



Power Generation

ROLLS-ROYCE MEETS EVERY REQUIREMENT FOR CALIFORNIA HOSPITAL

Who Centinela Hospital Medical Center
What Two 1,000 kW MTU generator sets powered by MTU 16V Series 2000, with switchgear, day tank and ASCO automatic transfer switches.
Where Inglewood, California, USA

Centinela Hospital Medical Center has been serving its community in Inglewood, California since 1924. Providing comprehensive, quality healthcare, Centinela is a part of Prime Healthcare Services, which was recently named one of the top 15 healthcare systems in the country.

In 2012, the 369-bed hospital began an extensive upgrade program. As a part of the upgrade, Centinela planned to replace its standby power system. The project's specifications were so daunting many suppliers refused to bid on the project. They said it couldn't be done. The most unnerving aspect of the job was the hospital's extreme proximity to an apartment complex. To meet the city's residential noise code, the generators had to operate while producing sound at levels quieter than a normal conversation, while also meeting California's notoriously stringent environmental and seismic regulations.

With a mix of strategic problem solving and expert product application, Rolls-Royce rose to the occasion and recommended a solution that would not only meet, but also exceed requirements and expectations. Centinela Hospital was outfitted with two 1,000 kW diesel generators engineered and manufactured by Rolls-Royce, each powered by an MTU 16V 2000 engine. With a 24-hour average load factor of 85 percent—15 percent over the ISO standard—Rolls-Royce was able to reduce the number of generator sets needed to support Centinela's power needs while increasing capacity and giving the health system a leap in fuel efficiency and durability over the outgoing equipment.

"Because of the generous 85 percent average load factor of these generator sets, healthcare facilities have more flexibility. This is very attractive to hospitals like Centinela that plan for future growth after a new standby power system is installed," said Al Prosser, director of sales, North and Latin America, Gas & Diesel Systems.

Stealth whispers of power

One of the project's biggest hurdles was the hospital's extreme proximity to an apartment complex. Inglewood city's sound ordinance requires that generator sets meet 45 decibels of sound (dBA) within 50 feet of the nearest property line. A typical generator set emits up to 105 dBA—equivalent to the loudness of a gas-powered lawnmower at three feet. Taming that noise down to a dBA level of 45 is no simple task.

With Centinela just 100 feet from a residential area, Rolls-Royce played it safe and aimed for 40 decibels, which is comparable to the white noise in a large conference room.

MTU's generator sets are contained in a rigid structure that allows the units to run smoothly with minimal vibration. This, along with a special enclosure from ACS Manufacturing, helped Centinela achieve noise reduction levels to the sound of a whisper, exceeding the requirements for a facility situated in a cluster of crowded buildings with three sides of the hospital enclosed and the opening side facing an apartment complex.

"The generators are quieter than the surrounding ambient noise. They're even quieter than the service team's diesel pickup truck when it's idling in the parking lot," said Prosser. "They often can't tell whether the generators are running or shut down. You just can't believe it."

Another layer of Inglewood's noise ordinance is its sound curfew, which lifts every morning at 6 a.m. The noise of the hospital's original generator sets required Centinela to balance a 6 a.m. generator set startup time with the hospital's surgery schedule to avoid interrupting the flow of electricity to the hospital's critical equipment. Since they couldn't start the generator sets until the sound curfew lifted due to the loudness, the start time was occasionally delayed. Today, with the new MTU generator sets, Centinela can switch the units on before the hospital begins its daily activities and procedures, contributing to increased flexibility in the power system.

Centinela Hospital installed two MTU 1,000 kW diesel generators, built to exceed demanding environmental, noise and seismic requirements.



On shaky ground

California, known for its perfect weather and laid-back lifestyle, is also infamous for its earthquakes thanks to its geological landmark, the San Andreas Fault. To ensure its patients are safe, Centinela is subject to California's rigorous seismic codes. These codes, known as IBC 2009, require that all electrical and mechanical equipment supplied to California hospitals can withstand a 3-axis earthquake simulation called the "shaker table test." The test violently shakes full-size generator sets to simulate the movements of a real-world earthquake in laboratory conditions to ensure the equipment is functional with all essential components intact following a seismic event.

"If you have a major earthquake, the building and the power source have to withstand the rock and roll of the earthquake. When you come out the other side you want to continue to protect your patients' lives," said Stan Horn, director of plant operations at Centinela Hospital.

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Protecting more than patients

Centinela is located in the South Coast Air Quality Management District, an air pollution control agency that sets smog and water quality standards for the area. The district requires that the concentration of a diesel engine's particulate matter emissions not exceed 450 milligrams per cubic meter.

"In California, anything that involves the environment is a major challenge," added Horn. "Our generators had to meet a very strict environmental code."

To meet this requirement, a diesel particulate filter, the combination of a filter and a muffler, was installed on the rugged Rule 1470-compliant MTU 16V 2000 engine to make it even more efficient. Already equipped with an electronically controlled common rail fuel injection system, which allows the combustion process to be optimized to achieve low pollutant levels and lower fuel consumption, Centinela Hospital is now powered by one of the cleanest, most economical engines on the market.

"In terms of technology, we've moved ahead about 50 years in just six months with the new MTU generator sets. The system keeps our data in perfect order. It's 100 percent better than our old system," said Horn.

The project also called for the installation of a new underground diesel tank with several leakage backups, tests and sensors to ensure the tank can't leak into the water table.

In the hospital setting, thousands of people rely on generators for life-saving power without understanding just how that power is delivered. At Centinela Hospital, the new generators delivered such a boost in technology that the facility management team offers even better service to those whose lives depend on it.

Rolls-Royce provides world-class power solutions and complete lifecycle support under our product and solution brand MTU. Through digitalization and electrification, we strive to develop drive and power generation solutions that are even cleaner and smarter and thus provide answers to the challenges posed by the rapidly growing societal demands for energy and mobility. We deliver and service comprehensive, powerful and reliable systems, based on both gas and diesel engines, as well as electrified hybrid systems. These clean and technologically advanced solutions serve our customers in the marine and infrastructure sectors worldwide.



A Rolls-Royce
solution