

## ABSTRACT

Cooling water has a function in the process of condensing steam from turbines flowing into the condenser. On the other hand, the function of cooling water is as a pressure guard on the condenser so that it is in a vacuum and minimizes uncondensed steam or commonly called NCG (Non Condensable Gas) inside the condenser and the steam that enters the condenser can be maximally condensed. In knowing the magnitude of the effect of the value of the cooling water temperature on the geothermal power generation system, the calculation of the performance of the steam turbine will be carried out. Therefore, this study aims to analyze how the influence of cooling water temperature on the performance of steam turbines at PT. Geo Dipa Energi (Persero) Unit Patuha. This research begins by observing the condition of the actual steam turbine and the data specifications of the steam turbine design including the surrounding environment. Followed by activities in the form of a review and observation of how the influence of the cooling water temperature value of the geothermal power system on the performance of steam turbines. After that, it is continued with the field data retrieval then the data is processed to get the turbine performance value. Based on the results of data processing will be analyzed and obtained a comparison of cooling water temperature graphs on the performance of steam turbines. From the graph that has been obtained, it is found that the cooler or lower the cooling water temperature, the higher the value of the performance of the steam turbine, where the lowest cooling water temperature of  $19.7^{\circ}\text{C}$  produces a steam turbine performance of  $656.0199 \text{ kJ / kg}$  while the highest cooling water temperature at  $23.4^{\circ}\text{C}$  which results in a steam turbine performance of  $635.4263 \text{ kJ / kg}$ . The difference between the highest and lowest cooling water temperatures is  $3.70\text{C}$  and the performance difference is  $20.5936 \text{ kJ / kg}$ .

**Keywords:** performance, cooling water temperature, condenser vacuum pressure, steam turbine.