



13331 Reeck Road, Southgate, MI 48195-3054
Phone (734) 281-3830 Fax (734) 281-1905

Request for Proposal [RFP]

September 15, 2006

RFP Description	Emergency Backup Power (UPS) and Data Center Upgrade
Proposal Due Date	September 29, 2006 by 4pm Eastern
Contact Person	Angie Michelini Network Services Manager Voice: 734.759.0255 Email: AMichelini@tln.lib.mi.us
Facility Tour	Arranged by appointment. 8am-4pm Monday-Friday
RFP Proposal is also availability in PDF format on TLN website	www.tln.lib.mi.us/dept/administration www.tln.lib.mi.us/tnt

The Library Network [TLN] seeks proposals from qualified vendors who will provide hardware and installation costs for an emergency backup power system (UPS) and data center upgrade for the TLN data center located at 13331 Reeck Road in Southgate, Michigan.

TLN will provide interested firms with an opportunity to inspect our facilities and view building blue prints, electrical diagrams and any other available and relevant documentation, including a load analysis of the current data center configuration.

Proposal responses should include the following items. Details are provided in the RFP document and in the attachments.

1. The name and office address of the project manager who will direct the work and names of the key staff who will be working on the project.
2. A list of sub-consultants, if any, to be used and the work they will perform.
3. A disclosure of ancillary projects that might affect your work on the proposed project.
4. A list of a minimal of three references, including contact information, currently using its services.
5. Project timeline for receiving materials and installation of materials. Please begin the timeline with a start date of October 23, 2006.
6. Detailed pricing for UPS unit with 4 hours of up-time including installation.
7. Detailed pricing for UPS unit with 6 hours of up-time including installation – this would be a comparison between the cost for investing in a UPS with 4 hours of up-time vs. 6 hours of up-time.
8. Detailed pricing for 3 new 4-post open racks including rack kits for existing equipment.
9. Detailed pricing for cable management
10. Detailed pricing for KVM switch and monitor
11. Detailed installation costs
12. Specifications describing scope of work, manufacturers, standards, workmanship and other characteristics pertaining to the project.
13. Dimension drawings of the data center showing how the proposed solution will fit into the data center.
14. Pictures or brochures showing the equipment described in the proposal.
15. Contract documents in sufficient detail to allow a comprehensive technical review.
16. Proof of insurance coverage for property insurance, workers compensation, installation risk, automobile, general liability and excess liability.
17. Maintenance contract information
18. Extended warranty information
19. Estimated ship date of the materials after receipt of purchase order
20. Trade-in rebate of current UPS units as detailed in Attachment B
21. Pricing details including type of pricing and discount percentage.
22. Proof of license of electrical contractor
23. Bids meet specifications as detailed in Attachment A.
24. Six copies of the RFP to be submitted by 4pm on Friday, September 29, 2006.
25. One electronic version of the RFP emailed to AMichelini@tln.lib.mi.us after 4:05pm on Friday, September 29, 2006. Since this is a sealed bid process, electronic versions cannot be accepted prior to 4:05pm on Friday, September 29, 2006.

Emphasis should be placed upon providing information concerning staffing, your experience with similar projects, and your approach to completing the proposed project. Oral interviews are not anticipated.

For your firm to be considered, your response must be received by 4pm Friday, September 29, 2006. Late proposals will not be accepted. Please send your RFP responses to:

Angie Michelini
Network Services Manager
The Library Network
13331 Reeck Road
Southgate, MI 48195

All submitted bids will be considered sealed bids. All sealed bids will be opened at 4:01pm on Friday, September 29 at The Library Network headquarters.

Service Description

The Library Network (TLN) is a public library cooperative serving 65 libraries in southeast Michigan. Our mission is to provide and facilitate quality services developed through collaboration of our member libraries. We are funded by the state and by our member libraries. The member libraries are dependent upon TLN to provide 24/7 up time for the shared database system and wide area network connectivity.

TLN owns and occupies a two-story office building. The building is approximately 21,850 square feet in size and is served by Detroit Edison under the utility's secondary-metered Business Electric Service Rate D3 (Tariff 110) at 480/277 volts, three phase, four wire. The 800 ampere main electrical service reflects the building's original use as a medical diagnostic facility. Service is derived from a utility-owned, underground-fed transformer located at the facility's northeast corner. Incoming service entrance conductors (cables) are routed in conduit beneath the east end of the building and terminate in the main switchboard within the electrical room where the utility meter is located.

TLN's technology systems are housed within a 13' x 20' data center, on a ground floor and limited-access room. Raised flooring is not present in the room. The electrical branch circuits supplying the data center originate from unlocked panel boards RP-E and RP-M are located along corridor walls outside this room.

The Summary of Data center Electrical Loads (available upon request) was compiled from visual inspection of all existing IT equipment currently located within the data center. Based upon nameplate equipment ratings, the total existing electrical demand is estimated to be 20 kilovolt-amperes (kVA). All components draw single phase AC current at 120 volts, 60Hz directly or through small plug-in transformers. Varieties of small UPS systems are presently in use and range up to 6000 kVA in size. These systems may provide up to 15 minutes of continuous electrical support for the IT systems they serve directly.

The air conditioning system dedicated to the data center is rated at 4 tons in capacity (48,000 BTU/Hr). This system consists of a Carrier compressor-condenser on the roof and a blower-evaporator unit located within the suspended ceiling of the room immediately south of the data center. Conservatively, the total electrical consumption of these components is estimated to be 2.5 kVA/cooling ton, or 10kVA overall. The HVAC equipment operates at 480 volts, three phase.

The lighting within the data center consists of six (6) four-lamp 2' x 4' recessed fluorescent lighting fixtures, representing approximately 1 kVA in total. The lighting fixtures operate at 277 volts, single phase.

The intent of this RFP is to invest in a UPS unit with a minimum of four hours of up-time to provide uninterrupted service to TLN and library members in case of power disruption. To provide space for a UPS unit in the data center, TLN must consolidate their existing equipment that resides in several racks and includes several KVM switches and monitors to a more efficient configuration. Following is a summary of the main areas that TLN is including in this RFP:

- 1) UPS unit with 4 hours of up-time including installation.
- 2) UPS unit with 6 hours of up-time including installation.
 - a. Note: the 4 hour and 6 hour UPS unit will be used as a cost comparison
- 3) Rack consolidation and cable management with 3 new 4-post racks and the use of 1 existing 2-post rack.
- 4) KVM switch and monitor consolidation with 1 new KVM 24-port (minimum) switch with dual display capability.

Please refer to Attachment A for detailed specifications on the UPS, racks and KVM switch. Please refer to the TLN Data Center diagram for an overview of dimensions and available space.

Scope of Work

The following outline establishes the scope of work for the services needed for a back up power system and data center upgrade.

- 1) Specifications describing scope of work, acceptable manufacturers, standards, workmanship and other characteristics pertaining to the project. Please include dimension drawings of the data center and pictures or brochures showing the equipment described in your proposal.
- 2) Contract documents in sufficient detail to allow a comprehensive technical review.

Selection Process

Proposals will be evaluated by TLN staff and Shared Automation System committee members and reviewed and approved by the Shared Automation System Executive Committee and Board of Directors. Proposals will be evaluated based on qualifications, references and costs. Although price will be an important factor in evaluating responses, the respondent selected will be chosen on the basis of the greatest benefit to TLN and its members, not necessarily on the basis of the lowest price. Any or all bids may be rejected due to failure to respond adequately to the RFP. TLN reserves the right to contact parties that have used the respondent's previous services and use any other information that would assist in the evaluation. When the decision has been made, all respondents submitting a proposal will be notified in writing.

Questions and Submissions

Telephone or email inquiries from respondents concerning this RFP and all responses to this proposal, should be addressed to Angie Michellini, Network Services Manager.

Specifications/Quality/Qualifications for Products or Services

- The specifications (see Attachment A) in this RFP are the minimum acceptable. When specific manufacturer and model numbers are used, they are to establish a design, type of construction, quality, functional capability and/or performance level desired. When alternates are bid/proposed, they must be identified by manufacturer, part number, and other information necessary to establish equivalency. The Library Network (TLN) shall be the sole judge of equivalency. Suppliers are cautioned to avoid bidding alternates that may result in rejection of their bid/proposal.
- Unless otherwise indicated in the RFP, all material shall be first quality. Items that are used, demonstrators, obsolete, seconds, or which have been discontinued are unacceptable without prior written approval by TLN.
- Contractor or Sub-Contractor Qualifications:
 - Licensed electrical contractor (or subcontractor).
 - Satisfactory insurance coverage for property, workers compensation, installation risk, automobile, general liability and excess liability. Proof of insurance coverage must be included with the RFP bid.
 - Capable of interfacing with the owner's representative throughout all design and installation phases of the project, including UPS startup, commissioning, demonstration and owner training of the entire system.
 - Capable of providing satisfactory customer references of prior experience in the design and installation of UPS systems up to 50kVA in rating.
 - Capable of providing satisfactory customer references of prior experience in performing electrical installations within corporate data centers around existing customer operations.
 - Capable of providing an extended warranty against all defects in equipment, materials and workmanship.

General Pricing and Payment Terms

- Prices are to be quoted F.O.B.: The Library Network, various locations as applicable, with freight prepaid and added. Any variance in F.O.B. point is subject to negotiation.
- Subject to negotiation of early payment discounts, payment terms for the agreement resulting from this RFP will be Net 30 days. Payment terms beyond Net 30 days may be considered in the evaluation of this request.
- Pricing must be provided in U.S. Dollars only. Payment will be made by check in US dollars. Requests for other methods of payment will not be honored unless agreed upon prior to releasing the Purchase Order.
- The Supplier's insurance will take precedence over TLN insurance coverage. It is not necessary to be assessed additional insurance coverage rates, and TLN declines such coverage.
- Please itemize all prices, discounts and charges. TLN reserves the right to accept all or part, or decline the whole. There is no obligation to buy.
- Pricing details should indicate whether the pricing is GSA (government services administration) or state and local pricing and the discount percentage.
- Include the estimated ship date of the materials after receipt of a purchase order (for example, one week after P.O. is received).
- Pricing details should indicate the trade-in cost of current UPS's. Detailed information on current UPS's can be found in Attachment B.

Energy Star

TLN desires to purchase "Energy Star" compliant equipment; this shall be taken into consideration as part of the award decision. Supplier shall describe the availability of "Energy Star" compliant equipment and include manufacturer specifications as part of the Supplier's response. For more information on Energy Star, please reference the following website: www.energystar.gov.

Equipment Maintenance Contracts

Describe any maintenance services agreements that are available for this equipment, and provide costs for these agreements.

Extended Warranty Options

Describe any extended warranty options and quote prices on these options.

Rights Reserved by The Library Network and Restrictions on RFP Process

- TLN reserves the right to reject any or all quotations, including by way of example only and without limitation, any quotation that does not contain all the requested information.
- TLN reserves the right to contact a respondent for clarification of information submitted and/or to negotiate modifications of proposed specifications and prescribed terms and requirements during the selection process. TLN is the only agency authorized to change or clarify the specifications and conditions of the RFP.
- TLN may presume that any quotation is a best-and-final offer.
- TLN reserves the rights to award in part, in whole, or not at all.
- TLN will not pay for any information requested nor is it liable for costs incurred by the Supplier in responding to this RFP.
- Any discussions with TLN personnel, other than as listed above, regarding this RFP while the RFP is in progress (from the time Supplier receives this RFP until final award is made) are strictly prohibited. Such contact and discussion may result in disqualification of Supplier's Quotation.
- TLN is the sole owner of all data and information contained within the RFP document and accompanying attachments. Supplier shall use this information exclusively to prepare a quotation. Supplier should not disclose this information to any other firm or use it for any other purpose.
- All proposals submitted become the property of TLN; they will not be returned.

Supplier Acknowledgements

By virtue of submittal of a quotation, Supplier acknowledges:

- That all of the requirements of this RFP have been read and understood.
- That TLN's Basic Terms & Conditions have been read and understood.
- That compliance with the Specifications/Qualifications, Basic Terms & Conditions and any applicable Supplemental Terms and Conditions will be assumed by TLN if not otherwise noted in the submittal.
- That Supplier is not delinquent on the repayment of any Federal debt.
- That Supplier is presently not debarred, suspended, proposed for debarment, declared ineligible, nor voluntarily excluded from covered transactions by any Federal department or agency.

- The individual signing below has authority to enter into this on behalf of Supplier.

Supplier, through the signature below of its agent, hereby offers to provide the requested products/services at the prices identified under the terms and conditions stated and incorporated into this RFP. This offer remains open for 60 days.

DATE: _____

SUPPLIER'S LEGAL NAME: _____

AUTHORIZED SIGNATURE: _____

PRINT NAME: _____ TITLE: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

EMAIL ADDRESS _____

PHONE NUMBER: _____

FAX NUMBER: _____

The Internal Revenue Code requires recipients of payments which must be reported on Form 1099 to provide their taxpayer identification number (TIN). T.I.N. (Taxpayer Identification Number or Federal Identification Number, Social Security Number)

T.I.N. Number: _____ Social Security Number: _____

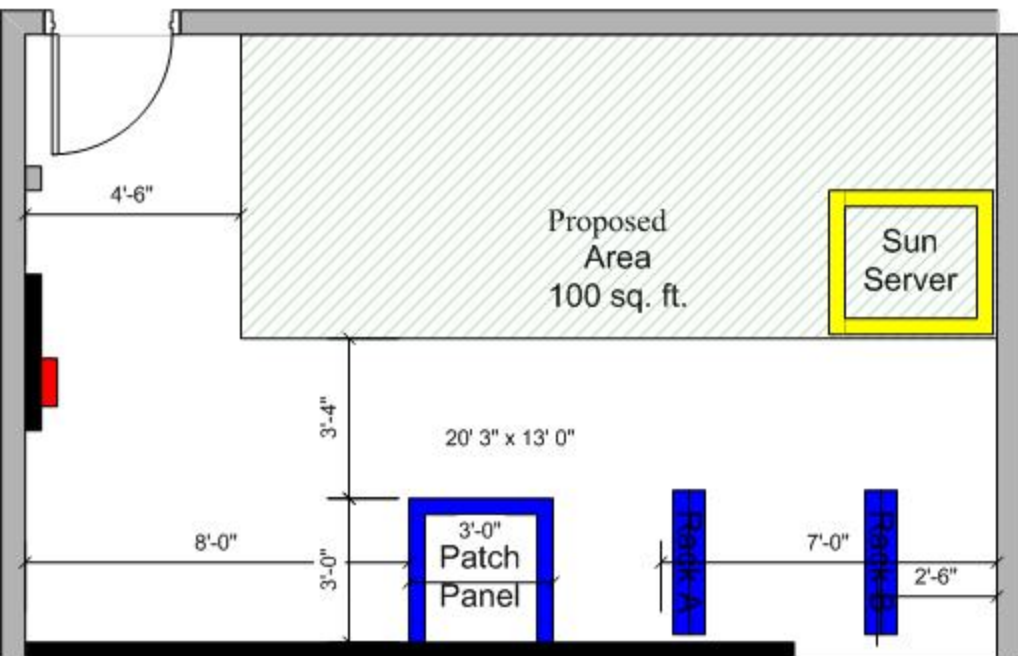
Project: The Library Network UPS and Data Center Upgrade

Specification Compliance: 'Supplier' **Complies** with all sections of the written specification labeled Attachment A: The Library Network UPS Distribution/Data Center Upgrade

Remit to Address: _____

NOTE: If the address to submit purchase orders, remit payment or send additional request for proposals is different from the above address, please indicate those addresses on a separate sheet and include with your response.

TLN Data Center



ATTACHMENT A:

Project: The Library Network UPS System / Data Center Upgrade

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification describes the operation and functionality of a continuous duty, three-phase, solid-state, static Uninterruptible Power System (UPS) hereafter referred to as the UPS. The UPS shall utilize an N+1 redundant, scalable array architecture. The system power train shall be comprised of hot swappable / user replaceable 10kW/10kVA power modules, which shall operate in parallel, and be configured for N+1 redundant operation at rated load. Each 10kVA/10kW power module contains a full rated input rectifier / boost converter (hereafter referred to as Input Converter), full rated output inverter, and 10% battery charging circuit. The system shall also comprise of a user-replaceable continuous duty bypass static switch module, hot swappable / user replaceable battery modules, redundant control modules, redundant logic power supplies, and LCD interface display. System static switch shall be capable of being fed from the same input as the rectifier or a separate input. All of the above system components are housed in two standard, 24 inch wide, 36 inch deep, 42U high equipment racks.
- B. In addition, this specification describes the performance, functionality, and design of the UPS Maintenance Bypass Cabinet and power distribution unit, hereafter referred to as the PDU/System Bypass. In addition this specification also includes multi-conductor overhead distribution, rack level distribution and the Battery System.
- C. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power and distribution for mission critical, electronic equipment load. The entire system shall bear the UL60950 listing as a complete product solution.
- D. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the System.

1.2 STANDARDS

- A. UL 1778 Uninterruptible Power Supply Equipment
- B. UL 891 Dead-Front Switchboards
- C. UL60950 Information Technology Equipment
- D. Where applicable, the UPS 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
- E. IEEE 519-1992 Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.
- F. ISO 9001
- G. ISO 14001

1.3 UPS MODES OF OPERATION

- A. Normal: The input converter 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.
- C. Recharge: Upon restoration of the AC input source, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.
- D. Static Bypass: The static bypass shall be used to provide 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 an emergency, this transfer shall be an automatic function.
- E. Maintenance Bypass: The system shall be equipped with an external make-before-break Maintenance Bypass Cabinet (MBC) to electrically isolate the UPS during routine maintenance and service of the UPS. The MBC shall completely isolate both the UPS input and output connections.

1.4 SUBMITTALS

- A. Proposal Submittals:
 - 1. As bid system bill of materials.
 - 2. Product catalog sheets or equipment brochures.
 - 3. Product guide specifications.
 - 4. System single-line operation diagram.
 - 5. Installation information, including weights and dimensions.
 - 6. Information about terminal locations for power and control 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 UPS.
2. User manual, which includes operating instructions.
3. As built equipment drawings

PART 2 – PRODUCT

2.1 DESIGN REQUIREMENTS

- A. The UPS shall be sized for 20 kVA and 20 kW load.
- B. The UPS battery shall be sized for 20 KW at a Power Factor of 0.8 for 240 minutes.

2.2 SYSTEM CHARACTERISTICS

- A. System Capacity: The system shall be scaleable for full kW output in the following frame sizes:
 1. 40 kVA/kW - Can be configured with up to (5), 10kW power modules for N+1
- B. Input:
 1. AC Input Nominal Voltage: 480 V, 3 Phase, 4 wire, 60 Hz.
 2. AC Input Voltage Window: +/- 15% of nominal (while providing nominal charging to the battery system).
 3. Short Circuit Withstand Rating: 30,000 Symmetrical Amperes
 4. Maximum Frequency Range: 40-70Hz
 5. Input Power Factor:
 - a. > .96 at 50% load
 - b. > .99 at 100% load
 6. Input Current Distortion *with no additional filters*:
 - a. < 6% at 100% load
 - b. < 6% at 50% load
 7. Soft-Start: Shall be linear from 0-100% input current and shall not exhibit inrush. This shall take place over a 15 second time period

C. UPS Output:

1. AC Output Nominal Output: 208/120 V, 3 Phase, 4 wire, 60 Hz.
2. AC Output Voltage Distortion: Max. 3% @ 100% Linear Load.
3. AC Output Voltage Regulation: +/- 1% For 100 % Linear or Nonlinear Load
4. Voltage Transient Response: +/- .5% maximum for 100% load step
5. Voltage Transient Recovery within <60 milliseconds
6. Output Voltage Harmonic Distortion:
 - a. <2% THD maximum and 1% single harmonic for a 100% linear load
 - b. <5% THD maximum for a 100% non-linear load
7. Phase Angle Displacement:
 - a. 120 degrees +/- .1 degree for balanced load
 - b. 120 degrees +/- .1 degrees for 50% imbalanced load
 - c. 120 degrees +/- .3 degrees for 100% imbalanced load
8. Overload Rating:
 - a. Normal Operation:
 - 1) 150% for 30 seconds
 - 2) 105% continuous
 - b. Bypass Operation:
 - 1) 125% continuous
 - 2) 1000% for 500 milliseconds
9. System AC-AC Efficiency: >91.5% at 100% load
10. Output Power Factor Rating: The UPS output shall not require derating for purely resistive loads (PF of 1). The output kW and kVA ratings of the UPS output shall be equal. For loads exhibiting a power factor of .9 leading to .8 lagging no derating of the UPS shall be required.

2.3 ENVIRONMENTAL

- A. Storage Ambient Temperature: -40°F to 158°F (-40°C to 70°C).
- B. Operating Ambient Temperature: +32°F to 104°F (0°C to 40°C). (77°F is ideal for most battery types).
- C. Relative Humidity: 0 to 95% Non-condensing
- D. Altitude: Maximum installation with no derating of the UPS output shall be 10,000 feet (3000m) above sea level.

2.4 INPUT POWER CONVERTER

- A. The input power converters of the system are housed within the parallel connected, 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.
- B. Input Current Total Harmonic Distortion: The input current THD_i shall be held to 6% or less at full system, while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting loads of both a linear or non-linear type. This shall be accomplished with no additional 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 0-100% of the nominal input over a default 15 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. (di/dt= constant)
- D. Magnetization Inrush Current: The UPS shall exhibit 0 inrush current as a standard product. If provided with an optional isolation transformer or PDU/System Bypass, system inrush shall be limited to 6 times the nominal input current of the transformer.
- E. Input Current Limit:
 - 1. The input converter shall control and limit the input current draw from utility to 150% of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation of up to +/-15% of the nominal input voltage.
 - 2. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current shall not exceed 126% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.
- F. Redundancy: The UPS shall be configured with redundant input converters, each with semiconductor fusing, and logic controlled contactors to remove a failed module from the input bus.
- G. Charging:
 - 1. The battery charging shall keep the DC bus float voltage of +/- 220v, +/-1%
 - 2. The battery charging circuit shall contain a temperature compensation circuit, which will regulate the battery charging to optimize battery life.
 - 3. The battery charging circuit shall remain active when in Static Bypass and in Normal Operation.
- H. Back-feed Protection: The above-mentioned logic controlled contactor also provides the back-feed protection required by UL1778.

2.5 OUTPUT INVERTER

- A. The UPS output inverter shall constantly recreate the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT driven 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 recreated output voltage sine wave delivered by the output inverters.
- B. Overload Capability: The output power converters shall be capable of 300% for short-circuit clearing. Steady-state overload conditions, of up to 150% of system capacity, shall be sustained by the inverter for 30 seconds in normal and battery operation. Should overloads persist past the outlined time limitation, the critical load will 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 removed 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 configured with redundant output inverters, each with semiconductor fusing, and logic controlled contactors to remove a failed component from the critical bus.

2.6 STATIC BYPASS

- A. As part of the UPS, a system static bypass switch shall be provided. The system static bypass shall 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 can not support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and static bypass switch 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. The design of the static switch power path shall consist of Silicon Controlled Rectifiers (SCR) with a continuous duty rating of 125% 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 bus output 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 display interface.
- E. Overloads: The static bypass shall be rated and capable of handling overloads equal to or less than 125% 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% of system capacity for periods of up to 500 milliseconds.

F. Modularity: The static bypass switch shall be of a modular design.

F. System Protection:

As a requirement of UL1778, 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.

2.7 DISPLAY AND CONTROLS

A. Control Logic: The UPS shall be controlled by two fully redundant, user-replaceable / hot-swappable control modules. 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).

B. Display Unit: A microprocessor controlled display unit shall be located on a hinged door in the front of the system. The display shall consist of an alphanumeric display with backlight, an alarm LED, and a keypad consisting of pushbutton switches.

C. Metered Data: The following metered data, shall be available on the alphanumeric display:

1. Year, Month, Day, Hour, Minute, Second of occurring events
2. Source Input Voltage
3. Output AC voltage
4. Output AC current
5. Input Frequency
6. Battery voltage
7. Internal Battery temperature

D. Event log: The display unit shall allow the user to display a time and date stamped log of the 64 most recent status and alarm events.

E. Alarms: The display unit shall allow the user to display a log of all 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 Temp 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 is installed and failed
29. Redundant Intelligence Module is installed and failed
30. Redundancy has been lost
31. Redundancy is below alarm threshold

32. Runtime is below alarm threshold
33. Load is above alarm threshold
34. Load is no longer above alarm Threshold
35. Minimum Runtime restored
36. Bypass is not in range (either frequency or voltage)
37. Backfeed contactor stuck in OFF position
38. Backfeed contactor stuck in ON position
39. UPS in Bypass due to Internal Fault
40. UPS in Bypass due to overload
41. System in Forced Bypass
42. Fault, Bypass Relay Malfunction
43. Q001 open/closed
44. Q002 open/closed
45. Q003 open/closed
46. High DC Warning
47. High DC Shutdown
48. Low Battery Shutdown
49. Low Battery Warning

F. Controls: the following controls or programming functions shall be accomplished by use of the display unit. Push button membrane switches shall facilitate these operations.

1. Silence audible Alarm
2. Set the alphanumeric display language
3. Display or set the date and time
4. Enable or disable the automatic restart feature
5. Transfer critical load to and from static bypass
6. Test battery condition on demand
7. Set intervals for automatic battery tests
8. Adjust set points for different alarms

9. Program the parameters for remote shutdown.

G. Potential Free (Dry) Contacts

1. The following potential free contacts shall be available on an optional relay interface board:

- a. Normal Operation
- b. Battery Operation
- c. Bypass Operation
- d. Common Fault
- e. Low Battery
- f. UPS Off

H. Communication Interface Board: A communication interface board shall provide the following communication ports which can be used simultaneously:

- 1. RS232 Serial Port #1
- 2. RJ-45 Interface port for a Remote Display

2.8 BATTERY

- A. The UPS battery shall be of modular construction made up of user replaceable, hot swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic, and temperature compensated charger circuitry.
- 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 health of each removable battery module. This system shall notify the user in the event that a failed or weak battery module is found.

PART 3 - Components

3.1 BATTERY DISCONNECT BREAKER

- A. Each UPS system shall have a 250 VDC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers are to be located within the UPS enclosure or as part of a line-up-and-match type battery cabinet.

3.2 PDU/SYSTEM BYPASS

- A. The PDU/system bypass cabinet shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The PDU/System bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution. The PDU/System bypass shall be constructed in a Standard 30 inch wide 36 inch deep 42U High, IT Rack Style enclosure.

- B. As a minimum, the PDU/system bypass shall contain the following features and accessories:
1. Appropriately rated circuit breakers to fully isolate the UPS during times where maintenance is required. As a part of this design there shall be a UPS input circuit breaker designated as Q1, a UPS output circuit breaker designated as Q2, and a wrap-around maintenance bypass circuit breaker designated as Q3 and an input circuit breaker to the UPS static bypass labeled as Q10. For PDU/system bypass panels equipped with an input transformer, there shall also be a molded case switch to isolate the transformer primary windings from the main input to the system. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each circuit breaker / switch actuator to the UPS and PDU/system bypass shall be provided, along with a means of locking out the circuit breakers to inhibit operation of the bypass transfer pair. The PDU/System Bypass shall be available for a 208V, 480V, or 600V input.
 2. Also included in the PDU/system bypass shall be a 42 pole distribution panelboard connected to the output bus of the PDU/system bypass to serve as critical load distribution.
 3. For purposes of providing local annunciation of status and alarm messages, the PDU/system bypass shall have an alphanumeric display with pushbutton switches, allowing retrieval of active alarms, system level programming, and event history of the PDU/system bypass. For purposes of simplicity and ease of use, the PDU/system bypass display shall be identical in nature to that of the InfraStruXure™ UPS.
 4. The PDU/system bypass shall also have a full-length hinged front door, with locking mechanism, to allow access to the panelboard circuit breakers and "three breaker" type maintenance bypass circuit breakers. There shall also be a hinged rear door to allow access to the main input 42 pole panelboard.
 5. Mimic Bus - The PDU/system bypass shall bear a full mimic diagram inside the hinged front door. Also associated with the mimic panel shall be indicating lights, capable of depicting proper operation of maintenance bypass circuit breaker and UPS output circuit breaker.

3.3 EXTENDED RUN (XR) BATTERY SOLUTIONS

For purposes of providing extended UPS back-up power, extended runtime battery enclosures shall be available. For ease of maintenance the extended runtime battery enclosures, shall house draw-out battery cartridges. These cartridges shall conform to OSHA lifting requirements for one person to replace battery cartridges without lifting tools or additional mechanisms. Battery cartridges shall interlock in place within the battery enclosure to ensure proper contact. When withdrawing a battery cartridge, a catch shall stop the battery cartridge from inadvertently being withdrawn in an unsafe manner. The Extended Run Battery solution shall be housed in a standard, 24 inch wide, 36 inch deep, 42U high equipment racks. Up to (3) Extended Run Battery enclosures may be added for increased battery runtime.

3.4 RACK MOUNT POWER DISTRIBUTION UNITS (Quantity 3 required)

For purposes of distributing power within an IT enclosure, rack mount power distribution units shall be available for installation within the IT enclosure. The rack mount power distribution units shall be capable of being installed in the back of the accompanying

enclosure to consume zero U space in the front of the rack, and shall not require tools for installation within the rack.

- A. Input Connection - For ease of installation, the Rack Mount PDU shall be connected via a twist lock connector, and shall be capable of being fed from agency approved flexible corded distribution wiring as described in section 3.6 of this specification. The input shall be capable of being served by 208Y120 Volts from an L21-20 type NEMA connector.
- B. Output Connections - The output of the Rack Mount PDU shall be fed from 208Y120Volts, and shall be distributed to receptacles capable of supplying power to cord connected equipment. Assuming Rack Mount PDU is fed from a circuit breaker with an 80% continuous rating, a single Rack Mount PDU shall include (42) NEMA 5-20R.

3.5 OVERHEAD DISTRIBUTION (To Distribute to Quantity 3 IT Enclosures)

- A. Flexible Distribution Conductors - For purposes of overhead distribution wiring of datacenter branch circuits, flexible conductors of either an SJO type, or TC 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 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. 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.

3.6 INFORMATION TECHNOLOGY (IT) ENCLOSURE (Quantity 3 required)

IT enclosures shall be available for housing of customer supplied IT equipment. Enclosures shall be listed under the same UL60950 agency approval as other products outlined within this specification.

- A. General Requirements
 1. The Enclosure shall be designed to provide a secure, managed environment for computer and networking equipment.
 2. The Enclosure shall conform to EIA-310 Standard for Cabinets, Racks, Panel and Associated Equipment and accommodate industry standard 19" rack mount equipment.
 3. The Enclosure shall be designed with four (4) vertical posts to allow rack mount equipment installation utilizing four (4) vertical mounting rails.
 4. The Enclosure will provide vertical equipment mounting space of 42U (1U=1.75" or 44.45mm)
- B. Physical Requirements
 1. External Width Dimensions shall be 597mm (23.5") for 19" rack enclosures.

2. External Depth Dimensions shall be 900mm (35.4")
3. Rack enclosures of a 42U design shall have a maximum external height of 2070mm (81.5") to allow passage through a standard 7ft. (84") doorway without tipping.
4. Rack enclosure shall support a dynamic load (rolling on castors) of 909kG (2000 lbs.) total weight.
5. Rack enclosure shall also be designed and manufactured to be matching in both color and construction to the UPS, PDU/System bypass and extended runtime battery enclosures to provide a uniform and consistent appearance in a datacenter environment.

C. Equipment Access and Mounting

1. The enclosure shall provide 42U of equipment vertical mounting space.
2. The vertical mounting rails shall be adjustable to allow different mounting depths.
3. The enclosures shall be 4-post open racks (quantity required 3).
4. Rack-mount kits (quantity required 6) will be required to mount six existing rack-mountable servers.

D. KVM Switch, Monitors and Keyboard Shelf

1. The KVM switch (quantity 1) shall have a minimum of 24 ports. Cables with the appropriate cable length and rack mountable kit will be included.
2. The KVM switch must be capable of allowing 2 people using 2 separate monitors to utilize the KVM switch at the same time.
3. The KVM switch will be multi-platform capable for use with SUN Solaris, Windows 2000/2003, and Linux.
4. The keyboard, monitor and mouse (quantity 2) shall be 1U rack mountable integrated keyboard, 17" monitor and mouse. The unit will allow a KVM switch to be mounted in the rear of the device. The rack mountable kit will be included

3.7 FLOOR ANCHOR BRACKETS

Floor Anchor brackets shall be available to solidly connect UPS, PDU/System Bypass, and Battery Enclosure to minimize unintended moving of the equipment.

3.8 SOFTWARE AND CONNECTIVITY

- A. Network Adapter: The Ethernet Web/SNMP Adapter 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. The SNMP interface adapter shall be connected to the UPS via the RS232 serial port on the standard communication interface board.
- B. Unattended Shutdown

1. The System, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on reserve mode.
2. The System shall also be capable of using an RS232 port to communicate by means of serial communications to gracefully shut down one or more operating systems during an on battery situation.

3.9 REMOTE SYSTEM MONITORING

A. The following three 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. RS232 Monitoring: Remote UPS monitoring shall be possible via either RS232 or contact closure signals from the UPS.
3. Simple Network Management Protocol (SNMP): Remote UPS Monitoring shall be possible through a standard MIB II compliant platform.

B: The UPS manufacturer shall provide notification to selected staff via cell phone number, cell phone text message and email when the UPS system is on battery, proceeding to shutdown, forced bypass and UPS is restored.

3.10 SOFTWARE COMPATIBILITY

A: The UPS manufacturer shall have available software to support graceful shutdown and remote monitoring for the following systems:

- a. Microsoft Windows 95/98/XP
- b. Microsoft Windows NT 4.0 SP6/2000
- c. Microsoft Windows Server 2000/2003
- d. Linux
- e. Sun Solaris v9, v10

Part 4 - EXECUTION

4.1. FACTORY START-UP

Factory UPS start-up, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

A. Visual Inspection:

1. Inspect equipment for signs of damage.
2. Verify installation per manufacturer's instructions.
3. Inspect cabinets for foreign objects.
4. Inspect Battery Units.

5. Inspect Power Modules.

B. Mechanical Inspection:

1. Check all UPS and external maintenance bypass cabinet internal control wiring connections.
2. Check all UPS and external maintenance bypass cabinet internal power wiring connections.
3. Check all UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

C. Electrical Inspection:

1. Verify correct input and bypass voltage.
2. Verify correct phase rotation of all mains connections.
3. Verify correct UPS control wiring and terminations.
4. Verify voltage of all battery modules.
5. Verify neutral and ground conductors are properly landed.
6. Inspect external maintenance bypass switch for proper terminations and phasing.

D. Site Testing:

1. Ensure proper system start-up.
2. Verify proper firmware control functions.
3. Verify proper firmware bypass operation.
4. Verify proper maintenance bypass switch operation.
5. Verify system set points.
6. Verify proper inverter operation and regulation circuits.
7. Simulate utility power failure.
8. Verify proper charger operation.
9. Document, sign, and date all test results.

- E. On-Site Operational Training: During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

4.2 MANUFACTURER FIELD SERVICE

- A. 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.
- B. 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.

4.3 MAINTENANCE CONTRACTS

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

4.4 TRAINING

UPS service training workshop: A UPS service training workshop shall be available from the UPS manufacturer. The service training workshop shall include a combination of lecture and practical instruction with hands-on laboratory sessions. The service training workshop shall include instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls and adjustment, preventative maintenance, and troubleshooting.

PART 5 – INSTALLATION

- 5.1 Placement of UPS in designated area per attached floor plan.
- 5.2 Provide and install matching input feeder breaker, associated conduit, 3 phase + N + G copper conductors per drawing and raceway to meet as a minimum NEC requirements, UPS input terminations, fire stop on all penetrations through demising walls, control wiring from UPS to Emergency Power Off.
- 5.3 Provide and install two (2) 3 pole 20 amp dedicated output circuits from UPS Distribution Panel to feed output receptacle power strip along telecommunication boards on South and West wall, use plenum rated cabling, sleeves to penetrate ceiling space and supports to feed overhead through drop ceiling. Output receptacles to be mounted below back board.
- 5.4 Installing Contractor will be responsible for installing UPS/PDU/MBP per Manufacturers Installation and Owner's Manual. Factory Trained and Approved Personnel.
- 5.5 Installing Contractor will be responsible for site co-ordination, cut-over scheduling and startup scheduling and co-ordination of progress with Owner.
- 5.6 The Library Network will be responsible for data drop, TCP/IP for UPS SNMP/Web interface.
- 5.7 The Library Network will be responsible for clearing area for UPS Installation to provide an unimpeded work space.

- 5.8 The Library Network will be responsible for providing dumpster access for debris, packaging material and site waste.
- 5.9 TLN staff will be responsible for moving equipment to the new racks after hours.

End Of Attachment A



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Attachment B – UPS Trade-in Details

Quantity	Description
4	Powerware 5125
2	Powerware 5125 extra battery modules
2	APC Smart UPS 1400
1	APC Back-UPS 600
1	APC Back-UPS 400
1	APC Smart UPS 1500 (rack mountable)
1	APC Smart UPS 3000