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ORIGINAL ARTICLE

Physical model to investigate the effect of the thermal discharge on the mixing zone (Case Study: North Giza Power Plant, Egypt)

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Abstract

This research aims to investigate the effect of effluents, excess temperature above the ambient of the power plants and flow regime on the mixing zone characteristics. To achieve these aims an undistorted thermal physical model was constructed. The model is a fixed bed with an undistorted scale of 1:50. It represents 2.5Â km of EL-Rayah EL-Behery at the vicinity of the North Giza Power Plant, Egypt. It simulates the thermal plume produced from the plant. The results showed that the mixing zone depends on the flow regime, the effluent discharge and the excess temperature above the ambient at the outfall. The results showed that, the mixing zone area increases with increasing

the effluents and decreases with increasing the flow in the river. It was found that in case of increasing the excess temperature above the ambient at the outfall and decreasing the effluent discharge, the mixing zone area was increased. It means that the excess temperature at the outfall has more influence on the mixing zone. In conclusion, the mixing zone characteristics are defined which helps in understanding of thermal plumes. Using equations have been developed assist in predicting of the dimensions of mixing zone.

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Keywords

Thermal plume; Physical model; Mixing zone

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