

Onshore portion of sea water cooling system of Al Khalij Power Plant project

by: Fuat Tinis

Summary:

Al Khalij Power Plant Project is a thermal power plant project with four units each having 350 MW capacity located in Sirte, Libya. Cooling water system is once through system, for which water is taken from and discharged to Mediterranean Sea.

Marine intake and discharge lines are 3 m and 2.8 m diameter GRP pipes for each four units separately. In this study, inland portion of this cooling water system after intake structure until outfall structure, which includes intake structure, pumps, intake header, underground GRP pipes, surge chamber structure, outfall structure and relevant intake and outfall sluice gates, is explained.

Intake, surge chamber and outfall structures are concrete structures, where intake and outfall structures are constructed just near to the sea shore line with special dewatering methods. Intake header is 2.8 m diameter steel construction collector with eight 1800 mm diameter pump inlet and four 2500 mm diameter outlet nozzles and with three sectionalizing butterfly valves between four intake header flanged segments. Cooling water supply and return lines are 2.5 m diameter GRP pipes laid separately for each four unit of the power plant, in which flow rate of cooling water is 51,000 m³/h. Connection of these supply and return lines to condensers of the turbines are with 1800 mm diameter flanged nozzles at the end and beginning of cap ended supply and return lines.

Connection of these GRP supply and return lines to the steel intake header and concrete surge chamber and outfall structures is a challenging problem, where sealing and differential settlements are the main issues to be considered during design and construction.

Entrance of sea water to intake structure and closing of discharge water to sea at the outfall structure are accomplished by Ni resist cast iron sluice gates.