Optimization of Cooling Tower Using Exergy Analysis at PT.Indonesia Power Kamojang POMU Unit 2

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ABSTRACT

Exergy Analysis and Optimization of the Induced Draft Crossflow cooling Tower at the Kamojang Geothermal Power Plant in Indonesia has been carried out with the Response Surface Method with the Box Behnken Design plan type to evaluate the performance of the cooling tower during the energy conversion process and identify the components that have the greatest losses. Exergy analysis provides information about the value of exergy efficiency and irreversibility in the cooling tower and calculates the energy rate contained in the cooling tower. The results of data analysis on the cooling tower for 1 month at PLTP Kamojang POMU (Power generation Operation and Maintenance Service Unit) obtained data from the logsheet and using the head balance to calculate exergy analysis on the cooling tower which resulted in an average number of incoming exergy before optimization of 12339,55 kW, the average result of exergy output is 6305,671 kW, the average result of irreversibility is 6033,879 kW with an exergy efficiency value of 51.10% and the average amount of exergy after optimization is 13426.67 kW , the average result of exergy output is 8358 kW, the average result of irreversibility is 5068.67 kW with an exergy efficiency value of 62.10%. From the calculations before optimization and after optimization, there is a decrease in the exergy efficiency of the cooling tower, so the goal of optimization is to use the Response Surface Method with the Box Behnken Design plan type to optimize and reduce the irreversibility value and increase the efficiency of cooling tower exergy and to obtain the most optimal operating conditions from components that are optimized.

Keywords: *Cooling tower, energy, exergy, irreversibility and optimization*