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The Optimal Power Dispatch for Operating a Combined Cycle Power Station

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Abstract

The purpose of this study is to search for the optimal power dispatch for a combined cycle power station. The power station is equipped with four coal-fired units and five gas-fired combined cycles. Each combined cycle has three gas turbines, with three heat recovery steam generators and one condensing steam turbine. The capacity of each combined cycle is 440 MW. The real time operating conditions acquired from the units' DCDAS (distributed control data acquisition system) including power output, auxiliary power, natural gas fuel consumption rate, compressor air inlet temperature, flue gas outlet temperature, turbine steam inlet temperature, condenser vacuum pressure, etc. are monitored and the data are collected for further analysis. It is found that the unit heat rate could be cut down 20% to 30% more if the units are dispatching power optimally and the optimization for all the units are net outputs under the ranges of 95MW~140MW (1GT + ST), 210MW~290MW(2GTs + ST), and 320MW~430MW(3GTs + ST) respectively.