COMMON EFFLUENT TREATMENT PLANT

Water is life (ઝન મેં જીવન...)

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CONTENTS OF PRESENTATION:

• CONCEPT & ADVANTAGES OF CETP
• INLET AND OUTLET NORMS FOR CETP
• MANAGEMENT & MEMBERSHIP
• COLLECTION MECHANISM
• INFRASTRUCTURE
• OPERATION AND MAINTENANCE
• RECORD KEEPING
• RECAPPING PREVIOUS PRESENTATION ON ETP
Concept & Advantages of CETP

- A collective effort for the treatment of effluent especially for cluster of small scale industrial units at lower unit cost.
- It not only helps the industries in easier control of pollution, but also act as a step towards cleaner environment and service to the society at large.
- Waste water of individual industries often contain significant concentration of pollutants; and to reduce them by individual treatment up to the desired concentration, become techno-economically difficult – CETP is better and economical option.
- Availability of professional and trained staff for the operation of CETP, which can otherwise be difficult, at SSI level.
- Space constraint at individual industry level.
- Handling sludge is reduced / avoided at industry level.
- Aiming at achieving end-of-pipe treatment of combined wastewater at lower unit cost than could be achieved by individual industries, and to facilitate discharge.
Inlet & Outlet Norms for CETP

Standards for Common Effluent Treatment Plants as per, (Environment Protection Rules, 1986)

CETP norms.....
Management & Membership

Management

- CETP shall be professionally managed – should be Special Purpose Vehicle (SPV) registered under an appropriate statute
- Shall have CEO with relevant qualification and adequate experience – experience of at least 5 years of operating ETP / CETP
- Shall have team of professionals for operation, maintenance, quality assurance, R & D, accounting, legal compliance etc...
- Shall strive for improvement in treatment by all technical and legal means ways – associations with academic institutes, research institutes etc...
- Shall take all decisions in transparent manner
- Shall publish/furnish their financial audit report to the concern agency/department/members. Shall be linked with environmental audit.
- Shall have facility of prompt communication with their member industries – through automated SMS, email etc. – e.g. dissemination of information about quality (inlet & outlet) for sensitization etc...
- Should play a role of service provider cum regulator – not mere operator
- Should accord all certifications / accreditation viz. ISO 9001 : 2008, ISO 14001 : 2004, OHSAS 18001, NABL to demonstrate and to ensure systems are in place
Management & Membership

Membership

- Membership certificate shall be granted & issued to members.
- Rationale approach – Unit category wise membership fees shall be prescribed.
- Haphazard membership shall not be granted – distantly located industry, inter estate membership etc. be avoided unless considered at the time of establishment
- Quality of effluent that is to be received at CETP shall be judiciously ensured at the time of grant of membership – should be representative / factual
- Member industry shall be clearly informed about the inlet norms, if any and/or design inlet values and any treatment that is required by industry to carry out at their end prior to sending to CETP to meet with inlet norms/values – removal of heavy metals, phenols, ammonical-nitrogen etc.
  - Inlet norms : Legally prescribed values for different parameters
  - Inlet value : Designed / Specified value which may be amended by CETP management from time to time with regard to compliance to final quality at outlet for different parameters
Management & Membership

Membership

- Designed / consented value shall not exceed designed criteria.
- Acceptance criteria shall be well defined and intimated to member **three months in advance** : e.g. high TDS, refractory COD, colour etc...
- Registered quantity / receipt of quantity of effluent shall be in conformance to CCA quantity
Management & Membership

Membership

- Shall carry out random / periodical audit of member industry through reputed third-party – to cross check treated effluent being received etc.
- While registering members, cumulative quantity and quality be taken into consideration vis-à-vis available treatment facilities and capacity
- Shall issue membership certificate clearly indicating quantity, membership number, validity etc.
- Member industry shall not have any outlet other than CETP – no dual discharge or membership except for advance treatment
- A legal agreement with member industry clearly delineating relationship and mutual obligations.
- The cost recovery formula developed should be ratified by all members.
- Member shall be asked to provide guard pond of adequate capacity (48 hours storage capacity) at their end – to facilitate any corrective action(s) at CETP / conveyance pipeline
- Shall provide technical assistance to their member industry for any difficulties in achieving inlet norms / values, ISO certification etc.
Collection Mechanism

- CETP mainly receives raw / partially treated effluent as per consented norms from their member industries for further treatment through
  - **Effluent collection through Dedicated Tanker**
    - Should be sufficient in numbers to cater the need of member industries
    - Tanker shall be rubber lined *(if corrosive effluent is to be transported)* and properly labeled
    - Physical condition of tankers should be regularly checked – to avoid any spillage, leakage during transportation due to corrosion etc.
    - Registration with RTO for the purpose and compliance to guidelines for transportation
    - Shall be GPS mounted
    - Trained drivers
    - No movement during night time *(7 P.M. to 7 A.M.)*
Collection Mechanism

- **Effluent collection through Dedicated Tanker**
  - Randomization of tanker and drivers to lift effluent from member industry – same tanker / driver to same industry be avoided
  - Each movement / fleet be recorded

- **Effluent collection through Pipeline**
  - Dedicated pipeline – preferably over ground
  - Standard flow meter with totalizer on outlet / discharge line at each member industry
  - Regular checking for physical condition of pipeline (fitness of pipeline) and for any possible pilferage
  - Network of pipeline shall be such that finger printing of industr(ies) / pocket is possible in case of receipt of any abnormal flow / quality
Collection Mechanism

- **Effluent collection through Pipeline**
  - SCADA system shall be provided – to check for any leakage
  - System in place for immediate communication with member industries for stoppage of discharge in case of pipeline leakage / breakage and preparedness for immediate corrective action(s) through SMS / email etc.
Infrastructure

- Adequate land area with provision of future expansion / upgradation and green belt
- Sufficient parking area for tankers and resting area for drivers
- Mechanized lime slurry preparation for neutralization
- Storage shed for various chemicals
- D. G. Set(s) of sufficient capacity
- Laboratory capable of analyzing all necessary parameters including microbiology – also should have rapid analysis capability with reference to acceptance criteria so as to permit receipt of effluent
- R & D division
- Engineering store with adequate inventory of spares
- Electrical & instrumentation division
- Measuring and metering devices – inlet totalizers, tamper proof efficient magnetic flow meter & TOC-TN meter at outlet with recording and connectivity with XGN, on-line pH, TDS, DO meter at appropriate places
- Metering pumps for calculated dosing of chemicals
- Provision of dyke wall, acid proof brick lining wherever required
- Leachate collection and conveyance to collection tank
Infrastructure

- Spare tanks of adequate size to facilitate preventive and / or sudden maintenance of operational units
- Piping as per P & ID with proper colour coding
- Continuous sampler at final outlet – to ensure quality of treated effluent discharged by collecting and analyzing composite sample – may be collected on hourly basis
- Guard pond – to guard against any unforeseen circumstances
- Mechanized sludge dewatering system – RVDF, Belt filter press etc.
- Adequate sludge storage area
- Separate energy meter
- First Aid / Occupational Health Center
- Pilot plant
- Sufficient lighting within entire premises
- Accounts and administration building
- Security
- Weigh bridge, if necessary
Operation and Maintenance

- Quality of effluent received through each tanker be ensured through analysis for conformance to inlet norms and acceptance criteria
- Fleet shall be arranged in such a way that there is no queuing of tankers awaiting their turn to decant effluent
- Pre-informed preventive maintenance schedule – to facilitate smooth preventive maintenance within shortest possible time without affecting much to the smooth operations of CETP and manufacturing activities of member industries
- Regular checking of important parameters for each of the treatment units to ensure requisite efficiency – DO, MLSS/MLVSS in aeration tank, TDS at outlet of primary clarifier etc.
- Segregated streams be stored separately – high ammonical-nitrogen bearing stream is separately collected, analyzed, recorded and imparted MAP treatment at ETL, Ankleshwar
Operation and Maintenance

- Ensuring no foaming, foul odour nuisance to surrounding – by adding de-foaming agent, covering necessary tanks, provision of industrial deodorant spray etc.
- **Sewage shall be mixed at appropriate location(s) in appropriate proportion, if required.**
- Ensuring no dilution either by the members or at CETP level.
- Continual improvement - Striving for bringing R & D study result to pilot plant level to operational level for enhancing the treatibility
- Ensuring reduction in resource consumption / water consumption – usage of treated waste water for lime slurry preparation, filter backwashing, energy audit etc.
- Exploring usage of primary sludge / gypsum in cement industry
- No use of flexible pipes
- Prompt disposal of sludge – no extended storage
- Skill upgradation of all personnel including drivers through regular training
Operation and Maintenance

- Keeping watch on maneuvering of dedicated tankers through GPS
- Mock drills
- Implementation of recommendations / suggestions of environmental audit
- Seeking help of GPCB regional office under environmental clinic for any short falls
Operation and Maintenance

- Studying effluent characteristics for any non-compliance to the discharge norms and devising alternate / additional treatment methods. For Example.....

  At CETP-ETL, Ankleshwar

  - High ammonical-nitrogen bearing stream received from member industries are now segregated and imparted MAP treatment
  - Refractory COD / high TDS stream now segregated and sent to common MEE
  - Member industries are motivated / persuaded to use alternate clean raw materials / manufacturing processes
  - Aerator designed modified enabling supply of calculated air supply / oxygen supply and requiring minimum preventive maintenance
  - Cultivation of special cultured microbes
    - All these have improved treatability of the conventional treatment units leading to better compliance to discharge norms

- Compliance to all EC/CCA conditions
- Improved house keeping
Record Keeping

- By CETP:
  - Record of CCA of each member industry
    - Validity
    - Waste water quantity
    - Membership certificate copy
    - Treatability report – shall be crosschecked for what use has been made etc.
  - Member wise record - each tanker (daily, monthly, yearly)
    - Number of tankers received
    - Quantity of effluent received
    - Total quantity of segregated stream received, if any
    - Quality of effluent received
    - Number of tankers rejected with reasons
  - Quantity and quality wise record thus kept for each member shall be compared with quantity & quality data submitted at the time of taking membership – any abnormality be brought to the notice of concern regional office of GPCB apart from regular submission of above data.
Record Keeping

By CETP:

- Daily record maintenance and monthly submission pertaining to
  - Total quantity of effluent received
  - Total quantity of treated effluent discharged
  - Total quantity of sewage mixed, if any
  - Total quantity of segregated stream received, if any – high ammonical – nitrogen bearing stream
  - Composite quality of untreated effluent at inlet
  - Composite quality of treated effluent discharged
  - Chemical consumed, energy consumed, D. G. Set operations, water consumed
  - Sludge generated and disposed at TSDF

- Shift wise log-book for CETP operations shall be maintained

- Non-conforming effluent received from member industry be sent back after proper record keeping / tracking under the intimation of concern GPCB regional office

- Membership status – total number of members, any new member, termination of existing member etc.
Record Keeping

- By CETP:
  - Number of Executives (Top management) and their tenure – rotation may be considered
  - Profit making / no loss – no profit type / other
  - Inventorization of names of products or materials which spoil the result of common facility
Unit wise Inspection....... 

While inspecting individual treatment units of the CETP, it shall be inspected keeping in mind the points which were already documented and explained in previous presentation on ETP.
ALL OF US DO NOT HAVE EQUAL TALENT. YET, ALL OF US HAVE AN EQUAL OPPORTUNITY TO DEVELOP OUR TALENTS.

~ Ratan Tata

THANK YOU...
Standards laid by Ministry of Environment and Forests, Government of India for **Common Effluent Treatment Plants** as per, (Environment Protection Rules, 1986)

A. Primary Treatment

<table>
<thead>
<tr>
<th>Parameter for inlet effluent quality of CETP</th>
<th>Standards (Concentration in mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.5 - 9.0</td>
</tr>
<tr>
<td>Temperature °C</td>
<td>45</td>
</tr>
<tr>
<td>Oil &amp; Grease</td>
<td>20</td>
</tr>
<tr>
<td>Phenolic Compounds (as C₆H₅OH)</td>
<td>5.0</td>
</tr>
<tr>
<td>Ammonical Nitrogen (as N)</td>
<td>50</td>
</tr>
<tr>
<td>Cynide (as N)</td>
<td>2.0</td>
</tr>
<tr>
<td>Chromium hexavalent (as Cr⁶⁺)</td>
<td>2.0</td>
</tr>
<tr>
<td>Chromium (total) (as Cr)</td>
<td>2.0</td>
</tr>
<tr>
<td>Copper (as Cu)</td>
<td>3.0</td>
</tr>
<tr>
<td>Lead (as Pb)</td>
<td>1.0</td>
</tr>
<tr>
<td>Nickel (as Ni)</td>
<td>3.0</td>
</tr>
<tr>
<td>Zinc (as Zn)</td>
<td>15</td>
</tr>
<tr>
<td>Arsenic (as As)</td>
<td>0.2</td>
</tr>
<tr>
<td>Mercury (as Hg)</td>
<td>0.01</td>
</tr>
<tr>
<td>Cadmium (as Cd)</td>
<td>1.0</td>
</tr>
<tr>
<td>Selenium (as Se)</td>
<td>0.05</td>
</tr>
<tr>
<td>Fluoride (as F)</td>
<td>15</td>
</tr>
<tr>
<td>Boron (as B)</td>
<td>2.0</td>
</tr>
<tr>
<td>Alpha emitters, Hc/mL</td>
<td>10-7</td>
</tr>
<tr>
<td>Beta emitters, He/ml</td>
<td>10-8</td>
</tr>
</tbody>
</table>

**Note:** 1. These Standards apply to the small scale industries, i.e. total discharge upto 25KL/Day.

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 clusters of units, the State Board with the concurrence of CPCB in writing, may prescribe suitable limits.

Contd..
## Treated Effluent Quality of Common Effluent treatment Plant

[Concentration in mg/l except pH & Temperature]

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Into inland surface waters</th>
<th>On land for irrigation</th>
<th>Into Marine Coastal areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.5-9.0</td>
<td>5.5-9.0</td>
<td>5.5-9.0</td>
</tr>
<tr>
<td>BOD [3days at 27 °C]</td>
<td>30</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Oil &amp; Grease</td>
<td>10</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Temperature</td>
<td>Shall not exceed 40 °C in any section of the stream within 15 meters down stream from the effluent outlet</td>
<td>-</td>
<td>45 °C at the point of discharge.</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Dissolved Solids (inorganic)</td>
<td>2100</td>
<td>2100</td>
<td>-</td>
</tr>
<tr>
<td>Total residue chlorine</td>
<td>1.0</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td>Ammonical nitrogen (As N)</td>
<td>50</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>Total Kjeldahl nitrogen (as N)</td>
<td>100</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>250</td>
<td>-</td>
<td>250</td>
</tr>
<tr>
<td>Arsenic (as As)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Mercury (as Hg)</td>
<td>0.01</td>
<td>-</td>
<td>0.01</td>
</tr>
<tr>
<td>Lead (as Pb)</td>
<td>0.1</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td>Cadmium (as Cd)</td>
<td>1.0</td>
<td>-</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Cadmium (as Cr)</td>
<td>2.0</td>
<td>-</td>
<td>2.0</td>
</tr>
<tr>
<td>Copper (as Cu)</td>
<td>3.0</td>
<td>-</td>
<td>3.0</td>
</tr>
<tr>
<td>Zinc (as Zn)</td>
<td>5.0</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Selenium (as Se)</td>
<td>0.05</td>
<td>-</td>
<td>0.05</td>
</tr>
<tr>
<td>Nickel (as Ni)</td>
<td>3.0</td>
<td>-</td>
<td>5.0</td>
</tr>
<tr>
<td>Boron (as B)</td>
<td>2.0</td>
<td>2.0</td>
<td>-</td>
</tr>
<tr>
<td>Percent Sodium</td>
<td>-</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>Cyanide (as CN)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Chloride (as Cl)</td>
<td>1000</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>Fluoride (as F)</td>
<td>2.0</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Sulphate (as SO₄)</td>
<td>1000</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td>Sulphide (as S)</td>
<td>2.8</td>
<td>-</td>
<td>5.0</td>
</tr>
<tr>
<td>Pesticides</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Phenolic compounds (as C₆H₅OH)</td>
<td>1.0</td>
<td>-</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Note:** All efforts should be made to remove colour and unpleasant odour as far as possible.