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DPR FOR EXPANSION OF MMA CETP MAHAD

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Abstract-

This paper defines an**Industrial wastewater treatment** covers the mechanisms and processes used to treat wastewater that is produced as a by-product of industrial or commercial activities. After treatment, the treated industrial wastewater (or effluent) may be reused or released to a sanitary sewer or to a surface water in the environment. Most industries produce some wastewater although recent trends in the developed world have been to minimize such production or recycle such wastewater within the production process. However, many industries remain dependent on processes that produce wastewaters.Many industries have a need to treat water to obtain very high quality water for demanding purposes such as environmental discharge compliance. Water treatment produces organic and mineral from filtration and sedimentation. Ion exchange using natural or synthetic resins removes calcium, magnesium and carbonate ions from water.The recent concept of "industrial ecology," in which the waste generated by one industry becomes the raw material for another industry, is an ideal principle in siting industries in an industrial estate. The industrial ecology concept results in minimum net production of industrial pollution to be handled. Ultimately, waste from some industries will have no secondary use and hence must be treated before disposal. On an industrial estate, the use of a common effluent treatment plant reduces the cost to each industry and controls the overall quality of the treated effluent.

KEYWORDS- Effluent, waste wate

Introduction

The MAHADindustrial area came into existence in the later part of Eighties.To overcome the pollution related problems of the area it was decided to develop a CETP in 1998-99. The treatability studies were conducted in the year 2000 by M/s Paramount Ltd., Baroda and the Detailed Project Report was prepared in November 2000. The technical appraisal was done by IIT in 2001.
The project execution was delayed due to financial difficulties & the project was operational only in June 2005.The MMA CETP Co-op. Soc. Ltd. was formed in the year 2000 as a joint venture of MIDC, MPCB, MOEF, M/s Paramount Ltd., Baroda and Industries in the area. The MMA CETP Co-op. Soc. Ltd. is registered under the Maharashtra Co-operative Societies Act.The MMA CETP Co-op. Society has an Executive committee under which operation and technical committees work. The society has a General Manager who is responsible for operation and administration of the CETP. The Operation & Maintenance is given on contract and supervised by the society.MMA CETP is designed to treat 5 MLD, (5,000 m^3/d) industrial effluent in dry weather condition (October to May) and 7.5 MLD, (7,500 m^3/d) effluent in wet weather condition (June to September).The designed influent organic load as COD is 17500kg/d and as BOD is 7500kg/d.The CETP was expected to meet the treated effluent discharge limit especially for COD as 250mg/L and for BOD as 100mg/L as prescribed by Maharashtra Pollution Control Board (MPCB).

Brief Description of Treatment Scheme for MMA CETP Expansion

The treatment scheme in view of expansion of the MMA CETP is evolved on the basis of extensive analytical data generated, the operating experience of the CETP as well as the present industrial situation at MAHAD MIDC.

The treated effluent quality achieved with the present CETP operation is ~1500mg/L COD, ~150mg/L BOD and ~100 mg/L SS.

It is therefore proposed to provide a second stage biodegradation unit comprising of aeration tank and a clarifier after the existing tertiary clarifier (Reaction Clarifier) and before the existing oxidation with liquid Chlorine.

It has been observed as shown in **Table 2** below that the treated effluent discharge from M/s.SUDARSHAN ChemicalsL AXMIOrganics and Ashok Alco-Chemical is ~1780m^3 per day with a COD concentration of ~240mg per L amounting to a COD load of ~427kg per day. Treated effluent from these industries is connected to a common chamber before getting drained into the combined effluent fromMAHAD MIDC Industrial Area including the Additional MAHAD MIDC Industrial Area.

Since the effluent volume contribution from these industries is nearly one third ($^1/_3$) the total industrial effluent volume and the concentration of COD and BOD is very low, it is proposed to first segregate the treated effluent discharge from M/s. SUDARSHAN Chemicals, LAXMI Organics and Ashok Alco-Chemical from the existing combined industrial effluent received at CETP .

It is proposed that the treated effluent from M/s. SUDARSHAN Chemicals LAXMI Organics and Ashok Alco-Chemical will be collected in the common chamber before being drained to combined industrial effluent chamber before CETP inlet chamber and divert the same to a separate new receiving cum equalization tank having a capacity of 1000m^3. The collected effluent will then be mixed with the treated combined industrial effluent after the Tertiary Clarification (Reaction Clarifier outlet) before the proposed second stage Secondary treatment.

Quality of Treated Effluent

The treated effluent quality achievable after the expansion will be as below:

Total industrial effluent that can be treated : ~ 7000m^3/d

Final Treated Effluent COD : less than 250 mg/L

BOD : less than 50 mg/L

SS : less than 50 mg/L

Process Description

The detailed process description for existing treatment as well for new expansion is as under and the process flow diagram for the CETP expansion is shown in **Figure 4**.

Collection:

→ Industrial effluent from all the member industries of CETP except M/s. Sudarshan Chemicals, Laxmi Organics and Ashok Alco-Chemical will be received in the existing ~5MLD receiving sump.

→ An additional 1 MLD (one MLD, 1000m^3) capacity receiving sump with two compartments, each of 0.5 MLD (500 m^3) capacity will be provided which will be used to collect treated effluent from M/s. Sudarshan Chemicals, Laxmi Organics and Ashok Alco-Chemical before further treatment through proposed second stage biodegradation. This sump can also be used as a standby receiving sump or can be used to accommodate effluent during emergencies.

→ The existing 5 MLD and the new 1 MLD sump will be operated as a receiving cum equalization tank.

→ Floating surface aerators have been provided in the existing receiving sump to achieve preaeration and better homogenization of effluent.

→ The new sump will be provided with high efficiency low power agitators for better homogenization of effluent.

Primary Treatment:

→ The effluent from existing receiving sump will be pumped through the existing setup of grit channel for removal of grit matter and will then be led by gravity to the neutralization tank for coagulation with PAC followed by neutralization with Lime and will be flash mixed with the Polyelectrolyte.

→ The chemically treated effluent will then be flocculated and clarified in the existing Clariflocculator by settling the flocculated suspended solids in the form of chemical sludge.

Secondary Treatment:

→ The clarified effluent from Clariflocculator will overflow into the existing Buffer tank from where it will be pumped to the Biotower for polishing treatment.

→ The existing Extended Aeration Activated Sludge process will continue to operate with the diffused aeration system provided for aerobic biodegradation followed by biosludge settling in the secondary clarifier.

Tertiary Treatment:

→ The clarified effluent from secondary clarifier will be further pumped and chemically treated with Lime and PAC and flocculated with Polyelectrolyte in the existing Reaction Clarifier.

New Collection:

→ The clarified tertiary treated effluent will be collected in a new 0.5 MLD (500m^3) capacity intermediate collection tank for further pumping to the second stage biodegradation system.

→ The treated effluent from M/s. Sudarshan Chemicals, Laxmi Organics and Ashok Alco-Chemical which is collected in a separate 1 MLD receiving sump provided with agitators will be pumped to the 0.5 MLD intermediate collection tank and will be mixed with the clarified combined tertiary treated effluent for further treatment in second stage biodegradation system.

New second stage Secondary Treatment:

→ A new Bioreactor of 10 MLD (10000m^3) capacity having two compartments of 5 MLD (5000m^3) each will be provided for activated sludge extended aeration aerobic biodegradation with retrievable air diffusion system followed by a new secondary clarifier, as second stage biodegradation.

→ The Design BOD load to the new bioreactor will be ~2000kg BOD per day and the COD load will be ~12000kg per day at ~7 MLD effluent.

Tertiary Treatment:

→ The clarified treated effluent from second stage clarifier will then be oxidized with liquid Chlorine in the existing Chlorine Contact Tank from where it will be pumped through existing Pressure Sand Filter and Activated Carbon Adsorb for additional Tertiary Treatment.

Final Disposal:

→ The treated effluent will then flow to the existing Treated Effluent disposal Tank for final disposal to saline zone of a SAVITRI River at OVALE

Sludge Handling:

The existing sludge handling and dewatering system is mechanical.

→ A Sludge thickener has been provided to compact the chemical and excess biological sludge before dewatering.

→ Two decanters are in operation to dewater chemical sludge and excess biological sludge from the existing operating process.

→ An additional Sludge Thickener to reduce the volume of sludge before dewatering and an additional decanter will be provided to dewater existing chemical sludge and additional excess biological sludge from new second stage secondary treatment.

→ Dewatered sludge is presently being disposed of at MWML's CHWTSDF at Taloja.

→ Additional dewatered sludge will also be disposed of at MWML's CHWTSDF at Taloja.

→ A sludge storage area with shed has been provided for temporary storage of dewatered sludge which will be extended suitably to accommodate additional temporary sludge storage.

→ Two sludge drying beds each of 100 m^2 area have been provided as an additional facility for dewatering thickened sludge during dry season & emergency.

Chemical Storage, Preparation and Dosing:

→ A chemical house is provided for housing storage of chemicals, preparation of chemical solutions and dosing of chemicals.

→ Additional solution preparation tanks one each for Lime and Polyelectrolyte, with mechanical agitation and dosing facility and additional storage tank for PAC with dosing facility will be provided.

Mechanical Equipment and pumps:

→ Suitable capacity mechanical equipment and transfer pumps wherever required will be provided.

Automation:

→ Level control devices will be provided for 1 MLD new receiving sump and 0.5 MLD new intermediate collection tank for uniform effluent feeding to downstream systems.

→ It is proposed to provide Dissolved Oxygen Control System for the new secondary treatment system for efficient biodegradation and energy conservation.

Safety Aspects

→ All operators shall be trained in safety aspects.

→ Requisite personal protection equipment shall be provided in the plant.

→ Sufficient number of fire extinguishers of appropriate type and nos. shall be provided as recommended by TAC.

→ Safety shoes and other safety equipment shall be made mandatory for all staff.

Plant Operation and Maintenance

The proper operation and maintenance of the plant is one of the vital factors for effective operation of the entire system.

The following aspects have been covered for effective operation of the system.

- → Chemical requirement.
- → Power requirement.
- → Manpower requirement.

Chemical Requirement

The different types of chemical requirement have been envisaged at various stages of the treatment of CETP.

- → The dosing rates of these chemicals at the plant scale shall be decided on the basis of quality of effluent received at CETP.

Power Requirement

Power requirement for the various electrically operated equipment has been estimated for normal operation of the system.

- → The rating of each drive and power consumption is based on the duty condition and efficiency of the same as per manufacturer's design.
- → The overall power requirement mentioned in **Table 3** below includes power requirement for standby unit.

Manpower requirement.

The selection of appropriate experienced manpower is an important factor for proper operation of the CETP.

Literature review
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5967
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177
Performance Evaluation of EffluentTreatment Plant for Rice Industry: a Case study of Aggarwal Agro industry Ambala, Haryana
Among agro
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industries, rice processing industry is the biggest industry in India. Moreover, it has the biggest area underrice cultivation. Almost all of the Rice mill effluent generation comes from parboiling of rice. It discharges processed waste water, particulate matter and solid wastes. Rice husk produces rice husk ash when burned as a fuel through boilers/furnaceswhich needs to be disposed properly. Poorly treated waste water with high levels of pollutants caused by poor design, operation or treatment systems creates major environmental problems when discharged to surface water or land. Such problems include: More grow th of algae in water bodies as effluent is rich in nutrients. Eutrophication problem in tanks leads to low dissolved oxygen content and reduction in water quality. Due to color and turbidity of waste water, low penetration of sunlight into waterways affects the photosynthesis process. Pollution of inland surface water is a threat to natural ecosystem and lifestyle of people as well. Impact on public health due to soak waste water discharged into land and water bodies is another issue. Also land degradation and damage to pastures and crops due to low pH and Organic matter. Environmental degradation is an escalating problem owing to the continual expansion of industrialproduction and high-levels of consumption. A renewed dedication to a proven strategy to resolve this problem is needed. Cleaner Production is one such strategy, which can address this problem. It is a preventive environmental management strategy, which promotes eliminating waste before it is created to systematically reduce overall pollution generation, and improve efficiencies of resources use. The quality of such effluents can be determined by their physicochemical and biological analysis. Monitoring of the environmental parameters of the effluents would allow having at any time, a preciseidea on performance evaluation of the effluent treatment plant (ETP) and, if necessary, appropriate measures may be undertaken to achieve environmental compliance or to prevent the occurrence of critical pollution. Moreover, such information can also be utilized to establish methods for improved mill management and plant waste minimization strategies [2]
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Page 309Sanjeev Kumar Sinha,Vikas Kumar Sinha, Samir Kr.Pandey,Anup Tiwari

A Study on the Waste Water Treatment Technology for Steel Industry: Recycle And Reuse.

The treatment of steel industrial wastewater requires a variety of strategies to remove different types of contaminants. These are:
1. Solid removal
2. Oil and Grease removal
3. Removal of biodegradable organics.
4. Activated sludge process
5. Trickling filter process
6. Treatment
of toxic materials
7. Treatment of acid & alkalis
8. Treatment of other organics.
Technologies used in steel plants include cooling Tower, DM Plant, STP and river water treatment. The wastewater Treatment Plant (WWTP or STP) possesses conventional methods like primary

Treatment,Secondary treatment and Tertiary treatment followed by ozonation method. In the last, River water treatment
was done which contains chlorination, preozonation, Flocculation, Filtration / aeration, pH correction,Adsorption processes etc.n the present study, the research work will be undertaken for characteristics of wastewater of steel industry, innovations in technology for wastewater treatment of steel industries and recycling and reuse of water and sludge of steel industries. Emphasis will be given on filtration, chlorination and adsorption technology in the light of mechanistic view for the steel industrial wastewater treatment. A design of industrial wastewater treatment plant for steel industry will be undertaken. This technology will be ver useful and efficient for the treatment of industrial effluents
. It will be very fruitful for the development of sustainable environment. Water reuse and recycling of sludge is another beneficial aspect of this study. A proper plan for the reuse of water for various purposes and utilization of sludge for making (producing) different industrial byproducts will be given.

Recycling of wastewater is a mechanical process, which includes purification of wastewater upto the standard in a separate lagoon and internal circulation to the system for its water requirement.

Reuse of water implies following three important uses:

-(i)Cooling and processing water in industrial applications.

(ii)Irrigation for cropland, golf courses, water requirement for plant and grass growth.

(iii)Ground water recharge: reused water can be directly injected into aquifers or applied to land for percolation into the aquifer.

