

Energy Abounds at Nashville Music Center

The Music City Center in Nashville, Tenn., produces lots of energy. That energy results from the installation of two 69-kV underground-cable circuits that power the \$585-million convention center. To accommodate the facility, Nashville Electric Service (NES) decommissioned their 60-year-old Demonbreun Substation and replaced it with a gas-insulated substation that

could be enclosed and hidden from public view. NES designed and built a 3,300-ft tunnel beneath city streets. This allowed them to remove overhead lines and poles, improving the center's visual appeal.

The 8-ft-dia tunnel required a custom-built tunnel-boring machine. Access to the tunnel is provided by shafts at each end, built at significantly different depths due to grade elevations. The north end rests at 60 ft while the south end drops to 150 ft.

The transmission cables had to maintain a minimum bending radius and accommodate forces produced when the cable heats up and cools down during use. "The cables were hung in a catenary between supports to allow them to expand and contract," says Mike Mueller, project manager with POWER Engineers.

POWER served on the engineering, procurement and construction team for the cable installation. Brackets were fabricated and anchored into the shafts' 2-ft-thick concrete walls to clamp the cables which were hung at 10-ft intervals and held in place with clamps capable of withstanding the strong magnetic forces that can occur during a short-circuit event. These supports were also staggered to provide stress relief. "Since the cables are installed in the air—a relatively poor heat conductor—it was important to carefully calculate the current carrying capacity of the circuits," Mueller says.

The 1.5-million-sq-ft center which opened in May is performing well, and the circuits are handling the power according to plan. ■