GENERAC | INDUSTRIAL POWER

DOCTORS HOSPITAL

POWER SOLUTIONS CASE STUDY of

DOCTORS HOSPITAL AT RENAISSANCE

DOCTORS HOSPITAL AT RENAISSANCE WEATHERS HURRICANE AND POWER OUTAGES

NATION'S FIRST HEALTHCARE MPS/BI-FUEL INSTALLATION

UNITS

Medical Campus:
10,000 kilowatts of Generac standby power

Women's Hospital and Central Cooling Plant:
2 3 x 750 kW Bi-Fuel™ Gemini®

LOCATION
Edinburg, Texas

Since opening its doors in 1997, Doctors Hospital at Renaissance (DHR), Edinburg, Texas, has grown to be one of the premier healthcare providers in the nation. For the past two years DHR has been placed on the list of the 100 Top Hospitals in the nation by Thomson Reuters, a major source of independent healthcare business intelligence. The 100 Top Hospitals award is based on three measures of hospital performance: clinical excellence, operating efficiency and financial health, and responsiveness to the community.

Beginning as an outpatient surgical center, DHR today is a huge, 90-acre medical complex – an east and west campus on both sides of a major highway in downtown Edinburg. The complex includes seven different medical centers (a total of one million square feet), three central cooling plants, and a 506-bed, full-service-care facility with a medical staff of over 500 physicians. DHR today provides a broad spectrum of medical and surgical services, including intensive care, obstetrics, day surgery, skilled nursing care, outpatient diagnostic services, cardiology services, bariatric services, oncology services, behavioral and emergency services.

> *"It was a revelation; the best thing since sliced bread," Eulenfeld said. "I had to have this system for the next DHR expansion project."*

Backup Power Needed for New Women's Hospital

In 2008, a 200,000-square-foot, 105-bed Woman's Hospital at Renaissance was added to the east campus. The facility provides 24 labor and delivery suites, 24 post-surgical patient suites, 48 post-partum suites, a 36-bed newborn nursery, a 28-bed neo-natal Intensive Care Unit, five surgical suites and 14 medical beds.

Like every hospital, DHR is required to have reliable backup power to protect the life and safety of its patients in the event of severe weather or a utility power outage. For the first 10 years of operation, the hospital's planning team relied on the traditional solution for backup power generators – large single-engine units for hospitals and chiller plants. As the DHR expansion began to evolve, the DHR facility managers consulted with a team of MEP design engineers from GPM Engineering, Corpus Christi, Texas.

Introducing DHR to Modular Power Systems

GPM's project manager for DHR was a third-generation master electrician named Randall Eulenfeld. In 2003, during a major growth period at the hospital, GPM was visited by a sales team from Generac® Industrial Power, Waukesha, Wis., and Generac's industrial dealer, WPI (Waukesha-Pearce Industries), San Antonio, Texas. The team came to introduce GPM to Generac's Modular

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The Generac Bi-Fuel Gemini MPS systems are poised to kick into gear in the event of a power outage. The three units installed operate in parallel to provide consistent and reliable backup power.

Power System (MPS) – an integrated approach to generator paralleling that is more cost effective than traditional paralleling systems. The MPS advantages could provide the growing DHR complex with redundancy, flexibility and scalability in a modular type paralleling system.

Eulenfeld recalls being concerned about relying on large single-engine units due to the hospital's rapid development. In the case of single-engine failure, he knew there would be no redundancy and thus, no standby power for a hospital unit or chiller. That was unthinkable, so Eulenfeld accepted a Generac invitation to visit the Generac factories in Wisconsin to see the MPS equipment and engineering first hand. "It was a revelation; the best thing since sliced bread," Eulenfeld said. "I had to have this system for the next DHR expansion project."

Modular Power Systems vs. the Single Engine

Eulenfeld and his team liked the fact that the Generac MPS combines the output of multiple generators without the need for expensive and space-consuming paralleling switchgear that is typical of traditional paralleled systems. Redundancy and expandability is built into the system since each genset features onboard paralleling capabilities, making it easy to achieve n + 1 or greater coverage by simply adding modular generators of the appropriate size. The MPS solution is also scalable, allowing kilowatt (kW) outputs to be tailored more precisely to current and future requirements.

Just in time for the construction of the new Women's Hospital in 2007, Generac brought to market its new Bi-Fuel™ generator – combining diesel fuel (30 percent) with natural gas (70 percent) in configurations of 600 to 9,000 kW of power. Generac Power Systems is the only U.S. manufacturer that offers a true Bi-Fuel system.

Bi-Fuel Option Extends Engine Run Time by Six Times

Eulenfeld explained that Texas Department of Health Services requires that an engine have sufficient fuel to run straight for 24 hours. For hospitals that accept Medicare patients, the Joint Commission on Accreditation of Healthcare Organizations' emergency management standards raises this run time "bar" to 72 hours. Unless a hospital has an additional diesel storage tank, there is no practical way for a single engine to achieve a 72-hour run time on diesel alone. With the MPS Bi-Fuel option, a hospital owner can

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extend a single engine run time by about six times that of straight diesel!

Gemini® Twin Pack Provides Space-Saving, Redundant Design

As space outside the Women's Hospital was limited, the team recommended that DHR invest in the Generac Gemini Twin Pack genset, an option of the MPS system that skillfully consolidates two powerful 500 kW engines operating independently within a single, weather-resistant, sound-attenuated enclosure. The result is 1,000 kW (1mW) of power in a space up to 40 percent smaller than a comparable large, single engine. Because these EPA-compliant, side-by-side diesel engines operate in parallel, Gemini offered the Women's Hospital quiet, built-in redundancy and increased reliability.

Because of the many benefits of the MPS Bi-Fuel system, Gemini's small footprint and superior redundancy, the reduced diesel fuel consumption and extended run times per tank, John Rustick, DHR's associate administrator and director of engineering, ordered 12 Bi-Fuel generators – two sets of 3 x 750 kW Gemini Bi-Fuel gensets – 4,500 kW of backup power for the new Women's Hospital and adjacent central cooling plant.

MPS Put to the Test: Hurricane Dolly & 13-Day Outage

Packing winds with gusts over 100 miles per hour, Hurricane Dolly came roaring ashore at Padre Island, Texas, on Wednesday morning, July 23, 2008. Causing over one billion dollars worth of damage, the Category 1 storm dumped 16 inches of rain on the Rio Grande Valley and more than 212,000 customers lost power. It was to be the first real test for Rustick's new investment in standby power. "The Generac engines whirled into action instantly and kept us operating for 14 hours before we got power restored. Not a single venue on campus was without power," Rustick remarked. "The Generac equipment performed perfectly."

It wasn't 60 days later that Rustick and his engineering team were rewarded again for their decision to convert the DHR complex to backup power from Generac. But this time, the trial was more severe. Rustick recalls that in September 2008, a main switching gear literally blew up on the main power supply line to the Women's Hospital from DHR's electric utility AEG Texas® - a unit of American Electric Power, Corpus Christi. "Without Generac's modular platform, we would have had catastrophic problems of biblical proportion at our newest hospital," Rustic said. "Instead, without a hitch, the Generac units kicked on immediately and ran continuously for **13 straight days**! Not a single chiller, critical care unit or operation at the Women's Hospital was ever compromised. That's an amazing record!"

Rustick praises Generac Power Systems for its system design and robust redundancy. He said that during the nearly two weeks the Women's Hospital was totally on emergency power, the smaller modular units gave his engineers the flexibility to take an engine off-line occasionally for rest and maintenance without sacrificing any power needs.

Rustick explained that under normal circumstances, a standby generator will run about 20 hours a year. Engine oil needs to be changed every 100 hours. So, when an engine runs 24 hours a day over a period of weeks without changing the oil, the life of the engine is seriously compromised.

"The n + 1 redundancy factor we had planned provided us with the highest level of reliability that is so important for medical facilities – especially those in coastal areas. And finally, having the Bi-Fuel capability enabled us to extend our run time and reduce the consumption of diesel fuel for each engine. These capabilities could not have been possible with a large single-engine unit," Rustick said.

Eulenfeld also explained, "Emergency power systems should be designed around a 'perfect storm' scenario. With the Generac MPS Bi-Fuel solution we were able to provide a reliable system that is capable of weathering any storm and keep the hospital fully functional. Because when the lights go out, it's simply too late."

Out of 25 Standby Generators, Only Two Large Engines Remain

With each campus expansion, more Generac systems have been installed. DHR engineers requested that their older, single engine units be replaced by MPS systems. Today, out of a total of 25 engines on the two campuses, only two 2 mW large engines still remain.

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