shall be provided during open or closed transition transfer sequences

- *Transfer Fail: Control logic shall be provided for sensing a transfer switch failure in open or closed transition mode. When an alarm condition is activated, the transfer controller shall automatically force a transfer to the alternate source if available.*
- *Power Switching Device Fail: Control logic shall be provided to detect if a power switching device fails to close or open during an open or closed transition operating sequence. Should a power switching device fail to close or open for any reason within a pre-set time period (adjustable), an alarm light and alarm relay contact shall be activated.*
- *Gen Failure: Control logic shall be provided for immediate transfer to the utility supply (if within acceptable limits) should the generator set fail during any activated test mode.*

AA. Gen Commit to Transfer Logic: Programmable control logic shall be provided to select whether or not the load shall be transferred to the generator (following a utility power failure) if the utility supply is restored immediately before the generator transfers on load. With the feature programmed as NO (DISABLED), the transfer switch shall not commit a transfer to the generator after the engine

start delay has expired, but shall return to the utility supply if immediately restored. With the feature programmed as YES (ENABLED), the transfer switch shall commit a transfer to the generator after the engine start delay has expired. This feature shall be automatically cancelled after expiry of the Gen Commit to Transfer timer (5 mins adjustable) should the generator fail to start.

- BB. Load Disconnect Contact (LDC): Control logic shall be provided to signal an external load (e.g. elevator) of an impending transfer to and from the generator supply. A single normally open output contact shall be supplied and shall be rated 2A, 120VAC, 28Vdc resistive. The contact shall close prior to a transfer and remain closed until the transfer is completed and the post transfer delay time has expired. A pre-transfer delay function shall be provided, programmable 0 - 30 seconds. A post transfer delay function shall be provided, programmable 0 - 30 seconds.
- CC. Engine Start Contacts: Two (2) engine start contacts shall be provided which shall close to initiate starting of the engine. The engine start contact shall be rated 7A, 120/240VAC, 28Vdc resistive.
- DD. Load Shed: The transfer controller shall have provisions to provide a load shed output contact via assignment of one of the programmable output contacts. The Load shed output shall be activated whenever the generator transfers on load and shall reset once the utility supply retransfers back on load. If the ATS is equipped with ATS Load bus power metering option, the Load shed feature shall be programmable based on a generator kW load set point.
- EE. User Programmable Digital Inputs: Sixteen (16) user programmable digital inputs shall be provided by the transfer controller. The digital inputs shall accept a dry (isolated) logic contact to switch to DC negative (ground). Each input shall allow mapping to over 30 different control or monitoring functions as available within the transfer controller database. The following inputs shall be mapped as factory defaults:
- *Remote Test - Utility Power Fail Simulate (Close to Test)*
 - *Remote Alarm Reset (Momentary Close to Reset)*
 - *Service Disconnect Mode Activated (External Control Switch)*
 - *Utility Power Switching Device (USD) Tripped*
 - *Generator Power Switching Device (GSD) Tripped*
 - *Transfer Control in Manual (External Control Switch)*
 - *Transfer Control in Closed Transition Mode (External Control Switch)*
 - *Utility Power Switching Device (USD) Open*
 - *Generator Power Switching Device (GSD) Open*

- *Generator Bypass Switch (GB) Closed*
- *Utility Bypass Switch (NB) Closed*
- *Load Isolate Switch (LI) Closed*
- *Generator Isolate Switch (GI) Closed*
- *Utility Isolate Switch (NI) Closed*
- *Inhibit Transfer to Utility (Source 1)*
- *Inhibit Transfer to Generator (Source 2)*

FF. User Programmable Output Contacts: Eight (8) user programmable output contacts shall be provided by the transfer controller. The contacts shall be rated 2A, 120/240VAC, 28Vdc resistive, Form C. Each output contact shall be user programmable. The following outputs shall be mapped as factory defaults:

- *Load on Utility (AUX U)*
- *Load on Generator (AUX G)*
- *Load Disconnect Contact (LDC)*
- *Fail to Transfer (FTT)*
- *ATS Not in Auto*
- *ATS in Auto*
- *Utility Power Available (UPA)*
- *Generator Power Available (GPA)*

GG. Remote Alarm Contacts: A factory installed common alarm output rated 10 Amps, Normally Open, for connection to the Owner's SCADA System shall be included. Items shall be included for SCADA connection by the Installation Contractor.

- *Load on Utility*
- *Load on New Generator Set*
- *Load on Existing Generator Set*

HH. Transfer to Generator Inhibit: Controller shall provide a programmable digital input to inhibit transfer to generator until external signal is removed. Input can be

utilized in multiple generator/ATS applications, to inhibit transfer to generator until external logic has determined the specified number of “on-line” generators has been reached. **Note:** Transfer to Generator inhibit shall be automatically bypassed should the utility source fail and the generator source is available within normal limits

II. In-Sync Transfer Sensor: For transfer switches equipped to operate in a fast “open” or “closed” transition transfer sequence, the transfer switch controller shall provide an integrated “in-sync” transfer sensor to safely permit in-sync transfers to occur when both sources are available. The in-sync transfer sensor shall provide adjustable voltage and frequency thresholds to only permit transfers when the two sources are safely in phase. The in-sync sensor shall also provide a zero degree closing angle target by utilization of anticipatory closing angle control logic for different levels of slip frequency.

JJ. Closed Transition Transfer Controls: The following features shall be provided for closed transition transfer ATS:

Specification **writer’s note:** Select the following control features as required for closed transition transfer ATS applications:

- Open/Closed Transfer Mode Selection: ATS controller shall provide a programmable selection of desired transfer mode operation (i.e. Open or Closed Transfer). Selection can be via graphical operator interface screen buttons or via external switch/pushbutton assigned digital input contacts. Operation shall be as follows:
- Closed Transition Transfer Mode selection: ATS controller shall provide a programmable selection of desired closed transition transfer mode (i.e. Fast transfer or Soft-load transfer). Selection can be via graphical operator interface screen buttons or via external switch/pushbutton assigned digital input contacts.
- Generator Unloaded Digital Input: Controller shall provide a programmable digital input to inhibit opening of the generator transfer breaker until external “Gen Unloaded” input signal is removed. **Note:** Trip inhibit shall be automatically bypassed should generator source fail and utility source is available and/or max parallel time is exceeded.
- Utility Unloaded Digital Input: Controller shall provide a programmable digital input to inhibit opening of the Utility transfer breaker until external “Utility Unloaded” input signal is removed. **Note:** Trip inhibit shall be automatically bypassed should utility source fail and generator source is available and/or max parallel time is exceeded.
- External Sync Check Permissive Input: Controller shall provide a programmable digital input from an external generator synchronizer to signal a permissive “in-sync” as a secondary permissive in order to issue breaker closure during closed transition operation.
- Utility Protective Relay Trip/Block Input: Controller shall provide a

programmable digital input from an external Utility Protective Relay when used in a closed transition soft-load transfer switch application. This digital input shall be used to either block a closed transition transfer operation or to initiate separation of the two sources should the Utility protective relay trip due to an abnormal condition.

- *Generator Unload Digital Output: The controller shall provide an assigned programmable digital output contact to signal an external generator load sharing controller to begin unloading the generator load during a closed transition soft-load transfer operating sequence.*
- *Utility Unload Digital Output: The controller shall provide an assigned programmable digital output contact to signal an external generator load sharing controller to begin ramping up load on the generator during a closed transition soft-load transfer operating sequence to unload the utility supply.*
- *Auto Sync Initiate Digital Output: The controller shall provide an assigned programmable digital output contact to initiate an external generator synchronizer to begin auto synchronizing to the Utility source during a closed transition soft-load transfer sequence.*
- *Closed Transition: Fast Transfer (<100 mSEC) Protection: The transfer controller shall provide integrated closed transition control protection logic to allow the following operating conditions;*
 - *The transfer controller shall be capable of either open or closed transition operation as selected by operator interface control switch.*
 - *Closed transition transfer shall only be permitted if both sources are available and the sources are in synchronism (via in-sync sensor permissive signal) prior to interconnection of the two sources.*
 - *Should an “in-sync” condition not be achieved within a pre-selected time period, an alarm condition shall be activated.*
 - *If only one source of power is available, and the transfer switch is called to transfer, it shall automatically revert to open transition mode.*
 - *Under normal operation, both sources of supply shall be inhibited from staying interconnected (in parallel) for longer than 100 milliseconds.*
 - *Circuitry shall be provided to detect an extended parallel operation time greater than 100 milliseconds. Should the two sources stay interconnected in parallel for longer than 100 milliseconds due to an abnormal condition and independent supervisory circuit shall separate the two sources via alternate tripping signals to ensure the two sources are not interconnected in parallel for longer than a maximum of 500 milliseconds.*

KK. Modbus TCP Ethernet Communication: The transfer switch controller shall provide a 100BaseT Ethernet port for customer connection to a remote data monitoring device such as PLC, building automation system or desktop PC. The Ethernet Port shall provide Modbus TCP protocol with data registers defined in the Modbus Communication Manual. The Modbus port shall provide the following main data register information:

- *ATS Position Status*
- *ATS Source and Load Status*
- *Alarm status*
- *Utility/Generator 3 Phase Voltage*
- *ATS Load Bus voltage*
- *ATS Load Bus Power Metering (kW, kVA, kVAR, PF) when power metering option is provided).*
- *Event logging data*

LL. Data Logging Memory: The transfer controller shall provide data logging and shall store the data in non-volatile memory on a removable SD memory card. The following events shall be recorded and stored:

- *Total Number of Transfers*
- *Total Number of Transfers due to source failure*
- *Number of Hours Controller is energized*
- *Number of Hours Load is on Utility*
- *Number of Hours Load is on Generator*

MM. Three Source Transfer Control – The TSC-900 controller shall include a Master/Slave functionality for use in configuring two independent transfer switches as a three source transfer system.

NN. Sequence of operations - In the event of a source 1 power failure the Master ATS controller shall send an engine start signal to the slave input on the Slave controller. The slave controller shall send an engine start signal to both generators. If a preferred generator is selected, the Slave controller will count down through the time delay for engine failure and remain on the preferred generator if it is available. If the preferred generator is not available at that time, the Slave ATS will transfer to the non-preferred generator. If none-preferred is selected, the Slave ATS will transfer to the first available generator. The unused generator will be shut down as soon as the Slave ATS is connected to a good source.

OO. OPTIONAL CONTROL

- *Enclosure Strip Heater c/w Thermostat (TS-H2): An enclosure strip heater shall be supplied inside the Transfer Switch enclosure and shall be controlled by an adjustable thermostat. Power for the strip heater shall be to be connected to the transfer switch load bus via suitably sized power transfer.*

3 PART 3 - EXECUTION

3.1 INSTALLATION

- A. Delivery and Acceptance Requirements: The Auto Transfer Switch System supplier shall deliver all equipment to the site after coordinating with the Owner and Installation Contractor he ATS Supplier
- B. Storage and Handling Requirements shall be the responsibility of the Installation Contractor.
- C. Packaging Waste shall be removed from the site and properly disposed by the Installation Contractor.
- D. Installation –Under separate contract, an Installation Contractor will be selected by the Owner.
- E. Verification of Site Conditions- Generator Set System Pre-approved Bidders will be granted a site visit up to seven days before scheduled bid time. Bidder shall contact the Owner to request a site visit.
- F. Demonstration and Training of Owner Personnel; a minimum four hours shall be provided on two separate sessions as scheduled by the Owner.

3.2 FACTORY TESTING

The automatic transfer switch shall be factory tested prior to delivery to the purchaser. The following tests shall be conducted by qualified factory personnel:

- A. Visual Inspection: Electrical and Mechanical inspections to verify installed components are of correct ratings; meet the requirements of the project specifications and to ensure regulatory and quality requirements are met.
- B. Mechanical Tests: As a minimum, the following mechanical tests shall be performed on the transfer switch:
 - *Power Conductor Torque Verification*
 - *Verification of Mechanical Interlock*
 - *Manual ATS Mechanism Operation/Adjustment*

- *All Mechanical Fasteners/Wire Connections Tight*
- C. Electrical Tests: As a minimum, the following electrical tests shall be performed on the transfer switch:
- *Adjustment/Setting All Timers & Voltage Sensors*
 - *Verification of Electrical Interlock*
 - *Function Test-Normal Operation-3 Complete Cycles*
 - *Mechanism Adjustment*
 - *Dielectric Test*
- D. Final Inspection: As a minimum, the following final inspection tasks shall be performed on the transfer switch:
- *Calibration Label/Equipment labels Installed & Correct*
 - *All safety/warning labels attached*
 - *All wiring straight, neatly bundled and adequately protected.*
 - *All options supplied as specified*
 - *Enclosure is clean, no paint imperfections*
 - *Final Documentation is Enclosed (Drawing, O&M Manual)*

3.3 FIELD TESTING/COMMISSIONING

The automatic transfer switch shall be tested once installed at the project site to confirm proper operation of the system. Schedule and witness testing activities shall be coordinated with the Owner and site contractor required in advance of the testing. Qualified local factory-trained field service representatives shall conduct the following tests:

- A. Visual Inspection: Electrical and Mechanical inspection to verify the installation is correct as recommended by the transfer switch manufacturer and as per NEC/CEC requirements.
- B. Mechanical Tests: As a minimum, the following mechanical tests shall be performed on the transfer switch:
- *Power Conductor Torque Verification*
 - *Verification of Mechanical Interlock*

- *Manual ATS Mechanism Operation*
 - *All Mechanical Fasteners/Wire Connections Tight*
 - *Confirmation of correct transfer switch voltage, current and withstand ratings as is required for the application.*
- C. Electrical Tests: As a minimum, the following electrical tests shall be performed on the transfer switch:
- *Megger Testing the Power Cabling to the transfer switch*
 - *Verification of correct power cabling phasing and phase rotation, prior to energization.*
 - *Confirmation of settings for all Timers & Voltage Sensors*
 - *Full Function Test-Normal Operation-3 Complete Cycles of failing the utility supply, and transfer load to/from the generator set.*
 - *Verification of all Closed Transition operation modes*
 - *Verification of all Test Modes operate correctly*
- D. Demonstration and Training of Owner Personnel; a minimum four hours shall be provided on two separate sessions as scheduled by the Owner.
- E. Qualified factory-trained field service personnel shall provide upon request of the Owner four (4) copies of field test reports noting any deficiencies that require corrective action.

End of Specifications