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### DIAGNOSIS OF THERMAL EFFICIENCY OF COAL POWER PLANTS USING HEAT BALANCE ANALYSIS METHOD

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#### Abstract:

Recent years, the operated number of coal power plants has been increasing because coal reserves is abundant and it is easy to procure it. The rate of operation of the plants is high in general. Therefore thermal efficiency of the plants attracts increasing interest nowadays, as it concerns fuel saving. It is important for plant management to identify which machinery affects the deterioration when the plant efficiency is reduced. Heat input-output method has been used in order to diagnose thermal efficiency of coal power plants conventionally. However, the accuracy of the diagnosis is not enough to manage the plant, because it is difficult to measure coal calorie input to the plant with high accuracy. It is big problem in plant management. Therefore, diagnostic technique of thermal efficiency using heat balance analysis method was applied to a coal power plant at first time in order to make more accurate diagnosis. The coal power plant is a new type of 1,000 MW output owned by Tokyo Electric Power company, TEPCO. The heat balance analysis method was developed by TEPCO and has been applied to considerable number of thermal power plants. The output of the plants was 350 MW, 600MW and 1,000 MW respectively, and the fuel was LNG or oil. The heat balance method is characterized by high accuracy. Optimum state estimation of the plant was executed by iterative calculation in a computer using measurement data. The measurement data of generator output, which is the most precise among the plant, is taken as standard value. Consequently, it can minimize deviation of measurement data which is difficult to be measured precisely, such as feed water flow rate. As a result of the diagnosis, it was confirmed that performance of each machinery of the plant could be analyzed with least unknown factor and the method was also useful to coal power plants.