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Yokogawa's CENTUM CS 3000 and PRM in Utility Plant of Dushanzi Refinery & Petrochemical Complex

Location: Dushanzi, China
Order Date: June 2006
Completion: January 2010
Industry: Power



中国石油天然气股份有限公司
PetroChina Company Limited

Executive Summary

At a cost of 30 billion yuan (\$4.4 billion), PetroChina, China's largest oil producer, has recently completed construction of a large refinery and petrochemical complex on a 455 hectare parcel of land in Dushanzi, a city in China's Xinjiang Uyghur Autonomous Region. Using mainly high sulfur crude oil from the Kazakhstan-China pipeline, the complex processes 10 million tons of crude oil and produces 1 million tons of ethylene per year. As such it plays an important role in the China-Kazakhstan energy cooperation strategy.

The utility plant that provides steam, electricity, and water to this complex include five 440 t/h circulating fluidized bed (CFB) boilers, three 100 MW turbines/ generators, and chemical and water treatment systems.

The complex's CFB boilers use brown coal as a fuel and are designed to keep CO₂ emissions to a minimum. Normally, four of the complex's five boilers are in use and the remaining boiler is kept on standby and undergoes maintenance. For the utility plant at this important industrial complex, Yokogawa China successfully installed a CENTUM CS 3000 integrated production control system and the Plant Resource Manager (PRM) package.



The PetroChina Dushanzi head office



Refinery



Petrochemical plant

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The Challenges and the Solutions

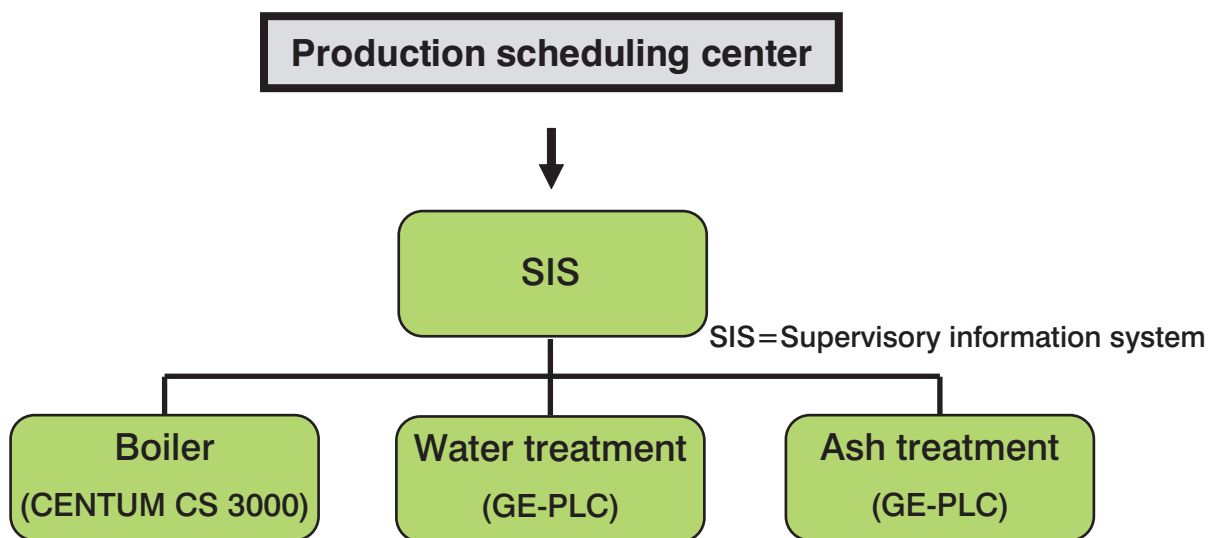
1. Safe and steady operation

The utility plant operates non-stop throughout the year, ensuring an uninterrupted supply of steam, water, and electricity to the main process facilities. In response to boiler master signals that are issued in real time by the production scheduling center, the four boilers must adjust their output to match shifts in demand for steam by the processes and the turbines that generate electricity for the complex. With its highly reliable dual redundant CPUs and seven 9s availability, Yokogawa's CENTUM CS 3000 production control system maintains steady control of the boilers and ensures that operations can continue nonstop without any major system problems. Standard process graphics, process overview, trend, operator guidance, and alarm summary displays are all designed with safe operation in mind, and can be accessed quickly and smoothly by operators, giving them a comprehensive overview of operations.

2. Total integration of information

Through an OPC interface, the PetroChina Dushanzi refinery and petrochemical complex uses a supervisory information system (SIS) as its plant information management system (PIMS). All process data from throughout the complex are gathered by the CENTUM CS 3000 system and the GE PLCs used in the water and ash treatment processes. Based on this process data, boiler efficiency, coal consumption, rate of electricity generation, and many other kinds of useful data from the boilers can be accessed by the engineers at their desks, without having to visit the central control room. The CENTUM CS 3000 system is a very steady platform and provides a very convenient process monitoring environment.

The integration of information allows PetroChina Dushanzi to reduce its consumption of water, coal, and other resources. In many different performance statistics, it is ranked number one in the PetroChina Group.



Total system configuration

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Customer Satisfaction

Liu Jian Ming, Director of the Utility Control and Instrumentation Department said, "Every day we are trying to improve operations at our plant and to reduce both coal consumption and CO2 emissions, because one of our targets is to achieve sustainable manufacturing. We very much appreciate that Yokogawa supplies very reliable products and systems, and has been working together with us to provide support. Of the many vendors that are supplying products and services for this PetroChina utility plant, Yokogawa is one of the best."



SIS boiler operation display