

Gas power plant powers arctic Purtazovskaya

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Power plants for arctic conditions are just one of Wärtsilä's many specialities. The gas power plant for the new Purtazovskaya compressor station in northern Siberia meets the most exacting gas industry standards for quality, safety and efficiency.

One of the largest gas producing areas in the world is located near the Arctic Circle in Russia's Western Siberia. The gas producing reservoirs are located deep underground in the Yamal-Nenets area south of the Obskaya Gulf near the towns of Noviy Urengoi and Nadym. These reservoirs are the major source of the natural gas for Russia and Europe. All the gas fields and pipelines are owned and operated by the Russian giant Gazprom.

Multiple large-diameter pipelines pump the gas to consumers all over Europe, where it supplies on average 20% of Europe's energy needs. The pipelines, which use different routes to feed the gas to most parts of Europe, are equipped with high-powered compressor stations at an average interval of about 120-160 km. Each of these compressor stations is built as a totally independent unit with high redundancy, safety and security in every function and with their independent power plants.

New gas is constantly in demand to satisfy the increasing consumption in Europe and to replace old depleted fields. Accordingly, in the mid-1990s Gazprom started to develop the Zapolarniy gas-condensate reservoir in Western Siberia for production and to build large-diameter pipelines with compressor stations to connect the field to the existing gas export lines to Europe.

Gas CHP plant

New trunk line projects are always mega projects in the oil and gas industry and they usually take many years to design and to construct.

Wärtsilä was first approached by Gazprom in 1997 to provide information on our new-generation 34SG series gas engines for feasibility studies in selecting power plants for the Zapolarniy-Urengoi pipeline compressor stations. In these studies gas engines proved to be the best alternative and therefore in 2000 a tender process was started by OAO Yamalgazinvest to procure a 22 MW gas engine combined heat and power plant for the Purtazovskaya compressor station near the Arctic Circle.

The power plant site is located in the transition zone between taiga and tundra with some occurrence of permafrost. In other respects the conditions are typically very arctic: lowest winter temperatures minus 63 °C and with summer temperatures going up to plus 40 °C, strong stormy winds all the year round, and in winter everything is covered with snow – conditions that are somewhat similar to those in northern Finland.

Strict specifications

The tender requirements were very challenging as they included numerous strict quality, safety and redundancy features in addition to Gazprom's in-house design rules and standards, which are typical for all gas industries. Naturally all Russian rules and norms had to be observed as well.

Based on Wärtsilä's extensive proven experience of arctic conditions a winning design based on 34SG engines was prepared



Main features of the Purtazovskaya power plant

Design: Fully enclosed arctic power plant.

Fuel: Pipeline gas, export quality.

Generator sets: 4 x Wärtsilä 18V34SG.

Electrical power: 22 MW.

Heat generation: 70/115 °C hot water for district heating.

Generated heat: 18.8 MW.

The design includes many special arctic features such as prevention of snow ingress, preheating of the engine charge air, fully enclosed access areas, insect filters, redundant black starting capabilities, emergency heating systems, and heat tracings etc.

Purtazovskaya has proved to be an excellent addition to the long line of Wärtsilä arctic power plants. But this is also the first arctic plant to meet the exacting quality and safety demands of the Russian gas industry.

and the contract was signed in May 2001. The power plant was built in two stages with final take-over in October 2003.

This typical oil and gas industry project took more than six years in all from the first studies to a fully operating power plant. The power plant design and construction was a co-operation project involving the various Russian companies and Wärtsilä, which made the design, and delivered all the equipment and power house materials to the site. The customer's construction organizations installed the power plant. The design phase, in particular, proved fruitful in combining both the Russian and Finnish arctic experience. ■

