Learning Outcomes

The industrial visit to the Sabarigiri Hydro Electric Power Station provided valuable practical exposure to the operation and performance of a large-scale hydroelectric generating station. The visit enhanced my understanding of both the technical and operational aspects of hydro power generation, particularly from a system performance and monitoring perspective.

One of the key learnings from the visit was understanding how hydroelectric power generation performance is evaluated in real-time. Parameters such as energy generation (measured in Million Units), day peak load, night peak load, and maximum demand were continuously monitored and displayed in the control room. Observing these parameters helped in understanding how generation varies with load demand and water availability. The significance of load factor, which was observed to be around 88%, became clear as an indicator of effective utilization of the installed capacity of the plant.

The visit also provided insights into the concept of auxiliary power consumption, which includes the electrical energy consumed by internal systems such as pumps, control panels, cooling arrangements, lubrication systems, and station lighting. Although auxiliary consumption does not contribute to the power supplied to the grid, it plays a crucial role in ensuring the safe and continuous operation of the power station. Understanding this internal consumption highlighted the importance of efficiency not only in power generation but also in supporting systems.

Another important learning outcome was the understanding of unit-wise operation and capacity distribution. The plant consists of six generating units with different rated capacities, namely 55 MW and 60 MW units, which have been upgraded over time through renovation and modernization. Observing how individual units contribute to the overall generation helped in appreciating the flexibility and reliability built into large hydroelectric projects.

The visit further enhanced my understanding of the water management and conveyance system, including the role of interconnected reservoirs, surge shafts, and penstocks. The surge shaft was particularly important in preventing water hammer effects during sudden load changes, ensuring mechanical safety and system stability.

From the electrical engineering perspective, the visit clarified the process of power generation at 11 kV and its evacuation at 220 kV using step-up transformers. The importance of grounding and protection systems, such as Neutral Grounding Transformers, in limiting fault currents and protecting generators was also clearly understood.

In addition, exposure to the control room and SCADA-based monitoring system highlighted the role of automation and real-time data acquisition in maintaining operational reliability. Parameters such as voltage, current, frequency, turbine speed, and alarms are continuously monitored, enabling quick decision-making and fault response.

Overall, the industrial visit significantly strengthened my practical understanding of hydroelectric power plant operation, performance assessment, and system reliability. The knowledge gained from observing real-time generation statistics, auxiliary systems, and control mechanisms has enhanced my technical awareness and will be valuable for future academic and professional engagements in the power sector.