

SEWAGE TREATMENT PLANT - HINDUSTAN ZINC LIMITED

- **Background**

Hindustan Zinc limited (HZL) is a Vedanta Group company in zinc, lead and silver business. HZL wanted to treat and recycle the sewage collected from Udaipur City and the recycled sewage is to be used in various process application thereby saving the Potable water resources.

On an average, Udaipur city generates about 70 million liters of sewage per day and cleaning it has been a challenge. Most of the sewage was finding its way to the lakes leading to contamination of water.



In association with Government of Rajasthan, Hindustan Zinc has constructed the first PPP Sewage Treatment Plant (STP) in Udaipur, with a capacity to treat 20 million litres of sewage daily, which treats 30% of Udaipur's domestic sewage. The company has invested close to INR 170 crore on this project. Taking forward the success of this STP, which has brought significant cleanliness in lakes, Hindustan Zinc is looking forward to scale up its Sewage Treatment Plant project to treat 100% of Udaipur's domestic sewage.

- **Location, Date**

Rajasthan, 2014

- **Areas**

Urban & Rural

- **Stage/Scale**

Fully operational model with continuous improvement

- **Objective of the assignment**

To scale up Sewage Treatment Plant project in Udaipur, a step towards "Smart City"

• What was done

HZL has provided *Moving Bed Bio Reactor i.e. MBBR* technology followed with Claritube Flocculator & filters to produce high quality treated water suitable for reuse.

Plant Type: Sewage Recycle plant

Capacity of the plant: 20 MLD

End Use: Treated Sewage is used in Process application.

Hindustan Zinc had already commissioned a 20 MLD STP in Udaipur in 2014. With the additional commissioning of 40 MLD STP, the total capacity of STP will be now 60 MLD. The construction of the plants will be based on Sequencing Batch Reactor (SBR) process and have a provision for re-use of 50 per cent treated water for Udaipur city.

Aligning with PM's "Swachh Bharat" last year, Hindustan Zinc had launched its campaign "*Maryadaa*" a year ago that emphasized role of individuals and institutions towards developing a strong sanitation awareness and infrastructure in rural Rajasthan. "*Maryadaa*" had focus to involve schools, panchayats, rural opinion makers, rural women, and particularly, the young women to advocate and practice good sanitation habits and stop defecation in open. They have also taken the responsibility to construct 40,000 house-hold toilets in rural Rajasthan and separate toilets for boys and girls in 623 government schools. Recently, the Company has signed an MoU with Rajasthan Government and adopted 3055 Anganwadi Centres in Rajasthan under its child-care campaign "*Khushi*". Besides improving the nutrition and infrastructure, child-friendly toilets are being constructed in 1000 Anganwadi Centres.

• Impact

- The STP is vital for the city of Udaipur, which is witnessing rapid urbanization and is a popular tourist destination. It will treat city's sewage leading to a substantial reduction in sewage inflow to the lakes and help maintain the beauty of lakes. Additionally, it will generate manure that will be sold by UMC to local bodies. Some of the visible impacts of the sewage treatment plant are:
 - The project has a provision for re-use of 50 per cent treated water for Udaipur city.
 - 20 million litres per day Fresh water conserved every day
 - Outlet water quality fit for Process application
 - Simplicity in operation and maintenance
 - Less Power consumption
 - Wastewater previously disposed into the lakes (30% of city's wastewater) is now collected and treated effluent is used for industrial production, released into the river during summer months and applied in horticulture.
 - Fresh water abstraction at Rajpura Dariba Complex is reduced by 60% from 16 500 cubic metres per day to 7,000 cubic metre per day.
 - Water quality improvement of the Ahar River, Pichola and Udai Sagar lakes due to reduced volume of wastewater discharges.

Besides this:

- Construction of 11,425 household toilets have been completed which includes 2,700 household toilets in Udaipur; 6,870 in Bhilwara, 1,570 in Chittorgarh and 285 household toilets in Rajsamand districts of Rajasthan.

- Toilets have also been constructed in 170 rural government schools.

• Challenges and Issues

Land acquisition was the greatest challenge for completing the project. Firstly, in terms of selecting a WWTP location close to the city that would be financially viable, and secondly negotiating with local stakeholders that were concerned about the potential visual and odour impacts. The neighbouring community was consulted on the technology selection and the operational and maintenance elements of the contract, which resulted in building trust and support for the project. To meet the WWTP opening schedule, the developer worked closely with the Government to obtain the necessary approvals for laying down the pipe-network in busy urban and touristic areas. There were operational difficulties at the beginning of the project at both WWTP and the Rajpura Dariba industrial complex. The main issues at the WWTP were related to reliability and optimisation issues as well as inconsistent incoming wastewater quality. At the Rajpura Dariba industrial complex, there were challenges switching from freshwater to a treated effluent water quality that had higher total dissolved solids. The problem was resolved by marginally modifying the treatment process.

• Innovation

- **PPP funding:** The project was primarily financed by Hindustan Zinc, this covered the land acquisition, the construction of the WWTP, and the 78 kms pipeline linking the WWTP with the industrial complex. The Urban Improvement Trust and the Municipality of Udaipur City has contributed 70% of the costs for the 7 kms pipeline connecting the city's sewerage system with the WWTP.
- **Wastewater treatment for river-recharge and horticulture:** Treatment capacity of the WWTP is 20,000 cubic metre per day and the industrial complex requires only 9,500 cubic metre per day, a proportion of the treated effluent is released to the river for recharge (1,100,000 cubic metre per year) and a considerable amount is also used in horticulture (730,000 cubic metre per year).
- **Wastewater treatment for Industrial Zinc Complex:** The WWTP supplies 3,500,000 cubic metre per year to the Hindustan Zinc industrial complex where treated effluent is used at one of the three key mining and smelting operations:
 - The beneficiation plant at the mining location
 - During the smelting process at roaster, leaching and purification phases
 - At the cooling towers of the captive power plant.

The majority of water is supplied during the dry period of February to July. As a result of this intervention, the complex has reduced its water withdrawal by 60% from 16,500 cubic metre per day to 7,000 cubic metre per day.

• Lessons learnt

With thoughtful planning and extremely well executed public private partnership model (PPP), Hindustan Zinc was able to transform the sewage condition of Udaipur city. They are expanding their capacities as per the need of the city and the funding for this is made available as and when required.

- **Financials**

Earlier, while installing the 20 MLD sewage treatment plant, which was commissioned in 2014, the company had invested INR 170 crores that involved expenditure pertaining to laying the pipelines for carrying the sewage to the plant. 80 Crores were sanctioned for the plant that was to be commissioned for additional capacity.

- **Economic sustainability/Revenue Model**

Hindustan Zinc Sewage Treatment Plant is treating 20 million litres sewage per day. Built at a cost of INR 170 crore, the STP has been constructed and commissioned on a 'Design Build Own Operate and Transfer' basis in association with the government of Rajasthan. Apart from treating sewage, the STP would also generate a large quantity of manure which will be sold by Udaipur Municipal Corporation to local bodies.

Besides treating the sewage, Hindustan Zinc's treatment plant will also generate large quantity of manure to be sold by the Udaipur Municipal Corporation to the local bodies, and generate revenues of INR 1 crore every year.

- **Implementer Contact Persons**

- **Mr. V Jayaraman & Mr. Ashok Jain**
Hindustan Zinc

- **Sources and References**

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