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HEAT POLLUTION GENERATED BY THERMAL POWER STATIONS

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Abstract. *Temperature of cooling water in combined-system power stations. Share of river water that can be used for cooling in a combined system with natural-draft cooling towers, depending on load, river water temperature and weather conditions. Variation of the river water share for different specific load levels of the cooling tower. Classified graph of the cooling time for natural draft cooling towers operating in combined systems. Hourly variation of cooling water temperature for constant-power operation. Combined system cooling schemes.*

Rezumat. *Temperatura apei de răcire la centralele electrice în circuit mixt. Cota de debit folosibilă din apa unui râu la răcirea în circuit mixt, cu turnuri de răcire cu tiraj natural funcţie de încărcare, de temperatura apei din râu şi condiţiile atmosferice. Variaţia cotei de debit folosibil pentru diferite încărcări specifice ale turnului de răcire. Curba clasată a intervalului de răcire la turnuri cu tiraj natural funcţionând în circuit mixt. Variaţia orară a temperaturii apei de răcire pentru funcţionarea la putere constantă. Scheme de răcire în circuit mixt.*

Keywords: power stations, cooling time, water temperature, cooling tower, combined system

1. Introduction

The need to improve fuel efficiency in thermal power stations is subject to various technical, economic and environmental constraints. A change by one degree in the temperature of cold water means an increase by 7-9.5 degrees in the superheated steam cycle and by 2-2.6 degrees in the saturated steam cycle. For the cooling of power plants, the restrictions concerning the heating of surface waters result in a higher temperature of the cold source. This is because heat has to be either partly or completely evacuated in the environment, through cooling towers, and the temperature of the water cooled in a closed circuit is in any case higher that the natural temperature of river water. Figure 1 shows the variations in the average monthly temperature of the water cooled in towers and of surface water in the climate conditions of the Danube Plain. The impact of temperature differences justifies, from an economic viewpoint, the use of a combined cooling system, considering the economic circumstances and the flow pattern of Romanian rivers, even though rivers provide cooling water for thermal power stations for only 25% of the total time.

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