

## Song Hau Power Plant, Block 1 – Simulation of 3D Fluid Dynamics and Temperature Distribution at Intake and Outfall

**Client:** Envi Con Plant Engineering GmbH / LILAMA 18 JSC

**Location:** Mekong Delta, Can Tho, Song Hau River, Vietnam

**Scope of Work:** ADCP-Measurements, Echo-sounding, Setup of a 3D hydro-numerical Model, Calibration, Simulation of fluid dynamics and temperature distribution

**Methodology:** 3D Model for Fluid Dynamics and Thermodynamics (DELFT 3D FM)

### INTRODUCTION

The company LILAMA 18 is currently building Block 1 of the 5 block Song Hau Power Plant (Fig. 1) approx. 20 km downstream of Can Tho.

Therefore, we were contracted for an investigation of 3D fluid- and thermodynamics around the intake and outfall structure to optimize the circulation of cooling water and to prevent a short cut between these two structures.

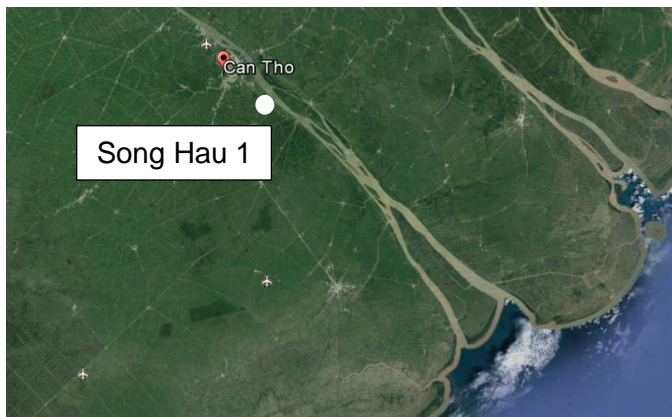


Fig. 1: Location of Song Hau Power Plant downstream Can Tho in the Middle of Mekong Delta

### METHODOLOGY

During a six-week field campaign in April 2016 detailed echo-sounding of the river bed topography (Fig. 2) was performed.

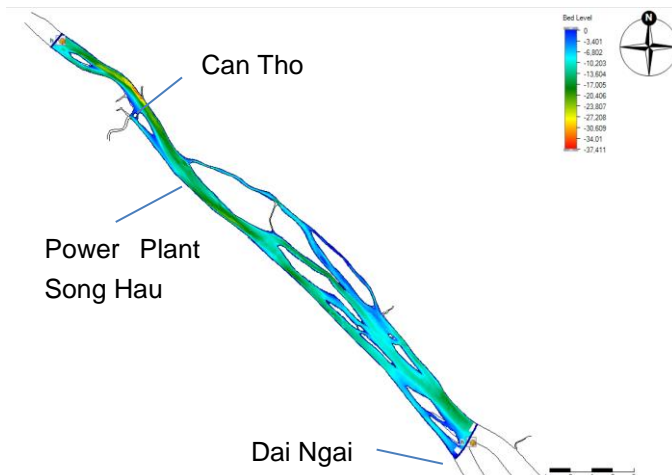


Fig. 2: Area of the 3D hydro-numerical Model

ADCP measurements were performed for several river sections during neap and spring tide during fully developed ebb and flood currents. A network of gauges was setup to measure tidal water levels, salinity and the water temperature down to Dai Ngai every minute for a period of two months. The data were used to setup and calibrate a 3D model of Song Hau River using DELFT 3D FM (Fig. 2).

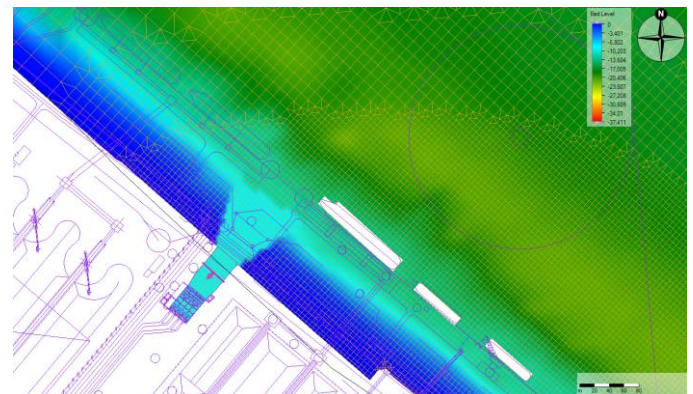


Fig. 3: Intake of Song Hau Power Plant, Block 1

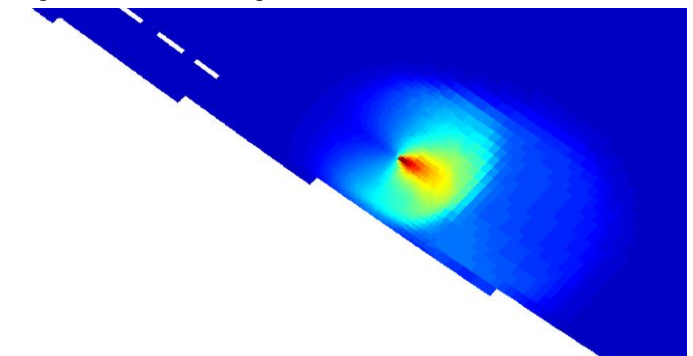


Fig. 4: Temperature Distribution at still water at the bottom of the river

### RESULTS & CONCLUSIONS

Our simulations show, that the optimized design of the facility prevents a short cut of cooling water between intake and outfall.

It also proved, that the maximum water temperature will remain below critical values defined by environmental guidelines,