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Study on multi-effect distillation of seawater with low-grade heat utilization of thermal power generating unit

Yuan Xue¹, Xiaoze Du^{2†}, Zihua Ge¹, Lijun Yang¹

1 Key Laboratory of Condition Monitoring and Control for Power Plant Equipment (North China Electric Power University), Ministry of Education, Beijing 102206, China

2 School of Energy and Power Engineering, Lanzhou University of Technology, Lanzhou 730050, China

Abstract

In order to reduce the energy consumption of low temperature multi-effect distillation (LT-MED), three schemes were proposed to utilize the low-grade heat of thermal power unit. The LT-MED system was combined with the thermal power unit by abolishing gas-gas heater (GGH) to recover the waste heat of flue gas and utilize the recirculating seawater of steam turbine condenser. Physico-mathematical models were established, with which the fresh water production performance of each scheme was investigated. Comparing with the reference six-effect TVC-MED system, the coal consumption rate of power generation dropped by 6.05 g/kWh for a 600MW power generating unit, as well as thousand tons fresh water production could be obtained by using the flue gas as the heat resource of the first effect. Economic analysis results showed that reduce the amount of extraction steam from the turbine can significantly reduce water production cost. From the viewpoint of coal consumption rate, the combination of exhaust flue gas with the LT-MED system was better than that of heating condensed water. The gained output

[†] Corresponding author. Tel.: +86(10)61773923; Fax: +86(10)61773877. Email address: duxz@ncepu.edu.cn

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