Industrial Visit At Wanakbori Thermal Power Station

GUJARAT STATE ELECTRICITY LTD.

The department of Electrical Engineering, Sarvajanik college of Engineering and Technology, Surat had organized a one day Industrial visit to Wanakbori Thermal Power Station, Wanakbori on 21st March, 2018. There were 82 students from B.E- 3rd year Morning & Evening shift along with four teaching faculties Prof. Urvi Jariwala, Prof. Naman Bhatt, Prof. Hardik Pandya and Prof. Siddhi Patel.

We had coordinated with Shri Abhay Pandya for the visit. At 11:30 am, we reached at WTPS. After reaching there, Shri Abhay Pandya received us with a warm welcome. Then we had taken lunch. Then we were taken to the training center. In the training center, Mr. Gandhi had given presentation and explained us the working of WTPS in detail.

It is a coal based thermal power plant whose function is to generate electrical energy. There are seven units of each 210 MW capacity. So, total power generation capacity of WTPS is 1,470 MW. The working of WTPS can be realized by Figure 1.

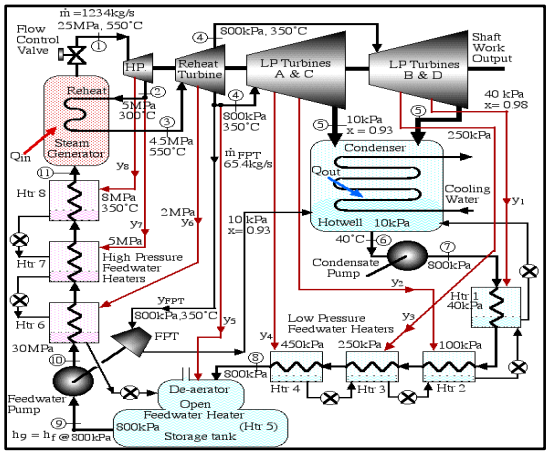

Figure 1: Working of WTPS

Students were divided into two groups. Then we were taken to boiler section. They explained very well in the section. Then after we were taken to the Turbine and Generator room and there we have seen HP, LP heaters also. We were taken to the control room where the whole monitoring of the plant was explained in detail. Lastly we were taken to the cooling towers and they were natural draft cooling tower. Functions different components of WTPS are as follows:

1. Pulverizer: Coal is taken from coal storage plant by conveyer belts and is pulverized.
2. Boiler: Pulverized coal is burnt into the furnace of steam boiler. High pressure steam is produced in the boiler.

3. Economiser: It is located below the LPSH in the boiler and above pre heater. It is there to improve the efficiency of boiler by extracting heat from flue gases to heat water and send it to boiler drum.
4. Air Preheater: The heat carried out with the flue gases coming out of economiser are further utilized for preheating the air before supplying to the combustion chamber. It is a necessary equipment for supply of hot air for drying the coal in pulverized fuel systems to facilitate grinding and satisfactory combustion of fuel in the furnace.
5. Reheater: Power plant furnaces may have a reheater section containing tubes heated by hot flue gases outside the tubes. Exhaust steam from the high pressure turbine is rerouted to go inside the reheater tubes to pickup more energy to go drive intermediate or lower pressure turbines.Turbine: In turbine this steam force rotates the turbine blades that means here in the turbine the stored potential energy of the high pressured steam is converted into mechanical energy.
6. Turbine: A steam turbine is a device that extracts thermal energy from pressurized steam and uses it to do mechanical work on a rotating output shaft.

7. Generator: Generator or Alternator is the electrical end of a turbo-generator set. It is generally known as the piece of equipment that converts the mechanical energy of turbine into electricity. The generation of electricity is based on the principle of electromagnetic induction.

8. Cooling tower: The cooling tower is a semi-enclosed device for evaporative cooling of water by contact with air. The hot water coming out from the condenser is fed to the tower on the top and allowed to

tickle in form of thin sheets or drops. The air flows from bottom of the tower or perpendicular to the direction of water flow and then exhausts to the atmosphere after effective cooling.

9. Condenser: The condenser condenses the steam from the exhaust of the turbine into liquid to allow it to be pumped. If the condenser can be made cooler, the pressure of the exhaust steam is reduced and efficiency of the cycle increases.
10. Boiler Feed Pump: Boiler feed pump is a multi stage pump provided for pumping feed water to economiser. BFP is the biggest auxiliary equipment after Boiler and Turbine. It consumes about 4 to 5 % of total electricity generation.

We are very grateful to WTPS, GSECL for giving permission for this visit. Students got an opportunity to know regarding practical aspects about what they are learning in theory. We hope that such kind of permission will be given in future also. It was an informative, interesting and a successful visit. Some glimpses of visit are given below.