



Procurement Division
Public Services Building
2051 Kaen Road
Oregon City, OR 97045
(503) 742-5444 (Office)

REQUEST FOR QUOTES (RFQ) #2018-95

Issue Date: October 11, 2018

Project Name:	Emergency Operations Center Uninterrupted Power Supply Replacement Project		
Quote Due Date/Time:	November 1, 2:00 PM		
Non-Mandatory Walkthrough:	October 23, 2018, 10:00 AM		
Procurement Analyst:	Ryan Rice	Phone:	503-742-5446
		Email:	rrice@clackamas.us

**SUBMIT QUOTES VIA EMAIL TO PROCUREMENT@CLACKAMAS.US
OR MAIL/HAND DELIVERY TO THE ABOVE ADDRESS**

**PLEASE NOTE: EMAIL SUBMISSIONS SHOULD HAVE
“RFQ #2018-95 EMERGENCY OPERATIONS UPS REPLACEMENT” IN THE
SUBJECT LINE**

1. ANNOUNCEMENT AND SPECIAL INFORMATION

Quoters are required to read, understand, and comply with all information contained within this Request for Quotes (“RFQ”). All quotes are binding upon Quoter for sixty (60) days from the Quote Due Date/Time. Quotes received after the Quote Due Date/Time may not be considered. If authorized in the RFQ and resulting contract, travel and other expense reimbursement will only be reimbursed in accordance with the Clackamas County Travel Reimbursement Policy in effect at the time the expense is incurred. The Policy may be found at www.clackamas.us/bids/terms.html.

It will be the responsibility of potential Quoters to refer daily to the Bids and Contract Information Page (www.clackamas.us/bids/index.html) to check for any available addenda, response to clarifying questions, cancellations or other information pertaining to this RFQ.

All questions regarding this RFQ are to be directed to the Procurement Analyst named above. Quoters may not communicate with County employees or representatives about the RFQ during the procurement process until the Procurement office has notified Quoters of the selected Quoter. Communication in violation of this restriction may result in rejection of a Quoter.

2. SCOPE

The purpose of this RFQ is to contract for the supply and start up and commissioning of two (2) 20KV_a Uninterrupted Power Supplies (“UPS”) units in parallel, maintenance bypass switch, demolition, training, and all incidentals needed or required to deliver a complete, operable system.

Project Overview

Clackamas County is soliciting bids from qualified Vendors to supply, start up and commission of equipment for the replacement of two existing Uninterruptable Power Supply (UPS) systems in the County’s Emergency Operations Center (“EOC”) located at 2200 Kaen Rd., Oregon City, OR 97045. The existing units are at the end of life expectancy and the County has found it to be in their best interest to replace both units with a new parallel system. This project shall be awarded to the lowest, responsive, responsible bidder.

Major work components will consist of the following:

1. Uninterruptible Power Supply
2. System Ratings and Operating Characteristics
3. Internal Batteries
4. Extended Run Battery Cabinet
5. Controls and Indicators
6. System Protection
7. A 3-phase continuous duty, on-line, solid state uninterruptible power system, hereafter referred to as the UPS. UPS operates in conjunction with the building electrical system to provide power conditioning, back-up, and distribution for critical electrical loads. System consists of UPS module, one or more battery packs, and other features as described in this specification. System includes:
 - a. Rectifier/Charger
 - b. Static Inverter
 - c. Bypass
 - d. Control Panel
 - e. Monitor Panel
 - f. Communication Panel

Work is further described within the Project Specifications, hereby attached and incorporated by reference as **Attachment A**.

General Requirements

1. The Contractor shall apply and pay for all necessary permits to perform the work associated with or described in this BID. If the quotation should exceed \$50,000 the Contractor must obtain and pay for performance and payment bonds which shall be a required part of the Contract.
2. It is understood that work to be performed by the Contractor is based upon the specified structure in the existing location and condition, and that Clackamas County assumes no responsibility and makes no guarantee or representation as to the condition thereof prior to, or subsequent to, the execution of the contract.
3. Work hours are generally Monday through Friday 6:30am to 5:30pm, however, specific times and access points will be discussed and approved at the pre-con meeting.
4. Clackamas County will provide potable water access and 120v power supply for Contractor's operations. Any additional requirements or needs of the Contractor shall be included in the bid proposal.
5. Selected Contractor shall convene a pre-construction meeting after contract award and before ordering materials or commencing any work. The Contractor shall provide a duration schedule for the project including anticipated delivery dates of materials. The pre-con shall be held at a mutually agreed upon location.
6. Due to the secure nature of the EOC facility, the awarded Contractor's on-site employees must submit to a thorough law enforcement background check including fingerprinting. There is a \$5.00 cash payment per each fingerprint submittal.

Non-Mandatory Pre-Quote Walkthrough

A Non-Mandatory Pre-Quote Walkthrough will be conducted at the Clackamas County C-Com building, 2200 Kaen Road, Oregon City, Oregon 97045 on October 23 at 10:00AM. Attendance will be documented through a sign-in sheet. Although not required, attendance is strongly encouraged.

Engineers Estimate: \$66,000.00

Key Dates

Work may commence upon issuance of the Notice to Proceed (“NTP”)
Project Final Completion: February 28, 2019.

Prevailing Wage

Prevailing Wage Rates requirements apply to this project because the maximum compensation for all owner-contracted work is more than \$50,000. The selected contractor and all subcontractors shall comply with the provision of ORS 279C.800 through 279C.870, relative to the Prevailing Wage Rates and the required public works bond.

PREVAILING WAGE RATES for Public Works Contracts in Oregon, July 1, 2018, as amended on July 1, 2018 which can be downloaded at the following web address: http://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx.

The Work will take place in Clackamas County, Oregon.

3. Sample Contract

Submission of a Quote in response to this RFQ indicates Quoter’s willingness to enter into a contract containing substantially the same terms of the **Public Improvement** contract, which can be found at: <http://www.clackamas.us/bids/terms.html>. No action or response to the sample contract is required under this RFQ.

4. Quote

Quotes should be short and concise with the following information:

- A. Company experience in these types of projects, including any certifications of lead technicians assigned to the project;
- B. Lump Sum price to complete the project presented on company letterhead.
- C. Estimated time to complete the project;
- D. Clackamas County Certifications Form; and
- E. Any additional information that Clackamas County should take into consideration for the project or qualifications.

5. Evaluation

The quote received from the lowest responsive responsible Quoter will be awarded a contract. The "lowest responsive responsible Quoter" is the lowest Quoter who has substantially complied with all requirements of the Request for Quote and who can be expected to deliver promptly and perform reliably in the determination of Clackamas County.

CLACKAMAS COUNTY CERTIFICATIONS
RFQ #2018-95

Each Quoter must read, complete and submit a copy of this Clackamas County Certification with their Quote. Failure to do so may result in rejection of Quote. By signature on this Certification the undersigned certifies that they are authorized to act on behalf of the Quoter and that under penalty of perjury the undersigned will comply with the following:

SECTION I. OREGON TAX LAWS

As required in ORS 279B.110(2)(3), the undersigned hereby certifies that, to the best of the undersigned's knowledge, the Quoter is not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 320.005 to 320.150 and 403.200 to 403.250 and ORS chapters 118, 314, 316, 317, 318, 321, 323, and elderly rental assistance program under ORS 310.630 to 310.706, and local taxes administered by the Department of Revenue under ORS 305.620, all as applicable. If a contract is executed, this information will be reported to the Internal Revenue Service. Information not matching IRS records could subject Quoter to 28% backup withholding.

SECTION II. NON-DISCRIMINATION

The undersigned hereby certifies that the Quoter has not and will not discriminate in its employment practices with regard to race, creed, age, religious affiliation, sex, disability, sexual orientation, national origin, or any other protected class. Nor has Quoter or will Quoter discriminate against a subcontractor in the awarding of a subcontract because the subcontractor is a disadvantaged business enterprise, a minority-owned business, a woman-owned business, a business that a service-disabled veteran owns or an emergency small business that is certified under ORS 200.055.

SECTION III. CONFLICT OF INTEREST

The undersigned hereby certifies that no elected official, officer, agency or employee of Clackamas County is personally interested, directly or indirectly, in any resulting contract from this RFQ, or the compensation to be paid under such contract, and that no representation, statements (oral or in writing), of the County, its Commissioners, officers, agents, or employees had induced Quoter to submit this Quote. In addition, the undersigned hereby certifies that this proposal is made without connection with any person, firm, or corporation submitting a quote for the same material, and is in all respects fair and without collusion or fraud.

SECTION IV. COMPLIANCE WITH SOLICITATION

The undersigned further agrees and certifies that they:

1. Have read, understand and agree to be bound by and comply with all requirements, instructions, specifications, terms and conditions of the RFQ (including any attachments); and
2. Are an authorized representative of the Quoter, that the information provided is true and accurate, and that providing incorrect or incomplete information may be cause for rejection of the Quote or contract termination; and
3. Will furnish the designated item(s) and/or service(s) in accordance with the RFQ and Quote; and
4. Will use recyclable products to the maximum extend economically feasible in the performance of the contract work set forth in this RFQ.

Firm Name: _____ Date: _____

Signature: _____ Title: _____

Name: _____ Telephone: _____

Email: _____ OR CCB # (if applicable): _____

Business Designation (check one):

Corporation Partnership Sole Proprietorship Non-Profit Limited Liability Company

Resident Quoter, as defined in ORS 279A.120

Non-Resident Quote. Resident State: _____

Oregon Business Registry Number: _____

**CLACKAMAS COUNTY
INSTRUCTIONS TO QUOTERS**

Quotes are subject to the applicable provisions and requirements of the Clackamas County Local Contract Review Board Rule C-047-0270 (Intermediate Procurements) and Oregon Revised Statutes.

QUOTE PREPARATION

1. **QUOTE FORMAT:** Quotes must be submitted as indicated in the RFQ.
2. **CONFORMANCE TO RFQ REQUIREMENTS:** Quotes must conform to the requirements of the RFQ. Unless otherwise specified, all items quoted are to be new, unused and not remanufactured in any way. Any requested attachments must be submitted with the quote and in the required format. Quote prices must be for the unit indicated on the quote. Failure to comply with all requirements may result in quote rejection.
3. **ADDENDA:** Only documents issued as addenda by Clackamas County serve to change the RFQ in any way. No other directions received by the Quoter, written or verbal, serve to change the RFQ document. NOTE: IF YOU HAVE RECEIVED A COPY OF THE RFQ, YOU SHOULD CONSULT THE CLACKAMAS COUNTY BIDS AND CONTRACT INFORMATION WEBSITE (www.clackamas.us/bids/index.html) TO ENSURE THAT YOU HAVE NOT MISSED ANY ADDENDA OR ANNOUNCEMENTS. QUOTERS ARE NOT REQUIRED TO RETURN ADDENDUMS WITH THEIR QUOTE. HOWEVER, QUOTERS ARE RESPONSIBLE TO MAKE THEMSELVES AWARE OF, OBTAIN AND INCORPORATE ANY CHANGES MADE IN ANY ADDENDA ISSUED, AND TO INCORPORATE ANY CHANGES MADE BY ADDENDUM INTO THEIR FINAL QUOTE. FAILURE TO DO SO MAY, IN EFFECT, MAKE THE QUOTER'S QUOTE NON-RESPONSIVE, WHICH MAY CAUSE THE QUOTE TO BE REJECTED.
4. **USE of BRAND or TRADE NAMES:** Any brand or trade names used by Clackamas County in the specifications are for the purpose of describing and establishing the standard of quality, performance and characteristics desired and are not intended to limit or restrict competition. Quoters may submit quotes for substantially equivalent products to those designated unless the RFQ provides that a specific brand is necessary because of compatibility requirements, etc. All such brand substitutions shall be subject to approval by Clackamas County.
5. **PRODUCT IDENTIFICATION:** Quoters must clearly identify all products quoted. Brand name and model or number must be shown. Clackamas County reserves the right to reject any quote when the product information submitted with the quote is incomplete.
6. **FOB DESTINATION:** Unless specifically allowed in the RFQ, ***QUOTE PRICE MUST BE F.O.B. DESTINATION with all transportation and handling charges included in the Quote.***
7. **DELIVERY:** Delivery time must be shown in number of calendar days after receipt of purchase order.
8. **EXCEPTIONS:** Any deviation from quote specifications, or the form of sample contract referenced in this RFQ, may result in quote rejection at County's sole discretion.
9. **SIGNATURE ON QUOTE:** Quotes must be signed by an authorized representative of the Quoter. Signature on a quote certifies that the quote is made without connection with any person, firm or corporation making a quote for the same goods and/or services and is in all respects fair and without collusion or fraud. Signature on a quote also certifies that the Quoter has read and fully understands all quote specifications, and the sample contract referenced in this RFQ (including insurance requirements). No consideration will be given to any claim resulting from quoting without comprehending all requirements of the RFQ.
10. **QUOTE MODIFICATION:** Quotes, once submitted, may be modified in writing before the time and date set for quote closing. Any modifications should be signed by an authorized representative, and state that the new document supersedes or modifies the prior quote. Quoters may not modify quotes after quote closing time.
11. **QUOTE WITHDRAWALS:** Quotes may be withdrawn by request in writing signed by an authorized representative and received by Clackamas County prior to the Quote Due Date/Time. Quotes may also be withdrawn in person before the Quote Due Date/Time upon presentation of appropriate identification.

12. **QUOTE SUBMISSION:** Quotes may be submitted by returning to Clackamas County Procurement Division in the location designated in the introduction of the RFQ; however, no oral or telephone quotes will be accepted. Envelopes, or e-mails containing Quotes should contain the RFQ Number and RFQ Title.

QUOTE EVALUATION AND AWARD

1. **PRIOR ACCEPTANCE OF DEFECTIVE PROPOSALS:** Due to limited resources, Clackamas County generally will not completely review or analyze quotes which fail to comply with the requirements of the RFQ or which clearly are not the best quotes, nor will Clackamas County generally investigate the references or qualifications of those who submit such quotes. Therefore, neither the return of a quote, nor acknowledgment that the selection is complete shall operate as a representation by Clackamas County that an unsuccessful quote was complete, sufficient, or lawful in any respect.
2. **DELIVERY:** Significant delays in delivery may be considered in determining award if early delivery is required.
3. **CASH DISCOUNTS:** Cash discounts will not be considered for award purposes unless stated in the RFQ.
4. **PAYMENT:** Quotes which require payment in less than 30 days after receipt of invoice or delivery of goods, whichever is later, may be rejected.
5. **INVESTIGATION OF REFERENCES:** Clackamas County reserves the right to investigate references and or the past performance of any Quoter with respect to its successful performance of similar services, compliance with specifications and contractual obligations, and its lawful payment of suppliers, sub-contractors, and workers. Clackamas County may postpone the award or execution of the contract after the announcement of the apparent successful Quoter in order to complete its investigation. Clackamas County reserves the right to reject any quote or to reject all quotes at any time prior to Clackamas County's execution of a contract if it is determined to be in the best interest of Clackamas County to do so.
6. **METHOD OF AWARD:** Clackamas County reserves the right to make the award by item, groups of items or entire quote, whichever is in the best interest of Clackamas County.
7. **QUOTE REJECTION:** Clackamas County reserves the right to reject any and all quotes.
8. **QUOTE RESULTS:** Quoters who submit a quote will be notified of the RFQ results. Awarded quote files are public records and available for review by submitting a public records request or by appointment.

ATTACHMENT A
PROJECT SPECIFICATIONS



Jeff Jorgensen
Manager
FACILITIES MANAGEMENT

CENTRAL UTILITY PLANT
1710 Red Soils Court,#200 \ Oregon City, OR 97045

**EMERGENCY OPERATIONS CENTER
UNINTERRUPTABLE POWER SUPPLY REPLACEMENT PROJECT**

PROJECT SPECIFICATIONS

PROJECT OVERVIEW

Clackamas County is soliciting bids from qualified Vendors to supply, start up and commission of equipment for the replacement of two existing Uninterruptable Power Supply (UPS) systems in the County's Emergency Operations Center (EOC) located at 2200 Kaen Rd., Oregon City, OR 97045. The existing units are at the end of life expectancy and the County has found it to be in their best interest to replace both units with a new parallel system. This project shall be awarded to the lowest, responsive, responsible bidder.

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included: Provision of materials, installation and testing of:
 - 1. Uninterruptible Power Supply
 - 2. System Ratings and Operating Characteristics
 - 3. Internal Batteries
 - 4. Extended Run Battery Cabinet
 - 5. Controls and Indicators
 - 6. System Protection
 - 7. A 3-phase continuous duty, on-line, solid state uninterruptible power system, hereafter referred to as the UPS. UPS operates in conjunction with the building electrical system to provide power conditioning, back-up, and distribution for critical electrical loads. System consists of UPS module, one or more battery packs, and other features as described in this specification. System includes:
 - a. Rectifier/Charger
 - b. Static Inverter
 - c. Bypass
 - d. Control Panel
 - e. Monitor Panel
 - f. Communication Panel

1.2 REFERENCES AND STANDARDS

- A. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
 - 1. State of Oregon:
 - a. OAR Oregon Administrative Rules
 - b. OESC Oregon Electrical Specialty Code
 - c. OFC Oregon Fire Code
 - d. OMSC Oregon Mechanical Specialty Code
 - e. OPSC Oregon Plumbing Specialty Code
 - f. OSSC Oregon Structural Specialty Code
 - g. OEESC Oregon Energy Efficiency Specialty Code

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1.3 SUBMITTALS

- A. Submit 2 electronic copies of all data, specifications and drawings for review and approval no less than 21 days before ordering materials.
- B. In addition, provide:
 - 1. Shop Drawings: Indicate electrical characteristics and connection requirements. Provide rack dimensions; battery type, size, dimensions, and weight; detailed equipment outlines, weight, and dimensions; location of conduit entry and exit; single-line diagram indicating metering, control, and external wiring requirements; heat rejection and air flow requirements.
 - 2. Product Data: Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements, UPS module description, communications capability, battery description and description of accessories.
 - 3. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product. Include equipment installation outline, connection diagram for external cabling, internal wiring diagram, battery wiring diagram, accessory wiring diagrams, and written instruction for installation.
 - 4. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Operation Data: Description of operating procedures including:
 - 1. Performance data and technical data.
 - 2. General description.
 - 3. UPS module description.
 - 4. Communications capability.
 - 5. Battery description.
 - 6. Accessory description.
- D. Installation manual: To possess sufficient detail and clarity to enable Owner's technicians to install the system equipment including:
 - 1. Receiving and installation instructions.
 - 2. System one-line diagrams.
 - 3. Equipment outline drawings.
 - 4. Interconnection drawings.
 - 5. Battery wiring diagram.
 - 6. Accessory wiring diagrams.
- E. Maintenance Data: Description of servicing procedures; list of major components; recommended remedial and preventive maintenance procedures; spare parts list.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Work and materials installed to conform to all local, State and Federal codes, and other applicable laws and regulations.
- B. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify County, in writing, before starting work.
- C. UL and CSA Compliance: Provide products which are UL listed. In addition, meet the following:
 - 1. Conform to requirements of NFPA 70.
 - 2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 5 years documented experience.
 - 3. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience in design, manufacture and tests.
 - 4. Products: Furnish products listed and classified by Underwriters Laboratories or other firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.
 - 5. ISO 9001 certification for engineering/R & D, manufacturing facilities and service

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organization.

1.5 WARRANTY

- A. Provide written warranty covering the work and materials for a period of one year from date of Substantial Completion.
- B. In addition, provide:
 - 1. Battery: Provide three year warranty coverage for batteries on prorated basis to no less than 80 percent of its capacity.
 - 2. System: Provide not less than one year warranty after acceptance which includes costs for repair, parts, labor, travel and living expenses for manufacturers personnel within contiguous United States, all of the United States including United States territories, or country of project or from nearest manufacturers service location to country of project.
 - 3. Other manufacturers allowed to bid the project need to meet warranty terms as well or its equivalent at the discretion of the County.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect equipment from extreme temperature and humidity by storing in a conditioned space.
- B. Protect equipment from dust and debris by wrapping unit in dust-tight cover and storing away from other construction activity.
- C. Deliver batteries no sooner than 7 days before charging.

1.7 FIELD CONDITIONS

- A. Do not store or install unless temperature is maintained between 50 degrees F and 104 degrees F, at relative humidity less than 95 percent (non-condensing).
- B. Maintain conditions during and after installation of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Eaton 93PM UPS (208 Volt Model)
- B. Or approved equivalent.

2.2 UNINTERRUPTIBLE POWER SUPPLY

- A. Rectifier/Charger: Converts incoming AC power to regulated DC output for charging battery.
- B. Inverter: Meets or exceeds the following parameters:
 - 1. Capable of providing specified quality output power while operating from any DC source voltage (rectifier or battery) within specified DC operating range.
 - 2. Modular design of UPS to permit easy removal of each phase of Inverter and DC electrolytic capacitors without removal of any other assembly.
 - 3. Capable of uninterrupted manual transfer operation initiated from control panel. Transfer to bypass and from bypass without using emergency bypass control logic or static switch. During manual transfers to bypass mode, Inverter must verify proper bypass operation before transferring critical load to bypass.
- C. Batteries: High-rate discharge, lead-acid cells. Expected Life: 200 complete full load discharge cycles when operated and maintained within Specifications.
- D. Bypass: To serve as an alternate source of power for critical load when performing maintenance on UPS or when failure prevents operation in normal mode. Bypass to consist of naturally-commutated static switch, for high-speed transfers, and wrap-around switchgear.
 - 1. Static Switch: Plug-in type construction, featuring an integral contactor to provide static switch backfeed protection during utility outages. Modular design of UPS permits removal of static switch without removal of any other assembly. Static switch is necessary for controlling emergency make before break transfers. Bypass features following transfer and operational characteristics:
 - 2. Automatic initiated uninterrupted transfers to bypass for following conditions:
 - a. Output overload period expired.
 - b. Critical bus voltage out of limits.

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- c. Over temperature period expired.
 - d. Total battery discharge.
 - e. UPS failure.
 3. Uninterrupted automatic retransfer takes place whenever inverter is capable of assuming critical load.
 4. Provide inhibited uninterrupted automatic retransfers for following conditions:
 - a. When transfer to bypass is activated manually or remotely.
 - b. In event of multiple transfer-retransfer operations, control circuitry limits "cycling" to three operations in any 10 minute period.
 - c. UPS failure.
 5. Inhibit transfers and retransfers for following conditions:
 - a. Bypass voltage out of limits (plus or minus 10 percent of nominal).
 - b. Bypass frequency out of limits (plus or minus 0.5 Hz; adjustable, factory set).
 - c. Bypass out of synchronization.
 - d. Bypass phase rotation/installation error.
- E. Monitoring and Control Components: Following components provide monitor and control capability:
 1. Microcontroller Driven Circuitry: Embedded 20MHZ, 16 bit, single chip controller.
 2. Monitor panel with status indicators.
 3. Video alarm and metering display.
 4. Input circuit breaker.
 5. Inverter and bypass contactors.
 6. (1) RS-232, (1) relay contact (2) Environmental input communication ports.
- F. Battery Management System (BMS):
 1. BMS provides battery time available, or percent remaining, while operating in normal mode and battery mode. Display real-time battery time available information, even under changing load conditions.
 2. Automatic analysis of UPS battery during user defined periodic test cycle (quarterly and monthly). BMS to detect and annunciate battery failure condition without transferring critical load to bypass.
 3. Indicate battery health information.
- G. Wiring Terminals: Size neutral output compression terminal for 200 percent of UPS rated current to accommodate higher neutral currents associated with nonlinear loads. UPS contains mechanical compression terminals (adequately sized to accommodate 75C wiring) for securing user wiring to following locations:
 1. Rectifier/charger input connections (3 phases).
 2. Bypass input connections (3 phases).
 3. DC link connections for remote battery cabinets (positive and negative).
 4. AC output connections (3 phases and 1 neutral).
- H. External Battery Disconnect: An enclosed DC circuit breaker to provide manual means of disconnecting battery which is not located adjacent to UPS.

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- I. Dedicated PC based system to continuously monitor critical power elements associated with UPS, using communications port on UPS. System to automatically alarm if problems arise and notify local or remote personnel of alarm condition. Monitoring system to support software interface with Binary Computer Mode (BCM). Monitoring system to be upgradable, at any time in future, to incorporate multivendor power and environmental equipment.
 - 1. Real time, true multi-tasking operating system capable of minimum of 100 concurrent operating tasks.
 - 2. Identify and resolve existing and potential failures. Update alarm status for all measured variables once per second or at rate not less than scan time of UPS being monitored. System to provide rate-of-change alarms to proactively monitor UPS variables. Measure each metered (analog) variable against four alarm limits (high-high, high, low and low-low) configurable at the user-interface. An alarm summary screen displays operator alarm responses, time of alarm, alarm value and current value. System is able to prioritize multiple alarms.
 - 3. System is able to store and graph most recent 1,400 data points for each variable being monitored.
 - 4. Provide system and power reports. Power reports include UPS Report, Load Analysis report, and Capacity Planning report. System automatically updates report information with most current data for each point monitored.
 - 5. System software consists of standard, commercialized application to ensure operating integrity and system support.
 - 6. Expand system to allow for increased UPS monitoring capacity and functionality. System is able to expand its monitoring capability beyond UPS monitoring to include local or remote environmental equipment, safety/security systems, and other power equipment.
 - 7. System provides monitoring, data collection and performance analysis of critical UPS elements. Approve points list by UPS manufacturer.

- J. UPS Parallel Redundant System: UPS parallel redundant system (hereafter referred to as the System) to have the following characteristics:
 - 1. System consists of the following components:
 - a. Two identical UPS modules which comply with this specification.
 - b. One Parallel Tie cabinet.
 - 2. System Configuration:
 - a. Connect outputs of two parallel modules to critical bus by parallel tie cabinet.
 - b. Two modules share common bypass input source.
 - 3. Module Configuration:
 - a. System features two identical modules.
 - b. Each module features power processing unit comprised of rectifier, DC link and inverter.
 - c. Each module features an internal emergency bypass circuit consisting of static switch and high speed bypass contactor.
 - d. Each Ups module uses Digital Signal Processing to monitor and control its own operation.
 - 4. Parallel Tie Cabinet Configuration:
 - a. Parallel tie cabinet provides either module with ability to be completely isolated from critical bus for service, while critical load remains energized and protected by other module.
 - b. Locate serviceable components in front of parallel tie cabinet. Side or rear access to parallel tie cabinet is not to be required for service or maintenance.
 - c. Parallel tie cabinet has multiple power wire routes to permit top, bottom, or side power or control wire entry.
 - 5. Battery Configurations:
 - a. Common Battery Configuration: System capable of operating with common battery connected to DC links of both modules.
 - b. Separate Battery Configuration: System capable of operating with separate batteries connected to DC links of each module.
 - 1) Integral battery management system provides up-to-date battery runtime

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information and battery health indication.

6. System Interconnections:
 - a. Wiring between modules and parallel tie cabinet includes power wiring and control wiring. Control wiring is not be required for normal parallel operation.
 7. System Performance During Normal Operations:
 - a. Two modules do not have master/slave relationship.
 - b. Wireless selective tripping and load sharing eliminates controls single point of failure.
 - c. Modules share load equally to within plus or minus 2 percent when operating normally.
 - d. System features constraints which do not permit it to be continuously operated in configuration where one module is in bypass mode while other module in inverter mode and both modules are connected to critical bus.
 - e. It is possible to continuously load system at 200 percent of module rating. Module redundancy is lost when system is loaded beyond system rating. Both modules alarm when system loads exceeds 125 percent of systems level rating.
 8. System Performance With Faulty Module:
 - a. In event of module failure, failed module removes itself from the critical bus. Remaining module immediately assumes all of critical load.
 - b. System does not interrupt flow of conditioned power to critical load, if one module fails.
 - c. System does not interrupt supply of power to critical load, if fuse in bypass circuit blows.
 9. System Performance During a Utility Outage:
 - a. If one module loses its utility input power, its inverter remains on and connected to critical bus, but it does not support critical load. Other module supports critical load. To preclude discharging battery (common or separate), inverter within module that loses its utility input phases back its output by 0.003 sec from nominal frequency. Module with utility input fully supports critical load. In this manner, battery (or batteries) remain fully charged and available, while both module inverters are available to support critical load if utility input to other module is subsequently lost.
 - b. With loss of bypass power to either module, system output frequency remain regulated at frequency of other modules bypass. If both modules lose bypass power and rectifier power, system output frequency is regulated by internal clock frequency set within each module. Modules remain in parallel and share load in this operating mode.
 10. Load Sharing:
 - a. System shares critical load between two UPS modules so equally that each modules load is within 2 percent of others.
 - b. Each module needs to monitor only its own input and output power in order to remain phase locked with other modules. This wireless paralleling method does not rely on information to be shared between two modules.
- K. Remote Notify:
1. Capability to initiate out calling for user selectable alarms and notices. Accomplish out calling through Hayes compatible modem connected to UPS RS232 port.
 2. Available alarms and notices initiates out calling to two different user programmable phone numbers. When activated, each of available alarms and notices have capability to call either of two different phone numbers, both phone numbers, or neither phone number.
 3. UPS sequentially initiates outgoing calls and receive incoming calls through same modem and same telephone line. After completing an out call, UPS will wait with RS232 port configured for an incoming call through modem.
 4. Information available to personal computer connected to UPS via modem includes: Metering, event log, and battery test log.
 5. UPS logs each unsuccessful out call attempt in event log. Number of redial attempts to two different phone numbers is programmable up to maximum of 255 attempts. Interval between redial attempts to two different phone numbers is programmable in 1 minute increments up to maximum of 60 minutes.
 - 6.

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2.3 SYSTEM RATINGS AND OPERATING CHARACTERISTICS

- A. System Continuous Rating:
 - 1. KVA rating: Minimum 20Kva (N+1 Redundancy)
 - 2. Field upgradable: Add up to 2 units for 4 total units.
 - 3. Rating (max) for load power factor range of 0.9.
- B. Battery Capacity: Each unit capable of operating at full load for 20 minutes.
- C. Input Voltage Operating Range: Plus 10 percent, minus 15 percent of average nominal input voltage without battery discharge.
- D. Input voltage without battery discharge.
- E. Input Frequency Operating Range: 60 Hz. Plus or minus 5 Hz.
- F. Input Normal Current Limit:
 - 1. Rectifier/Charger Input Current Limit: Adjustable from 50 percent to 125 percent of full-load input current.
 - 2. Battery Input Current Limit: Battery charge current limit is adjustable from 10 percent to 25 percent of system's full load current regardless of the actual load on system.
- G. On Generator Input Current Limit: UPS has following programmable input current limit settings while operating in normal mode on generator:
 - 1. Rectifier/Charger Input Current Limit: Adjustable from 50 percent to 125 percent of full-load input current.
 - 2. Battery Input Current Limit: Battery charge current limit is adjustable from 10 percent to 25 percent of system's full load current regardless of actual load on system.
- H. Current Walk-in: Adjustable from 3 seconds to 60 seconds.
- I. Bypass Input:
 - 1. Synchronizing Bypass Voltage Range: Plus or minus 10 percent of average nominal input voltage.
 - 2. Synchronizing Bypass Frequency Range: 60 plus or minus 5 Hz
 - 3. Magnetizing Inrush Current: Typically 800 percent of largest models full load rectifier input current. Input isolation transformer doubles this value.
 - 4. Input Surge Withstand Capability: UPS is in compliance with ANSI C62.41, Category-A and B (6KV).
- J. Rectifier/Charger Output:
 - 1. Nominal Output Voltage: 540VDC (adjustable from 300 to 560VDC)
 - 2. Steady State Voltage Regulation: Plus or minus 0.5 percent
 - 3. Voltage Ripple: less than 0.5 percent (peak to peak)

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4. Capacity: Rectifier/charger supports a fully-loaded Inverter and recharges battery to 95 percent of its full capacity within 10 times discharge time when input current limit is set at 125 percent of full load input current.
 5. Low Line Operation: Rectifier/charger is capable of sharing DC load with Battery when input voltage falls below specified operating input voltage range, on battery indicator annunciates operation in this mode.
 6. Battery Equalize: Automatic and manual means must be provided for battery equalization.
 7. DC Sensing: Incorporate redundant DC voltage sensing methods for providing battery overvoltage protection.
- K. System Input and Output in Normal Mode:
1. Nominal Input and Output Voltage: 120/208 VAC, 3 phase, 4 wire plus ground.
 2. Steady-State Voltage Regulation (on Inverter): Within plus or minus 1 percent average from nominal output voltage.
 3. Manual Output Voltage Adjustment: Plus or minus 5 percent from nominal.
 4. Transient Voltage Response: Within plus or minus 5 percent from nominal voltage for a 100 percent load step, full load retransfers and full load drop on battery.
 5. Transient Voltage Recovery: 25 ms to within plus or minus 1 percent of steady state.
 6. Line Synchronization Range: Plus or minus 0.5 Hz, adjustable to plus or minus 5 Hz.
 7. Frequency Regulation: Plus or minus 0.01 Hz free running.
 8. Frequency Slew Rate: 1 Hz/second maximum (adjustable).
 9. Phase Angle Control:
 - a. Balanced Linear Loads: Plus or minus 1 degree from nominal 120 degrees.
 - b. Unbalanced Linear Loads: Plus or minus 3 degrees from average phase voltage.
 10. Phase Voltage Control:
 - a. Balanced Linear Loads: Plus or minus 1 percent from average phase voltage.
 - b. Unbalanced Linear Loads: Plus or minus 3 percent for 100 percent load unbalance.
 11. Output Voltage Total Harmonic Distortion (THD): 3 percent into 100 percent linear load; 2 percent for a single harmonic.
 12. Nonlinear Load Capability: Output voltage THD of 5 percent for 100 percent nonlinear load.
 13. Overload Current Capability (with nominal line and fully charged battery): Unit maintains voltage regulation for 125 percent for 10 minutes and 150 percent for 10 seconds.
 14. Fault Clearing Current Capability: 160 percent phase-to-phase for 10 cycles; 300 percent phase-to-neutral for 10 cycles.
 15. Static Transfer Time: Make-before-break transfer completed in less than 4 ms.
 16. Common Mode Noise Attenuation: Minus 65dB up to 20KHZ, minus 40dB up to 100KHZ.
- L. System Output in Bypass Mode: (Input Voltage 3 phase, 120/208V 4 wire w/ground)
1. Nominal Output Voltage: 120/208 VAC, 3 phase, 4 wire plus ground.
 2. Static Transfer Time: Make-before-break transfer completed in less than 4 ms.
 3. Common Mode Noise Attenuation: Minus 65dB up to 20KHZ, minus 40dB up to 100KHZ.

2.4 MECHANICAL DESIGN

- A. Enclosures: House UPS module in free-standing, double front enclosures (safety shields behind doors) equipped with casters and leveling feet. Design enclosures for industrial or computer room applications in accordance with environmental requirements. Enclosures line up and match up in style and color for an aesthetically pleasing appearance. Ship each of enclosures separately with joining hardware to be bolted together at time of installation.
- B. Ventilation: Design UPS module for forced air cooling. Air inlets are in the lower front. Air outlets are in rear of top. 12-inches of clearance over UPS air outlets is required for proper air circulation. Air filters for UPS module are in commonly available sizes.
- C. Cooling Fans: Modular design of UPS module permits removal of each fan without removal of any other assembly. Accomplish fan replacement by removing no more than one fastener per fan and will not require removal of another subassembly.

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- D. Cable Entry: Standard cable entry for UPS module is through top or back of enclosure. Provide dedicated wire way within UPS module for routing user input and output wiring.
- E. Front Access: Serviceable subassemblies are modular and capable of being replaced from front of UPS (front access only required). Locate components with exception of power magnetics within front 12-inches of UPS enclosure for easy maintenance access. Removal and replacement of any subassembly does not require removal of another subassembly
- F. Service Area Requirements: UPS module, battery and options enclosures require no more than 30-inches of front service access room, and does not require side access for service or installation.

2.5 BATTERY

- A. Battery Type: Heavy duty industrial grade. Valve-regulated, high-rate discharge, lead-acid cells. Impact resistant plastic case. Cells with explosion-proof vents, clear containers and ample space for plate growth.
- B. Expected Life: 200 complete full load discharge cycles when operated and maintained within Specifications.
- C. Electrolyte specific gravity: No greater than 1,250 when fully charged and measured at 77 degrees F/25 degrees C.
- D. Nominal Battery String Voltage: 480VDC, 240 cells.
- E. Final Discharge Voltage:
 - 1. Full Load: 1.66 volt per cell (adjustable).
 - 2. No Load: 1.75 volt per cell (adjustable). UPS automatically selects final discharge voltage (either 1.66 or 1.75 volt per cell) based on rate of discharge.
- F. Nominal Float Voltage: 2.25 volt per cell.
- G. Maximum Equalizing Voltage: 2.40 volt per cell.
- H. Battery Capacity Protection Time (at 25C): 25 minutes.
- I. Battery Recharge Time: 10 times discharge time to 95 percent of original protection time.
- J. Add alternate for Lithium-Ion Batteries**

2.6 CONTROLS AND INDICATORS

- A. Microcontroller Operated Circuitry: UPS controls have following design and operating characteristics:
 - 1. Provide fully automatic operation of each UPS module through use of microcontrollers. (Digital signal processing eliminates variances from component tolerance or drift, and provide consistent operational responses.)
 - 2. Operating and protection parameters are firmware controlled, thus eliminating need for manual adjustments. Perform adjustments and calibrations without use of potentiometers. Printed circuit boards replacement are possible without requiring calibration.
 - 3. Start-up and transfers are automatic functions.
 - 4. Use multiple microcontrollers so no single controller is in mission critical application.
 - 5. Store configuration, setup and calibration information in non-volatile memory that does not require control battery for data storage.
 - 6. Emergency transfers to Bypass due to UPS failure, are independent of control logic controlling rectifier/charger, inverter and monitor panel. Emergency transfer circuitry contains necessary circuitry to perform an emergency transfer without any other functioning logic.
 - 7. Monitoring and communications logic are independent of rectifier/charger and Inverter control logic. Functionally isolate circuitry and firmware required for monitoring and communications logic from bypass, rectifier/charger and inverter controls. Monitoring firmware is field upgradeable.
 - 8. Program UPS to optionally provide automatic restart capability following loss of utility and a complete battery discharge. When utility power returns, UPS automatically energizes output terminals and subsequently transfer to normal mode.

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- B. Monitor Panel Indicators: Equip UPS module with monitor panel providing following monitoring functions and indicators (each alarm and notice condition is accompanied with an audible alarm):
1. NORMAL: This symbol is lit when UPS is operating in normal mode.
 2. BATTERY: This symbol is lit when UPS is operating in battery mode. Normal indicator also remains lit.
 3. BYPASS: This symbol is lit when UPS is operating in bypass mode. Critical load is supported by bypass source. Normal indicator is not lit when system is in bypass mode.
 4. NOTICE: This symbol is lit when system needs attention. Some notices may be accompanied by an audible horn. Notices include:
 - a. Bypass not available.
 - b. Battery under voltage.
 5. ALARM: This symbol is lit when a situation requires immediate attention. Accompany alarms by an audible alarm. Alarms include:
 - a. Over temperature.
 - b. Output overload.
 - c. Inverter failure.
 - d. Rectifier/charger failure.
 - e. Shutdown imminent (low battery in emergency mode.)
 6. STANDBY: This symbol is lit when electricity is present in rectifier and Inverter while Normal indicator is not lit. During normal startup this indicator remains lit until UPS transfers to normal mode, at which time normal indicator lights. During normal shutdown standby indicator remains lit until energy in UPS is dissipated and shutdown is complete.
- C. Monitor Panel Controls: Equip UPS module with monitor panel providing following control functions:
1. Menu and Cursor Controls: Selects, displays and scrolls data on LCD.
 2. Load Off: Shuts down UPS, de-energizes critical load and opens UPS's breaker and contactors.
 3. Horn Silence: Silences current audible alarm(s). Horn sounds again if new alarms occur.
 4. Screen Adjust: Controls liquid crystal display contrast.
- D. Monitor Panel Liquid Crystal Display (LCD): UPS features liquid crystal display measuring 6 by 7.5-inch with 30 lines of information, 80 characters wide. Display features an auto blanking feature. Provide graphical user screens on monitor panel LCD to display UPS operating parameters. Use monitor panel pushbuttons to access information in these screens. Information in meter screen and alarm history screen is available to remote terminal or printer through RS-232 (EIA/TIA-232) communication port. Screens include:
1. Common Information: Present following information on LCD panel at times:
 - a. UPS Identification: User programmable UPS identification of up to 45 characters.
 - b. UPS status.
 - c. Highest priority active alarm.
 - d. Highest priority active notice.
 - e. Time and date.
 - f. Real time battery time available (in event utility outage occurs) for current critical load.
 2. System Meter Screen: Real time digital metering of:
 - a. Rectifier/Charger Inputs: Voltage (per phase, RMS), current (per phase), frequency, kW, KVA, power factor.
 - b. System outputs: Voltage (per phase, RMS), current (per phase plus neutral), frequency, kW, KVA, power factor. Output voltage and current sensing independent of Inverter controls.
 - c. Bypass inputs: Voltage (per phase, RMS).
 - d. DC link voltage.
 - e. Battery charge and discharge current.
 3. Output Current Screen: Bar graph display of percent output current of each phase.

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4. Event History Screen: Display up to 400 of most recent events by date and time. Display time in tenths of seconds (0.1 sec) and recorded in thousandths of seconds (0.001 sec). Screen defines and displays events as either alarms, notices, commands or status. Provide brief description for each event recorded on this screen.
5. Active System Events Screen: Automatically displaylist of active alarms and notices.
6. Statistics Screen: This screen displays:
 - a. Time on battery: Record displays duration and frequency of utility outages in life of batteries and in current month.
 - b. Building alarms: Record displays frequency of each building alarm enunciation in life of UPS and in current month.
 - c. Operational History: Record displays total amount of time UPS has been in eachof following modes of operation: Normal, bypass and battery. Record displays total amount of time UPS has been on generator.
 - d. Availability: Display observed availability of normal mode. In addition, display availability of Bypass supply as backup source.
 - e. Startup Date: Display date UPS was initially energized.
7. System Mimic Screen: Display graphic display of UPS operational mode and power flow through UPS to critical load in real time. Operational status of Inverter, Rectifier/charger, bypass and battery is also indicated. Indicate circuit breaker and contactor states.
8. Setup Screen: Permit setting time and date for system clock with controls on monitor panel. Permit configuration of RS232 and RS485 communications ports, with controls on monitor panel, for following modes of operation:
 - a. Terminal Mode: Log system events immediately as they occur.
 - b. Calibration Mode: Used by service personnel for system diagnostics.
 - c. System Configuration Mode: Allow setup and configuration of user level functions like battery test and building alarms. Allow six building alarms to be customized with description of up to 30 characters for display locally on monitor panel screens and remotely. Allow six building alarms to be programmed to initiate UPS commands upon contact closure.
 - d. Computer Mode: Allow user to interface with UPS in binary computer mode.
 - e. Remote Monitor Mode: Configure RS485 port to interface with remote monitor panel, supervisory contact module or relay interface module.
- E. Control Panel: Equip UPS module with control panel providing UPS control functions. (A key is required to turn on UPS.) Provide following controls on control panel:
 1. Key switch initiates energize sequence to place UPS in either normal mode or bypass mode, as defined by mode switch position.
 2. Mode switch controls manual transfer of UPS to and from bypass mode.
 3. Battery switch enables or disables internal battery contactor closure.
 4. Circuit breaker enables operation of rectifier.
 5. Load off reset switch resets UPS, following load off command.
- F. Communication Panel: Equip UPS module with communication panel, located behind protective cover, which provides following signals and communication features in Class 2 environment:
 1. Alarm and Notice Contacts: Provide dry contacts for summary alarms and notices for external use.
 - a. Alarm: Indicates UPS is experiencing an Alarm condition.
 - b. Notices: Indicates UPS is experiencing a Notice condition.
 2. RS-232 (EIA/TIA-232) and RS-485 Communication Interface: Provide circuitry for one RS-232 (EIA/TIA-232) and one RS-485 communication port. These ports may be used with simple terminals to gain remote access to unit operation information.
 3. Remote Monitor Panel Connection: Provide circuitry for connection of up to two accessory remote monitor panels, relay interface modules or supervisory contact module.

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- 4. Building Alarms: Provide six inputs for monitoring status of external dry contacts. Dedicate one input to monitoring an external battery disconnect, and dedicate one to monitor an auxiliary generator and initiate reduced input current limit. Remaining four inputs is user selected (smoke, temperature, and water.) Building alarms are set up through system configuration mode function of RS-232 (EIA/TIA-232) port. Building alarms also provide following capabilities:
 - a. Program building alarms to initiate UPS commands upon contact closure.
 - b. Building alarms allow user to customize building alarm message (up to 30 characters max.) which appears locally on Monitor Panel or remotely through communication ports.

2.7 SYSTEM PROTECTION

- A. Provide rectifier/Charger protection by thermal magnetic or RMS current sensing molded-case circuit breakers and transient suppression circuitry.
- B. Provide bypass protection through individual fusing of each phase.
- C. Static switch features thermal switch which will open backfeed contactor in event static switch temperature exceeds normal operating parameters.
- D. Provide battery protection by individual fusing or thermal magnetic molded case circuit breakers in each battery cabinet (if standard battery pack is provided) or external protective device for an external battery.
- E. Provide output protection by electronic current limit circuitry and fuses in Inverter circuit.
- F. Monitor input wiring to rectifier/charger input and bypass input for proper sequencing. If wiring is installed out of sequence, UPS detects and annunciates this condition (on monitor panel) when power is supplied to inputs. UPS does not allow operation in normal mode until wiring error is corrected.
- G. Provide inverter circuitry which automatically inhibits Inverter IGBT switching currents should they exceed normal operating parameters.
- H. UPS remains in normal mode during a failure condition where bypass backfeed protection fails. Manual transfers between normal mode and bypass mode is possible with this failure condition
- I. UPS remains in normal mode during failure condition where one or more SCRs in the static switch shorts. Manual transfers between normal mode and bypass mode is possible with this failure condition.
- J. To comply with agency safety requirements, UPS does not rely upon any disconnect devices outside of UPS module to isolate battery cabinet from UPS.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions and current regulations and codes.
 - 1. The EOC is an Essential Facility. Installation must meet current seismic codes to ensure continued operation in the event of a survivable natural disaster.

3.2 FIELD QUALITY CONTROL

- A. Provide services of manufacturer's field technician to supervise adjustments, final connections, and system testing.
- B. Perform field inspection and testing in accordance with Division 01, General Requirements.
 - 1. Verify specification performance criteria.
 - 2. Measure battery discharge and recharge times.
 - 3. Simulate fault in each system component and utility power.
 - 4. Operate unit at 77 degrees F for eight hours.
 - 5. Visual Inspection.
 - a. Visually inspect equipment for signs of damage or foreign materials.
 - b. Observe type of ventilation, cleanliness of room, use of proper signs, and any other safety related factors.
 - 6. Mechanical Inspection.

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- a. Check power connections for tightness.
- b. Check control wiring terminations and plugs for tightness or proper seating.
7. Electrical Precheck:
 - a. Check DC bus for a possible short circuit.
 - b. Check input and Bypass power for proper voltages and phase rotation.
 - c. Check lamp test functions.
8. Initial UPS Startup:
 - a. Verify that alarms are in a "go" condition.
 - b. Energize system and verify proper DC, walkup, and AC phase on.
 - c. Check DC link holding voltage, AC output voltages, and output waveforms.
 - d. Check final DC link voltage and Inverter AC output. Adjust if required.
 - e. Check for proper synchronization.
 - f. Check for voltage difference between the Inverter output and Bypass source.
9. Other tests as recommended by manufacturer.

3.3 CLOSEOUT ACTIVITIES

- A. Demonstrate operation uninterruptible power supply by simulating an outage.
- B. Operational Training: Before leaving site, field service engineer familiarizes responsible personnel with operation of UPS. UPS equipment is available for demonstration of modes of operation.
- C. Supply the County with signed installation completion letter with substantial completion date noted.

END OF SECTION