

THE BOARD OF SUPERVISORS OF THE COUNTY OF STANISLAUS  
ACTION AGENDA SUMMARY

DEPT: Chief Executive Office

BOARD AGENDA # \*B-2

Urgent

Routine

AGENDA DATE January 31, 2012

CEO Concurs with Recommendation YES  NO

4/5 Vote Required YES  NO

(Information Attached)

SUBJECT:

Approval to Reject All Bids Received for the Strategic Business Technology Data Center Server Room Improvements at 3705 Oakdale Road; Direct Staff to Identify Cost Savings to Bring the Project Within the Project Budget, Redesign Elements of the Project, and Direct Staff to Return to the Board to Recommend Approval for the Designed Project

STAFF RECOMMENDATIONS:

1. Approval to reject all bids received for Bid Package #1 for the construction of Strategic Business Technology Data Center server room improvements at 3705 Oakdale Road.
2. Approval to reject all bids received for Bid Package #2 for the data center infrastructure management system components items to furnish and equip the server room.
3. Authorize the Project Manager to issue a Request for Proposal (RFP) for the direct purchase of the back-up generator package on February 2, 2012, to receive and open the proposals on March 1, 2012, and return to the Board of Supervisors to recommend an award to the most responsible proposer.

(Continued on Page 2)

FISCAL IMPACT:

The objectives for the Strategic Business Technology Server Room Relocation Project are to ensure that the data center and server room functions are protected and to ensure business continuity in time of an emergency. At completion, the total project budget was estimated to be \$1.76 million. The original estimated cost was to be funded by \$1.76 million as follows: \$858,407 Fund Balance from the Strategic Business Technology Department; \$131,000 from the CEO Plant Acquisition Budget; \$231,000 from the Criminal Justice Facilities fund and \$545,627 from Public Facilities Fees.

(Continued on Page 2)

BOARD ACTION AS FOLLOWS:

No. 2012-039

On motion of Supervisor Withdraw, Seconded by Supervisor De Martini

and approved by the following vote,

Ayes: Supervisors: Chiesa, Withdraw, Monteith, De Martini, and Chairman O'Brien

Noes: Supervisors: None

Excused or Absent: Supervisors: None

Abstaining: Supervisor: None

1) X Approved as recommended

2)        Denied

3)        Approved as amended

4)        Other:

MOTION:



ATTEST: CHRISTINE FERRARO TALLMAN, Clerk

File No.

**STAFF RECOMMENDATIONS: (Continued)**

4. Authorize the Project Manager to issue a Request for Proposal (RFP) for the direct purchase of the data center infrastructure management system component package on February 2, 2012, to receive and open the proposals on March 1, 2012, and return to the Board of Supervisors to recommend an award to the most responsible proposer.
5. Authorize the Project Manager to take the routine actions necessary to manage the project including construction management, professional services, and other project related expenses as necessary to manage the project as long as the costs are within the Project Budget approved by the Board of Supervisors.

**FISCAL IMPACT: (Continued)**

On November 1, 2011, the Board of Supervisors approved the plans and specifications for the Strategic Business Technology (SBT) Data Center server room improvements at 3705 Oakdale Road prepared by Miller Pezzoni and Associates, Inc. At that time, the Board of Supervisors also authorized the Project Manager to issue a notice inviting bids for Bid Package #1 for the construction of the project, and Bid Package # 2 for the various stand alone equipment and component items for the data center infrastructure management system package. The Board of Supervisors authorized the Project Manager set a due date of December 14, 2011 at 2:00 p.m.; to open and evaluate bids, and return to the Board of Supervisors to recommend an award to the lowest responsible bidder for each bid package.

On December 14, 2011, eight bids were received for Bid Package 1 from the following contractors: Menghetti Construction of Modesto, California; Huff Construction of Modesto, California; Diede Construction of Lodi, California; BC Construction of Ceres California; Applegate Johnston Construction of Modesto, California; Hometown Construction of Rio Linda, California; Bobo Construction of Elk Grove, California; and CT Brayton and Sons of Escalon, California.

All bids received exceeded the estimate and the project budget. The base bids for Bid Package 1 ranged from \$997,000 to \$1,124,458. All of the base bids were higher than the estimated construction budget of \$935,000. Also submitted were prices for three additive bid alternates: (1) addition of one air conditioning unit for future cooling for the UPS room when additional UPS may be added; (2) possible renovation of the existing restrooms; and (3) the addition of a second back-up fire suppression reserve tank. The bid alternates ranged from \$69,000 to \$140,343.

On December 14, 2011, one bid was received for Bid Package 2 from CompuCom Systems. The base bid for Bid Package 2 was \$299,000. The based bid was higher than the estimated budget of \$276,021 for the data systems infrastructure management

system components package. Also submitted was the price for one additive bid alternate: the addition of a second uninterrupted power supply unit for increased redundancy. The bid alternate was \$125,599.

Overall the lowest bids for both the tenant improvement work and the equipment as described above were \$84,989 over budget, not including the additive alternate prices received.

Upon receiving bids, the Project Team evaluated options for reducing costs and identifying project components that could be minimized. The Team believes we can minimize the cost of the project and improve the efficiency of the design by making additional changes. The Team also believes that some cost savings may be possible by the County purchasing some of the key equipment component pieces directly and providing that equipment to the Contractor. Given the costs received at bid and the critical requirements for working in the Regional 911 Center, some additional funding may be required to implement the Project and if necessary, those recommendations will be made when the design is returned to the Board of Supervisors for consideration in the coming weeks.

At this time, the Chief Executive Office is returning to the Board of Supervisors for approval to reject all bids for Bid Package 1 and Bid Package 2 and their subsequent additive bid alternates. Staff is also recommending the Board of Supervisors direct the Project Manager working in collaboration with the Project Engineer to redesign the project, to identify cost savings to bring the project within the previously approved project budget, and direct staff to return to the Board for approval of the redesigned project, and any funding recommendations that may be required to proceed with the project.

Under the County's agreement the Project Engineer is totally responsible, at no additional cost to the County for redesign of the project. Staff will return to the Board of Supervisors with a revised plan. The existing project budget will fund the minimal costs associated with rebidding the project.

## **DISCUSSION:**

### Background

The Strategic Business Technology Department maintains a data center that houses the core County Information Technology systems, such as the County website, Oracle Financial Management System and PeopleSoft Human Resource Management System. In addition to enterprise systems, the County SBT Data Center houses many of the County departments' servers. Due to continued growth, the current facility is at capacity and can no longer provide space for additional servers or network infrastructure equipment.

Previously, the Board of Supervisors authorized the Chief Executive Officer to issue a Request for Proposal (RFP) for design, specifications and scoping phase for the necessary improvements needed for the Strategic Business Technology Data Center. The purpose of the project is to provide essential protections for the County's Server Room for Strategic Business Technologies to ensure that the Center is adequately protected and can withstand emergency conditions. The server room systems manage crucial business and personal data, operate software applications for the County's core business, and maintain the essential computer hardware on which these services and data reside. An outage at any time can be disastrous if the proper procedures and equipment are not in place for a timely recovery.

Subsequently, the Board of Supervisors approved awarding a contract for the design and scoping phase for the Strategic Business Technology Data Center improvements to Miller-Pezzoni and Associates, Inc. of Modesto, California for the lump sum amount not to exceed \$99,200 and then later, approved contract Amendment No. 1 with Miller-Pezzoni and Associates, Inc. of Modesto, California to perform the evaluation of the electrical service and the Arc Flash Study of the high voltage electrical panels at the 801 11<sup>th</sup> Street as required by recent changes to CAL-OSHA regulations.

The project team worked with Miller-Pezzoni and Associates, Inc. to initially plan the improvements of the Data Center at its current location, on the fourth floor at 801 11<sup>th</sup> Street and to identify the requirements and components needed for construction. The initial analysis identified unforeseen challenges with the proposed location at 801 11<sup>th</sup> Street and further research resulted in the current proposal to locate the computer server facility adjacent to the existing computer facility at 3705 Oakdale Road in Modesto. As a result, staff recommended and the Board of Supervisors approved Amendment No. 2 with Miller-Pezzoni and Associates, Inc. of Modesto, California to develop plans and specifications for the Strategic Business Technology Data Center improvements to be located at 3705 Oakdale Road, Modesto, California.

On November 1, 2011, the Board of Supervisors approved the plans and specifications for the Strategic Business Technology Data Center Server Room relocation and improvements at 3705 Oakdale Road prepared by Miller Pezzoni and Associates, Inc.

Attachment A illustrates the overall project plan.

The proposed server room will be located in a small space adjacent to the existing SR911 server room. This space which is currently occupied by SR911 technical staff will be converted to the new server room and new space for the staff will be provided internally as part of this project. The design team has worked closely with SR911 staff to provide a solution for the reuse of existing vacant work space which meets their operational needs.

The new server room will be self contained with its' own cooling system, electrical systems, environmental remote monitoring, fire suppression, and uninterrupted power supply. Additionally, staff is recommending adding a back-up emergency generator to the project that will provide power to both SR911 and the SBT Data Center. A back-up generator will minimize any chance of disruption, it will allow business to function in the midst of a power failure, power will be provided to HVAC, and will ensure continued operations for missions critical systems with a total estimated cost of \$387,000. Of the total amount, funding of \$155,999 was approved by the Public Facilities Committee on October 20, 2011, and \$231,001 to be funded through the Criminal Justice Facilities Fund. The project will also include installation of a dry fire suppression system which will be extended into the existing SR911 server room.

Finally, the design solution also includes up-grading of the existing site and building to bring it up to the latest ADA requirements.

### **Next Recommended Actions**

The next critical steps for the project recommends that the Board of Supervisors approve two key actions that will ensure the project proceeds to the bid and award phase of the project including the following:

- 1. Authorize the Project Manager issue a Request for Proposal (RFP) for the direct purchase by the County of the back-up generator package on February 2, 2012, to receive and open the proposals on March 1, 2012, and return to the Board of Supervisors to recommend an award to the most responsible proposer***

Staff recommends the Board of Supervisors approve to issue a Request for Proposal for the generator equipment package while the building improvement project is redesigned. By advancing the long-lead time acquisition of the generator equipment (which has already been technically specified) during the redesign of the project, this equipment can be constructed and provided by the Owner for installation by the general contractor without delay to the project schedule after the project is re-bid.

- 2. Authorize the Project Manager issue a Request for Proposal (RFP) for the direct purchase by the County of the data center infrastructure management system components package on February 2, 2012, to receive and open the proposals on March 1, 2012, and return to the Board of Supervisors to recommend an award to the most responsible proposer.***

Staff recommends the Board of Supervisors approve to issue a Request for Proposal (RFP) for the direct purchase of the data center infrastructure management system components package to achieve overall project savings. Staff recommends and requests that the Board of Supervisors approve issuance of a Request for Proposal for

Approval to Reject All Bids Received for the Strategic Business Technology Data Center Server Room Improvements at 3705 Oakdale Road; Direct Staff to Identify Cost Savings to Bring the Project Within the Project Budget, Redesign Elements of the Project, and Direct Staff to Return to the Board for Approval of the Redesigned Project

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the data center infrastructure management system while the building improvement project is redesigned. By advancing the long-lead time acquisition of this equipment (which has already been technically specified) during the redesign of the project, the data center infrastructure management system can be constructed and provided by the County for installation by the general contractor without delay to the project schedule after the project is re-bid.

Several ideas for re-design and the direct purchase recommendations are intended to save money and deliver the project more efficiently. Final recommendations for funding will be made only after the project is re-designed and re-bid.

The re-designed project will be returned to the Board of Supervisors for consideration prior to the re-bidding. The turn-around time will be short and staff expects the re-designed project to be back before the Board of Supervisors in a one month period. It is expected that the construction can still be completed in 2012.

**POLICY ISSUES:**

Approval of this action supports the Board's priority of A Safe Community and Efficient Delivery of Public Services by providing back-up power and emergency fire suppression to core server functions maintained during an emergency.

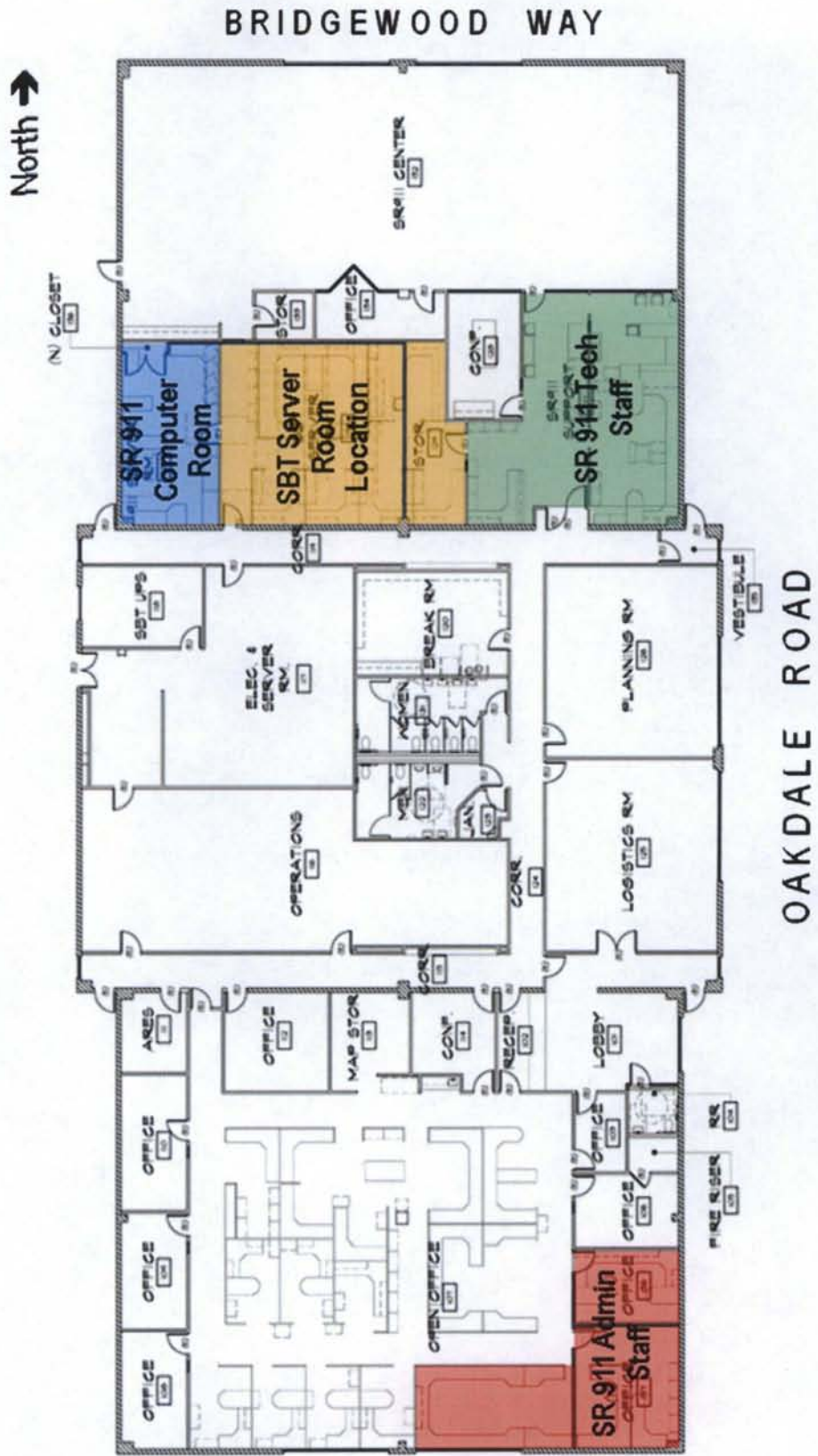
**STAFFING IMPACTS:**

Current Chief Executive Office staff working with SBT and SR911 Staff will continue to implement the project.

**CONTACT PERSON:**

Patricia Hill Thomas, Chief Operations Officer. Telephone: (209) 525-6333

Attachment 1  
Project Plan



**Stanislaus County – Strategic Business Technology  
Data Center  
ENGINE GENERATOR**

**SCOPE OF WORK**

**Background**

The Strategic Business Technology department is the IT department for Stanislaus County. SBT maintains a data center made up of computer file servers, network infrastructure equipment, and associated facilities infrastructure such as dedicated air conditioning and uninterruptible power supplies (UPS). The data center supports core County Information Technology (IT) systems such as the County website, Oracle Financial Management System and PeopleSoft Human Relations Management System, as well as file and print services and specific application and web servers for many departments are managed in this data center. SBT provides twenty-four hours a day, seven days a week services.

The SBT data center is at the heart of much critical business practice in the County, and therefore any unplanned service interruptions could have significant negative impact on the ability of the County as a whole to provide services to the public.

In addition to the SBT data center the generator will provide redundant backup for Stanislaus Regional 911 (SR 911) data center. SR 911 services Stanislaus County, the heartland of the Central Valley located just 90 minutes from two of the largest consumer and industrial marketplaces - San Francisco and the Silicon Valley. Stanislaus County offers a mix of rural communities, a metropolitan city, and a moderate climate conducive to many outdoor activities and adventure.

Stanislaus Regional 911 (SR 911) provides twenty-four hours a day, seven days a week public safety emergency dispatch service and is the answering point for the 911 telephone system. Dispatching is provided for 22 Law Enforcement and Fire agencies within Stanislaus County.

The following information describes Stanislaus County Strategic Business Technology (SBT) department specifications and requirements for the FURNISHING AND INSTALLING AN ENGINE GENERATOR for the County of Stanislaus Strategic Business Technology Server Room, Stanislaus Regional 911 (SR 911) Server Room and the Emergency Dispatch Center located at 3705 Oakdale Road, Modesto, CA 95357.

- A. Work includes, without limitation:
  - 1. Provision of all specified equipment and components
  - 2. Shipping and installation of all specified equipment and components
  - 3. Set-up and testing of all specified equipment and components
  - 4. Training to County staff on operations and troubleshooting
  
- B. The Work of this Contract comprises construction of all the Work indicated, described Specifications, or otherwise required by the Contract Documents.
  
- C. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered under Contract Documents shall rest with Contractor until Final Acceptance of the Work.



D. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered included in the proposal price and no direct or additional payment will be made therefor.

E. Products

1. Term includes new material, machinery, components, equipment, fixtures, and systems forming the Work. Term does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
2. Contractor shall not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
3. For similar components, Contractor shall provide interchangeable components of the same manufacturer.

F. PRODUCT OPTIONS AND SUBSTITUTIONS

1. Summary: This Paragraph 1.3 describes procedures for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the Specifications or approved for use in Addenda that were not already the subject of a Document 00660 (Substitution Request Form) submittal as provided in Document 00200 (Instructions to Bidders).
2. Contractor's Options:
  - a. For products specified only by reference standard: Select any product meeting that standard.
  - b. For products specified by naming one or more products or manufacturers:
    - 1) Select products of any named manufacturer meeting specifications.
    - 2) If product becomes unavailable due to no fault of Contractor, submit Request for Substitution (RFS), including all information contained in this Section F and a fully executed Request for Substitution form, but using the term "Contractor" each place the term "Bidder" appears in that form.
3. Substitutions:
  - a. Except as provided in Document 00200 (Instructions to Bidders) with respect to "or equal" items, County will consider Contractor's substitution requests only when product becomes unavailable due to no fault of Contractor, or if the product specified no longer complies with local regulations or laws. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS shall state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, and whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with County for work on the Project).
  - b. Contractor shall submit separate RFS (and four copies) for each product and support each request with:
    - 1) Product identification.

- 2) Manufacturer's literature.
  - 3) Samples, as applicable.
  - 4) Name and address of similar projects on which product has been used, and dates of installation.
  - 5) Name, address, and telephone number of manufacturer's representative or sales engineer.
  - 6) For construction methods: Detailed description of proposed method; drawings illustrating methods.
- c. Where required, Contractor shall itemize a comparison of the proposed substitution with product specified and list significant variations including, but not limited to dimensions, weights, service requirements, and functional differences. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed. Identify all variations of the proposed substitute from that specified in the RFS and indicate available maintenance, repair, and replacement service.
- d. Contractor shall state whether the substitute will require a change in any of the Contract Documents (or provisions of any other direct contract with County for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.
- e. Contractor shall include accurate cost data comparing proposed substitution with product and amount of net change in Contract Sum including, but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by County in evaluating the proposed substitute. County may require Contractor to furnish additional data about the proposed substitute.
- f. County will not consider substitutions for acceptance (or, in County's sole discretion, County may make Contractor solely responsible for all resulting costs, expenses and other consequences) when a substitution:
- 1) Results in delay meeting construction Milestones or completion dates.
  - 2) Is indicated or implied on submittals without formal request from Contractor.
  - 3) Is requested directly by Subcontractor or supplier.
  - 4) Acceptance will require substantial revision of Contract Documents.
  - 5) Disrupts Contractor's job rhythm or ability to perform efficiently.
- g. Substitute products shall not be ordered without written acceptance of County.
- h. County will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.

- i. Accepted substitutions will be evidenced by a Change Order. All Contract Documents requirements apply to Work involving substitutions.
4. Contractor's Representation and Warranty:
- a. Contractor's RFS constitute a representation and warranty that Contractor:
    - 1) Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
    - 2) Will provide the same warranty for substitution as for specified product.
    - 3) Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
    - 4) Waives claims for additional costs which may subsequently become apparent.
    - 5) Will compensate County for additional redesign costs associated with substitution.
    - 6) Will be responsible for Construction Schedule slippage due to substitution.
    - 7) Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution that are subsequently rejected by County.
    - 8) Will compensate County for all costs; including extra costs of performing Work under Contract Documents, extra cost to other contractors, and any claims brought against County, caused by late requests for substitutions or late ordering of products.
5. County's Duties. County will:
- a. Review Contractor's RFS with reasonable promptness.
  - b. Notify Contractor in writing of decision to accept or reject requested substitution.
6. Administrative Requirements:
- a. Specified products, materials, or systems for Project may include Architectural or Engineering or on-file standards required by the regulatory agency. Contractor's substitution of products, materials or systems may require additional Architectural or Engineering, testing, reviews, approvals, assurances, or other information for compliance with regulatory agency requirements or both. Contractor shall provide all agency approvals or other additional information required and pay additional costs for required County services made necessary by the substitution at no increase in Contract Sum or Contract Time, and as a part of substitution proposal.

#### G. PRODUCT DELIVERY REQUIREMENTS

Contractor shall:

- 1. Deliver products in accordance with manufacturer's instructions.

2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

#### H. SHIPPING REQUIREMENTS

1. Preparation for Shipment. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.
  - a. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of County.
  - b. Grease and lubricating oil shall be applied to all bearings and similar items.
2. Shipping. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.
3. Contractor shall store products only in the designated staging area.
4. Handle, store, and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.
5. For exterior storage of fabricated products, place on appropriate supports, above ground.
6. Cover products subject to deterioration with impervious sheet covering.
7. Provide ventilation to avoid condensation.
8. Store loose granular materials on solid flat surfaces in a well-drained area.
9. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
10. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
11. Without limiting the foregoing:
  - a. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the Site and shall comply with the requirements specified herein and provide required information concerning the shipment and delivery of the materials specified in Contract Documents. These requirements also apply to any subsuppliers making direct shipments to the Site. Acceptance of the equipment shall be made only after it is installed, tested, placed in operation and found to comply with all the specified requirements.

- b. All items shall be checked against packing lists immediately on delivery to the Site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.
- c. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe fittings and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.
- d. Electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above 60°F. Electrical equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.
- e. Equipment having moving parts such as gears, bearings, and seals, shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer. Manufacturer's storage instructions shall be carefully followed by Contractor.
- f. When required by the equipment manufacturer, moving parts shall be rotated a minimum of twice a month to ensure proper lubrication and to avoid metal to metal "welding". Upon installation of the equipment, Contractor shall, at the discretion of County, start the equipment at one-half load for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
- g. When required by the equipment manufacturer, lubricant shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment by Contractor at the time of acceptance.
- h. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.
- i. In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.
- j. Handling. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to

ensure the precise piece of equipment is removed and that it is handled in a manner than does not damage the equipment.

## ENGINE GENERATOR

### 1.01 SUMMARY

#### A. Section includes

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified, including but not limited to engine generators, its accessories and controls.

#### B. Related work under this section

1. Properly coordinate work specified herein with the Project Manager to ensure a timely delivery and produce a complete installation.

### 1.02 REFERENCES

#### A. The generator set and its installation and on-site testing shall conform to the requirements of the following codes and standards:

1. CCR –California Code of Regulations, Title 24
  - a. Part 3 -California Electrical Code(CEC); NFPA 70 National Electrical Code (NEC) with California amendments
  - b. Part 9 -California Fire Code; WFCU Uniform Fire Code (UFC) with California amendments
2. FCC Part 15, Subpart B.
3. ISO –International Organization for Standardization
  - a. 8528; Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets (All Parts)
4. IEEE –Institute of Electrical and Electronic Engineers
  - a. C2; National Electrical Safety Code (NESC)
  - b. 446; Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications
5. NECA –National Electrical Contractors Association
  - a. 404; Recommended Practice for Installing Generator Sets
6. NEMA –National Electrical Manufacturer’s Association
  - a. ICS 1; Industrial Control and Systems: General Requirements
  - b. MG 1; Motors and Generators
  - c. MG 2; Safety Standard for Construction and Guide for Selection, Installation, and Use of Electric Motors and Generators
7. NFPA –National Fire Protection Association

- a. 37; Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
- b. 99; Standard for Health Care Facilities
- c. 110; Standard for Emergency and Standby Power Systems
- 8. UL -Underwriters Laboratories, Inc.
  - a. 508; Standard for Industrial Control Equipment
  - b. 2085; Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids
  - c. 2200; Standard for Stationary Engine Generator Assemblies

### 1.03 SYSTEM DESCRIPTION

- A. Provide a 1,000kW integrated paralleling, standby power system to supply electrical power at 277/480Volts, 60 Hertz, 3 Phase, 4 Wire. The system will utilize twin-packed generators rated 2 x 500 kW. The generators shall consist of a liquid cooled diesel engine, a synchronous AC alternator, a paralleling switch, and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified hereinafter.
- B. The stand-by generator set shall be supplied to operate on No. 2 diesel fuel. The engine shall be liquid cooled by means of engine mounted radiator.
- C. The stand-by generator set shall be rated continuous stand-by (defined continuous for the duration of any power outage) per Part 2 below.
- D. Engine: The turbo charged engine shall be diesel fueled, 4 cycle, liquid cooled, with a governed speed of 1800 RPM. Engine shall be turbocharged with intercooler/aftercooler, forged steel crankshaft and rods. Engine shall be equipped with 90% efficient controls for crankcase emissions, in full conformance with the latest and applicable California Air Resources requirements and all local emissions requirements. Submit certifications with the submittals.

### 1.04 REQUIREMENTS OF REGULATORY AGENCIES

- A. An electric generating system, consisting of a prime mover, generator, governor, coupling and all controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.
- B. The generator set must conform to applicable NFPA requirements.
- C. The generator set must be available with the Underwriters Laboratories listing (UL2200) for a stationary engine generator assembly.
- D. The generator set must meet EPA federal emission guidelines for stationary standby power generation as well as San Joaquin Valley Air Pollution Control District requirements.

### 1.05 SUBMITTALS

- A. Submit manufacturer's data for materials specified within this Section in accordance to Section 16050.

B. The submittal shall contain the following minimum information:

1. Engine Generator specification sheet
2. Controls specification sheet(s)
3. Installation / Layout dimensional drawing
4. Wiring schematic
5. Sound data
6. Emission certification
7. Warranty statement

#### 1.06 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.
- B. The engine shall be equipped with all devices and accessories required to meet the California Air Resources Board and other applicable State and Local emissions standards.
- C. Manufacturer shall provide all UL labeling as required by Local ordinances, which may include:
  1. UL 2200 labeling of engine generator and fuel tank as a complete unit.
  2. UL 2085 labeling of fuel tank in conjunction with UL 2200 in accordance to City of Modesto Municipal Code 3-1.228.
- D. Factory Testing.
  1. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.
  2. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.
- E. Installation shall conform to NECA 404, Recommended Practice for Installing Generator Sets unless otherwise specified.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Handle carefully to avoid damage to internal components, enclosure and finish.
- B. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional cover to protect enclosure in harsh environments.

#### 1.08 WARRANTY



- A. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.
- B. Service and support
  - 1. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.
  - 2. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.
  - 3. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

#### 1.09 SYSTEM STARTUP

- A. Refer to manufacturer's documentation to start-up procedures and requirements.

### **PART 2 – PRODUCTS**

#### 2.01 MANUFACTURERS

- A. All equipment shall be new and of current production of a National firm, who manufactures the generator, engine, control panel, acoustical assemblies comprising the stand-by paralleled generator set as a matched unit, having a service and parts organization.
- B. Generac Gemini Single Skid with Sound Enclosure Generator System (no known equal – see Appendix A for reference only)
  - 1. The generator set shall operate at 1800 RPM and at a voltage of: 277/480Vac, 3 phase, Four-wire, 60 Hz.
  - 2. The generator set shall be rated at 1,000kW, 1,250kVA, 1,503A at 0.8 PF.
- C. The genset shall be applied at the listed ambient and elevation. Proposers to submit the generators rated power output at 100 degrees ambient (°F) and 100 feet elevation.
- D. The genset is to meet site noise requirements of 80 dBA at 23 feet assuming no installed sound barriers.

#### 2.02 ENGINE(S)

- A. Engine(s)
- B. Engine Rating and Performance
  - 1. The prime mover shall be a liquid cooled, diesel fueled, turbocharged after-cooled engine of 4-cycle design. It will have adequate horsepower to achieve rated kW output with at an operating speed of 1800 RPM.

2. The engine shall support a 100% load step.
3. The system shall be sized and sequenced to allow emergency system loads as defined by NEC 700 to be transferred onto the generator(s) within 10 seconds. Non-emergency system loads will be sequenced onto the generator(s) as generator capacity comes on-line.

#### C. Engine Oil System

1. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s).
2. The engine shall operate on mineral based oil. Synthetic oils shall not be required.
3. The oil shall be cooled by an oil cooler which is integrated into the engine system.

#### D. Engine Cooling System

1. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system. The coolant system shall include a coolant fill box which will provide visual means to determine if the system has adequate coolant level. The radiator shall be designed for operation in 122 degrees F, (50 degrees C) ambient temperature.
2. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer.
3. Engine coolant and oil drain extensions, equipped with pipe plugs and shut-off valves, must be provided to the outside of the mounting base for cleaner and more convenient engine servicing.
4. A radiator fan guard must be installed for personnel safety that meets UL and OSHA safety requirements.

#### E. Engine Starting System

1. Starting shall be by a solenoid shift, DC starting system.
2. The engine's cranking batteries shall be lead acid. The batteries shall be sized per the manufacturer's recommendations. The batteries supplied shall meet NFPA 110 cranking requirements of 90 seconds of total crank time. Battery specifications (type, amp-hour rating, cold cranking amps) to be provided in the submittal.
3. The genset shall have an engine driven, battery charging alternator with integrated voltage regulation.
4. The genset shall have an automatic dual rate, float equalize, 10 amp battery charger. The charger must be protected against a reverse polarity connection. The charger's charging current shall be monitored within the generator controller to support remote monitoring and diagnostics. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

#### F. Engine Fuel System

1. The engine fuel system shall be designed for operation on #2 diesel fuel and cold weather diesel blends.
2. The engine shall include a primary fuel filter, water separator, manual fuel priming pump, and engine flexible fuel lines must be installed at the point of manufacture. Element shall be replaceable paper type.
3. The engines suction line shall be fitted with a check valve to secure prime for the engines injection pump.

#### G. Engine Controls

1. Engines that are equipped with an electronic engine control module (ECM), shall monitor and control engine functionality and seamlessly integrate with the genset controller through digital communications. ECM monitored parameters shall be integrated into the genset controllers NFPA 110 alarm and warning requirements. All ECM fault codes shall be displayed at the genset controller in standard language – fault code numbers are not acceptable.
2. For engines without ECM functionality or for any additional genset controller monitoring, sensors are to be conditioned to a 4-20ma signal level to enhance noise immunity and all sensor connections shall be sealed to prevent corrosion.
3. Engine speed shall be controlled with an integrated isochronous governor function with no change in alternator frequency from no load to full load. Steady state regulation is to be 0.25%.

#### H. Engine Exhaust & Intake

1. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.
2. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system. A rain cap will terminate the exhaust pipe after the silencer. All components must be properly sized to assure operation without excessive back pressure when installed.
3. The manufacturer shall supply a critical grade exhaust silencer as standard. For applications with site specific sound requirements (reference section 1.1), the silencer shall be selected to achieve site sound levels.
4. For gensets in a weather or sound attenuated enclosure, all exhaust piping from the turbo-charger discharge to the silencer shall be thermally wrapped to minimize heat dissipation inside the enclosure.
5. The engine intake air is to be filtered with engine mounted, replaceable, dry element filters.

#### I. Alternator

1. The alternator shall be the voltage and phase configuration as specified in section 1.03.A.
2. The alternator shall be a 4 pole, revolving field, stationary armature, synchronous machine. The excitation system shall utilize a brushless exciter with a three phase full wave rectifier assembly protected against abnormal transient conditions by a surge protector. Photo-sensitive components will not be permitted in the rotating exciter.

3. The alternator shall include a permanent magnet generator (PMG) for excitation support. The system shall supply a minimum short circuit support current of 300% of the rating (250% for 50Hz operation) for 10 seconds.
4. The system shall support 2,650 skVA with a maximum instantaneous voltage dip of 35%.
5. Three phase alternators shall be 12 lead, broad range capable of supporting voltage reconnection. Single phase alternators shall be four lead and dedicated voltage designs (600v) shall be six lead. All leads must be extended into a NEMA 1 connection box for easy termination. A fully rated, isolated neutral connection must be included by the generator set manufacturer.
6. The alternator shall use a single, sealed bearing design. The rotor shall be connected to the engine flywheel using flexible drive disks. The stator shall be direct connected to the engine to ensure permanent alignment.
7. The alternator shall meet temperature rise standards of UL2200 (120 degrees C). The insulation system material shall be class "H" capable of withstanding 150 degrees C temperature rise.
8. The alternator shall be protected against overloads and short circuit conditions by advanced control panel protective functions. The control panel is to provide a time current algorithm that protects the alternator against short circuits. To ensure precision protection and repeatable trip characteristics, these functions must be implemented electronically in the generator control panel -- thermal magnetic breaker implementation are not acceptable.
9. An alternator strip heater shall be installed to prevent moisture condensation from forming on the alternator windings. A tropical coating shall also be applied to the alternator windings to provide additional protection against the entrance of moisture.

#### J. Controls & Operating Sequence

1. Genset Controller
  - a. The generator control system shall be a fully integrated microprocessor based control system for standby emergency engine generators meeting all requirements of NFPA 110 level 1.
  - b. The generator control system shall be a fully integrated control system enabling remote diagnostics and easy building management integration of all generator functions. The generator controller shall provide integrated and digital control over all generator functions including: engine protection, alternator protection, speed governing, voltage regulation, synchronizing, load-sharing (real and reactive) and all related generator operations. The generator controller must also provide seamless digital integration with the engine's electronic engine control module (ECM) if so equipped. Generator controller's that utilize separate voltage regulators and speed governors or do not provide seamless integration with the engine management system are considered less desirable.
  - c. Communications shall be supported with building automation via the Modbus protocol without network cards. Optional internet and intranet connectivity shall be available.

- d. The control system shall provide an environmentally sealed design including encapsulated circuit boards and sealed automotive style plugs for all sensors and circuit board connections. The use of non-encapsulated boards, edge cards, and pc ribbon cable connections are considered unacceptable.
- e. Circuit boards shall utilize surface mount technology to provide vibration durability. Circuit boards that utilize large capacitors or heat sinks must utilize encapsulation methods to securely support these components.
- f. A predictive maintenance algorithm that alarms when maintenance is required. The controller shall have the capability to call out to the local servicing dealer when maintenance is required.
- g. Diagnostic capabilities should include time-stamped event and alarm logs, ability to capture operational parameters during events, simultaneous monitoring of all input or output parameters, callout capabilities, support for multi-channel digital strip chart functionality and .2 msec data logging capabilities.
- h. In addition to standard NFPA 110 alarms, the application loads should also be protected through instantaneous and steady state protective settings on system voltage, frequency, and power levels.
- i. The control system shall provide pre-wired customer use I/O: 4 relay outputs (user definable functions), 4 contact inputs, 2 analog inputs, communications support via RS232, and RS485. Additional I/O must be an available option.
- j. Customer I/O shall be software configurable providing full access to all alarm, event, data logging, and shutdown functionality. In addition, custom ladder logic functionality inside the generator controller shall be supported to provide application support flexibility. The ladder logic function shall have access to all the controller inputs and customer assignable outputs.
- k. The control panel shall include a touch screen to display all user pertinent unit parameters including: engine and alternator operating conditions; oil pressure and optional oil temperature; coolant temperature and level alarm; fuel level (where applicable); engine speed; DC battery voltage; run time hours; generator voltages, amps, frequency, kilowatts, and power factor; alarm status and current alarm(s) condition per NFPA 110 level 1.

#### K. Paralleling System Controller

1. The system controller shall be an integrated microprocessor based solution providing full digital integration with the generator controllers. The system controller shall utilize standard hardware and firmware manufactured by the generator supplier. The use of PLC based solutions will be considered less desirable due to reliability and support concerns posed by custom hardware/custom software solutions. A preference will be shown for designs that use the same control board hardware for both the generator(s) and system controller.
2. To ensure reliability and serviceability, the system controller shall be required to meet the same requirements as listed for the generator controller in sections 2.02.J.1.c to 2.02.J.1.g and 2.02.J.1.j.
3. The control panel will provide a touch screen display to provide intuitive access to all user pertinent system status information.

4. The power for the system controller shall utilize redundant DC sources - an internal DC source inclusive of charging system and an external DC source from one of the generator's cranking batteries.
5. The system controller shall interface with the generators using digital communications. Any of the generator(s) status, operation conditions, or configuration parameters shall be accessible with a single point communication via the system controller.
6. The system controller shall provide sequence of facility load through 3 priority loading (permissive) load steps and 3 load shedding steps. These output parameters function based on the number of generators on the generator bus. The priority loading function provides sequential permissive contact closures enabling load to be transferred onto the generator in response to generators coming on-line. The load shedding function provides contact closures that disconnects load from the generator bus in response to a reduction in available generator capacity.
7. In addition to the communication requirements identified in 2.02.J.1.c, the system controller shall provide modem communications as standard.
8. The system controller and digital communications shall enhance system operation but neither shall be required to synchronize or operate the generators in parallel. Systems that require external control hardware or digital communications to synchronize and operate the generators in parallel are not acceptable.
9. The design of the system shall allow continued generator paralleled operation with failures to the system controller and/or communication. Control systems that have any systemic single point failure modes are not acceptable. This is inclusive of systems that rely on reactive cross current and isochronous load sharing control loops. Control systems that rely on redundant communications will be evaluated for potential common mode failures that can impact both of communication channels.

#### L. Typical / Normal Operating Sequence

1. Upon the failure of utility power, the automatic transfer switch(es) (ATS) provides a two-wire start signal to the system controller. The system controller sends a start command to the generators via RS485 communication. The first generator that reaches rated voltage and frequency requests permission to close into the "dead" generator bus. This is to provide dead bus arbitration. After this process, the generator closes its paralleling switch connecting to the generator bus.
2. If the system has an emergency system transfer switch, it will typically transfer to the first generator on-line. If the emergency system load is larger than a single unit, two generators may be configured to come on-line prior to transferring the emergency system load.
3. The system controller compares the on-line generator capacity to additional load segmentation. When adequate generator capacity becomes available, the system controller enables the priority one loads to be switched to the generator bus. This is typical accomplished by providing a permissive contact to the ATS. The system controller shall support 3 load steps.

4. Additional generators upon sensing generator bus voltage, synchronize and parallel to the generator bus.
5. The system controller shall provide load-shed capability via programmed outputs based on a comparison of the number of generators on-line and connected load requirements. Three load-shed outputs shall be provided for this purpose. Load shedding may not need to occur in systems with planned for additional generator capacity or in systems that are lightly load due to typical load factors. The system controller shall be easily reconfigured to match expected load conditions. Load shedding is possible through an ATS, shunt trip breakers, or control circuits.
6. Once utility power has returned, the two-wire start signal will be removed. The generator paralleling contactors will open, generators will run in a cool down mode, and then generators shut down.
7. Transfer switch(es) supplied shall be capable of being inhibited from transferring with a contact from the system controller. The transfer switches supplied shall also be able to shed load via trip-to-neutral feature -- the load is shed and does not re-close to a utility that may have a fault present. For applications in which load shedding with the transfer switch is not feasible, load shedding requirements will be evaluated and accommodated as necessary.

## 2.03 ENGINE / ALTERNATOR PACKAGING

### A. General

1. The engine/alternator shall be bolted directly to the genset frame and the entire frame shall be mounted on spring isolators.
2. A mainline, thermal magnetic circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated between 100 to 125% of the rated ampacity of the genset. The line side connections are to feed from the alternator, and the load side of the breaker shall feed a paralleling switch. The breaker is to have aux contact and shunt trip. The breaker will function as a redundant tripping device in the system. If the paralleling switch fails to open, the generator breaker will be shunt tripped.
3. Each generator shall feed a cycle rated paralleling switch using proven contactor technology. The mechanism shall have a minimum cycle life of 20,000 operations. The generator paralleling switch shall be mounted in the generator connection box. Solutions utilizing motor operated or stored energy breakers for generator paralleling shall provide documentation of 20,000 operation cycle rating capability.
4. The generator shall include a unit mounted auxiliary power load center. All ancillary AC devices (block heater, battery charger, alternator strip heater, etc.) shall have a dedicated breaker within the load center.

### B. Enclosure

1. The genset shall be packaged with a sound attenuating enclosure.
2. The enclosure shall be made of steel with a minimum thickness of 14 gauge. The enclosure is to have hinged, removable doors to allow access to the engine, alternator and control panel. The hinges shall allow for door fit adjustment.

Hinges and all exposed fasteners will be stainless steel or JS5000. The use of pop-rivets weakens the paint system and not allowed on external painted surfaces. Each door will have lockable hardware with identical keys.

3. The enclosure shall be coated with electrostatic applied powder paint, baked and finished to manufacturer's specifications. The color will be manufacturer's standard.
4. The sound attenuated enclosure shall utilize an upward discharging air flow. The enclosure shall be completely lined with sound deadening material. This material must be of a self-extinguishing design.
5. The configuration shall incorporate the silencers in an upper attic area within the generator's discharge air flow away from mission critical genset components.

#### C. Sub-base fuel tank

1. The Contractor shall furnish and install the tank according to the manufacturer's written instructions, as shown on the drawings, and as specified. The storage tank shall be sized to provide enough fuel for 24 hours of operation at full rated load plus 1/9 for fuel expansion. The tank shall be a Firesteel Protected Secondary Containment Generator Sub-base Fuel Tank as manufactured by Phoenix Products; or equal. Tank dimensions shall conform to the outer dimensions of the sound attenuated enclosure.
2. Steel tanks shall conform to UL 142 and Steel Tank Institute Standard F941. The secondary containment shall be capable of being tested onsite. Primary and secondary containment shall be UL 2085 listed, "Protected Secondary Containment Generator Base Tank" with "Projectile Resistant" and "Vehicle Impact Resistant" markings. The tank and installation shall conform to City of Modesto Fire Code Appendix II-F, National Fire Protection Association Standards 30 and 30A, and California Air Resources Board testing requirements for air emissions.
3. The tank shall be sized to provide 24 hours of run time.
4. The Contractor shall furnish and install a complete and operable fuel system in accordance with these Special Provisions, the work shall include but not be limited to the following items:
5. Supply a full tank of low-sulfur diesel fuel Number 2, with no more than 0.05 percent by weight sulfur.
6. The tank shall include fuel suction and return connections, normal and emergency vents, secondary containment emergency vent and rupture basin sensor, mechanical fuel level indication and a stub-up area convenient for electrical conduit entry.
7. The fuel tank shall use an electric fuel sensor to provide an analog indication of fuel level. The controller shall have a warning indication on low fuel level and provide optional shutdown functionality for low, low fuel level.
8. The fuel tank must be supplied by the engine-generator set manufacturer and be installed before shipment.

#### D. Loose Items



1. Supplier to itemize loose parts that require site mounting and installation. Preference will be shown for gensets that factory mount items like mufflers, battery chargers, etc.
- E. Spare Parts:
1. Fuses: One spare set
  2. Filters One spare set (air, fuel, oil)

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Equipment shall be installed by the contractor in accordance with final submittals and Drawings. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.
- B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier. Provide flexible electrical connections from pad to equipment.
- C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site. **[WHO IS INSTALLING THE CONCRETE HOUSEKEEPING PADS – part of construction]**
- D. Equipment shall be initially started and operated by representatives of the manufacturer.
- E. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

### **3.02 STARTUP AND COMMISSIONING**

- A. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:
  - B. Ensuring the engine starts (both hot and cold) within the specified time.
  - C. Verification of engine parameters within specification.
  - D. Verify no load frequency and voltage, adjusting if required.
  - E. Test all automatic shutdowns of the engine-generator.
  - F. Perform a load test of the electric plant, ensuring full load frequency and voltage are within specification by using building load.

3.03 TESTING

- A. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.
- B. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test.
- C. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.
- D. After installation, the Contractor shall demonstrate to the Owner and the Local Fire Authority that the fuel system is complete, without leaks and is seismically braced.

3.04 TRAINING

- A. Training is to be supplied by the start-up technician during commissioning. The training should cover basic generator operation and common generator issues that can be managed by the end-user.
- B. Training is to include manual operation of system.

**END OF SECTION**

<b>EVALUATION CATEGORIES</b>	<b>MAXIMUM POINTS</b>
Financial Review	Pass (10)/fail (0)
General Organizational Background/Qualifications	10
Meeting the Technical Requirements	80
Sub Total for Proposal Points:	100
Cost	100
<b>TOTAL POSSIBLE WEIGHT OR POINTS:</b>	<b>200</b>

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#### GSA Advantage

- GSA Global Supply (NSN issues/requisition status): contact our National Customer Service Center at [ncscustomer.service@gsa.gov](mailto:ncscustomer.service@gsa.gov) or call 1-800-488-3111.
- GSA Contractors (schedule purchase order issues/order status): contact the vendor directly. You can find the vendor contact information on your order confirmation email or go to Order History.
- GSA Advantage: if you require further assistance contact GSA Advantage Customer Service at [GSA.Advantage@gsa.gov](mailto:GSA.Advantage@gsa.gov) or call 1-877-472-3777, option 2.

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**Stanislaus County – Strategic Business Technology  
Data Center  
Infrastructure Management System RFP**

**SCOPE OF WORK**

The following information describes Stanislaus County Strategic Business Technology (SBT) department infrastructure management system environment. Please use this information to create an infrastructure management system design that meets the County's existing needs, and provides enough for scalability to continue to meet the County's needs for several years to come.

The SBT data center is at the heart of much critical business practice in the County, and therefore any unplanned service interruptions could have significant negative impact on the ability of the County as a whole to provide services to the public.

Work comprises of FURNISHING AND INSTALLING A DATA CENTER INFRASTRUCUTRE MANAGEMENT SYSTEM for the County of Stanislaus Strategic Business Technology Server Room located at 3705 Oakdale Road, Modesto, CA 95357.

A. Work includes, without limitation:

1. Uninterruptible Power Supply Package Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for a power distribution unit (PDU) as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
2. Environment Monitoring Equipment
3. Environmental Monitoring Software
4. Cabling
5. Cable Management
6. Racks
7. Accessories
8. Power Distribution Units
9. Power Cords
10. Installation
11. Set up/testing
12. Training
13. Contract Documents fully describe the Work

- B. The Work of this Contract comprises construction of all the Work indicated, described Specifications, or otherwise required by the Contract Documents.
- C. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered under Contract Documents shall rest with Contractor until Final Acceptance of the Work.
- D. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered included in the proposal price and no direct or additional payment will be made therefor.

E. Products

1. Term includes new material, machinery, components, equipment, fixtures, and systems forming the Work. Term does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
2. Contractor shall not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
3. For similar components, Contractor shall provide interchangeable components of the same manufacturer.

F. **Product Procurement Requirements:** County will purchase NEW equipment with options and accessories. Accessory purchases will be made in conjunction with the new equipment purchases. Used, re-conditioned or re-manufactured equipment will not satisfy the requirement for NEW equipment.

G. **Software Licenses and Support:** All software licenses and associated support and/or subscriptions, including but not limited to the original purchase, major releases, maintenance releases, upgrades, updates or patches shall be delivered by ELECTRONIC DISTRIBUTION ONLY to the contact as specified by the County department that placed the order.

H. **Trade-In Opportunities:** With regards to Trade-In offers or promotional opportunities, the County will work with the successful vendor to secure the appropriate discount and the vendor will be expected to pass any savings negotiated to the County.

I. PRODUCT OPTIONS AND SUBSTITUTIONS

1. Summary: This Paragraph 1.3 describes procedures for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the Specifications or approved for use in Addenda that were not already the subject of a Document 00660 (Substitution Request Form) submittal as provided in Document 00200 (Instructions to Bidders).
2. Contractor's Options:
  - a. For products specified only by reference standard: Select any product meeting that standard.
  - b. For products specified by naming one or more products or manufacturers:
    - 1) Select products of any named manufacturer meeting specifications.
    - 2) If product becomes unavailable due to no fault of Contractor, submit Request for Substitution (RFS), including all information contained in this Section F and a fully executed Request for Substitution form, but using the term "Contractor" each place the term "Bidder" appears in that form.
3. Substitutions:
  - a. Except as provided in Document 00200 (Instructions to Bidders) with respect to "or equal" items, County will consider Contractor's substitution requests only when product becomes unavailable due to no fault of Contractor, or if the product specified no longer complies with local regulations or laws. Requests for review of proposed substitute items will

not be accepted from anyone other than Contractor. The RFS shall state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, and whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with County for work on the Project).

- b. Contractor shall submit separate RFS (and four copies) for each product and support each request with:
  - 1) Product identification.
  - 2) Manufacturer's literature.
  - 3) Samples, as applicable.
  - 4) Name and address of similar projects on which product has been used, and dates of installation.
  - 5) Name, address, and telephone number of manufacturer's representative or sales engineer.
  - 6) For construction methods: Detailed description of proposed method; drawings illustrating methods.
- c. Where required, Contractor shall itemize a comparison of the proposed substitution with product specified and list significant variations including, but not limited to dimensions, weights, service requirements, and functional differences. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed. Identify all variations of the proposed substitute from that specified in the RFS and indicate available maintenance, repair, and replacement service.
- d. Contractor shall state whether the substitute will require a change in any of the Contract Documents (or provisions of any other direct contract with County for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.
- e. Contractor shall include accurate cost data comparing proposed substitution with product and amount of net change in Contract Sum including, but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by County in evaluating the proposed substitute. County may require Contractor to furnish additional data about the proposed substitute.
- f. County will not consider substitutions for acceptance (or, in County's sole discretion, County may make Contractor solely responsible for all resulting costs, expenses and other consequences) when a substitution:
  - 1) Results in delay meeting construction Milestones or completion dates.
  - 2) Is indicated or implied on submittals without formal request from Contractor.
  - 3) Is requested directly by Subcontractor or supplier.
  - 4) Acceptance will require substantial revision of Contract Documents.
  - 5) Disrupts Contractor's job rhythm or ability to perform efficiently.

- g. Substitute products shall not be ordered without written acceptance of County.
  - h. County will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.
  - i. Accepted substitutions will be evidenced by a Change Order. All Contract Documents requirements apply to Work involving substitutions.
4. Contractor's Representation and Warranty:
- a. Contractor's RFS constitute a representation and warranty that Contractor:
    - 1) Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
    - 2) Will provide the same warranty for substitution as for specified product.
    - 3) Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
    - 4) Waives claims for additional costs which may subsequently become apparent.
    - 5) Will compensate County for additional redesign costs associated with substitution.
    - 6) Will be responsible for Construction Schedule slippage due to substitution.
    - 7) Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution that are subsequently rejected by County.
    - 8) Will compensate County for all costs; including extra costs of performing Work under Contract Documents, extra cost to other contractors, and any claims brought against County, caused by late requests for substitutions or late ordering of products.
5. County's Duties. County will:
- a. Review Contractor's RFS with reasonable promptness.
  - b. Notify Contractor in writing of decision to accept or reject requested substitution.
6. Administrative Requirements:
- a. Specified products, materials, or systems for Project may include Architectural or Engineering or on-file standards required by the regulatory agency. Contractor's substitution of products, materials or systems may require additional Architectural or Engineering, testing, reviews, approvals, assurances, or other information for compliance with regulatory agency requirements or both. Contractor shall provide all agency approvals or other additional information required and pay additional costs for required County services made necessary by the substitution at no increase in Contract Sum or Contract Time, and as a part of substitution proposal.

#### G. PRODUCT DELIVERY REQUIREMENTS

Contractor shall:

- 1. Deliver products in accordance with manufacturer's instructions.
- 2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.



## H. SHIPPING REQUIREMENTS

1. Preparation for Shipment. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.
  - a. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of County.
  - b. Grease and lubricating oil shall be applied to all bearings and similar items.
2. Shipping. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.
3. Contractor shall store products only in the designated staging area.
4. Handle, store, and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.
5. For exterior storage of fabricated products, place on appropriate supports, above ground.
6. Cover products subject to deterioration with impervious sheet covering.
7. Provide ventilation to avoid condensation.
8. Store loose granular materials on solid flat surfaces in a well-drained area.
9. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
10. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
11. Without limiting the foregoing:
  - a. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the Site and shall comply with the requirements specified herein and provide required information concerning the shipment and delivery of the materials specified in Contract Documents. These requirements also apply to any subsuppliers making direct shipments to the Site. Acceptance of the equipment shall be made only after it is installed, tested, placed in operation and found to comply with all the specified requirements.
  - b. All items shall be checked against packing lists immediately on delivery to the Site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.
  - c. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe fittings and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.

- d. Electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weather tight structures maintained at a temperature above 60°F. Electrical equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.
- e. Equipment having moving parts such as gears, bearings, and seals, shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer. Manufacturer's storage instructions shall be carefully followed by Contractor.
- f. When required by the equipment manufacturer, moving parts shall be rotated a minimum of twice a month to ensure proper lubrication and to avoid metal to metal "welding". Upon installation of the equipment, Contractor shall, at the discretion of County, start the equipment at one-half load for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
- g. When required by the equipment manufacturer, lubricant shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment by Contractor at the time of acceptance.
- h. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.
- i. In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.
- j. Handling. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner than does not damage the equipment.

## **DATA RACKS AND ENCLOSURES**

### **PART 1 — GENERAL**

#### **1.01 SUMMARY**

##### **A. Section includes**

1. Provide all labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to telecommunication cabinets, racks and enclosures.

##### **B. Related sections**

1. Where items specified in other Division 16 sections conflict with the requirements of this Section, the most stringent requirement shall govern.
  - a. 16065 – Grounding and Bonding for Communications
2. The requirements of this Section apply to all Division 16 work, as applicable.
3. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

## 1.02 REFERENCES

A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:

1. CCR –California Code of Regulations, Title 24
  - a. Part 2 -California Building Code (CBC); ICBO Uniform Building Code (UBC) with California amendments
2. EIA –Electronic Industries Alliance
  - a. 310; Cabinets, Racks, Panels, and Associated Equipment
3. UL -Underwriters Laboratories, Inc.
  - a. 1863; Standard for Communications-Circuit Accessories

## 1.03 SUBMITTALS

A. Submit manufacturer's data for grounding materials specified within this Section in accordance to Section 16050.

## 1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the materials specified herein shall be new and unused, bearing UL labels where applicable.

## PART 2 – PRODUCTS

### 2.01 EQUIPMENT ENCLOSURE SYSTEMS

A. General:

1. Provide type, size and quantity as shown on Drawings. Unless otherwise noted, completely enclose interior of enclosure, or ensembles of enclosures with equipment, blank or vent panels, including sides and top. Provide rear access door except at enclosures flush with the wall behind or enclosures which are portable.
2. Provide enclosure systems conforming to the latest CBC requirements for seismic design.
3. The drawings show a scheme of heat management based on generic conventionally packaged components to convey design intent. Coordinate fans, blank panels, vent panels and related heat management provisions with products provided.
4. Equipment Enclosures: Provide each bay with basic frame and pairs of adjustable mounting angles located at front and rear of each bay, angles tapped #10-32, EIA 310-E universally spaced. At each bay, provide pontoon base, solid top panel and with fan where noted or scheduled and locking rear door. Except where otherwise indicated, at each ensemble of bays, provide end (side) panels to provide complete enclosure.

B. Full Height Equipment Enclosure

1. Manufacturers

- a. APC AR3100 or approved equal.

2. Construction

- a. Channels shall be 12 gauge steel minimum with #10-32 mounting holes. All steel panels and door shall be 16 gauge CRS minimum.
- b. Enclosure shall be phosphate pre-treated and finished in a durable black powder coat finish.
- c. Removable front and rear locking doors with universal swing capability. Provide front door and rear steel, vented unless noted otherwise on Drawings.
- d. Field removable steel side panels.

- e. Install top panel with 2 openings minimum for exhaust fan mounting. Install wire guards over unused openings.
- f. Adjustable feet for leveling.
- g. Capable, with proper option, to comply with CBC Zone 4 seismic requirements.
- h. EIA 310-E compliant and UL listed.

## 2.02 RACK PANELS AND ACCESSORIES:

### A. Rack Mounting Screws:

- 1. Screws 10-32; length as required for at least ¼" excess when fully seated; oval head with black plastic non marring cup washer or equivalent ornamental head; nickel, cadmium or black plated; Phillips, Allen Hex, Square-Tip or Torx drive. Slotted screws are not acceptable.

### B. Vertical Wire Management Section:

- 1. All Steel construction with black finish.
- 2. Total cross-sectional area of vertical tray shall be greater than 26 square inches.
- 3. Universal hole pattern to bolt to rack channel.
- 4. Provide matching de-attachable front covers.
- 5. Manufacturers
  - a. Panduit, Hubbell or approved equal.

### C. Horizontal Wire Management Panel (1 or 2 Rack Unit(s)):

- 1. All Steel construction with black finish.
- 2. Panel without cover will not be accepted.
- 3. Manufacturers
  - a. Panduit, Hubbell or approved equal.

## 2.03 EQUIPMENT ENCLOSURE VENTILATION:

### A. Enclosure exhaust fan

- 1. Characteristics
  - a. UL labeled 4 ½" diameter fan of smooth ball bearing design.
  - b. Electrical: 115Vac, 60Hz
  - c. Air flow: approximately 50CFM
  - d. Sound level: <40dBA
- 2. Supply metal wire guard where exposed.
- 3. Manufacturers
  - a. Comair Rotron, Rittal or approved equal.

### B. Enclosure thermostat

- 1. Characteristics
  - a. UL labeled device with bi-metal temperature sensitive element.
  - b. Temperature control range from +10°C to +60°C
  - c. Electrical
    - 1) Requirements: 115Vac, 60Hz
    - 2) Output Contact: 1A minimum at 120Vac
- 2. Manufacturers
  - a. Rittal, Honeywell or approved equal.

## PART 3 — EXECUTION

### 3.01 INSTALLATION

- A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

- B. Access shall not require de-mounting or de-energizing of equipment. Install access covers, hinged panels or pull-out drawers as required to insure complete access to terminals and interior components.
- C. Provide adequate work room clearances per CEC Article 110.
- D. Provide permanent labels for all equipment devices installed within rack(s)/enclosure(s).
- E. Anchorage wall and floor mounted racks/enclosures to structural members to withstand seismic forces based upon rack/enclosure's maximum load capacity.

## POWER DISTRIBUTION UNITS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. **Scope:** Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for a power distribution unit (PDU) as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
- B. **Section Includes:** The work specified in this Section includes, but shall not be limited to, requirements for a complete modular power distribution system for powering IT loads.
  1. This specification describes the operation and functionality of a continuous duty, three phase Modular Power Distribution Unit for Data Center and Infrastructure Equipment Room installation, hereafter referred to as the PDU.
  2. The PDU shall provide a mechanical means of complete isolation of the input source from the critical output distribution.
  3. The PDU shall contain the appropriate modular distribution panel within a Rack enclosure suitable for installation in a data center environment. The distribution panel shall be intrinsically finger safe, and shall be suitable for the installation of single or three phase modular circuit breaker assemblies without the need for hand tools.
  4. Each 208V PDU shall be comprised of trained-personnel hot-swappable circuit breakers which shall require no tools to install.
  5. All of the above system components are housed in an APC NetShelter™ SX Rack, 300mm (W) x 1070mm (D) x 2000mm (H).
  6. The PDU and associated equipment shall operate in conjunction with a primary power supply to provide quality uninterrupted power for mission critical, electronic equipment load.
  7. All programming and miscellaneous components for a fully operational system as described in this Section shall be available as part of the PDU.

#### 1.2 REFERENCES

- A. **General:** The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
- B. **Electronic Industries Association (EIA):**
  1. EIA 310, "Racks, Panels, and Associated Equipment" (copyrighted by EIA, ANSI approved).
- C. **Institute of Electrical and Electronics Engineers (IEEE):**
  1. IEEE 519-1992 Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.

- D. **International Organization for Standardization (ISO):**
  - 1. ISO 9001, "Quality Management Systems - Requirements."
  - 2. ISO 14001, "Environmental Management Systems - Requirements With Guidance for Use."
- E. **Underwriters Laboratories, Inc. (UL):**
  - 1. UL 60950, "Standard for Information Technology Equipment."
  - 2. ULc CSA 60950-1
- F. Where applicable, the PDU shall also be designed in accordance with publications from the following organizations and committees:
  - 1. NFPA- National Fire Protection Associations
  - 2. OSHA - Occupational Safety and Health Administration

### 1.3 SYSTEM DESCRIPTION

- A. **Design Requirements**
  - 1. The PDU shall be sized for 250 kVA load.
- B. **System Characteristics**
  - 1. **System Capacity: 277kW** The PDPM277H PDU shall support 400A at 400V maximum input and provide 277kW output.
  - 2. **Upstream Breaker Protection:** Upstream breaker protection rated at 400A is recommended.
  - 3. **Input:** The system input shall be configurable as single mains derived from a three phase wye source. Standard cable entry shall be through the top. Bottom cable entry shall also be facilitated.]
    - a. **AC Nominal Input Voltage:** PDPM277H: 400V/230V 3-phase, 3-Wire+N+G, 60Hz
    - b. **Maximum Input Current:** PDPM277H: 400A
    - c. **Short Circuit Withstand Rating:** PDPM277H: 10kA Symmetrical
    - d. **Rated Impulse Withstand Voltage (UCC):** PDPM277H: 4kV
  - 4. **Output:**
    - a. **Nominal Output:** 277kW, 400V 3-phase, 400A maximum, 3-wire + N + G

### 1.4 SUBMITTALS

- A. **Product Data:** Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but shall not be limited to, the following:
  - 1. As bid system bill of materials.
  - 2. Product catalog sheets or equipment brochures.
  - 3. Product guide specifications.
- B. **Shop Drawings:** Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data, including, but not limited to, the following:
  - 1. Installation information, including, but not limited to, weights and dimensions.
  - 2. Information about terminal locations for power and control connections.
  - 3. Drawings for requested optional accessories.
- C. **Wiring Diagrams:** Submit wiring diagrams detailing power systems, clearly differentiating between manufacturer-installed wiring and field-installed wiring, and between components provided by the manufacturer and those provided by others.
  - 1. Submit system single-line diagram.

- D. **Operation and Maintenance Data:** Submit operation and maintenance data to include in operation and maintenance manuals including, but not limited to, safe and correct operation of UPS functions.
1. Submit an installation manual, which shall include, but shall not be limited to, instructions for storage, handling, examination, preparation, installation, and start-up of UPS.
  2. Submit an operation and maintenance manual, which shall include, but shall not be limited to, operating instructions.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

1. **Manufacturer Qualifications:** Manufacturer shall be a firm engaged in the manufacture of modular PDUs of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 20 years.
  - a. The manufacturer shall be ISO 9001 certified and shall be designed to internationally accepted standards.

### B. Regulatory Requirements:

Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

1. Work shall also be designed in accordance with the following:
  - a. NFPA 70
2. Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:
  - a. National Fire Protection Association (NFPA).
  - b. National Electrical Manufacturers Association (NEMA).
  - c. Occupational Safety and Health Administration (OSHA).
  - d. Institute of Electrical and Electronics Engineers, Inc. (IEEE); ANSI/IEEE 519.
  - e. ISO 9001
  - f. ISO 14001
  - g. FCC

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. The customer shall store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

## 1.7 PROJECT CONDITIONS

- A. **Environmental Requirements:** Do not install PDUs until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
  1. Environmental:
    - a. Storage Ambient Temperature: 0 to +45°C
    - b. Operating Ambient Temperature: 0 to 30°C (0 to 40°C derated)
    - c. Relative Humidity: 0 percent to 95 percent, non-condensing.
    - d. Altitude: 0 – 10,000 m

## 1.8 WARRANTY

- A. **Special Warranty:** The Contractor shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for period indicated below. This special warranty shall extend the one year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the Installer and the manufacturer.
  - 1. **Power Distribution Unit:** The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of 12 months from date of installation or acceptance by the Owner or 18 months from date of shipment from the manufacturer, whichever occurs first.
- B. **Additional Owner Rights:** The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

## 1.9 MAINTENANCE

- A. A complete offering of preventative and full service maintenance contracts for the Power Distribution Unit shall be available from the manufacturer. Contract work shall be performed by factory trained service personnel.

## PART 2 – PRODUCT

### 2.1 MANUFACTURERS

- A. **Basis of Design:** Product specified is “APC Modular Power Distribution Unit 277kW” as manufactured by APC by Schneider Electric. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable.

### 2.2 DESIGN REQUIREMENTS

As a minimum, the PDU shall contain the following features and accessories:

- A. **Input voltage:** The PDU shall be available for a PDPM277H: 480V input.
- B. **Distribution Board:** Also included in the PDU shall be one 72 pole distribution board connected to the output bus of the PDU to serve as critical load distribution.
- C. **Enclosure with locking mechanism:** The PDU shall also have a full-length hinged front door, with locking mechanism, to allow access to the panel board circuits. There shall also be a hinged rear door to allow access to the back of the unit.
- D. **Testing and quality assurance:** All circuit breakers shall be 100% factory tested to ensure the highest quality for the PDU. In addition the PDU shall be tested with 100% load and all panel circuit breakers shall be 100% tested. The PDU shall also be Hipot tested per UL 60950-1 guidelines.

### 2.3 DISPLAYS AND CONTROLS

- A. **Display unit:** For purposes of providing local annunciation of status and alarm messages, the PDU shall have a microprocessor-controlled display unit located on a hinged door in front of the system. The display shall consist of an alphanumeric display with pushbutton switches, allowing retrieval of active alarms, system level programming, and event history of the PDU.
- B. **Metered Data:** The following data shall be available on the alphanumeric display:
  - 1. Year, month, day, hour, minute, second of occurring events
  - 2. Output voltage by phase



3. Power distribution module status and manufacturing information
  4. Current and power used by the load
  5. Load as a percentage of capacity
  6. Total energy usage
  7. Volt meter
  8. Circuit configuration, including individual load configuration and global alarm configuration
  9. Alarms
  10. Log
  11. Network configuration
  12. Help files
- C. **Event log:** The display unit shall allow trained personnel to display a time and date stamped log.
- D. **Alarms:** The display unit shall allow the Owner to display a log of active alarms. The following minimum set of alarm conditions shall be available:
1. High Module Current
  2. High Subfeed Current
  3. Low Module Current
  4. Low Subfeed Current
  5. Maximum Module Current
  6. Maximum Subfeed Current
  7. Minimum Module Current
  8. Minimum Subfeed Current
  9. Modular Distribution Communication
  10. Module Breaker Open
  11. Subfeed Breaker Open
- E. **Controls:** The following controls or programming functions shall be accomplished by the use of the display unit. Push-button membrane switches shall facilitate these operations:
1. Silence audible alarm.
  2. Display or set the date and time.
  3. Adjust set points for different alarms.

## 2.4 OPTIONAL OVERHEAD DISTRIBUTION

- A. **Flexible Distribution Conductors:** For purposes of overhead distribution wiring of datacenter branch circuits, flexible conductors of DP1 type shall be available as a distribution means. Flexible conductors shall be equipped with NEMA or IEC style cord caps and shall be agency approved under UL60950 as part of the InfraStruxure system.
- B. **Cable Ladder:** For purposes of routing data and power cables between rows in a datacenter aisle layout, cable ladders shall be available to span the gap between rows. Cable ladders shall be agency approved under UL60950 as part of the InfraStruxure system. The use of overhead cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for downflow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor. Optional covers shall be available for ladders as a means of adhering to local codes requiring such.
- C. **Cable Trough:** For purposes of routing data and power cable along the length of a row of IT enclosures in a data center environment, cable troughs shall be available as a means of separating and housing data and power cable. Optional covers shall

be available for troughs as a means of adhering to local codes requiring such. The use of overhead cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor.

## 2.5 FLOOR ANCHOR BRACKETS

- A. To meet the requirements of NFPA 70 110.13, floor anchor brackets shall be available to solidly connect the PDU to minimize unintended moving of the equipment.

## 2.6 REMOTE SYSTEM MONITORING

- A. The following methods of remote PDU monitoring shall be available:
  1. Web Monitoring: Remote monitoring shall be available via a web browser such as Internet Explorer.
  2. RS232 Monitoring: Remote PDU monitoring shall be possible via RS232 serial port connection.
  3. Simple Network Management Protocol (SNMP): Remote PDU Monitoring shall be possible through a standard MIB II compliant liant platform.

## 2.7 OPTIONS

- A. **Power Distribution Modules:** A variety of Power Distribution Modules shall be available for the Power Distribution Unit.
- B. **InfraStruxure Central:** A centralized manager hereafter referred to as ISX Central shall be available for purposes of complete system monitoring and management of all components outlined in this specification.
  1. **Monitoring** - ISX Central shall be capable of monitoring the PDU through a network of category 5 cable and a 24 port hub, supplied by the PDU manufacturer. This 24 port hub shall relay information to the ISX Central, which in turn shall allow access to this information via the user's public network via a single IP address.
  2. **Monitored Values:** ISX Central shall be capable of monitoring alarms, general status parameters, voltage and current of the PDU.
  3. **Thresholds:** For individualized customer needs, ISX Central shall allow for user configurable thresholds for alarm notification. With this feature ISX Central can notify clients of reaching thresholds for PDU capacity, or branch circuit breaker capacity. Other custom programmable alarm points for non-APC products shall also be available via dry contact input signal.
  4. **Public Network Monitoring:** The ISX Central shall also be capable of monitoring other APC devices that are connected to the client's public network.

## PART 3- EXECUTION

### 3.1 EXAMINATION

- A. **Verification of Conditions:** Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect/Engineer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

### 3.2 INSTALLATION

- A. General: Preparation and installation shall be in accordance with reviewed product data,
- B. final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.
- C. Factory-Assisted Start-Up: Factory trained service personnel shall perform the following inspections, test procedures, and on-site training:
  1. **Visual Inspection:**
    - a. Inspect equipment for signs of damage.
    - b. Verify installation per manufacturer's instructions.
    - c. Inspect cabinets for foreign objects.
  2. **Mechanical Inspection:**
    - a. Check all internal control wiring connections.
    - b. Check all internal power wiring connections.
    - c. Check all terminal screws, nuts, and/or spade lugs for tightness.
  3. **Electrical Inspection:**
    - a. Verify correct input voltage.
    - b. Verify correct phase rotation of all mains connections.
    - c. Verify correct control wiring and terminations.
    - d. Verify neutral and ground conductors are properly landed.
  4. **Site Testing:**
    - a. Ensure proper system start-up.
    - b. Verify proper firmware control functions.
    - c. Verify system set points.
    - d. Document, sign, and date all test results.
  5. **On-Site Operational Training:** During the factory assisted start-up, operational training for site personnel shall include keypad operation, LED indicator definitions, start-up and shutdown procedures, AC disconnect operation, and alarm information.

### 3.3 FIELD QUALITY CONTROL

#### A. MANUFACTURER FIELD SERVICE

1. **Worldwide service:** The PDU manufacturer shall have a worldwide service organization available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the PDU system and power equipment. Standard offering is Next Business Day under the original one- year warranty. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year, 4-hour response time service support.
2. **Replacement parts:** Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, and 365 days a year. The worldwide service organization shall be capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

### 3.4 DEMONSTRATION

- A. **General:** Provide the services of a factory-authorized service representative of the manufacturer to provide start-up service and to demonstrate and train the Owner's personnel at time of startup.

1. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
2. Train the Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
3. Review data in operation and maintenance manuals with the Owner's personnel.

## **PART 1 - GENERAL**

### **1.1 SUMMARY**

- A. **Scope:** Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for a static uninterruptible power supply (UPS) as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
- B. **Section Includes:** The work specified in this Section includes, but shall not be limited to, a continuous duty, three-phase, solid state, on-line double conversion static UPS.
  1. The UPS shall utilize a rack-mounted N+1 redundant, scalable array architecture. The system power train shall be comprised of 25 kVA/25 kW power modules and shall be capable of being configured for N+X redundant operation at the rated system load.
  2. Each hot-swappable/user replaceable 25 kVA/25 kW power module shall contain a fully rated, power factor corrected input rectifier/boost converter hereafter referred to as the PFC input stage, a fully rated output inverter, battery charging circuit and field replaceable fans. Power module fans shall be variable speed controlled and capable of maintaining the system in the event of a single fan failure. The system shall also be comprised of a hot swappable continuous duty bypass static switch module, redundant control modules, redundant logic power supplies, and touch screen user interface/display. Hot swappable/user-replaceable battery modules shall be available as an option.
  3. All of the above system components shall be housed in a standard APC NetShelter SX Racks with one of the following dimensions:
    - a. 600 mm wide by 1070 mm deep by 2000 mm high (I/O Frame or Power Frame)
    - b. 750 mm wide by 1070 mm deep by 2000 mm high (Battery Frame)
    - c. 300 mm wide by 1070 mm deep by 2000 mm high (optional Battery Side Car or optional Bottom
    - d. Feed Frame)
    - e. 1000 mm wide by 1070 mm deep by 2000 mm high (optional I/O Frame with Maintenance Bypass with Distribution). [Maintenance Bypass Panels for parallel systems will be customized and will have custom dimensions based on the configuration.] The racks shall require no rear access for maintenance.
  4. In addition, this Section describes the performance, functionality, and design of the optional UPS maintenance bypass cabinet with output distribution, hereafter referred to as the MBwD and the battery system. The MBwD shall not be included or supported by UPSs in parallel configurations.

5. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission critical, electronic equipment load.
6. All programming and miscellaneous components for a fully operational system as described in this Section shall be available as part of the UPS.

## 1.2 REFERENCES

- A. **General:** The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
- B. **Institute of Electrical and Electronics Engineers, Inc. (IEEE):**
  1. ANSI/IEEE 519, "Guide for Harmonic Control and Reactive Compensation of Static Power Converters" (copyrighted by IEEE, ANSI approved).
- C. **International Organization for Standardization (ISO):**
  1. ISO 9001, "Quality Management Systems - Requirements."
  2. ISO 14001, "Environmental Management Systems - Requirements with Guidance for Use."

## 1.3 SYSTEM DESCRIPTION

- A. **Design Requirements:**
  1. The UPS shall be sized for 100 kVA and 100 kW load.
  2. The UPS battery shall be sized for 100 kVA at a power factor of 1.0 for 7 minutes.
- B. **System Characteristics:**
  1. **System Capacity:** The system shall be rated for full kW output in the following frame sizes:
    - a. 250 kVA/kW—can be configured with up to ten (10) 25 kW power modules for 250 kW N+0 or
    - b. 225 kW N+1 module-level redundancy.
  2. **Input:** The system input shall be configurable as either single or dual mains derived from a three phase wye source. Standard cable entry shall be through the top. Bottom cable entry shall also be facilitated. Depending on the specific configuration, the use of the optional bottom feed enclosure may be required. An option shall be available to facilitate the connection of NEMA 2 compression lugs for main input, bypass input, DC input, and output cable connections.
    - a. **AC Input Nominal Voltage:** System voltage shall support 3-phase + neutral + ground or 3-phase + ground in a dual or single mains configuration and be selectable at the front panel by service personnel with the following options:
      - 1) 380 volts, 400 volts, 415 volts, and 480 volts.
    - b. **AC Input Voltage Window:**
      - 1)  $\pm 15$  percent for full performance (340 to 460 volts at 400 volts, 408 volts to 552 volts at 480 volts).
      - 2) -50 percent for reduced load (200 volts at 400 volts, 240 volts at 480 volts).
    - c. **Short Circuit Withstand Rating:**
      - 1) **UPS:** 65,000 Symmetrical Amperes

- 2) **Optional Maintenance Bypass with Distribution Panel:** 50,000 Symmetrical Amperes or lowest rated subfeed circuit breaker
  - 3) **Custom Switchgear:** 65,000 Symmetrical Amperes or as specified
  - 4) **Lowest Rated Subfeed Circuit Breaker (60-100A) for MBwD:** 22,000 Symmetrical Amperes
  - 5) **Lowest Rated Subfeed Circuit Breaker (125-400A) for MBwD:** 25,000 Symmetrical Amperes
  - 6) **Custom Subfeed Circuit Breakers for MBwD:** Subfeed circuit breakers with a short circuit withstand rating greater than 22,000 Symmetrical Amperes or 25,000 Symmetrical Amperes shall be available as a custom option.
- d. **Maximum Frequency Range:** 40 to 70 hertz.
- 1) Frequency shall be synchronized to bypass input when available over the standard range of 57 to 63 hertz. Optional frequency tolerance range shall be configurable from 0.5 percent to 8 percent from front panel. Default shall be +/-1% (+/-0.6Hz at 60Hz).
- e. **Input Power Factor:**
- 1) Greater than 0.995 with load at 100 percent.
  - 2) Greater than 0.99 with loads above 50 percent.
  - 3) Greater than 0.97 with loads above 25 percent.
- f. **Input Current in Normal Operation:**
- 1) As a percentage of output current, with no charging, will be limited to a maximum of 105 percent of system capacity
- g. **Input Current Distortion with No Additional Filters:**
- 1) Less than 5 percent.
- h. **Soft-Start:**
- 1) Shall be linear from 0 percent to 100 percent input current and shall not exhibit inrush. This shall take place over an Owner-selectable 1 second to 40 second time period with a factory default of 15 seconds.

### 3. UPS Output:

- a. **AC Output Nominal Output:** System voltage shall support 3-phases + neutral + ground or 3- phases + ground be selectable at the graphical user interface by service personnel with the following options:
  - 1) 380 volts, 400 volts, 415 volts, and 480 volts.
- b. **AC Output Voltage Distortion:** Less than 2 percent at 100 percent linear load, less than 3 percent for SMPS load as defined by IEC 62040-3.
- c. **AC Output Voltage Regulation:**  $\pm 1$  percent for 100 percent linear or non-linear load.
- d. **Voltage Transient Response:**  $\pm 5$  percent maximum RMS change in a half cycle at load step 0 percent to 100 percent or 100 percent to 0 percent.
- e. **Voltage Transient Recovery:** Within less than 50 milliseconds.
- f. **Output Voltage Harmonic Distortion:** Less than 2 percent THD maximum and 1 percent single harmonic for a 100 percent linear load.
- g. **Overload Rating:**

- 1) **Normal Operation:**
    - a) 150 percent for 30 seconds before transfer to bypass.
    - b) 125 percent for 10 minutes before transfer to bypass.
  - 2) **Battery Operation:** 125 percent for 30 seconds (up to 10 minutes with fully configured battery solution)
  - 3) **Bypass Operation:**
    - a) 125 percent continuous at 480 volts.
    - b) 1000 percent for 100 milliseconds.
  - h. **System AC-AC Efficiency:**
    - 1) Normal operation greater than 96 percent at 40 percent to 100 percent load.
    - 2) Battery operation greater than 95 percent at 40 percent to 100 percent load.
  - i. **Output Power Factor Rating:** 0.5 leading to 0.5 lagging without any derating.
4. **Charge current:**
- a. 20% of charging capacity when the load is less than 90%
  - b. 10% of charging capacity with 100% load
5. **Parallel cabling:**
- a. The standard cable distance shall be 25m (81.3ft)
  - b. Custom cables of other lengths shall be accommodated.
  - c. The maximum cable distance shall be 75m (244ft) across all UPSs in the installation.
6. **Regulatory compliance:** The UPS shall comply with the following standards:
- a. **Underwriters Laboratories, Inc. (UL):**
    - 1) UL 891, "Standard for Dead-Front Switchboards" (copyrighted by UL, ANSI approved).
    - 2) UL 1558, "Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear."
    - 3) UL 1778, "Standard for Uninterruptible Power Supply Equipment" (copyrighted by UL, ANSI approved).
    - 4) UL 60950, "Standard for Information Technology Equipment."
  - b. **International Electrotechnical Commission (IEC):**
    - 1) IEC 61000-4-2, "Electromagnetic Compatibility - Testing and Measurement Techniques; Electrostatic Discharge Immunity Test."
    - 2) IEC 61000-4-3, "Electromagnetic Compatibility - Testing and Measurement Techniques; Radiated, Radio Frequency, Electromagnetic Field Immunity Test."
    - 3) IEC 61000-4-4, "Electromagnetic Compatibility - Testing and Measurement Techniques; Electrical Fast Transient/Burst Immunity Test."
    - 4) IEC 61000-4-5, "Electromagnetic Compatibility - Testing and Measurement Techniques; Surge Immunity Test."
    - 5) IEC 62040-2, "Uninterruptible Power Systems - Electromagnetic Compatibility (EMC) Requirements,"
    - 6) IEC 62040-3, "Uninterruptible Power Systems - Method of Specifying the Performance and Test Requirements."

## 1.4 SUBMITTALS

- A. **Product Data:** Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but shall not be limited to, the following:
  - 1. As bid system bill of materials.
  - 2. Product catalog sheets or equipment brochures.
  - 3. Product guide specifications.
- B. **Shop Drawings:** Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data, including, but not limited to, the following:
  - 1. Installation information, including, but not limited to, weights and dimensions.
  - 2. Information about terminal locations for power and control connections.
  - 3. Drawings for requested optional accessories.
- C. **Wiring Diagrams:** Submit wiring diagrams detailing power, signal, and control systems, clearly differentiating between manufacturer-installed wiring and field-installed wiring, and between components provided by the manufacturer and those provided by others.
  - 1. Submit system single-line operation diagram.
- D. **Operation and Maintenance Data:** Submit operation and maintenance data to include in operation and maintenance manuals, including, but not limited to, safe and correct operation of UPS functions.
  - 1. Submit an installation manual, which shall include, but shall not be limited to, instructions for storage, handling, examination, preparation, installation, and start-up of UPS.
  - 2. Submit an operation and maintenance manual, which shall include, but shall not be limited to, operating instructions.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

- 1. **Manufacturer Qualifications:** Manufacturer shall be a firm engaged in the manufacture of solid state UPS of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 20 years.
    - a. The manufacturer shall be ISO 9001 certified and shall be designed to internationally accepted standards.
  - 2. **Installer Qualifications:** Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing solid state UPS similar in type and scope to that required for this Project.
- B. **Regulatory Requirements:** Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.
- 1. Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:
    - a. National Fire Protection Association (NFPA).
    - b. National Electrical Manufacturers Association (NEMA).
    - c. Occupational Safety and Health Administration (OSHA).
    - d. Institute of Electrical and Electronics Engineers, Inc. (IEEE); ANSI/IEEE 519.
    - e. ISO 9001
    - f. ISO 14001
    - g. IEC 61000-4-2.

1) **Performance:** Minimum Level 3, Criterion A.



- h. IEC 61000-4-3.
  - 1) **Performance:** Minimum Level 2, Criterion A.
- i. IEC 61000-4-4.
  - 1) **Performance:** Minimum Level 2, Criterion A.
- j. IEC 61000-4-5.
  - 1) **Performance:** Minimum Level 3, Criterion A.
- k. IEC 62040-2, UL1778 (CUL), UL60950-1
- l. EN50091-2 / IEC62040 (Class A), FCC15A
- m. VFI-SS-111 performance level compliance (Voltage and Frequency Independent).
- n. VFI-SS-112 protection class (Voltage and Frequency Independent).

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. The customer shall store materials in their original, undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

## 1.7 PROJECT CONDITIONS

- A. **Environmental Requirements:** Do not install solid state UPS until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
  - 1. **Temperature:**
    - a. **Storage Ambient Temperature:** 5 to 104°F (-15°C to 40 °C)
    - b. **Storage Ambient Temperature without batteries:** -22° to 158°F (-30°C to 70°C) without batteries).
    - c. **Operating Ambient Temperature:** 32°F to 104°F (0°C to 40°C)
    - d. **Ideal Operating Ambient Temperature (for most battery types):** 77°F (25°C)
  - 2. **Humidity:**
    - a. **Relative Humidity:** 0 percent to 95 percent.
    - b. **Operating Relative Humidity:** 0 percent to 95 percent non-condensing.
    - c. **Altitude:** Maximum installation with no derating of the UPS output shall be 3280 feet (1000 m) above sea level. The UPS capacity shall be derated for altitude as follows:
      - 1) 4921 feet (1500 m), 95 percent load.
      - 2) 6562 feet (2000 m), 91 percent load.
      - 3) 8202 feet (2500 m), 86 percent load.
      - 4) 9843 feet (3000 m), 82 percent load.
  - 3. **Audible Noise (As Measured 3 Feet [914 mm] From Surface):**
    - a. **At 480 Volt Operation (at 77 °F [25 °C]):**
      - 1) 54 dBA at 100 percent load.
      - 2) 45 dBA at 70 percent load.

## 1.8 WARRANTY

- A. **Special Warranty:** The Contractor shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for period indicated below. This special warranty shall extend the one year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the Installer and the manufacturer.
  - 1. **UPS Module:** The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of 12 months from date of installation or acceptance by the Owner or 18 months from date of shipment from the manufacturer, whichever occurs first.
- B. **Additional Owner Rights:** The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

## 1.9 MAINTENANCE

- A. A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available from the manufacturer. Contract work shall be performed by factory trained service personnel.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. **Basis of Design:** Product specified is “APC Symmetra PX 250/500 kW” as manufactured by APC by Schneider Electric. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect/Engineer will be the sole judge of the basis of what is equivalent.

### 2.2 MODES OF OPERATION

- A. **Normal:** The PFC input stage and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- B. **Battery:** Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation. Upon restoration of utility power to the UPS input, the UPS shall recharge the battery.
- C. **Static Bypass:** The static bypass shall be used to provide controller transfer of critical load from the inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of a UPS output fault or significant output overload emergency, this transfer shall be an automatic function. Manual transfer to static bypass (called “requested bypass”) shall be available in order to facilitate a controlled transfer to maintenance bypass. [For parallel systems, the static bypass switches shall be installed in parallel.]
- D. **Maintenance Bypass:** The system shall be equipped with an optional integrated, bus connected external MBwD to electrically isolate the UPS during routine maintenance and service of the UPS. The MBwD shall allow for the completely electrical isolation of the UPS. An option for an external make-before-break external maintenance bypass panel shall be available.

## 2.3 PFC INPUT STAGE

- A. **General:** The PFC input stage converters of the system shall be housed within the removable power modules, and shall constantly control the power imported from the mains input of the system, to provide the necessary UPS power for precise regulation of the DC bus voltage, battery charging, and main inverter regulated output power. These power modules shall be connected in parallel within the UPS frame.
- B. **Input Current Total Harmonic Distortion:** The input current THDI shall be held to less than 5 percent at system load greater than 50 percent while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting both a linear or non-linear load. This shall be accomplished without the requirement for additional or optional filters, magnetic devices, or other components.
- C. **Soft-Start Operation:** As a standard feature, the UPS shall contain soft-start functionality, capable of limiting the input current from 0 percent to 100 percent of the nominal input over a default 10 second period, when returning to the AC utility source from battery operation. The change in current over the change in time shall take place in a linear manner throughout the entire operation.
- D. **Magnetization Inrush Current:** The UPS shall exhibit zero inrush current. The default softstart is 15 seconds.
- E. **Input Current Limit:**
  - 1. The PFC input stage shall control and limit the input current draw from utility to 124 percent of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100 percent load at -15% utility power and no charge power.
  - 2. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100 percent of UPS capacity, input current shall not exceed 116 percent of UPS output current, while providing full battery recharge power and importing necessary power to account for system losses.
- F. **Redundancy:** The UPS shall be capable of being configured with redundant PFC input stages, each with semiconductor fusing, and logic-controlled contactors to isolate a failed module from the input bus.
- G. **Charging:**
  - 1. The battery charging shall keep the DC bus float voltage of  $\pm 327$  volts,  $\pm 1$  percent.
  - 2. The battery charging circuit shall contain a temperature compensation circuit, which shall regulate the battery charging to optimize battery life.
  - 3. The battery charging circuit shall remain active when in static bypass and in normal operation.
  - 4. The UPS shall be capable of reducing the battery charging current under low input voltage conditions as long as utility power for the PFC is being provided.
  - 5. Battery charge shall be limited to 10 percent of the system capacity by default (or optionally, 20% with reduced load).
  - 6. The battery charging circuit will support boost, auto boost and equalization functions.
  - 7. An input connection will be provided that will allow the user to inhibit boost charging.
  - 8. The UPS shall be capable of reducing the battery charging current down to zero based on user defined input.

- H. **Back-Feed Protection:** The above mentioned logic-controlled contactor shall also provide the back-feed protection required by UL 1778.

## 2.4 OUTPUT INVERTER

- A. **General:** The UPS output inverter shall constantly develop the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT driven bi-directional power converters. In both normal operation and battery operation, the output inverters shall create an output voltage independent of the mains input voltage. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages shall not affect the amplitude or sinusoidal nature of the output voltage sine wave of the inverters.
- B. **Overload Capability:** The output power converters shall be capable of 230 percent for short circuit clearing. Steady-state overload conditions of up to 150 percent of system capacity shall be sustained by the inverter for 30 seconds in normal operation. Steady-state overload conditions of up to 125 percent of system capacity shall be sustained by the inverter for 10 minutes in normal operation. Overloads persisting past the outlined time limitation the critical load shall be switched to the automatic static bypass output of the UPS.
- C. **Output Contactor:** The output inverter shall be provided with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be isolated from the critical bus.
- D. **Battery Protection:** The inverter shall be provided with monitoring and control circuits to limit the level of discharge on the battery system.
- E. **Redundancy:** The UPS shall be capable of being configured with redundant output inverters, each with semiconductor fusing, and logic-controlled contactors to remove a failed component from the input, DC, and output critical bus.

## 2.5 STATIC BYPASS

- A. **General:** As part of the UPS, a system static bypass module shall be provided. The system static bypass shall be hot swappable and provide no break transfer of the critical load from the inverter output to the static bypass input source during times where maintenance is required, or the inverter cannot support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and static bypass module shall constantly monitor the auxiliary contacts of their respective circuit breakers, as well as the bypass source voltage, and inhibit potentially unsuccessful transfers to static bypass from taking place.
- B. **Design:** The design of the static switch power path shall consist of silicon-controlled rectifiers (SCR) with a continuous duty rating of 125 percent of the UPS output rating.
- C. **Automatic Transfers:** An automatic transfer of load to static bypass shall take place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from static bypass back to normal operation shall take place when the overload condition is removed from the critical output bus of the system. Automatic transfers of load to static bypass shall also take place if for any reason the UPS cannot support the critical bus.
- D. **Manual Transfers:** Manually initiated transfers to and from static bypass shall be initiated through the UPS graphical user interface. [For parallel configurations, transfers to and from bypass can be initiated from any online UPS in the system.]
- E. **Overloads:** For 480V systems, the static bypass shall be rated and capable of handling overloads equal to or less than 125 percent of the rated system output continuously. For 400/415V systems, the static bypass shall be rated and capable of

handling overloads equal to or less than 110 percent of the rated system output continuously. For instantaneous overloads caused by inrush current from magnetic devices, or short circuit conditions, the static bypass shall be capable of sustaining overloads of 1000 percent of system capacity for periods of up to 100 milliseconds.

- F. **Modular:** The static bypass switch shall be of a modular design.
- G. **System Protection:** As a requirement of UL 1778, back-feed protection in the static bypass circuit shall also be incorporated in the system design. To achieve back-feed protection, a mechanical contactor in series with the bypass SCR(s) shall be controlled by the UPS/static switch, to open immediately upon sensing a condition where back-feeding of the static switch by any source connected to the critical output bus of the system is occurring. One such condition could be a result of a shorted SCR.
- H. **Static Switch:** For parallel systems, static switch design shall be distributed/integral type. External static switch cabinets shall not be necessary.

## 2.6 DISPLAY AND CONTROLS

- A. **Control Logic:** The UPS shall be controlled by two fully redundant, owner-replaceable and hotswappable intelligence modules (IM). These modules shall have separate, optically isolated, communication paths to the power and static switch modules. Logic power for the control modules shall be derived from redundant power supplies, each having a separate AC and DC input and output. The communication of the control modules shall be of controller area network (CAN Bus) and EIA485. All control functions such as start-up, transfer to bypass, and all parameter changes shall be accessible from the touch screen user interface. Operations such as start-up will have step by step instructions from the user interface to ensure correct sequencing of operations. To further minimize user error, the touch screen shall highlight, in green, all functions that have been completed. The current step in the process shall also be outlined to ensure easy operation. Each UPS system shall have one such user interface.
- B. **Graphical User Interface:** A microprocessor-controlled user interface/display unit shall be located on the front of the system. The display shall consist of a 10.4 inch (264 mm) multicolor graphical display with 800 x 600 resolution. The display shall be localized into the following languages:
  - 1. Brazilian Portuguese
  - 2. Chinese
  - 3. French
  - 4. German
  - 5. Korean
  - 6. Russian
  - 7. Spanish
- C. **Metered Data:** The following data shall be available on the graphical user interface/display:
  - 1. Input/output voltages, currents, frequencies.
  - 2. Breaker and switch status.
  - 3. Battery status.
  - 4. Event log.
  - 5. Energy measurements.
- D. **Event Log:** The display unit shall allow the Owner to display a time and date stamped log. The event log shall be capable of holding 1500 entries. The default event log size shall be 400 entries.

E. **Alarms:** The display unit shall allow the Owner to display a log of active alarms. The following minimum set of alarm conditions shall be available:

1. Input frequency outside configured range.
2. AC adequate for UPS but not for bypass.
3. Low/no AC input, startup on battery.
4. Intelligence module inserted.
5. Intelligence module removed.
6. Redundant intelligence module inserted.
7. Redundant intelligence module removed.
8. Number of batteries changed since last on.
9. Number of power modules changed since last on.
10. Number of batteries increased.
11. Number of batteries decreased.
12. Number of power modules increased.
13. Number of power modules decreased.
14. Number of external battery cabinets increased.
15. Number of external battery cabinets decreased.
16. Redundancy restored.
17. Need battery replacement.
18. The redundant intelligence module is in control.
19. UPS fault.
20. On battery.
21. Shutdown or unable to transfer to battery due to overload.
22. Load shutdown from bypass. input frequency, volts outside limits.
23. Fault, internal temperature exceeded system normal limits.
24. Input circuit breaker open.
25. System level fan failed.
26. Bad battery module.
27. Bad power module.
28. Intelligence module installed and failed.
29. Redundant intelligence module installed and failed.
30. Redundancy lost.
31. Redundancy below alarm threshold.
32. Runtime below alarm threshold.
33. Load above alarm threshold.
34. Sub feed breaker above critical level
35. Load no longer above alarm threshold.
36. Minimum runtime restored.
37. Bypass not in range (either frequency or voltage).
38. Back-feed contactor stuck in off position.
39. Back-feed contactor stuck in on position.
40. UPS in bypass due to internal fault.
41. UPS in bypass due to overload.
42. System in forced bypass.
43. Fault bypass relay malfunction.
44. Q001 open/closed.
45. Q002 open/closed.
46. Q003 open/closed.
47. Q005 open/closed.
48. High DC warning.
49. High DC shutdown.

50. Low battery shutdown.
  51. Low battery warning.
  52. MBwD door open.
  53. Parallel communication error
- F. **Controls:** The following controls or programming functions shall be accomplished by the use of the user interface/display unit. The touch screen display shall facilitate these operations:
1. Silence audible alarm.
  2. Display or set the date and time.
  3. Enable or disable the automatic restart feature.
  4. Transfer critical load to and from static bypass.
  5. Test battery condition on demand.
  6. Set intervals for automatic battery tests.
  7. Adjust set points for different alarms.
  8. Adjustable ramp-in times from 1 to 40 seconds.
  9. Potential free (dry) contacts.
- G. **Free Contacts:** The following potential free contacts shall be available on the relay interface board:
1. Normal operation.
  2. Battery operation.
  3. Bypass operation.
  4. Common fault.
  5. Low battery.
  6. UPS off.
- H. **Communication Interface Board:** A communication interface board shall provide the following communication ports which shall be able to be used simultaneously:
1. Ethernet.
  2. Ethernet interface port for a remote display.
  3. Modbus RS485
- I. **Emergency power off (EPO)** (Note: The EPO pushbutton shall include a protective cover to prevent unintentional operation).

## 2.7 BATTERY

- A. The UPS battery shall support an optional battery plant of modular construction made up of Owner replaceable, hot-swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic. Battery charging current shall be temperature compensated.
- B. The battery jars housed within each removable battery module shall be of the valve regulated lead acid (VRLA) type.
- C. The UPS shall incorporate a battery management system to continuously monitor the status of each removable battery module. This system shall notify the Owner in the event a failed or weak battery module Breaker size Interrupt rating 60-100A 22,000AIC 125-400A 25,000AIC
- D. T-1, T-3, and T-5 breakers shall be supported. is found.
- E. The batteries shall be long life batteries (5 to 8 years) and the battery casing shall be flame retardant type.
- F. The UPS shall incorporate a battery capacity test that will be capable of determining available runtimes.

## 2.8 ACCESSORIES

- A. **Battery Breaker Cabinet:** To facilitate third party battery configuration including wet cell batteries, a battery breaker cabinet in a line-up and match net shelter enclosure shall be available. Each cabinet shall monitor breaker status and battery temperature. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The battery breaker cabinet shall accommodate top or bottom entry for cables. The cell number count shall be adjustable from 138 to 150 from the user display with the default cell count set at 144.
- B. **Maintenance Bypass Cabinet (MBwD):**
1. The MBwD shall provide power to the critical load bus from the bypass source, during times where maintenance or service of the UPS is required. The MBwD shall provide a mechanical means of complete isolation of the UPS from the electrical wiring of the installation and shall be mounted to the systems I/O frame. As a minimum, the MBwD shall contain the following features and accessories:
    - a. Subfeed circuit breakers of the appropriate size, withstand rating (see table), and trip rating for the system. Other breaker sizes and withstand ratings shall be available as custom options.
    - b. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each circuit breaker/switch actuator to the UPS and static bypass.
    - c. Plated copper bus bar (where applicable), braced for the appropriate withstand rating (50 kAIC rating) of the system.
    - d. A load test port (not breaker protected)
    - e. Field configurable such that the MBwD can be located on the left or right side of the system Input / output cabinet
  2. The following minimum options shall also be available for the MBwD:
    - a. Mimic label with light indications for power flow.
  3. The MBwD shall carry one of the following agency listings:
    - a. UL 891.
    - b. UL 1558.
    - c. UL 1778.
    - d. UL 60950.
- C. **Bottom-Feed Enclosure:** For installations greater than 250 kW, a bottom-feed enclosure shall provide the mechanical means necessary to support bottom feeds for specific system configurations.
- D. **Relay Board:** Relay boards shall be provided for Owner connections to external alarms or to activate external Owner circuits.
- E. **Software and Connectivity:**
1. **Network Adaptor:** The ethernet web/SNMP adaptor shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats.
  2. **Unattended Shutdown:** The UPS, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is operation from the battery.
- F. **Remote UPS Monitoring:** The following methods of remote UPS monitoring shall be available:
1. **Web Monitoring:** Remote monitoring shall be available via a web browser such as Internet Explorer.



2. **Simple Network Management Protocol (SNMP):** Remote UPS monitoring shall be possible through a standard MIB II compliant platform.
- G. **Software Compatibility:** The UPS manufacturer shall have available software to support remote monitoring and initiate the graceful shutdown for the following systems:
1. Microsoft Windows Vista
  2. Microsoft Windows 7
  3. Microsoft Windows 95/98/XP.
  4. Microsoft Windows NT 4.0 SP6/2000.
  5. OS/2.
  6. Netware 3.2 – 5.1.
  7. MAC OS 9.04, 9.22, 10.
  8. Digital Unix/True 64.
  9. SGI 6.0-6.5.
  10. SCO UNIX.
  11. SVR4 2.3, 2.41.
  12. SCO Unix Ware 7.0 - 7.11.
  13. SUN Solaris 2.6-2.8.
  14. SUN OS 4.13, 4.14.
  15. IBM AIX 4.3x-4.33g, 5.1.
  16. HP-UX 9.x-11.i.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. **Verification of Conditions:** To ensure full warranty coverage, a Schneider Electric certified technician must perform the start-up service. Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect/Engineer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

### 3.2 INSTALLATION

- A. **General:** Preparation and installation shall be in accordance with reviewed product data, final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.
- B. **Factory-Assisted Start-Up:** If a factory-assisted UPS start-up is requested, factory-trained service personnel shall perform the following inspections, test procedures, and on-site training:
1. **Visual Inspection:**
    - a. Inspect equipment for signs of damage.
    - b. Verify installation per manufacturer's instructions.
    - c. Inspect cabinets for foreign objects.
    - d. Inspect battery units.
    - e. Inspect power modules.
  2. **Mechanical Inspection:**
    - a. Check UPS and external maintenance bypass cabinet internal control wiring connections.

- b. Check UPS and external maintenance bypass cabinet internal power wiring connections.
- c. Check UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

**3. Electrical Inspection:**

- a. Verify correct input and bypass voltage.
- b. Verify correct phase rotation of mains connections.
- c. Verify correct UPS control wiring and terminations.
- d. Verify voltage of battery modules.
- e. Verify neutral and ground conductors are properly landed.
- f. Inspect external maintenance bypass switch for proper terminations and phasing.

**4. Site Testing:**

- a. Ensure proper system start-up.
- b. Verify proper firmware control functions.
- c. Verify proper firmware bypass operation.
- d. Verify proper maintenance bypass switch operation.
- e. Verify system set points.
- f. Verify proper inverter operation and regulation circuits.
- g. Simulate utility power failure.
- h. Verify proper charger operation.
- i. Document, sign, and date test results.

- 5. **On-Site Operational Training:** During the factory-assisted start-up, operational training for site personnel shall include, but shall not be limited to, key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

**3.3 FIELD QUALITY CONTROL**

**A. Manufacturer Field Service:**

- 1. **Worldwide Service:** The UPS manufacturer shall have a worldwide service organization available, consisting of factory-trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.
- 2. **Replacement Parts:** Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, 365 days a year. The worldwide service organization shall be capable of shipping parts within four working hours or on the next available flight, so that the parts may be delivered to the Owner within 24 hours.

**3.4 DEMONSTRATION**

- A. **General:** Provide the services of a factory-authorized service representative of the manufacturer to provide start-up service and to demonstrate and train the Owner's personnel.

- 1. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
- 2. Train the Owner's maintenance personnel on procedures and schedules related to start-up and shutdown, troubleshooting, servicing, and preventive maintenance.

3. Review data in operation and maintenance manuals with the Owner's personnel.
  4. Schedule training with the Owner, through the Architect/Engineer, with at least seven day's advanced notice.
- B. **UPS Training Workshop:** A UPS training workshop shall be available from the UPS manufacturer. The training workshop shall include, but shall not be limited to, a combination of lecture and practical instruction with hands-on laboratory sessions. The training workshop shall include, but shall not be limited to, instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls, adjustments, preventative maintenance, and troubleshooting.

### 3.5 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to the Installer that shall ensure that the solid state UPS shall be without damage at time of Substantial Completion.

## DATA CENTER INFRASTRUCTURE MANAGEMENT SYSTEM (By Data Center Infrastructure Management System Contractor)

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Division 01 – GENERAL REQUIREMENTS, and other applicable specification sections in the Project Manual apply to the work specified in this Section.

#### 1.2 SUMMARY

- A. **Scope:** This specification describes the operation and functionality of a Data Center Infrastructure Management system (DCIM) hereafter referred to as the DCIM. The DCIM shall be a centralized server appliance with a client console. The system shall have an architecture that allows for increasing the number of devices it manages up to 4025 devices. The system shall have the ability to manage 4025 devices on the public Local Area Network (LAN) or have the ability to manage 4025 devices on a private Local Area Network (LAN). The System shall operate in a manner allowing for management of a total of 4025 devices that can reside on both the public LAN and the private APC LAN. The System shall also be of an architecture that allows for monitoring of Multi-Vendor Simple Network Management Protocol (SNMP) devices, Modbus TCP devices, and Modbus RTU devices that are connected to a Modbus RTU-to-Modbus TCP gateway. The Basic system shall be a 1U rack mountable design, the Standard system shall be a 1U rack mountable design, and the Enterprise System shall be 2U in design and fault tolerant.
- B. **Section Includes:** This specification shall provide infrastructure management of the Uninterruptible Power System (UPS); Power Distribution Unit (PDU); Rack PDU (rPDU); Computer Room Air Conditioning (CRAC); In-row Cooling; Environmental Sensors; Automatic Transfer Switch (ATS) with supplied Generator; Surveillance Cameras (all the above supplied by the DCIM vendor); SNMP devices from multiple vendors (ex. UPS, PDU, CRAC, and rPDU); Modbus devices; and other infrastructure systems as specified.

- C. The DCIM and associated equipment shall operate in conjunction with an existing network infrastructure to provide system management of the systems described above.

### **1.3 APPROVED PRODUCTS**

- A. The Data Center Infrastructure Management system (DCIM) shall be StruxureWare Central, manufactured by APC by Schneider Electric. Substitutions shall only be permitted subject to 2.1, below.

### **1.4 REFERENCES**

- A. FCC Part 15, Sub-Part B, Class A
- B. CE EMC Directive, CTICK, Industry Canada
- C. EN60950-1
- D. CE Safety (Directives 73/23/EEC&89/336/EEC), VDE Safety Approval
- E. Where applicable, the DCIM shall also be designed in accordance with publications from the following organizations and committees:
  - 1. NFPA – National Fire protection Associations
  - 2. NEMA – National Electrical Manufacturers Association
  - 3. OSHA – Occupational Safety and Health Administration
- F. ISO 9001
- G. ISO 14001

### **1.5 SYSTEM DESCRIPTION**

#### **A. Design Requirements:**

1. All material and equipment used shall be standard components, regularly manufactured, available and not custom designed especially for this project. The data center infrastructure system, including the DCIM, shall previously be thoroughly tested as a system, and proven in actual use prior to installation on this project.
2. The DCIM shall be a server appliance, with a specified HTTP or HTTPS connection to access the user interface, and standard TCP protocol connections for notifications.
3. The Basic and Standard systems shall be a 1U rack mountable design. The Enterprise System shall be a 2U rack mountable design, with dual processors, redundant power supplies, and a fault tolerant RAID-5 design.
4. The Basic system shall be scalable up to 525 managed/monitored devices and support up to 15 NetBotz Appliances.
5. The Standard system shall be scalable up to 2025 managed/monitored devices and support up to 125 NetBotz Appliances.
6. The Enterprise system shall be scalable up to 4025 managed/monitored devices and support up to 250 NetBotz Appliances.
7. The manufacturer will supply an off the shelf management system that will require no factory customization to meet customer requirements.
8. The system architecture shall be scalable, allowing for future enhancements.
9. The DCIM shall manage/monitor devices both on a public LAN and on a private LAN created by the management system.
10. The DCIM shall be capable of managing a total of 4025 devices on a public LAN or a private LAN.

11. The DCIM shall be capable of hosting additional add-on modules that support a Building Management System (BMS), Power Management System, and Mobile Applications, and allow a user to perform Physical Threat and Environment Management, Surveillance, Energy Efficiency and Energy Cost Management, Inventory Management, Power and Cooling Capacity Management, and Change Management.
12. The DCIM shall be capable of integrating with additional plug-ins that support Cisco Energy Wise (network management systems), Schneider Electric Power Logic ION Enterprise (power management systems), Microsoft System Center Operations Manager and System Center Essentials, HP Operations Manager for Windows, and IBM Tivoli (enterprise management systems).

**B. System Characteristics:**

1. The (LAN) hardware needed to provide an Ethernet gateway used for communication between the DCIM and the managed devices as well as providing the communication link between the DCIM and the remote client accessing it. The components needed may include switches, routers, hubs, Category 5/Category 6/Fiber cables, IP addresses, firewalls, client workstations/servers, and any miscellaneous components that may be determined to be required. The owner of the location the DCIM is installed in, the managed devices, and the client workstation/server accessing the DCIM shall provide 10/100/1000 base T network drops.
2. The DCIM shall meet the following server appliance requirements:
  - a. The Basic and Standard system shall be a 1U rack mountable design, and the Enterprise System shall be a 2U rack mountable design.
  - b. The Enterprise system shall have dual processors, redundant power supplies, and a fault tolerant RAID-5 design.
  - c. Public LAN and Private LAN (10/100/1000 base T) network ports.
  - d. USB ports for future use.
  - e. Fedora Core 9 as the server operating system
  - f. Architecture to schedule discovery of devices connected on the Public LAN and assign IP addresses to devices connected to the private LAN.
  - g. Architecture to monitor multi-vendor SNMP devices (UPS, PDU, Rack PDU, CRAC, or other SNMP devices specified) and Modbus devices.
  - h. Monitor / keyboard port for field service diagnostic purposes only.
3. The DCIM client workstation/server shall have the following requirements:
  - a. Microsoft® Windows® 2003 Server (SP2), Microsoft Windows XP (SP3), Microsoft Vista, or Microsoft Windows 7
  - b. Red Hat® Enterprise Linux® v5.0
  - c. Java™ Plug-in (JRE) version 1.6.0\_22
4. The mobile devices, for use with the read-only DCIM mobile application, shall have the following requirements:

- a. Apple® iOS 4.3.2 – 4.3.3
  - b. BlackBerry® OS 4.5 – 6.0
- 5. The owner will supply the following information to facilitate system implementation:
  - a. Network configuration settings (IP addresses, subnet mask) necessary for the DCIM and any device to reside on the owner's public or private network.
  - b. E-mail addresses and SMTP settings for e-mail notification.
  - c. Device group structure
  - d. Network Management System (NMS) IP address and community names to accept SNMP traps.
  - e. Building Management System, Building Control System, or Building Automation System to accept Modbus TCP data and events from managed/monitored devices.
- C. **Contractor's Responsibilities:** The contractor shall perform the following, if the listed equipment is not purchased by the owner from the DCIM Vendor:
  - 1. Provide the Category 5, Category 6, or fiber network connection to DCIM.
  - 2. Provide the Category 5, Category 6, or fiber network connection to the devices managed/monitored by DCIM.
  - 3. Provide control wiring to optional Environmental Sensors for monitoring of dry contact points and or 4-20milliamp signals.
- D. **Management System Vendor Responsibilities**
  - 1. Provide the hardware and software pre-installed and tested on a 1U or 2U rack mountable server.
  - 2. Provide system start-up, commissioning, and operator orientation by factory employed Field Service Engineer. This shall include discovery of devices and creation of the customer defined grouping structure for devices.
  - 3. Provide 7 x 24 technical support through a toll free number per the Software Support Contract.
  - 4. Provide Parts & Labor warranty and Technical Support per the manufacturer's warranty and Software Support Contract.
  - 5. If purchased by the owner, termination of all Category 5, Category 6, and other 0-5V connections, Modbus connections, or Fiber connections to the DCIM and the managed/monitored devices.
- F. **Conduit and Wiring:** Conduit and wiring is provided under Division 16. The Contractor is responsible for termination of all control wiring used for connection to optional Environmental
- G. Sensors for monitoring of dry contact points and or 4-20milliamp signals.

## 1.6 SUBMITTALS

### A. Proposal Submittals:

- 1. As bid system bill of materials
- 2. Product catalog sheets or equipment brochures
- 3. Product guide specifications
- 4. Network single-line operation diagram
- 5. Installation information, including requirements
- 6. Information about terminal locations for network connectivity and control wiring connections

7. Drawings and details for requested optional accessories

**B. Delivery Submittals:**

1. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of DCIM
2. CD, which includes an Installation Guide and a Users Manual, which shall be translated from English into the following languages:
  - a. Japanese
  - b. Simplified Chinese
  - c. Russian
  - d. French
  - e. Italian
  - f. German
  - g. Korean
  - h. Brazilian Portuguese
  - i. Spanish
3. As built equipment drawings
4. StruxureWare™ Welcome Package

**1.7 QUALITY ASSURANCE**

**A. Qualifications:**

1. **Manufacturer Qualifications:** Manufacturer shall be a firm engaged in the manufacture of data center infrastructure management systems of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 10 years.
  - a. The manufacturer shall be ISO 9001 certified and shall be designed to internationally accepted standards.
2. **Installer Qualifications:** Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing data center infrastructure management systems similar in type and scope to that required of this Project.

**B. Regulatory Requirements:** Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

1. Where applicable, the DCIM shall also be designed in accordance with publications from the following organizations and committees:
  - a. FCC Part 15, Sub-Part B, Class A
  - b. CE EMC Directive, CTICK, Industry Canada
  - c. EN60950-1
  - d. CE Safety (Directives 73/23/EEC&89/336/EEC), VDE Safety Approval
  - e. Where applicable, the DCIM shall also be designed in accordance with publications from the following organizations and committees:
    - 1) NFPA - National Fire Protection Associations
    - 2) NEMA - National Electrical Manufacturers Association
    - 3) OSHA - Occupational Safety and Health Administration
  - f. ISO 9001
  - g. ISO 14001

- C. **Pre-Installation Conference:** Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Pre-installation conference shall include, but shall not be limited to, the Contractor, the Installer, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect/Engineer.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

#### 1.9 PROJECT CONDITIONS

- A. **Environmental Requirements:** Do not install data center infrastructure management system until space is enclosed and weatherproof, wet work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

##### 1. Environmental:

- a. **Storage Ambient Temperature:** -58 °F (-50 °C) to 131 °F (55 °C)
- b. **Operating Ambient Temperature:** 32 °F (0 °C) to 104 °F (40 °C) (77 °F [25 °C] is ideal for most battery types)
- c. **Relative Humidity:** 0 percent to 95 percent non-condensing.
- d. **Altitude:** Maximum installation with no derating of the UPS output shall be 3280 feet (1000 m) above sea level. At higher altitudes the following derating shall apply:
  - 1) 4921 feet (1500 m) derating factor of 0.95.
  - 2) 6562 feet (2000 m) derating factor of 0.91.
  - 3) 8202 feet (2500 m) derating factor of 0.86.

#### 1.10 WARRANTY

- A. **Special Warranty:** The Contractor shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for period indicated below. This special warranty shall extend the one-year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the Installer and the manufacturer.
  - 1. **Data Center Infrastructure Management System:** The DCIM shall be covered by a full parts and labor warranty from the manufacturer for a period of 24 months from the date of installation or acceptance by the Owner or 18 months from the date of shipment from the manufacturer, whichever occurs first.
- B. **Additional Owner Rights:** The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.



## 1.11 MAINTENANCE

- A. A complete offering of software support contracts and node licenses for the DCIM shall be available from the manufacturer, and shall be required to provide ongoing technical support and allow future software updates. Contract work shall be performed by factory-trained service personnel.

## PART 2 – EQUIPMENT

### 2.1 MANUFACTURERS

- A. **Basis of Design:** Product specified is “APC StruxureWare Central v6.3” as manufactured by APC by Schneider Electric. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect/Engineer will be the sole judge of the basis of what is equivalent.

### 2.2 MODES OF OPERATION

- A. **System Overview:** The DCIM shall be a centralized server appliance that is accessed remotely from client workstations/servers via a HTTP or HTTPS connection. No client-based services shall be used as a substitute. Microsoft System Center Operations Manager, Microsoft System Center Essentials, IBM Tivoli, HP Operations Manager, and StruxureWare Central mobile application integration shall be supported. A Web Services Open API guide shall be made available by the DCIM vendor. The DCIM shall send alerts from the devices it manages to a valid e-mail account accessible via mobile device; web page via HTTP POST; an FTP server; SNMP traps to a Network Management System; Web Services alerts to a BlackBerry smartphone or iPhone running the StruxureWare Central mobile application; and Modbus events to a Building Management System. These shall be a standard part of the DCIM notification architecture.
- B. The DCIM server console must support the following:
  - 1. Microsoft Windows Server 2003 (SP2), Microsoft Windows XP (SP3), Microsoft Vista, and Microsoft Windows 7
  - 2. Red Hat Enterprise Linux v5.0
  - 3. Java Plug-in (JRE) version 1.6.0\_22
- C. The DCIM read-only mobile application must support the following:
  - 1. Apple iOS 4.3.2 – 4.3.3
  - 2. BlackBerry OS 4.5 – 6.0
- D. **Modbus:** The DCIM shall provide access to a separately licensed MODBUS TCP Output Module used to support the Building Management System (BMS). The MODBUS TCP Output Module shall communicate with the Building Management System (BMS) on port 502. Devices that use the Modbus TCP protocol, and Modbus RTU devices that are connected to a Modbus RTU-to- Modbus TCP gateway, shall be discovered and monitored.
- E. **StruxureWare Central Client:** The DCIM client application shall provide a Monitoring perspective and Surveillance perspective to display device status, device data, device events, and surveillance video; an Alarm Configuration perspective to provide notification options; a Reports perspective to access reports about monitored devices and provide configuration and graphing/trending options; and a Power Management perspective to access PowerLogic™ ION Enterprise WebReach and WebReports.

#### 1. Monitoring Perspective

##### A. Device Groups

1. The user shall be able to define groups in a tree format. This shall allow a user to add groups by right clicking the All Devices group or on a sub group and select Create Device Group.
2. The user shall have the ability to drag and drop devices into device groups. The user shall also have the ability to multi-select devices and drag them into created groups
3. The user shall have the ability to right click on a device group and rename or delete the device group.
4. The user shall control access to each of the groups by defining the users that have access to that device group.
5. Devices shall have the ability to reside in multiple groups.
6. The Device Groups window shall have a button icon to run a Graphing/Trending report, and a button icon to minimize or maximize the Device Group view to full screen size.

#### **B. Device View**

1. The DCIM shall display all discovered devices in a separate window and display device status of normal, warning or critical. This status shall be real time status and updated as events occur, not based on a poll cycle.
2. The Device View shall display the total number of discovered devices and the number of displayed devices.
3. The Device View shall allow the user to sort the displayed columns by clicking each one.
4. The Device view shall allow the user client preferences to highlight a device that is in a critical state.
5. The Device View shall have user selectable columns displaying the following:
  - a. Type
  - b. Status
  - c. Location
  - d. Label
  - e. Model
  - f. Hostname
  - g. Parent Device
  - h. Serial Number
  - i. IP Address
  - j. Application Version
  - k. Groups
  - l. MAC Address
  - m. Maintenance Mode
  - n. Contact Name
6. The user shall have the ability to right click in the Device View and perform the following actions:
  - a. Add Devices
  - b. Delete Devices
  - c. Remove from Device Group
  - d. Outlet Control
  - e. View Device Sensors
  - f. Request Device Scan
  - g. Launch to Device

- h. Show Alarm History
  - i. Generate Sensor History Report, including graphing
  - j. Create Thresholds
  - k. SNMP Device Configuration
  - l. NetBotz Appliance Configuration
  - m. Enter/Exit Maintenance Mode
  - n. Change Device Type
  - o. Add Custom Property
7. The Device View pane shall contain a free text field to search for devices.

## 2. Surveillance Perspective

A. The DCIM shall have the ability to display camera images in central pane by selecting the Surveillance tab within the user interface. This tab shall have the following functionality:

1. Thumbnails:
  - a. This view shall display the images of all managed cameras. This view shall also highlight the camera image border in yellow, when any camera is in an alert state.
  - b. This view shall allow the user to select the thumbnail size in either 160 x 120 or 320 x 240.
  - c. This view shall allow the user the ability to right click on a thumbnail and open camera view. This view shall be date and time stamped.
2. Retrieve Clips: The user shall have the ability to either right click on the thumbnail or click on a retrieve clips radio button in the thumbnail view in order to retrieve clips:
  - a. The user shall have the ability to search for clips either by relative date or by date range.
  - b. The user shall have the ability to display clips based on defined tags/descriptions.
  - c. The user shall have the ability to view the displayed clips, tag the displayed clips, delete the displayed clips, or export the displayed clips.
  - d. The user shall have the ability to view the displayed clips, tag the displayed clips, delete the displayed clips, or export the displayed clips:
    - 1) Pod Label
    - 2) Hostname
    - 3) Location
    - 4) Status
    - 5) Licensed
    - 6) Model
    - 7) Device Groups
    - 8) Camera Label

### B. Third Party Closed Circuit Television Integration (CCTV)

1. The DCIM shall be capable of integrating CCTV into Surveillance using a CCTV Adapter.

- a. The CCTV Adapter Pod shall accept multi-format S-Video and Composite Video as well as featuring DIN, BNC, and RCA input jacks.
- b. The CCTV Adapter pod shall also feature a USB port to enable the pod to be tethered to the base station using a standard USB cable.
- c. The CCTV pod shall convert an analog video source into a digitally converted signal, which shall be integrated into the NetBotz physical security solution.
- d. The CCTV Adapter Pod shall display Images of up to 640x480 resolution, 24-bit color, and up to 30 frames per second (color and resolution may be limited by video source).
- e. The CCTV Adapter Pod shall have an Integrated microphone, as well as a microphone jack (standard 3.5mm miniplug), which shall provide the ability to monitor and capture monophonic audio from the location in which the pod or external microphone are installed.
- f. The CCTV adapter Pod shall have an integrated Speaker/headphone jack (standard 3.5mm stereo miniplug) that can be used with unpowered headphones or powered speakers to provide monophonic audio output.
- g. The CCTV Adapter Pod shall have an integrated Door Switch Sensor jack (magnetic door switch sensor available separately).
- h. The CCTV Adapter Pod shall have integrated Camera Motion Detection.

### **3. Reports Perspective**

- A. Data shall be collected for the Uninterruptible Power System (UPS), Power Distribution Unit (PDU), Rack PDU (rPDU), Computer Room Air Conditioning (CRAC), Environmental Sensors, Automatic Transfer Switch (ATS) with supplied Generator, Surveillance Camera's (all the above supplied by the DCIM vendor) Multi- vendor SNMP devices (UPS, PDU, CRAC, and rPDU), and other infrastructure systems as specified. Data collected over time must be stored on a dedicated data partition located on the server appliance for extracting and trending and /or can be exported to a Network Attached Storage Server (NAS).
  - 1. Data collection poll cycles shall be user defined in the user interface to collected data from 1 minute to every 24 hours.
  - 2. Saved Sensor History Reports shall be listed alphabetically in the user interface in the Reports perspective.
  - 3. Data shall be exportable to a NAS Server in a plain text format that shall have a selectable data delimiter of a Semicolon, Comma, Tab, or Space.
  - 4. Data shall be exportable through e-mail, FTP, HTTP, or to a Windows (CIFS) or a Unix (NFS) file share.

5. Device reports shall be run manually through a "Generate Report" button, or reports shall be delivered automatically on a scheduled basis.
6. Device data shall be accessed from the Sensor History Report or Snapshot Report, located in the Reports perspective.
7. The user shall have the ability to create sensor history reports that display line graphs for multiple data points, with data points to be charted on two axes for collected data.
8. The sensor history graph-format reports shall display a linear trend line for twice the time period as the data, on numeric sensors only, when all numeric sensors included in the graph use the same unit of measure.
9. The sensor history graph-format reports shall also display numeric values for the sensor(s) chosen. These numeric values shall display the Low, High and Average, for the time period chosen.
10. The user shall have the ability to create user defined summary-format reports for a device, group of devices, or specific sensors for a particular device, that shall display the High, Low, Average, and the Current value for the user defined time period.
11. The user shall have the ability to create user-defined table-format reports for a device, group of devices, or specific sensors for a particular device, that shall display the Current values for the user defined time period.
12. The user shall have the ability to create pre-defined snapshot reports for one or more specific device groups that shall display the Current values for the particular time the report is generated.
13. The user shall have the ability to monitor the status of storage repositories defined for use with your DCIM server to configure the automatic disk space management system.

#### **4. Configuration**

##### **A. Device Discovery**

1. The user interface shall allow for discovery of devices by IP address range.
2. The DCIM shall place all newly discovered devices in an Unassigned group until the user places them in a Created Device Group.
3. The DCIM shall be capable of auto discovering devices when connected to the private LAN Network A, as well as functioning as a DHCP server to assign IP addresses from a user defined IP address scheme. The DCIM shall also be capable of discovering devices with static IP addresses on the private LAN Network B, defined by its IP address and subnet mask.
4. The user shall have the ability to schedule discovery of new devices with the following configurable settings:

- a. IP or IP Range
  - b. SNMP Settings
  - c. Day of the week
  - d. Time of the day
5. The public LAN and/or the private LAN shall have the ability to manage up to 4025 devices.
  6. The user shall have the ability to register the discovered devices for SNMP trap directed polling.
  7. The DCIM shall have the ability to save the created discoveries and display them in a separate tab displaying the following:
    - a. IP or IP Range
    - b. Periodically
    - c. Type of Discovery
    - d. Activity
    - e. Last run
  8. The DCIM shall also display how many device discoveries are in progress.
  9. The user shall have the ability to import saved device discoveries from a local file, or right click a saved discovery and add a new discovery, edit the highlighted discovery, delete the highlighted discovery, or run the highlighted discovery.

#### **B. Building Management Integration**

1. The DCIM shall communicate device data and events up to a Building Management System (BMS) using the Modbus TCP protocol.
2. The DCIM shall communicate Modbus TCP using port 502.
3. The DCIM Building Management Settings shall allow the user to select the devices that will communicate with the BMS.
4. The DCIM Building Management Settings shall allow the user to generate and remove the slave addresses assigned to each device.
5. The DCIM Building Management Settings shall have a free text field to search for devices.
6. The DCIM Building Management Settings shall allow the user to select the data points to manage and define the Modbus register mappings.
7. The DCIM shall send data to a BMS for discovered multi-vendor devices.
8. The DCIM Building Management Settings shall allow the user to export the Modbus register mappings and allow the user to import those into additional DCIM.

#### **C. Network Management System Integration**

1. The DCIM shall send SNMP traps for connected devices to a user defined Network Management System (NMS).
2. The User shall have the ability to choose a SNMPv1 or SNMPv3 Trap receiver.
3. The user shall have the ability to define the following:
  - a. IP address of the NMS

- b. SNMP port
  - c. Read Community Name
  - d. Severity Level
4. The user shall have the ability to Enable/Disable Traps.

**D. Operations Management System Integration**

1. The DCIM shall integrate with the separately licensed InfraStruxure Operations modules for Energy Efficiency and Energy Cost Management, Power and Cooling Capacity Management, Change Management, and Mobile Applications.

**E. Power Management Integration**

1. The DCIM shall be capable of integrating with PowerLogic™ ION Enterprise WebReach and WebReports through the Power Management perspective.

**F. Mass Configuration of Devices**

1. The DCIM shall have the ability to mass configure devices manufactured by the DCIM vendor. This feature does not apply to Multi-Vendor devices.
2. The DCIM shall have the ability to mass configure NetBotz Appliances with the following Mass Configuration options:
- a. Backup/Restore
  - b. Camera Settings
  - c. Clock Settings
  - d. DNS Settings
  - e. E-mail Settings
  - f. Location Settings
  - g. Pod Sharing Settings
  - h. Post Alert Data Settings
  - i. Rack Access Settings
  - j. Region Settings
  - k. Serial Device Settings
  - l. SMS Settings
  - m. SNMP Settings
  - n. User Settings
  - o. Web Server Settings
3. DCIM shall have the ability to Mass Configure all settings related to APC devices.
4. The DCIM shall allow the user to select the specific settings to push to the selected APC devices.
5. The DCIM shall have the ability to create a template of settings for the APC devices the user is configuring.
6. The DCIM shall have the ability to edit the template of settings created for the configuring the APC devices.
7. The DCIM shall have the ability to configure APC devices from the template of settings created.
8. The DCIM shall have the ability to multi-select the devices the user is configuring.

**G. Mass Firmware Updates**

1. The DCIM shall have the ability to apply firmware updates to devices manufactured by the DCIM vendor. This feature does not apply to Multi- Vendor devices.

2. The DCIM shall have the ability to schedule an update check to see if new firmware is available.
3. The DCIM shall have the ability to display all devices needing updates.
4. The DCIM shall have the ability to allow the user to select all devices needing updates or select individual devices needing updates.

#### **H. Scalable Architecture**

1. The DCIM shall have the ability to be scaled to manage up to 4025 devices, with additional device licenses. There shall be no customization or programming involved from the DCIM vendor to add additional devices.

#### **I. Event Notification**

1. The user shall have the ability to view events from the entire DCIM from an Alarms view.
2. The user shall have the ability to click on a managed device in an alarm state and display the specific nature of the alarm in an Alarm Details pane.
3. The user shall have the ability to configure notification for managed devices based on specific sensors, for the maximum threshold, minimum threshold, range value, below value for time, and above value for time.
4. The user shall have the ability to acknowledge active alarms and suppress future notifications.
5. The user shall have the ability to add comments to active and historical alarms.
6. The DCIM shall have SMS support, when sending notification to a defined user, which will allow the user to configure the text sent.
7. The DCIM shall contain an Alarm History for all managed devices, which shall be sortable by date range.
8. The Alarm History shall display the Time Occurred, Time Resolved, Status, Description, Severity, Device Hostname, Parent Device, and Sensor.

#### **J. Network Time Protocol (NTP)**

1. The DCIM shall have the ability to act as an NTP server, or synchronize to a user defined NTP server.

**K. Mobile Application User Interface:** The DCIM read-only mobile application shall provide a Device Groups option to view a hierarchical list of device groups and subgroups, device status, and device and sensor data; and an Active Alarms option to view a chronological list of alarms and alarm details.

##### **1. Options**

###### **A. Device Groups**

- 1) The user shall be able to view device groups and subgroups in a tree format. This shall allow a user to view and select devices monitored by the DCIM in the All Devices group, or in a sub group, and access options to view device details, active alarms reported by the device, and a list of device sensors.



## B. Active Alarms

- 1) The user shall be able to view a list of active alarms for devices monitored by the DCIM, and access options to view alarm details, and details about the device reporting the alarm.

## 2.3 Data Center Infrastructure Management System Security

- A. **Authentication and Encryption:** The communication between the client and the DCIM shall be secured via a Secure Sockets Layer (SSL) 168-bit Triple-DES (Data Encryption Standard) encoded connection.
- B. **OpenLDAP and Active Directory:** The DCIM shall have Open Lightweight Directory Access Protocol and Active Directory support.
- C. The log in to the user interface of DCIM shall use Secure Socket Layer (SSL) or Secure Socket Handling (SSH) authenticate. The web launch to devices shall occur through a HTTP or HTTPS connection. To increase security, the HTTP or HTTPS connection and the HTTP or HTTPS port shall be user configurable for each device, through the DCIM user Interface.
- D. The DCIM shall allow the user to create user accounts ranging from Administrator Access to View Only Access. The DCIM shall have no specified limit to the number of user accounts that can be created. Each of these accounts shall have their own unique login user name and password. An administrator shall have full read/write access to all the DCIM's functionality. The "View Only Access" users shall only have access, limited to viewing specific groups or devices within those groups, as well as creating graphing trending reports as well as exporting device data reports. The "Read Only" access user shall not be allowed to change the DCIM configuration or device configurations.
- E. The DCIM shall have the ability to communicate SNMPv1 or SNMPv3 to monitored/managed devices.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. **Verification of Conditions:** Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect/Engineer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
  1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

### 3.2 INSTALLATION

- A. **General:** Preparation and installation shall be in accordance with reviewed product data, final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.
- B. **Factory-Assisted Start-Up:** If a factory-assisted DCIM start-up is requested, factory-trained service personnel shall perform the following inspections, test procedures, and on-site training:
  1. **Visual Inspection:**
    - a. Inspect equipment for signs of damage.
    - b. Verify installation per manufacturer's instructions.
  2. **Mechanical Inspection:**

- a. Check the network connections to the DCIM.
  - b. Check the network connections to all managed/monitored devices.
  - c. Ensure the DCIM is powered and verify power to the optional DCIM Hub (if installed).
- 3. Functional Inspection:**
- a. Ensure you can log in to the DCIM.
  - b. Ensure any additional license keys are installed on the DCIM.
  - c. Verify discovery of managed/monitored devices.
  - d. Ensure the owner's defined groups are configured in the DCIM.
- 4. Site Testing:**
- a. Ensure proper notification of alarms through the user interface.
  - b. Verify proper notification of alarms through e-mail.
  - c. Document, sign, and date test results.
- 5. On-Site Operational Training:** During the factory-assisted start-up, operational training for site personnel shall include log in to the user interface, navigation through the menu options, device discovery, generation of reports, creation of groups, creation of users, and setting up alarm notification.

EVALUATION CATEGORIES	MAXIMUM POINTS
Financial Review	Pass (10)/fail (0)
General Organizational Background/Qualifications	10
Meeting the Technical Requirements	80
Sub Total for Proposal Points:	100
Cost	100
<b>TOTAL POSSIBLE WEIGHT OR POINTS:</b>	<b>200</b>

**VENDOR CONTACT LIST**  
**UPS System**

**AMS.NET**

Chuck Davis  
Account Executive  
502 Commerce Way  
Livermore, CA 94551-7812  
925-245-6100 ext. 6153  
[cdavis@ams.net](mailto:cdavis@ams.net)

**CDW-G**

Kenny Stoller  
One CDW Way  
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**CompuCom Systems**

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**Facility Gateway Corporation**

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**Falcon Electric, Inc.**

5116 Azusa Canyon Rd.  
Irwindale, CA 91706  
Phone: 800-842-6940 or 626-962-7770  
Fax: 626-962-7720  
[gov@falconups.com](mailto:gov@falconups.com)  
[www.falconups.com](http://www.falconups.com)

**AGREEMENT  
FOR  
INDEPENDENT CONTRACTOR SERVICES**

This Agreement for Independent Contractor Services (the "Agreement") is made and entered into by and between the County of Stanislaus ("County") and E.S. Inc. dba Energy Systems\_ ("Contractor") as of May 15, 2012.

**Recitals**

WHEREAS, the County has a need for services involving the Engine Generator for the Strategic Business Technology Server Room; and

WHEREAS, the Contractor is specially trained, experienced and competent to perform and has agreed to provide such services;

NOW, THEREFORE, in consideration of the mutual promises, covenants, terms and conditions hereinafter contained, the parties hereby agree as follows:

**Terms and Conditions**

1) **Scope of Work**

a) The Contractor shall furnish to the County upon execution of this Agreement or receipt of the County's written authorization to proceed, those services and work set forth in **Exhibit A**, attached hereto and, by this reference, made a part hereof.

b) All documents, drawings and written work product prepared or produced by the Contractor under this Agreement, including without limitation electronic data files, are the property of the Contractor; provided, however, the County shall have the right to reproduce, publish and use all such work, or any part thereof, in any manner and for any purposes whatsoever and to authorize others to do so. If any such work is copyrightable, the Contractor may copyright the same, except that, as to any work which is copyrighted by the Contractor, the County reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, and use such work, or any part thereof, and to authorize others to do so.

c) Services and work provided by the Contractor at the County's request under this Agreement will be performed in a timely manner consistent with the requirements and standards established by applicable federal, state and County laws, ordinances, regulations and resolutions, and in accordance with a schedule of work set forth in Exhibit A. If there is no schedule, the hours and times for completion of said services and work are to be set by the Contractor; provided, however, that such schedule is subject to review by and concurrence of the County.

2) **Consideration**

a) County shall pay Contractor as set forth in Exhibit A.

b) Except as expressly provided in Exhibit A of this Agreement, Contractor shall not be entitled to nor receive from County any additional consideration, compensation, salary, wages or other type of remuneration for services rendered under this Agreement. Specifically, Contractor shall not be entitled by virtue of this Agreement to consideration in the form of overtime, health insurance benefits, retirement benefits, disability retirement benefits, sick leave, vacation time, paid holidays or other paid leaves of absence of any type or kind whatsoever.

c) County will not withhold any Federal or State income taxes or Social Security tax from any payments made by County to Contractor under the terms and conditions of this Agreement. Payment of all taxes and other assessments on such sums is the sole responsibility of Contractor. County has no responsibility or liability for payment of Contractor's taxes or assessments.

d) Pursuant to Penal Code section 484b and to Business and Professions Code section 7108.5, the Contractor must apply all funds and progress payments received by the Contractor from the County for payment of services, labor, materials or equipment to pay for such services, labor, materials or equipment. Pursuant to Civil Code section 1479, the Contractor shall direct or otherwise manifest the Contractor's intention and desire that payments made by the Contractor to subcontractors, suppliers and material men shall be applied to retire and extinguish the debts or obligations resulting from the performance of this Agreement.

3) Term

a) The term of this Agreement shall be from the date of approval of this Agreement until completion of the agreed upon services unless sooner terminated as provided below or unless some other method or time of termination is listed in Exhibit A.

b) Should either party default in the performance of this Agreement or materially breach any of its provisions, the other party, at that party's option, may terminate this Agreement by giving written notification to the other party.

c) This Agreement shall terminate automatically on the occurrence of (a) bankruptcy or insolvency of either party, (b) sale of Contractor's business, (c) cancellation of insurance required under the terms of this Agreement, and (d) if, for any reason, Contractor ceases to be licensed or otherwise authorized to do business in the State of California, and the Contractor fails to remedy such defect or defects within thirty (30) days of receipt of notice of such defect or defects.

d) The County may terminate this agreement upon 30 days prior written notice to the Contractor. Termination of this Agreement shall not affect the County's obligation to pay for all fees earned and reasonable costs necessarily incurred by the Contractor as provided in Paragraph 2 herein, subject to any applicable setoffs.

4) Required Licenses, Certificates and Permits

Any licenses, certificates or permits required by the federal, state, county or municipal governments for Contractor to provide the services and work described in Exhibit A must be procured by Contractor and be valid at the time Contractor enters into this Agreement. Further, during the term of this Agreement, Contractor must maintain such licenses, certificates and permits in full force and effect. Licenses, certificates and permits may include but are not limited to driver's licenses, professional licenses or certificates and business licenses. Such licenses, certificates and permits will be procured and maintained in force by Contractor at no expense to the County.

5) Office Space, Supplies, Equipment, Etc.

Unless otherwise provided in Exhibit A, Contractor shall provide such office space, supplies, equipment, vehicles, reference materials and telephone service as is necessary for Contractor to provide the services identified in Exhibit A to this Agreement. County is not obligated to reimburse or pay Contractor for any expense or cost incurred by Contractor in procuring or maintaining such items. Responsibility for the costs and expenses incurred by Contractor in providing and maintaining such items is the sole responsibility and obligation of Contractor.

6) Insurance

a) Contractor shall take out, and maintain during the life of this Agreement, insurance policies with coverage at least as broad as follows:

i) General Liability. Comprehensive general liability insurance covering bodily injury, personal injury, property damage, products and completed operations with limits of no less than One Million Dollars (\$1,000,000) per incident or occurrence. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to any

act or omission by Contractor under this Agreement or the general aggregate limit shall be twice the required occurrence limit.

ii) Automobile Liability Insurance. If the Contractor or the Contractor's officers, employees, agents, representatives or subcontractors utilize a motor vehicle in performing any of the work or services under this Agreement, owned/non-owned automobile liability insurance providing combined single limits covering bodily injury, property damage and transportation related pollution liability with limits of no less than One Million Dollars (\$1,000,000) per incident or occurrence.

iii) Workers' Compensation Insurance. Workers' Compensation insurance as required by the California Labor Code. In signing this contract, the Contractor certifies under section 1861 of the Labor Code that the Contractor is aware of the provisions of section 3700 of the Labor Code which requires every employer to be insured against liability for workmen's compensation or to undertake self-insurance in accordance with the provisions of that code, and that the Contractor will comply with such provisions before commencing the performance of the work of this Agreement.

b) Any deductibles, self-insured retentions or named insureds must be declared in writing and approved by County. At the option of the County, either: (a) the insurer shall reduce or eliminate such deductibles, self-insured retentions or named insureds, or (b) the Contractor shall provide a bond, cash, letter of credit, guaranty or other security satisfactory to the County guaranteeing payment of the self-insured retention or deductible and payment of any and all costs, losses, related investigations, claim administration and defense expenses. The County, in its sole discretion, may waive the requirement to reduce or eliminate deductibles or self-insured retentions, in which case, the Contractor agrees that it will be responsible for and pay any self-insured retention or deductible and will pay any and all costs, losses, related investigations, claim administration and defense expenses related to or arising out of the Contractor's defense and indemnification obligations as set forth in this Agreement.

c) The Contractor shall obtain a specific endorsement to all required insurance policies, except Workers' Compensation insurance and Professional Liability insurance, if any, naming Stanislaus County, its officers, directors, officials, agents, employees, and volunteers as additional insureds regarding: (a) liability arising from or in connection with the performance or omission to perform any term or condition of this Agreement by or on behalf of the Contractor, including the insured's general supervision of its subcontractors; (b) services, products and completed operations of the Contractor; (c) premises owned, occupied or used by the Contractor; and (d) automobiles owned, leased, hired or borrowed by the Contractor. For Workers' Compensation insurance, the insurance carrier shall agree to waive all rights of subrogation against Stanislaus County, its officers, directors, officials, agents, employees and volunteers for losses arising from the performance of or the omission to perform any term or condition of this Agreement by the Contractor.

d) The Contractor's insurance coverage shall be primary insurance regarding the County and County's officers, officials and employees. Any insurance or self-insurance maintained by the County or County's officers, officials and employees shall be excess of the Contractor's insurance and shall not contribute with Contractor's insurance.

e) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the County or its officers, officials, employees or volunteers.

f) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

g) Each insurance policy required by this section shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party except after thirty (30) days' prior written notice has been given to County. The Contractor shall promptly notify, or cause the insurance carrier to promptly notify, the County of any change in the insurance policy or policies required under this Agreement, including, without limitation, any reduction in coverage or in limits of the required policy or policies.

h) Insurance shall be placed with California admitted insurers (licensed to do business in California) with a current rating by Best's Key Rating Guide acceptable to the County; provided, however, that if no California admitted insurance company provides the required insurance, it is acceptable to provide the required insurance through a United States domiciled carrier that meets the required Best's rating and that is listed on the current List of Eligible Surplus Line Insurers maintained by the California Department of Insurance. A Best's rating of at least A-VII shall be acceptable to the County; lesser ratings must be approved in writing by the County.

i) Contractor shall require that all of its subcontractors are subject to the insurance and indemnity requirements stated herein, or shall include all subcontractors as additional insureds under its insurance policies.

j) At least ten (10) days prior to the date the Contractor begins performance of its obligations under this Agreement, Contractor shall furnish County with certificates of insurance, and with original endorsements, showing coverage required by this Agreement, including, without limitation, those that verify coverage for subcontractors of the Contractor. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements shall be received and, in County's sole and absolute discretion, approved by County. County reserves the right to require complete copies of all required insurance policies and endorsements, at any time.

k) The limits of insurance described herein shall not limit the liability of the Contractor and Contractor's officers, employees, agents, representatives or subcontractors.

#### 7) Defense and Indemnification

a) To the fullest extent permitted by law, Contractor shall indemnify, hold harmless and defend the County and its agents, officers and employees from and against all claims, damages, losses, judgments, liabilities, expenses and other costs, including litigation costs and attorneys' fees, arising out of, resulting from, or in connection with the performance of this Agreement by the Contractor or Contractor's officers, employees, agents, representatives or subcontractors and resulting in or attributable to personal injury, death, or damage or destruction to tangible or intangible property, including the loss of use; provided, however, such indemnification shall not extend to or cover loss, damage or expense arising from the sole negligence or willful misconduct of the County or its agents, officers and employees.

b) Contractor's obligation to defend, indemnify and hold the County and its agents, officers and employees harmless under the provisions of this paragraph is not limited to or restricted by any requirement in this Agreement for Contractor to procure and maintain a policy of insurance.

#### 8) Status of Contractor

a) All acts of Contractor and its officers, employees, agents, representatives, subcontractors and all others acting on behalf of Contractor relating to the performance of this Agreement, shall be performed as independent contractors and not as agents, officers or employees of County. Contractor, by virtue of this Agreement, has no authority to bind or incur any obligation on behalf of County. Except as expressly provided in Exhibit A, Contractor has no authority or responsibility to exercise any rights or power vested in the County. No agent, officer or employee of the County is to be considered an employee of Contractor. It is understood by both Contractor and County that this Agreement shall not be construed or considered under any circumstances to create an employer-employee relationship or a joint venture.

b) At all times during the term of this Agreement, the Contractor and its officers, employees, agents, representatives or subcontractors are, and shall represent and conduct themselves as, independent contractors and not employees of County.

c) Contractor shall determine the method, details and means of performing the work and services to be provided by Contractor under this Agreement. Contractor shall be responsible to County only for the requirements and results specified in this Agreement and, except as expressly provided in this Agreement, shall not be subjected to County's control with respect to the physical action or activities

of Contractor in fulfillment of this Agreement. Contractor has control over the manner and means of performing the services under this Agreement. Contractor is permitted to provide services to others during the same period service is provided to County under this Agreement. If necessary, Contractor has the responsibility for employing other persons or firms to assist Contractor in fulfilling the terms and obligations under this Agreement.

d) If in the performance of this Agreement any third persons are employed by Contractor, such persons shall be entirely and exclusively under the direction, supervision and control of Contractor. All terms of employment including hours, wages, working conditions, discipline, hiring and discharging or any other term of employment or requirements of law shall be determined by the Contractor.

e) It is understood and agreed that as an independent Contractor and not an employee of County, the Contractor and the Contractor's officers, employees, agents, representatives or subcontractors do not have any entitlement as a County employee, and do not have the right to act on behalf of the County in any capacity whatsoever as an agent, or to bind the County to any obligation whatsoever.

f) It is further understood and agreed that Contractor must issue W-2 forms or other forms as required by law for income and employment tax purposes for all of Contractor's assigned personnel under the terms and conditions of this Agreement.

g) As an independent Contractor, Contractor hereby indemnifies and holds County harmless from any and all claims that may be made against County based upon any contention by any third party that an employer-employee relationship exists by reason of this Agreement.

9) Records and Audit

a) Contractor shall prepare and maintain all writings, documents and records prepared or compiled in connection with the performance of this Agreement for a minimum of four (4) years from the termination or completion of this Agreement. This includes any handwriting, typewriting, printing, photostatic, photographing and every other means of recording upon any tangible thing; any form of communication or representation including letters, words, pictures, sounds or symbols or any combination thereof.

b) Any authorized representative of County shall have access to any writings as defined above for the purposes of making audit, evaluation, examination, excerpts and transcripts during the period such records are to be maintained by Contractor. Further, County has the right at all reasonable times to audit, inspect or otherwise evaluate the work performed or being performed under this Agreement.

10) Confidentiality

The Contractor agrees to keep confidential all information obtained or learned during the course of furnishing services under this Agreement and to not disclose or reveal such information for any purpose not directly connected with the matter for which services are provided.

11) Nondiscrimination

During the performance of this Agreement, Contractor and its officers, employees, agents, representatives or subcontractors shall not unlawfully discriminate in violation of any federal, state or local law, rule or regulation against any employee, applicant for employment or person receiving services under this Agreement because of race, religion, color, national origin, ancestry, physical or mental disability, medical condition (including genetic characteristics), marital status, age, political affiliation, sex, or sexual orientation. Contractor and its officers, employees, agents, representatives or subcontractors shall comply with all applicable Federal, State and local laws and regulations related to non-discrimination and equal opportunity, including without limitation the County's nondiscrimination policy; the Fair Employment and Housing Act (Government Code sections 12900 et seq.); California Labor Code sections 1101, 1102 and 1102.1; the Federal Civil Rights Act of 1964 (P.L. 88-352), as amended; and all



applicable regulations promulgated in the California Code of Regulations or the Code of Federal Regulations.

12) Assignment

This is an agreement for the services of Contractor. County has relied upon the skills, knowledge, experience and training of Contractor and the Contractor's firm, associates and employees as an inducement to enter into this Agreement. Contractor shall not assign or subcontract this Agreement without the express written consent of County. Further, Contractor shall not assign any monies due or to become due under this Agreement without the prior written consent of County.

13) Waiver of Default

Waiver of any default by either party to this Agreement shall not be deemed to be waiver of any subsequent default. Waiver or breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach, and shall not be construed to be a modification of the terms of this Agreement unless this Agreement is modified as provided below.

14) Notice

Any notice, communication, amendment, addition or deletion to this Agreement, including change of address of either party during the term of this Agreement, which Contractor or County shall be required or may desire to make shall be in writing and may be personally served or, alternatively, sent by prepaid first class mail to the respective parties as follows:

To County: County of Stanislaus  
Capital Projects Office  
Attention: Patricia Hill Thomas  
1010 10<sup>th</sup> Street, Suite 2300  
Modesto, CA 95354

To Contractor: E.S., Inc. dba Energy Systems  
Attn: Damien Oxendine  
7100 Longe Street  
Stockton, CA 95206

15) Conflicts

Contractor agrees that it has no interest and shall not acquire any interest direct or indirect which would conflict in any manner or degree with the performance of the work and services under this Agreement.

16) Severability

If any portion of this Agreement or application thereof to any person or circumstance shall be declared invalid by a court of competent jurisdiction or if it is found in contravention of any federal, state or county statute, ordinance or regulation the remaining provisions of this Agreement or the application thereof shall not be invalidated thereby and shall remain in full force and effect to the extent that the provisions of this Agreement are severable.

17) Amendment

This Agreement may be modified, amended, changed, added to or subtracted from by the mutual consent of the parties hereto if such amendment or change is in written form and executed with the same formalities as this Agreement and attached to the original Agreement to maintain continuity.

18) Entire Agreement

This Agreement supersedes any and all other agreements, either oral or in writing, between any of the parties herein with respect to the subject matter hereof and contains all the agreements between the parties with respect to such matter. Each party acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or anyone acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Agreement shall be valid or binding.

19) Advice of Attorney

Each party warrants and represents that in executing this Agreement, it has received independent legal advice from its attorneys or the opportunity to seek such advice.


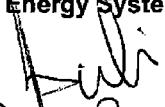

20) Construction

Headings or captions to the provisions of this Agreement are solely for the convenience of the parties, are not part of this Agreement, and shall not be used to interpret or determine the validity of this Agreement. Any ambiguity in this Agreement shall not be construed against the drafter, but rather the terms and provisions hereof shall be given a reasonable interpretation as if both parties had in fact drafted this Agreement.

21) Governing Law and Venue

This Agreement shall be deemed to be made under, and shall be governed by and construed in accordance with, the laws of the State of California. Any action brought to enforce the terms or provisions of this Agreement shall have venue in the County of Stanislaus, State of California.

IN WITNESS WHEREOF, the parties or their duly authorized representatives have executed this Agreement on the day and year first hereinabove written.

<p>COUNTY OF STANISLAUS</p> <p>By:  Patricia Hill Thomas Chief Operations Officer / Assistant Executive Officer</p> <p>"County"</p>	<p>E.S., Inc. dba Energy Systems</p> <p>By:  Name: BACI RANCICH Title: GENERAL MANAGER "Contractor"</p>
<p>APPROVED AS TO FORM:</p> <p>By:  John P. Doering County Counsel</p>	

## EXHIBIT A

### A. SCOPE OF WORK

The Contractor shall provide services under this Agreement as outlined in RFP #12-09-CP Data Center Engine Generator Solution.

### B. COMPENSATION

The Contractor shall be compensated for the services provided under this Agreement as follows:

1) Contractor will be compensated on a lump sum basis for each task as set forth in the proposal and scope of work dated January 17, 2012 and, by this reference, made a part hereof. In addition to the aforementioned fees, Contractor will be reimbursed for the following expenses, plus any expenses agreed to by the parties as set forth in a Schedule of Rates attached hereto, that are reasonable, necessary and actually incurred by the Contractor in connection with the services:

(a) Any filing fees, permit fees, or other fees paid or advanced by the Contractor.

(b) Expenses, fees or charges for printing, reproduction or binding of documents at actual costs.

2) The County shall retain five (5) percent of all periodic or progress payments made to the Contractor until completion and acceptance of all work tasks.

3) The parties hereto acknowledge the maximum amount to be paid by the County for services provided shall not exceed \$250,961.15, including, without limitation, the cost of any subcontractors, consultants, experts or investigators retained by the Contractor to perform or to assist in the performance of its work under this Agreement.

## Request for Taxpayer Identification Number and Certification

**Give Form to the  
 requester. Do not  
 send to the IRS.**

Print or type See Specific Instructions on page 2.	Name (as shown on your income tax return) <b>E.S. Inc.</b>	
	Business name/disregarded entity name, if different from above <b>DBA: Energy Systems</b>	
	Check appropriate box for federal tax classification (required): <input type="checkbox"/> Individual/sole proprietor <input checked="" type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ <input type="checkbox"/> Other (see instructions) ▶	
	<input type="checkbox"/> Exempt payee	
	Address (number, street, and apt. or suite no.) <b>7100 S. Longe Street Suite 300</b>	Requester's name and address (optional)
City, state, and ZIP code <b>Stockton, CA 95206</b>		
List account number(s) here (optional)		

### Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Social security number								

**Note.** If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Employer identification number								
6	8	-	0	2	8	0	7	0

### Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

**Sign Here**      Signature of U.S. person ▶ *[Handwritten Signature]*

Date ▶ *5-1-2012*

### General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

#### Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

**Note.** If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

**Definition of a U.S. person.** For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

**Agreement Between the City of Modesto, the County of Stanislaus,  
and Stanislaus Regional 911  
for Building Maintenance Services located at  
3705 Oakdale Road, Modesto, California**

THIS AGREEMENT, is made and entered into by and between the City of Modesto hereinafter called CITY and the County of Stanislaus, hereinafter called COUNTY and Stanislaus Regional 911, hereinafter called SR911 and shall become effective on July 1, 2007.

**RECITALS**

WHEREAS, the COUNTY is willing to provide building maintenance services for the Consolidated Center located at 3705 Oakdale Road, Modesto, California and;

WHEREAS, the City of Modesto, Stanislaus County Fire Warden/Office of Emergency Services, and Stanislaus Regional 911 jointly share the space available at 3705 Oakdale Road, Modesto, California, hereinafter called Tenants;

WHEREAS, the CITY, COUNTY and SR 911 have agreed upon a methodology to share the costs;

WHEREAS, Stanislaus County General Services Agency – Facilities Maintenance Division will coordinate the billing to the tenants for the building maintenance and utility costs associated with the Consolidated Center;

NOW, THEREFORE, the parties hereto agree as follows:

**TERMS AND CONDITIONS**

1. The aforementioned Recitals are true and correct and are deemed to be terms and conditions of this Agreement.

2. The term of this Agreement shall become effective on July 1, 2007 and shall continue in full force and effect for a five (5) year period through June 30, 2012. The agreement shall automatically renew each year after the initial five (5) year period, unless either party to the agreement takes action to cancel the agreement as provided in Section 14 of this agreement.
  
3. The parties agree that capital expenditures including but not limited to HVAC replacement, parking lot re-pavement, roof replacement or major maintenance will be split between the CITY and COUNTY on a 50/50 basis.
  
4. The parties further acknowledge that all existing agreements and billings for pest control services, landscape maintenance, fire protection equipment and extinguisher service, UPS battery monitoring system and maintenance, generator maintenance, fuel and permitting fees, and security system and cameras will be billed and paid through Stanislaus County General Services Agency – Facilities Maintenance Division. In addition custodial services and supplies; maintenance and repairs, and maintenance supplies will billed to the tenants by Facilities Maintenance. Facilities Maintenance will use a square footage distribution as described below to bill out actual costs to the tenants with the exception of the UPS battery monitoring system and maintenance. The costs associated with the UPS battery monitoring system and maintenance will be shared equally between the Fire Warden/ Office of Emergency Services and Stanislaus Regional 911. The agreed upon cost formula is as follows:

<b>Cost Formulas by Agency</b>	<b>SR 911</b>	<b>OES</b>	<b>MPD</b>
Partners by 3	33.3%	33.3%	33.3%
Square Footage	39.7%	44.3%	16.0%
Percentage of Occupancy	50.6%	24.1%	25.3%
OES (EOC) & SR 911	50.0%	50.0%	0.0%

5. The parties agree that all utility costs associated with the Consolidated Center will be paid through the Stanislaus County General Services Agency – Facilities Maintenance Division, which will then be billed on a monthly basis by Facilities Maintenance to the

tenants using the percentage of occupancy formula distribution as described in the Cost Formulas by Agency chart herein.

6. The parties agree that the cost of the reception staff, extra-help Police Assistant, will be divided by the three partners with an equal distribution of 33.3%, as defined in the Cost Formulas by Agency chart herein. The CITY will bill Stanislaus County Fire Warden/Office of Emergency Services and Stanislaus Regional 911 each at 33.3% of the actual costs on a monthly basis. Stanislaus County Fire Warden/Office of Emergency Services and Stanislaus Regional 911 will provide payment to the CITY within thirty (30) days of receipt of the billing invoice.
7. The County's General Services Agency – Facilities Maintenance will bill the City of Modesto Police Department for its share of the facility costs as defined above. The CITY will provide payment to the COUNTY General Services Agency – Facility Maintenance within thirty (30) days of receipt of the billing invoice.
8. The General Services Agency – Facility Maintenance will prepare a Standard Journal for the Stanislaus Regional 911 share of the facility costs. The Standard Journal will be submitted to the Director of Stanislaus Regional 911 for review and approval. Stanislaus Regional 911 will process this journal within thirty (30) days of receipt to reimburse the General Service Agency – Facility Maintenance for these costs.
9. The General Services Agency – Facility Maintenance will prepare a Standard Journal for the Stanislaus County Fire Warden/Office of Emergency Services share of the facility costs. The Standard Journal will be submitted to the Stanislaus County Fire Warden for review and approval. Stanislaus County Fire Warden will process this journal within thirty (30) days of receipt to reimburse the General Service Agency – Facility Maintenance for these costs.
10. Defense and Indemnification. Each of the parties hereto shall be solely liable for negligent or wrongful acts or omissions of its representatives and employees occurring in the

performance of this Agreement, and shall pay such damages without contribution by the other party. Each party hereto agrees to indemnify, defend, and hold harmless the other party, its officers, agents and employees from any and all claims and losses proximately caused by the party's solely negligent or wrongful acts or omissions.

11. Entire Agreement. This Agreement contains the entire Agreement of the parties, and no representations, inducements, promises, or agreements otherwise between the parties, not embodied herein, or incorporated herein by reference shall be of any force or effect. Further, no term or provision hereof may be changed, waived, discharged, or terminated unless the same is in writing executed by the parties above.

12. Severability. Should any part, term or provision of the Agreement be decided by a court or competent jurisdiction to be illegal or in conflict with any law of the State of California, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining part, terms or provision hereof shall not be affected thereby.

13. Modification Only in Writing. This Agreement may not be modified, amended, changed, added to or subtracted from without mutual written consent of the parties.

14. Cancellation of Agreement. Decision to cancel this agreement may be made by any party to this agreement without cause upon a one hundred twenty (120) calendar day written notice to each part to the agreement, after the initial contract period.

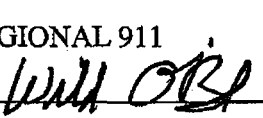
CITY OF MODESTO

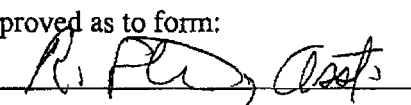
STANISLAUS COUNTY

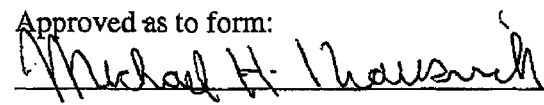
STANISLAUS

By   
CITY MANAGER

By   
CHIEF EXECUTIVE OFFICER

REGIONAL 911  
By   
CHAIRMAN, SR 911

Approved as to form:  
  
City Attorney

Approved as to form:  
  
County Counsel



**Agreement Between the County of Stanislaus – Strategic  
Business Technology Department, and  
Stanislaus Regional 911  
Services located at  
3705 Oakdale Road, Modesto,  
California**

This AGREEMENT is made and entered into by and between the County of Stanislaus Strategic Business Technology Department, hereinafter called SBT, and Stanislaus Regional 911, hereinafter called SR 911, and shall become effective on May 13, 2013.

**RECITALS**

WHEREAS, SBT and SR 911, jointly share the space available at 3705 Oakdale Road, Modesto, California, hereinafter called Tenants;

WHEREAS, SBT and SR 911 will jointly share the Backup Generator and Fire Suppression equipment residing at 3705 Oakdale Road, Modesto, California;

WHEREAS, SBT and SR 911 have agreed upon a methodology to share the costs;

WHEREAS, all parties to the agreement recognize that the long term arrangement is mutually beneficial for all involved;

WHEREAS, the economy of scale and collaborative approach associated with co-location of agencies has enhanced public health and safety, ensured efficient management of resources and promoted multi-jurisdictional cooperation for all parties to the agreement and the communities served;

WHEREAS, SBT and SR 911 have installed separate electrical circuits for the utilization of utility and General Services Agency will coordinate the billing to the tenants for the utility costs associated with the each of the designated circuits at the facility at 3705 Oakdale Road;

NOW, THEREFORE, the parties hereto agree as follows:

## TERMS AND CONDITIONS

1. The aforementioned Recitals are true and correct and are deemed to be terms and conditions of this Agreement.
2. The term of this Agreement shall become effective on May 13, 2013 and shall continue in full force and effect for a ten (10) year period through May 12, 2023.
3. All tenants acknowledge that SR 911 has contributed 730 square feet of space to SBT. This space is being utilized to house the SBT Data Center and Uninterruptable Power Supply equipment.
4. SBT will cover recurring costs associated with the fire suppression system including, but not limited to, annual maintenance/support agreements, materials, supplies, and repairs. In addition SBT will cover the monthly recurring cost for SR 911 – network connection via CSME at the Ceres location. In exchange for the space being provided at 3705 Oakdale and any building maintenance services/supplies at the 3705 Oakdale location. SBT requires no janitorial services.
5. SR 911 and SBT agree and acknowledge that all recurring costs associated with the backup generator including, but not limited to, annual maintenance/support agreements, materials, supplies, and repairs, will be shared equally between SBT and SR 911. During proposed budget calculations SBT will share with SR 911 the shared costs as part of SBT's annual budgeting process each January. These costs will be included in the annual CAP cost for SR 911. Specific detail will be shared and agreed upon by both SBT and SR911. Cost will be billed on a monthly basis by SBT. SR-911 will be invoiced monthly for the agreed recurring cost.


The agreed upon cost formula:

**Backup Generator Recurring Cost Share:**


50% - SBT      50% - SR 911

6. Future capital expenditures, including, but not limited to, roof replacement or other major facility maintenance, repair, or replacement, will be discussed and mutually agreed upon by all tenants with costs shared when applicable. If facility improvement costs are applicable to all tenants, then the costs will be shared among all tenants and distribution based on utilization of square footage utilized by each tenant.
7. Entire Agreement. This Agreement contains the entire Agreement of the tenants, and no representations, inducements, promises, or agreements otherwise between the tenants, not embodied herein, or incorporated herein by reference shall be of any force or effect. Further, no term or provision hereof may be changed, waived, discharged, or terminated unless the same is in writing executed by the tenants above.
8. Severability. Should any part, term or provision of the Agreement be decided by a court or competent jurisdiction to be illegal or in conflict with any law of the State of California, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining part, terms or provision hereof shall not be affected thereby.
9. Modification Only in Writing. This Agreement may not be modified, amended, changed, added to or subtracted from without mutual written consent of the tenants.

Stanislaus County – SBT

By   
Marcia Cunningham  
Director

Stanislaus Regional 911

By  5-21-13  
Lucian Thomas  
Director