

Industrial Visit Report

Name of Industry: Thermal Power Station, Wanakbori (GSECL)

Date of Visit: 09/03/2022

Faculty Coordinators: Prof. Chintan R Patel, Prof. Jignesh S Patel

Class: 3rd Year EE

Number of Visitors: 58 students + 2 Faculty Members

Department of Electrical Engineering has organized an industrial visit of Thermal Power Station, Wanakbori (GSECL) for 3rd year students. 58 students along with 2 faculty members visited the thermal power station on above mentioned date. WTPS has 7 units each of 210 MW and one unit of 800 MW. So, the total installed capacity of the plant is 2270 MW. Following sections of the WTPS had been visited.

- 1) Training center
- 2) Coal and ash handling plant
- 3) Boiler section
- 4) Turbine/Generator floor
- 5) Electrical control room (Unit No.1)
- 6) Cooling tower
- 7) Switch yard (220 kV & 400 kV)

At the training center, Mr. B A Patel explained the working cycle of thermal power station. Students visited various small scale models of equipments used in the power plant. We collected very important practical data like temperature, pressure, quantity of coal, etc. used for the power generation.

We visited the coal and ash handling plant where Mr. J B Bhatt, Junior Engineer guided us. The 210 MW unit consumes 125 ton coal per hour to generate the electricity. So, bulk amount of coal is transported through railway and with the help of Wagon Tripler coal is transferred to the coal storage area. To start the ignition of the boiler residual furnace oil (RFO) or light diesel oil (LDO) is used which is transported through tanker wagon by railway. After the combustion of coal in boiler furnace, ash is produced which is collected and treated by ash handling plant. The ash is used for many industrial applications like production of cement, ceramic, etc.

At boiler section we visited FD fan, ID fan, PA fan, APH, boiler furnace area and other auxiliary devices essential for boiler operation. Each boiler unit has 2 FD fans, 2 ID fans and

2 PA fans. The boiler consumes 125 ton pulverized coal per hour with 720 ton of air to generate heat at the temperature of 1200-1300° C.

At turbine/generator floor, students visited HP, IP and LP sections of turbine coupled with generator. Superheated steam at 140 kg/cm² pressure and 545° C temperature is fed to the turbine. Generator has capacity of 210 MW at 15.75 kV, 9050 A.

The control room of power plant is the brain of the entire plant. We visited control room of unit no. 3. It is equipped with DCS facility provided by ABB Ltd. All the important data were displayed in real time mode like MW, MVA_r, frequency, power factor, phase current, etc. on the display screen.

There are 7 natural draught cooling towers (NDCT) used for cooling of circulating water of condenser. Water is sprayed at the height of 21 meters in the tower and due to natural draught of air, its temperature is reduced by 10° C and this water is pumped in to condenser tubes for condensation of steam exhausted from LP turbine.

Switch yard consists of two sections, 220 kV and 400 kV. The voltage of unit no. 1, 2 and 3 is stepped up from 15.75 kV to 220 kV and the power is transmitted at 220 kV level. There are 7 outgoing transmission lines at 220 kV voltage level. The voltage of unit no. 4, 5, 6 and 7 is stepped up from 15.75 kV to 400 kV and the power is transmitted at 400 kV level. There are 4 outgoing transmission lines at 400 kV voltage level.

The visit was very fruitful as we observed each of energy conversion stages used in power plant starting from fuel section to switch yard. We collected very important information like practical data which are not available in books and other literature. Many of our doubts are cleared by the discussion with experts of the plant.

