

Dampier Power switches to Yokogawa DCS

A Yokogawa CS3000 R3 Distributed Control System has replaced an aging control system at Pilbara Iron's Dampier Power Station. Utilising a specially-designed migration kit, the changeover was completed with no interruption to daily electricity generating operations.

Built in the mid-1970s to serve the mining operations at Hammersley Iron, Dampier Power Station now supplies the electricity needs of the mining operations and adjacent town as well as feeding into the Western Power Pilbara Network. Total generating capacity is 120MW, derived from four steam turbine generators and four boilers units of 30MW each.

Significantly, Dampier is a range type station, with the capacity to supply steam from any of its four boiler units to any of the four steam turbines – an operating method that maximises operational flexibility and availability.

Pilbara Iron's requirements were for a Distributed Control System which would meet Dampier's immediate needs and be expandable to accept planned future system addition and expansion. The selected DCS must also be supported and relevant for life of the power station and provide industry best safety and operating economics.

Final assessment came down to two tenders with the Yokogawa CS3000 R3 Distributed Control System selected.

The new DCS at Dampier includes five dual-redundant controllers – one dedicated to the station master plant and one for each of the four boiler control and monitoring systems. The Master Control DCS accommodates the range master control logic and also houses an RS232 serial interface card to communicate with the station's air compressors. Each unit DCS Field Controller replaces logic and monitoring facilities previously housed in the old controllers. Additionally, each unit FCS also houses an RS232 card to communicate with the station's Burner Management Systems and an RS485 card to 'talk' to the turbine vibration monitoring system.

The CS3000 DCS has allowed optimisation of the combustion controls to reduce excess air and also achieve lower values for the flue gas oxygen. Additional enhancements to the feedwater and temperature controls have also been achieved – all of which has reduced CO2 emissions and improved plant efficiency.

Conscious of the role the station plays in the local and regional community, Dampier management was keen to avoid any interruption to electricity supply and expressed concern that any tripping of any of the station's generator and boiler control systems would automatically shutdown the other production units.

Yokogawa's response was to utilise a system-to-system migration kit developed by the company to facilitate on-line changovers and eliminate any possibility of an accidental total shutdown.

In practice, the migration kit picks up incoming signals from any connected field instruments and re-directs those signals to the new DCS. At Dampier four kits were used: one in each boiler control system.

The whole job went off without a hitch, facilitated by the close cooperation between Yokogawa site personnel and Dampier Power Station operating staff.

Each boiler was shutdown in a pre-determined sequence and made available to the installation team. A complete boiler system changeover was completed in three x 12-hour days with all four boilers and the control room fully operational well within the timeframe allowed in the contract.

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