

First Wärtsilä 50DF power plant in Turkey

Wärtsilä Corporation has been awarded a major power plant contract for an 84.8 MW_e replacement and extension of an existing diesel power plant at Manisa in western Turkey. It involves the first Wärtsilä 50DF generating sets for a power plant installation, while Wärtsilä 34SG sets will be added in the extension. The new plant will allow a change of fuel from heavy fuel oil to natural gas.

In 1999, Wärtsilä supplied a 54.3 MW baseload plant to Manisa with three Wärtsilä 18V46 diesel generating sets. It met the heat and electricity demand of Manisa Organised Industrial District (MOSB), one of Turkey's largest such business centres. MOSB houses some 115 companies from a range of industries, including paper, electronics, furniture, chemicals, textiles and food.

Under the new contract, the existing diesel generating sets are to be replaced by three Wärtsilä 18V50DF sets, each having an electrical output of 16,638 kW_e. In addition, four Wärtsilä 20V34SG generating sets will be installed, each giving 8730 kW_e. The plant is being supplied under an engineering, procurement and construction (EPC) contract.

The plant will have a high overall efficiency and be very flexible in operation. High energy efficiency will be achieved by the use of waste heat recovery to supply hot water and steam to the industrial park. The total steam production capacity will be around 40 tonnes/h at a pressure of 14 bar. Hot water will be fed into the district heating system of the industrial park, with the heating network having a pipeline length of 6 km.

The generators will deliver electricity through 34.5 kV transformers to the local grid of the industrial park. Excess electricity will be sold to the public grid at a price determined by the Turkish electricity authority.

Flexibility will be achieved by the use of two sizes of generating sets and the dual-fuel capability of the larger generating sets. Whereas the existing engines burn heavy fuel oil, the new engines will all run on natural gas which is piped to the site. The Wärtsilä 50DF engines are dual-fuel engines which have a pilot injection of a small quantity of light fuel oil to ignite the gas fuel. They can also switch over to operate solely on fuel oil in the event of an interruption in gas supply. The Wärtsilä 34SG engines are pure gas engines with spark ignition of the gas fuel.

When the engines are running on natural gas, the plant will be able to meet the environmental regulations without using the existing deSO_x system that was installed with the original HFO engines for removing sulphur oxides from the exhaust gases. The dual-fuel engines will bypass the deSO_x system when they are burning natural gas. Then if the operator should want to switch the 50DF engines to heavy fuel oil the deSO_x will be put back into operation.

The installation of the plant requires careful organization. The existing generating sets are to be replaced within a time span of seven months. However, it will be necessary to exchange the sets while keeping two sets running at all times. The Wärtsilä 18V50DF generating sets were delivered in October 2004 and the Wärtsilä 34SG sets will be delivered in January 2005. The construction time of the power plant extension is eight months.

Deliveries of the Wärtsilä 34SG engine type alone have already exceeded the 1000 MW milestone, which proves the success of this engine type in gas power plant applications all over the world. To date Wärtsilä has delivered more than 3600 MW of gas and dual-fuel engines. ■

The engine still has many of the original components like crank shaft, engine block, turbochargers and a few cylinder liners. The engine was modified at 102,715 running hours to improve its performance. The instrumentation, controls and monitoring were also completely revamped by incorporating a PLC station with panel display unit. The result of the modification was lower specific fuel oil consumption and NO_x emission levels.

Since its commissioning the plant has been under an inspection and maintenance agreement with Wärtsilä India. During the past five years, the average engine availability and engine reliability has been 92.4% and 98.1% respectively. This has been made possible by excellent teamwork between the Modipon operating team and the service support provided by Wärtsilä India.

The Wärtsilä power plant at Modipon has an installed capacity of 11.5 MW. Modipon Fibres has ordered a reconditioned Wärtsilä 16V32LN engine this year, which speaks volumes for their confidence in our value-added services. ■



The 54.3 MW baseload plant in Manisa, Turkey, currently powered by three Wärtsilä 18V46 generating sets, will be extended to 84.8 MW.