HOLLiAS MACS DCS has been used in China Largest 1000 MW Coal-fired Power Plant

THE BACKGROUND

Taishan Power Plant by the Beijing Guohua Electric Power (Group) Investment Co., Ltd. located in the city of Taishan in Tonggu Bay of Guangdong Province. The Phase I construction of sub-critical 5 × 600 MW power generating units had all been put into operation. For the Phase II construction of 4 × 1000 MW super-critical power generating units.

HollySys has won the contract for the first two units. Taishan Power Plant are designed to reach a total installed capacity of 1000 MW and will become China’s largest coal-fired power plants and the contract was delivered on 29 March 2011 in a high-end standards.

Taishan Power Plant is equipped with the most advanced production management system and technical expertise. Under the leading enterprise of Beijing Guohua Electric Power (Group), it plays an important role in the thermal power plant industry with numerous new technology implemented in Taishan Power Plant.

CHALLENGES & BENEFITS

At a temperature of 347.15 °C and air pressure of 22.115 MPa, the density of water vapor would be increased to liquid water. With a temperature reaching 600 °C and air pressure in between 25 to 28 MPa, you will enter the ultra super-critical stage.

Able to reach a thermal efficiency of around 45 % by turning wet steam into steam-gas and saturated steam delivering a lower coal consumption, environmental friendler using a higher technological system.

With lower coal consumption is its biggest advantage over any other super-critical thermal units in China with about 2 to 3 % improved efficiency.

The development direction of the ultra super-critical generating units is to maintain its availability, reliability, flexibility and operational lifespan of the units and further its enhancement on the steam parameters in order to achieve greater efficiency and environmental performance.
THE SOLUTION

The two current 1,000 MW super-critical power generating units was designed by Guangdong Electric Power Design Institute. All the main control and desulfurization (FGD) system are utilizing the HollySys’s MACS DCS control system with a total of 36,128 I/O points.

<table>
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<th>No</th>
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<th>I/O Configuration</th>
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<td>Total</td>
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Boiler Main Parameters

- Maximum Continuous Evaporation of Superheated Steam (B-MCR): 3091 t/h
- Superheated Steam Pressure: 27.56 MPa(a)
- Superheated Steam Temperature: 605 °C

Turbine Main Parameters

- Power Capacity: 1000 MW
- Maximum Continuous Power (T-MCR): 1053.485 MW
- Frontal Main Steam: Steam Pressure Condition: 26.25 MPa(a)
- Frontal Main Steam: Steam Temperature Condition: 600 °C

HollySys will deliver the DCS system which includes its proprietary control of generating units; Flue Gas Desulfurization (FGD), Utilities, Electrical Control System (ECS) for the two 1000 MW super-critical power generating units and the Distributed Control System (DCS) reserves communication interface with Management Information System (MIS), Supervisory Information System (SIS), etc.

At the same time, DCS communicates with turbine Digital Electro Hydraulic (DEH), generating TSI, protection system, Balance of Plant (BOP), to achieve integrated control, monitor and manage to a generating unit.

The functions of DCS includes:
- Data Acquisition System (DAS)
- Modulation Control System (MCS)
- Bypass Control System (BPCS)
- Sequence Control System (SCS)
- Furnace Safety Supervisory System (FSSS)
- MEH + METS (Steam-Driven Feed Water Pump)
- Electrical Control System (ECS)
- Flue Gas Desulfurization (FGD)

TESTIMONIAL

“The 2 x 1000 MW units DCS project in Taishan Power Plant is outstanding in terms of safety, economic efficiency and environmental protection, as well as investment control. It is the leading lever in China. The direct station service power consumption rate for power supply coal consumption is 3.77 %, which takes lead in China’s 1000 MW units. The service rate for protection devices, automation equipments and instruments is 100 %. The desulfurization and denitrification systems have been put into service in parallel with the main equipment. The overall performance fully meets our design requirements.”

From Taishan Power Plant, China

REFERENCE

<table>
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<tr>
<th>Power Capacity</th>
<th>Units</th>
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<td>1000 MW</td>
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<td>600 ~ 800 MW</td>
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<td>300 MW</td>
<td>204 units</td>
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Turbine Control

Over 3000 projects ranging from 6 MW to 1000 MW