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SUSTAINABLE ENVIRONMENTAL SANITATION AND WATER SERVICES

Major integrated Environmental System for Relocation of 540 Tanneries in Kolkata city - A biggest Environmental Project of its kind in Asia

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Introduction

The tanning Industry is one of the oldest and fastest growing industries in South and South East Asia. There are more than 3000 tanneries located in India with a total processing capacity of 700,000 tones of hides and skins per year. The wastewater discharge from these tanneries is about 100,000 cubic meters per day. More than 90% tanneries are in small and medium scale sector with processing capacities of less than 2-3 tons of hides/ skins per day.

Pollutional discharges in tannery wastewater per ton of hides/skins process are given in the following Table.

Table 1— Average pollutional loads in tannery wastewater per ton of hides/skins processed

Sl. No.	Pollutional Parameter	Unit Value	Pollutional load in Kg
1.	Biological Oxygen Demand (BOD), 5 days @ 20°C	1800 mg/l	70
2.	Chemical Oxygen Demand (COD)	4500 mg/l	180
3.	Chlorides as (Cl)	7000 mg/l	270
4.	Dissolved solids	1500 mg/l	600
5.	Suspended solids	3000 mg/l	100
6.	Sulphides (as S)	100 mg/l	4
7.	Total Chromium (as Cr)	150 mg/l	6

The treated effluent shall meet the standards of BOD; 30 mg/L, COD: 250 mg/L, TDS: 2100 mg/L, Chlorides: 1000 mg/L, Sulphide: 2 mg/L and Chromium: 2 mg/L for discharge into inland surface water. For discharge into sea, the TDS and chloride limits are not considered necessary.

Environmental Management Plan

According to the present Indian Environmental Pollution control regulations, the tanneries are obliged to set up effluent treatment systems either individually or collectively and the treated effluent shall meet the pollution control standards.

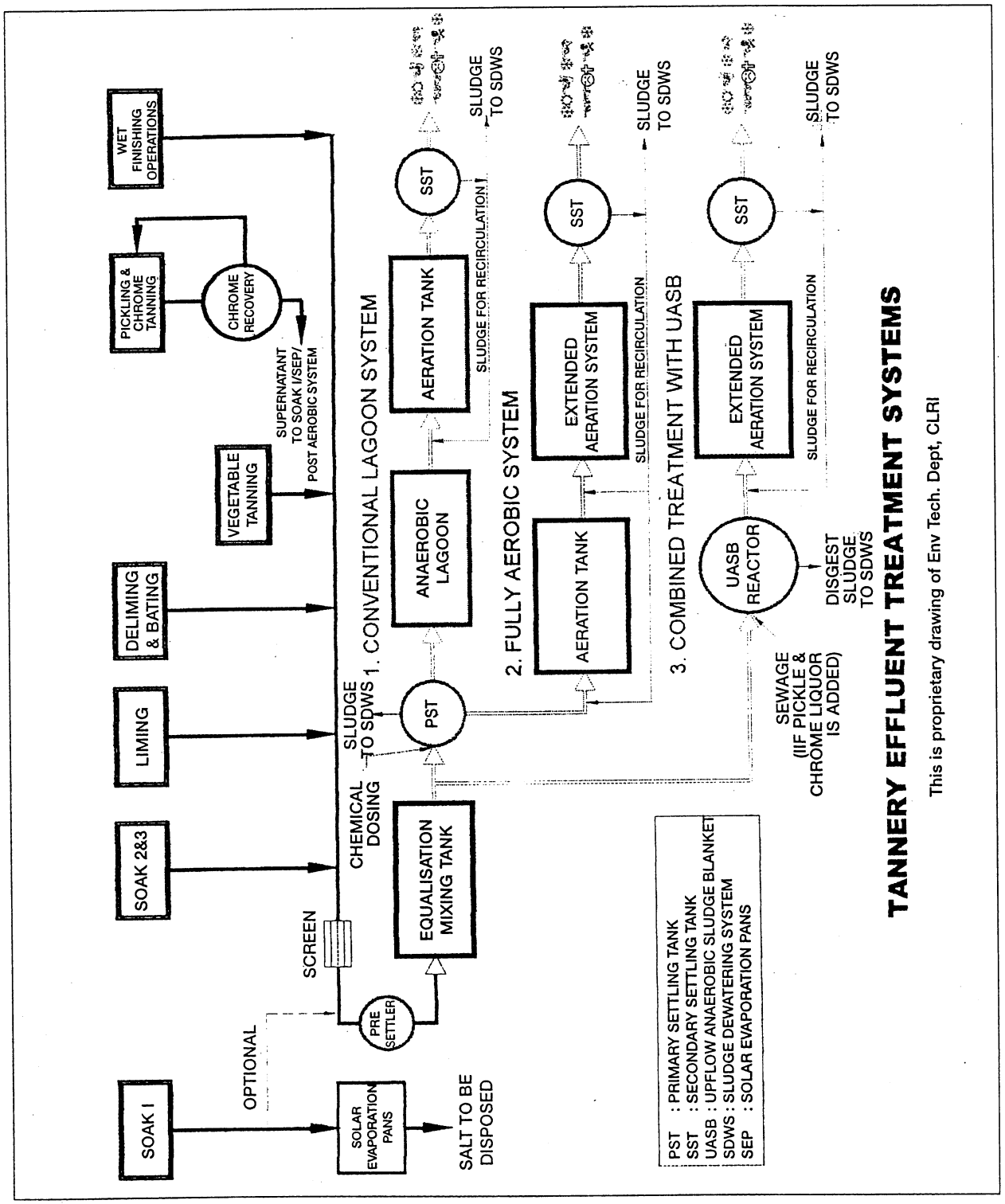
The tanneries in India and other countries in South Asia and Africa can be grouped into four major categories for effluent treatment management.

- Large and medium scale tanneries with adequate land, finance and managerial capacity had to set up individual effluent treatment plants.
- Tanneries located in clusters and do not have adequate land and financial/technical capability to set up individual effluent treatment units but feasible to set up CETP had to provide CETP system.
- Cluster of tanneries in cities like Istanbul & Izmir in Turkey, Kollata (Calcutta), Jalandhar, Bombay in India, Colombo in Srilanka, Cairo in Egypt etc. where there is no scope even for a CETP due to non-availability of adequate land, public resistance from the surrounding area, other-economic aspects etc. had to relocate and develop separate industrial complex with CETP system.
- Scattered small-scale tanneries, which neither can set up individual effluent treatment plant nor be included in a planned CETP system had to relocate and join one of the clusters with CETP system or to close down.

Environmental Plan for Relocation of Tanneries in Kolkata

There are 540 operating tanneries in three clusters namely in Tangra, Tiljala and Topsia in Kolkata Metropolitan area. Since there is no scope for providing individual units (ETPs) or common effluent treatment plants (CETPs) in the existing tannery clusters a new leather complex called Calcutta Leather Complex (CLC) is being developed in 24 Paraganas - District about 20 km from the Kolkata city. The relocating tanneries are being provided with pretreatment units and chrome recovery and reuse system. The effluent will be collected through a closed pipe line network of nearly 100 km upto the CETP. The treated effluent is discharged through a backwater canal of 30 km long to the sea.

The leather complex will have a CETP system of 30 MLD capacity in 6 modules each with 5 MLD capacity. The total cost of the CETP system is estimated at Rs. 900 million (i.e. about 20 million US Dollars). The complex with CETP is expected to be operational by 2003. The treated effluent will be discharged to the backwaters of the Bay of Bengal.



Treatment Technology

Treatment system development adopted for Calcutta Leather Complex comprises of five steps namely:

- Segregation of certain sectional waste streams such as spent chrome liquor for chrome recovery and reuse
- Pretreatment such as screeming, pre-settling and removal of coarse setteable matter in individual units.
- Transportation through closed pipeline system and pumping stations
- Common receiving chamber, physio-chemical treatment such as equalization cum mixing, chemicals dosing, primary settling and sludge dewatering system

- Secondary biological treatment adopting extended aeration system with special bio-sludge Recirculation system and

- Disposal of sludge from effluent treatment plants.

The treatment systems popularly adopted in India are shown in Fig. 1.

Investment and Finance

The capital cost of an effluent treatment plant depends upon the type of treatment technology, location, final mode of disposal etc. Capital cost for implementing 1000 cubic meter/day capacity effluent treatment plant ranges from 0.7 to 0.9 million US Dollars (Rs. 30 to Rs. 45 million). The estimated cost for implementation of the CETP system at Leather Complex is 20 million USD (i,e. Indian Rupees 950 million).

Treatment cost of 1000 cubic meter effluent including operation and maintenance cost, financial cost etc. ranges from 350 to 750 US Dollars (i.e. Rs. 15,000 to Rs. 35,000). Cost Estimate for the effluent plants are made on capital investment of the plants and annual operation and maintenance for utilization of its designed capacity.

Future R&D Options for Sustainable Development

The following are the emerging essential technological organisational options for long term sustainable development and environmental protection of the small and medium scale industries:

- Sustainable technological application for management of solid wastes from tanneries and effluent treatment plants and bio-energy generation by development of appropriate anaerobic treatment system such as improved UASB, sulphur recovery etc.

- Critical evaluation and optimisation of energy, chemical and water utilization in environmental pollution control systems.

- Development of appropriate technologies for degradation of matter and removal of pathogens from the wastewater.

- Econometrix on environmental compliance of Small and Medium Enterprises (SMEs) and sustainable development.

- Biotechnological development for removal of sulfate in acidic waste discharges from tanneries and associate industrial units.

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