





Outside the Cerner Technology Center, MTU Onsite Energy Series 4000 generator sets are contained in Level 2 sound attenuated enclosures.

managing the growth of high-density computing systems' thirst for power, and sustaining long-term electrical support if the electrical grid were to fail by natural or intentional actions.

"Without our unflinching support, hundreds of hospitals would not be able to run vital, life-sustaining processes," said Keyser.

The brand-new electrical system would require additional, more powerful generator sets to support the needs of the existing data center and a possible addition. Three MTU Onsite Energy Series 4000 generator sets, contained in Level 2 sound attenuated enclosures, specifically designed for continuous runtime, were selected.

#### Powerful Proficiency

To meet precise performance and functional requirements, the design team contracted

the local MTU Onsite Energy distributor and long-time power partner, Emergency Systems Service Company (ESSCO) for specification of the three units. Rated at 1,600 kWe prime / 1,750 kWe (standby), the MTU Onsite Energy generator sets are approved for an 85 percent 24-hour average load factor (15 percent above industry standard)

and renowned for best-in-class reliability and availability. The EPA Tier 2-certified units also offer versatility and flexibility in design, a key

requirement for the project. A sophisticated and complex project, ESSCO provided design assistance and project management for a full suite of emergency power system equipment, including new paralleling gear, redundant programmable logic controller (PLC), 1,600 kW resistive load bank, 2,000 amp portable generator quick connects, fuel polishing system, and a 15,000 gallon main fuel tank.

"The success of our decade long relationship of upkeep and reliability, assured me that ESSCO would bring the correct mix of talent and technologies to the project," Keyser shared.

With a goal of adding capacity while eliminating single points of failure, the team took a unique approach. Partnering with Enercon Engineering of Peoria, Illinois, ESSCO renovated the existing lineup of paralleling gear and Detroit Diesel generator sets using industry standard digital controls. Enercon implemented the system on the specified Siemens PLC devices, which were used to coordinate the operation of the four Detroit Diesels and three new MTU Onsite Energy generators.

With seven generator sets, four switchboards and two utility sources, the numerous PLCs are an essential element as they make decisions based on available sources, when, where, how and if they should to respond to changing power conditions. The sophisticated control system of Siemens PLCs, which oversees the entire infrastructure, was architected by Jeff Jerome of Siemens Industries. "The self-healing dual architecture runs the show, selecting between any of the numerous conditions the electrical 'ring' buss can encounter," noted Keyser.

"It was important that all the equipment run in synchronization," said Joseph Stillman PE, chief electrical engineer at Sharpe Engineering, a full-service mechanical, electrical, plumbing and fire protection engineering firm that supported the project. "The PLC system really made the entire paralleling process seamless and effortless."

#### Carrying the load

Being a mission-critical operation required that installation and commissioning take place with no disruption to the critical load or any of its support systems. To that end, Keyser and his team journeyed to Mankato, Minnesota for factory witness testing of its new generator equipment.

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A sophisticated control system of Siemens PLCs coordinates the seamless operation of seven generator sets, four switchboards and two utility sources.

“We needed to install the new generation equipment and be able to rely on it right out of the box,” said Keyser. “This would ensure our electrical contractor, Union Electric, could safely migrate the entire building full of critical equipment. Seeing it put through its paces instilled confidence that the units would perform when needed.”

Once all of the facility loads were safely migrated, the existing generator complex was upgraded, tested and commissioned in a live setting. Union Electric completed all of the wiring for all power and communication.

### **Demand Response**

The state-of-the-art installation of the MTU Onsite Energy generators makes reliable power available any time. After the project was completed, Cerner started a demand response program in the summer of 2015 with MAPP, an energy supplier for PJM Interconnection, the regional utility grid authority. During critical periods of overload to the electrical grid, the CTC can be seamlessly transferred to generation, giving back up to five megawatts of capacity back to the local utility. The power transfer is undetectable to even the most sensitive monitoring equipment and reduces regional energy consumption.

In June 2015, a mandatory multi-hour DR test was conducted at the CTC in order to fulfill contractual terms. “We use this time to train our critical facilities engineers on the gear operation, it’s not every day we just pull the plug, but I’m confident we can day or night,” said Keyser.



“It’s particularly cool with the closed transition transfers we can initiate. Not even our most sensitive downstream equipment sees the change to generator and back.”

**Unparalleled support**

Cerner’s critical facilities team and ESSCO have a long-standing partnership dating back many years. ESSCO supports a comprehensive maintenance schedule that includes planned service on all of the generator sets and associated equipment, as well as 24-hour on-call support.

“After many years of project development, this critical data facility now has a state-of-the-art power infrastructure that blends new with well-maintained legacy equipment to provide multiple levels of redundancy,” said Jim Marks, sales and project manager at ESSCO for this project.

“We at Emergency Systems Service Company are proud and honored to have been the chosen provider and to have earned the trust and relationship with the critical Malvern CTC team, Lane Keyser, George Hockman, Steve Grzywacz and Mark Rehner,” said Bob Hafich, president of sales and administration at ESSCO. “They are an extremely professional group to work with and we were also fortunate to have the opportunity to work with Craig Tupper from Union Electric and the Electrical Engineer Joe Stillman with Sharpe Engineering, who were first class as well. Working with people of this caliber is what made the project so successful.”

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**MTU Onsite Energy**

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*MTU Onsite Energy is a brand of Rolls-Royce Power Systems. It provides diesel and gas-based power system solutions: from mission-critical to standby power to continuous power, heating and cooling. MTU Onsite Energy power systems are based on diesel engines with up to 3,250 kilowatts power output (kWe), gas engines up to 2,530 kWe and gas turbines up to 50,000 kWe.*

