



Enriching Lives

## COASTAL GUJARAT POWER LIMITED (CGPL)

### Circulating Water Solution for first Ultra Mega Power Project (UMPP) of India



Mundra UMPP: Plant Evening View from Outfall Channel

#### Introduction

The first Ultra Mega Power Project (UMPP) of India, Mundra UMPP worth INR 18,000 Cr. only was awarded to Tata Power. The project had 5 units of 800 MW each, generating a total of 4,000 MW using supercritical technology and 40,000 MT /day imported coal. TCE Limited, Bangalore was appointed as engineering consultant to Tata Power. Strong pre-tendering by KBL helped to win the order of 10 CVP's from TCE. Each of these 10 CVP's are of 63000 m<sup>3</sup>/hr capacity at 23 mWC. KBL bagged the order in March 2008 over its competitors like Weir, UK & Kubota, Japan. Mundra UMPP boosts the world's largest condenser cooling water pumping system for a thermal power plant based on super critical technology.

#### Challenge

The project challenge was design, manufacture, erect and commission 10 Nos. of CVP's for sea water application. Supply, erect and commission 10 Nos. of 5200 kW, 22 poles, 11 kV, 271 RPM HT motors of BHEL. Design, supply, erect and commission cooling water system for motors, pump bearings and pump sealing. Design, supply, erection and commissioning of field instrumentation like VMS, RRI, Key Phasor, Transmitters, Flow Switches was also one of the major challenges. Certain components like Impellers, Thrust Bearings and Intermediate Cardon Shafts had to be sourced from overseas market. The project required close co-ordination between factory and site as volute casing was in concrete, and was built directly on-site. So, the Zero error fitment for all the components from varied locations on site was the major challenge met. Success lied in strictly adhering within tolerance zone to the installation procedures.



Volute Concreting



Impeller Assembly



### Solution

Concept to commissioning was the approach adopted by KBL. KBL worked closely with TCE to understand the exact capacity of water that needs to be handled in the unit time for given plant capacity. After thorough permutations and combinations, the option of 10 CVP's with 63000 m<sup>3</sup>/hr capacity each was proposed. Major engineering studies like Sump Model Study, Physical Modeling of Sump and Forebay were carried out to propose the appropriate CW Forebay divergent angle. Pump Model Test was carried out as Per JIS-B-8327-2002. Appropriate selection of material of construction of the wet parts like impeller based on application and nature of fluid handled was the key. This portrayed the Application Engineering capabilities of KBL.

### Learning

We learned to envisage site limitation and design the installation procedure accordingly. Identifying critical components and engineering & procurement actions to be initiated on priority to meet the deadlines was our next learning. Certain up gradations are required in contract specifications with regards to MOC of a particular component like carbon shaft based on our experience, expected misalignments based on site conditions. Our next learning was to review the technical specifications at offer stage and incorporate suitable changes before order finalisation. Many times supplies get delayed due to its customised nature leading to LD. So, we learned to insist on multiple choices of vendors and keep the client in loop for supply related issues.

### Conclusion

KBL was able to complete the project in the timeframe due to its System Engineering and Application Engineering capabilities. KBL concept-to-commissioning approach was responsible for the customer delight. Technically competent execution team, which is the strength of KBL, took timely accurate decisions, made necessary recommendations to the stakeholders. Thus, India's first UMPP becomes another feather in the cap of India's largest manufacturer and exporter of pumps and valves.