Market Segment: Nuclear

POWER PROFILE

Customer: CEZ Group

Location:
Dukovany and Temelín, Czech Republic

Customer Business Issue:
Emergency power installed on an accelerated timeline to meet higher industry benchmarks for safety, durability and reliability.

Solution:
Containerized solutions at each site that include Cat® C175-20 diesel generator sets, switchgear, control panels, cooling radiators and fuel tanks

Cat® Dealer:
Zeppelin Power Systems CZ

The Dukovany nuclear power plant generates about 20 percent of the electricity consumed in the Czech Republic.

POWER NEED

CEZ Group, an established, integrated electricity utility headquartered in the Czech Republic, operates nuclear power plants in Dukovany and Temelín, which are located about 160 km from each other in the southern part of the country.

The Dukovany nuclear power plant came online in the mid-1980s and today generates approximately 13 TWhr of electricity annually, which is about 20 percent of the electricity consumed in the country. Meanwhile, the Temelín power plant was commissioned in 2002 to replace more than 2,000 MW in outdated coal-fired units throughout the country that have been shut down progressively. After numerous technological upgrades, Temelín currently has an installed capacity of 2 x 1,125 MW, making it the largest power resource in the Czech Republic.

Following the Fukushima nuclear accident in Japan in 2011, the International Atomic Energy Agency (IAEA) mandated the performance of stress tests in every operating nuclear power plant worldwide. After evaluating the results, the Czech Republic's State Office for Nuclear Safety issued directives to the operators of nuclear power plants for improving the safety of their facilities, including upgrading their emergency power capabilities.

To decrease the risk of damage, project planners for CEZ Group sought an autonomous source of power that could be placed as far as possible from existing emergency power sources and the connection to the grid.

They evaluated various options to meet the criteria and deadlines set by government authorities, all while maintaining a reasonable project budget. Traditionally, a generator set installation with these requirements would feature a solid concrete building with functional components mounted to the building or dedicated support structures inside. Instead, the team at CEZ Group selected a modular approach that would provide dependability and durability in a compact package.

SOLUTION

Caterpillar and Zeppelin Power Systems CZ developed an innovative modular solution that includes Cat C175-20 diesel generator sets, fuel tanks, control panels, switchgear and cooling radiators protected by customized containers mounted on a concrete foundation.

Hardened to withstand mechanical impact design scenarios, the outer shell is equipped with ingress protection modules to maintain sufficient clearance under any circumstances at the combustion air and cooling air inlet and outlet openings, as well as the exhaust gas outlet. Other design requirements were met by using certified equipment, sizing the equipment for performance at extreme ambient conditions, and using pre-heating devices for reliable starting at low ambient temperatures.

Once the design details were approved, the modules were built in a controlled factory environment. Components were delivered to the nuclear facility by truck and installed over the course of a few days.

By minimizing the amount of site work and using simple interfaces, the entire project was completed in less than 12 months. All inspections and major tests were done at the offsite workshop, so no modifications were required at the plants.

"Comfortably meeting the deadline set by the authorities was particularly important to our customer in order to maintain the license for operating the reactors," noted Gert Hoffmeister, nuclear segment account manager for Caterpillar.

POWER PROFILE

Customer: CEZ Group

RESULTS

The unique package significantly reduced the overall project cost when compared with the traditional approach of building a fully reinforced concrete enclosure.

The project led Caterpillar and Zeppelin Power Systems CZ to be recognized for safety in the large company category at the WNE Awards, which were presented at the World Nuclear Exhibition in June of 2018.

"The nuclear industry challenges suppliers with the highest standards for safety, quality and performance," Hoffmeister observed. "By leveraging our extensive experience with nuclear projects and a wide portfolio of power solutions that have proven their value in the most demanding environments, Caterpillar and Zeppelin have developed an award-winning solution that sets a new benchmark for deployment velocity and simplicity of installation."

For more information, please visit cat.com/nuclear.

Caterpillar and Zeppelin Power Systems CZ developed a robust power system configuration that delivers an unprecedented level of flexibility.

LEXE1474-01 February 2019