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Consulting Report
225KVA UPS Project Review
Business Computer Systems of America, Ltd.
1000 Corporate Drive
Hitech Valley, CA

Introduction / Background

PowerCET Corporation was asked to review the proposed installation of a 225KVA UPS for the computer room facility located at 1000 Corporate Drive, Hitech Valley, CA. The proposed UPS would supplement the existing 125KVA unit currently serving the computer room.

The existing computer room was initially configured (designed) to support mainframe equipment—all of which has been removed. The equipment currently installed in the computer room consists of single-phase servers and other peripheral equipment supporting international client operations. Most equipment is in equipment cabinets with under floor cooling.

The electrical distribution for the computer room equipment consists of two 125KVA isolating (480V-208/120Va-c) power distribution units (PDU). PDU#1 has been supplemented with additional distribution to provide additional branch circuit capacity.

Methodology

The initial review consisted of a brief meeting with the BCSA staff and a walk through of the computer room, UPS electrical room and inspection of the emergency generator system.

Key Findings / Recommendations

1. The present computer room electrical supply (125KVA UPS) will support an equipment density of approximately 33 watts per square foot. Based on the 34% loading indicated on the UPS metering the present consumption is approximately 11 watts per square foot. (Note: The size of the computer room used for these calculations was 3000 square feet.) Information relative to the current draw of the equipment in the computer room is not currently available—the nameplate rating is being used for circuit sizing which results in installation of excess capacity.

RECOMMENDATION: Establish a program to develop a database of the electrical characteristics of the existing equipment and measure any new equipment before installation in the computer room. The information gathered in the database will allow for the calculation of more realistic power requirements and the ability to accurately predict actual computer room equipment capacity. Specific items to be included in the database are:

Operating voltage
Rated current draw
Measured current draw
Measured power factor

2. The 125KVA UPS feeds two 125KVA-isolating PDUs in the computer room. The over sizing of the computer room distribution with the transformer equipped PDUs will most likely lead to problems anytime the output power from the USP is interrupted—transferred to by-pass, etc. The problem is associated with the inrush of the isolation transformers in each of the PDUs—one transformer could pose a problem, but the combination of the two will most likely result in breaker tripping problems. In addition specific power-on instructions will need to be developed Figure 1 shows the existing computer room electrical configuration.

RECOMMENDATION: If the present equipment configuration is to be retained then a migration plan needs to be developed to feed the entire computer room from a single 125KVA isolating PDU with several remote power panels (RPP) slaved from the PDU for the branch circuit distribution. The PDU could provide some branch circuit distribution in addition to the feeders to the RPPs. If both of the isolating PDUs are retained then power sequencing procedures will need to be developed to bring up the PDUs one at a time following any interruption of UPS power to the computer room.

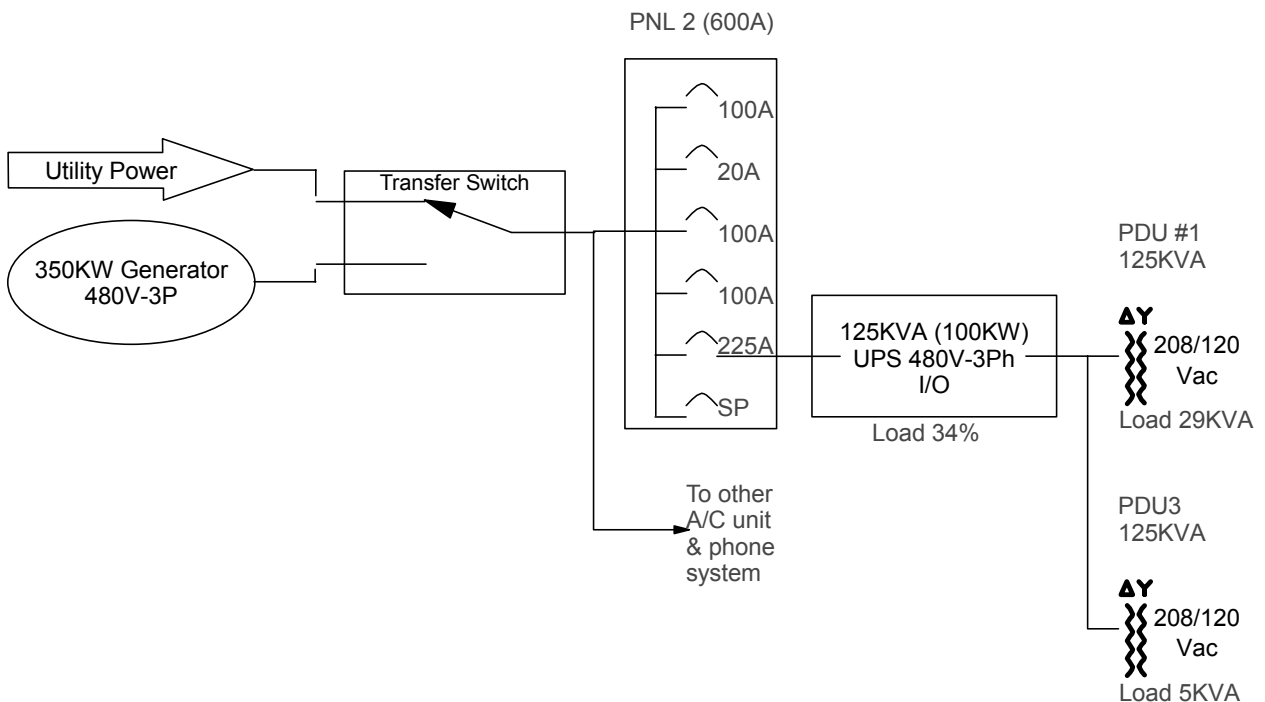


Figure 1 - Existing computer room electrical configuration.

3. The present air-conditioning and physical design of the computer room may not support fully populating the facility. As equipment densities increase the 12-inch under floor air plenum will become less efficient as the cable fill increase. Combined with the tall relay racks, long rows and low ceiling height the air return to the wall air-conditions units will be restricted and hot spots will most likely occur.

RECOMMENDATION: First it will be important to determine the total energy load for the maximum equipment configuration—item #1 above. With this information it may then be possible to layout the room to achieve the optimum airflow around and through the equipment. At some point it may be desirable to increase the

height of the suspended ceiling—assuming there is sufficient room above the exiting ceiling tiles.

RECOMMNDATION: It should be standard practice to remove any unused cables—both power and data—from the under floor area. In addition power distribution units should be installed in various sections of the room to minimize cable congestion and circuit length.

- It is doubtful that the existing generator and distribution can support the addition of the 225KVA UPS. The addition of the second UPS would create a total UPS load on the generator of approximately 350KVA. The output characteristics of the generator and the input characteristics of the UPS equipment are probably not going to be the most compatible. The general industry practice is to install a generator about double the size of the UPS load. In addition to the potential incompatibility of the UPS loads with the generator there is the issue of the other loads connected—air conditioning units, telephone equipment, lighting and other emergency loads. There is probably capacity for either of the UPSs, but not both simultaneously.

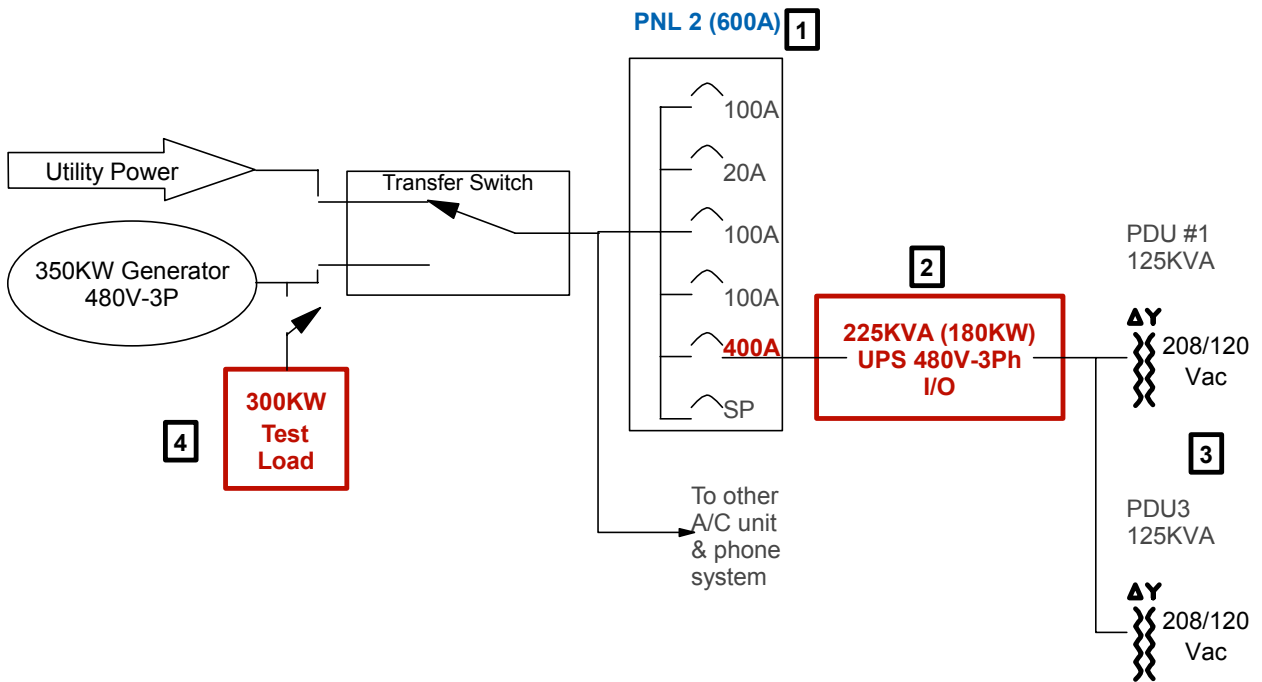


Figure 2 - Possible computer room electrical configuration with 225KVA UPS.

RECOMMENDATION: If increased computer room UPS power is required then install the 225KVA UPS –[2] in figure 2 above--and remove the existing 125KVA UPS. There is a possible problem with panelboard 2—[1] in figure 2—as it is rated at 600A and the addition of the 225KVA UPS (400A breaker) may require that it be upgraded.

RECOMMENDATION: Generally emergency generators should not be run for extended periods without a load. Most installations have a resistive load—[4] in figure 2—that can be switch during the routine testing of the generator. The actual generator load should be verified—UPS, air-conditioning, telephone



systems, lighting, etc.

RECOMMENDATION: If the decision is to implement the 225KVA UPS then it may be better to install a single 225KVA transformer for the computer room and utilize remote power panels instead of the individual isolating PDU—[3] in figure 2.

Summary

The proposed installation of the additional 225KVA UPS is not a simple matter. The project requires a review and documentation of the existing electrical distribution associated with the computer room and proper engineering of the new construction.

There is a high probability that the existing emergency generator will not support the combined UPS installation.

In addition there are a number of open issues concerning the actual power requirements for the computer rooms projected growth. Once this is known then the proper course of action will become clear.

Report prepared by:

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