

Industrial Wastewater Characteristics in GIDA Project Area of Gorakhpur, (U.P.)

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ABSTRACT: In order to minimize environmental pollution due to the small and medium-scale industries, cleaner production technologies and formation of waste minimization circles are being encouraged in India. Besides, collective treatment at a centralized facility, known as the CETP, is considered as a viable treatment solution, to overcome the constraints associated with effluent treatment in small to medium enterprises. Ever since the inception of Gorakhpur Industrial Development Authority (GIDA) in 1989, some 159 industries have come up in GIDA. However, most of the units being small scale industries do not have their waste water units. Besides, there is no satisfactory arrangement of wastewater treatment in large scale industries also, even though they have established their own Effluent Treatment Plant (ETP). This is a major cause of pollution of Ami River in the region. In the present study, of wastewater characterizes of large scale industries belonging to textile sector namely, M/s Lari Textiles and Dyeing Ltd., M/s Ambey Processors and M/s Bathwal Udyog Pvt. Ltd. worked out. The wastewater characteristics parameters have been looked into the quantitative and qualitative aspects of effluent treatment required by CETP are also studied. Wastewater characteristics in GIDA Industrial Area will be a step forward towards environmental protection and would go a long way in saving Ami River from the adverse effects of industrial pollution.

Key words: Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Effluent generating industries.

1. INTRODUCTION

In order to minimize environmental pollution due to the small and medium-scale industries, cleaner production technologies and formation of waste minimization circles are being encouraged in India. Besides, collective treatment at a centralized facility, known as the CETP is considered as a viable treatment solution, to overcome the constraints associated with effluent treatment in small to medium enterprises.

Accordingly the ministry of environment and forests instructed various states each industrial unit to provide and operate individual wastewater treatment plant because of the scale of operations or lack of space or technical manpower. However, the quantum of pollutants emitted by SSIs clusters may be more than an equivalent large scale industry, since the specific rate of generation of pollutants is

generally higher because of the inefficient production technologies adopted by SSIs.

2. Sample Collection

Out of 159 industrial units in GIDA Industrial Area, 154 units are small-scale industries and 5 units are large-scale units. The large scale units are:

1. M/s Ambey Processors
2. M/s Bathwal Udyog Pvt. Ltd.
3. M/s Lari Textiles and Dyeing Industries Pvt. Ltd. M/s
4. India Glycols Ltd.
5. M/s Gallant Steel Ltd.

It is realized that M/s India Glycols Ltd. is required by Central Pollution Control Board, Delhi to follow zero liquid discharge and the onus lies on the part of the industry. M/s Gallant Steel Ltd. is distantly located from the nest of the agglomeration of industrial units in GIDA Industrial Area as such it has to take up its own treatment mechanism. However, M/s

Ambey Processors, M/s Bathwal Udyog Pvt. Ltd. and M/s Lari Textiles and Dyeing Industries Pvt. Ltd. belong to the textile sector only and the performance of their treatment plants has not been found satisfactory earlier. In addition, the effluent from these units is discharged into GIDA drain, which finds its way into Ami river. The reports of Central Pollution Control Board, Delhi have indicated that Ami river is severely victimized by industrial pollution. So, there is an urgent need to put up a CETP in GIDA Industrial Area. In the present scenario, therefore, it is proposed to provide a CETP for the cluster of these three units, namely M/s Ambey Processors, M/s Bathwal Udyog Pvt. Ltd. and M/s Lari Textiles and Dyeing Industries Pvt. Ltd. It is also suggested that a detailed survey of waste load generation for the remaining small-scale units may be carried out and, in accordance with the findings, an expansion of the CETP may be subsequently, taken up, for which, enough land is available with GIDA. With this in view, design and operational aspects of a CETP for M/s Ambey Processors, M/s Bathwal Udyog Pvt. Ltd. and M/s Lari Textiles and Dyeing Industries Pvt. Ltd. have been worked out.

The wastewater samples were collected from these industries and were brought to Environmental and Public Health Engineering Laboratory of Civil Engineering Department, Madan Mohan Malaviya Engineering College, Gorakhpur and were analyzed for pH, TSS, BOD and COD.

3. Study Area

Ever since the inception of Gorakhpur industrial Development Authority (GIDA) in 1989, Common Effluent Treatment Plant could not be set up and the industries had been required to have their own arrangements of effluent treatment. The small-scale industries could not afford to effluent treatment plants and some of them were even ignorant about it, however, M/S Lari Textiles and Dyeing Ltd., Ambey Processors and Bathwal Udyog Pvt. Ltd. established their own effluent plants but, as represent by CPCB, their performance use for from satisfactory.

The effluent coming out from the premises of these units appears to be of a kind that could be primary treated only. In view of this fact and their proximity with one another as shown in

Fig.1. the setting up of a CETP for these units would be quite relevant.

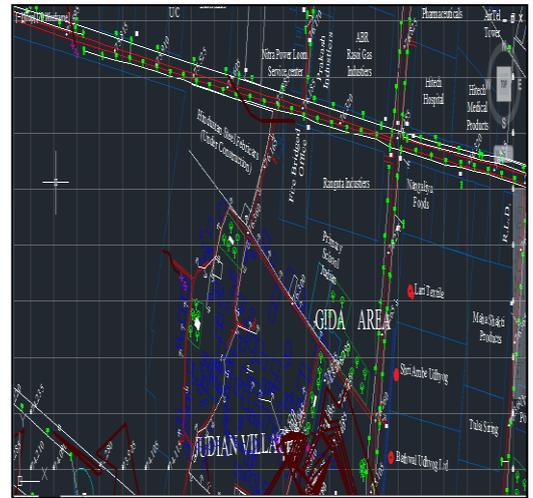


Fig. 1. Map of Study Area

4. Design and Operational Aspects

The design and operational aspects of CETP parameters relating to quality and quality of wastewater, selection of a least cost treatment option and the sizing parameters of the units belonging to secondary treatment of waste water.

4.1. Wastewater Quality

The test results of the samples collected from the three industrial units and analysed during this study are summarized in Table 1.

Table 1: Wastewater Characteristics of Industries Tested in Laboratory

S.No.	Parameters	Lari Textiles and Dyeing Limited	Ambey Processors	Bathwal Udyog Pvt. Ltd.
1.	pH	5.5	6.5	6.0
2.	TSS	324	433	234
3.	BOD	460	550	540
4.	COD	1800	920	1200

The teams of U. P. Pollution Control Board and Central Pollution Control Board have also been inspecting these units from time to time. The findings reported by these agencies

are summarized in Table 2 and Table 3 respectively.

Table 2: Summary of Test Reports of Grab Samples of Effluent collected by Regional Officer, U.P. Pollution Control Board, Regional Office, Gorakhpur in Respect of Effluent Quality of Industrial Units in GIDA Industrial Area

S.No.	Particulars/Parameters	Lari Textiles and Dyeing Industries Pvt. Ltd.	Ambey Processors	Bathwal Udyog Pvt. Ltd.
1.	pH	8.68	8.64	8.64
2.	TSS	816	804	794
3.	BOD	580	590	530
4.	COD	2080	1940	1860

Table 3: Analysis Report of Samples Collected from Industrial Units in GIDA Industrial Area by C.P.C.B. Team

S.No.	Particulars/Parameters	Lari Textiles and Dyeing Industries Pvt. Ltd.	Ambey Processors	Bathwal Udyog Pvt. Ltd.
1.	pH	7.60	6.69	8.20
2.	TSS	114	857	61
3.	BOD	98.2	263	108
4.	COD	222	618	349

The maximum value of a parameter for the respective industries as given in Tables 1, 2 and 3 is selected as design parameter. The summary of the design parameters is presented in Table 4.

Table 4. Design Parameters

S.No	Parameters	Lari Textiles and Dyeing Limited	Ambey Processors	Bathwal Udyog Pvt. Ltd.
1.	pH	8.68	7.71	8.20
2.	TSS	816	857	794
3.	BOD	580	590	540
4.	COD	2080	1940	1860

4.2. Wastewater Quantity

The wastewater generation from the three units is given in Table 5.

Table 5: Industrial Wastewater Generation

S.No.	Industries names	Wastewater generation KLD
1.	Lari Textiles and Dyeing Limited	800
2.	Ambey Processors	800
3.	Bathwal Udyog Pvt.Ltd.	800
Total		2,400

The total organic load contributed by the industries is given in Table 6.

Table 6. Total Waste Load and Wastewater Discharge from Industries

S.No	Unit	Design Parameters				Waste Water generation KLD	Organic load (kg BOD/d)	Organic load (kg COD/d)
		Quality						
		pH	TSS	BOD	COD			
1	Lari Textiles and Dyeing Limited	8.68	816	580	2080	800	464	1664
2	Ambey Processors	7.71	857	590	1940	800	472	1552
3	Bathwal Udyog Pvt. Ltd.	8.20	794	540	1860	800	432	1488
Total							1368	4704

It is observed that the total BOD organic load generated per day from the three industries is 1368 kg/d and the total COD organic load generated per day is 4704 kg/d. BOD 570 mg/l and influent COD 1960 mg/l.

A summary of life cycle cost analysis for different CETP technologies is presented in Table 8.

5. CONCLUSION

After the study carried out in GIDA Industrial Area relating to waste water characteristics it was found that:

1. Due to the delay in establishment of the CETP partially treated or untreated effluent from industries in GIDA Industrial Area is being discharged

directly in Ami River, a tributary of Rapti river, which is deteriorating the quality of the river and the aquatic life present in it.

2. There are 5 large and 154 small scale industries in the GIDA industrial area. All these industries discharge their effluents into the river.
3. It was found that most of the industries do not have any effluent treatment units so far. However, some large industrial units have their own wastewater treatment plants but their performance is not satisfactory
4. The capital cost of CETP is found to be Rs. 199.2 lakhs and the OMR cost is calculated as 7.17 lakhs.

RECOMMENDATIONS

It is recommended that a survey should be taken up for the determination of waste load from other industrial units located in GIDA Industrial Area and there should be provisions for the expansion of CETP as per need.

In order to manage the CETP, there should be a Special Purpose Vehicle (SPV) registered under an appropriate statute. A legal arrangement between the SPV and its member units clearly delineating their relationship and mutual obligations should be executed and implemented. The cost recovery formula developed for the CETP project should be ratified by all the members in order to prevent any conflict in future.

It is expected that the establishment of CETP in GIDA Industrial Area will be a step forward towards environmental protection and would go a long way in saving Ami river from the adverse effects of industrial pollution.

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