GOVERNMENT ENGINEERING COLLEGE, VALSAD

DEPARTMENT OF ENVIRONMENTAL ENGINEERING

Report on

Industrial visit at

Effluent Treatment Plant

Panoli Ankleshwar GIDC

Details of Industrial Visit

Name of Industry: J.B. Chemicals & Pharmaceuticals Ltd.

Date of Visit: 25th April 2022

Number of Participants: 4th Semester Environmental Engineering Students (no. 27) with Prof. M. N. Chaudhary and Prof. M. K. Kunvarani.

Objectives of industrial visit: To observe and understand the basic purpose of manufacturing process and various units of the Effluent Treatment Plant.

EVENT DESCRIPTION:

- The Department of Environmental Engineering organized an industrial visit to the Effluent Treatment Plant of J.B. Pharmaceuticals Ltd. Panoli Ankleshwar on 25thApril 2022. The visit was organized for 4th-semester students. The total number of students who visited the plant was 27. The students were accompanied by two faculty members as mentioned above.

- The students and faculty members were welcomed by **Mr. Bharatsinh Parmar** at Pharma company, The department is grateful to **Mr. Atul Raval,** for giving the permission to visit the manufacturing plant and ETP, HR & Admin for helping us plan & conduct the visit smoothly. The students and faculties were provided with Hair-net, apron, and foot covers for safety and were briefed about the safety measures to be followed during the manufacturing plant, we were allowed to visit the plant from the visitor's corridor. We have been briefed about the Tablet manufacturing site. Students and Faculties were divided into two groups and were guided by the production manager. Thanks to **Mr. Bhavesh Patel** who made us understand the tablet manufacturing units from raw material entry to labeling and packaging, stores-shipping and discharge.

- In the visitor's colony, they also measure the bacterial activity in the air and implement the positive displacement of air pressure in a corridor. The safety measurements were taken like smoke detector fire alarm, Emergency exit plan.

- **Description of Tablet manufacturing:** At the raw material receiving area, there is a de-dusting booth which opens up to Raw material warehouse. After QA it is segregated as the approved - unapproved product & solid and solvent in a storage room. For tablet manufacturing, the raw material goes under certain processes like weighing, granulation, mixing, sieving, drying, compacting, blending, drying, compressing, cutting, metal detecting, tablet bin, coating, packaging, and storage.

- After a brief introduction to the manufacturing of tablets we went to the ETP plant.

- ETP (Effluent Treatment Plant) is of 150 KLD and MEE (Multi-Effect Evaporator) 10 KLD. It consists of physical, chemical and biological treatment. The plant receives

combined wastewater, consisting of both domestic and industrial waste from the various industries in the area. The wastewater generated by all units is conveyed to ETP through an underground pipeline network. The total capacity of the treatment plant is 150KLD with 70 members per shift in the industry. And later we were briefed about the MEE by **Mr.Raj Panchal.**

- Later, the students were given refreshments followed by lunch.
- Finally, the visit ended, and students were enlightened with knowledge and they gained a good understanding of how an ETP works.

Plant Description:

The plant has Primary Secondary and Tertiary treatment units.

Primary Treatment

Bar screen chamber:

Wastewater enters the plant collection tank through the bar screen chamber.

Collection Tank:

Collection of wastewater in the underground tank. It collects the wastewater by an underground network of pipes. The capacity of the plant is 150 KLD.

Equalization tank:

From the collection tank, the wastewater is pumped and enters the Equalization tank. Wastewater is equalized with the help of diffused air system. Flow meter was installed to monitor the flow.

Clarifier:

A clarifier is a settling tank used to remove solid waste particles from water. When the clarifier separates the concentrated impurities, the sludge formed by the process is collected at the bottom of the tank. A clarifier is generally used to remove solid particulates or suspended solids from liquid for clarification and/or thickening. Inside the clarifier, solid contaminants will settle down to the bottom of the tank where it is collected by a scraper mechanism. Concentrated impurities, discharged from the bottom of the tank are known as sludge, while the particles that float on the surface of the liquid are called scum.

Secondary treatment

To remove most of the fine suspended and dissolved degradable organic matter that remains after primary treatment.

Nitrification:

Nitrification means the oxidation of ammonia to nitrate. Nitrification is possible with aerobic biological processes. Biological Wastewater Treatment Processes are those where the sufficed amount of dissolved oxygen is required in the wastewater to sustain aerobic action, as one of the major polluting effects of wastewater.

Followed by Aerobic Biological Treatment Processes. Activated sludge. Oxidation ponds. It is the most common attached growth process.

Aeration Tank:

- Aeration is performed through fine bubble diffusers fitted insets at the bottom of the tank.
- Bio-mass growth, helps break down the impurities in the water, rendering it clean.
- A baffle is provided near the inlet of the tank to aid in settling and prevent short-circuiting the wastewater.
- The inlet and outlet pipes are positioned farthermost apart from each other.

MBR (Membrane Bioreactor):

There were 2 stages of micron filters. First reactor filter is of 8-micron size and the second is of 5-micron size. **Membrane Bioreactor** (**MBR**) is a combination of a membrane process like microfiltration or ultrafiltration with a biological wastewater treatment process, the activated sludge process. The Membrane Bio-reactor requires frequent backwashing.

Tertiary treatment

RO:

After passing through the cartilage filter the water is pumped with high pressure in pressure tubes where filtrate is passed to the RO product tank, CIP tank, and to dosing system.
Rejected from RO 1 is feed to RO 2.

From RO 2 feed tank water is fed to pressurized tubes with the help of High-pressure pump. RO -2 permeate enters to RO product tank and reject from RO - 2 enters towards MEE feed tank. As per the pressure difference between the feed and outlet, CIP of RO is done.

Decanter:

Sludge obtained from primary clarifier, aeration and MBR system is dewatered and dried in decanter system.

MEE (Multiple-Effect Evaporator):

A multiple-effect evaporator is an apparatus for efficiently using heat from steam to evaporate water. In a multiple-effect evaporator, water is boiled in a sequence of vessels, each held at a lower pressure than the last. Because the boiling temperature of water decreases as pressure decreases, the vapor boiled off in one vessel can be used to heat the next, and only the first vessel (at the highest pressure) requires an external source of heat and thus saves energy and overall operational cost.

Glimpses of the Industrial Visit:

4th semester students with Prof. Monali N. Chaudhari and Prof. Meera K. Kunvarani

Plant head explaining to the students

Faculties interacting with students

Plant head explaining to the students

Plant head explaining to the students

END OF REPORT