

**Dollar General Corporation Data Center**  
Goodlettsville, TN



**UPS Room**

Due to increased demand and growth, Dollar General needed to expand their data center's critical infrastructure to meet current and future needs. They also wanted to improve the reliability of their critical infrastructure, although it would depend on available funding. Puckett Engineering's solutions began with an initial study to evaluate the feasibility, design alternatives, and estimated construction costs for expanding the data center's emergency power and UPS systems to accommodate the data center's future growth. The study also included a detailed evaluation of using a 2N redundant electrical system from the utility down to and including dual power supplies at the data center I.T. equipment. As a result of the study and collaboration with Dollar General, Puckett Engineering's solution for a reliable, efficient, and cost effective critical infrastructure included the following:

- Due to available funding, a 2N redundant critical infrastructure could not be implemented but was tabled for future consideration.
- Doubled the emergency power capacity by adding an additional 800kW/1000kVA emergency generator system.
- Increased the UPS system's capacity by adding a 225kVA UPS system.
- Added an additional PDU and circuits for supplying I.T racks.
- Although the entire electrical system was not fully redundant, power to critical loads was distributed to provide at least partial redundancy.
- Provisions were made for supplying future CRAC units in the data center for maintaining N+1 redundancy.
- Surge protection for power system and data/signal circuits.

**PROBLEM OR NEED**

Critical infrastructure undersized for current and future needs.

**PUCKETT SOLUTIONS**

Doubled emergency power system capacity.

Expanded UPS capacity by an additional 60 percent.

Distributed redundant power to loads where possible.

Provisions made to supply future CRAC units to maintain N+1 redundancy.

Harmonics reduction.

Identified and mapped electrical and mechanical equipment using color-coded nameplates.

Clean Agent and Pre-action Sprinkler Systems.

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**Year Completed: 2008**

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- Control and mitigation of power system harmonics.
- Monitoring of all power system and air conditioning equipment via their existing building management system.
- Emergency-power-off controls were provided for the UPS room in order to shutdown equipment prior to application of water from the sprinkler system. Also, the data center's emergency-power-off controls were upgraded to comply with codes.
- Fault current and coordination studies.
- Identified all electrical and mechanical equipment and devices in order to readily ID equipment and devices and know where they feed from. In addition, color-coded nameplates were utilized to quickly identify whether a circuit is supplied from emergency, UPS, or normal power.
- An existing protected storage space in their parking garage was converted into a UPS room for housing the new UPS system.
- Additional structural supports for the UPS room floor loading.
- Computer room type air conditioning (CRAC) for the UPS room.
- Clean-agent fire extinguishing system and pre-action sprinkler system were designed for the new UPS room.
- Special considerations were incorporated into the design for minimizing any negative impacts on the facility's aesthetics.
- Design implemented in phases on a fast-track basis with a contractor.
- Special considerations and coordination during design and installation were included for maintaining daily operations and minimizing power interruptions during the work.
- Construction administration services were also provided, including commissioning and closeout documentation.



Electrical room



New emergency generator