

Electrical Infrastructure Upgrades for Emergency Communications Center, Metro Nashville

Nashville, TN

The Metro ECC needed to improve the reliability of their electrical infrastructure for enhancing their capabilities in responding to emergency situations and maintaining system performance. The scope was based on a previous study performed by Puckett Engineering for upgrading the electrical infrastructure to a 2N redundant configuration. Puckett Engineering was retained to serve as a technical consultant to Metro ECC for implementing the upgrades using a fast-track design/build RFP process. Puckett Engineering provided the following services:

- Design concept and layout of the 2N redundant electrical infrastructure for inclusion in the RFP.
- Technical specifications for the RFP.
- Participated in the selection process of a design/build team.
- Represented Metro ECC throughout the design/build process in the review and approval of the design/build drawings, providing technical assistance to the design/build team, participating in equipment submittal reviews, participating in frequent construction progress meetings, and leading the technical reviews, site observations, and commissioning.



Metro Emergency Communications Center

The project included upgrading the electrical power distribution system, including a 225 kVA UPS system and 1188 kVA standby generator system, to provide a 2N redundant power distribution path from the utility transformer down to the branch circuit panelboards and where possible down to the branch circuits. Following are the project highlights:

- Added a second electrical service to provide 2N redundancy in the electrical service from the utility transformer. Providing 2N redundancy on the primary-side of the utility transformer was also considered in the prior study but was cost prohibitive given that the existing primary feed was currently available from two substations via manual tie switches and the utility's anticipated repair/replacement time of the single-path primary components.

PROBLEM OR NEED

Reliability of electrical infrastructure inadequate to respond to emergency situations and maintain system performance.

PUCKETT SOLUTIONS

Designed concept and layout of 2N redundant electrical infrastructure.

Participated in selection process of a design/build team.

Technical Lead throughout the design/build process.

Project upgraded power distribution system, including 225 kVA UPS system and 1188 kVA standby generator.

Year Completed: 2004

Contact:
Jody Clinard, Assist. Dir.
of Radio Communications
615-862-5111

Electrical Infrastructure Upgrades for Emergency Communications Center, Metro Nashville, continued

- Added an additional emergency generator to provide 2N redundancy in the emergency power system.
- Split-up an existing N+1, parallel-redundant, 225kVA UPS system and reconfigured it in a 2N redundant configuration, providing two redundant UPS paths.
- Using static switches downstream of the 2N redundant UPS systems, provided 2N redundant power distribution paths from the electrical services down to the most critical panelboards and where possible down to redundant power supplies in the equipment.
- Fault and coordination studies.
- Surge protection for the power distribution system and low-voltage circuits between the outdoor generator and indoor components.
- Grounding for safety and lightning protection.
- Equipment and wiring for control and mitigation of power system harmonics caused by the UPS systems and nonlinear electronic loads.
- Identification of all electrical equipment in order to readily identify equipment and know where it feeds from. In addition, color coding of nameplates were utilized to quickly identify whether a circuit is supplied from emergency, UPS, or normal power.
- Special considerations and coordination were incorporated for maintaining daily operations and minimizing power interruptions during the construction work.
- Commissioning of generators, transfer switches, UPS systems and monitoring system, included load-bank testing, functional testing, and simulating fault conditions. Adjustable settings for generator, transfer switches, and UPS systems were specified for compatibility with loads, controlling motor inrush, and to avoid nuisance transfers and retransfers.