

# Industrial Visit at Thermal Power Station, Wanakbori (*GSEL*)

Date of Visit: 29.04.2022

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May 1, 2022

Department of Electrical Engineering organized an industrial visit to Thermal Power Station, Wanakbori (*GSEL*) for 2<sup>nd</sup> and 3<sup>rd</sup> year, B.E. Electrical Engineering students. 52 students along with 5 faculty members visited the thermal power station on the above-mentioned date. WTPS has 7 units each of 210 MW generation. So, the total installed capacity of the plant is 1470 MW. The following sections of the WTPS were visited by students.

1. Training center
2. Coal and ash handling plant
3. Boiler section
4. Turbine/Generator floor
5. Control room of Plant (Unit No.3)
6. Switchyard (220kV & 400 kV)

At the training center, Bhatt Sir (DE, TPS Wanakbori) explained the working cycles of the thermal power station. Students also visited various small-scale models of equipments used in the power plant in the training center. Students collected very important practical data used for power generation. Students visited the coal and ash handling plants. The 210 MW units consume 125 tons of coal per hour to generate electricity. So, a bulk amount of coal is transported through the 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 the boiler furnace, ash is produced which is collected and treated by the ash handling plant. The ash is used for many industrial applications like the production of cement, ceramic,



Figure 1: Group Photo of all the students, Faculties of GIDC Degree College at TPS Wanakbori

etc. In the boiler section, students visited the 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 tons of pulverized coal per hour with 720 tons of air to generate heat at the temperature of  $1200^{\circ}\text{C}$ - $1300^{\circ}\text{C}$  on the turbine/generator floor, students visited the HP, IP, and LP sections of the turbine coupled with the generator. Superheated steam at  $140\text{kg}/\text{cm}^2$  pressure and  $545^{\circ}\text{C}$  temperatures are fed to the turbine. The generator has a capacity of 210 MW at 15.75 kV, 9050 A. The control room of the power plant is the brain of the entire plant. Students visited the control room of unit no.3. It is equipped with a DCS facility provided by ABB Ltd. All the important data were displayed in real-time mode like MW, MVAR, 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 the condenser. Water is sprayed at the height of 21 meters in the tower and due to the natural draught of air, its temperature is reduced by  $100^{\circ}\text{C}$  and this water is pumped into condenser tubes for condensation of steam exhausted from the LP turbine. The switchyard consists of two sections, 220 kV and 400 kV. The voltage of units no. 1, 2, and 3 is stepped up from 15.75 kV to 220 kV and the power is transmitted at a 220 kV level. There are 7 outgoing transmission lines at 220 kV voltage levels. The voltage of units no. 4, 5, 6, and 7 is stepped up from 15.75 kV to 400 kV and the power is transmitted at a 400 kV level. There are 4 outgoing transmission lines at a 400 kV voltage level.

The visit was very fruitful for students who observed each of the energy conversion stages used in the power plant starting from the fuel section to the switchyard. Students collected very important information which are not available in books and other literature. Many of doubts were cleared by the discussion with experts of the plant.

The industrial visit to Thermal Power Plant, Wanakbori was impossible without the efforts and valuable inputs from faculties of department. We are here extending our great acknowledgment and appreciation to the following persons with their memorial inputs that are not limited only to those mentioned below,

Dr.N.D.Sharma, Principal Sir was very helpful to us. As a principal, he has inspired us to arrange an industrial visit to students. Not only does that permit industrial visits, but his academic guidance, fairness, and responsiveness to kind of queries also remain him a role model, thereof we are extending our gratitude to Dr.N.D.Sharma, Principal Sir.

Dr.Rakesh.J.Motiyani, H.O.D. of the Electrical Engineering Department was faithful to us, he is also always ready for solving the problem related to the industrial visit. He has injected us with the familiarity and methodology of planning of visit. thereof we are extending our gratitude to Dr.Rakesh.J.Motiyani, H.O.D. of the Electrical Engineering Department.