

Tanir Bavi Barge Combined Cycle Power Plant

World's Largest Barge mounted Combined Cycle Power Plant



Owner: GMR Energy Limited

Country : INDIA

Builder : Hyundai Heavy Industries

- Electrical Power 220 MW (Net Export)
- 4 GE LM6000PC gas turbine generators
- 4 Dual pressure, once-through steam generators (OTSGs)
- 1 ABB Alstom dual pressure condensing steam turbine

Background

The plant is a 13,000 DWT floating barge located at Tanir Bavi Village, on the bank of Gurupur River, in Mangalore, Karnataka, India. The naphtha-fired plant was designed and built by Hyundai Design Engineering Constructors (HDEC). It has 4 General Electric LM6000 PC combustion turbines and one ABB steam turbine. The OTSGs were built by Innovative Steam Technologies, Ontario, Canada. All major equipment items including turbines, generators, HRSG, etc. and auxiliaries were mounted on a barge that was built in Ulsan, Korea by HDEC. After mounting the equipment on the barge it was then towed to Mangalore, India, where it was permanently moored to the dock, and connected to the main transformers and fuel delivery equipment.

The barge measures are 348ft (106M) long by 181ft (55.2 m) wide by 20 ft (6m) high. 8 Feet (2.4m) of the barge plant is below the water line. The total weight of the barge including the turbine hall, control building on the deck and all of the floating equipment is 15,325 tons (13,900 tonnes). The project included all of the barge mounted power plant equipment plus the mooring system together with barge to shore electrical connections.

The plant operates in base load mode, but has regulation capability that can be dispatched to the grid as required by Load Dispatch center.

Process Technology

Four LM6000PC Aero derivative gas turbine and generators are completely enclosed, synchronous, air cooled type with two pole, 3000 rpm, three phase generators rated at 11kV at 50Hz. The LM6000PC gas turbine consists of 5-stage low pressure compressor (LPC), 14-stage variable geometry high pressure compressor(HPC), an annular combustor, 2-stage high pressure turbine(HPT), 5-stage low pressure turbine(LPT), an accessory drive gearbox(ADG) and accessories. The electric generator is connected to the gas turbine through the Reduction Gear Box (RGB).

Four (4) dual pressure, once through, heat recovery steam generators manufactured by Innovative Steam Technologies, Cambridge, Ontario, Canada convert the waste heat from the gas turbines to steam for use by the steam turbines. The OTSGs produce superheated HP-steam and LP-steam and do not require supplementary duct firing.

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Scope of Supply

The maxDNA system has 10 pairs of Distributed Processing Units (DPU4B). The DCS controls the gas and steam turbines and the balance of plant through their respective control systems. The management of the OTSGs, balance of plant, auxiliaries, and electrical distribution within the plant are controlled directly by the maxDNA system.

Functions delivered by Metso Automation include the following:

- Automatic plant start-up and shut-down sequence control
- Automatic Power Regulation control (APR)
- Modulating control
- Binary control
- Data acquisition
- Sequence of events reporting
- Electrical switchgear control - Remote commands and status monitoring

The maxDNA DCS includes the following elements:

- 1 Engineer's maxSTATION
- 4 Operator maxSTATIONS
- 1 maxSTORIAN for data archiving and retrieval
- 1 Training console
- 1 max STATION for Admn Building
- 2 DBMs
- 10 Pairs of DPU4B.
- 1 Master Clock DPU.

There are 2,300 points controlled through the DPUs.

