

Hitachi Rinkai Power Station

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1. Introduction

As one of independent power producer (IPP), Hitachi has built a power plant located inside the Rinkai Works (Hitachi City, Ibaraki Prefecture), and started the commercial operation in June, 2000. As a model of high efficiency, high reliability 100MW middle class power plant, the outline of Rinkai power station will be introduced in this paper.

2. Plant outline and main specifications

2.1 Outline

Rinkai power plant is a combined cycle plant with a F6FA gas turbine, waste heat recovery boiler, and steam turbine, which has net output of 106MW and maximum contract electrical power of 102.8MW.

The gas turbine is fueled with low sulfur A-type distillate oil.

The gas turbine, steam turbine and the generator is arranged in a single-shaft configuration, which made the plant to have a compact layout. A Vertical Dual pressure natural circulation-type waste heat recovery boiler is adopted to minimize the foundation area. The steam turbine is a multi pressure condensing type, utilizing condenser with a cooling tower system. Aerial view of power station is shown in the Figure 1.

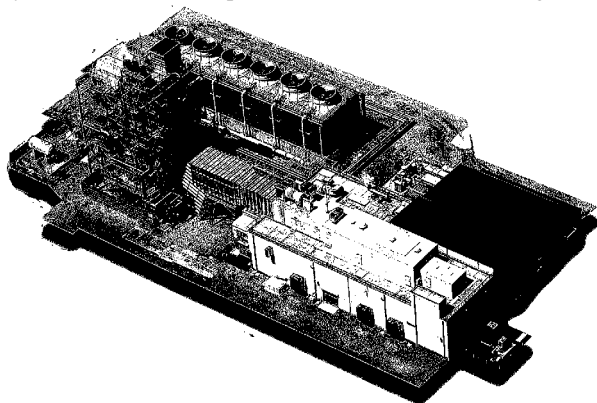


Fig.1 Aerial view of power station

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2.2 Plant operation

The plant operates in middle-load operation mode for 12-hours operation (WSS and DSS) in the weekdays, results in 30% annual operation rate. The plant will be operated automatically, utilizing the digital control unit and the CRT after the start-up preparation. For hot start, the start-up time counted from the gas turbine start-up to the full load is 90 minutes.

2.3 Environmental countermeasure

In this plant, NOx is reduced by adopting water injection technology for the gas turbine, and DeNOx (selective catalytic reduction). The gas turbine, steam turbine, and the generator is installed outdoor, and soundproof enclosure is adopted to reduce noise.

3. Characteristics of the gas turbine

The F6FA gas turbine was jointly developed by U.S. General Electric Company and Hitachi. The gas turbine is a middle class capacity gas turbine, with firing temperature of 1300°C, output of 73,560kW (authorized output at 10.8°C ambient temperature, 1,013hPa ambient pressure), and nominal rotating speed of 5,235 min⁻¹. The F6FA gas turbine is designed according to scale-down philosophy from the preceding model (the F7F /F7FA gas turbine), which has many operation experience. The scale ratio vs the F7FA gas turbine is 0.69. A photograph is shown in the Figure 2 at the time of gas turbine assembly.

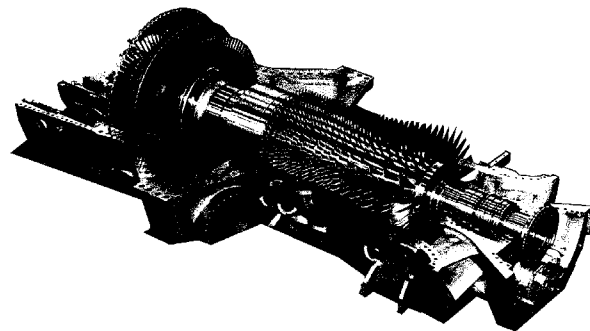


Fig.2 F6FA gas turbine

4. Operation results

Started from the commercial operation on June 8, 2000 to May, 2001, the operation hours in one year are 2,896 hours,

with numbers of start-up of 234 times. During the operation time, the reliability is 99% and the operation rate (the ratio of the operation time vs the installation period) is more than 33%. A fifteen days inspection has been held in June, 2001 for inspection of the high temperature parts such as combustor, etc, and at the same time operation for the second year has been started again.

5. Summary

In this paper, an IPP power plant for middle load operation, has been confirmed to have a high reliability according to the original plan, in condition of a lot numbers of start and stop times.

Based on the Rinkai plant operation from this time on, by accumulating our experience on the plant management and know-how on the plant maintenance, we are advancing our business on the solution service corresponding to the electric power liberalization.