News Letter On Cleaner Production And Technology

GCPC - ENVIS

Vol. 01, No. - 03 Oct. - Dec. 2003

Green
&
Clean
Environment

GUJARAT CLEANER PRODUCTION CENTRE

Estd by: Gujarat Industrial Development Corporation (GIDC)

What is CP ?

CONTENTS:-

CLEANER PRODUCTION V/S END-OF-PIPE TREATMENT

Cleaner Production(CP) offers an alternative to the conventional end-of-pipe strategies practiced by the industries. While the aim of the end-of-pipe approach is to control/treat the waste and emissions when they are already created, CP aims to prevent waste and emission during the creation in the first place. This reduces the need to install and operate, often expensive end-of-pipe control facilities like wastewater treatment plants, gaseous emission treatment and disposal of solid & hazardous wastes. It also saves input resources (water, raw materials, chemicals & energy) from being lost in the form of waste and emissions. Thus CP offers a twin benefit of improving economic performance of the company and simultaneously reduces the environmental impact as depicted in Figure-1 (NIEM-UNEP 1998).

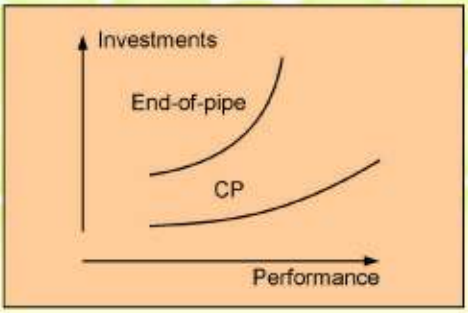


Fig. 1 : CP as cost effective approach to environmental management

CLEANER PRODUCTION IN CHEMICAL PRODUCTION (CP IN CP)

DR.C.B.UPASANI

Director,

JYOTI OM CHEMICAL RESEARCH CENTRE

Shed No. K1 7705/2, GIDC, Ankleshwar 393 002

INTRODUCTION:

Gujarat is one of the most entrepreneur friendly state of India wherein during last half a century large number of chemical industries are established. Ankleshwar is the major industrial estate developed by Gujarat Industrial Development Corporation (GIDC) covering 25 Km^2 area, exclusively meant for chemical industries. It also consists of large number of engineering, textile, plastic, paper and other industries. The development of these industries has lead to the generation of huge quantities of wastewater, gaseous emissions and solid waste. To minimize all these types of waste generations, Cleaner Production activity was carried out in number of chemical units located in this estate. The ultimate aim was to obtain the ecological and economical efficiency through the optimal use of inputs, instead of relying on end of pipe pollution control technologies.

Production of chemicals involves different operations and processes like filtration, washing, drying, distillation, drowning, reduction, precipitation etc. All these operations and processes are associated with the generation of different quantities and qualities of effluent depending upon the type of product and type of the operations and processes involved. Here we are presenting the first part of our article with the single unit operation i.e washing operation.

CLEANER PRODUCTION IN WASHING OPERATION:

Filtration is the major operation in the production of chemicals. It is carried out either in the centrifuge, nutsch filters or in the filter press. After the filtration, wet cake is given the washings with large quantity of fresh water to make it either salt free, acid free or alkali free. Thus, huge quantity of wastewater is generated which is drained and finally goes to the effluent treatment plants for the treatment. At the treatment plant also, chemicals are needed to neutralize such wastewaters before disposal. Thus, the opportunities associated with the recycling of these effluents or the recovery of the saleable byproduct is often neglected by the industries.

Cleaner production in the washing operation can be carried out in a simple way. Washings given to the wet cake should be carried out in stages and stored in different containers. Suppose, number of washings given to the wet cake are four, the first stage washings containing concentrated mass can be treated in the treatment plant or if it contains some saleable by product it can be sold to the actual users. The second stage washings can be utilized as first stage washing in the next batch. The third stage washings can be used in the second stage washings in the next batch and the fourth stage washings can be used as third stage washings in the next washing. Last washings can be utilized for the dilution in the next batch or goes for the washing in the third stage.

Thus exploring such cleaner production opportunities will not only result in reduction of fresh water consumption and decrease in waste water generation but also can bring extra income to the industry. Cleaner production opportunities in washing operation is explored in one of the chemical unit, a case study of which is presented as under:

A CASE STUDY:

M/s. Nucleophile Chemicals was established in the year 1986 in the GIDC Estate of Ankleshwar. It is involved in the manufacture of 3-nitro 4-chloro benzoic acid, which is used as a pharmaceutical intermediate.

Brief Manufacturing Process :

Para chloro benzoic acid is nitrated to 3-nitro 4-chloro benzoic acid using concentrated nitric acid. After the reaction is over, the product is diluted with water and filtered. Wet cake is made acid free by giving water wash. The wet cake is then dried to get the final product. Large quantity of wastewater was generated due to number of washings given to the wet cake to make it acid free. It was found that washings given contain different concentrations of nitric acid. Observations are as under:

FILTERATE	:	Contains approx. 30 % nitric acid.
FIRST WASH	:	Contains approx. 9.5% nitric acid.
SECOND WASH	:	Contains approx. 5% nitric acid.
THIRD WASH	:	Contains approx. 2.5% nitric acid.
FOURTH WASH	:	Contains approx. 1 % nitric acid.
FIFTH WASH	:	Contains approx. 0 % nitric acid.

Thus, this five stage washings were given leading to the generation of large quantity of waste water containing spent acid which needs treatment before disposal.

Cleaner production activity is carried out in this unit. It was found that recycling of the washings can be done containing different concentrations of acid. All the five stage washings are stored in different storage tanks and recycling is done in the following way:

FILTERATE	:	30 % nitric acid (By product generation)
Ist WASHINGS	:	Recycled as extra wash and mixed with 30 % nitric acid.
IInd WASHINGS	:	Recycled in the Ist washing in the next batch.
IIIrd WASHINGS	:	Recycled in the IInd washing in the next batch.
IVth WASHINGS	:	Recycled in the IIIrd washing in the next batch.
Vth WASHINGS	:	Recycled in the reactor for dilution.

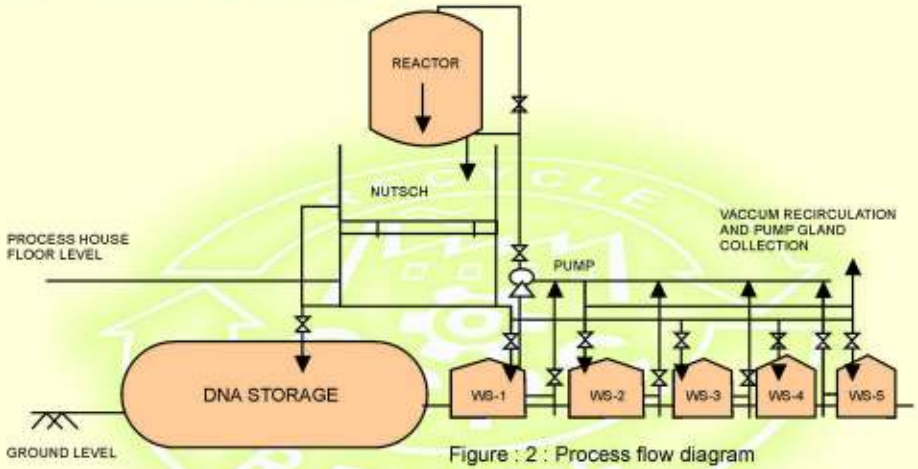


Figure : 2 : Process flow diagram

Thus, all the washings are utilized in a proper way resulting in no effluent generation by the industry. Adoption of these steps are associated with number of benefits like:

1. Zero wastewater generation.
2. No treatment cost.
3. Fresh water conservation.
4. Better image.
5. Increase in quantity of saleable byproduct i.e. 30% nitric acid.

SUCCESSTORIES OF CP AT FISH PROCESSING SECTOR ,VERAVAL

Industrial Scenario	Fish processing typically consumes large quantities of water and energy and discharges significant quantities of organic material, both as effluent and as solid waste. Until recently, the seafood industry did not have to meet major environmental demands. The industry is now facing growing demands from local and central authorities (A 5 MLD CETP is about to start at Veraval) to establish fast and efficient environmental protection. **These demands may force the companies to consider and plan major investments in pollution control and this in a period when many of them are fighting simply to survive financially.**
Objective of Study	The aim of the Sectoral study is to locate potential areas in which improvisation will lead to economy in operations, minimize waste, sustain export revenues and possibility of growth through CP assessment exercise.A project was completed with technical support of Prof.Vipul Shah
Target of CP	CP assessment exercise was started at four units with the target of reducing energy consumption by 10%, water consumption by 25 % and developing a habit of self-evaluation during course of exercise.

Summary of Economic Gains

Industry	Investment (in lacs)	Savings achieved (lacs/annum)	Further potential exists	
			Envisaged investment (in lacs)	Anticipated benefits (lacs/annum)
Unit - 1	0.34	8.14	60.55	64.83
Unit - 2	1.00	1.88	33.15	27.70
Unit - 3	3.00	6.00	27.15	30.30
Unit - 4	0.20	2.13	00.75	1.08
Total	**4.54**	**18.15**	**121.60**	**123.91**

It can be seen that so far industries have invested **Rs. 4.54 lacs and achieved savings of around Rs. 18.15 lacs per annum.** This indicates **saving to investment ratio of around 4.**
Along with betterment in yield, economic gains are further devided in to following areas.

(1) Energy:

Collectively all industrial units put together have saved 3,77,360 kWh per annum equivalent to 10.6 % of the total kWh consumption per annum i.e. 35,56,000 kWh. This is matching with the expected target of reducing energy consumption by 10 %.

(2) Water:

All industrial units collectively have saved around 55,00,000 lit of water/annum, which is equivalent to 7.6 % of total water consumption per annum Total potential identified for water conservation was 24.93 % and reasons for only 7.6 % reduction in water consumption are attributed to easy availability, low cost of water and nature of industry. However, it is expected that treatment cost at CETP will provide driving force for remaining water conservation, which is not applicable today.

Though the cost of water is not substantial for units, its conservation could generate **Social Gains** at Veraval. Potential identified for reducing water is around 24.93 % of total water consumption per annum for the sector. **It is estimated that if around 20 % of potential is achieved for the sector, it can save 17,94,96,000 lit quantity of fresh water which can fulfill water requirement of around 3500 person of Veraval population per day** (as per standard norms of WHO of 140 LPCD)

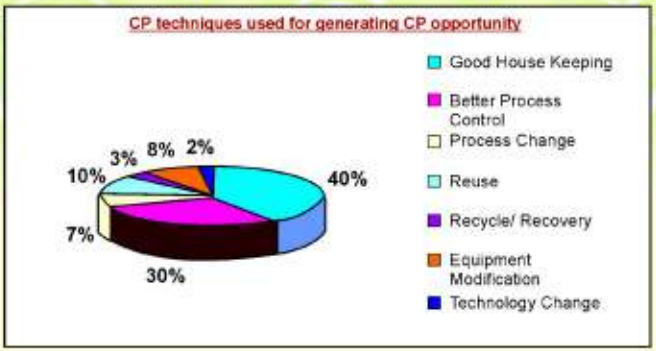
(3) Waste water:

In this sector, the waste water quantities are more than the quantity of water used on account of lot of ice getting consumed by industrial units. **Overall potential identified for reducing wastewater is 20.92 % and achieved is 6.38 %.**

(4) Solid waste:

However, **major solid waste in this sector is coming in the form of 'Kutta'/ trash fish. It is estimated that around 70 % of catch is 'Kutta'/ trash fish.** Compared to this quantity, solid waste generation at industrial units is very negligible and can be neglected on account of its minimal impact and low cost.

However, 'Kutta' has significant impact in terms of future of fisheries, marine Eco-system, bad odor in Veraval and in surrounding areas etc. and shall be given due importance and consideration by all stake holders. Lot of initiative in this direction has already begun and a movement in the offing for sustainable fisheries in this area.



CP World wide

There is a major role of UNIDO-UNEP in development of Cleaner Production Centres around the world for providing assistance to the industries not only to reduce the pollution at the source itself, but also as a cost effective measure. Till date 29 centre have been established in all over world including the National Cleaner Production Centre in India.

Name of Nation	Web Site & E-mail Address
Brazil	E-Mail: ncpc@terra.com.br Web-Site: www.rs.senai.br/cntl
China	E-Mail: ningduan@craes.org.cn
Costa Rica	E-Mail: cnpml@cicr.com Web-Site: www.cnpml.or.cr
Croatia	E-Mail: marijan.host@apo.hr Web-Site: www.cro-cpc.hr
Cuba	E-Mail: cterry@ama.cu Web-Site: www.redpml.cu
Czech Republic	E-Mail: christinova@cpc.cz Web-Site: www.cpc.cz/
El Salvador	E-Mail: bcoughlin@cnpml.org.sv Web-Site: www.cnpml.org.sv
Ethiopia	E-Mail: ecpc@mail.telecom.net.et
Guatemala	E-Mail: cgpl@cgpl.org.gt Web-Site: www.cgpl.org.gt
Hungary	E-Mail: skerekes@enviro.bke.hu Web-Site: www.hcpc.bke.hu
India	E-Mail: ncpc@del2.vsnl.net.in Web-Site: www.ncpcindia.org
Kenya	E-Mail: info@cpkenya.org
Viet Nam	E-Mail: vncpc@un.org.vn Web-Site: www.un.org.vn/vncpc
Zimbabwe	E-Mail: mchidavaenzi@sirdc.ac.zw

Name of Nation	Web Site & E-mail Address
Mexico	E-Mail: djorperez@hotmail.com Web-Site: www.cmpl.ipn.mx/
Morocco	E-Mail: cmpp-maroc@aim.net.ma Web Site: www.alhilali70@yahoo.com
Mozambique	E-Mail: mncpc1@teledata.mz
Nicaragua	E-Mail: ceb@ibw.com.ni Web-Site: www.cpmlnic.org.ni
Rep. Of Macedonia	E-Mail: avramovski1@hotmail.com
Rep. of Korea	E-Mail: youngpk@kitech.re.kr
Russian Federation	Mail: stas@gubkin.ru Web-Site: www.ncpc.ru/
Slovak Republic	E-Mail: viera@scpc.sk Web-Site: www.scpc.sk
South Africa	E-Mail: CMASUKU@CSIR.co.za
Sri Lanka	E-Mail: sncpc@mail.ewisl.net
Tanzania	E-Mail: cpct@ud.co.tz
Tunisia	E-Mail: DG@citet.nat.tn Web-Site: www.citet.nat.tn/
Uganda	E-Mail: pmwesigye@ucpc.co.ug
Uzbekistan	E-Mail: uzbekncpc@ars-inform.uz

RECENT EVENT - ENVIRO Tech-2003

(Mr. Bharat Jain, Member Secretary, GCPC making presentation)

ENVIRO TECH 2003 ,a conference-cum-exhibition on Clean Environment Technologies was organized by CII at Ahmedabad, from 12- 14 December'03. Focus areas of this exhibition were treatment of industrial effluents and reusing water, handling sewage treatment and reuse of water, solid waste management and revenue generation, recycling and reuse of wastes, Air pollution measuring and control systems etc.

Chairman of CII, Gujarat Council, Piruz Khambatta while addressing curtain raiser on the event said " The objective of the event is to bring latest, efficient and cost effective technologies at the doorsteps of Indian Industry and other stake holders like the municipal corporation, solid waste management, effluent treatment plant operators, NGOs and educational institutes." The regional coordinator of US Aid and Exchange programme Mr. P.U. Asnani Chairing the technical session on Clean Environmental Technologies on 13th Dec.'03, pointed out that Solid Waste Management is a serious problem and municipalities, industry etc. should view it as a huge business opportunity. Mr. N J. Hogendoorn ,NMCP, Netherland also appreciated the Waste treatment facilities implimented at Ahmedabad, Ankleshwar Industrial Estates. Ms. Sandra Shroff presented a case study " Waste to Wealth" of United Phosphorous Limited. The Member Secretary of Gujarat Cleaner Production Centre, Mr. Bharat Jain sketched the activities of Gujarat Industrial Development Corporation in providing all basic infrastructure to industries in the Golden Corridor. He said that GCPC has been instrumental in promoting Cleaner Production Concept in State through Orientation Programmes, Training Programmes and Demonstration Project. He also presented **"Success stories of Cleaner Production implementations"** in the industries of Gujarat and urged industries to come forward for adopting CP.

Editorial Team

Mr. Nalin Gami
Project Coordinator, GCPC

Miss. Jayshree. Jamliya
Chemical Engineer, GCPC

Mr. Shivraj Sharma
Program Officer, GCPC-ENVIS-Node

Contact Us :

Bharat Jain - Member Secretary
GUJARAT CLEANER PRODUCTION CENTRE
Gujarat Industrial Development Corporation
Block No: 4 , 3rd Floor, Udhyoug Bhavan ,
Sector-11,Gandhinagar-382017
Ph: 91 79 23243211, Fax : 91 79 23244306
E-mail:info@gcpcgujarat.org

Siddhi Vinayak Printers. Ph. 079-22133463

The electronic version of the News- Letter is also available at our Web- Site: www.gcpcgujarat.org