



MATHEJA CONSULT

Königsberger Str. 5
30938 Burgwedel / OT Wettmar
fon: +49 5139 / 402799 - 0
fax: +49 5139 / 402799 - 8
mobil: +49 / 1607262809
email: kontakt@matheja-consult.de
www.matheja-consult.de

Temperature Distribution in the Elbe Estuary for Cooling Water Discharge of the Power Station “Stadersand”

Client: E.ON Kraftwerke GmbH

Location: Stade, Elbe Estuary

Scope of Work: Simulate the temperature distribution for the cooling water discharge of the pre-designed cooling system

Method: ADCP measurements, multi beam echo soundings, 2D transport model

INTRODUCTION

We were commissioned for an investigation on the spreading of cooling water in front of the planned Power Station “Stadersand” (Fig. 1).



Figure 1: Location of the Power Station “Stadersand”

METHODOLOGY

Therefore, we carried out measurements of currents (ADCP) and temperatures in the Elbe Estuary and made a multibeam echo sounding of the bathymetry near the facility. These measurements were used to setup and verify a hydrodynamic 2D model and an associated 2D transport model (Fig. 2).

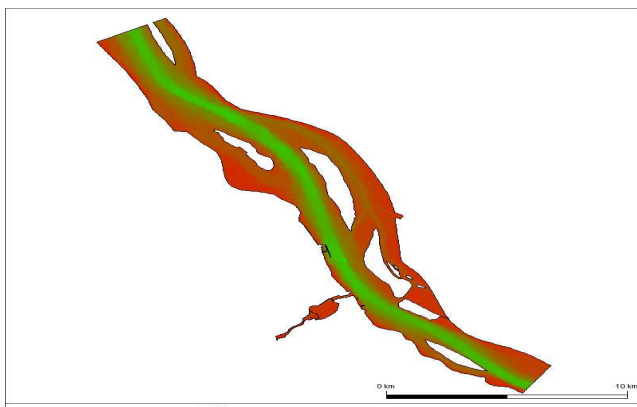


Figure 2: 2D Transport Model between Wedel and Glückstadt (L = 32 km, A = 79 km²)

RESULTS

Several alternatives of intake and port setup were simulated (Fig. 4).

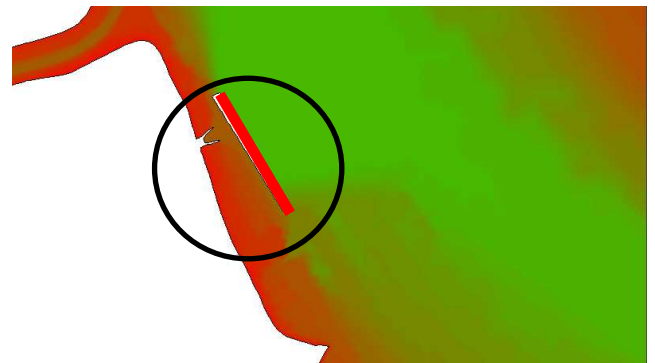


Fig. 4: Example for a Discharge of Cooling Water behind the Quay Structure (closed pile wall structure)

Results (Fig. 5) show that higher temperatures are limited to the local area. Temperatures are below prescriptive limits.

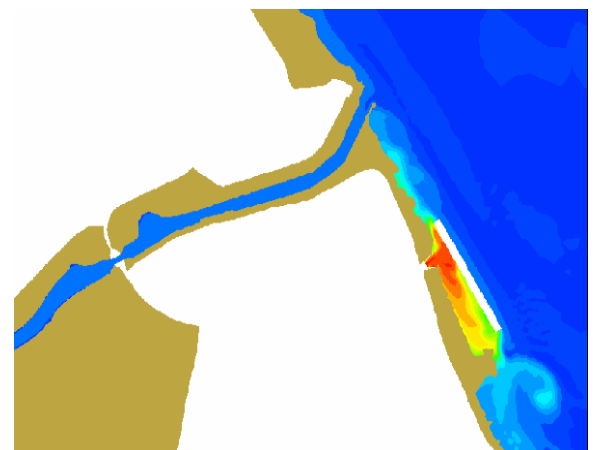


Fig. 6: Temperature Variations in the Elbe River

CONCLUSIONS

Simulations have shown that the environmental impact of the new Power Plant “Stadersand” can be minimized by an intelligent design of inlet/outlet structure and the port itself.