

## Details of One Unused ~ 19 MW Gas Turbine Generator, plus 46 TPH HRSG

### Gas Turbine

Supplier:	ABB
Model:	GT110B (heavy-duty gas turbine generator and power turbine) New and clean set as per ISO 2314
Features:	Designed and developed to incorporate size and weight advantages of the aircraft derivative gas turbine having advantages for traditional industrial turbines like robustness, flexibility and long life
Installation:	Inside building (indoor installation)
Installation status:	Complete along with air intake and exhaust system
Ambient temp/press:	35°C / 1.013 bar(a) – as designed
Relative humidity:	70%
Fuel:	Naphtha(C=84.525%, H <sub>2</sub> = 15.425%, S=0.05%[wt], LHV = 39795 KJ/KG) or HSD (can be converted to burn natural gas).
Net power output:	19190 kW (as guaranteed by the OEM)
Voltage/Freq/phase:	11 kV, 50 Hz, 3 ph
Power factor:	0.8
Gross heat rate:	12013 KJ / KWH, 2867 Kcal / kWh
Control system:	Operations controlled automatically from standstill, through starting, run-up, loading, normal operations, unloading, shutdown and cool down.

### Heat Recovery Steam Generator(HRSG)

Type:	Unfired natural circulation single pressure type boiler Exhaust gas from turbine is directed horizontally in to the HRSG
Installation:	outdoor
Design & Mfg. code:	IBR / International std.
Exhaust stack:	Boiler stack – 45 m high Bypass stack – 30 m high with guillotine dampers (between GT exhaust duct and HRSG inlet)
GT exhaust flow:	74.5 kg/sec
GT exhaust gas temp:	532°C
Steam generation:	46 TPH at 10 bar(g), 99.5% saturated Note: Medium pressure steam at 5 bar(g) can be produced from high pressure steam through PRS
Ambient temp:	35°C
Pressure drop:	Flue gas side less than 25 mbar
Heat losses:	Blow down and vent -2%
Pre-heater:	Condensate type raising make up water temp. from 30°C to 105°C
Deaerator:	Installed
Exhaust gas temp:	82°C
Boiler Feed pumps:	3 x 50% capacity

### Plant Electrical System

11 kV switchgear:	two off out-going feeder
415V system:	for plant auxiliary requirement, 440VDC system for post lubrication, 110VDC system for protection and UPS, 230VAC uninterruptible power for control equipment

### Plant Control System

Master based control system for turbine and HRSG with all auxiliaries. It is a multifunction controller handling modulating / sequential controls besides data acquisition.

## **Auxiliary Consumptions**

Power:	350 kW
DM water:	Make up 47 tph Nox control 6 tph
Cooling water:	80 cubic metre /hr

## **Fuel system**

Fuel for turbine:	naphtha and HSD as starting / back up fuel
Fuel storage capacity:	Naphtha tanks – floating roof – 6 off - 2500 cubic metres HSD tanks-fixed roof – 1 off – 2400 cubic metres.
Size of tanks:	22 m dia x approx 9 m height, with water sprinklers and fire detectors and alarms
Tank farm:	approx. 1.2 kms away from power plant and fuel transfer through pumps
Naphtha transfer pumps:	2 off 15 cubic metres /hr, 54 mlc (KSB-CPK-ECM 40-200) Motor: 2.2 kW, 1400 rpm
HSD holding:	day tank of 15 cubic metres at power plant with two compartments. Oil received (transferred) from tank farm will be centrifuged and stored in clean compartment. Centrifuging capacity is 7.5 cubic metres / hr and 2 off of centrifuges are installed)
HSD feed pumps:	2 off x 15 cubic metres/hr-42 mlc to turbine
Fuel supply and unloading:	through road tankers-provision for unloading of 8 off tankers at a time
Naphtha unloading pump:	2 off x 20 cubic metres/hr, 13 mlc (KSB-CPK-ECM 50-200). Motor-1.5kW,1450 rpm
HSD unloading pump:	2 off x 20 cubic metres/hr, 17 mlc (KSB-CPK-ECM 50-200). Motor – 2.2 kW, 1450 rpm
Drain pumps:	provided in unloading area

## **Building and Civil Works**

Power plant area:	Approx. 65m x 65m
Building Area:	Approx. 57m x 26m
Building height:	15m with a facility of EOT crane of 20MT capacity
Building structure:	Frame structure with Masonry wall roof with steel sheet cover, industrial flooring, duly ventilated area, designed for 1+1 turbine and aux. equipment, RCC trenches, electrical and control room are adequate size, etc. Building is not painted from outside

## **Pipe Rack:**

Purpose:	for yard piping of fuel transfer and steam transport MOC steel
Height:	approx 6m
Length:	1.2km for fuel transfer

## **Fire Fighting Facility**

The tanks installed at the tank farm are installed with MVW system and hydrant system. All tanks are fitted three rings for water spray system along reservoir and pump house. The fire water pump house is constructed in utility 2 area along with pumps and allied facilities within pump house. This facility has been planned to be shared between SVP, Utility-2 and FTD-4 plants

At power plant building and surrounding area where HRSG is installed, the hydrant network is found in place as installed. However it was not found connected with main firewater reservoir and pump house. Within the pump house the pumps were found without electrical / mechanical drive units

## **Battery Limit conditions for Power plant**

To the plant:	compressed air DM water – 53 tph Cooling water – 80 cu.m/hr Fuel: naphtha and HSD
From plant:	steam 46tph at 10 bar(g) Power -19.2 MW at 11kV