Parivesh

A News Letter from ENVIS Centre - Central Pollution Control Board

Editorial

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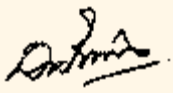
Editorial

The genesis of common effluent treatment plants (CETPs) for clusters of small scale industries (SSIs) dates back to the mid-eighties. I still recollect the days of our interaction with the Industry Association, Central Leather Research Institute (CLRI) and the Leather Development Corporation to explore the possibilities for collective treatment of effluents from a cluster of tanneries in Vaniyamvadi, Tamil Nadu. The tanneries were not able to put up individual effluent treatment facilities due to lack of funds and space. The common effluent treatment plant designed by CLRI provided a possibility for solution to the problem. However, it was still difficult for the tanneries to meet the expenses for installation of the CETP. Hence, an innovative initiative was taken whereby the cost for setting up of CETP ws was shared by the Central and State Government besides soft loan from the financing institutions. Thus, the CETP was commissioned in Vaniyamvadi which became a model for similar initiatives in different parts of the country. Subsequently, the World Bank entrepreneurs have also come forward with funding support the scheme. As a result, 48 CETPs have been commissioned by 84 projects are in various stages of implementation thus providing the facilities for treatment of effluent from a large number of SSI units In this issue of Parivesh, the facts and figures on various aspects of CETPs including their present status and case studies are furnished. We hope, it will be useful to the industries, regulatory bodies and public at large. My colleagues Dr. B. Sengupta, Member Secretary, Shri B.P. Shukla Zonal Officer, Kanpur, Dr. S.S. Bala, Zonal Officer, Baroda, Shri P.K. Mirashe, Environmental Engineer and Shri R..K. Singh, Scientist 'B' have compiled the information for this issue.



Dilip Biswas
Chairman, CPCB

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Common Effluent Treatment Plants

INTRODUCTION

Urbanisation and need for better living has incessantly generated requirement of consumer goods and infrastructural inputs. With market potential and easy finance available, the mushrooming rise in the number of small scale industries can be seen in any Indian city. Besides being a resource for market economy and production of large number of consumer items, it is generally observed that, either due to their economies of scale coupled with their unplanned growth and dearth of affordable and cost- effective treatment technology, efforts by small scale units in achieving the environmental compliance have not been effective. Their large number and diverse trade has further aggravated the problem. Under these constraints, setting-up of individual full-fledged treatment device is no longer feasible. Hence the desirable option is of the shared or combined treatment, wherein, managerial and operational aspects are collectively addressed and the cost of treatment , becomes affordable as enunciated in the scheme of the common effluent treatment plants, which are proving to be a boon especially for small entrepreneurs, given the methodical planning, regular operation and equitable contribution of member units. Such common facilities also facilitate proper management of effluent and compliance of the effluent quality standards.

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CONCEPT OF COMMON TREATMENT

- *The* concept of effluent treatment, by means, of a collective effort, has assumed reasonable gravity by being especially purposeful for cluster of small scale industrial units. Common effluent treatment plant (CETP) not only help the industries in easier control of pollution, but also act as a step towards cleaner environment and service to the society at large. Small scale industries, by their very nature of job cannot benefit much from economies of scale and therefore the burden of installing pollution- control equipment, falls heavy on them. Realising this practical problem, under the policy statement for abatement of pollution the Govt. felt to extend the scheme for promoting combined facilities for treatment of effluent and management of solid waste for clusters of small scale industria l units and also to provide technical support to them. Accordingly, Ministry of Environment & Forests, Govt. of India, had instructed various State Pollution Control Boards, to examine the possibilities of establishing CETPs in various Industrial estates in the respective states.

  The concerted approach of joint or common effluent treatment provisions has many advantages. Wastewater of individual industries often contain significant concentration of pollutants; and to reduce them by individual treatment upto the desired concentration, become techno-economically difficult The combined treatment provides a better and economical option because of the equalization and neutralization taking place in the CETP.

  Other important issues for the merit of common treatment include, scarcity of land at the industry's level and a comparatively easier availability of professional and trained staff for the operation of CETP, which can otherwise be difficult, at the individual industry level. For the regulatory authorities also,common treatment facility offers a comparatively easier means of ensuring compliance of stipulated norms. The handling and disposal of solid- waste also becomes increasingly easier as the infrastructure is created in the project itself. The concept of common treatment, based on feasibility, should be part of the new industrial estates as essential component of infrastructure, In fact, the location of industries should always be such that units with compatible nature of activity are located in a cluster which in-turn can facilitate in providing common treatment .

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Measures for optimum efficiency

Operation of CETP being a participatory mechanism, the primary requirement is hence to define the ultimate responsibility for the proper functioning of the plant after it is commissioned. The important issues which meri consideration are :

Aspect of Ownership

Various ownership alternatives include- the plant owned by government, consortium of industries or by an independent body. Whatever be the case, the primary emphasis should be on responsiveness in terms of effective and optimal operation of the plant and accountability. The member industries should also be made to realise that they are equally responsible for the sustenance of the plant.

Conveyance System

Different from the discharge characteristics of an integrated (big) industrial unit, small scale units usually generate higher proportion of floating or suspended particles in their effluent streams. At times their job operation result in high corrosive effluent. In either of these cases , to effectively convey their effluent to the CETP , it becomes necessary for individual units to set-up a 'pre - treatment' device. It is also necessary that the conveyance network be so designed as to ensure their periodic de-sludging. Care should also be taken to minimise on cost of operation by facilitating conveyance through gravity flow, instead of multistage pumping. In fact the location of CETP should be selected after a careful topographical survey of the drainage area to keep the conveyance route as short as possible. The chances of flooding in monsoon and accidental surface run-off into the conveyance route should also be looked into. Conveyance by tankers is another option, provided the chances of leakage are effectively checked and their transit is strictly monitored in accordance to a properly laid down system.

Cost of Treatment

The cost effective treatment supported with a system of regular collection / payment of treatment charges by eac member unit, while maintaining its effluent quality within acceptable norms are some of the prerequisites. The system of payment should be legally supported to provide a check for non-payment of dues and to take steps against defaulters.

Criteria for Cost

The cost sharing should be decided in such a way that volume of effluent becomes an important norm, but its share in the total cost should not be such as to encourage by-passing of dilute streams and conveying highly toxic / non-biodegradable waste to CETP. The treatability factor should also be given due consideration in cost estimation. An effort by the industry to segregate toxic, highly acidic / highly basic, or toxic metal bearing waste be made to explore the possibility to de-toxify / neutralize or to attempt the recovery of metals by installing recovery plants, which are feasible and economically viable on account of their pay-back potentials.

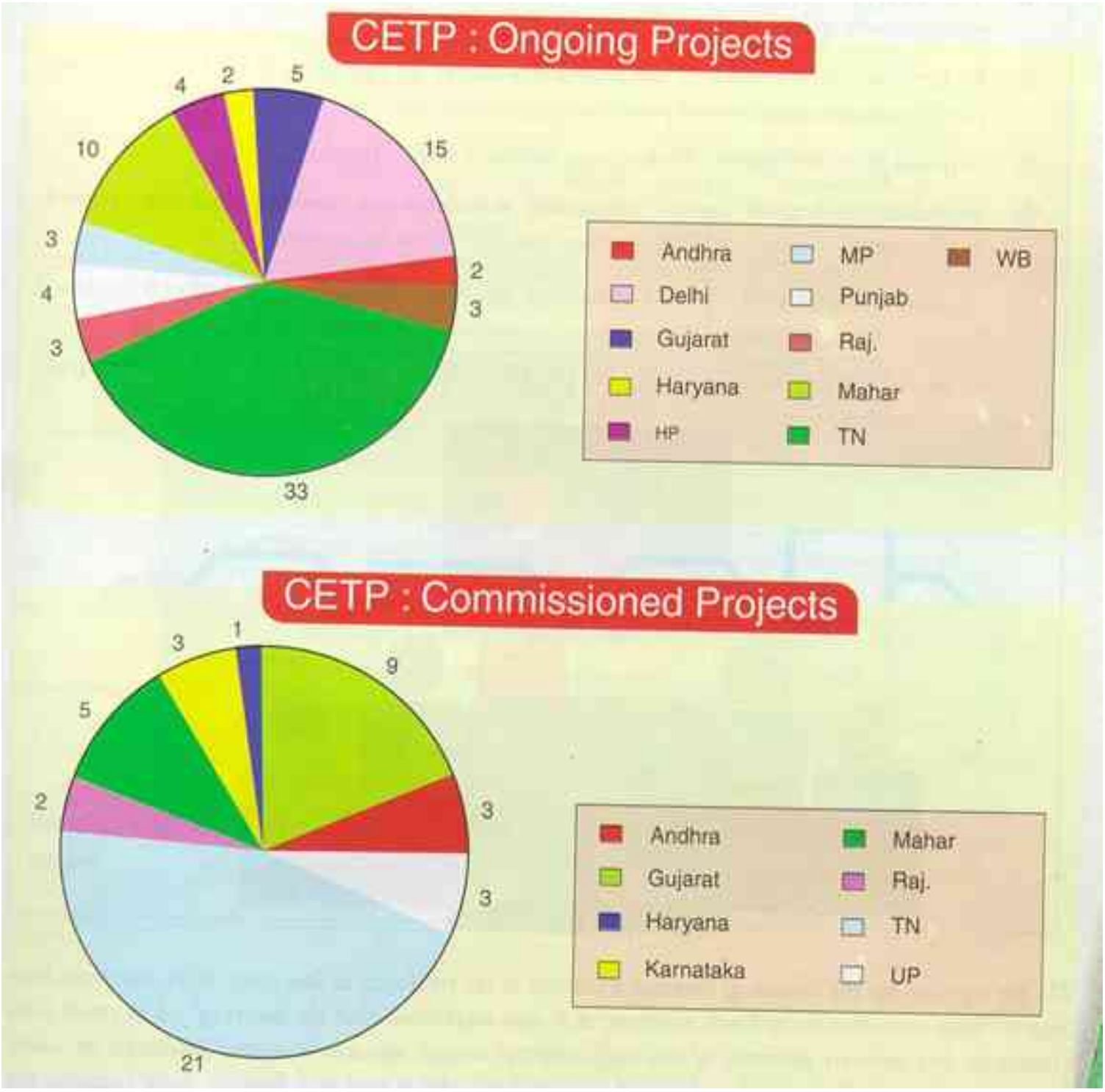
Plant Design

The approach to provide treatment at low cost, an important factor in common treatment, depends on appropriate design of CETP. In keeping with the diverse nature and scale of operations, typical of small scale units, low capital investment and lower operation and maintenance cost incurred on treatment is a prime factor. In such a situation mechanical and

chemical processes are advantageous over bio-logical systems. And the least preferred are conventional anaerobic processes on account of huge space requirements and least flexibility. Though,, the advanced UASB technique with less hydraulic retention and space requirement being significantly low, *anaerobic system* is also a possible option. In order to obviate the need of excessive civil work at CETP in making huge equalization and settling units, the member units should also provide settling and neutralization of their individual waste.

In order to minimize on the electrical cost, the possibility of substituting bio-energy should be explored to the extent possible. Proper management of sludge with its nutritive value would mobilize resources to substitute the operational cost.

While designing the plant it would be of additional advantage to keep manpower requirement as low as possible but high in technical skills to reduce down-time for maintenance.



- **Advantages of Common Treatment**
  - Saving in Capital and operating cost of treatment plant. Combined treatment is always cheaper than small scattered treatment units.
  - Availability of land which is difficult to be ensured by all individual units in the event they go for individual treatment plants. This is particularly important in case of existing old industries which simply do not have any space.
  - Contribution of nutrient and diluting potential, making the complex industrial waste more amenable to degradation.
  - The neutralization and equalisation of heterogeneous waste makes its treatment techno-economically viable.
  - Professional and trained staff can be made available for operation of CETP which is not possible in case of individual plants.
  - Disposal of treated wastewater & sludge becomes more organised.
  - Reduced burden of various regulatory authorities in ensuring pollution control requirement.

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WASTE MINIMISATION

The pre-requisite for the concept of common treatment is the treatment at low cost . *With more and more improvisation and stress on in-house measures, it is now established that the nature of job in small scale industries has immense potential of not only adopting certain measure to control pollutants at source thereby reducing pollution load and cost of treatment but also to reap rich benefits. Some examples are summarised below :*

Industry	Measures	Benefits
Hosiery	*Manufacturing liquid detergent from spent kier liquor*	● *Reduction in pollution load*
Electroplating	*Reactive rinsing by use of rinsewater after alkaline cleaning for rinsing components after pickling*	● *Reduced water consumption and wastewater generation* ● *Effective cleaning of components*
	Modification in dragout tray arrangements (hang the workpiece vertically instead of dragging out horizontally)	● *Better rinsing* ● *Reduced chemical consumption*
	Installation of double plating line instead of single line inn plating bath	● *Enhanced production capacity*
Cotton dyeing	*Substituting soda ash by caustic soda in dyeing process*	● *Reduced chemical consumption*

Tannery	*Installation of flow meter*	● *Exact measurement of water / chemical*
	Scrapping salt from hides before rinsing	● *Salt recovery, low TDS in effluent*
	Measurement of chemicals by weight and not by volume	● *Reduced wastage of chemicals*
	Substitution of Benzidine based dye with non- Benzidine based dye stuff	● *Elimination of toxicity due to dye stuff*
	Recycling of spent alkaline bath after screening for next batch	● *Reduction in chemical consumption and pollution load*
Small pulp & paper	*Increase in wire mesh size in de-pither*	● *Increased pith recovery* ● *Decrease in chemical consumption*

Courtesy : NPC

Cost Sharing Systems[+]

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Various systems for cost sharing as exercised by Common Treatment provisions operating in India as well as in other countries are discussed below. The concerned management body can opt the most suited and viable system based on the local situation and feasibility to implement. The system exercised in most of CETPs operational in India is partly based on Quality-Quantity method with case specific modifications.

-

1. **Quantity Method**

- Simplest Method and applicable for joint treatment of sewage and low strength industrial waste
- Operation cost and the cost for debt service are divided by total volume(quantity) of waste in a given time
- Advantageous where nature of waste from industries are generally uniform.

1. **Quantity – Quality method**

- Charges are proportional to the benefits from the treatment plant. The computation of treatment cost can be summarised in following steps:

Step-1
Identify the critical design - parameters for the treatment plant. Let us assume they are BOD, SS and volume

Step-2
Work-out fixed cost (depreciation, loan repayment etc.) and operational cost on annual basis, for all major components like conveyance system, pumps, clarifiers, digesters etc.

Step-3
Identify the variables (BOD, SS , volume) and extent of dependence the variable is considered for design specification for the given component. eg. Conveyance system and digesters are designed based primarily on volume and SS respectively, whereas for clarifier , volume and SS are equally considered.

Step-4
Work-out apportionment of the total treatment cost (fixed and operational), based on the function of the variables.

Step-5
Depending upon design specification of the plant, against critical parameters, work out the cost component for unit volume treated, kg BOD removed and kg SS removed .

Step-6
Calculate the cost of treatment for effluent from any industry based on unit cost component as in Step-4 and effluent characteristics in terms of quantity (volume) and quality (BOD, SS etc.) for the given industry.

3. **Malz Formulation**

- Based on " Polluter Pays" principle
- The factors considered in cost computation are volume, degree of noxiousness ‘S’ of wastewater and dilution factor ‘V’ to ensure survival of fish (48 hr. exposure)

$V = A/A_o + B/B_o + TDS/ TDS_o + F – 1$

Where A = Settleable matter , mg/L

B = COD of settled sample, mg/L

TDS = Total dissolved solids mg/l

F = Fish Toxicity

A_o , B_o , TDS_o = Standards

- Noxiousness degree ‘S’ is estimated from dilution factor expressed in appropriate slabs
- Annual treatment cost apportioned to each polluter is calculated as follows:

Cost Share = S. Q . Z. / S (S. Q.)

Q = Annual flow of an individual industry

Z = Total cost of collection/ conveyance & treatment

1. **Fukashiba formulation**

- Japanese system adopted for CETP catering to petrochemical industries
- Charges levied are calculated differently on the basis of quantity and differently for quality
- While quantity rate is mutually decided and is binding to all member industries, the quality rate is determined based on B. O. D. , C.O.D., Suspended solids and concentration of N-hexane extract in effluent from individual industry

1. **Roman Formulation**

- Based on the idea that :

    a. Construction cost of CETP should correspond to the volume and strength of effluent from individual industry
    b. Conveyance cost should be proportional to the volume by each industry irrespective of its distance from CETP

- Provision of penalties in terms of transgression of 'discharge volume' regulated for each industry
- Incorporates Roman concept that economic aspect of pollution control should never be considered as the main factor influencing economic decision.
- Different factors considered in cost computation are:

    a. Avg. flow of effluent from industry to CETP
    b. Total flow of effluent reaching CETP
    c. Construction cost of CETP
    d. Construction cost of all additional facilities used for conveyance of effluent
    e. Avg. strength of effluent of the given industry expressed as BOD_5 in kg O_2 / m^3
    f. Avg. strength of total effluent expressed as BOD_5 in kg O_2 / m^3
    g. Cost of treatment plant units depending on the pollution load to construction cost of the whole treatment plant.

1. **Chemtech Formulation**

- This formulation is based on the proportion of the CETP usage
- Industries pay according to their volume of effluent and the influence of chemical, physical and biological conditions of the waste on capital and operational cost of CETP.
- Cost of neutralisation at CETP is not considered as this is considered to be a part of pre-treatment by the industry.

1. **Graduated Payment Formulation**

- Based on concept of graduated payment, whereby:

a. Large industries pay marginally higher cost
b. Cost paid by smaller industries is fixed as minimal amount thus eliminating intricate accounting procedures
c. The cost for large or medium industries can be calculated based on factors which include effluent generation of individual industry, total quantum of effluent reaching CETP and pollution factor 'P' as follows:

$$P = 0.5 (BOD_i + 200) \text{ , } 600 + 0.5 (COD_i + 500) \text{ , } 1500$$

Where BOD_i & COD_i are avg. BOD and COD in effluent from individual industry

1. **Flecksedar Methodology**

- Cost apportioning can be attempted based on following system:

a. Cost be adjudged separately for designed and actual treatment capacity of CETP
b. The type of treatment and the cost incurred on it , be levied from the industry(s) responsible for particular pollutant

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Design Criteria for CETP

- Inventory of Industries
- Qualitative and Quantitative characterisation of wastewater from industries
- Classification of industries based on wastewater generation
- Classification of wastewater based on bio-degradability
- Site-specific , effective and easy-to-maintain design of conveyance system
- Bench Scale and Pilot scale treatability study
- Segregation of wastewater
- Pre-treatment of wastewater
- Assessment of appropriate treatment technology
- Waste minimisation and resource recovery
- Disposal mechanism of treated effluent and sludge
- Estimation of treatment cost
- Cost benefit analysis
- Selection of best suited cost sharing pattern
- Stress on cleaner technologies

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GOVT. INCENTIVES AND REGULATIONS

The concept of common effluent treatment plant in itself is in the phase of development. As regards conceptualization of project, construction, operation and achieving the required treatment efficiency the entire mechanism has to be viewed in totality. Moreover the CETP for all practical and techno-economic consideration is a viable treatment option for small scale industrial units, wherein the member units and CETP management share equal responsibilities for achieving desired efficacy.

The proposal from project proponents may be sent to the State Pollution Control Board and the State Govt. for their approval and State subsidy and to Ministry of Environment & Forests, Govt. of India for the Central Subsidy. The project proponent for CETP (company) may also obtain loan from any nationalised bank.

Criteria for Assistance

- Ordinarily in an industrial estate or cluster of SSIs one CETP will be promoted. This may vary on case to case basis.
- Central assistance will be available only for cluster of SSIs.
- Projects for assistance will be prioritized on the basis of

  a. Toxicity of pollutant
  b. Pollution load treated
  c. Number of units covered

- The project should be self-financing for servicing of the loan and meeting operation & maintenance cost.
- The project must formulate adequate institutional arrangement for the cost sharing, recovery of dues and management and ensure observance of prescribed standards. The scheme must have the technical recommendations of the State pollution control board.

Pattern of Assistance

- Central assistance upto 25 percent of the total cost of the CETP would be provided as a grant to the common effluent treatment plants on the condition that the State Govt. gives a matching contribution. The remaining cost should be met by equity contribution by the industries & loans from financial institutions.
- Central Assistance will be provided only for capital cost. No assistance will be provided for recurring cost. The assistance will be released in installments.
- Central Assistance will generally be limited to 25% of the capital cost of the project , subject to other conditions such as matching grant of the State Govt. It may be of advantage to combine some components of CETP with

the municipal system. On such scheme the municipalities have also to contribute their share of cost.

Procedure

The company will obtain loan from the IDBI or any other financial institutions. The project proponent for CETP (company) will approach the State Govt./Central Govt. for their contribution of their subsidy. The subsidy would be released into the account of the company opened in the IDBI (or any other financial institutions).

Resource Recovery---a case with chrome tanning

The Chrome tanning of hides is carried out by employing Basic Chrome sulphate (BCS) as the tanning agent. The quantity of BCS employed is 60-80 kg per 1000 kg hide processed. This BCS quantity on average contains 9.04 kg chromium as metal. The chronology of the chrome recovery is summarised in the following text. It is established that in case of conventional process, even after the chrome tanning is complete wherein the chrome absorption by the hide is only 60%, the spent tan liquor still contains a significant concentration (upto 40%) of chromium which can be recovered by the mechanism described below.

Step 1. Collection of spent Tan liquor

Step 2. Maintenance of pH of spent liquor at 8 to 8.2 by adding MgO(0.5% of spent liquor) to optimize the precipitation of chrome(in sludge).

Step 3. The mixture is stirred and allowed to settle down for few hours. The chrome in the form of chrome hydroxide gets settled.

Step 4. The supernatant containing insignificant quantity of chromium concentration is liable to be
discarded.

Step 5. The chrome sludge is dissolved in 98% concentration sulphuric acid (quantity of which is 0.1% of spent liquor). This mixture is worth of blending with freshly made chrome tan liquor.

Step 6. It is generally believed that recovery of chromium in a properly designed and operated recovery plant could be somewhere around 98% of the chromium in the spent tanned liquor.

COMMON EFFLUENT TREATMENT PLANTS

*A **Boon** to Small Scale Industries*

		COMFORTABLE FINANCE
C		Government Incentives through its subsidiary Institutions provide much needed financial inputs, a significant boost, especially for small scale sector.

		EASIER OPERATION
E		Establishment of individual treatment plants become unacceptable by SSIs due to extreme characteristics of untreated effluent and high qualitative variance therein. A skilled operational staff becomes an affordable option in CETP, wherein all the member units can identify a management group from within, for its effective operation.

		TREATMENT AT LOW COST
T		Source specific effluent quality(extreme pH , BOD, colour, nutritive value & metals etc.)which would otherwise render their treatment ac costly preposition, becomes homogenized in CETP and significantly reduce the treatment cost.

		PRAGMATIC REGULATION
P		Performance evaluation and its surveillance for implementation of

		qualitative measures in large nos. of individual plants, at times become a difficult task for regulatory authorities. All this become easily manageable in case of CETP.

PROCESS FLOW DIAGRAM OF TYPICAL CHROME RECOVERY PLANT

RECOMMENDED PROVISIONS

It is an observed fact that the desired efficacy of the CETP depends on simulated efforts on the part of the CETP management, entrusted with the task of operation and maintenance, as well as, on the member-industrial-units. Although there are stipulated standards prescribed for effluent quality for inlet to and outlet from CETPs, much is required for regulatory provisions by making them more comprehensive which in-turn shall help ensuring effective implementation of stipulated recommendations besides making all the member units equally accountable for any aberrations.

OPTION I : ***THE CASE WHERE CETP MANAGEMENT IS EXCLUSIVELY CONSTITUTED BY REPRESENTATIVES FROM THE CONCERNED INDUSTRIES*****.**

RECOMMENDATION

Considering the nature of job and prevailing mode of effluent disposal, the concerned individual industries be given prescribed effluent standards, to be complied by them either at their outlet or at the final outlet of the CETP concerned. In this case seeking consent be made obligatory only for the individual industry and the CETP management be kept free from such obligation.

OPTION II : ***WHERE THE CETP MANAGEMENT IS AN INDEPENDENT BODY AND DOES NOT HAVE ANY REPRESENTATION OF THE INDUSTRIES CONCERNED.***

RECOMMENDATION "A"

Two separate standards be prescribed, the PRIMARY STANDARDS in terms of pH,SS and/or Chromium be stipulated for the individual units and the SECONDARY STANDARDS (Comprehensive) in terms of all the relevant parameters, be prescribed for the CETP management. In this case, seeking consent be made obligatory on the part of the Individual industries, as well as for the CETP management. Moreover, there should be an agreement among the individual industries and the CETP management for achieving the prescribed characteristics of the treated effluent.The modalities of agreement should be such that in the event of any aberrations, at least the levying of equity contribution from member units for operation and maintenance of CETP are rendered liable to be reviewed under intimation to the apex authority.

RECOMMENDATION "B"

Although the Primary and Secondary Standards be prescribed as mentioned in Recommendation "A", the compliance only of the Secondary Standards be adjudged at the final outlet of the CETP , and only the CETP management be held responsible for any aberrations in (Secondary) standard compliance. Moreover, seeking consent in this case be made obligatory only for the CETP management. However, in the event the CETP management feels that the individual unit fails to comply the Primary Standards, it may,under intimation to the concerned appellate authority, discontinue accepting effluent from that defaulting unit,and the unit henceforth be treated as operating without the valid consent.

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VIABILITY OF COMMON EFFLUENT TREATMENT PLANTS

Different View points

Since last few years there has been a debate on various aspects regarding participation of large & medium units (located in industrial area) in the CETP. There are different view of experts on this issue. An effort* has been made to compile various opinion.

Viewpoint no.1

- To allow all categories of industries to join CETP is against the spirit of CETP.
- In case of large scale industries, the responsibility of controlling pollution will be diluted
- In case of failure of CETP the entire untreated effluent shall be released to environment. The volume of effluent shall be phenomenal considering the inclusion of large & medium units also contributing to CETP
- Hence the idea of CETP should be kept limited to small scale industries however the present limit of 25 m3/d for discharging to CETP may be revised
- The large & medium units joining CETP shall not be entitled for Central subsidy, although SPCBs may consider allowing subsidy to CETP as per merit.
- Large & medium industries will have to pay differential treatment cost to CETP company on "PolluterPays Principle"

Viewpoint no.2

- Although CETPs are intended for small scale industries where the maximum flow is upto 25 m3/d, there are many instances of the limit is exceeded.
- It is imperative to consider the removal of criteria of maximum flow for joining the CETP schemes as some small scale units may send effluent for higher pollution potential and lesser quantity and vice-versa.
- There are quite a few advantages of considering large & medium units in CETP . Some of these advantages are

a. Enough quantity of effluent is always available
b. With large & medium units as nuclius members along with the small scale units, thee is a greater chance of efficient running of the CETP inb mutual interest.
c. Many large & medium units don't have high quantum of wastewater generation hence they can ensure cost effective treatment through CETP

Although the policy decision for inclusion of large and medium industries in CETP is yet to be taken the above view

points are signifcant to frame an idea

. The views referred above are excerpts from the paper titled 'Viability of Common Effluent Treatment Plants-views and via media, authored by Dr. D.B. Boralkar Assistant Secretary, CPCB, Delhi, India*

ONGOING CETP PROJECTS IN DIFFERENT STATE

	A	B		A	B
1. Andhra Pradesh			***8. Punjab***		
Enumamula - - -			***Ludhiana-1***	**-**	**-**
Jammapur - -			***Ludhiana-2***	**-**	**-**
2.Gujarat			***Ludhiana-3***	**-**	**-**
Naroda, Ahmedabad	**229**	**795**	***Amritsar***	**-**	**-**
Sanand, Ahmedabad	**31**	**320**	***9. Rajasthan***		
Jetpur-2, Rajkot	**19**	**-**	***Pali***	**-**	**-**
Panoli, Bharuch	**180**	**400**	***Sumerpur***	**-**	**-**
Sachin, Surat	**50**	**1156**	***Jodhpur***	**-**	**-**
3. Haryana			***10. Tamilnadu***		
Kundli	**-**	**78**	***Melpudupet***	***19***	***151***
Jind	**-**	**-**	***Chettithangal***	***11***	***139***
4. Himachal Pradesh			***Melvisharam***	***36***	***3663***
Barotiwala I. E.	**-**	**-**	***Eruguthimallnedu***	***10***	***154***
Parwanoo I. E.	**-**	**-**	***Perumalpet***	***50***	***552***
Melatpur	**-**	**-**	***Vaniambadi***	***20***	***200***
Kala- Amb	**-**	**-**	***Pudur***	***09***	***142***
5. Maharashtra			***SIPKOT-SIDCO***	***40***	***252***
Dombilvili-2	**200**	**20**	***Mitta***	***19***	***259***
Dombivili-3	**150**	**15**	***Standard Effluent***	***21***	***245***
Tarapur-2	**7**	**3.6**	***Erode-1***	***77***	***1025***
			10. Tamilnadu (contd.)		

Kherana, N. Mumbai	**-**	**3.63**
Ambernath	**37**	**4**
Jaisinghpur	**13**	**3.35**
Roha	**13**	**12**
Taloja	**110**	**41.9**
Lote Parashuram	**42**	**7.6**
Badal pur	**-**	**-**
6. Madhya Pradesh		
Bhopal	**28**	**170**
Gwalior	**74**	**76**
Raipur	**74**	**124.6**
7. New Delhi / Delhi		
Anandparbat	**-**	**-**
Badli	**-**	**-**
DSIDC I. E.	**-**	**-**
Jhilmil I.. E.	**-**	**-**
G.T. Karnal Rd. I. E.	**-**	**-**
Naraina I. E.	**-**	**-**
Lawrence Rd. I. E.	**-**	**-**
Mangolpuri I. E.	**-**	**-**
Mayapuri I. E.	**-**	**-**
Nazafgarh Rd. I. E.	**-**	**-**
Okhla Ind. Area	**-**	**-**
Mohan Co-op I. E.	**-**	**-**
Okhla I. E.	**-**	**-**
S. **M. A. Ind. Area**	**-**	**-**
Wazirpur I. E.	**-**	**-**
Erode-2	***211***	***102***
Erode-3	***191***	***400***
Karur-1	***49***	***172***
Karur-2	***49***	***214***
Karur-3	***58***	***143***
Karur-4	***62***	***177***
Karur-5	***80***	***168***
Karur-6	***135***	***225***
Amravathi	***53***	***240***
Bhavani Dying	***62***	***106***
Salem-2	***76***	***400***
Kodaikanal	***93***	***103***
Chennimalai	***81***	***98***
Kumarapalyam	***120***	***100***
Anaipalyam	***57***	***543***
Mangalam	***42***	***408***
Angeripalyam	***75***	***760***
Kulathupalyam	***62***	***553***
Muruganpalyam	***53***	***525***
Kasipalyam	***86***	***500***
Cuddalore	***28***	***411***
Madhavpuram	***14***	***200***
Ambur	***1 8***	***165***
11. West Bengal		
Kalaidanga	***600***	***6000***
Behala	***-***	***-***
Kasba	***-***	***-***

A: Member units ; B : Capital investment (Rs. In- lakh); I.E. : Industrial Estat

Status of Operational CETP Projects

Name/Location		Treatment Capacity (MLD)	Member Units		Capital Cost (Rs in million)	Operating Agency
			No.	Type		
Andhra Pradesh						
1.	Jeedimetla	1.5	109	Drug & Chemicals	25	M/s Jedimetla E.T.P.Ltd
2.	Pattencheru	7.50	72	Drug & Chemicals	62.4	M/s Patancheru E.T.P.Ltd.
3.	Bollaram	0.25	26	Drug & Chemicals	25	M/s Progressive ET Ltd.
Gujarat						
1.	Vatva, Ahmedabad	16.00	437	Textile, Distillery, Pharmaceutical, Chemicals	300	The Green Env. Services C.O. Ltd
2.	Odhav, Ahmedabad	1.20	57	Dye & Dye Intermediate	41.5	Odhav Enviro Projects Ltd.
3.	Ankleshwar	1.00	200	Dye & Dye Intermediate, Textile, Pharmaceutical, Pesticides, Pigments	68	Enviro Technology Ltd., Ankleshwar
4.	Vapi	55.00	615	Chemical, Plastic, Pharmaceuticals, Paper, Garments, Engineering	204	Vapi Industries Association
5.	Jetpur, Rajkot	20.00	2000	Dyeing &	50	Jetpur Dyeing &

				Printing		Printing Assocn.
6.	Nandesari, Vadodara	5	-	Chemicals, Dyes & Dye Intermediate	-	Nandesari Industrial Association
7.	Sarigam, Valsad	0.40	07	-	-	Perfect Enviro Control System Ltd. GIDC, Sarigam.
8.	Gumsav, Odhav, Ahmedabad	1.00	-	-	15	Gujrat Vepari Mahamandal S.A.V.Ltd. Ahmedabad
9.	Dharmeshwar, Jetpur, Rajkot	0.15	19	-	-	Dhareshwar GIDC Vistar Asscn, Rajkot
Haryana						
1.	Sonepat, Kundli	-	-	-	-	-
Karnataka						
1.	Kadugondanahalli Bangalore	-	14	Tannery	16	M/s Lidkar Enviro Control System Ltd.
2.	Kumbalgod	-	40	Tannery	11.3	M/s Pai & Pai Chemicals (I) Ltd.
3.	Bangalore	-	-	-	-	M/s Bangalore Golf Club
Maharashtra						
1.	Thane-Belapur (Navi Mumbai)	12.00	400	Dyes & dye Intermediates, Pharmaceuticals, Chemicals, Drugs & Drug Intermediates	45	CETP(T-B) Asscn. MIDC Navi -Mumbai
2.	Dombivili	1.50	331	Dyes & dye	26	Dombivili CETP

				Intermediates, Pharmaceuticals, Chemicals, Drugs & Drug Intermediates		MIDC Phase-II Dombilvili (East)
3.	Tarapur, Boisar	1.00	208	Chemicals, Pharmaceuticals, Dyes & dye Intermediates, Paint & Textiles	33	TIMA Co-op. Society Ltd., MIDC Boisar,Thane
4.	Ambernath	-	-	-	-	M/s ACMA CETP Society
5.	Jaysinghpur	-	-	-	-	M/s L.K.Akiwate Indl. Co-op Estate
Punjab						
1.	Jullundhar	1.50	29	Tanneries	9.6	M/sPunjab Small Scale Leather Export Corpn., Jullundhar
Rajasthan						
1.	Pali Unit-1	6.75	-	Textile units	-	
2.	Pali Unit-2	6.75	-	Textile units	-	
Tamil Nadu						
1.	Ranipet	-	86	-	29.5	M/s Ranipet SIDCO
2.	Ayyampeettai	-	-	-	-	M/s Ayyampet-Muthialpet
3.	Ranipet	-	-	-	-	M/s TALCO-Ranipet
4.	Pallavaram	-	132	-	70	M/s Pallavaram Tanners Indl. Co-

						op Ltd.
5.	Salem	-	64	-	0.45	M/s Selem Medical Waste Management Co. Ltd.
6.	Thirumanialaiyur	-	-	-	-	M/s Karur, Thiruvai
7.	Amravathinagar	-	-	-	-	M/s Amravathi Pollutech
8.	Melivishram	-	-	-	-	M/s Vishram Tanners
9.	Dindigul	-	-	-	-	M/s TALCO-Dindigul
10.	Madhavaram	-	-	-	-	M/s Madhvaram Leathers
11.	Malligai Thope	-	-	-	-	M/s Ambur Tannery
12.	Andipalyam Thirupur	-	-	-	-	M/s Andipalyam CETP
13.	Mannarai Thirupur	-	-	-	-	M/s Mannarai CETP
14.	Manickpuram Thirupur	-	-	-	-	M/s Manickpuram CETP
15.	Mannarai Thirupur	-	-	-	-	M/s Angeri Palyam CETP
16.	Veerapandi	-	-	-	-	M/s Veerapandi CETP
17.	Chinnakarai Thirupur	-	-	-	-	M/s Chinnakarai Thirupur
18.	Agraharam, Peripalyam Thirupur	-	-	-	-	M/s Kashipalyam CETP
19.	Kunnangalpalyam Thitrupur	-	-	-	-	M/s Kunnangalpalyam CETP

20.	Karuppampalayam Karur	-	-	-	-	M/s Karur-Karuppampalayam
21.	Bakkalapalli	-	-	-	-	M/s TALCO Perinambut
Uttar pradesh						
1.	Jajmau, Kanpur	36.00	354	Tanneries	220.8	U.P.Jal Nigam
2.	Unnao	2.15	21	Tanneries	19.5	M/s UTPCCL, Unnao
3.	Mathura	6.25	30	Textile Dyeing	-	M/s Mathura A.K.P.N..Co. Ltd

Courtesy : Ministry of Environment & Forests, Govt. of India

Inlet Effluent Quality Standards for CETPs

PARAMETER	CONCENTRATION
pH	5.5 - 9.0
Temperature, ^0C	45
Oil and Grease	20
Phenolic compounds(as C_6H_5OH)	5.0
Ammonical nitrogen(as N)	50
Cynide (as CN)	2.0
Hexavalent Chromium	2.0
Total chromium	2.0
Copper	3.0
Lead	1.0
Nickle	3.0
Zinc	15.0
Arsenic	0.2
Mercury	0.01
Cadmium	1.0

Selenium	0.05
Fluoride	15.0
Boron	2.0
Radioactive materials	
Alfa emitters,Hc/ml	10^{-7}
Beta emitters,Hc/ml	10^{-8}

Note : 1. These standards apply to the small scale industries i.e total discharge upto 25 KL/D.

2. For each CETP and its constituent units, the State Board will prescribe standards as per the local needs and conditions; these can be more stringent than those prescribed above. However, in case of the clusters of units, the State board with the concurrence of CPCB in writing may prescribe suitable limits.

3. Concentration in mg/L except pH & Temperature or otherwise specified

SOURCE : The gazette of India : Extraordinary-Part II- Sec.3(i)pp 10 Dt.27th Feb 1991

Treated Effluent Quality Standards for CETP

PARAMETERS	**CONCENTRATION IN mg/L EXCEPT pH & TEMPERATURE**		
	INTO INLAND SURFACE WATER	**ON LAND FOR IRRIGATION**	**INTO MARINE COASTAL AREAS**
pH	5.5 - 9.0	5.5 - 9.0	5.5 - 9.0
BOD 20^0C	30	100	100
Oil & Grease	10	10	20
Temperature	Shall not exceed 40^0C in any section of the stream with in 15m down stream from the effluent outlet	- -	45^0C at the point of discharge
Suspended solids	100	200	**a**.For process wastewater - 100 **b**.For cooling water effluent 10% above

			total sus. matter of influent cooling water
Dissolved solids (inorganic)	2100	2100	-
Total residual chlorine	1.0	-	1.0
Ammonia nitrogen (as N)	50	-	50
Total Kjeldahl nitrogen (as N)	100	-	100
COD	250	-	250
Arsenic(as As)	0.2	0.2	0.2
Mercury(as Hg)	0.01	-	0.01
Lead(as Pb)	0.1	-	1.0
Cadmium(as Cd)	1.0	-	2.0
Total Chromium(as Cr)	2.0	-	2.0
Copper(as Cu)	3.0	-	3.0
Zinc(as Zn)	5.0	-	15
Selenium(as Se)	0.05	-	0.05
Nickel(asNi)	3.0	-	5.0
Boron(as B)	2.0	2.0	-
Precent sodium	-	60	0.2
Cyanide(as CN)	0.2	0.2	0.2
Chloride(as Cl)	1000	600	-
Fluoride(as F)	2.0	-	15
Sulphate(as So_4)	1000	1000	-
Sulphide(as S)	2.8	-	5.0
Pesticides	Absent	Absent	Absent
Phenolic compound (as C_6H_5OH)	1.0	-	5.0

All efforts should be made to remove colour and unpleasent odour as far as possible.

**SOURCE:The Gazette of India: Extraordinary-Part i- Sec..3(i)pp11Dt.27.2.91*

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Parivesh
A News Letter from ENVIS Centre - Central Pollution Control Board

Common Effluent Treatment Plants

VIABILITY OF COMMON EFFLUENT TREATMENT PLANTS

CETP at Vatva, Ahmedabad

Name of Project :	The Green Environment Co-op. Soc. Ltd., Plot No.244 to 251, Phase-II GIDC Estate, Vatva, Ahmedabad-382445 Phone: 079-5892283, 5832449 Fax : 079-5893614
No. of Contributing Members :	437
Area of CETP Site :	20,000 sq.mt.
Designed Capacity of CETP :	16,000 m^3/d
Present Flow being Recd. :	10,000 m^3/d
Cost of Project :	About Rs.300 million(including cost of conveyance, treatment and disposal)
Commencement of CETP :	April,1998
Treatment Units :	Equalization tank 1 no Panic/surge tank for excessive shockload 1 no. Flash mixer 1 no. Floccualater 1 no. Dissolved air floataation unit 1 no. Combined aeration tank/clarifier Unit with diffused aeration tank 1 no

Plate & frame type filter press for dewatering of sludge 3 nos.

Other details

- The contributing members have to pretreat the effluent as per the inlet norms prescribed by the governing body of CETP before making discharge.
- The conveyance of effluent to CETP is through underground drainage system consisting of rising mains.
- For the day today discharge individual members have been given specific time slot and quantity of flow is being measured

CETP at Odhav, Ahmedabad

Name of the Project :	Odhav Enviro Projects Limited Plot No.25, GIDC Estate , Odhav, Ahmedabad-382415 Phone : 079-2891277
No. of Contributing Members :	57
Area of CETP Site :	6,015 sq.mt.
Designed Capacity of CETP :	1,200 m^3/d
Present Flow being Recd. :	720 m^3/d
Cost of the Project :	Rs. 41.5 million (including cost of conveyance, treatment and disposal)
Commencement of CETP :	January,1998
Treatment Units :	Collection sump 2 no. Equalization tank 1 no. Flash mixer Calrifloculater First stagte aaeration tank First stage secondary clarifier Second stage aeration tank Second stage secondary clarifier Intermediate storage tanak

Pressure sandfilter
Cetrated curbon colour
Plated frame type filter press for watering of primary stage
Sludge drying beds for secondary sludge.

Other details :

- The contributing members have to pre-treat the effluent as per the inlet norms prescribed by the governing body of CETP before making discharge.
- The conveyance of effluent to CETP is through underground drainage system consisting of rising mains.
- For the day today discharge individual members have been given specific time slot and quantity of flow is being measured.

-

CETP at Vapi, dist : Valsad, Gujarat

Name of the Project :	Vapi Water & Effluent Management Co. Ltd. Plot No.135, VIA House GIDC Estate, VAPI Dist : Valsad - 396 195 Phone : 02638 – 29950 ; Telefax : 02638 - 30950
No. of Contributing Members :	1800
Area of CETP Site :	2,86,655 sq.m.
Designed Capacity of CETP :	55,000 m^3/d, further expansion is possible upto 90,000 m^3/d
Cost of Project :	Rs.204 million (does not include cost conveyance and disposal) 40 % initially contributed by the industries, remaining amount to be paid in 32 quarterly installments with interest
Commissioning of CETP :	January 1997

Treatment units :

a Screen chamber 1 no.	g. Aeration tank 2 nos
b. Grit chamber 2 nos	h. Secondary settling tank 2 nos.
c. Equalisation tank 1 no.	i. Return sludge pumping stn. 1 no.
d. Equalisation pumping stn. 1 no.	j. Sludge thickener 2 nos.
e. Primary settling tank 2 nos	k. Thickened sludge pumping stn. 1 no.
f. Primary sludge pumping stn. 1 no	l. Sludge drying beds

Effluent characteristics (as on March 2000*)*

Sample specification	pH	SS	TDS	BOD	COD	CL-	S2-	Phenol
Raw effluent after equalisation	7.5	510	88190	792	2202	2763	-	1.85
Final treated effluent	7.3	40	6020	41	601	3516.2	1.17	0.33

All parameters except pH are in mg/l

Other details

- The conveyance is through underground drainage by gravity
- The individual member has to treat the effluent to the norms prescribed try the administrative agency of CETP
- The treatment expenses are levied based on water consumption by the individual unit
- The effluent quality discharged by individual industries is under regular scrutiny.
- The treatment process(BOD and volume) is regularly co-related with power consumption. Reported figures for one year term indicates 1.5 to 2 kwh / kg BOD removed and 0.5 to1 kwh / m^3 of effluent treated.
- Waste minimisation efforts at individual industries underway. Paper units already made headway through 'fibre - recovery'.
- Proposal being scrutinised to accept domestic sewage from Vapi township.

CETP at Mathura, U.P.

Name of the Project : Mathura Industrial Area Pollution Control Co. Ltd.
D-70, Site-A, Industrial Area
Mathura (U.P.)
Phone : 0565-461254

No. of Contributing Members : 30

Area of CETP Site : 16540 sq.m.

Designed Capacity of CETP : 6250 m^3/d

Cost of Project : Rs. 18.8 million

Commencement of CETP : Oct. 1997 (Stabilised since June 1998)

Treatment units :
Equalisation tank
Grit chamber
Flash mixer
Clariflocculator
Aeration tank
Secondary clarifier
Sludge Drying Beds

Effluent characteristics (as on Nov. 1999)

Sample specification	pH	SS	PO4	BOD	COD	Colour	S^{2-}	Oil & Grease
Raw effluent	7.82	82.7	0.21	159	445	1000	61.1	30.4
Final treated effluent	8.3	40.5	0.55	48	142	100	47.5	45

All parameters except pH are in mg/l, colour in hazen units

Other details :

- Pretreatment units are set-up by member units but are poorly maintained
- Conveyance of wastewater from member units is through 3 km long conveyance network operating under gravity.
- The operation & maintenance cost as recovered from member units is based on production. With minimum charges being Rs. 3000 / month they are collected @ Rs 50, Rs 75 and Rs 100 per table / month for different kind of sari manufacturing processes. The net actual operation and maintenance cost comes out to be Rs 11.66 / KL of wastewater treated.

CETP at Naroda, Ahmedabad, Gujarat

Name of the Project : Naroda Enviro Projects Ltd.,
CETP Division
Plot No. 512-515, Opp. : Naroda Post Office
GIDC Estate, Naroda, Ahmedabad
Phone: 079-2816311, Fax: 079-2823299

No. of Contributing Members : 229

Area of CETP Site : 16,500 sq.m.

Designed Capacity of CETP :	3,000 m^3/d
Present Flow being Received :	Plant has not as yet been commissioned, However it is expected @ 70% of designed capacity.
Cost of Project :	Rs.79.5 million (including cost of conveyance, treatment and disposal
Commencement of CETP :	July,1999
Treatment units :	Collection sump Oil and Grease trap Equalization tank 3 nos. Flash mixer Clarifloculater Aeration basin with diffused aeration 4 nos. Second clarifier 2 Nos. Treated water sump 1 No. Plate and frame type filter press and sludge beds for de-watering of sludge
Other details :	

- The contributing members will have to pre treat the effluent as per the inlet norms prescribed by governing body of CETP before making discharge.
- The conveyance of effluent to CETP site is by gravity through wider ground drainage system.

CETP At Nandesari, dist., Gujarat

Name of the project :	Pollution Advisory Committee Nandesari Industries Association Plot No.135/1, GIDC Estate Nandesari - 391 340. Distt. : Vadodara Phone : 0265 - 840390 Fax : 0265 - 840890
No. of Contributing Members :	226 (mostly Organic / inorganic chemical , dye / dye intermidiate units)
Area of CETP Site :	6918 sq.m. (Land area)
Designed Capacity of CETP :	11250 m^3/d
Cost of Project :	Rs 30 million (does not include conveyance & disposal cost)

Commencement of CETP : Nov. 1994

Treatment units :

Collection cell
Grit chamber
Equalization tank
Flash mixer
Flocculation tank
Primary clarifier
Aeration tank with surface aeration
Secondary clarifier
Gravity sand and activated carbon filter
Sludge drying beds.

Effluent characteristics (as on March 2000)

Sample specification	**pH**	**SS**	**TDS**	**BOD**	**COD**	**Cl^-**	**S^{2-}**	**Oil & Grease**
Raw effluent after equalisation	8.1	330	20344	165	1244	8589	1.95	17.5
Final treated effluent	7.6	73.5	7766	74	372	4521	-	-

All parameters except pH are in mg/l,

Other details :

- The conveyance of pretreated effluent to CETP site is through tankers
- The ultimate disposal is gulf of Cambay through 55 km. effluent channel
- The industry has to treat the effluent to the norms prescribed by administrative body for operation & maintenance of CETP i.e. Pollution advisory committee
- The treatment charges recovered from member units are based on COD concentration and water (ind.) consumption. The rates levied are Rs. 15/KL, Rs. 25 /KL and Rs. 40/KL for COD ranges of 0-500, 500-1500 and 1500-2000mg/l respectively
- The raw effluent received at CETP is not easily bio-degradable
- Effective utilisation of treatment units is not observed

CETP At Ankleshwar, Gujarat

Name of the project :	M/s Enviro Technology Ltd. Ankleshwar, Gujarat
No. of Contributing Members :	200
Designed Capacity of CETP :	1000 m^3/d
Cost of Project :	Rs 59.90 million
Commencement of CETP :	Dec. 1996
Treatment units :	Equalisation tank Flash Mixture Primary Clarifier Aeration tank Secondary Clarifier Chlorination,HyderogenPeroxideTreatment Sand bed Granular Activated Carbon Tower Rotory Vacuum Drum Filter

Effluent characteristics (as on March 2000)

Sample specification	**pH**	**SS**	**TDS**	**BOD**	**COD**	**Cl^-**	**S^{2-}**	**Phenol**
Raw effluent after equalisation	1.97	570	48910	2183.5	6940	26309	19.74	8.65
Final treated effluent	7.72	590	8070	31.5	381.5	3893	0.59	1.83

All parameters except pH are in mg/l

Pollution load status (as on March 2000)as received by CETP Ankleshwar

Flow	**SO_4^-**	**SS**	**TDS**	**BOD**	**COD**	**Cl^-**	**S^{2-}**	**Phenol**

Cubic meters / day	Tonnes / day							
980	11.76	0.59	47.93	2.14	6.80	25.88	0.019	0.008

Other details :

- The conveyance of pretreated effluent to CETP site is through rubber lined tankers
- Operational charges are recovered based on effluent characteristics viz: acidity and COD
- CETP generally receives highly acidic wastewater from member units
- CETP has Public Liability Insurance Policy, valid upto Feb 2001

Jeedemetla CETP, Andhra Pradesh

1. Name of the project :	M/s Jeedimetla Effluent Treatment Plant Ltd.
2. Members :	109 medium and small scale units , out of which 66 are active members contributing effluent to CETP
3. Designed capacity :	1500 m^3/d, 66% from bulk drugs, 20% from dye & dye inter- Mediate, 14% from others
4. Cost of project :	Rs. 25 million
5. Date Commencement :	1989
6. Conveyance system :	Through tankers
7. Treatment units :	Neutralisation tank - 2 nos Equalisation tank - 2 nos Clariflocculator - 1 nos Buffer tanks - 3 nos Distribution Chamber - 1000 m^3 Aeration tank - 3 nos Sec. Clarifier - 2 nos Primary SDB - 6 nos Sec. SDB - 3 nos
8. Measures undertaken at CETP	

- Construction of additional aeration tank
- Construction of pipeline for conveyance of treated waste
- Segregation (proposed) of waste having low and high dissolved solids(TDS)

9. Measures suggested at industry level

- Provision of 7 days' storage for pre-treated/ segregated effluent
- Reduce effluent generation by 40 %

11. Pattern of cost sharing : On the basis of C.O.D., in addition to this a minimum charge is levied from all member units irrespective they are active or not, as the CETP already has built-in treatment capacity for them

CETP at Jullundhar, Punjab

1. Name of the project : M/s Punjab Small Scale Industries Export Co-operation (PSIEC), Leather Complex, Kapoorthala Rd. Jullundhar, Punjab .

2 Members :	29 medium and small scale units pursuing chrome tanning
3. Area of CETP :	Approximately 40,000 sq.m
4. Designed capacity :	1500 m^3/d, pre-treated tannery waste blended in 9: 1 proportion with sewage.
5. Cost of project :	Rs. 9.6 million
6. Operational cost :	Rs. 4.03 million / y
7. Date of Commencement :	June 1995
8. Conveyance system :	The CETP is established in leather complex, wherein the member units are also established. The effluent is conveyed through 2 ft. wide RCC / RBC open channels
9. Treatment units :	Equalisation tank - 1 no. Reaction channel Oxidation tank Primary Clarifier - 1 no. Main Clarifier - 1 no. Aeration tank - 1 no. Polishing pond - 1 no. Sec. Clarifier - 1 no. Sludge tank - 2 no. Sludge beds
10. Pattern of cost sharing :	On the basis of plot size and volume of effluent.

CETP at Unnao, U.P.

Name of the project :	M/s Unnao Tanneries Pollution Control Co. Ltd.(UTPCCL) A-&, Site-II, Indl. Area, Unnao
Members :	21 medium and small scale units pursuing chrome and vegetable tanning , out of which 11 are active members contributing effluent to CETP
Designed capacity :	2150 m^3/d
Area of project :	20311 sq.m
Cost of project :	Rs. 19.5 million
Operational cost :	Rs. 7.03 million
Date of Commencement :	31.01.1996
Conveyance system :	5 km long closed conveyance network made of HDPE / RCC followed by drains covered with pre-cast slabs.
Treatment units :	Screen chamber - 2 nos. Equalisation tank - 2 nos Clariflocculator - 2 no Aeration Tank - 2 no Clarifier - 2 no. Sludge Beds - 20 nos

Effluent characteristics (as on Dec. 1998*)*

Sample specification	**pH**	**SS**	**Alk.**	**BOD**	**COD**	**Cl^-**	**S^{2-}**	**Cr. Total**
Raw effluent	8.6	1037	1310	1178	2408	3241	211	32.2

Final treated effluent	8.2	214	850	101	521	3219	102	4.1

All parameters except pH are in mg/l,

Measure(s) undertaken at CETP

- Bio-remediation technique being tried to restrict content of sulphides and chromium in effluent

Measures at industry level

- Six industries performing chrome tanning (raw to wet blue operations) have set-up chrome recovery plants(CRP)

.Pattern of cost sharing : On the basis of raw water consumption / standard rate of effluent generation.

CETP at Kanpur, U.P.

Name of the project : 36 MLD, UASB Plant, Jajmau, Kanpur.

Members : 354 tanneries, Out of which 305 are active members which consist of 167 chrome tanning units, 35 vegetable tanning, 55 pursuing both type of tanning and 48 units engaged in leather splitting. Out of 305 active members 6 are in large scale and remaining 299 in small or medium scale category.

Designed capacity : 36000 m^3/d, consisting of mixture of tannery waste and sewage blended in 1:3 ratio.

Area of project : 30,000 sq.m

Cost of project :

UASB plant : Rs. 118.81 million

Conveance system : Rs. 39.08 million

Post treatment : Rs. 62.99 milion

Date Commencement : Dec. 1994

Conveyance system : Through 17.57 km long network, wherein majority is closed and some of the portions are open channel covered with pre-cast slabs. Flow is facilitated by 4 pumping stations located at appropriate junction in the network

Treatment units : Screen chamber - 4 nos; Grit channel - 4 nos.
Equalisation tank - 2 nos; UASB reactors - 2 nos
Collection well - 1 no; Diffuser - 1 no
Dosing tank - 1 no; Clariflocculator - 2 no
Sludge thickener - 1 no; Gas holder - 1 no.
Sludge Beds

Effluent characteristics (as on June 2000)

Sample specification	**pH**	**TSS**	**VSS**	**BOD**	**COD**	**NH_3-N**	**S^{2-}**	**Colour**
Raw effluent after equalisation	8.23	563	401	243	917	192	-	100
Final treated effluent	8.4	230	142	86	353	197	223	100-150

All parameters except pH are in mg/l, color in hazen units

Measure(s) undertaken at CETP

- The effluent treated through UASB system and Post Treatment units is to be blended with treated sewage and to be used for irrigation.

Measures at industry level

- Sixteen industries performing chrome tanning have set-up chrome recovery plants(CRP) .

  Eight proposals for CRP are under different stages of commissioning.

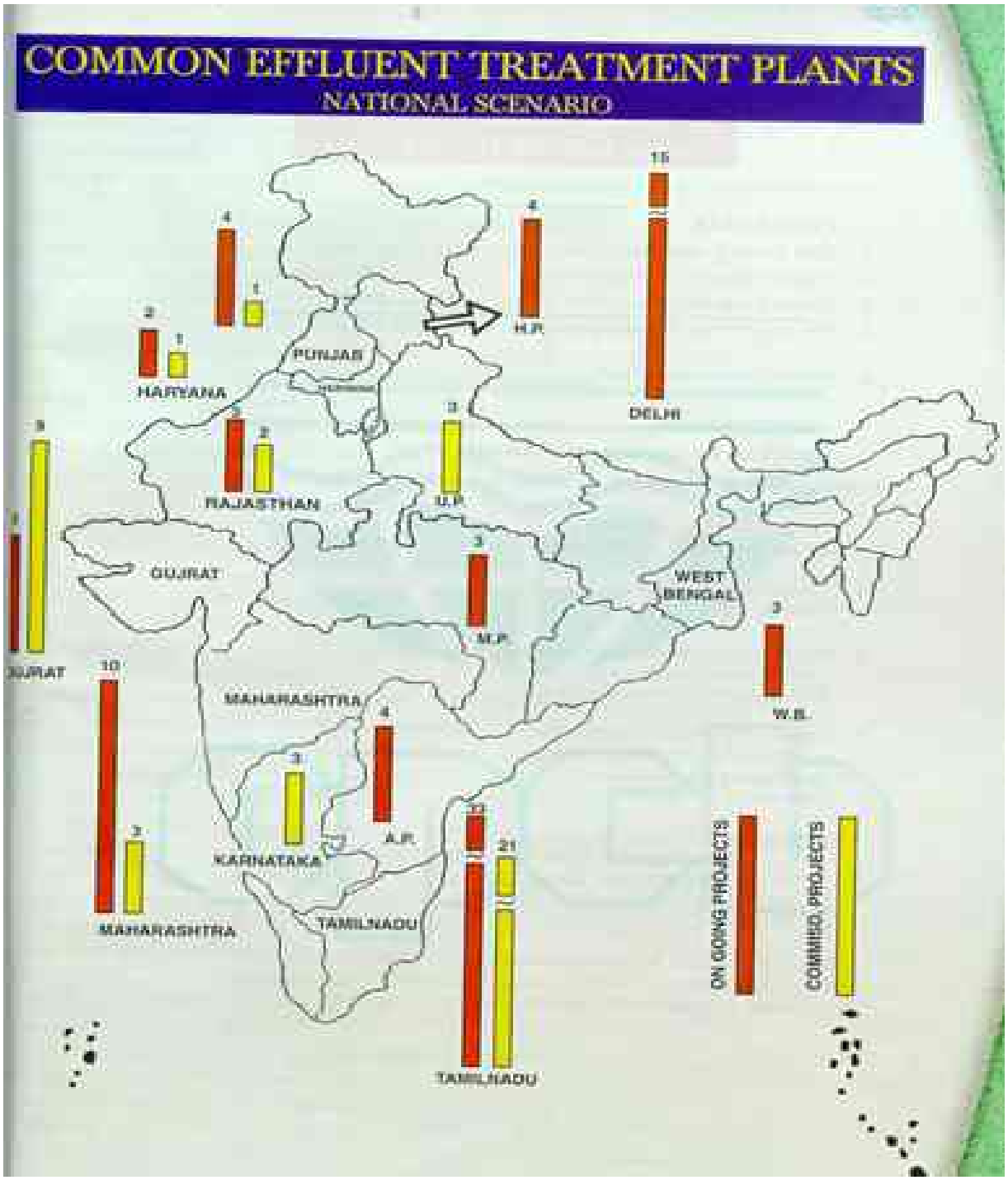
Pattern of cost sharing : On the basis of number of hides processed by the individual industry.

CETP AT KANPUR

GAS BASED GENERATORS

UASB REACTORS

GAS COLLECTION NETWORK



DESIGNED ENERGY BUDGET
A case with CETP * at Kanpur

CONSTANTS

1. Total Power Requirement of the plant : 372 KW
2. Designed capacity of Gas generation : 1800 M^3/D
3. Designed capacity of Gas dome : 600 M^3

4. Nos. and wattage of Gas engines : 3 Nos.180 KW each.

5. Hourly consumption of Gas : 3x75 M^3

CONCLUSIONS
(Based on designed specification)

1. Hourly Generation of Gas : 75 M^3

2. Time required to completely fill

the gas dome(Plant on KESA supply) : 8 hrs.

3. Gas Amount in excess which should

either be utilized or flared. : 1200 M^3/d

4. Duration for which the entire plant

can be run exclusively on Gas, once

the Gas dome is completely filled. : 3.8 hrs.

5. Duration for which the entire plant

can be run by completely utilizing

the designed gas production.

(1800 M^3/day). :11.61 hrs.

CONSIDERING POWER REQUIREMENT OF THE PLANT BEING 372 KW, IT CAN BE WORKED-OUT THAT 48 % OF THE POWER REQUIREMENT CAN BE MET BY OPTIMUM GENERATION AND UTILISATION OF GAS AT THE DESIGNED GENERATION CAPACITY OF 75 M3/HR

*** The CETP at Kanpur has its designed capacity of 36 MLD and receives combined waste constituted by 9 MLD Tannery waste and 27 MLD Sewage. The treatment is through UASB Anaerobic process**

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