Comprehensive Environmental Pollution Abatement Action Plan Ankleshwar Industrial Cluster - Gujarat

Gujarat Pollution Control Board
Gandhinagar
2010

INDEX

Annexures

FOREWORD

Need of action plan is justified to control pollution in any area where pollution sources are identified, pollutants are measured, assessed and found exceeding permissible limits. To implement such action plans is a duty of any SPCB and all concerned agencies/stakeholders.

After declaration of critically polluted areas by OMs dated 13.1.2010 and 15.3.2010 of MoEF, GOI and imposing temporary moratorium for a period upto August 2010, the action plans for these specified areas (industrial clusters) are desired by the CPCB and MoEF, GOI.

In Gujarat, six areas – Ankleshwar, Vapi, Ahmedabad, Vatva, Bhavnagar and Junagadh – are identified by above OMs as critically polluted. GPCB started quick actions, expanded its infrastructure, decided and declared main points to control pollution at source, prepared action plans including these points and finalized the same in consultation with main stakeholders and issued necessary directions. These action plans were sent to MoEF on 19.4.2010. Meanwhile, by letters dated 19.4.2010 and 18.5.2010, CPCB suggested TOR to make the action plans. Accordingly the action plans are revised.

Consultative meetings were held with various stakeholders including the industries associations, CETP/TSDF operators, NGOs, CPCB and GIDC authorities, who have helped to improve the action plans.

We are thankful to the CPCB and MoEF to have recognized the wholehearted efforts by GPCB team, DoEF, GIDC, VW&EMCL industries of Vapi and all other concerned.

We are hopeful that this will serve the purpose and help various agencies/ authorities to implement and monitor the Action Plans for the six industrial clusters/ areas of the state.

We are also hopeful that the implementation of these Action Plans would bring in the positive results in other clusters also.

Place: Gandhinagar
Date: 30-10-2010

Dr.K.U.Mistry
Chairman, GPCB

COMPREHENSIVE ENVIRONMENTAL POLLUTION ABATEMENT ACTION PLAN FOR ANKLESHWAR INDUSTRIAL CLUSTER – GUJARAT

1. INTRODUCTION

1.1 Area Details including brief history :

Ankleshwar Industrial Estate set up by Gujarat Industrial Development Corporation in 1975. This industrial estate is spread over an area of 1574.34 hectares in close proximity to National Highway No.8 and Delhi-Mumbai Railway Line. This industrial estate houses more than 1200 industries which consist of industries manufacturing chemicals, pesticides, pharmaceuticals, bulk drugs, petroleum products, engineering, textiles, plastics, rubber and packaging etc.

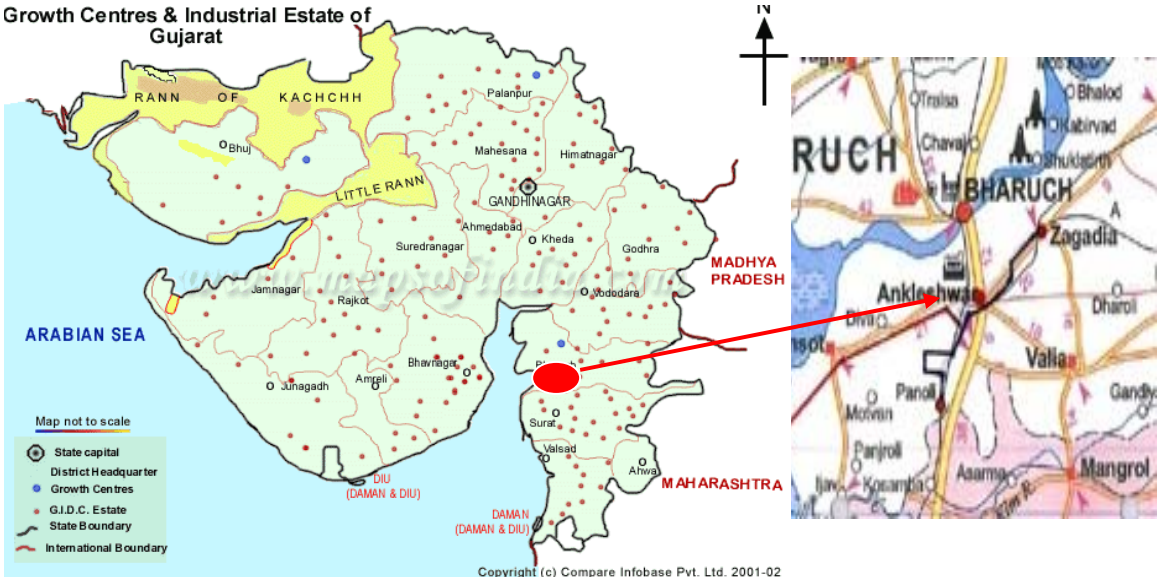
This industrial estate through their constant endeavor for providing better infrastructure and educational facilities have created a special niche and presently estate has,

- Enviro Technology Limited – a CETP was established in 1986 having 1.8 MLD capacity and EC is obtained to increase the capacity to 3.5 MLD.
- Common incinerator of 2.5 MT/Hr capacity was erected in 2004 near TSDF site.
- Closed pipeline conveyance from FETP to deep sea was completed in 2006. The capacity of FETP is of 60 MLD.
- Disaster Prevention Management Centre (DPMC) which does many activities including running of prescribed courses of Industrial Safety and Environment Protection.
- Ankleshwar Research & Analytical Infrastructure Limited was established in 2008. Analytical Laboratory and Research Centre also exists.
- AEPS ecology centre was established in 2009.
- Library at United Phosphours Limited provides a place to thousands for technical books, publication and other reading materials.
- Attractive green belt and plant ecology centre for research work is also established.
- Centre of Excellence is worth visiting.
- Children Theater and Gattu High School are famous.
- Sports complex including swimming pool, tennis court, jogging track and cricket ground is established and programmes are being conducted throughout the year.
- Big and good residential colonies, K. M. Munshi town hall, gardens and green place are provided near estate for the

local residents and creates attractive living place / atmosphere.

Panoli Industrial Estate is set up by Gujarat Industrial Development Corporation. This industrial estate is spread over an area of 1056 hectares in close proximity to National Highway No.8 and Delhi-Mumbai Railway Line. This industrial estate houses more than 700 industries which consist of industries manufacturing chemicals, pesticides, pharmaceuticals, bulk drugs, petroleum products, textiles, plastics, etc.

1.2 Location :



1.3 Digitized Map with Demarcation of Geographical Boundaries and Impact Zones :

Digitized Map with Demarcation of Geographical Boundaries and Impact Zones is attached as Annexure – 1.

1.4 CEPI Score :

Industrial Cluster / Area	Air	Water	Land	CEPI	
Ankleshwar	72.00	72.75	75.75	88.50	Ac_Wc_Lc

1.5 Total population and sensitive receptors (hospitals, educational institutions, courts etc) residing in the area comprising geographical area of the cluster and its impact zone (minimum 2 km) and health impact related data :

It has been observed that the industrial area was developed long back in the year 1975 and gradually due to the industrial and commercial developments residential establishment also started.

Ankleshwar :

Population

Population within 3 km radius – 19415 persons approx.

Sensitive Receptors

TALUKA	VILLAGE	EDUCATIONAL	MEDICAL	DRINKING WATER	POST & TELEGRAPH	TRANSPORTATION	APPROACH TO VILLAGE	NEAREST TOWN	POWER SUPPLY
ANKLESHWAR	Sarangpore	P (2)	CHW	W, HP	PHONE	BS	PR, KR	Ankleshwar-10	EA
	Jitali	P (3), H, AC (4), O	PHC, RP, SMP, CHW	T, W, HP	PO, PHONE	BS	PR, KR	Ankleshwar-10	EA
	Dadhal	P (3), O	PHS, FPC, CHW	T, W, HP	PO, PHONE	BS, RS	PR, KR	Ankleshwar-9	EA

Panoli :

Population

Population within 3 km radius – 14510 persons approx.

Sensitive Receptors

TALUKA	VILLAGE	EDUCATIONAL	MEDICAL	DRINKING WATER	POST & TELEGRAPH	TRANSPORTATION	APPROACH TO VILLAGE	NEAREST TOWN	POWER SUPPLY
ANKLESHWAR	Sanjali	P(2), O	CHW	T, W	PO, Phone	BS, RS	PR, KR	Ankleshwar-10	EA
	Panoli	P(3), H, O	H, MH, CWC, PHS, D, FPC, NH, RP, SMP, CHW	T, W	PTO, Phone	BS, RS	PR	Ankleshwar-10	EA
	Kharod	P(3), H, O	CWC, PHC, CHW	T, W	PO, Phone	BS	PR, KR	Ankleshwar-10	EA
MANGROL	Nana Borsara	P, Ac	-(5-10 kms)	T, W, TK	-(-5 KMS.)	-(-5KMS)	KR	Kosamba-5	EA

ABBREVIATIONS

1. Education
P-Primary Elementary School
H-Matriculation or Secondary
O-Other Educational Institution
PUC-Higher Secondary/Intermediate/pre-University/junior Collage
AC – Adult literacy class
TR – Training center

2. Medical Facilities
RP-Registered Private Practitioner
PHS-Primary Health Centre
FPC-Family Planning Centre
D- Dispensary
CHW - Community Health Worker/Health Worker

H - Hospital
NH - Nursing Home
MH - Maternity Home
PHC - Public Health Centre
CWC - Child Welfare Centre
TB - T.B Clinic
O – Others

3. Drinking Water

T-Tap Water
HP-Hand Pump
TK-Tank Water
W-Well Water
R-River Water
C-Canal
N - Nallah
S - Spring

4. Post & Telegraph

PO-Post Office
PTO-Post & Telegraph
Phone-Telephone Communication

5. Transportation

RS- Railway Station
BS-Bus Station
NW-Navigable Waterway

6. Approach to Village

PR-Pucca Road
KR-Kuccha Road

7. Power Supply

EA-Electricity for all purposes
EAG - Electricity for Agriculture
ED - Electricity for domestic
EO - Electricity for other purpose like Industrial, Commercial etc.

Health Impact Related Data

As per the information available from the office of the Director of Industrial Safety & Health, Ahmedabad and office of the National Institute of occupational health, Ahmedabad, they have stated that no incidence of death due to pollution or occupational disease or poisoning is recorded in their office.

Occupational health centers are provided by MAH units in this cluster to monitor health of the industrial workers. Primary health center are provided in industrial cluster.

1.6 Eco-geological features :

1.6.1 Major Water Bodies (Rivers, Lakes, Ponds etc.)

River Narmada passes through on the Far North side of Ankleshwar Industrial Cluster.

Regular monitoring of the quality of River Narmada is being carried out.

1.6.2 Ecological parks, Sanctuaries, flora and fauna or any eco sensitive zones.

There are no identified ecological parks, sanctuaries or any eco sensitive zones within the CEPI area. Being a planned industrial area there are no specific local flora and fauna in the area except planned plantation and gardens.

1.6.3 Buildings or Monuments of Historical / archaeological / religious importance.

There are no identified monuments of historical, archaeological or religious importance within the CEPI area.

1.7 Industry classification and distribution :

1.7.1 Highly Polluting Industries (17 categories)

Sector	Large	Medium	Small	Total
Chlor-Alkali	02	00	00	02
Aluminium	00	00	00	00
Cement	00	00	00	00
Copper	01	00	00	01
Dyes & Dyes Intermediate	07	05	176	188
Distillery	04	00	00	04
Fertilizer	00	00	00	00
Iron & Steel	00	00	00	00
Oil Refineries	00	00	00	00
Pulp & Paper	03	04	02	09
Petrochemicals	00	00	00	00
Pesticides	15	00	00	15
Pharmaceuticals	16	8	48	72
Sugar	03	00	00	03

Tannery	00	00	01	01
TPP	00	00	00	00
Zinc Smelter	00	00	00	00
Total	**51**	**17**	**227**	**295**

1.7.2 Red Category Industries (54 categories)

Category	Large	Medium	Small	Total
Red	25	17	436	478

***** Above are the figures of industries located within the industrial estates of Ankleshwar and Panoli.

1.7.3 Orange and Green Category Industries

Ankleshwar : ***Number of Industries :***

Category	Large	Medium	Small	Total
Orange	5	5	130	140
Green	0	1	12	13
Total	5	6	142	153

Panoli : ***Number of Industries :***

Category	Large	Medium	Small	Total
Orange	1	3	34	38
Green	0	0	2	2
Total	1	3	36	40

1.7.4 Grossly Polluting Industries

There is no industrial unit in CEPI area having direct discharge into River or Khadi.

2. WATER ENVIRONMENT

2.1 Present status of water environment :

2.1.1 Water bodies / effluent receiving drains in the area important for water quality monitoring

- River Narmada (Annexure 2)
- River Amravati (Annexure 3)
- Amlakhadi (Annexure 4 & 5)
- Chhapra Khadi (Annexure 11)
- Vand Khadi (Annexure 6)

2.1.2 Present levels of pollutants in water bodies / effluent receiving drains / ground water

Above mentioned water bodies which directly / indirectly receive effluent are being regularly monitored and results of the same are shown in Annexure at numbers mentioned in the parenthesis respectively.

Ground water Quality Monitoring is also done regularly by GPCB from various locations and the compiled analysis results for few of them are shown in Annexure-7.

2.1.3 Predominant sources contributing to various pollutants

The predominant sources of water pollution in Ankleshwar region is industrial pollution as the area is accommodating industrial units manufacturing a spectrum of products covering pharmaceuticals, dyes & dyes intermediates, pesticides, other chemicals, paints, textiles etc. Inadequate / lack of sewerage system, sewage also contributes to water pollution problem.

2.2 Sources of Water Pollution

2.2.1 Industrial

As mentioned above, predominant sources contributing to various pollutants are industrial units and partly domestic effluent. Estate wise average monthly hydraulic load to FETP based on last six month data indicates

Ankleshwar estate	: 33 MLD
Panoli estate	: 04 MLD

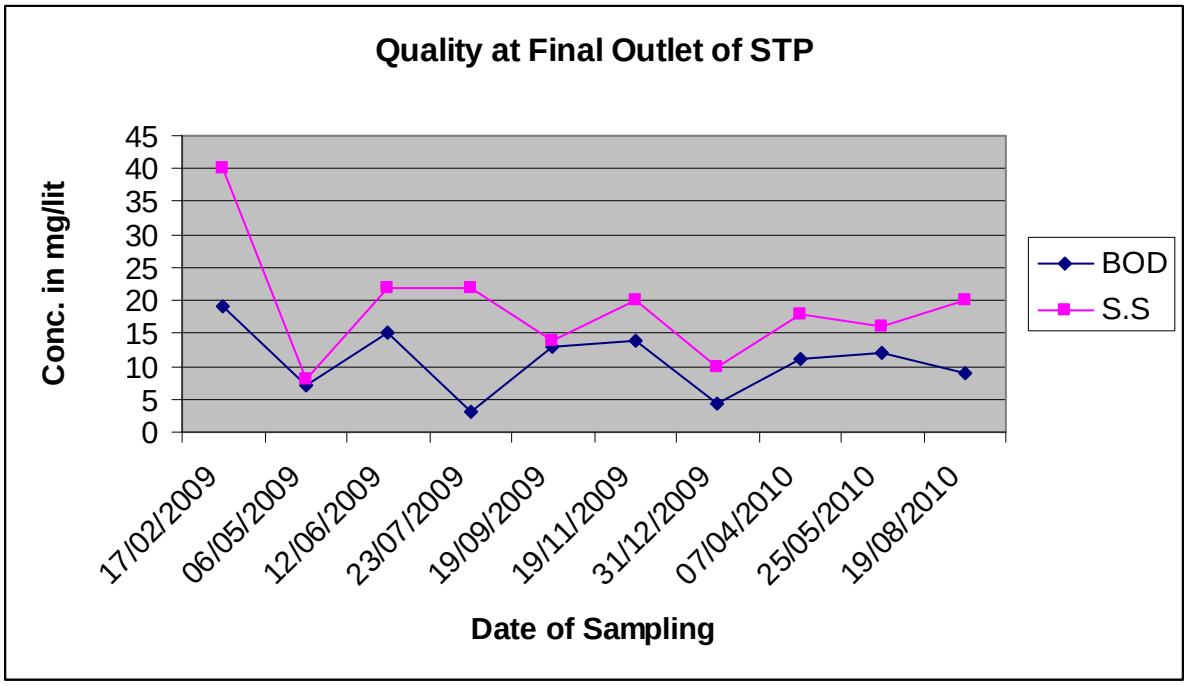
Quality of the month wise effluent received from Ankleshwar and Panoli estate to FETP is summarized and attached as Annexure – 8 and 9 respectively.

2.2.2 Domestic

Ankleshwar : STP was commissioned in February 2009 for sewage of GIDC, Ankleshwar residential area. This STP is located at Plot No. 624/B, Valia Road, Ankleshwar. Capacity of STP is 22 MLD. Present load is average 4 MLD. STP consists of collection tank, grit chamber, aeration tank with diffused aeration system, settling tank, sludge drying bed. Gas Chlorination system is yet to be commissioned. Treated sewage was used for gardening and partly earlier was discharged into Amlakhadi. Now, treated effluent is diverted to FETP through

Final Pumping Station of Ankleshwar. The quality of treated sewage discharged from final outlet of STP is depicted below. Results of the samples of the treated sewage are attached as Annexure 10.

Sewage of some villages located near Amlakhadi on upstream of Ankleshwar estate also finds its way into Amlakhadi as there is no treatment and disposal method available.



(For above Graphs – Refer Annexure – 10)

Panoli : Domestic waste water by industries is generally disposed off into septic tank / soak pit system and/or treat it along with its trade effluent. Many of industries use it in their secondary treatment units of ETP as well. There is a village namely Sanjali which is in close proximity to the estate and domestic waste water in absence of any conventional treatment system; findings its way to nearby natural drain / Chhapra Khadi.

2.2.3 Others (Agricultural runoff, leachate from MSW dump, illegal dump site etc.)

As far as CEPI area for Ankleshwar cluster is concerned, above mentioned sources are not significant.

2.2.4 Impact on surrounding area (outside the CEPI Area) on the water courses / drainage system of the area under consideration

Due to industrial activities within the CEPI area i.e. industrial estates at Ankleshwar and Panoli, water stretches namely Amlakhadi, Chhaprakhadi, Vand khadi and River Narmada as well as Amaravati are directly or indirectly affected. Quality data for the same are already considered under point no. 2.1.2.

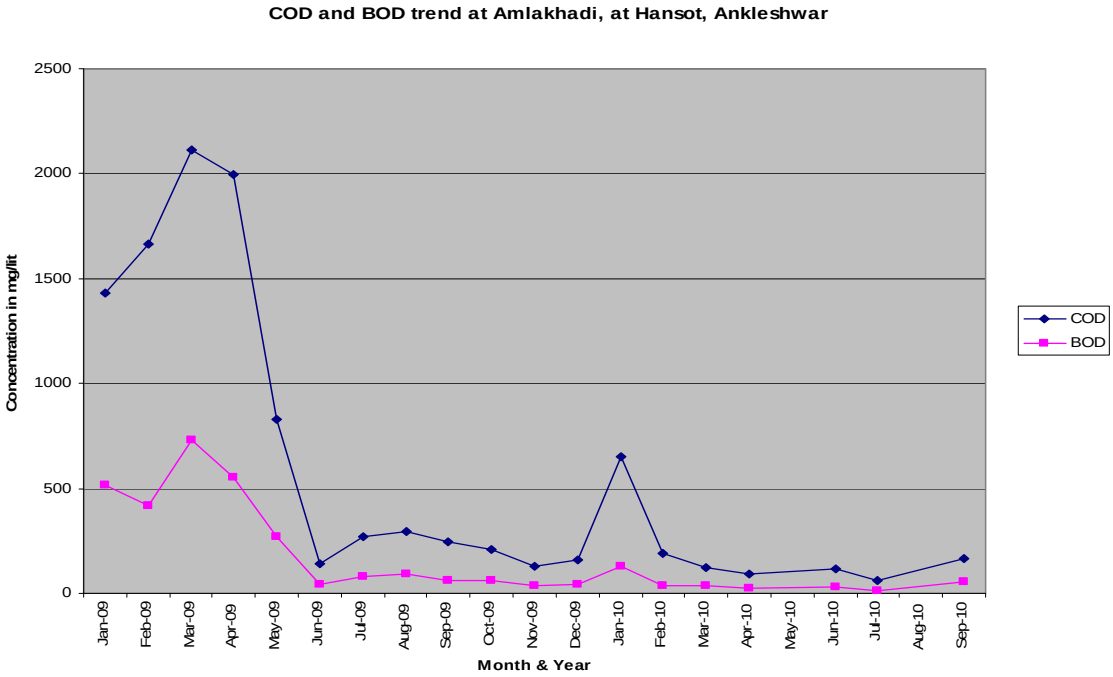
2.3 Details of water polluting industries in the area / cluster

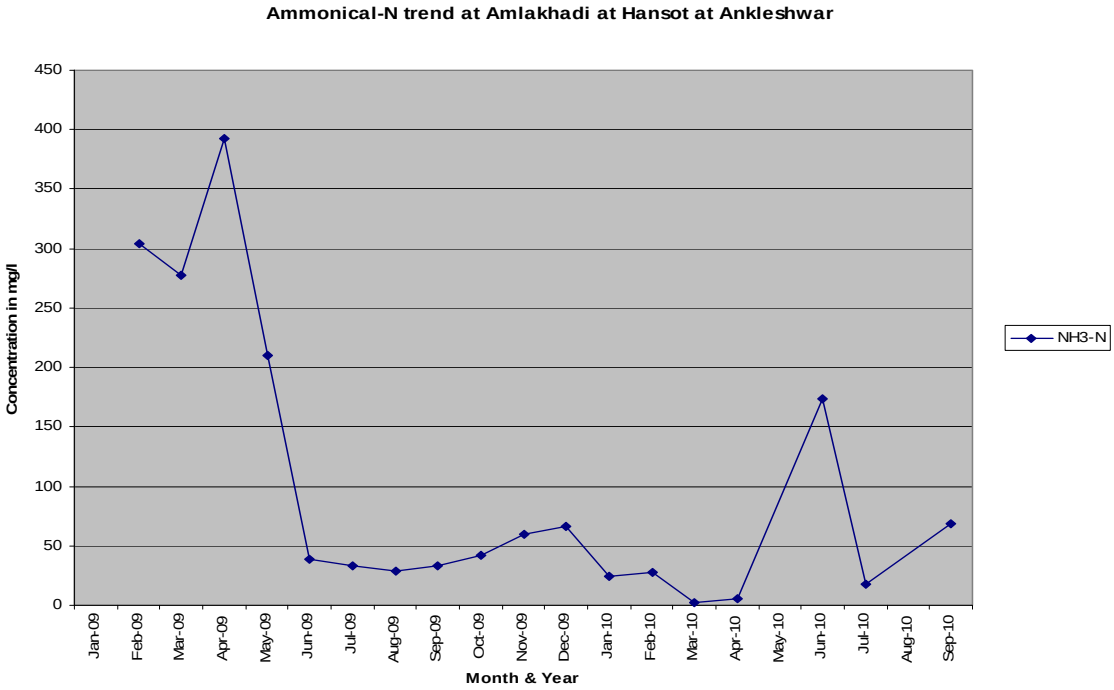
These data are presented under point no. 2.6.2.

2.4 Effluent Disposal Methods – Recipient water bodies etc.

Previously when BEAIL pipeline was not commissioned, effluent was reaching to estuary of River Narmada through Amlakhadi. With passage of time and considering the gravity of the issue, pipeline was laid for conveyance and disposal of entire effluent of all the three industrial estates located at Ankleshwar, Panoli and Jhagadia to deep sea and thereby, stop the direct discharge of effluent into the Amlakhadi. However, still in some cases of leakages and / or other unforeseen circumstances, effluent might reach to Amlakhadi and therefore to keep watch on the situation, under Amlakhadi action plan, samples are collected along the stretch from four different locations. At times, domestic effluent of the nearby area also goes to Amlakhadi. In case of abnormality or discharge of effluent to Amlakhadi irrespective of its quality, necessary immediate action(s) are being taken by concerned stake holders.

Results of the samples thus collected are tabulated and attached as Annexure – 4 as mentioned above.

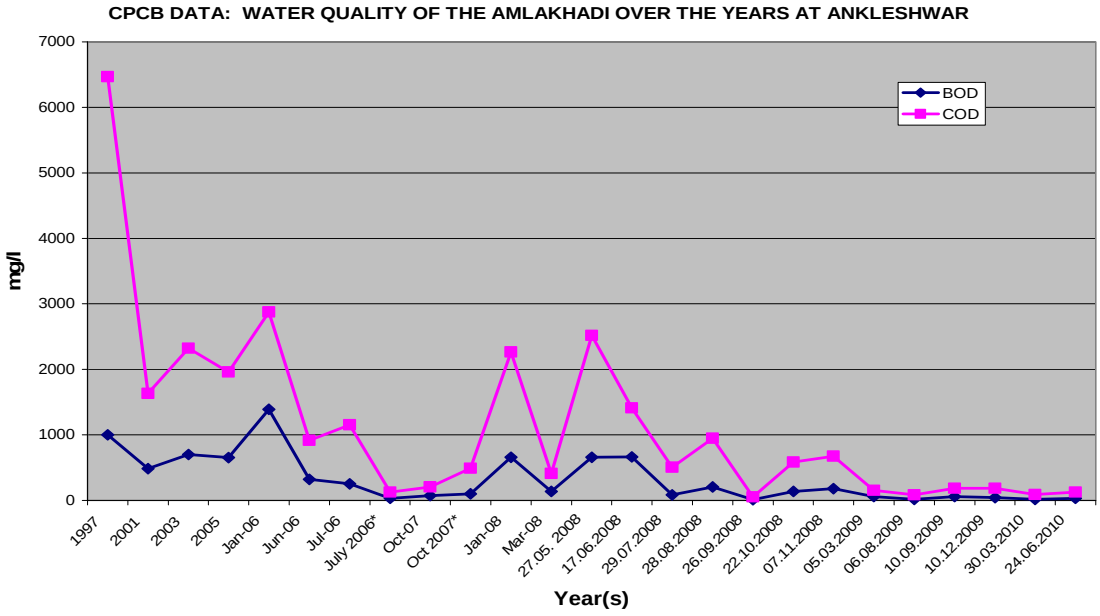




(For above Graphs –Please Refer Annexure – 4)

Above are the results & relevant graphs for the analysis results of the sample of water flowing through Amlakhadi at Hansot Bridge. This sampling location is the location after which there is no other known probable source of direct / indirect discharge into Amlakhadi. The graphs depict the downword trend and showing improvement in the quality. Samples from Amlakhadi are also being collected by Central Pollution Control Board (CPCB). Results of the samples collected by CPCB since 1997 are presented below which also indicate improvement

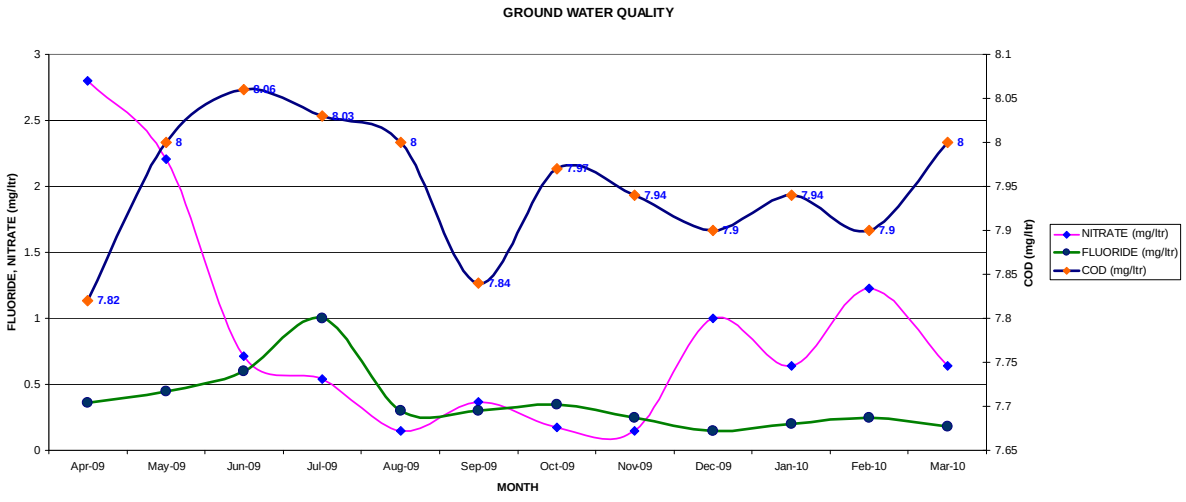
in quality to large extent. Results are tabulated and attached as Annexure 5.



(For above Graphs – Refer Annexure – 5)

There is one khadi called Chhapra khadi wherein effluent may get in if pumping station "B" is not properly operated and / or there is an unauthorized discharge from / near GIDC Ankleshwar industrial estate. Domestic effluent of vill. Gadkhol is also going to this khadi. Therefore, sample from the Chhapra khadi is regularly being collected. Analysis results are tabulated and attached as Annexure – 11.

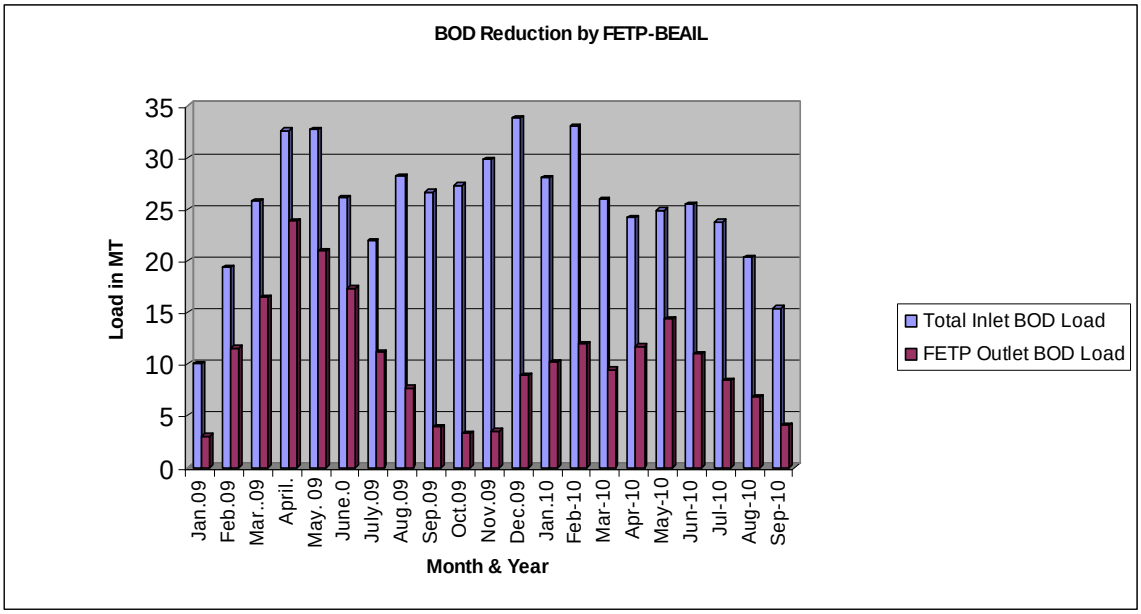
For ascertaining ground water quality, samples of subsurface water are also collected and analyzed, results of which are attached as Annexure – 7 as mentioned above.

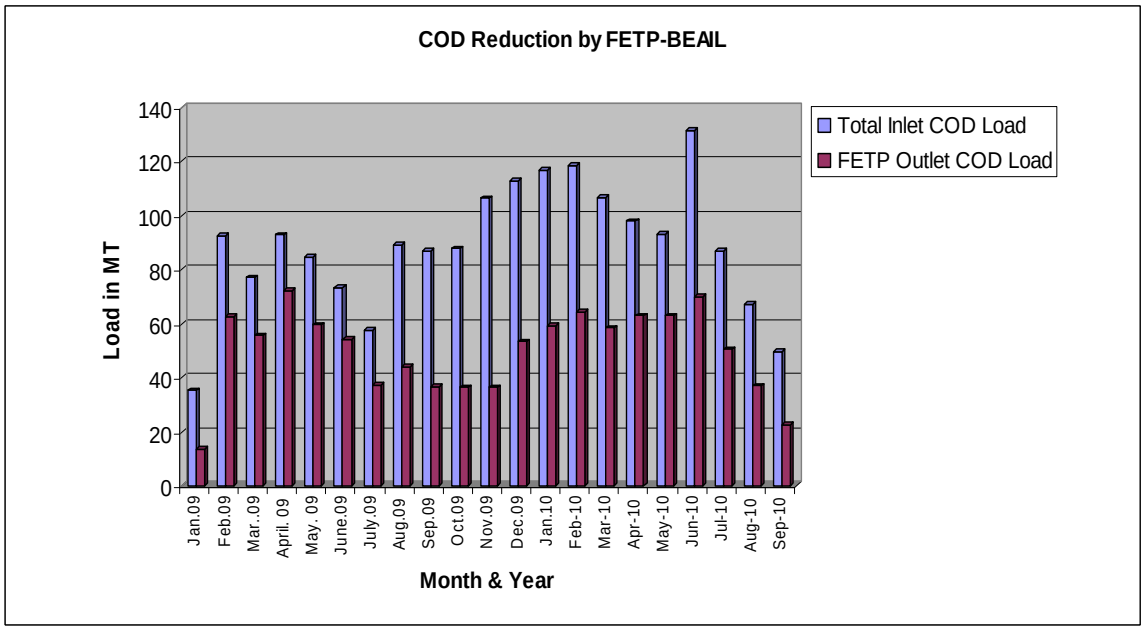


(For above Graph – Refer Annexure – 7)

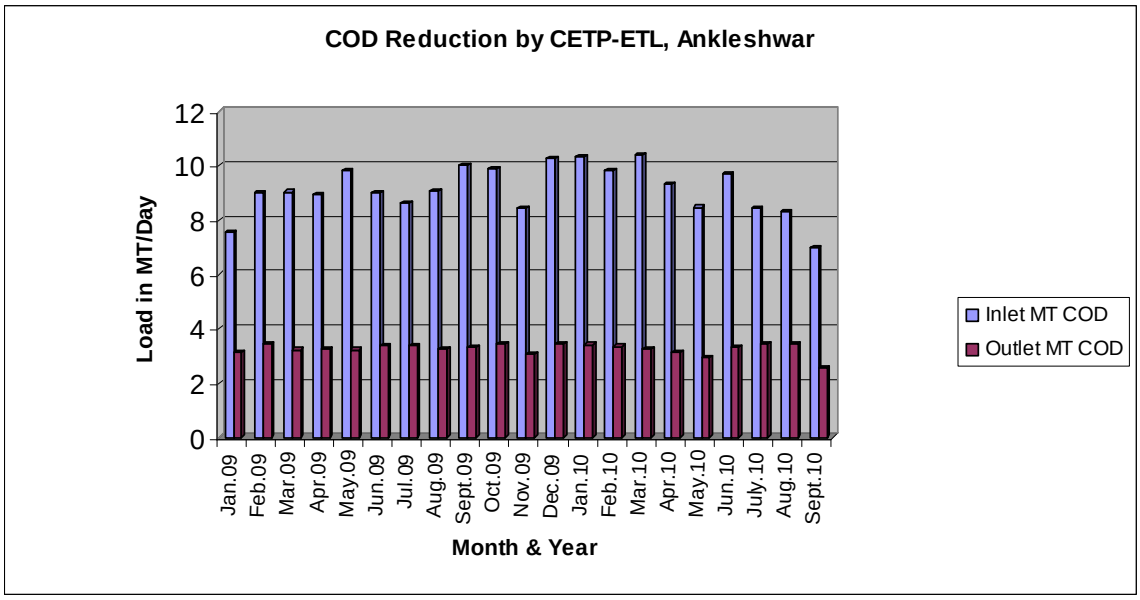
2.5 Quantification of wastewater pollution load and relative contribution by different sources viz. industrial / domestic

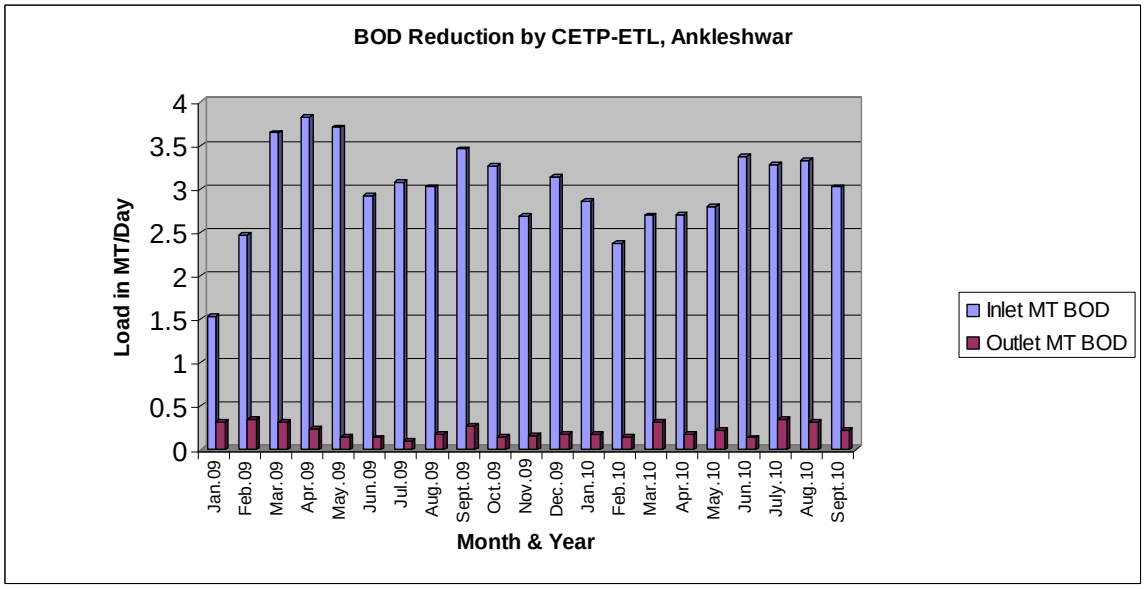
Effluent of all the three industrial estates is conveyed to FETP for further treatment and for its final disposal into deep sea through pipeline. Concentration of COD and BOD at inlet of FETP and outlet of FETP i.e. quality of effluent that is being discharged into deep sea is measured and maintained by them. Similarly, both the CETPs namely Enviro Technology Limited at Ankleshwar and Panoli Enviro Technology Limited - Panoli are also measuring and maintaining records pertaining to load received from their member industries and one which is being discharged after the treatment. Data such collected from FETP, ETL and PETL are attached herewith as Annexure - 12, 13 & 14.



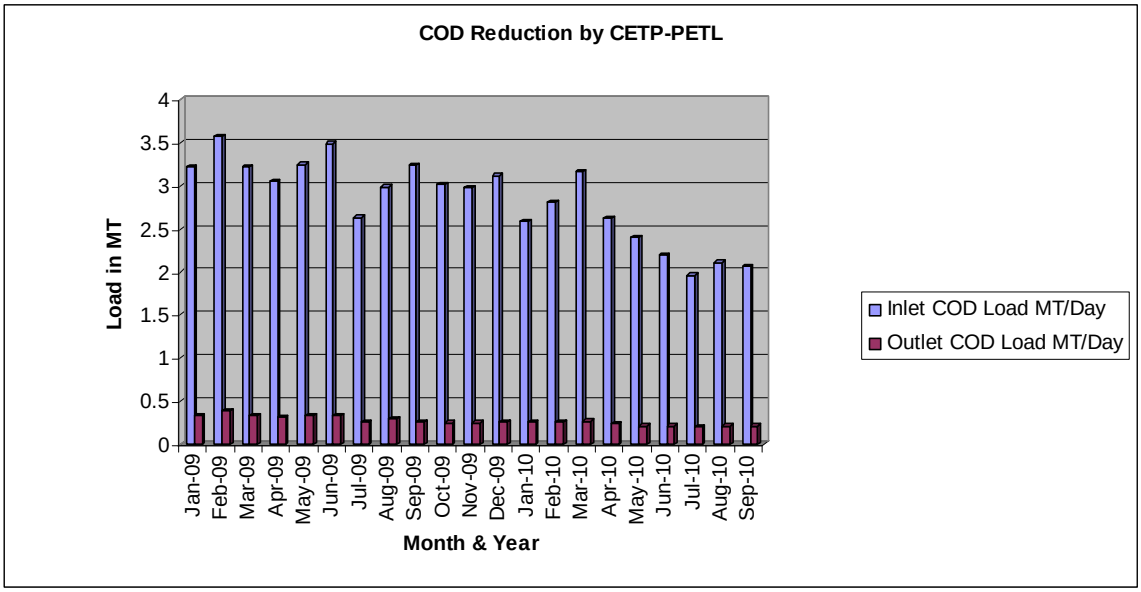


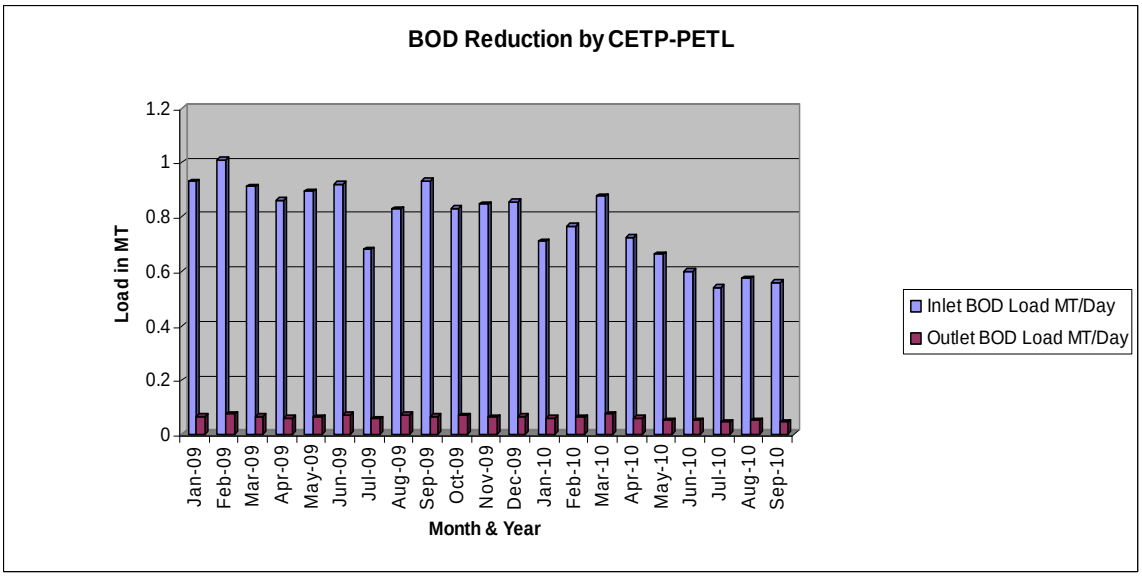
(For above Graphs – Refer Annexure – 12)





(For above Graphs – Refer Annexure – 13)





(For above Graphs – Refer Annexure – 14)

2.6 Action Plan for compliance and control of pollution

2.6.1 Existing infrastructure facilities – water quality monitoring network, ETPs, CETPs, STPs of industry, surface drainage system, effluent conveyance channels, outfalls etc.

Water Quality Monitoring Network :

Pumping stations for pipeline network, action plans to reduce high COD and high ammonical-nitrogen in effluent, treatment by CETP, odour monitoring, listing of identified units having high

COD, ammonical-nitrogen and acidity in their effluent, odour problems and issuance of directions to them, regular monitoring and collection of samples from Amlakhadi are included in continuous pollution control programme at Ankleshwar & Panoli.

In addition to above, currently GPCB carries out regular water quality monitoring under GEMS, MINAR and under routine monitoring programmes and ambient air quality monitoring in the area under SAMP and NAMP. Presently ambient air quality monitoring is carried out at six stations and samples are collected regularly as per the CPCB protocol. All the CETPs & TSDF along with CHWIF in the area are monitored and samples are collected regularly. Samples from the River Amaravati, Chhapara Khadi, Sarangpur khadi and Amlakhadi are also being collected regularly to know the quality of water flowing from the same. Industrial units located in the area are monitored under Water Act, Air Act and E P Act as per the CPCB guidelines.

Additionally, Bharuch Eco-Aqua Infrastructure Limited (BEAIL) also carries out independent monitoring of their member industries and erring units are not only penalized by them but also recommends to this Board for appropriate action(s) and this Board immediately takes necessary action(s).

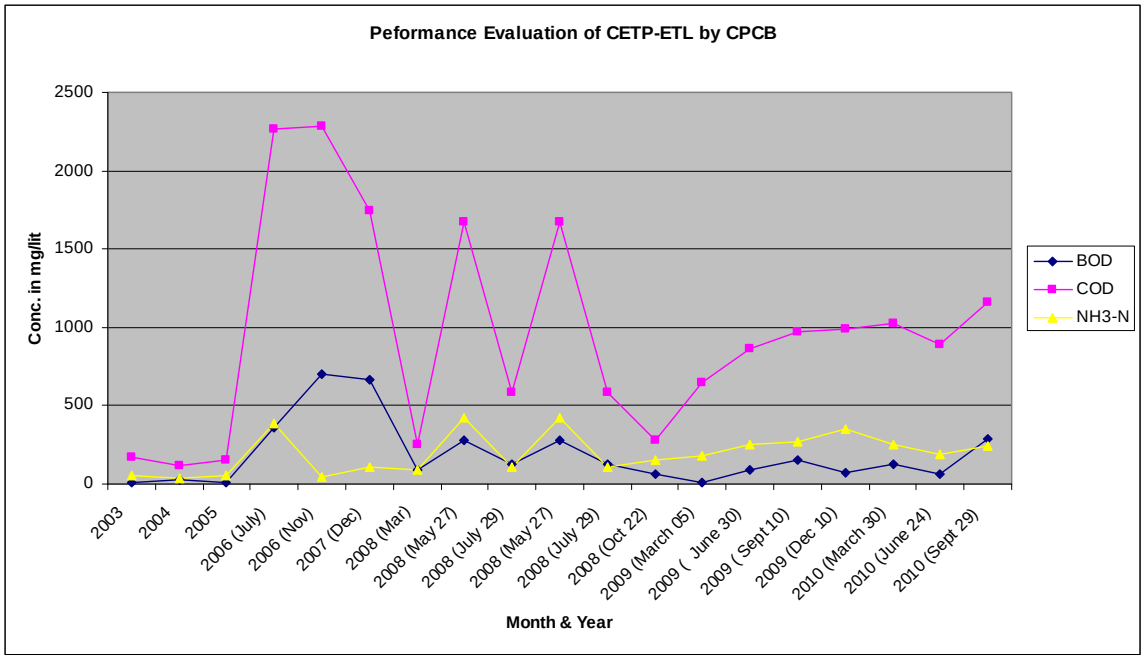
Further, independent third party monitoring work is also started by Sarvajanik College of Engineering & Technology, Surat.

ETPs :

Ankleshwar : About 277 units located in GIDC Ankleshwar are sending their effluents through tankers to CETP of M/s Enviro Technology Limited (ETL) situated within GIDC Ankleshwar. Remaining units of Ankleshwar treat their effluent in their own ETPs. The treated industrial effluent of the industries of GIDC, Ankleshwar is collected through under ground pipeline and conveyed to final pumping station through pumping station “A”, “B”, “C” and gravity line. From the final pumping station, the effluent is pumped to Final Effluent Treatment Plant (FETP) operated by M/s Bharuch Eco-Aqua Infrastructure Limited (BEAIL), a company owned by the Gujarat Industrial Development Corporation (GIDC). Apart from effluents from Ankleshwar, the FETP also receives effluents from the GIDC’s industrial estates at Panoli and Jhagadia.

Analysis results of samples collected from the final outlet of CETP - Enviro Technology Limited by ETL itself and by GPCB – Regional office are tabulated and attached as Annexure – 15 & 16 respectively.

A trend analysis carried out by CPCB Zonal Office, West Zone, Vadodara for performance of CETP of ETL, Ankleshwar is presented below. These results are tabulated and attached as Annexure –16A.



(For above Graphs – Refer Annexure – 16A)

As mentioned earlier, the treated industrial effluent of the industries of GIDC, Ankleshwar is collected through under ground pipeline and conveyed to final pumping station through pumping station "A", "B", "C" and gravity line.

In other word, inlet quality of the effluent measured at final pumping station of Ankleshwar is the quality of effluent of entire estate of GIDC, Ankleshwar and is the quality of effluent of Ankleshwar conveyed to FETP for further treatment and final disposal into deep sea through pipeline. Quality of effluent of GIDC Ankleshwar at Final Pumping Station of Ankleshwar and going to FETP is tabulated and attached as Annexure – 17.

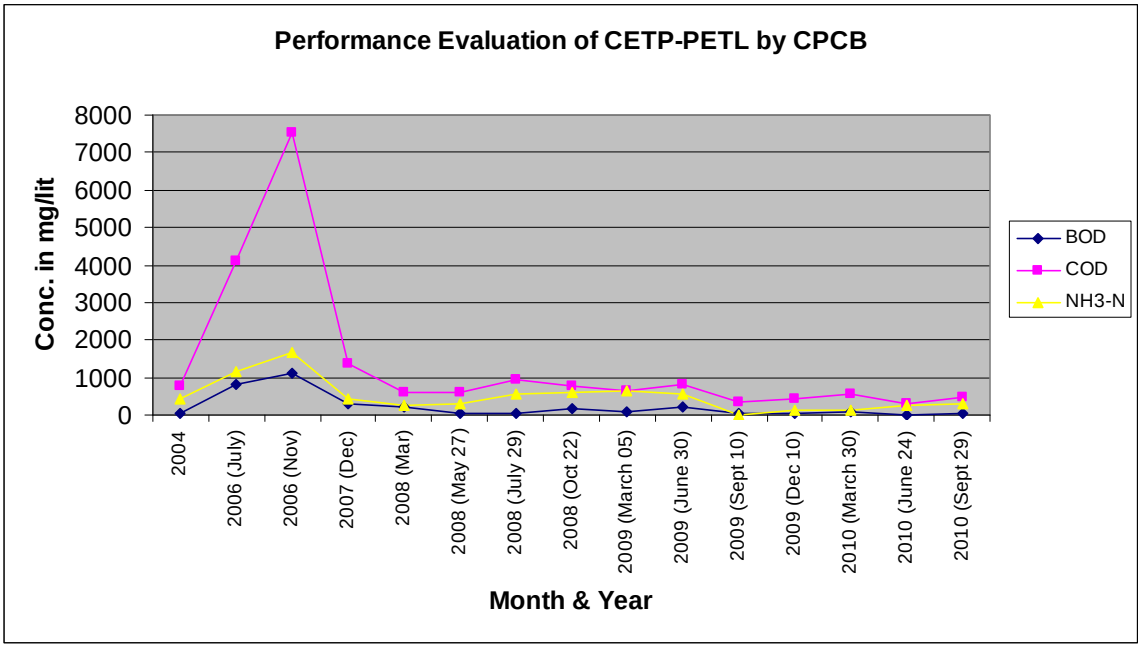
Month wise quantity and its quality of effluents received at the FETP of M/s BEAIL is tabulated and presented at Annexure – 18.

Panoli : About 118 units located in GIDC Panoli are sending their effluents through tankers to CETP of M/s Panoli Enviro Technology Limited (ETL) situated within GIDC Panoli. Remaining units of Panoli treat their effluent in their own ETPs. The treated industrial effluent of the industries of GIDC, Panoli is collected and conveyed to final pumping station through 15

number of individual pipelines as narrated above. From the final pumping station, the effluent is pumped to Final Effluent Treatment Plant (FETP) operated by M/s Bharuch Eco-Aqua Infrastructure Limited (BEAIL), a company owned by the Gujarat Industrial Development Corporation (GIDC). Apart from effluents from Panoli, the FETP also receives effluents from the GIDC's industrial estates at Ankleshwar and Jhagadia.

The present scenario of waste water quality for CETP-PETL considering key parameters at various locations are summarized and attached as Annexure – 19.

A trend analysis carried out by CPCB Zonal Office, West Zone, Vadodara for performance of CETP of PETL, Panoli is presented below. These results are tabulated and attached as Annexure – 19A.



(For above Graph – Please refer Annexure – 19A)

The quality of effluent measured at final pumping station is presented at Annexure – 20.

The quantity and its quality of effluents received at the FETP of M/s BEAIL is tabulated and presented as Annexure - 21.

CETP - Enviro Technology Limited (ETL) at Ankleshwar :

- **Details of CETP when commissioned :**
  - The CETP was set up in 1996 with primary, secondary and tertiary treatment system. The initial treatment capacity was 1 MLD of raw effluent, current capacity of this CETP is 1.8MLD, but ,EC is obtained to make it of 3.5MLD.

- Effluent from member industries was collected in tankers and brought to CETP for treatment
- At the time of start up, major equipments available were as follows;

Name of Equipment	Unit	Quantity (Nos)	Size in M with SWD
Equalization Tank	M	2	32 x 12.5 x 2.5 each
Lime Storage (Chemical House)	-	1	35 x 25 x 4 height
Neutralizer	M	2	3 x 3 x 2.5 each
Primary Clarifier	M	1	20 dia x 4
Aeration Tank	M	2	70.1 x 17.23 x 3.5
Surface Aerator	Nos	8	30 HP each
Secondary Clarifier	M	1	12 dia x 3.5
Treated Effluent Sump	M	1	6.45 x 6.45 x 3
pH adjustment Tank	M	1	4 x 4 x 3
Sand Filter	M	2	2 dia x 1.75
Activated Carbon Tower	M	2	2.3 dia x 3
RVDF	Nos.	2	-
Solid Waste Storage Pit with impervious lining	Nos.	1	60 x 30 x 3
DG Set	Nos.	1	600 KVA

- ***Details of upgradation / modification done with passage of time since establishment :***

  - **Transportation / collection of effluent from member industries**
    - Improvement made with respect to effluent collection: Member industries were asked to keep storage so that loading to tankers can be done without delay;
    - Immediately on receipt at ETL, samples are taken and checked so that any deviation may be found out immediately;
  - **Primary Treatment**
    - Added one more neutralization system and clarification system;
    - Incorporated pressure sand filter to remove suspended solids coming to aeration tank (implemented recently)
    - Originally, started with 2 (two) Rotary Vacuum Drum Filters (RVDF) for filtering of sludge. Added 2 (two) more RVDFs thereby making total 4 (four) RVDFs in operation by 2000;
    - Subsequently to improve performance, these RVDFs were replaced by Super Decanter. Presently dewatering of sludge is done only with Super Decanter;
    - Originally, solid waste was collected and stored in a pit and being sent to CHWTSDF for disposal. Now, storage at site is avoided and solid waste is collected directly in containers; and hook loader takes the containers to CHWTSDF;
    - Proper addition of Poly Electrolyte so that sludge settling and removal is done faster;
  - **Secondary Treatment**
    - Originally, CETP was set up with aeration tanks having 8 (eight) Surface Aerators with connected load of 240 HP. Subsequently, during expansion, surface aerators were replaced with energy efficient Diffused Aeration System;
    - Aeration tanks' height was increased from 3.5 meters to 5.5 meters enhancing the capacity
    - Addition of sewage from residential area in the system is done as suggested by NEERI. Also set up collection and transfer system for sewage from residential area
    - Augmentation of biological system by addition of special bacterial culture. Presently, under guidance of Agharkar Research Institute, Pune and also with the help of National Chemical Laboratory, Pune; and IMTECH Chandigarh, specialized bacterial culture is being added
    - Set up Microbial Laboratory

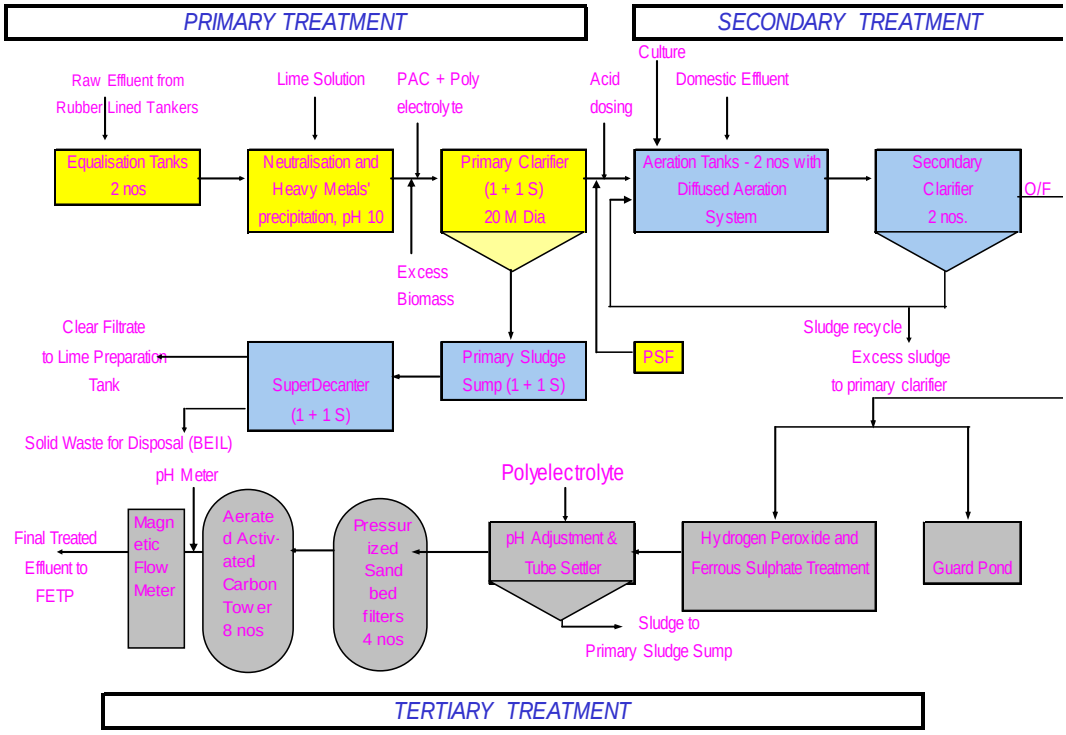
- Treatability studies for continuous improvement;

❖ **Tertiary Treatment**

- Sand Bed Filter added and activated carbon filter numbers is increased to take care of entire flow
- Incorporation of air sparging in activated carbon towers to give additional COD reduction

- **Details of Existing CETP**

FLOW DIAGRAM OF CETP



- Existing CETP is having primary, secondary and tertiary treatment system with capacity to treat raw effluent @ 1.8 MLD. Additionally, sewage from residential area up to 1.5 MLD can be taken to aeration system for treatment.
- Due to major modifications done over the years, CETP is presently working with energy efficient Diffused Aeration System
- Dewatering of solid waste generated is done with the help of Super Decanters
- When CETP was commissioned in 1996, treated effluent was discharged to GIDC underground drainage going to Amla Khadi which was leading to estuary of river Narmada. Now, treated effluent from CETP is sent to FETP of BEAIL for further treatment and disposal up to deep sea through closed pipe line system
- Details of major equipments in existing CETP are as follows

(Capacity of CETP -1.8 MLD)

Name of Equipment	Unit	Nos.	Size in meter with SWD
Equalization Tank	m	2	32 x 12.5 x 2.5 each
Lime Storage (Chemical House)	--	1	35 x 25 x 4 height
Neutralizer	m	4	3 x 3 x 2.5 each
Primary Clarifier	m	2	20 (dia.) x 4.0
Aeration Tank – I	m	1	70.1 x 17.23 x 5.5
Aeration Tank – II	m	1	70.1 x 17.23 x 5.5
Secondary Clarifier – I	m	1	12. (dia.) x 3.5
Secondary Clarifier – II	m	1	10 (dia) x 3.0
Treated Effluent Sump	m	1	6.45 x 6.45 x 3
pH Adjustment Tank	m	1	4.0 x 4.0 x 3.0
Tube Settler	m	3	4.0 x 4.0 x 3.0
Sand Filter	m	2	2 (dia.) x 1.75
		2	2.3 (dia.) x 3.0
Biological Activated Carbon	m	4	2.3(dia.) x 3.0
		3	2.4(dia.) x 4.0
		1	1.1(dia.) x 2.5
Decanter	MT	2	3.0 MT / Hr.
Guard Pond	745 (m^3)	1	23 x 13 x 2.5
30 % Acid Tank	15kl	1	15kl x 1nos
10 % Acid Tank		2	10 m^3 each x 2 Nos.
Polyelectrolyte Solution Tank		2	10 m^3 each x 2 Nos.
Solid waste Storage Pit with impervious lining		1	60 x 30 x 3
D.G. Set	600KV		

Name of Equipment	Unit	Nos.	Size in meter with SWD
	A		
Under Ground Water Storage Tank	650 (m^3)		
Polyelectrolyte Solution Tank – Decanter		2	25 m^3 each x 2 Nos.

Up-gradation Plan of ETL- CETP, Ankleshwar with time limit and its financial outlay.

(a) On-going R & D Activity

ETL has spent Rs.1.35 Cr for R & D including consultancy charges of IITs, CLRI and ARI, Pune for development of various processes like Bio- augmentation, Removal of Calcium deposition on Bacterial cell, Effect of Advance Oxidation processes like Ozonation, Fenton as pretreatment to refractory COD.

(b) Segregation of Inlet effluent:

As per the guidelines of Indian Institutes of Technology, Kanpur/Mumbai and CLRI, Chennai, segregation scheme is planned based on

(i) High Ammonical Nitrogen,

(ii) Pharmaceutical industries

(iii)Dyes, Pigment and Dyes Intermediates

(iv) Others

Work in this regard is started and likely to be completed before Dec-2010. The estimated cost is Rs 70 lacs.

(c) Ammonical Nitrogen removal by Physicochemical Treatment:

Magnesium Ammonium Phosphate process being developed at ETL R & D as well as in CLRI, Chennai laboratory. Process will be implemented after optimization.

Target Date of completion: 31-12-2010

Cost will be Rs 6. 0 lacs.

(d) Electro oxidation Pilot plant study:

Purchase order for Boron Doped Electrode with complete Electro Oxidation systems is given to M/S XH2O, Vatva. After receipt of pilot plant, study will be conducted and scheme will be prepared based on data gathered on pilot plant study.

Target Date of completion: 30-10-2010

The cost of pilot plant is Rs 15.8 lacs.

(e) Plan for the enhancement of the capacity of the CETP

The detailed project of enhancement of capacity from existing 1.8 MLD to 3.5 MLD raw effluent treatment with a cost of about Rs 9.00 Crores has been prepared. ETL has already obtained Environmental Clearance from MoEF, New Delhi for the same.

CETP- Panoli Enviro Technology Limited (PETL) at Panoli :

Introduction :

Panoli Enviro Technology Ltd was established / incorporated under the CETP scheme in the year 1998 with an aim to provide collective treatment to the SSI and Medium scale industries of Panoli GIDC.

Treatment Facility :

The existing CETP is designed for 1.0 MLD flow. Collection tank is followed by Primary Treatment subsequently followed by Secondary Treatment and finally culminates with Tertiary treatment.

- Primary treatment units includes: Equalization tank, Flash mixer, Clariflocculator.
- Secondary treatment unit includes: Aeration tank 1 & 2, Secondary settling tanks.
- Tertiary treatment unit includes: Three units of Dual Medial pressure filter with Sand and Granular Activated Carbon media are provided with a flow capacity of 30 m^3/hr.

Total Area	:	31842.63 Sq. mtrs.
Capital Cost	:	3.25 crore
Total Number of Members	:	118 nos.

Installed Capacity & Present quantity

(a) Installed Capacity : 1.0 MLD
(b) Booked Quantity : 1.0 MLD
(c) Present Quantity : 650-800 M3/ Day

Prevailing inlet norms at PETL

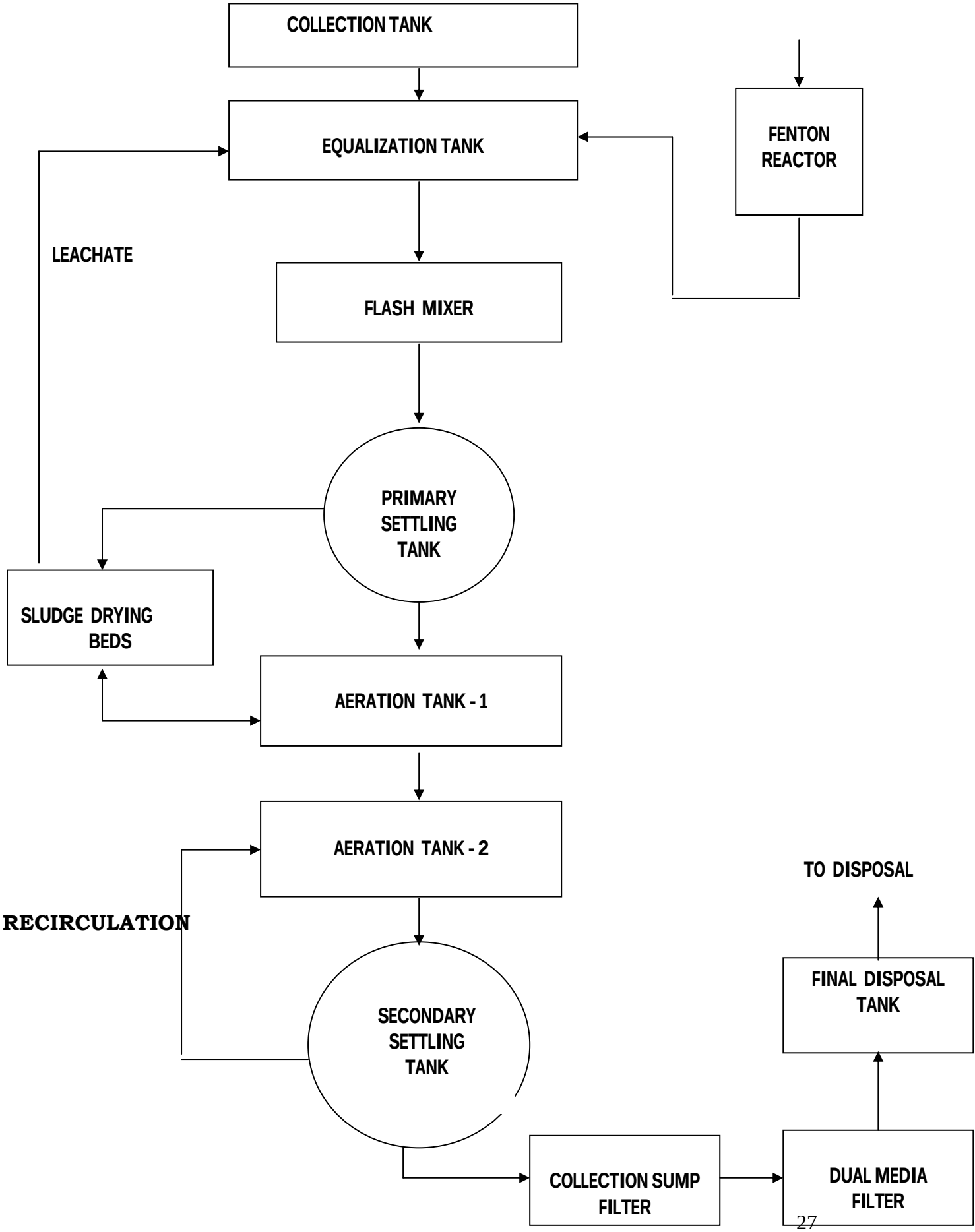
A. pH - 6.5 to 8.5
B. C.O.D. - upto 9,000 mg/l
C. B.O.D - upto 3,000 mg/l
D. T.D.S - 10,000 mg/l

Existing units of CETP-Panoli. (Hydraulic flow of 1.0 MLD)

No.	Unit	No.Of Units	Size (Mts.)	Capacity (m^3)
01.	Collection Tank	01	14.1 x 14.1 x 2.65	526.85 m^3
02.	Equalization tank	01	14.1 x 14.1 x 2.65	526.85 m^3
03.	Fenton Reactor	01	-----	20 m^3
04.	Alum/ $FeSO_4$ Dosing Tank	03	2.0 x 2.0 X 2.5	10m^3 each
05.	Lime dosing Tanks	02	2.0 x 2.0 X 2.5	10m^3 each
06.	Flocculent Dosing Tank	01	HDPE TANK	10m^3
07.	Hydrogen peroxide	01	HDPE TANK	10m^3
08.	Flash mixer –1	01	3.0 x 3.0 x 2.8	25m^3
09.	Flash mixer –2	01	3.0 x 3.0 x 2.5	23m^3
10.	Clariflocculator	01	10m Dia x 2.95	232m^3
11.	De- Canter	01	Flow Rate10m3/hr	Solid Handling cap. on dry basis 500Kg.hr
12.	Sludge drying beds	08	12 x 12	144m^2(each)
13.	Sludge Storage Yard	01	21.5 x 6.55	140m^2
14.	Aeration Tank – 1	01	24 x 10.5 x 4.0	1008 m^3
15.	Aeration Tank – 2	01	24 x 10.5 x 4.0	1008 m^3

16.	Secondary Clarifier	01	8 Dia x 2.5	126 m^3
17.	Collection Sump	01	6.0 x 6.0 x 2.5	90 m^3
18.	Dual Media Filter	03	2.5 Dia x 3.2	16 m^3 (Each)
19.	Final Disposal Sump	01	6.0 x 6.0 x 2.5	90m^3

Flow Diagram :



EXISTING CETP PROJECT EXPANSION STATUS :

- At present CETP is going for expansion for another 1.0 MLD to fulfill the demand of existing member units and forthcoming new industries in Panoli GIDC.

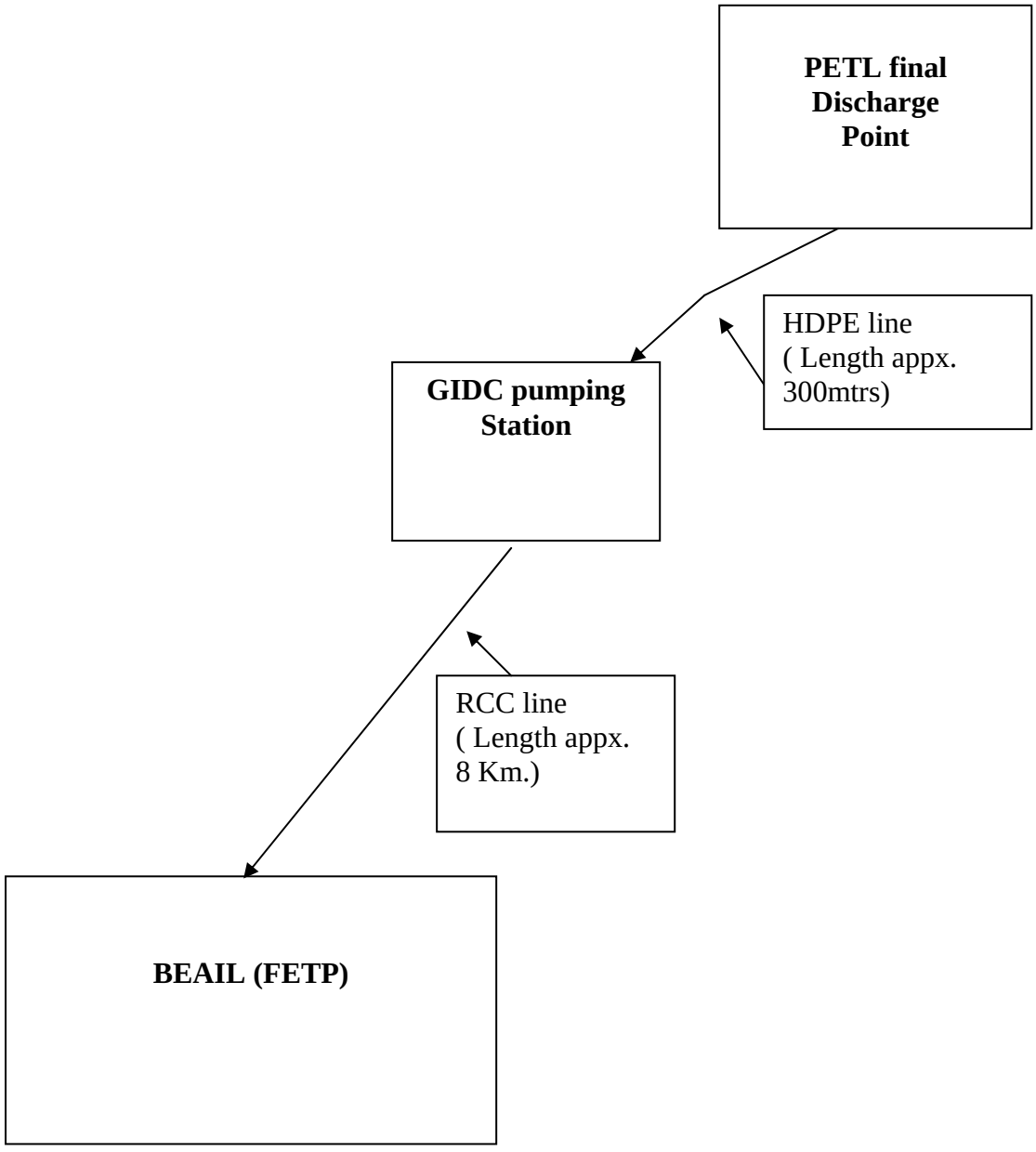
- So after expansion, CETP capacity will be 2.0 MLD.

- They have already acquired adjoining plot from GIDC admeasuring
  12000 Sq. mtrs. (Plot No.619/1)

- Technical & Financial consultant already appointed to initiate the project expansion activities. Necessary feasibility as well as treatability carried out.

- They have also booked Additional 1.0 MLD Effluent quantity at F.E.T.P. of BEAIL. Now, the total booked quantity with BEAIL is 2.0 MLD.

LINE DIAGRAM FROM PETL (C.E.T.P.) TO BEAIL (FETP)



DETAILS OF UPGRADATION / MODIFICATION :

Commissioning of Extra Aeration Tank :

To enhance aeration, CETP has commissioned another extra Aeration facility with capacity appx.1000m3 with the similar kind of facility – Diffuser System with silicon Rubber membrane - to increase the retention time period for effluent to be treated. Commissioning of aeration tank-2 has also increased efficiency of the treatment scheme to substantial extent and it has provided totally 2000m3 capacity for daily influent to be treated.

Commissioning of Fenton Treatment Reactor :

As a part of Upgradation, CETP has installed a Fenton Reactor. The Fenton treatment is proposed for approximately 100 m^3/day of incoming high COD between 8000-9000 mg/l of wastewater.

The high COD effluent directing to the chemical treatment reactor (Fenton Treatment Reactor) wherein the chemical treatment being given to the effluent.

For this treatment they have installed a MS Reactor with capacity of 20m^3 . The reactor would be batch process reactor with agitator for proper mixing. It is equipped with an agitator of 5 HP. After proper dosing of various chemicals, effluent redirected to equalization tank unit. It would be mixed with all other effluents and follow the ongoing treatment regime.

Installation of TOC Analyzer :

As per Action Plan for Upgradation , PETL has purchased and installed a TOC analyzer, which is further helping in acceptance/rejection of the incoming wastewater in rather accurate manner as compared to the previous methodology.

With the help of TOC analyzer TOC : COD ratio is established for a particular industrial unit's effluent. Subsequently there is only a need to measure the TOC to arrive at the COD of that effluent daily. This

not only gives prompt COD result but also improvesthe accuracy of work.

Stabilization of Aeration tanks :

As per Upgradation Plan,they have put their effort to stabilize the Aeration Tanks. This includes the addition of activated sludge in the aeration tanks along with the addition of Probiotic solutions daily in prescribed quantities to help in growth and acclimatization of bacteria.

Commissioning of De- Canter System :

As per Upgradation Plan, PETL decided to phase out existing sludge drying bed system for sludge management. It creates lots of problems in rainy season.

For effective sludge management, PETL has installed and commissioned the De–Canter (Solid Bowl Centrifuge) system.

Reduction of COD Inlet Norms :

For achieving the better result and effective operation of the CETP, they have also reduced the inlet norms for COD from 10000 mg/l to 9000 mg/l.

Installation of Magnetic Flow Meter :

They have installed a Magnetic Flow Meter at CETP final discharge effluent conveyance pipeline to measure the exact discharge quantity.

In-house treatability studies for reduction of COD.

They have engaged a technical consultant to carry out in-house treatability for their existing plant.

2.6.2 Pollution Control measures installed by Industries.

Ankleshwar : The details of EMS provided by the industries located in industrial cluster of Ankleshwar are summarized as below:

- Number of industries having primary treatment : 259
- Number of industries having primary, secondary treatment: 97
- Number of industries having primary, secondary & tertiary treatment : 85
- Number of industries generation zero effluent : 272
- CETP-ETL members : 277
- Number of industries discharging effluent directly to FETP : 118

Panoli : The details of EMS provided by the industries located in industrial cluster of Panoli is summarized as below:

- Number of industries having primary treatment : 56
- Number of industries having primary, secondary treatment : 24
- Number of industries having primary, secondary & tertiary treatment : 20
- Number of industries generation zero effluent : 102
- CETP-PETL members : 118

2.6.3 Technological Interventions.

2.6.3.1 Inventorisation of prominent industries with technological gaps

On the basis of the observations / findings of monitoring by GPCB / BEAIL / SCET (Third Party) and / or pollution potentiality of industrial units of these estates, total 93 units are identified. These industries have been asked to submit their plans along with financial outlay and accordingly estate wise proposed investment found was Ankleshwar : 83.11 Crores; Panoli : 27.20 Crores. Proposed investment by BEAIL is 231.18 Crores, GIDC is 33.90 Crores and BEIL is 2.6 Crores.

2.6.3.2 Identification of low cost and advanced cleaner technology for pollution control

Adoption of Advance Technologies for up-gradation of environmental quality of clusters :

About Fenton & FACCO Treatment :

Fenton Treatment and FACCO (Fenton Activated Catalytic Carbon Oxidation) are both advance chemical oxidation process, in which Hydrogen Peroxide in presence of Ferrous Sulfate is used to oxidize

non-biodegradable and refractory COD part of the effluent. In these processes, in presence of Fe++ ions, H_2O_2 releases hydroxyl radicals (*OH), which is a very strong oxidizing agent comparable to oxygen. The released hydroxyl radicals start a chain reaction thus requiring less hydrogen peroxide. FACCO is further development of Fenton, where activated carbon provides additional reaction sites of accomplishing this reaction by working as additional catalyst and thus requiring less quantity of peroxide. In both the processes, non-biodegradable part of effluent is preferentially converted into bio-degradable COD. Thus it is very effective pre-treatment method for high COD or refractory COD effluents. The outlet of this treatment is normally followed by conventional biological treatment.

Adoption of Advance waste water treatment:

In Ankleshwar and Panoli GIDC, there are three units, who have already installed advance waste water FACCO treatment. This includes both the CETPs, namely ETL (277 members) and PETL (125 members). Seven units have Fenton treatment for advanced effluent treatment mainly in Pesticides and pharma sector. Ten more units are planning FACCO/Fenton treatment in this year.

Separate CETP for Pharma units:

Common Effluent Treatment Plant for pharma industries: company named Green Development Centre Ltd. formed. This is promoted by Sun Pharmaceuticals Ltd. Application for Environment Clearance has been made to Ministry of Environment and Forest, New Delhi. Plot no. 3460 and 3461 is kept for this purpose. This CETP will have following facilities:

TREATMENT FACILITIES PLANNED TO BE CREATED:

- Raw effluent storage tanks based on characteristics
- Primary treatments
- Multi effect evaporators for high organics
- Sludge separations and drying facilities
- Collection tanks for MEE fractions
- Solvent strippers /collection systems from MEE
- Ammonia stripping systems
- Ammonium sulfate isolation system
- Effluent collection from ammonia stripper
- MEE for inorganic/ high TDS i.e for sodium sulfites, sodium acetate etc
- Collection and equalization tanks
- Primary treatment systems- neutralization tanks, equalization tank, etc
- Conventional two stage biological systems
- Tertiary treatment systems
- Fantom treatment facility

- Guard ponds
- Sludge drying beds
- Solvent recovery systems
- Phenol recovery systems
- Aluminum hydroxide recovery systems
- Bromine recovery system
- Solvent stripper

The project will be financed by Sun Pharma. This project will help pharma industries to improve their environment performance. The capacity is one MLD. Cost of project is Rs.20 crores.

Incinerator based on Plasma Technology:

Plasma Technology for hazardous waste destruction: Company named Plasma Energy Applied Technologies Ankleshwar Pvt. Ltd. formed. Environment Clearance obtained from MoEF, New Delhi. Applied for NOC to GPCB, Gandhinagar. GIDC has kept plot No. 9206 of 11000 sq.mt. reserved for this company. Capacity of plant 30 ton per day solid waste and 15 ton per day aqueous waste. Also application for State subsidy is made. Cost of project is Rs. 85 crores.

Leak Detection and Repair (LDAR):

Leak Detection & Repair (LDAR) is used to determine fugitive emissions / leakages from flange joints and other joints in Refinery and Petrochemical Industries where huge quantity of Organic Solvents is handled. By LDAR, fugitive emissions or leakages of Organic Vapours can be determined and repairs can be undertaken immediately. By doing LDAR, VOC / HC in atmosphere will be minimized.

One of the methodologies of LDAR is usage of portable VOC / HC monitors. These monitors / sensors are brought near flange joints / other joints and readings are observed. Once VOC / HC readings are indicated in the monitor, it shows that there is some emission from the joints. Immediately, investigation is carried out and necessary repair works are being done.

In other industrial sectors where solvents / organic materials are less, preventive maintenance will reduce fugitive emissions. Tightening of flange joints and inspection of flanges of pumps will ensure that emissions are well within limits.

Benefits of LDAR

- Improved operational efficiency
- Reduced pollution
- Reduced potential for contamination

- Extended life of facilities
- Reduced potential property damage
- Improved public relations

The model LDAR program includes following elements;

- Written LDAR Program
- Training
- LDAR Audit
- Internal leak definition for valves, pumps and other equipments
- More frequent monitoring
- Repair leaking components
- Delay of repair compliance assurance
- Electronic monitoring and storage of LDAR data
- QA / QC of LDAR data
- Records maintenance

Advanced Technology for removal of Ammonical Nitrogen from effluents:

(1) MAT Process: the effluents containing very high concentrations of Ammonical Nitrogen will react with Magnesium and Phosphoric acid to make a complex compound called Magnessium Ammonium Phosphate (MAT). This process reduces Ammonical Nitrogen by 50 to 60 %. For further removal, any of the following treatment process may be used depending upon the characteristics of the effluents:

(2) Electrochemical Oxidation Process: Here the oxidation of Ammonia will take place, whereby it will be decomposed into N2 & H2O.

(3) Hypo Treatment: Here the Ammonia is chemically oxidised using H_2O_2.

(4) Air Stripping: Here the pH of the effluents is raised up to 12 at this pH, most of the Ammonia will be in free form, which can easily be stripped out by blowing air.

2.6.4 Infrastructure Renewal.

2.6.4.1 Details of existing infrastructural facilities

For proper collection, conveyance of the treated industrial effluent of all the three industrial estates of an area viz. Ankleshwar, Panoli, Jhagadia and its environmentally safe disposal into deep sea, a company namely BEAIL is formed - a company owned by the Gujarat Industrial Development Corporation (GIDC). This conveyance system is having a final ETP at village Piraman. FETP of 40 MLD capacity was established in 2006 which presently augmented to 60 MLD capacity.

1. Details about BEAIL :

Project Details

- **Capacity** — 60 MLD
- **Pipeline** — On-Shore 44 km, 800 mm ,GRP Pipeline at 1 m depth Off-Shore 10 km, 750 mm Carbon Steel Pipeline at 2 m depth
- **Diffuser** — 45 m long, 650 mm, having 8 pores at 200 mm.
- **Cost of the Project** — Rs123.20 crores

Location of the project

Selection of route for Onshore Pipeline

- Pipeline route is Selected Considering Topography and Land use Pattern, Water Bodies and Water Logged Areas, Human Settlement & Avoiding Ecologically Sensitive Areas.
- Route mostly Parallel to Road Boundary.
- Very Less Portion of Route in Cultivated Lands-Hence Minimum Impact on Farmers During Construction.
- Route Avoids the Water Logged Areas and Flood Zone of Narmada River.
- Easy access to pipeline for monitoring and repair.
- Least Impact on Fertile Land, Human Settlements and Ecology.

Selection of Marine Discharge point and Off-shore pipe alignment

The Disposal Point Selection included Following Surveys conducted by NIO:

- Marine Life and Biodiversity at Disposal Point.
- Depth of Water, Stratification, Temperature.
- Physical & Chemical Characteristics of Sea Water.
- Current Strength and Direction.
- Dilution of the Effluent at Lowest Low Tide.
- Length of Possible Construction Activity Corridor and Hazards in Marine Environment.
- Discharge point fixed after detail Marine Study and Modeling Carried out by NIO.
- Discharge Point is Selected Beyond Intertidal Area of Narmada Estuary. Pipe Alignment has been Fixed After Detail Bathymetric Survey from Landfall Point to Discharge Point in a 50 m Corridor.

Discharge point and Diffuser design.

Salient Features of the Disposal Point

- Treated Effluent is released in to the Sea by 45 m Long Diffuser with 8 pores.
- Mathematical Modeling and Simulation Studies have been Carried Out by NIO, and Location of Safe Discharge was Determined.
- Tidal Amplitude in the Gulf of Khambhat is Around 8.8 m(mean high) & 1.4 m (mean low)
- Very Strong Tidal Currents are Generated.
- High Currents and High Tide Makes the Vicinity Unsuitable for
  (a)Sea Sports
  (b)Marine Park Marine Resort
  (c)Development of CRZ region
- Average Drogue Speed of 8 m/s Indicate Significant Mixing Capacity
- The Marine Outfall Location (Diffuser Point) is Sufficiently Away from Coast (more than 10 km from shore) Hence Chance of Effluent Reaching the Shore are Remote.
- There is no Development Near the Shore, Beach is Muddy and There is no Sand on the Shore and This is the Best Possible Corridor for the Effluent.
- Diffuser Remains Submerged all the Time as it is at 11 m depth from MSL.
- The dilution achieved due to prevailing ambient current and circulation is approximately :
  (a) 72 times (minimum) at all time.
  (b) 172 times (maximum).

Discharge Point and Diffuser Design

Landfall Point : Latitude 210 28’ 10.4”N
Longitude 720 40’ 10” E
•Marine Outfall Point (Diffuser Point)
Latitude 210 28’ 10.4”N
Longitude 720 33’ 42.7”E

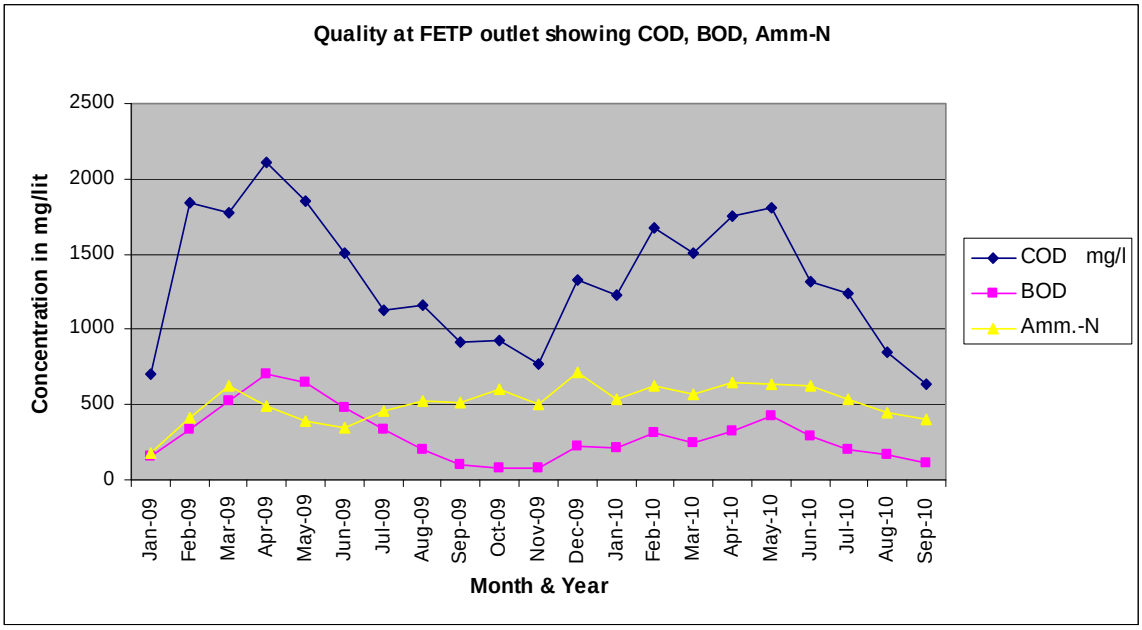
• •Depth at which diffuser point located is 11 m below MSL level
•Length 45 m
•Inner Dia 650 mm
•Number of Pores 8 No
•Rise of Ports above Sea Bed 0.5 m(min)
•Distance Between Ports 4 m
•Angle Ports to Pipe Axis 450
•Direction Alternative 4 Facing North and 4 facing South alternately.

Final Effluent Treatment Plant

The Treatment Plant Consists of Physico-chemical Treatments, Biological Treatment and Tertiary Treatment.

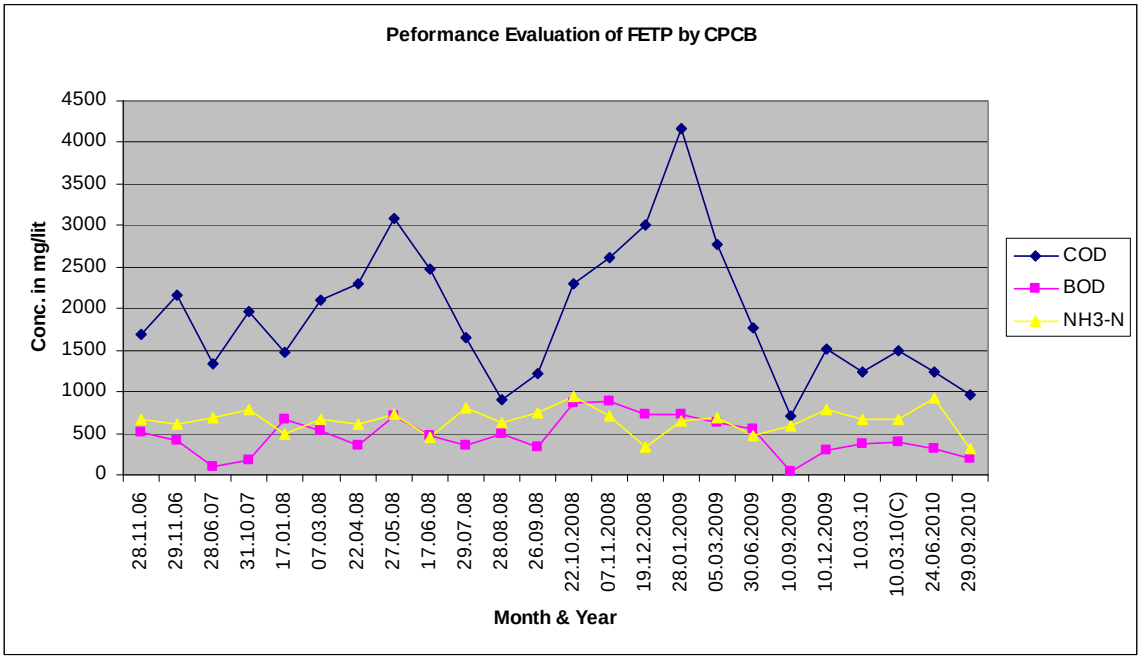
Inlet norms and outlet norms for FETP are attached as Annexure – 22 & 23 respectively.

Effluent of GIDC, Ankleshwar, Panoli and Jhagadia ultimately reaches to FETP and after treatment of the same it is discharged to sea through 55 km long pipeline. Out of 55 km long pipeline, 44 km is offshore and 11 km is onshore. Quantity & quality of effluent thus discharged into deep sea is tabulated and attached as Annexure – 24 & 25.



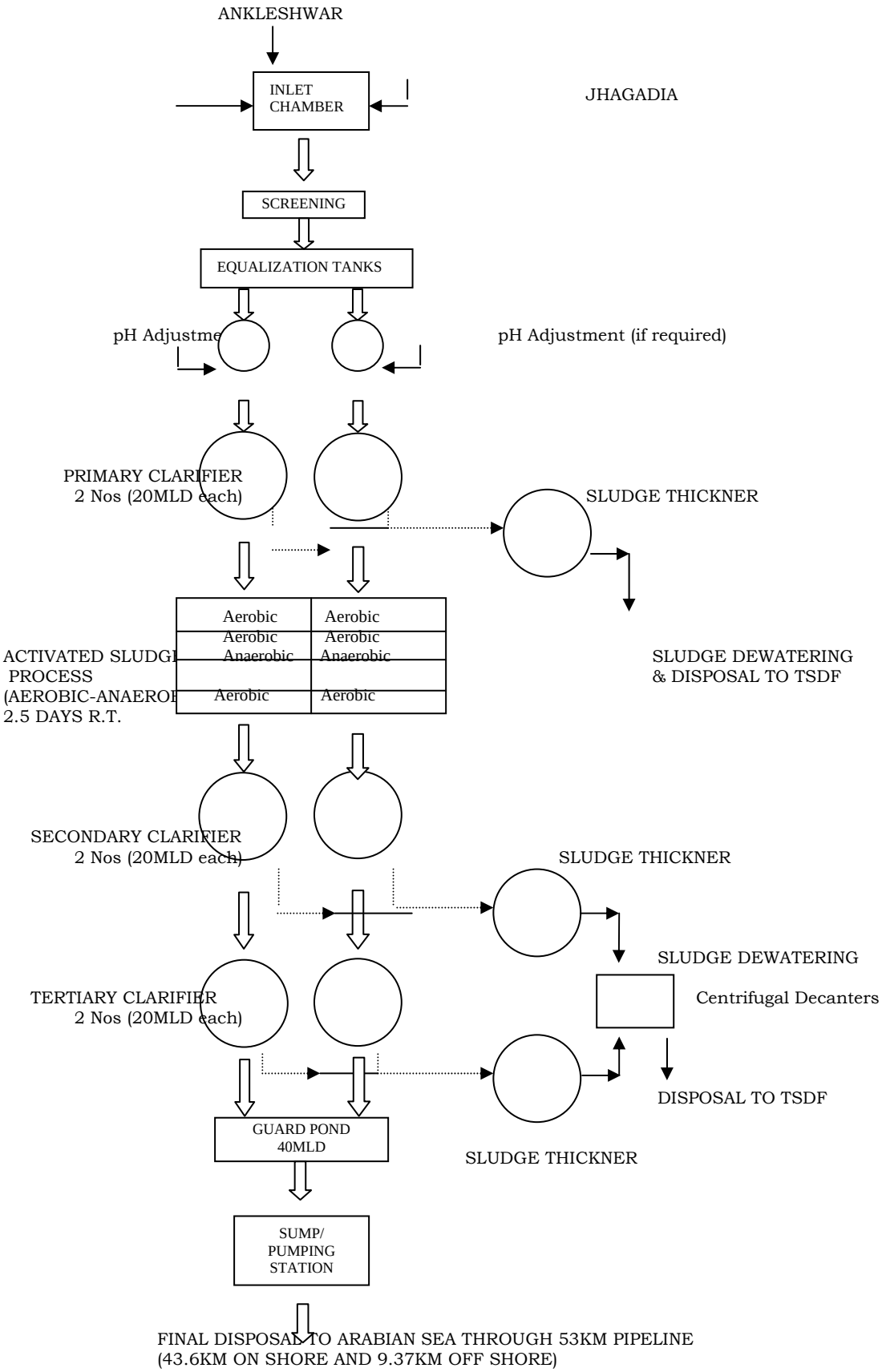
(For above Graphs – Please Refer Annexure – 25)

A trend analysis carried out by CPCB Zonal Office, West Zone, Vadodara for performance of FETP is presented below. These results are tabulated and attached as Annexure –25 A.

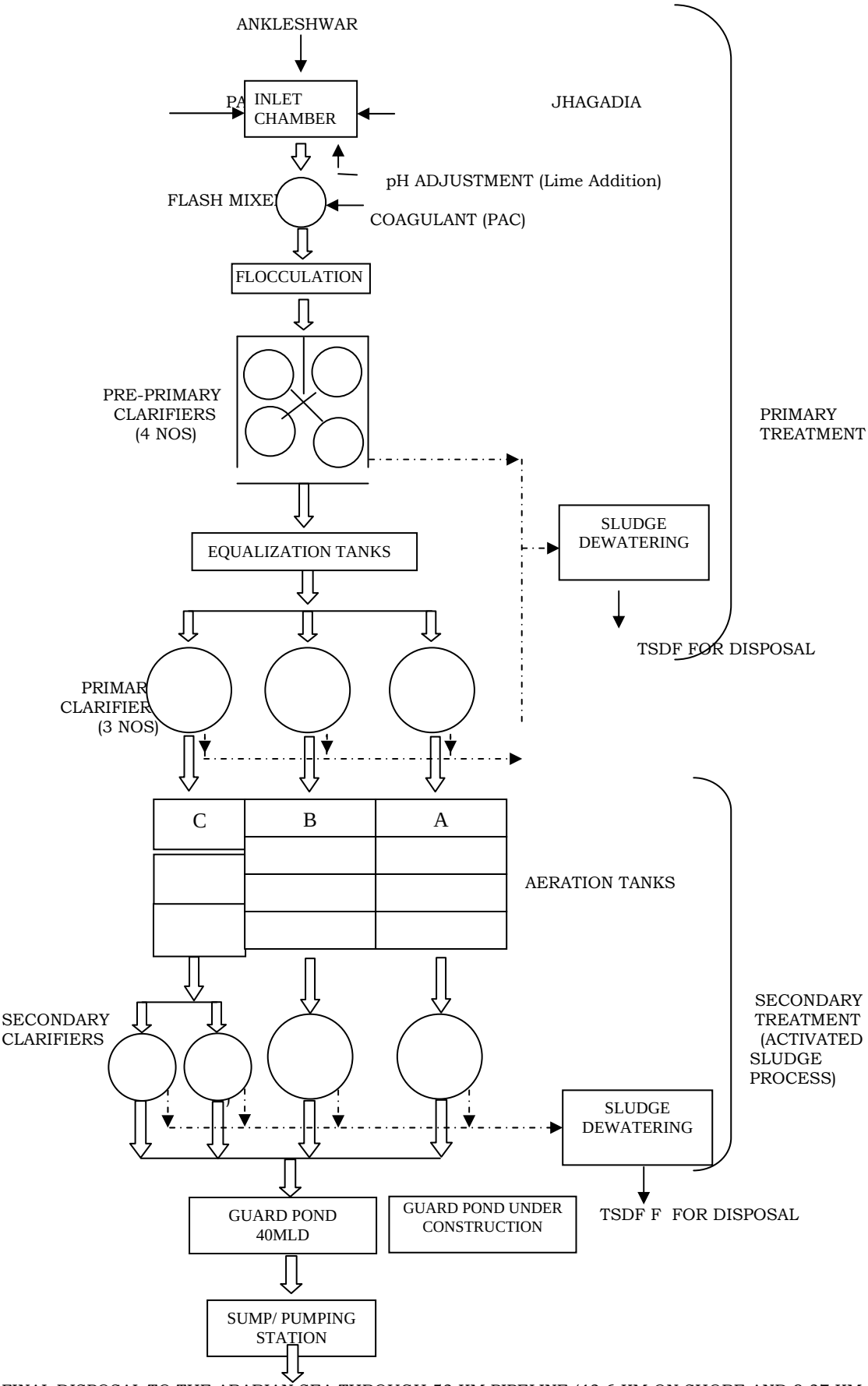


(For above Graphs – Refer Annexure –25 A)

FLOW DIAGRAM OF FETP (40 MLD), ANKLESHWAR



FLOW DIAGRAM OF FETP 60 MLD (After expansion)



FINAL DISPOSAL TO THE ARABIAN SEA THROUGH 53 KM PIPELINE (43.6 KM ON SHORE AND 9.37 KM OFF SHORE)

2.6.4.2 Need of up gradation of existing facilities

Ankleshwar :

- At present CETP is proposed for expansion for achieving ultimate capacity of 3.5 MLD for which Environment Clearance is already obtained.
- Feasibility of providing clarifier at individual pumping stations and / or at final pumping station for removal of precipitated suspended solids is decided to be checked & to be provided and / or alternatives available are to be worked out to ensure removal of such suspended solids for ultimate reduction of load on FETP.
- BEAIL shall work out and implement system for segregation of dilute stream that can directly be taken for final discharge along with treated effluent of FETP and thereby, reduce the hydraulic load on FETP and comply with the discharge norms.
- Process has been initiated related to work of lining of natural drain passing through GIDC – Ankleshwar, providing new gravity line for conveying effluent of pumping station "A", pumping station "B" and Enviro Technology Limited – CETP and this will have positive impact on quality of the environment as ultimately this will ensure proper collection & conveyance of effluent to FETP.
- Preventive procedure of cleaning underground pipeline network of GIDC – Ankleshwar to avoid problems that arises out of choking of the pipelines.

Panoli :

- At present CETP is proposed for expansion by 1 MLD for achieving ultimate capacity of 2 MLD.
- Panoli Notified Area has started to convert earthern storm water drains into RCC drain. It is necessary to segregate the rain water from other waste water for controlling the contamination of rain water and diverting rain water to natural drains.
- Separate TSDF and CHWIF for Panoli estate to avoid waste movement outside of the estate.

2.6.4.3 De-silting of water tanks, drains, rivulets, etc.

There are three pumping stations within the Ankleshwar industrial estates for collection and conveyance of effluent to final pumping station and subsequently to FETP for final disposal to deep sea. Notified area authority

removes the sludge from the pumping stations regularly from time-to-time. Notified area authority also has a jetting machine for cleaning of the choked underground drainage line.

2.6.4.4 Construction of lined drains / connections

Notified Area Authority have planned to remold the existing Amla Khadi passing through the industrial area with pakka lining & service road wherever it is possible and to construct walk way where width is not permitting to construct approach road. Project cost worked out to be approximately 1400 Lacs and work is to be taken up in Critical Infrastructure Project scheme and will be completed before next monsoon i.e. monsoon 2011. Tenders have already been invited.

2.6.4.5 Treatment and management of contaminated surface water bodies

Ankleshwar : To prevent the overflow of effluent from final pumping station to Amlakahadi, a RCC wall has been constructed. However, in the event of high hydraulic load due to rain or otherwise, it gets overflowed to Amlakhadi which is minimized by putting all the pumps in operations. However, still Amlakhadi carries domestic waste water generated from the adjoining villages.

Panoli : Storm water run off and the domestic waste water of village Sanjali is ultimately going to Vand Khadi. Notified Area Authority has been asked to provide / make arrangement to prevent overflow of the same to Vand Khadi and divert it to pumping station.

2.6.4.6 Rejuvenation / Management Plan for important eco-geological features

River Narmada is a perennial river. There is no rejuvenation plan specifically for River / khadis but actions as narrated above are

taken / proposed to be taken to prevent carry over of effluent / contaminated rain water into them.

2.6.4.7 Carrying of effluent from industrial units located in non-industrial locations to CETP facilities by lined drains / pipelines only and prevention of their disposal into city sewerage / surface drains.

There are no industrial units located in non-industrial locations which discharge effluent into city sewerage or surface drains.

2.6.4.8 Installation of Gen Sets at CETPs

- FETP of BEAIL has provided total three numbers of D. G. Sets. Two having capacity of 1250 KVA and one having capacity of 1275 KVA.
- Enviro Technology Limited – CETP at Ankleshwar has provided one number of D. G. Set having capacity of 600 KVA.
- Panoli Enviro Technology Limited – CETP at Panoli has provided one number of D. G. Set having capacity of 180 KVA.

2.6.5 Managerial and Financial aspects.

2.6.5.1 Cost and time estimates

Identified individual units, common facilities, BEAIL, Notified Area Authority have submitted their upgradation programmes along with estimated cost. The estimated cost of proposed measures at this juncture works out to approximately Rs. 405.56 Crores. The time frame for various action points is mentioned in the Action Plan at Para12.

2.6.5.2 Identified Private / Public Sector Potential investors & their contribution / obligation

Identified individual industrial units and common facilities viz. BEIL, ETL, PETL have submitted their EMS upgradation plan along with its financial outlay, summary of which is attached as Annexure – 26.

2.6.5.3 Government Budgetary support requirement

BEAIL as well as GIDC has submitted an upgradation plan along with its financial outlay, summary of which is attached as Annexure – 27.

2.6.5.4 Hierarchical and structured managerial system for efficient implementation

For efficient implementation of the action plan, periodical follow – up & review meetings have already been conducted by Principal Secretary – F & ED, Govt. of Gujarat and Gujarat Pollution Control Board. For better and timely transmission and implementation of the decisions taken by various Govt. Authorities as well as for technical support to the industrial units, a core team consisting of representatives of BEAIL, industries associations, common facilities and major industries has been constituted. This core team has already started functioning.

2.6.6 Self Monitoring system in industries (ETPs etc.)

Mainly large and medium scale industries carry out effluent quality monitoring periodically either by outsourcing or using in-house facilities. Some of the industries also have provided online monitoring facilities, details of which is provided in Annexure 28.

Ankleshwar :

For the monitoring of the member industries within the estate, a committee namely Environment Liaison & Drainage Committee is formed which carries out following activities.

- Monitoring of disposal of liquid and solid effluent and emission of air by the industries of Ankleshwar Industrial Estate.
- Spot verification in case of complaint and report to the concerned agencies for remedy, if necessary.
- Co-ordination with Security Committee for monitoring tanker movement in the estate during night hours.
- Monitoring of effluent pumping stations and underground drainage scheme of Ankleshwar Industrial Estate.

- Representation of issues of industries related to the environment with the concerned agencies.
- Co-ordination of environment preservation activities.

Panoli :

For the monitoring of the member industries within the estate, a committee namely Paryavaran Suraksha Cell is formed which carries out monitoring.

2.6.7 Data linkages to SPCB / CPCB (of monitoring devices)

Data linkages of monitoring devices to GPCB has already been taken up. The software and hardware required and currently available is being identified after which further action will be taken accordingly.

3. AIR ENVIRONMENT

3.1 Present Status of Air environment

The status of environment in Ankleshwar region is presented in subsequent paragraphs.

3.1.1. Critical locations for air quality monitoring

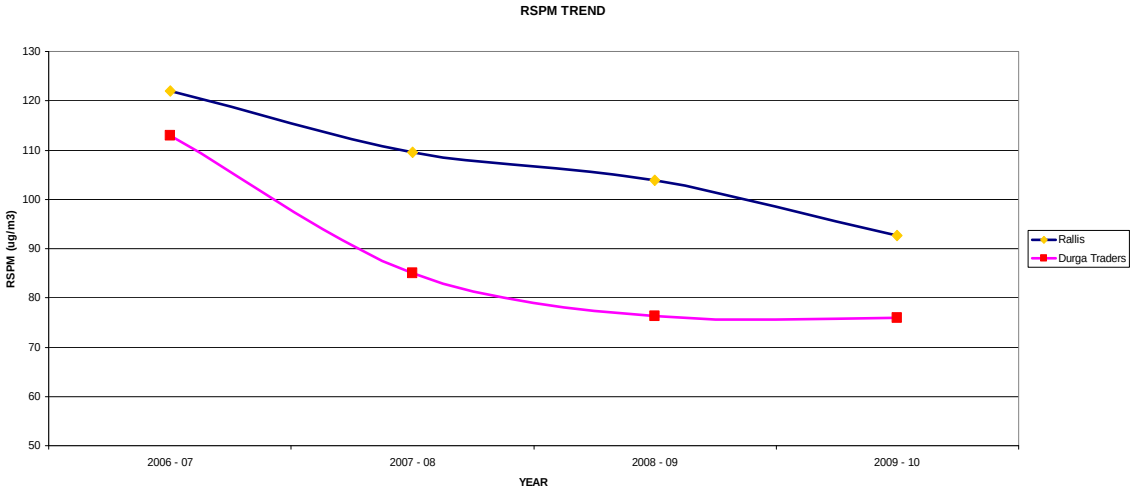
Ambient air quality monitoring is carried out at four locations in GIDC Ankleshwar and nearby areas as per CPCB guidelines i.e 104 monitoring in a year. Out of these, monitoring is carried out under NAMP (National Air Monitoring Programme) at two locations while at two more locations under SAMP (State Air Monitoring Programme). The details are as follows:

NAMP M/s Ralis Pharma India Ltd, GIDC, Ankleshwar (Industrial Area)
NAMP M/s Durga Traders, Rajpipala Road, Near ONGC Colony) Ankleshwar (Residential Area, in the North-West direction of Ankleshwar Industrial Area)
SAMP Gram Panchayat, Piraman, Dist. Bharuch (Residential Area, Adjacent to Ankleshwar Town, in the South-West direction of Ankleshwar Industrial Area)
SAMP Kumkum Banglow, Village Kosamadi, Dist. Bharuch (Residential Area, In the South-East direction of Ankleshwar Industrial Area)

3.1.2. Present levels of pollutants in air (routine parameters, special parameters and air toxic relevant to the area in three categories – known carcinogens, probable carcinogens and other toxic)

Samples of ambient air as per CPCB criteria have been collected under NAMP & SAMP programme from four different stations for GIDC, Ankleshwar. Average yearwise data are tabulated and attached as Annexure – 29.

Average of RSPM measured under NAMP Programme at GIDC, Ankleshwar



(For above Graph –Please Refer Annexure – 29)

Apart from ambient air quality monitoring under NAMP and SAMP as tabulated above, Ankleshwar Industries Association has started ambient air quality monitoring station as a part of implementation of on-going action plan at two more locations i.e. above sports club – Gattu School & Near Biltox Plant (Rallis Inida Limited – Unit III) from dt. 20/05/10 for all the twelve parameters as per revised ambient air quality standards notified in November – 2009. This sampling is being carried out by Aqua – Air Environmental Engineers Pvt. Limited, Surat. Results so far received are tabulated and attached as Annexure – 30.

Results of ambient air quality samples collected under NAMP & SAMP indicates downward trend and thus shows improved air quality.

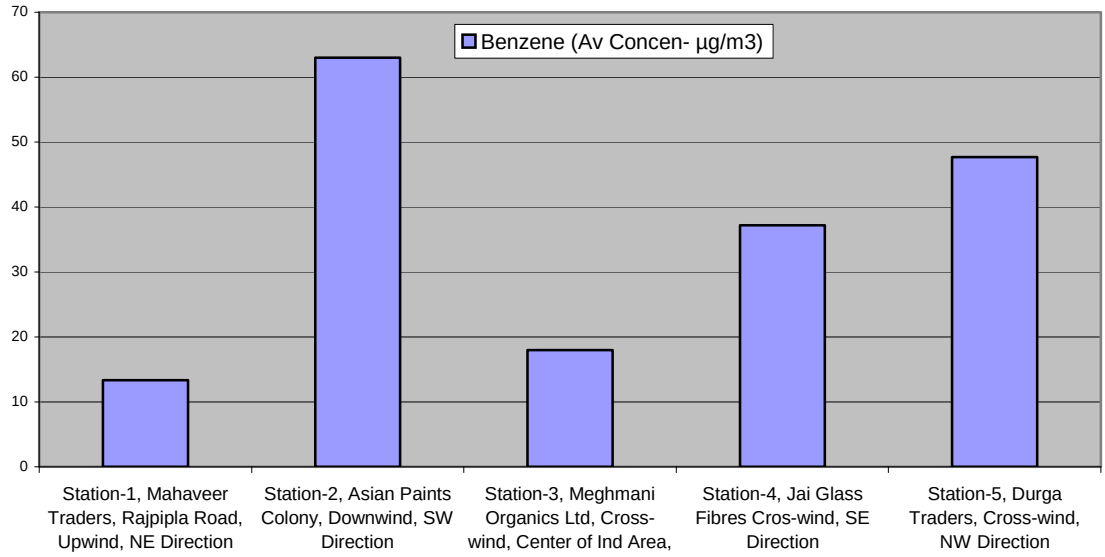
Panoli Industries Association has started ambient air quality monitoring station as a part of implementation of on-going action plan at two locations i.e. Sanjali Gram Panchayat & P. I. Industries from dt. 14/05/10 for all the twelve parameters as per revised ambient air quality standards notified in November –2009. These sampling is

being carried out by Preci-Tech Laboratories, Ankleshwar. Results are attached as Annexure – 31.

VOC in Ambient Air in Ankleshwar

CPCB had carried out VOC monitoring in Ankleshwar in March 2008. The VOCs in ambient air were monitored at five location on 3rd and 4th March 2008. The average concentration of Benzene at all the locations is depicted in the Chart given below. Range and average concentration of predominant VOCs (i.e. Benzene, Chloroform, Toluene, Methylene Chloride) found in the ambient air at Ankleshwar along with average concentration of Benzene at all locations is attached herewith as Annexure- 32.

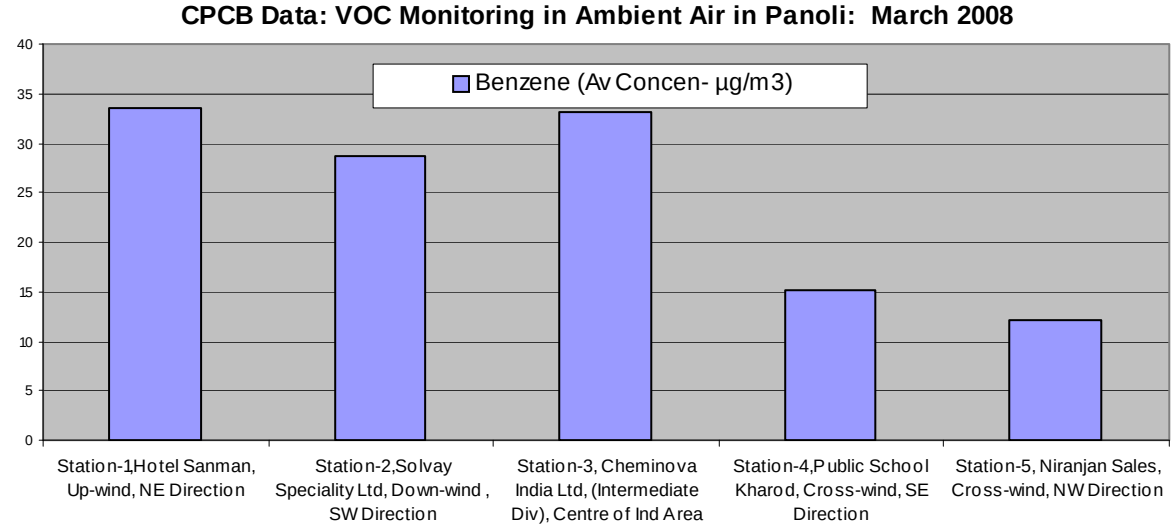
CPCB Data: VOC monitoring in ambient air in Ankleshwar : March 2008



(For above Graph- Please refer Annexure – 32)

VOC in Ambient Air in Panoli

CPCB had carried out VOC monitoring in Panoli in March 2008. The VOCs in ambient air were monitored at five location on 6th and 7th March 2008. The average concentration of Benzene at all the locations is depicted in the Chart given below. Range and average concentration of predominant VOCs (i.e. Benzene, Chloroform, Toluene, Methylene Chloride) found in the ambient air at Panoli along with average concentration of Benzene at all locations is attached herewith as Annexure- 33.



(For above Graph- Please refer Annexure – 33)

3.1.3. Predominant Sources contributing to various pollutants

The predominant source of air pollution in Ankleshwar region is industrial pollution as the area is accommodating industrial units, manufacturing a spectrum of products covering Pharmaceuticals, Dyes & Dye Intermediates, Pesticides, Other chemicals, Paints, Textile etc

3.2 Sources of air pollution:

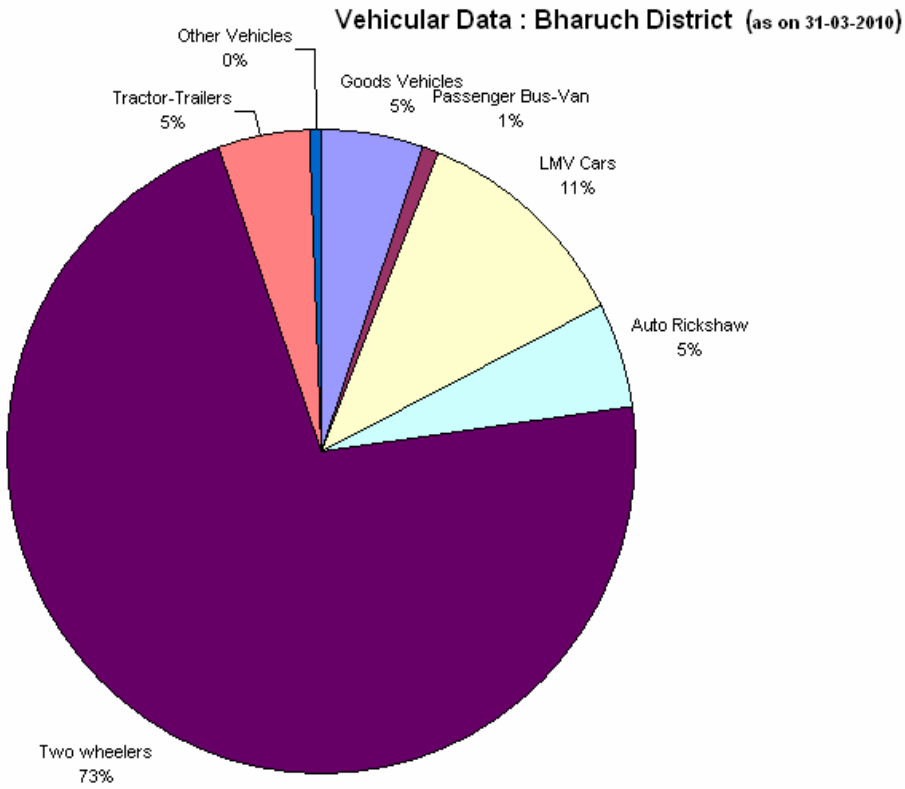
Industrial Pollution:

Ankleshwar and Panoli industrial estates mainly comprises of Pharmaceuticals, Dyes & Dye Intermediates, Pesticides, Engineering, Plastic, Paints, Textile and other chemical units. The details of industries in these estates are narrated in para1.7. The major probable air pollutants are PM, SO_2, NOx, Cl_2, HCl, Ammonia, VOC etc.

Vehicular Pollution:

Total number of registered vehicles in Bharuch district is 338786 as per ARTO data as on 31/03/2010. Out of these, 243853 (71.98 %) are two-wheelers. As per ARTO / GGCL data, presently 19919 vehicles are plying on cleaner fuel i.e. CNG/LPG. There are total five CNG operational stations in Bharuch district of which four are online/mother stations where as remaining is daughter booster station. Total compression capacity of these five stations is 2840 SCMH. There are six PUC centers. Percentage wise vehicle distribution is presented as below and details thereof are attached as Annexure 34.

The industrial estates of Ankleshwar and Panoli are located on National Highway -8 which is one of the busiest highways of the country. The movement of heavy vehicles and other traffic passing through the Highway also contribute to air pollution.



(For above Graph – Refer Annexure – 34)

3.3 Air polluting industries in the area / cluster

As mentioned earlier, the industries located in GIDC estates of Ankleshwar and Panoli mainly comprises of Pharmaceuticals, Dyes & Dye Intermediates, Pesticides and other chemicals sector, there is significant nos. of industries having air pollution potential.. The distribution of industries based on the type of emission is as follows:

	Industries having only flue gas emission	Industries having only process gas emission	Industries having flue and process gas emission	Total
Ankleshwar	294	30	118	442
Panoli	79	15	49	143
Grand Total	373	45	167	585

It is noteworthy that though there is considerable number of industries having flue gas emission, the infrastructure for supply and distribution of clean fuel - natural gas has been in place in this region since long back. Thus the majority of industries has been using NG as fuel and therefore there has been no significant impact from flue gas emission in this region. All the concerned industrial units located within industrial estate of GIDC, Ankleshwar have installed requisite air pollution control measures and are operating. However, still there is a problem of foul odour, to curb this issue, Odour Control Committee has already been formed.

3.4 Impact of activities of nearby area on the CEPI area

The industrial estates of Ankleshwar and Panoli are located on National Highway -8 which is one of the busiest highways of the country. Actually some stretch of NH is passing through Ankleshwar industrial area. The movement of heavy vehicles and other traffic passing through the Highway would definitely contribute to air pollution load. However, looking to the area of the industrial estates of Ankleshwar and Panoli and number & type of industries, the other sources of air pollution are assumed to be less significant and emphasis has been laid on abatement of air pollution from industrial activity.

3.5 Quantification of the air pollution load and relative contribution by different sources

Quantification of air pollution load as well as relative contribution by different sources can be worked out by carrying out source apportionment study of the region. However, ambient air quality data is available and has been produced in the previous paragraphs. The data of NAMP and SAMP would indicate that there is improvement in air quality of the region in terms of concentration of RSPM while other major parameters like SO2 and NOX are found within the National Ambient air Quality standards.

3.6 Action Plan for compliance and control of pollution

3.6.1 Existing infrastructure facilities – Ambient air quality monitoring network

As stated earlier, ambient air quality monitoring is carried out at four locations in GIDC Ankleshwar and nearby areas as per CPCB guidelines i.e 104 monitoring in a year. Out of these, monitoring is carried out under NAMP (National Air Monitoring Programme) at two locations while at two more locations under

SAMP (State Air Monitoring Programme). Details are given in para 3.1.1

3.6.2 Pollution control measures installed by the individual sources of pollution

Individual units having air pollution potential have provided cyclone/multi cyclone separator/ water scrubber/Bag filter as APCM for flue gas emission. Chemicals industries have provided scrubbers for the process emission, if any. The details of APCM are as below:

- Number of industries having Scrubbers for gaseous emission : 136 in Ankleshwar and 42 in Panoli
- Number of industries having APCM for flue gas emission : 34 in Ankleshwar and 16 in Panoli

Details about actions taken / proposed with regard to odour nuisance and noise pollution

A. <u>Noise:</u>

Following actions are taken:

- Air carrying network (900 ~ 750 mm dia C.S.Pipe) has been clamped (30 nos.) to control micro vibration which may create humming noise. (Rs.12,500/-)
- All perpendicular joints of blowers to common manifold is replaced by tangential entries. (Rs.70,000/-)
- New and Old air networks are isolated. (Rs.20,000/-)
- Installation of silencer at all the blowers. (Rs.1.00 Lac)
- Acoustic enclosure to all new blowers. (Rs.7.80 Lacs)
- Closing of all opening of blower house. This blower house is concrete house with pakka slab.
- Reduce the dia of pulley to alter the reduction ratio – old blowers (Rs.1.25 Lacs)
- Decanter platform is closed by brick wall from north and east sides (Rs.45,000/-).
- As per the directives given by GPCB, order has been placed to SVNIT, Surat to monitor the noise level as well as to suggest the remedial measures. (Rs.55,000/- Order value)

Following actions are to be taken:

- Acoustic enclosure to all old blowers.(One month – Rs.7.80 Lacs)
- To reduce the dia of pulley to alter the reduction ratio for all new blowers. (Two months – Rs.1.65 Lacs)

B. Odor:

Following actions are taken:

- Stopped using secondary sludge storage platform
- Discharge chute (of GI) installed at all decanter (sludge) outlets (Rs.60,000/-)
- Use of compressed air is stopped at flash mixture and flocculation tanks .
- As per the directives given in Environment Clearance, DDIT, Nadiyad has been consulted to study the system and to suggest the remedial measures. Dr. Rao of DDIT shall be visiting shortly. In parallel Dr. Anjali Khambete of SVNIT who is doing research work on odor problem is also consulted. Also professional consultants are contacted to take effective measures like use of spray, electronic device etc. (Order value – Rs.2.00 Lacs)
- Use of spray system (fogging system) started (Rs.9.0 Lacs)
- Simultaneous transfer of sludge with generation is arranged, to avoid excessive sludge accumulation on platform.
- Panoli sump is being covered completely with FRP sheet (Rs.2.25 Lacs)

Following actions are to be taken:

- Preprimary platform is to be closed in totality from all sides with acrylic transparent sheet. (Two months – Rs.65.0 Lacs)
- To divert all three main inlets deep into the working level to avoid flashing of volatile matter. (One months – Rs.0.50 Lacs)
- Sludge storage platform is to be covered from top as well as all sides (Two months – Rs.50 Lacs).

3.6.3 Technological Intervention

3.6.3.1 Inventorisation of prominent industries with technological gaps

All the concerned industrial units located within industrial estate of GIDC, Ankleshwar have installed requisite air pollution control measures and are operating. However, still there is a problem of foul odour, to curb this issue, Odour Control Committee has already been formed. Board has identified industries prone to cause odour nuisance.

3.6.3.2 Identification of low cost and advanced cleaner technology for air pollution control

For controlling of pollutants like VOCs, PAHs, PCBs Industries which are engaged in handling of solvents, Solvents shall be recovered & reused. Solvent recovery shall not be less than 95%

under any case and shall be upgraded to achieve the 99% efficiency. .Separate godowns for the storage of finish goods ,raw materials & separate tank farm for solvents & other chemical storage as per MSIHC Rules 1989 shall be provided.
Solvents Management shall be as follows: Reactor shall be connected to chilled brine condenser system. Industries shall provide the chilled brine solution in secondary condenser for condensation of the VOCs.

1) Reactor and solvent handling pump shall have proper seals to prevent leakages.
2) The condensers shall be provided with sufficient High Transfer Area (HTA) and residence time so as to achieve more than 95% recovery and to be further upgraded it to 99%.
3) Solvents shall be stored in a separate space specified with all safety measures.
4) Entire Plant shall be flame proof. The solvent storage tanks shall be provided with breather valve to prevent losses.
5) Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.

3.6.3.3. Introduction and switch over to cleaner fuel

As mentioned earlier, it is noteworthy that though there is considerable number of industries having flue gas emission, the infrastructure for supply and distribution of clean fuel - natural gas has been in place in this region since long back. Thus the majority of industries have been using NG as fuel and therefore there has been no significant impact from flue gas emission in this region.

3.6.4 Need of infrastructure Renovation

3.6.4.1 Development of roads

The CEPI area of Ankleshwar comprises of GIDC estates of Ankleshwar and Panoli. State Government has carried out major works of internal roads in these estates in last few years and as a result road conditions in these estates have improved to considerable extent. Moreover, as mentioned earlier, looking to the area of the industrial estates of Ankleshwar and Panoli and number & type of industries, the other sources of air pollution are assumed to be less significant.

3.6.5 Impact on CEPI score after installation/ commissioning of full fledged air pollution control systems

The impact on CEPI score after installation / commissioning of full fledged air pollution control systems is presented in Annexure - 35.

3.6.6 Managerial and Financial aspects- Cost and time estimates

These points are already covered above under point no. 2.6.5.

3.6.7 Self monitoring system in industries (Stacks, APCDs)

Mainly large and medium scale industries carry out stack and ambient air quality monitoring periodically either by outsourcing or using in-house facilities. Ankleshwar Industries Association and Panoli Industries Association have also commenced ambient air quality monitoring for all twelve parameters as per the revised standards notified by the Govt. of India. Details of online systems provided by the industries are already given above in Annexure 28.

3.6.8 Data linkages to SPCB/ CPCB (of monitoring devices)

Data linkages of monitoring devices to GPCB have already been taken up.

4. LAND ENVIRONMENT (Soil and Ground Water)

4.1 Soil Contamination

Currently there is no soil contamination identified in the area as all the hazardous waste generated from the industrial units is disposed into TSDF and there is no illegal dumping currently.

4.1.1. Present status of land environment supported with minimum one year analytical data

Currently there is no such data available for land environment.

4.1.2. Critical locations for land/ soil pollution assessment and ground water monitoring

Since the land / soil pollution assessment is not being done any such locations are not identified.

4.1.3. Present levels of pollutants in land/soil and ground water (routine parameters, special parameters and water toxics relevant to the area in three categories – known carcinogens, probable carcinogens and other toxics)

Present level of pollutants in land / soil are not being analysed currently since any such illegal hazardous waste dumps do not exist in the said cluster.

4.1.4. Predominant sources contributing to or posing danger of pollution of land and ground water such as hazardous/toxic wastes or chemicals dumps/storage etc.

Presently there are no such hazardous or toxic wastes or chemical dumps or storage etc in the area which pose danger of pollution of land and ground water.

4.1.5. Sources of Soil Contamination

There are no sources of soil contamination currently.

4.1.6. Types of existing pollution

Presently no such pollution exists in the area.

4.1.7. Remedies for abatement, treatment and restoration of normal soil quality

There is no such current proposal for abatement, treatment and restoration of normal soil quality since such pollution does not exist in the area presently.

4.2. Ground water contamination

4.2.1. Present status/ quality of ground water

The compiled analysis reports of samples collected from various ground water sources within the cluster are already attached as Annexure – 7.

4.2.2. Source Identification (Existing sources of Ground water Pollution)

Currently there are no identified sources of Ground Water Pollution in the said cluster.

4.2.3. Ground water quality monitoring program

GPCB regularly collects ground water samples under Ground Water Quality Monitoring Program and various Action Plans.

Currently samples are collected from 15 locations at varying frequency under this program.

4.2.4. Action Plan for control of pollution including cost/ time aspects

There is no proposed action plan for control of ground water pollution since presently there is no such source in the area.

4.2.5. Treatment and management of contaminated ground water bodies, etc.

There are no contaminated ground water bodies in the cluster hence any such proposal is not being made.

4.2.6. Impact on CEPI score after abatement of pollution

As per table attached as Annexure – 35.

4.3. Solid waste Generation and management

4.3.1. Waste classification and Quantification

4.3.1.1. Hazardous waste

Individual industrial units have provided in-house storage facilities with leachate collection system for storage of their generated hazardous waste(s) prior to its final disposal at TSDF and/or CHWIF. Details of the hazardous waste disposed to TSDF and incinerated at CHWIF are attached as Annexure – 36 & 36A respectively for Ankleshwar estate and as Annexure – 37 & 37A respectively for Panoli estate.

The industrial units of GIDC, Ankleshwer, Panoli are member of common TSDF and presently there is no illegal hazardous waste dumping.

Presently there is no major issue of disposal of hazardous waste disposal on land through unauthorized way. However, there were few such incidents in the past and subsequently for the clean up of such sites, solid / hazardous wastes dumped were got lifted & shifted to TSDF – BEIL; details of which is summarized and attached as Annexure – 38.

4.3.1.2. Bio-medical waste

There is no common bio-medical waste incineration facility. However, whatever bio-medical waste generated by public/private hospitals, occupational health centers at industry and animal houses is sent to nearby common bio-medical waste incineration facility viz. Envision located at Surat.

4.3.1.3. Electronic waste

Data for Electronic Waste generated specifically in this Industrial Cluster is not available.

4.3.1.4. Municipal solid Waste/ Domestic Waste/ Sludges from ETPs/ CETPs/ STPs and other industrial sources

Ankleshwar : Municipal solid waste generated in the notified area of GIDC, Ankleshwar is collected by Notified Area Authority. It has provided Door-to-Door Waste Collection system and roads/ streets sweeping arrangements. It has provided 90 collection bins and 6 nos. of tractor - trailers and employed about 50 persons for waste collection activity. Average MSW generation in the area is about 5 MT/day. The collected MSW is transported to Biogas / composting plant located at Bharuch Enviro Infrastructure Limited (BEIL) through tractor-trailer. Capacity of composting plant is 5 MT/Day. BEIL has set up this bio gas plant based on the technology developed by Bhabha Atomic Research Centre. As per the agreement executed between Notified Area Authority and BEIL, Municipal Solid Waste generated in Notiified Area is collected, segregated, treated and disposed of by BEIL. Biodegradable portion pf municipal waste (kitchen waste) is treated in composting plant. The bio gas generated is utilized by BEIL in the Common Incineration System as support fuel. The compost formed is sold as fertilizer / soil conditioner. The non-biodegradable portion is disposed off in to TSDF site of BEIL. The Notified Area authority has obtained Authorization under MSW (M&H) Rules 2000 , valid up to 31/12/2013.

BEIL has set up a bio gas plant based on the technology developed by Bhabha Atomic Research Centre. BEIL is collecting kitchen waste and other domestic waste; and treating them at the plant. The bio gas plant is working on principle of aerobic and anaerobic

treatment. The gas generated is utilized in the Common Incineration System as fuel. The residual material which is good quality compost is a valuable fertilizer.

Panoli : Municipal solid waste generated from GIDC, Panoli is sent to composting plant located at BEIL through tractor-trailer. This facility is being operated by BEIL on behalf of Ankleshwar notified authority. Some of the industries also have compost pits.

4.3.1.5. Plastic waste

BEIL has obtained NOC from GPCB for plastic waste management. BEIL is working on installation of a system where segregated plastic waste can be converted into granules for recycling. The proposed system will be ready by October 2010.

4.3.1.6. Quantification of wastes and relative contribution from different sources

Estate wise actual quantification of waste received at BEIL for land filling and incineration is already presented under Annexure 36, 36A, 37 and 37A.

4.3.2. Identification of waste minimization and waste exchange options

As of now there is no Centralized Industrial Waste Exchange and By-product Recovery Facility for handling of waste within the estates. However, at an individual level spent acid generated is being used / reused / recycled by another actual end user. Gypsum is also being sent for reuse in cement industries.

Creation of waste exchange center inline with Novel Spent Acid System for the estate is one of the action point.

4.3.3. Reduction/ Reuse/ Recovery/ Recycle options in the co-processing of wastes.

Currently the spent acid generated from various industrial units is being re-used captively or by other industrial units. Also various wastes like Gypsum Sludge and Iron Sludge are being re-used by industrial units like cement industries.

4.3.4. Infrastructure facilities

4.3.4.1. Existing TSDF/ Incineration facilities including capacities

TSDF for Solid Waste Disposal

INTRODUCTION

Bharuch Enviro Infrastructure Ltd (BEIL) is operating a state-of-the-art Hazardous Waste Management Facility at Ankleshwar, Gujarat, since 1997.

BEIL is promoted by Industries Associations of Ankleshwar, Panoli and Jhagadia.

BEIL TSDF has major two components, a secured landfill and a Common Incineration System. The secured landfill is in operation from 1997 and so far, over 10 Lacs MT of solid / hazardous wastes from industries in Bharuch region, has been collected and disposed off. Common Incineration System was commissioned in 2005; and so far, more than 45,000 MT of organic waste has been incinerated during the last five years of operations. The Facility is subjected to various monitoring.

BEIL is having a well equipped laboratory for helping in proper monitoring and analysis. The Facility is also having other infrastructure facilities like Storages, Drains, Roads, Leachate Wells, Monitoring Bore Wells, Weigh Bridge etc. Surrounding the Facility, 15 meters' wide green belt is developed and varieties of plant species have been planted.

BEIL started operations with 18 acres of land in the GIDC Estate and additional 50 acres land has been acquired, making the total land available 68 acres for the Facility

SECURED LANDFILL FACILITY

Central Pollution Control Board has published "Criteria for Hazardous Waste Landfills" in 2001. BEIL is constructing and operating the secured landfill as per the CPCB Criteria. This Facility was developed under the guidance of National Productivity Council, New Delhi. Now, the design and drawings are prepared under the guidance of Indian Institute of Technology Delhi. IIT Delhi (Civil Engineering Department) is carrying out inspection and is also providing required guidance.

Ankleshwar TSDF has been constructed at a depth of approximately 8 (eight) meters below ground level. The liner system provided consists

of clay liner and HDPE liner. Leakage detection system is also provided. The critical components of construction are clay liner and HDPE liner. Preparation of clay liner is done by blending natural clay with bentonite to make it impervious.

BEIL have about 592 member industries for disposal of waste in the secured landfill.

BEIL is also conducting detailed analysis of wastes from member industries so that only the wastes which can go directly to landfill are put to the TSDF. Other wastes needing treatment like neutralization / stabilization / incineration, are segregated and given proper treatment before disposal to landfill.

One of the important aspects is leachate management. Leachate generated is collected and treated at the sister concern Enviro Technology Ltd. During monsoon period, the site is kept covered.

BEIL has already provided coverage system for the utilized area of landfill where about 6,00,000 MT waste has been disposed off. Phase 1 facility is already provided vegetative coverage.

Year wise hazardous waste received for secured landfilling, number of members for secured landfilling and year wise leachate collection data are attached as Annexure – 39, 40 and 41 respectively.

Methodology adopted for grouping and grading of different type of waste prior to disposal into TSDF - BEIL

- Whenever Industry member approaches BEIL for membership for Landfill/Incinerator, he is given an application form to fill up alongwith necessary documents as under.
  (i) List of Directors.
  (ii) List of Raw Materials.
  (iii) Effluent Treatment flow sheet diagram.
  (iv) Solid Waste storage facility details.
  (v) Authorisation (Solid Waste) copy of GPCB.
  (vi) SSI Certificate.
  (vii) Plot Allotment Letter.
  (viii) Board Resolution / Partnership Deed Copy
  (ix) Application Form duly filled in alongwith membership fees and a 1 kg. sample of incinerable wastes.

- The representative samples of waste is received from the party. The samples is analysed for comprehensive analysis and compliance to criteria for direct Disposal to Landfill site.

- After examining comprehensive analysis and compliance to criteria for direct disposal to Landfill, we decide that the waste is suitable for the landfill or not.

- While deciding for disposal method we also consider the authorization issued by Gujarat Pollution Control Board Gandhinagar.The waste, category, Type of waste and quantities generated and disposal method may be available.

- Comprehensive analysis is carried out as per the guideline given by CPCB "Table-5 in Protocol Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities including Common Hazardous Waste Incinerators" and finger print analysis as per Protocol, Table-4.

- If waste is suitable is for landfill then we ask the party to send their waste for the landfill.

- If waste fails to comply the criteria of direct disposal to landfill due to presence of heavy metals, the solidification/stabilization experiments are performed at the time of comprehensive analysis and disposal price is given to members.

- When we receive the waste from party for disposal to landfill, first we check the manifest that party has given all the information with category number and waste description.

- Based on the description and as per requirement of landfill test we do the finger print analysis such as appearance, pH, Flammability, PFLT test,and compatibility test before release to landfill for disposal.

- If it passes all the test and we found that it is suitable for the landfill, we send the material to landfill site for the disposal.

- So when we get the same material from the party, we send that waste first for stabilization and then we dispose it into the landfill.

- Waste segregation and treatment methodology is as follows;

    - For direct landfilling; and
    - Treatment and landfilling
    - If waste is acidic, treatment given is neutralization
    - If waste contains Heavy Metals, it is stabilized; and
    - If waste is organic, then treatment given is incineration. Ash generated is disposed off in the secured landfill

Clean & attractive solid waste disposal site is praised by many visitors / dignitaries including Hon'ble Minister, Shri Jairam Ramesh and Members of the Planning Commission.

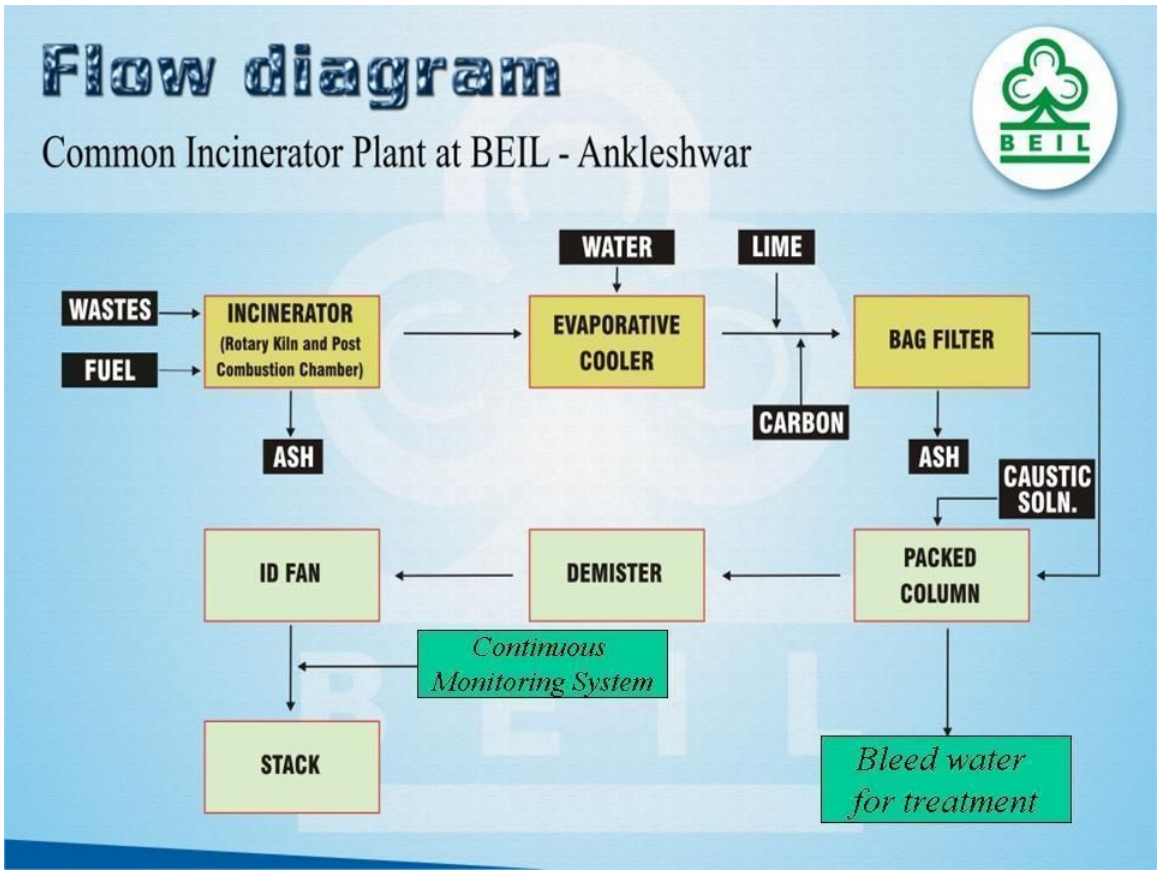
Common Incineration System

Common Incineration System set up at BEIL is first of its kind in India. This Facility has been set up after extensive studies with various types of wastes generated in the region. The studies were carried out at Chemical Engineering Division, Central Leather Research Institute, Chennai. All the required studies, including Hazop Studies, have been conducted before setting up the plant.

The Incineration System consists of two stage combustion, rotary kiln and post combustion chamber followed by air pollution control system. The rotary kiln and post combustion chamber are refractory lined. High temperatures (above 1100 ° C) are maintained in the post combustion chamber to complete destruction of the organics present in the waste. The incineration system can handle various types of wastes generated by the industries, like solid, liquid, sludge and tarry waste.

The air pollution control system consists of an evaporative cooler (quencher), lime and carbon injection system, bag filter (for removal of particulates), wet scrubber (with caustic solution), an Induced Draught Fan and Chimney. The continuous monitoring system is installed to monitor various emission parameters. The incineration system is operated with the help of PLC (Programmable Logic Control).

TECHNICAL DETAILS OF INCINERATOR:



The system set up consists of a rotary kiln, post combustion chamber, cooler, Dry Scrubber, Bag Filter, Wet Scrubber, ID Fan, Continuous Monitoring System and Chimney etc. The technical details are given below;

I. Type of Waste Generated

Combination of Process waste and Waste streams from different industries. (solid / liquid / sludge)

II. The Thermal Capacity will be 6.5 Million K Cal / Hour

III. Waste details

Average net calorific value	3,000 kcal/kg
Chlorine	Less than 25 g/kg (system can take up to 50 g/kg as a surge) The utility figures are for 25 g/kg)
Sulphur	Less than 16 g/kg
Fluorine	Less than 3 g/kg
Cd + Th (and its compounds)	Less than 1.7 mg/kg
Hg (and its compounds)	Less than 1.25 mg/kg
Sb + As + Pb + Cr + Co + Cu + Mn +Ni + V	

	(and its compounds)	Less than 25 mg/kg
IV	Fuel	Natural Gas This can be replaced with liquid waste having high calorific value.
V	Maximum possible capacity	1 MT / Hour of waste – liquid / solid 950 liters / hour aqueous waste 500 liters / hour liquid waste as fuel i.e. Total approximately 2.5 MT / Hour
VI	Connected Load	833 HP. The consumed HP will be 520
VII	Continuous Monitoring System for Opacity, CO, SO2 and NOX	
VIII	Plant design and supply Thermax Ltd., Pune with technical collaboration of M/s Weston Solutions, USA	
IX	Operation parameters as per the norms prescribed by CPCB	

Details of year wise quantity of waste incinerated are presented at Annexure – 42.

INCINERABLE WASTE STORAGES

BEIL has constructed 3 new godowns for incinerable waste storages and modified all the existing godowns in 2008, as per Guideline for Storage of Incinerable Waste, published by CPCB. The storages are provided with fire fighting system including heat detectors / smoke detectors. Inside the godowns, wastes are stored in blocks of less than 300 MT with separation distance of 4 meters between the blocks. Also, inspection space of 1 meter is provided between the pallets. Non compatible wastes are stored separately.

Details of Storage Sheds for Incinerable Wastes				
Storage Area No.	***Size after modification (Meters)***	***Area (Sq M)***	***Capacity as per new storage arrangement – 300 MT block, fire resistant wall, 4 meters separating distance, 1 meter inspection space etc***	***No. of passages of 3.5 meters***
1	*65 x 19.5*	*1,267.500*	*888.000*	*4*
2 and 3	*67 x 42.452*	*2,844.284*	*1,910.400*	*3*
4 A	*34 x 12 x 6 + 43.1 x 13.5*	*1,010.250*	*688.040*	*4*
5	*44.877 x 27.9*	*1,252.068*	*1,044.000*	*4*
6	*44.888 x 22.2 + 13.337 x 12*	*1,156.557*	*849.000*	*2*
7 (newly constructed)	*39 x 26 + 26 x 13*	*1,352.000*	*926.400*	*4*
8 (newly constructed)	*65.5 x 30.9*	*2,023.950*	*1,411.200*	*4*
9 (newly constructed)	*55 x 30.9*	*1,699.500*	*1,161.600*	*4*
10 (newly constructed)	*43.5 x 30.9*	*1,344.150*	*1,030.400*	*4*
Platform	*17.5 x 51*	*892.500*	*300.00*	*2*
Drum Cutting Area (4 B)	*18 x 26.1*	*469.800*	*319.960*	*2*

Details of Storage Sheds for Incinerable Wastes				
Storage Area No.	***Size after modification (Meters)***	***Area (Sq M)***	***Capacity as per new storage arrangement – 300 MT block, fire resistant wall, 4 meters separating distance, 1 meter inspection space etc***	***No. of passages of 3.5 meters***
Total →			*10,529.000*	

Details of Heat Detectors and Smoke Detectors		
Storage Shed No.	***No. of smoke detectors installed***	***No. of heat detectors installed***
1	*45*	*36*
2 and 3	*81*	*81*
4	*81*	*81*
5	*21*	*21*
6	*32*	*32*
7	*38*	*36*
8	*60*	*60*
9	*50*	*50*
10	*40*	*40*

For fire fighting BEIL has provided following facilities

- Fire hydrant water storage = 650 kl
- Fire hydrant line length in meters = 2400
- Fire hydrant posts = 42 nos.

Details of Heat Detectors and Smoke Detectors		
Storage Shed No.	***No. of smoke detectors installed***	***No. of heat detectors installed***
• Fire hydrant monitors = 15 (hose pipes are not required and the range is about 110 meters on full opening) • Foam type extinguishers = 8 nos. • *Fire extinguishers =70 nos.*		

Methodology adopted for grouping and grading of different type of waste prior to disposal into Incinerator- BEIL

- Whenever Industry member approaches BEIL for membership for Landfill/Incinerator, he is given a application form to fill up alongwith necessary documents as under.
  (x) List of Directors.
  (xi) List of Raw Materials.
  (xii) Effluent Treatment flow sheet diagram
  (xiii) Solid Waste storage facility details.
  (xiv) Authorisation (Solid Waste) copy of GPCB.
  (xv) SSI Certificate.
  (xvi) Plot Allotment Letter.
  (xvii) Board Resolution / Partnership Deed Copy
  (xviii) Application Form duly filled in alongwith membership fees and a 1 kg. sample of incinerable wastes.

- The representative samples of each type of waste is received from the party. The samples is analysed for comprehensive analysis. The comprehensive analysis includes the Hazard tests such as flammability, Reactivity, Toxicity and Special Hazard.
- The waste streams with flash points less than 65 degree C, are identified for minimum storage and taken up for incineration on priority.

- Similarly highly reactive waste streams with water and Air, Lime etc are identified for disposal on priority.

- The waste streams are mainly classified based on physical nature as under.
  - Organic Liquid- High CV/Low CV
  - Aqueous Liquid
  - Tarry waste
  - Semi solid
  - Solid

- After examining comprehensive analysis high organics containing streams are recommended for Incineration.

- Compatibility group no, Waste category no, Waste ID and UN classification no. of Incinerable waste stream is confirmed.

- While deciding for disposal method we also consider the authorization issued by Gujarat Pollution Control Board Gandhinagar.The waste, category, Type of waste and quantities generated and disposal method may be available.

- Comprehensive analysis is carried out as per the guideline given by CPCB "Table-5 in Protocol Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities including Common Hazardous Waste Incinerators" Additional properties of Flash Point, Reactivity, Toxicity Hazards are also checked (MSDS).

- If waste is suitable is for Incinerator, then we ask the party to send their waste for the Incinerator.

- When we receive the waste from party for disposal to lIncinerator, first we check the manifest that party has given all the information with category number and waste description.

- Based on the description and as per requirement of Incinerable waste, we do the finger print analysis such as pH, CV, organic Chlorine, Organic Sulfur, LOD, Ash content and moisture. The analysis is conveyed to Plant for suitable storage and menu plan

4.3.4.2. Present status/ performance and need of up gradation of existing facilities including enhancement of capacities

Generated hazardous waste of individual industries are stored in hazardous waste storage facility within plant and disposed off to common TSDF site located at Ankleshwar. Details furnished as annexure are :

- Details of landfill waste received by BEIL from industries located in cluster of Ankleshwar : Annexure – 36
- Details of incinerable waste received by BEIL from industries located in cluster of Ankleshwar : Annexure – 36A
- Year wise HW quantity received for secured land filling : Annexure 39
- Details for members for secured land filling : Annexure 40
- Leachate quantity data : Annexure 41
- Year wise details of waste quantity incinerated : Annexure 42

- Details of landfill waste received by BEIL from industries located in cluster of Panoli : Annexure – 37
- Details of incinerable waste received by BEIL from industries located in cluster of Panoli : Annexure – 37A

4.3.4.3. Treatment and management of contaminated waste disposal sites, etc.

At present there is no illegal hazardous waste disposal site in the cluster.

4.3.4.4. Impact on CEPI score after proper management of Solid Wastes.

As per table attached as Annexure – 35.

5. PPP Model

5.1 Identification of project proposals (for both the options i.e. technology intervention and infrastructure renewal) for implementation under the PPP mode under the Action Plan.

The identified industries as well as common facilities like BEIL, ETL, PETL and Infrastructure agencies like Notified Area Authority, BEAIL have proposed various measures including strengthening of on –going actions. The proposed cost works out to Rs. 405.56 crores. These measures include EMS upgradation by individual industries and infrastructure strengthening in both the estates.

5.2 Identification of stakeholders/ agencies to be involved and to evolve financial and managerial mechanisms for implementation of PPP projects.

The major stakeholders for the implementation of PPP projects can be :

a. GPCB
b. CPCB
c. State Government
d. Central Government
e. Industrial Association
f. Industrial Units
g. NGOs
h. Other allied agencies

6. Other infrastructural Renewal measures:

6.1 Green Belts

Notified Area Authority vide their letter bearing no. NTA/Ank/1865 dt. 11/08/2010 has informed that Green belt area developed by GIDC approx. 1800 sq. mtrs. with 1 lakhs trees proposed and planting in green belt area. It is also informed that saplings are planted along the road side available place and will also plan to plant the sapling across the Ankleshwar estate.

6.2 Development of Industrial Estate(s)

There is no plan of development of industrial estate within the cluster presently.

6.3 Development/ shifting of industries located in the non- industrial areas to the existing/ new industrial estates.

There is no plan or proposal for development or shifting of industries located in non-industrial areas to existing or new industrial estates.

7. Specific Schemes:

7.1. GIS-GPS system for pollution sources monitoring

GPCB is on procedure to procure latest devices for GIS-GPS system for pollution source monitoring. The same will be integrated into the existing XGN system for better results.

7.2. Hydro-geological fracturing for water bodies rejuvenation

Currently there is no such proposal for water bodies rejuvenation.

7.3. In-situ remediation of sewage

The sewage generated from some industrial units is sent to CETP while in some industrial units it is disposed by in-situ remediation through septic tank - soak pit system.

7.4. Utilization of MSW inert by gas based brick kilns

There is no such proposal currently as there are no brick kilns within the cluster.

7.5. Co-processing of wastes in cement industries

Some of the wastes like gypsum sludge, iron sludge etc. generated by the industrial units of the cluster are used by the Cement Industries.

8. Public awareness and training Programmes

This is an ongoing process and public awareness and training programmes are regularly arranged by GPCB.

9. Overall Impact of installation/ commissioning of pollution control equipments/ measures on the CEPI score

Scenario of environmental quality in the clusters of Ankleshwar region has been documented in previous paras along with remedial measures that are taken or are being taken. To achieve the further improvement in the quality of the environment, specific issues have been considered under the Action Plan which has been derived after due deliberations with various stakeholders. It is expected that timely implementation of Action Plan will fetch the improvement in all the three components of environment and on the basis of the same predicted score of CEPI is tabulated and attached as Annexure – 35.

10. Assessment of Techno-economical feasibility of pollution control systems in clusters of small/medium scale industries.

Such assessment is not required since all the small and medium scale industries already have pollution control systems.

11. Efforts shall be made to encourage use of Bio-compost and Bio-Fertilizer alongwith the chemical fertilizer in the state to minimize the unutilized chemical fertilizer run-off into the natural water resources from agriculture fields (through Govt. policy)

There are no such units in the area hence not applicable.

12.Summary of proposed action points:

7.1. Short Term Action Points (upto 1 year, including continuous Activities)

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
WATER						
1	Standard flow meter at final outlet of ETP	To control overflowing of drainage pipeline, it is necessary to control the discharge of excessive quantity of w/w from the industrial units (i.e. the w/w discharge should be as per CCA condition). To check the quantity of w/w being discharged it is proposed that the units having effluent **quantity >= 25 m3/day** should provide Standard Flow Meter at the final outlet.	Identification of units having effluent **quantity >= 25m3/day**.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB	Already identified & verification by 15.07.2010	To be borne by the concerned industry. Industrial Association may assist individual units
			Industrial Association will issue the circular to their member to provide the Standard flow meter. GPCB will also issue notice to such units.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB	31.7.2010	
			Standard flow meter required to install at final outlet of ETP by units having effluent discharge **quantity >= 25 m3/day**.	Concerned industries.	31.10.2010	
			Industry having **discharge >= 25 KL/Day** shall store their treated effluent in their guard pond during heavy rain and shall restore their discharge activities upon receipt of intimation from BEAIL.	Concerned industries, BEAIL, Notified Area Authority, AIA, PIA	Immediate	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
2	Water consumption from non permitted sources (eg. Borewell, tanker etc.) or more than permitted quantity	It is observed that many industrial units have no proper control over water consumption which not only increase the overall w/w generation but also tends to w/w disposal mismanagement. Therefore, it is necessary to direct unit to restrict water consumption as per the quantity mentioned in CCA application and to also to direct GIDC to seal the non permitted bore well.	Identification of source of water i.e. tanker, bore well etc. for its authenticity. Industry shall have only one source of water.	Concerned industries, BEAIL,PETL, ETL, GIDC, GPCB	31.8.2010	-
			Issue direction to stop the unauthorized use of water by the industries.	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	31.10.2010	
			Direction to seal the non permitted bore well, tankers	GIDC/ Concerned agency	31.12.2010	
3	Sealing of unauthorized discharge other than regular discharge	All industrial units shall be directed to operate only one outlet through flow meter for effluent disposal so that unauthorized discharge can be checked and concerned authority shall disconnect / seal such unauthorized discharge.	Concerned authority will be asked to identify unauthorized outlet.	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	Ongoing process and will be made more vigorous	Expenses, if any, to be borne by the unit having unauthorized outlet.
			All industrial units will be asked to submit notarized undertaking to GPCB with a copy to respective association stating that there is no unauthorized outlet.	Concerned industries	31.8.2010	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
4	zero discharge unit – not to have drainage connection or any outside discharge.	GIDC/BEAIL shall be asked to disconnect the drainage connection (if any) to the industrial units which are issued CCA with zero discharge condition. Careful monitoring shall be carried out to avoid any illegal discharge.	Inventorisation of the units having consent under Water Act for zero discharge.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB	31.7.2010	-
			Review the condition specifically for zero discharge condition Units discharging or having connection only for sewage shall send sewage through tanker to STP only and drainage connection shall permanently be sealed	GPCB Concerned industries, GIDC,BEAIL,GPCB	30.9.2010 31.08.10	
			Drainage connection to be disconnected of zero discharge units and certified by GIDC/ BEAIL and checked by GPCB.	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	30.9.2010	
			All zero discharge industrial units will be asked to submit notarized undertaking to GPCB with a copy to respective association stating that there is no unauthorized outlet and observing zero discharge.	Concerned industries	30.9.2010	
5	Identification of unauthorized connection to BEAIL pipeline	Unauthorized connection by units ultimately results in hydraulic as well as pollution load on CETP and FETP.	Unauthorized connection in BEAIL pipeline to be checked and disconnected by competent authority and verified by GPCB.	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	Ongoing process	-
			Third party monitoring is to be carried out	Independent Agency	Ongoing process	SCET, Surat (Rs. 1,08,00,000/- per annum)

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
6	Identification of non-biodegradable / high COD and/or high NH3-N containing effluent	For better treatability of ETP/ CETP units having non-biodegradable effluent shall be identified and shall be directed to segregate the said stream and to install non conventional treatment units like multiple effect evaporator, RO system, incinerator etc	Identification of industrial units having high pollution potentiality with regard to COD and/or NH3-N and to ask such industries to submit time bound action plan for its treatment along with financial outlay.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB	31.8.2010	
			Identification of the streams having Non-biodegradable effluent containing refractory COD, toxicants like Ammonical Nitrogen where treat ability not possible/difficult/techno-economically not viable.	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	31.8.2010	Common incinerator may be installed for non-biodegradable effluent Cost may be worked out by respective association on PPP mode before 31.12.2010.
			The units manufacturing Pesticides, Dyes intermediates, Bulk drugs will be asked to study their present treat ability of effluent and accordingly segregate non-biodegradable streams.	Concerned industries	31.10.2010	
			A time bound action plan required to be submitted to install multiple effect evaporator/RO system/ Incinerator System/Ammonia stripper/ New technology like FACCO including cleaner production and cleaner technology by concerned industries.	Concerned industries in consultation with GCPC, ETL, PETL	**31.12.2010**	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
			Implementation/Commissioning of above proposal	**Concerned industries**	**30.09.2011**	
7	Reduction of pollution load on CETP, upgradation of CETP and efficient operation of CETP	It is observed that CETP inlet norms are not meeting with the prescribed inlet norms also outlet norms are not meeting the specified norms.	**The units generating effluent more than 25 KL/day required to strengthen individual effluent treatment plant to meet with the CETP inlet norms, so as to reduce inlet pollution load on CETP and thereby improvement in treated effluent quality from CETP.**	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	30.9. 10	PPP mode
			Installation of FACCO or any other suitable technology at CETP for small scale industrial unit.	PETL	30.9.10	
			Identification of high COD and high Ammonical Nitrogen containing effluent and individual installation of FACCO or any other suitable technology for large scale units having high COD effluent and Ammonical Nitrogen removal system.	Concerned industries, PETL,ETL ,GIDC , GPCB	31.12.10	
			An action plan for strengthening of individual ETP to be submitted to BEAIL, PETL, ETL & to GPCB and required to monitor its progress by concerned agencies.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB	31.10.10	
			CETP / FETP should optimize operation / performance of their existing units.	**BEAIL, ETL, PETL**	**31.12.2010**	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
			To strengthen performance evaluation of ETPs , to be done by third party agency.	Independent Agency	31.12.10	
		The performance evaluation of CETP indicates that quality of effluent discharge is not as per the specified norms, which clearly indicates the CETP requires up gradation/modification	CETP authority shall study their treatability of effluent from prominent agency and come out with action plan and up gradation./ modification.	BEAIL,PETL, ETL	30.9.2010	
			Based on the recommendation of agency CETP authority shall complete required upgradation / modification of CETP/FETP.	**BEAIL,PETL, ETL**	**30.06.2011**	PPP mode
			To change the management of BEAIL under Government Supervision and Chief Executive Officer have to be appointed.	GIDC, Govt. of Gujarat,	Implemented and GIDC is the main stakeholder.	
			To finalize disciplinary action against non compliant units	BEAIL	ON GOING PROCESS	
8	Checking of illegal discharge of Acidic/ highly polluted effluent	Units manufacturing dye-intermediates are generating spent acid of low concentration which is required to be managed properly. Necessary directions shall be issued to the spent acid generating as well as using industrial units for proper management of spent acid.	Movement of spent acid shall be checked vigilantly. Acidic/ highly polluted effluent which is discharged illegally to be checked by GPCB as well as Industrial Association on routine basis	Concerned industries, BEAIL,PETL, ETL ,GIDC , GPCB	Ongoing process	-
			Third party monitoring	Independent Agency	Implemented	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
			To set up vigilance cell for vigorous & surprise monitoring under supervision of senior officer	GPCB	Implemented	
9	Identification & rectification of various leaking manholes, overflowing pumping stations.	Master plan to Identify & rectify various leaking man holes, overflowing pumping stations and other bypass system in GIDC area to be prepared & implemented.	Foolproof mechanism for regular monitoring, cleaning and maintenance is required by concerned authority.	Notified Area Authority	31.12.10	Scheme in this connection may be prepared by the concerned authority for financial help under the government policy.
			Reasons of overflow of man-holes should be identified and adequate measures should be adopted.	**Notified Area Authority, AIA, Concerned industries**	**31.03.2011**	
10	**Action till commissioning of separate CETP for Pharma units**	**It is observed that concentrated effluent generated from pharmaceuticals industries which in nature having very high concentration of COD.**	**High COD streams of existing pharmaceutical industries should be segregated and treated and disposed of by individual units through adequate environmental friendly technologies till commissioning of new CETP.**	**Concerned pharmaceutical industries**	**Immediate**	
11	Monitoring of surface and sub surface water quality.	Surface and sub surface water quality is required to be checked periodically.	Surface and sub surface water quality	GPCB	On going process.	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
12	Impact on Health- within and surrounding population.	Probable health risk within vicinity of 2 km from the cluster.	As per the information available no incidence of death due to pollution or occupational disease or poisoning is recorded. Occupational health centers are provided by MAH units in this cluster to monitor health of the industrial workers. Primary health center are provided in each industrial cluster. PIA will establish occupational health center	Institute of repute/NIOH	31-12-2010 30.06.11	AIA/PIA
13	To stop tray drying and salting process	Generation of high TDS stream wastewater, which disturb the functioning of the CETP.	Identification of the unit having tray drying and salting process	Concerned industrial units, GPCB	30.9.2010	-
AIR						
1	Strengthening of air pollution control measures	Air Action Plan for Ankleshwar is under implementation. The industrial units shall be directed to upgrade APCM to meet the amended Ambient Air Quality Norms, if required.	Industrial units consuming solid fuel like coal, agro waste, etc. required to upgrade air pollution control system by installing bag filters /multi cyclone separator so that ambient air in the nearby area meet with the revised norms of $PM_{2.5}$.	Concerned industries GPCB	31.12.2010.	To be borne by the concerned industry. Asso. may assist individual units

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
			To check air pollution control system attached, with respect to adequacy and if needed upgrade the same. For controlling of pollutants like VOCs, PAHs, PCBs Industries which are engaged in handling of solvents, Solvents shall be recovered & reused. Solvent recovery shall not be less than 95% under any case and shall be upgraded to achieve the 99% efficiency. .Separate godowns for the storage of finish goods ,raw materials & separate tank farm for solvents & other chemical storage as per MSIHC Rules 1989 shall be provided. Solvents Management shall be as follows :Reactor shall be connected to chilled brine condenser system. Industries shall provide the chilled brine solution in secondary condenser for condensation of the VOCs. 6) Reactor and solvent handling pump shall have proper seals to prevent leakages. 7) The condensers shall be provided with sufficient Heat Transfer Area (HTA) and residence time so as to achieve more than 95% recovery and to be further upgraded it to 99%. 8) Solvents shall be stored in a separate space specified with all safety measures. 9) Entire Plant shall be flame proof. The solvent storage tanks shall be provided with breather valve to prevent losses. 10) Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.	Concerned industries GPCB	31.12.2010.	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
3	Plantation in the industrial estate	Concerned authority shall be asked to provide adequate green belt in the periphery as well as wherever possible within the GIDC	Considering the present plantation as baseline datum, five years plan for plantation of industrial estate to be submitted by the GIDC/ association in consultation with Forest department. To allot unused plots, road side areas and other areas reserved for green belt within GIDC and to sign MoU between GIDC and association for plantation	BEAIL,ETL,PETL, GIDC, Forest dept.	30.09.2010	
4	Restriction on using un authorized fuel.	Use of unauthorized fuel like petcoke, shall be stopped. The industrial units shall be directed to use the fuel as per the consented condition	Industrial units shall use authorized fuel as consented and shall not use any unauthorized fuel.	Concerned industries, GPCB	30.09.2010	
5	**Control of fugitive emission**	Fuel handling, chemical storage, the processes like pickling are the major source of fugitive emission hence the industrial units should adopt good housekeeping practices	Good practices like cleaner production and cleaner technology to be adopted in fuel handling and to have better house keeping	Concerned industries, **GPCB**	30.09.2010 and ongoing process.	Concerned industries
6	Ambient Air Quality Monitoring	concerned agency shall be asked to operate the existing AAQMS regularly and also to increase the no of stations	Existing AAQMS to be strengthen to monitor AAQ as per new notification New AAQMS shall be installed.	GPCB, AIA, PIA.	31.12.2010	Ankleshwar: AIA (Rs. 20,80,000/- per annum) & Panoli: PIA (Rs. 20,80,000/- per annum)

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
7	Implementation of the suggestions of the odour Control Expert Committee	Many complaints received regarding odour nuisance. Total 22 number of units are identified.	Implementation of the suggestions of the odour Control Expert Committee as per following 1. Consider use of non-halogenated and non-aromatic solvents (eg. Ethyl acetate,alcohols and acetone) instead of more toxic solvents (eg. Benzene,chloroform and trichloroethylene) 2.Contain and enclose batch reactors and install close feed system. 3.Reduce operating temperature. 4.Install nitrogen blanketing on pumps, storage tanks and during formulation processes. Install process condensers 5.VOC vapours from solvent handling activities and processes should be connected to air control devices. 6.Activated carbon adsorption may be used to achieve VOC removal efficiency of 95-98%. 7.Thermal oxidation/incineration system can destroy 99.99% VOC.	GPCB Concern Industries.	31.12.2010	To be borne by the concerned industry.
8	Monitoring of AAQM	Ambient Air quality is required to be checked periodically.	To check Ambient Air quality	GPCB	On going process.	
9	**Monitoring of VOC in cluster**	**To curb health risk on population at large.**	**To monitor the VOC concentration in cluster and to take remedial measures.**	**GPCB, Concerned Association through Independent agency**	**Immediately**	
			Final quality report shall be submitted.	**AIA, PIA, GPCB**	**31.01.2011**	
	Hazardous Waste					

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
1	Checking of illegal transportation and dumping of Hazardous waste	TSDF operators/Industries Association shall be asked to keep vigil on their member units regarding timely and regular disposal of HAZ wastes	Vigil check required to be kept on illegal transportation and dumping of hazardous waste.	Concerned industries, BEAIL,PETL,ETL ,GIDC , GPCB,RTO.	On going process	
2	CPCB guidelines for TSDF are to be strictly followed	TSDF guidelines for waste quantity at site, sheds for different wastes, fire fighting facility working of incineration, etc. are not properly observed.	TSDF operator will comply with these requirements and GPCB shall verify	Concerned TSDF ,GPCB	31-08-2010	Concerned TSDF
3	Adoption of 4- R's (Reduce, Recover, Reuse, Recycle)	It is required to adopt 4-R"s for better management of Hazardous waste and co-incineration of incinerable hazardous waste in cement kiln.	Inventorization of the various solid/ Hazardous waste generated from the industries	Concerned industries, BEIL,PETL,ETL , GPCB, Gujarat Cleaner Production Centre	31.12.2010	
4	Common facility for collection, storage & transportation of incinerable waste generated from individual industrial units	Common facility for collection, storage & transportation of incinerable waste generated from individual industrial units shall be enhanced	Common hazardous waste incinerator capacity to be enhanced.	BEIL	31.12.2010	

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
6	Captive facility for destruction of incinerable waste	Industrial units having own incinerator (liquid and solid) required to upgrade/ install adequate incineration system as per guidelines of CPCB.	Up gradation of captive incineration system. Incinerators not as per CPCB guidelines shall be dismantled and the industry shall send waste to common incinerator.	Concerned industries GPCB	31.12.2010	
7	Transportation of Hazardous waste	Hazardous waste shall be transported through only dedicated & well covered vehicles.	Vigil checking on transportation of hazardous waste. **GPS based tracking system for transport of hazardous waste should be incorporated.**	BEIL, AIA, PIA, GPCB	Ongoing Process	
8	Waste Minimization Measures	To reduce the quantity of waste material.	Industries shall install, • Metering and control of quantities of active ingredients to minimize waste. • Reuse of byproducts from the process as raw materials or as raw material substitutes in other processes. • Use of automated filling to minimize spillage. • Use of Close Feed system into batch reactors. • Venting equipment through vapour recovery system and APCM. • Use of high pressure hoses for equipment clearing to reduce waste water generation.	Concerned Units	31.12.2010	

7.2. Long Term Action points (more than 1 year)

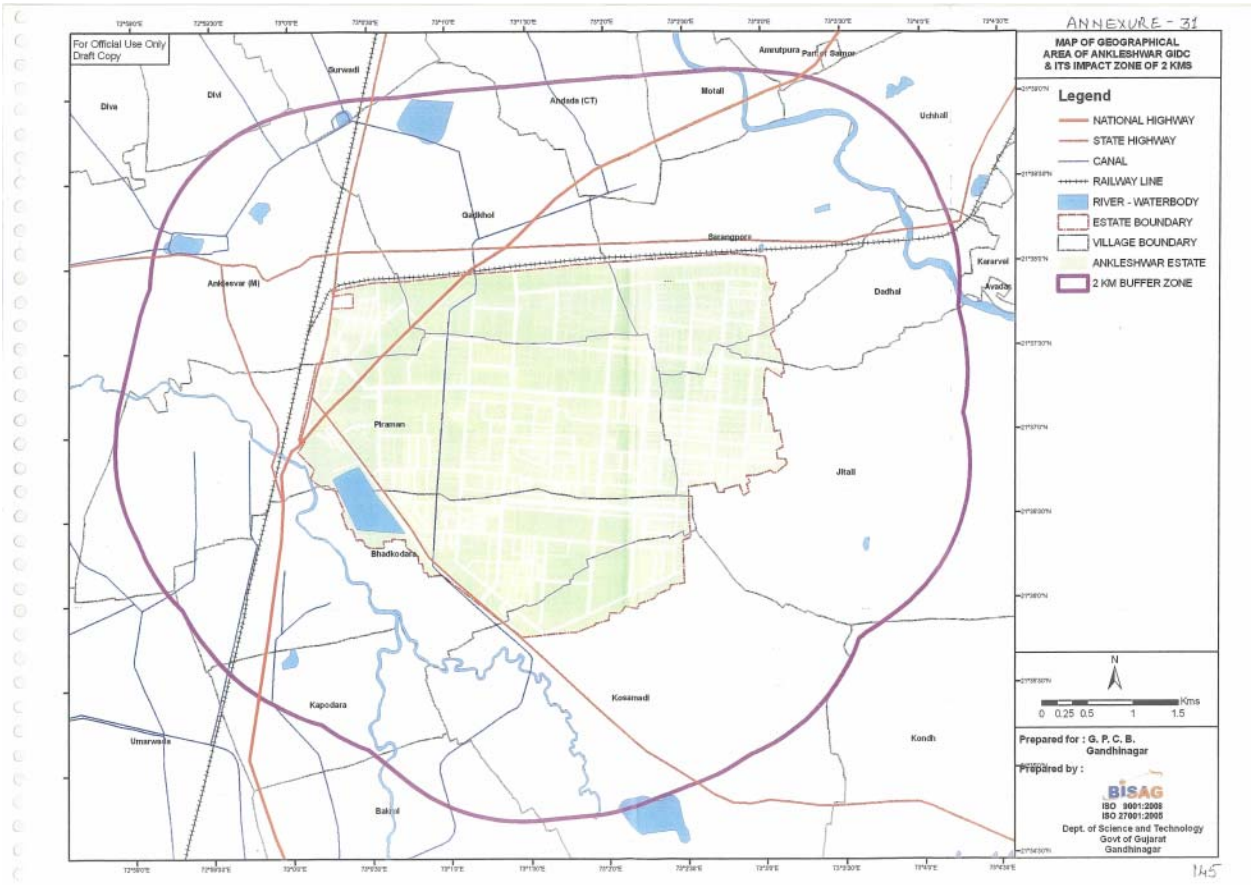
Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
WATER						
9	Identification & rectification of various leaking manholes, overflowing pumping stations.	Master plan to Identify & rectify various leaking man holes, overflowing pumping stations and other bypass system in GIDC area to be prepared & implemented.	Lining of creek passing through GIDC along with motor-able road and lighting.	Notified Area Authority	31.12.11	Scheme in this connection may be prepared by the concerned authority for financial help under the government policy.
10	Separate CETP for Pharma units	It is observed that concentrated effluent generated from pharmaceuticals industries which in nature having very high concentration of ammonical nitrogen and COD and is very difficult to treat in the CETP	To set up a new CETP specific for pharma units only to treat effluent having very high concentration of ammonical nitrogen and COD.	Concerned Industries.	31.07.2012	PPP
13	To stop tray drying and salting process	Generation of high TDS stream wastewater, which disturb the functioning of the CETP.	Setting up of common spray drying facility or identification of spare capacity with existing spray dryer	CETP, AIA	31.3.2011	-

Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
			Complete phase out of tray drying and salting process	Concerned industries	30.6.2011	
AIR						
2	Adoption of cleaner fuel	Gas infrastructure agency has created an infrastructure for industrial gas supply, the industrial units shall be motivated to switch over to clean fuel. Fluctuation in prices and assured supply are major issue.	Large industrial units using solid fuel shall be switch over to cleaner fuel wherever it is feasible considering availability of gas and economics.	Concerned industries ,Gujarat Gas Co.,,GPCB	6 months to two years	
6	Ambient Air Quality Monitoring	concerned agency shall be asked to operate the existing AAQMS regularly and also to increase the no of stations	Installation of continuous ambient air monitoring station.	GPCB, AIA, PIA.	31.12.11	
		To obtain real-time ambient air quality data	**Online monitoring system linked with Regional Office and Head Office shall be provided at-least at two stations (Ankleshwar and Panoli).**	**AIA, PIA, GPCB**	**31.12.11**	
	Hazardous Waste					

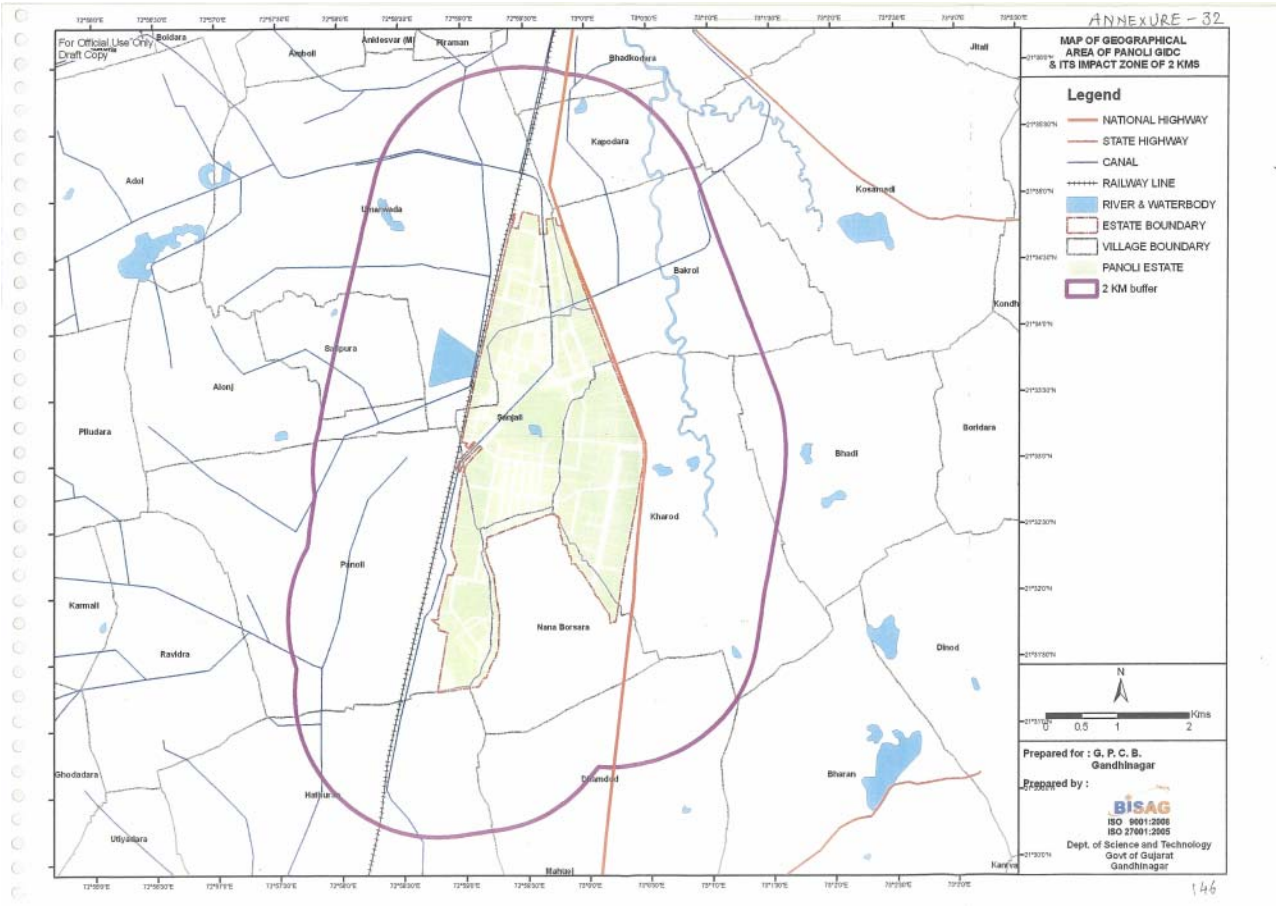
Sr No	Activity	Issue	Action	Implementing Agency	Time limit	Financial implication & outlay
3	Adoption of 4- R's (Reduce, Recover, Reuse, Recycle)	It is required to adopt 4-R"s for better management of Hazardous waste and co-incineration of incinerable hazardous waste in cement kiln.	Creation of waste exchange center inline with Novel Spent Acid System	Concerned industries, PETL,ETL	30.6.2011	
5	Incinerator based on Plasma Technology	Common facility for collection, storage & transportation of incinerable waste generated from individual industrial units shall be enhanced	Plasma Technology for hazardous waste destruction: Company named Plasma Energy Applied Technologies Ankleshwar Pvt. Ltd. formed. Environment Clearance obtained from MoEF, New Delhi. Applied for NOC to GPCB, Gandhinagar. GIDC has kept plot No. 9206 of 11000 sq.mt. reserved for this company. Capacity of plant 30 ton per day solid waste and 15 ton per day aqueous waste. Also application for State subsidy is made. Cost of project Rs. 85 crore.	Plasma Energy Applied Technologies Ankleshwar Pvt. Ltd.	31.12.11	PPP Cost Rs. 85 Crore

Annexure 1

Digitized Map with Demarcation of Geographical Boundaries and Impact Zones



Ankleshwar Cluster



Panoli Cluster

Annexure 2

River Narmada (at Bhadbhut)						
Month	**pH**	**TURBIDITY**	**D.O**	**Pb**	**Cd**	**BOD**
Jan-09	7.64		8.09			3.41
Feb-09	7.94		8.22			1.4
Mar-09	7.88		7.16			0.85
Apr.-09	8.22	24	3.88	NR	NR	1.1
May-09	8.32	18	5.91	NR	NR	2.08
Jun-09	7.97	14	4.78	0.01	BDL	1.36
Jul-09	7.96	220.00	5.81	BDL	BDL	1.45
Aug-09	7.89	40.00	6.23	NR	NR	0.31
Sep-09	8.06	40.00	5.08	NR	NR	0.58
Oct-09	8.17	136	4.89	NR	NR	0.76
Nov-09	7.86	22	6.54	NR	NR	0.83
Dec-09	7.84	28	6.98	NR	NR	0.88
Jan-10	8.18	30	6.99	NR	NR	0.94
Feb-10	8.21	44	6.49	NR	NR	0.82
Mar-10	7.89	252	6.54	NR	NR	0.91
Apr.-10	7.77	248	6.39	NR	NR	0.94
May-10	7.86	212	5.42	NR	NR	0.94
Jun-10	8.08	188	6.38	NR	NR	0.97
Jul-10	8.24	24	5.82	NR	NR	1.02
Aug-10	8.23	186	6.91	0.164	NR	0.96
Sep-10	8.10	148	6.87	0.086	BDL	0.97

(Source : GPCB)

Annexure 3

RIVER AMRAVATI							
MONTH	**BOD**	**PH**	**TDS**	**DO**	**COD**	**NITRATE**	**FLUORIDE**
Jan-09	1.35	8.3	512	7.44	10	2.6	0.5
Feb-09	0.9	8.32	482	8.32	7.9	2.75	0.05
Mar-09	2.86	8.11	556	7.98	12	2.7	0.02
Apr-09	2.62	8.13	478	8.04	8	2.7	0.13
May-09	1.14	8.43	780	8.61	11	3.49	0.2
Jun-09	3.5	8.2	588	5.6	16	0.0738	0.1
Jul-09	2.5	7.95	560	8.3	12	0.123	0.1
Aug-09	1.09	6.97	504	6.58	12	BDL	0.15
Sep-09	1.45	7.68	446	6.46	12	BDL	0.15
Oct-09	1.24	8.05	780	6.55	12	0.246	0.05
Nov-09	1.2	8.03	618	7.73	12	0.246	0.05
Dec-09	0.73	7.98	726	7.03	7.9	0.3	0.2
Jan-10	1.46	8	698	4.13	12	0.42	0.05
Feb-10	0.94	7.91	654	8.11	7.9	0.4428	0.15
Mar-10	2.08	8.27	434	6.89	8	0.12	0.09
Apr-10	0.96	8.18	870	6.98	8	0.07	0.13
May-10	0.97	7.86	1544	7.19	8	0.09	0.09
Jun-10	1.07	7.32	332.00	7.78	8.00	0.10	0.00
Jul-10	0.98	8.16	306	7.19	16		
Aug-10	< 5	8.02	604	7.43	8	0.16	0.18
Sep-10	1.02	8.04	240	7.19	12	0.65	0.27

(Source : GPCB)

Annexure 4

SAMPLE COLLECTED UNDER AMLAKHADI ACTION PLAN SAMPLING POINT : AMLAKHADI AT ANK-HANSOT ROAD BRIDGE NEAR KADAKIA COLLEGE ULIMATELY REACHING TO ESTUARY OF RIVER NARMADA						
Month	**COD**	**NH3-N**	**BOD**	**pH**	**PHENOL**	**O&G**
Jan-09	1431		513	6.66	2	5.6
Feb-09	1667	304	415	7.16	2.25	8.4
Mar-09	2113	277.2	734	7.11	2.35	6
Apr-09	1994	392	553	6.81	2.99	6
May-09	828	210	269	7.38	2.66	2.8
Jun-09	141	39	42	7.68	1.83	0.8
Jul-09	273	33	82	7.37	1.08	1.2
Aug-09	296	28.56	93	8	0.83	2
Sep-09	248	33	62	6.9	0.5	1.2
Oct-09	211	41.49	61	7.3	0.25	1.2
Nov-09	132	60	35	7.55	0.25	0.8
Dec-09	161	66	42	7.72	0.25	1.2
Jan-10	653	24	131	7.54	0.83	3.6
Feb-10	192	27.44	36	7.52	0.5	1.6
Mar-10	124	2.24	33.8	7.39	-	0.8
Apr-10	90	5.6	25	7.95	BDL	1.6
May-10	1369	526	365	7.91	BDL	9.6
Jun-10	119	174	29	7.98	BDL	4.8
Jul-10	60	18	15	7.38	0.08	BDL
Aug-10	402	80	74	7.88	0.42	1.2
Sep-10	165	68	53	8.15	0.4	1.6

(Source GPCB: Regional Office)

Annexure 5

CPCB DATA: WATER QUALITY OF THE AMLAKHADI OVER THE YEARS AT ANKLESHWAR

(Sampling was carried out near NH-8, Mumbai-Ahmedabad, Ankleshwar, and * near FETP, Ankleshwar)

Year(s)	Parameter(s)							
	pH	TSS	TDS	BOD	COD	O & G	NH_3-N	CN
1997	5.25	343	5200	1000	6468	0.52	39.2	--
2001	6.87	400	8222	484	1635	--	123.2	--
2003	7.5	188	12422	700	2323	50	404	--
2005	7.5	335	8304	653	1958	--	--	--
Jan-06	4.5	329	13041	1393	2877	-	434	--
Jun-06	6.7	115	3908	323	914	-	139	--
Jul-06	7.7	394	5293	251	1152	29	101	--
July 2006*	7.5	136	798	29	128	10	12	--
Oct-07	7.3	82	1243	75	207	--	27	--
Oct 2007*	6.9	204	1503	101	489	--	38	--
Jan-08	7.7	282	5495	657	2263	28	286	1.11
Mar-08	7.7	95	2744	135	411	--	--	--
27.05. 2008	6.45	276	9224	658	2519	--	222	0.76
17.06.2008	7.36	174	5784	662	1411	40	217	0.08
29.07.2008	7.34	80	2122	85	508	-	63	--
28.08.2008	8.05	169	1533	203	948	14.5	86	0.2
26.09.2008	8.41	21	955	11	54	5.5	5.9	0.11
22.10.2008	6.62	119	3184	138	583	8.65	99	2.4
07.11.2008	6.95	65	3261	177	674	17	64	0.06
05.03.2009	8.16	26	1132	56	155	--	31	--
06.08.2009	7.72	49	934	18	83	5.3	18	--
10.09.2009	7.25	53	1493	57	186	6.5	26.5	--
10.12.2009	7.48	70	1270	40	183	2.84	12	--
30.03.2010	7.87	84	1043	18	87	9.8	7.1	--
24.06.2010	7.72	117	1688	29	128	7.6	8.7	0.13
29.09.2010	7.32	79	2040	84	276	14	70	1.22

(Source : CPCB)

Annexure 6

SAMPLE OF WATER COLLECTED FROM VAND KHADI								
	pH	**TDS**	**TSS**	**NH3**	**COD**	**BOD**	**O&G**	**PHENOL**
DATE		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Jan-09	8.15	3340	18	2.24	19.6	5.06	0.4	BDL
Feb-09	7.82	3268	28	1.68	47	12	0.4	0.1
Mar-09	7.48	602	14	BDL	39	14.4	0.4	0.41
Apr-09	7.84	2148	50	2.24	35	10	0.4	0.58
May-09	8.21	1430	16	BDL	16	4.96	0.4	BDL
Jun-09	8.18	3472	16	1.68	20	4.6	0.4	0.58
Jul-09	7.97	3328	14	0.56	20	5.8	0.4	BDL
Aug-09	7.73	794	10	6.72	16	1.86	0.4	BDL
Sep-09	7.58	1000	60	BDL	28	9	0.4	BDL
Oct-09	7.93	1040	12	BDL	24	5	0.4	BDL
Nov-09	7.69	1016	16	BDL	16	5.08	0.4	BDL
Dec-09	8.02	3010	32	BDL	12	1.16	0.4	BDL
Jan.10	7.81	790	18	0.56	16	1.94	0.4	BDL
Feb-10	8.46	3094	24	4.48	12	1.3	0.4	BDL
Mar-10	7.46	862	35	6.16	60	18.26	0.4	BDL
Apr-10	8.22	2102	14	BDL	12	2.46	0.4	BDL
May-10	8.23	1350	18	BDL	23	1.03	0.8	BDL
Jun-10	7.93	570	26	p.nil	8	2.19	0.4	BDL
Jul-10	7.44	566	8	BDL	24	6	BDL	BDL
Aug-10	8.54	1228	16	10	32	7.2	BDL	BDL
Sep-10	8.44	760	80	BDL	24	9	0.4	BDL

(Source GPCB: Regional Office)

Annexure 7

Source of Sample : Borewell of Shri Ahmedbhai Patel, Piraman Village								
Year	pH	TDS mg/l	DO mg/l	COD mg/l	NO3 -N mg/l	F mg/l	NO2 -N mg/l	NH3 -N mg/l
2005-06	8.31	1422	---	11	3.6	0.3		
2006-07	7.13	1604	5.02	19	2.4	0.8		
2007-08	7.45	1588	6.08	18	5.54	0.56	0.04	BDL
2008-09	7.82	1504	3.25	3.95	1.425	0.0208	0.05	BDL
2009-10	7.78	2482	5.91	7.97	0.54	0.02	0.4	BDL
Source of Sample : Borewell of Khadiwala, Mottafalia Piraman Village								
Year	pH	TDS mg/l	DO mg/l	COD mg/l	NO3 -N mg/l	F mg/l	NO2 -N mg/l	NH3 -N mg/l
2005-06	8.25	676	6.5	5.3	6.5	0.28		
2006-07	8.15	976	5.77	7.8	1.6	0.89		
2007-08	7.55	1116	5.21	8	3.32	0.56	0.08	BDL
2008-09	8.1	1128	3.22	3.95	2.875	0.0208	BDL	BDL
2009-10	8.28	1788	4.61	7.97	0.54	0.02	0.45	BDL
Source of Sample : Borewell of Piraman Village Panchayat								
Year	pH	TDS mg/l	DO mg/l	COD mg/l	NO3 -N mg/l	F mg/l	NO2 -N mg/l	NH3 -N mg/l
2005-06	8.36	1100	---	5.7	2.5	0.4		
2006-07	7.62	1586	5.1	18.1	6.6	0.73		
2007-08	8.05	106	5.77	16	2	0.46	0.09	BDL
2008-09	8.28	192	3.37	3.95	3.325	0.0234	0.02	BDL
2009-10	8.46	604	3.82	7.97	0.05	0.02	0.3	BDL

(Source GPCB: Regional Office)

BOREWELL OF ALUNJ							
MONTH	BOD	PH	TDS	DO	COD (mg/ltr)	NITRATE (mg/ltr)	FLUORIDE (mg/ltr)
Apr-09	0.98	7.77	1784	3.96	7.82	2.8	0.36
May-09	0.94	7.43	950	3.1	8	2.21	0.45
Jun-09	0.82	7.88	1282	2.84	8.06	0.7134	0.6
Jul-09	0.9	7.57	1434	3.45	8.03	0.5412	1
Aug-09	0.7	7.84	1818	5.55	8	0.1476	0.3
Sep-09	0.67	7.84	1832	3.96	7.84	0.369	0.3
Oct-09	0.76	7.8	1872	3.98	7.97	0.1722	0.35
Nov-09	0.89	7.68	1972	5.11	7.94	0.1476	0.25
Dec-09	0.79	7.82	2812	4.39	7.9	1	0.15
Jan-10	0.82	8.17	1906	4.97	7.94	0.64	0.2
Feb-10	0.83	8.2	1798	7.75	7.9	1.23	0.25
Mar-10	0.81	7.37	1858	4.88	8	0.64	0.18
Apr-10	0.83	8.15	1922.00	4.72	12.00	0.36	1.13
May-10	1.09	8.29	1796.00	4.97	8.00	0.34	0.09
Jun-10	1.06	7.78	1972.00	4.89	8.00	0.32	0.18
Jul-10	0.97	7.98	1932	5.34	8.00		0.31
Aug-10	1.57	7.89	1938	4.21	8.00	1.6	0.63
Sep-10	1.29	8.25	1760	4.39	8.00	2.43	0.5

Annexure 8

GIDC - ANKLESHWAR					
Quantity of effluent received at FETP from GIDC Ankleshwar along with its quality					
Month \& Year	**Flow in MLD**	**pH**	**COD mg/l**	**BOD mg/l**	**Amm.-N mg/l**
Jan.09	14.25	6.13	1927	626	323
Feb.09	28.31	5.51	2563	584	352
Mar..09	25.77	5.33	2483	793	259
April. 09	29.05	4.09	2659	858	251
May. 09	29.38	4.28	2465	842	270
June.09	31.65	6.85	1916	745	328
July.09	27.22	7.11	2001	679	431
Aug.09	32.86	5.93	2394	726	457
Sep.09	33.65	6.36	2220	619	436
Oct.09	33.90	6.28	2230	607	437
Nov.09	41.41	6.13	2241	571	425
Dec.09	33.67	6.10	2900	865	583
Jan-10	41.10	6.68	2505	633	447
Feb-10	30.97	6.52	3281	930	465
Mar-10	31.37	6.94	2899	697	519
Apr-10	31.06	6.78	2866	698	612
May-10	30.26	6.99	2821	708	625
Jun-10	33.06	6.85	2560	687	579
Jul-10	34.17	7.30	2148	590	512
Aug-10	34.80	7.59	1654	491	425
Sep-10	19.26	7.75	1558	434	424

(Source: BEAIL)

Annexure 9

GIDC – PANOLI					
Quantity of effluent received at FETP from GIDC Panoli along with its quality					
Month \& Year	**Flow in MLD**	**pH**	**COD mg/l**	**BOD mg/l**	**Amm.-N mg/l**
Jan.09	3.55	7.79	1962	542	602
Feb.09	3.81	7.70	3426	586	1043
Mar..09	3.55	7.87	4172	1088	1357
April 09	3.72	7.71	3446	1005	1070
May. 09	3.87	7.82	3346	1267	1074
June.09	3.97	7.78	2697	990	1019
July.09	4.44	8.13	2162	899	917
Aug.09	3.90	7.97	2833	926	1237
Sep.09	4.01	7.78	3113	1036	1104
Oct.09	3.57	7.98	2745	895	1322
Nov.09	4.19	8.17	2759	859	1330
Dec.09	4.32	8.26	3212	928	1138
Jan-10	4.74	8.19	2055	487	784
Feb-10	4.97	8.23	2972	754	861
Mar-10	5.00	7.93	2549	526	764
Apr-10	2.73	7.72	2251	445	708
May-10	3.05	7.74	1867	350	674
Jun-10	3.07	8.00	2007	513	744
Jul-10	3.47	7.95	1596	365	732
Aug-10	4.62	7.93	1348	300	674
Sep-10	3.72	7.87	1115	287	517

(Source: BEAIL)

Annexure 10

PERFORMANCE OF STP : AT ANKLESHWAR – ANALYSIS BY GPCB

Sampling Location : **Outlet of STP**

Date of Sample Collection	Permissible Limit								
	BOD	CHL	COD	NH3	O&G	pH	S.S	SUL	TDS
	20						30		
	Concentration of Parameters (in mg/lit) except pH								
	BOD	CHL	COD	NH3	O&G	pH	S.S	SUL	TDS
19/08/2010	9	130	32	16	BDL	7.41	20	63	500
25/05/2010	12	110	36	BDL	0.4	8.06	16	BDL	688
07/04/2010	11	90	27	BDL	0.4	8.12	18	175	566
31/12/2009	4.30	200	12	2.24	0.4	8.07	10	BDL	696
19/11/2009	14	200	40	BDL	0.4	7.04	20	60	700
19/09/2009	13	290	58	1.09	0.4	7.56	14	30	570
23/07/2009	3.07	50	16	1.68	0.4	7.45	22	88	428
12/06/2009	15	90	33	5.04	0.4	7.43	22	BDL	470
06/05/2009	7	130	20	BDL	0.4	7.67	8	BDL	748
17/02/2009	19	50	60	1.12	0.4	7.38	40.0	p nil	564

Annexure 11

SAMPLE OF WATER COLLECTED FROM CHHAPRA KHADI						
Month	**PH**	**TSS**	**NH3**	**COD**	**BOD**	**PHENOL**
		mg/L	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Jan-09	7.73	120	29.68	706	132	2.25
Feb-09	7.64	158	70.56	427	118	0.17
Mar-09	7.73	60	-	619	169	2.42
Apr-09	7.49	46	96.88	665	159	2.58
May-09	2.3	76	146.72	1650	467	3.1
Jun-09	2.35	66	10.08	3108	755	4.99
Jul-09	6.56	92	169	1435	434	4.5
Aug-09	7.18	86	249	880	318	4.83
Sep-09	6.98	86	109	910	208	4.16
Oct-09	6.8	94		838	212	3
Nov-09	6.59	146	148	1562	440	3.49
Dec-09	7.15	176	169	1541	406	2.08
Jan-10	5.56	72	180.88	486	104	1.17
Feb-10	< 1	34	170	948	211	1.17
Mar-10	7.41	58	39.76	396	102	BDL
Apr-10	< 1	46	73	929	282	BDL
May-10	1.7	48	34	467	102	BDL
June-10	< 1	30	112	1440	322	BDL
Jul-10	6.80	84	33	800	183	2.08
Aug-10	8.11	62	267	435	97	0.83
Sep-10	7.97	140	30	231	64	0.007

(Source GPCB: Regional Office)

Annexure 12

Average per Day Load of COD					
Month	Ankleshwar Inlet Load	Panoli Inlet Load	Jhagadia Inlet Load	Total Inlet Load	FETP Outlet Load
Jan.09	27.46	6.97	0.53	35.35	13.52
Feb.09	72.56	13.05	0.41	92.47	62.55
Mar..09	63.99	14.81	0.81	77.10	55.59
April. 09	77.23	12.82	0.46	92.75	72.18
May. 09	72.41	12.96	0.92	84.78	59.60
June.09	60.65	10.71	0.31	73.52	54.34
July.09	54.48	9.60	0.95	57.50	37.28
Aug.09	78.68	11.06	1.27	89.33	44.09
Sep.09	74.69	12.49	0.89	86.79	36.59
Oct.09	75.59	9.79	1.29	87.75	36.54
Nov.09	92.82	11.55	0.82	106.44	36.44
Dec.09	97.67	13.88	0.84	112.89	53.37
Jan.10	102.96	9.73	1.09	116.72	59.23
Feb-10	101.39	14.81	0.99	118.49	64.38
Mar-10	90.75	12.72	0.83	106.54	58.55
Apr-10	88.96	6.19	1.04	97.82	63.01
May-10	85.21	5.67	0.7	93.11	63.04
Jun-10	124.03	11.62	1.4	131.57	70.15
Jul-10	73.41	5.53	1.07	86.90	50.54
Aug-10	57.55	6.22	0.86	67.06	36.89
Sep-10	40.54	5.87	1.06	49.79	22.49
Average per Day Load of BOD					
Month	Ankleshwar Inlet Load	Panoli Inlet Load	Jhagadia Inlet Load	Total Inlet Load	FETP Outlet Load
Jan.09	8.92	1.92	0.07	9.98	3.04
Feb.09	16.53	2.23	0.06	19.37	11.53
Mar..09	20.44	3.86	0.13	25.77	16.43
April. 09	24.91	3.74	0.08	32.60	23.85
May. 09	24.73	4.91	0.17	32.68	20.94
June.09	23.58	3.93	0.02	26.06	17.36
July.09	18.49	3.99	0.22	21.94	11.17
Aug.09	23.85	3.62	0.27	28.21	7.69
Sep.09	20.83	4.16	0.22	26.69	3.86
Oct.09	20.58	3.19	0.26	27.33	3.30
Nov.09	23.65	3.59	0.17	29.84	3.50
Dec.09	29.14	4.01	0.21	33.81	8.89
Jan.10	26.03	2.31	0.21	28.01	10.15
Feb-10	28.71	3.68	0.16	33.05	11.93
Mar-10	21.75	2.6	0.17	25.92	9.44
Apr-10	21.68	1.25	0.09	24.21	11.72
May-10	21.3	1.06	0.24	24.91	14.34
Jun-10	22.64	1.61	0.06	25.44	11.01
Jul-10	20.15	1.26	0.09	23.78	8.37
Aug-10	17.36	1.33	0.10	20.29	6.81
Sep-10	11.94	1.36	0.19	15.39	4.10

(Source : FETP)

Annexure 13

Details pertaining to ETL-Ankleshwar								
	Inlet Parameters per Day				Outlet Parameters per Day			
Month	Total Qty. in M3/Month	MT COD per Day	MT BOD per Day	MT NH4-N per Day	Qty. in M3	MT COD per Day	MT BOD per Day	MT NH4-N per Day
Jan.09	34110	7.546	1.534	0.719	86791	3.144	0.314	0.826
Feb.09	35000	9.019	2.471	0.791	89703	3.463	0.346	0.907
Mar.09	39190	9.035	3.643	0.723	95577	3.219	0.318	0.792
Apr.09	44930	8.922	3.822	0.936	93696	3.257	0.240	0.759
May.09	47810	9.812	3.705	0.876	105997	3.224	0.150	0.899
Jun.09	42760	8.991	2.916	0.837	99966	3.386	0.140	0.990
Jul.09	46810	8.622	3.080	0.975	106072	3.387	0.103	0.982
Aug.09	48080	9.082	3.020	1.169	104373	3.259	0.175	1.057
Sept.09	47220	10.037	3.458	1.232	99816	3.331	0.276	0.882
Oct.09	48070	9.910	3.266	1.093	104486	3.431	0.142	0.927
Nov.09	36960	8.412	2.689	0.775	91310	3.056	0.161	0.770
Dec.09	43550	10.254	3.140	0.861	101727	3.419	0.177	0.948
Jan.10	43140	10.326	2.856	0.985	105475	3.413	0.177	0.970
Feb.10	39760	9.843	2.373	1.258	94901	3.349	0.149	1.081
Mar.10	45870	10.374	2.692	0.817	105304	3.268	0.313	0.781
Apr.10	42470	9.326	2.704	0.733	95807	3.133	0.179	0.693
May.10	37940	8.462	2.794	0.714	99052	2.914	0.224	0.639
Jun.10	43300	9.686	3.368	0.696	102875	3.326	0.137	0.679
July.10	43350	8.436	3.280	0.604	106741	3.432	0.344	0.633
Aug.10	40790	8.298	3.321	0.515	107001	3.420	0.321	0.624
Sept.10	34740	6.968	3.021	0.479	78228	2.552	0.227	0.466

(Source : ETL)

Annexure 14

Common Effluent Treatment Plant								
FLOW DETAILS and QUALITY at inlet of PETL								
Month	**Flow in (m3)**	**pH**	**COD**	**BOD**	**NH3-N**	**Inlet COD Load MT/Day**	**Inlet BOD Load MT/Day**	**Inlet NH3-N Load MT/Day**
Jan-09	16740	7.45	5963	1714	95	3.220	0.930	0.050
Feb-09	17420	7.21	5951	1689	93	3.574	1.010	0.060
Mar-09	16890	7.36	5910	1674	96	3.220	0.912	0.050
Apr-09	15510	8.11	5915	1665	92	3.058	0.860	0.047
May-09	17070	7.68	5896	1623	89	3.246	0.893	0.049
Jun-09	18100	7.36	5789	1526	96	3.492	0.920	0.057
Jul-09	14480	7.34	5642	1456	82	2.635	0.680	0.038
Aug-09	17690	7.75	5236	1452	78	2.987	0.828	0.044
Sep-09	17920	7.82	5412	1562	86	3.232	0.933	0.051
Oct-09	18220	7.11	5123	1417	82	3.011	0.832	0.048
Nov-09	17040	7.23	5244	1488	88	2.978	0.845	0.049
Dec-09	18460	7.56	5236	1436	91	3.117	0.855	0.050
Jan-10	15550	8.15	5148	1419	79	2.582	0.711	0.040
Feb-10	15550	7.32	5246	1432	84	2.812	0.767	0.045
Mar-10	19140	7.48	5116	1422	78	3.158	0.877	0.048
Apr-10	15390	7.39	5122	1415	87	2.627	0.725	0.044
May-10	14590	7.41	5113	1405	71	2.406	0.661	0.033
Jun-10	12560	7.32	5236	1431	94	2.192	0.599	0.039
Jul-10	11760	7.58	5178	1429	85	1.964	0.542	0.032
Aug-10	12540	7.83	5219	1418	91	2.111	0.573	0.036
Sep-10	11980	7.21	5164	1398	82	2.062	0.558	0.032

Common Effluent Treatment Plant								
FLOW DETAILS and QUALITY at outlet of PETL								
Month	**Flow in (m3)**	**pH**	**COD**	**BOD**	**NH3-N**	**Outlet COD Load MT/Day**	**Outlet BOD Load MT/Day**	**Outlet NH3-N Load MT/Day**
Jan-09	17182	7.25	612	118	74	0.34	0.065	0.040
Feb-09	18088	8.12	603	115	71	0.39	0.074	0.040
Mar-09	17445	7.54	596	119	68	0.34	0.067	0.038
Apr-09	16014	7.36	591	113	65	0.32	0.060	0.034
May-09	17877	7.27	587	110	63	0.34	0.063	0.036
Jun-09	18647	7.52	546	116	61	0.34	0.072	0.037
Jul-09	15045	8.12	523	118	56	0.254	0.057	0.027
Aug-09	18259	7.13	492	121	38	0.29	0.071	0.022
Sep-09	18611	7.68	423	108	55	0.26	0.067	0.034
Oct-09	18948	7.42	410	113	42	0.25	0.069	0.025
Nov-09	17729	7.63	418	109	43	0.25	0.064	0.025
Dec-09	19291	8.01	414	106	48	0.26	0.065	0.029
Jan-10	16247	6.89	504	117	52	0.26	0.061	0.027
Feb-10	16285	7.56	463	112	44	0.26	0.062	0.024
Mar-10	19986	7.14	415	118	41	0.27	0.076	0.026
Apr-10	16016	7.72	446	113	47	0.24	0.060	0.025
May-10	15216	6.95	422	103	42	0.21	0.050	0.020
Jun-10	13130	7.18	485	115	72	0.21	0.050	0.031
Jul-10	12448	7.63	496	119	76	0.20	0.047	0.030
Aug-10	13191	7.13	509	121	65	0.21	0.051	0.027
Sep-10	12724	7.55	488	112	71	0.21	0.047	0.030

(Source : PETL)

Annexure 15

Common Effluent Treatment Plant At Ankleshwar : Enviro Technology Limited (ETL)								
ETL – Outlet								
Quantity of Treated Effluent					Quality of Treated Effluent			
Month	Raw Effluent (MLD)	Sewage (MLD)	Raw water (MLD)	Final Discharge (MLD)	pH	COD (mg/lit)	BOD (mg/lit)	NH3-N (mg/lit)
Jan.09	1.1	1.25	0.44	2.79	7.83	1123	112	295
Feb.09	1.25	1.44	0.51	3.2	7.85	1081	108	283
Mar.09	1.26	1.36	0.46	3.08	7.73	1044	103	257
Apr.09	1.49	1.14	0.49	3.12	7.75	1043	77	243
May.09	1.54	1.41	0.48	3.41	7.74	943	44	263
Jun.09	1.42	1.41	0.5	3.33	7.73	1016	42	297
Jul.09	1.51	1.45	0.46	3.42	7.71	990	30	287
Aug.09	1.55	1.35	0.46	3.36	7.67	968	52	314
Sept.09	1.57	1.19	0.58	3.32	7.7	1001	83	265
Oct.09	1.55	1.35	0.47	3.37	7.73	1018	42	275
Nov.09	1.23	1.34	0.47	3.04	7.73	1004	53	253
Dec.09	1.41	1.4	0.47	3.28	7.76	1042	54	289
Jan.10	1.39	1.49	0.52	3.4	7.62	1003	52	285
Feb.10	1.42	1.45	0.51	3.38	7.66	988	44	319
Mar.10	1.47	1.4	0.52	3.39	7.62	962	92	230
Apr.10	1.42	1.28	0.49	3.19	7.66	981	56	217
May.10	1.22	1.47	0.5	3.19	7.71	912	70	200
Jun.10	1.44	1.50	0.52	3.43	7.73	970	40	198
July.10	1.40	1.56	0.52	3.44	7.74	997	100	184
Aug.10	1.31	1.58	0.55	3.45	7.72	991	93	181
Sept.10	1.16	1.03	0.41	2.61	7.81	979	87	179

(Source ETL)

Permissible limits for discharge from this CETP to FETP for above referred parameters are :
pH : 5.5. to 8.5
COD : 100 mg/lit
BOD : 30 mg/lit
NH3-N : 50 mg/lit

Annexure 16

PERFORMANCE OF CETP : ETL AT ANKLESHWAR –A TREND ANALYSIS BY GPCB

Sampling Location : Outlet of CETP

MONTH	Permissible Limit						
	COL	PH	TDS	TSS	COD	BOD	NH3-N
	Pt. Co.		mg/L	Mg/L	mg/L	mg/L	Mg/L
		5.5 – 8.5	2100	100	100	30	50
	Concentration of Parameter						
	COL	PH	TDS	TSS	COD	BOD	NH3-N
	Pt. Co.		mg/L	Mg/L	mg/L	mg/L	Mg/L
Jan-09	100	7.57	4630	60	510	148	85.1
Mar-09	70	6.55	8030	162	1220	403	111
Apr-09	2000	7.72	18082	176	1463	452	113
May-09	1400	7.77	14916	338	1216	371	49.8
Jun-09	1200	7.89	19540	148	1290	326	326
Jul-09	1000	7.81	15606	62	1006	271	510
Aug-09	1600	7.74	16322	82	1435	380	384
Oct-09	1200	8.04	18514	148	796	181	246
Nov-09	700	7.78	14230	148	1102	265	325
Dec-09	2000	7.84	25026	48	1211	260	596
Jan.10	1200	7.79	16664	90	1200	253	349
Feb-10	2000	7.48			1519		330
Feb-10		7.45			1350		377
Mar-10	150	7.52	15402	128	1620	539	241
Apr-10	800	7.53	16106	108	953	326	224
May-10		7.57	18598	114	1654	447	353
June-10							
July-10	600	7.32	12654	106	921	230	182
Aug-10							
Sept-10	750	7.80	12860	80	1390	320	267

Annexure 16A

PERFORMANCE OF CETP : ETL AT ANKLESHWAR –A TREND ANALYSIS BY CPCB

Sampling Location : **Outlet of CETP**

Year	Permissible Limit									
	pH	**TSS**	**TDS**	**BOD**	**COD**	**O& G**	**NH_3-N**	**S^{--}**	**Phenols**	**CN^{--}**
	5.5-8.5	**100**	**2100**	**30**	**100**	**10**	**50**	**0.5**	**1**	**0.2**
	Concentration of Parameter in mg/lit except pH									
	pH	**TSS**	**TDS**	**BOD**	**COD**	**O& G**	**NH_3-N**	**S^{--}**	**Phenols**	**CN^{--}**
2003	7.5	84	3476	09	174	06	50	0.14	--	BDL
2004	7.7	22	2570	26	115	04	36	0.19	3.68	BDL
2005	7.8	10	3032	11	153	6.2	56	--	--	--
2006 (July)	7.4	221	20801	360	2268	26	386	--	--	--
2006 (Nov)	7.3	453	9670	698	2288	--	48	--	13.6	0.67
2007 (Dec)	7.7	573	11700	664	1744	1.8	110	1.3	3.6	0.02
2008 (Mar)	7.7	91	4659	86	249	17.5	87	--	2.14	--
2008 (May 27)	7.8	380	12568	282	1672	--	422	1.7	--	0.8
2008 (July 29)	7.4	363	5841	130	588	22	104	--	--	0.28
2008 (May 27)	7.8	380	12568	282	1672	--	422	1.7	--	0.8
2008 (July 29)	7.4	363	5841	130	588	22	104	--	--	0.28
2008 (Oct 22)	7.85	50	3920	67	275	2.14	154	0.5	0.72	0.28
2009 (March 05)	8.21	164	7340	08	647	2.4	180.8	--	0.35	0.01
2009 (June 30)	7.91	154	16058	88	863	4.8	255	--	0.72	0.17
2009 (Sept 10)	7.38	295	15288	152	968	8.9	274	--	--	0.14
2009 (Dec 10)	7.09	608	15018	75	985	4.70	347	--	0.59	--
2010 (March 30)	7.41	285	16618	128	1028	39	252	BDL	7.06	--
2010 (June 24)	7.62	114	16782	60	894	--	190	1.47	2.49	0.06
2010 (Sept 29)	7.48	205	15413	287	1156	23	245	2.7	7.41	2.25

Annexure 17

Quality of effluent of GIDC Ankleshwar at Final Pumping Station of Ankleshwar going to FETP						
	PH	TSS	NH3-N	COD	BOD	PHENOL
DATE		mg/L	mg/L	mg/L	mg/L	mg/L
2/1/2009	7.6	592	215	5333	1080	1.58
7/2/2009	7.81	352	728	2494	605	1.92
4/3/2009	2.37	88	240.8	3077	1065	1.67
8/4/2009	4.01	240	44.8	1940	507	2.58
4/5/2009	7.19	596	321	1824	521	3.7
3/6/2009	7.63	84	216	1628	525	2.75
1/7/2009	7.71	110	366.8	1245	375	4.33
1/8/2009	6.6	370	185.36	770	280	4.67
2/9/2009	7.89	170	218	1846	489	6.25
3/10/2009	7.15	168	513	1997	498	7.99
3/11/2009	7.3	420	476	1656	411	2.83
2/12/2009	7.11	812	320	2546	662	5.33
04/01/2010	7.22	112	366.8	1634	327	3.67
03/02/2010	8.01	162	268	2115	472	3.83
02/03/2010	6.46	278	193	1616	655	3.67
05/04/2010	7.28	534	521	2240	583	4.17
07/05/2010	7.58	260	599	2088	639	0.58
03/06/2010	8.03	724	482	2531	604	5.66
03/08/2010	8.16	358	286	1953	568	6.99
03/09/2010	7.90	600	750	2008	539	7.20

(Source GPCB: Regional Office)

Annexure 18

GIDC - ANKLESHWAR					
Quantity of effluent received at FETP from GIDC Ankleshwar along with its quality					
Month \& Year	**Flow in MLD**	**pH**	**COD mg/l**	**BOD mg/l**	**Amm.-N mg/l**
Jan-09	14.25	6.13	1927	626	323
Feb-09	28.31	5.51	2563	584	352
Mar-09	25.77	5.33	2483	793	259
April- 09	29.05	4.09	2659	858	251
May- 09	29.38	4.28	2465	842	270
June-09	31.65	6.85	1916	745	328
July-09	27.22	7.11	2001	679	431
Aug-09	32.86	5.93	2394	726	457
Sep-09	33.65	6.36	2220	619	436
Oct-09	33.90	6.28	2230	607	437
Nov-09	41.41	6.13	2241	571	425
Dec-09	33.67	6.10	2900	865	583
Jan-10	41.10	6.68	2505	633	447
Feb-10	30.97	6.52	3281	930	465
Mar-10	31.37	6.94	2899	697	519
Apr-10	31.06	6.78	2866	698	612
May-10	30.26	6.99	2821	708	625
Jun-10	33.06	6.85	2560	687	579
July-10	34.17	7.30	2148	590	512
Aug-10	34.80	7.59	1654	491	425
Sep-10	19.26	7.75	1558	434	424

(Source: BEAIL)

Annexure 19

PERFORMANCE OF CETP : PETL AT PANOLI – A TREND ANALYSIS BY GPCB

Sampling Location : Outlet of CETP

MONTH	Permissible Limit						
	COL Pt. Co.	pH	TDS mg/L	TSS Mg/L	NH3-N Mg/L	COD mg/L	BOD Mg/L
		5.5 – 8.5	2100	100	50	100	30
	Concentration of Parameter						
	COL Pt. Co.	pH	TDS mg/L	TSS Mg/L	NH3-N Mg/L	COD mg/L	BOD Mg/L
Mar-09	80	7.13	8568	96	812	575	151
Apr-09	500	7.75	15352	102	1344	918	258
May-09	80	7.57	12678	138	1092	1127	299
Jun-09	20	7.54	14978	176	702.8	677	215
Jul-09	150	6.99	10226	228	571.2	588	180
Aug-09	110	7.34	9568	158	67.2	574	153
Oct-09	200	7.7	15530	128	131.6	500	118
Nov-09	120	6.86	12122	316	116	496	131
Dec-09	400	7.29	15674	88	288	851	171
Jan.10	300	7.15	7614	190	99.1	448	110
Feb-10	250	6.77			77.84	356	
Mar-10	200	7.45	5190	162	70	467	136
Mar-10	400	7.36	6754	256	78	758	264
Apr-10	70	7.93	42528	296	392	1898	470
May-10		7.05	36112	264	235	2828	806
June-10							
July-10	300	7.33	17562	138	440	760	189
Aug-10	400	7.74	12928	70	374	814	223
Sept-10	1000	7.25	6900	100	344	496	134

Annexure 19A

PERFORMANCE OF CETP : PETL AT PANOLI – A TREND ANALYSIS BY CPCB

Sampling Location : **Outlet of CETP**

Year	Permissible Limit									
	pH	**TSS**	**TDS**	**BOD**	**COD**	**O& G**	**NH_3-N**	**S^{--}**	**Phenols**	**CN^{--}**
	5.5-8.5	**100**	**2100**	**30**	**100**	**10**	**50**	**0.5**	**1**	**0.2**
	Concentration of Parameter in mg/lit except pH									
	pH	**TSS**	**TDS**	**BOD**	**COD**	**O& G**	**NH_3-N**	**S^{--}**	**Phenols**	**CN^{--}**
2004	7.5	160	15494	51	779	11	414	BDL	1.6	BDL
2006 (July)	7.4	164	31341	820	4104	45	1134	--	--	--
2006 (Nov)	7.4	282	23658	1091	7520	--	1649	8.6	28.3	0.26
2007 (Dec)	7.9	212	8180	310	1361	30	412	1.9	1.6	0.64
2008 (Mar)	7.8	63	5467	194	584	9.6	277	--	0.7	--
2008 (May 27)	7.7	456	7068	29	611	07	289	BDL	0.19	0.12
2008 (July 29)	7.6	160	9982	40	936	6.8	555	--	--	0.32
2008 (Oct 22)	8.3	95	6775	167	754	8.9	594	1.8	1.75	0.71
2009 (March 05)	8.0	469	13008	100	634.4	8.0	634.4	1.28	0.31	0.02
2009 (June 30)	7.78	241	4822	229	797	8.4	537	--	0.60	0.09
2009 (Sept 10)	7.14	355	10100	22	353	15.3	19.4	--	0.14	0.16
2009 (Dec 10)	6.97	545	13420	23	408	2.84	137	--	0.086	--
2010 (March 30)	6.90	650	12958	101	564	8.0	117	BDL	12.02	--
2010 (June 24)	7.15	102	11393	17	287	5.6	270	8.0	0.81	0.11
2010 (Sept 29)	7.25	341	10417	44	455	20	306	1.54	0.07	0.48

Annexure 20

Quality of effluent of GIDC Panoli at Final Pumping Station of Panoli going to FETP						
	PH	**TSS**	**NH3-N**	**COD**	**BOD**	**PHENOL**
DATE		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Jan-09	12.13	232	244.16	3371	783	4.2
Feb-10	7.55	1476	4222	5201	1298	3.83
Mar-09	7.4	898	1848	9604	2989	7.25
Apr-09	7.84	924	5180	11574	3580	0.5
May-09	7.15	230	75.6	4030	1026	3.9
Jun-09	7.16	112	244	661	206	2.42
Jul-09	7.85	148	1288	1775	457	5
Aug-09	8.31	152	1792	808	291	4.5
Sep-09	8.01	236	1276	1949	400	4.83
Oct-09	7.95	148	1564	2756	763	5.27
Nov-09	7.07	198	1176	1588	383	4.66
Dec-09	7.87	138	1084	2386	659	6.13
Jan-10	8.01	138	918	2949	710	6.25
Feb-10	7.23	492	829	3213	637	4.37
Mar-10	7.92	510	930	3618	1347	4.66
Apr-10	6.37	214	493	1815	539	4.17
May-10	6.34	280	336	2127	625	3.67
June-10	8.05	182	426	1020	204	2.67
Jul-10	8.15	62	259	710	173	0.17
Aug-10	8.38	178	1764	3238	894	2.67
Sep-10	7.74	100	408	956	221	0.90

(Source GPCB: Regional Office)

Annexure 21

GIDC - PANOLI					
Quantity of effluent received at FETP from GIDC Panoli along with its quality					
Month \& Year	**Flow in MLD**	**pH**	**COD mg/l**	**BOD mg/l**	**Amm.-N mg/l**
Jan-09	3.55	7.79	1962	542	602
Feb-09	3.81	7.70	3426	586	1043
Mar-09	3.55	7.87	4172	1088	1357
April 09	3.72	7.71	3446	1005	1070
May- 09	3.87	7.82	3346	1267	1074
June-09	3.97	7.78	2697	990	1019
July-09	4.44	8.13	2162	899	917
Aug-09	3.90	7.97	2833	926	1237
Sep-09	4.01	7.78	3113	1036	1104
Oct-09	3.57	7.98	2745	895	1322
Nov-09	4.19	8.17	2759	859	1330
Dec-09	4.32	8.26	3212	928	1138
Jan-10	4.74	8.19	2055	487	784
Feb-10	4.97	8.23	2972	754	861
Mar-10	5.00	7.93	2549	526	764
Apr-10	2.73	7.72	2251	445	708
May-10	3.05	7.74	1867	350	674
Jun-10	3.07	8.00	2007	513	744
July-10	3.47	7.95	1596	365	732
Aug-10	4.62	7.93	1348	300	674
Sep-10	3.72	7.87	1115	287	517

(Source: BEAIL)

Annexure 22

Parameters	FETP Inlet Specifications
Ph	6.5 – 8.5
COD mg/lit	1000
BOD mg/lit	200
S.S. mg/lit	150
Ammonical Nitrogen mg/lit	100

Annexure 23

FINAL DISCHARG EFFLUENT SPECIFICATIONS FOR FETP		
1	PH	5.5 TO 8.5
2	Temperature	45 C
3	Suspended solids	100 mg / l
4	BOD(3 Days at 27 C)	100 mg/l
5	COD	250 mg/l
6	Oil & Grease	10 mg/l
7	Phenolic Compounds	5 mg/l
8	Ammonical Nitrogen	50 mg/l
9	Chlorides	600 mg/l
10	Sulphates	1000 mg/l
11	Sulphides	5 mg/l
11	Phosphate	5 mg/l
13	Cyanides	0.2 mg/l
14	Copper	3 mg/l
15	Chromium(Hexavalent)	1 mg/l
16	Chromium (Total)	2 mg/l
17	Lead	1 mg/l
18	Fluoride	15 mg/l
19	Total residual chlorine	1 mg/l
10	Total kjeldahl Nitrogen (as N)	100 mg/l
11	Insecticides / Pesticides	Absent
11	Arsenic	0.2 mg/l
13	Iron	3 mg/l
14	Mercury	0.01 mg/l
15	Cadmium	2 mg/l
16	Zinc	15 mg/l
17	Selenium	0.05 mg/l
18	Nickel	5 mg/l
19	Bio-Assay Test	90% survival of fish after 96 hrs in 100% effluent.

Annexure 24

FETP Outlet						
Quantity of Treated Effluent			Quality of Treated Effluent Discharged into Deep Sea			
Month & Year	Inlet Flow in MLD	Discharge in MLD	pH	COD mg/l	BOD mg/l	Amm.-N mg/l
Jan-09	19.53	19.15	7.77	706	159	184
Feb-09	34.11	33.90	7.63	1845	340	413
Mar-09	31.43	31.23	7.65	1780	526	623
April- 09	34.32	34.15	7.36	2114	698	492
May- 09	34.71	32.24	7.29	1849	649	391
June-09	36.07	36.14	7.78	1504	480	348
July-09	33.04	33.16	7.77	1124	337	463
Aug-09	38.36	38.15	7.58	1156	202	529
Sep-09	39.82	39.80	7.46	919	97	518
Oct-09	39.92	39.62	7.47	922	83	603
Nov-09	47.74	47.12	7.51	773	74	497
Dec-09	40.38	40.25	7.60	1326	221	713
Jan-10	48.38	48.39	7.54	1224	210	533
Feb-10	38.30	38.50	7.78	1677	310	626
Mar-10	38.84	38.93	7.76	1508	243	571
Apr-10	35.45	35.57	7.72	1748	329	649
May-10	35.58	36.18	7.71	1812	421	640
Jun-10	38.06	37.81	7.77	1315	290	620
July-10	41.03	40.89	7.65	1236	205	538
Aug-10	43.66	43.35	7.73	851	162	446
Sep-10	26.41	32.60	7.81	635	116	407

(Source BEAIL)

Permissible limits for discharge from this FETP to deep sea through underground pipe line for above referred parameters are :

pH : 5.5. to 8.5
COD : 250 mg/lit
BOD : 100 mg/lit
NH3-N : 50 mg/lit

Annexure 25

PERFORMANCE OF FETP AT PIRAMAN – A TREND ANALYSIS BY GPCB

Sampling Location : Outlet of FETP

MONTH	Permissible Limit					
	PH	NH3-N	COD	BOD	O&G	PHENOL
		Mg/ltr	Mg/ltr	mg/ltr	mg/ltr	mg/ltr
	5.5 - 8.5	50	250	100	10	5
	Concentration of Parameter					
	PH	NH3-N	COD	BOD	O&G	PHENOL
		Mg/ltr	Mg/ltr	mg/ltr	mg/ltr	mg/ltr
Jan-09	7.53	806.4	2369	835	8.8	2.16
Feb-09	7.48	817.6	3002	1427	7.2	9.16
Mar-09	7.5	784	1407	439	1.2	1.42
Apr-09	6.86	714	2349	662.5	4.2	6.16
May-09	7.16	342.4	1545	428	2.8	5.16
Jun-09	7.46	418	1407	403	2.4	3.39
Jul-09	7.88	621.6	1217	375	2.8	6.66
Aug-09	7.72	961	1106	338	2.2	4.965
Sep-09	7.64	543	974	216	2.7	6.83
Oct-09	7.97	868	876	210	3.2	5.33
Nov-09	7.72	563	904	188	2.4	3.83
Dec-09	7.77	638	1148	228	4	3.83
Jan.10	7.3	742	1496	287	3.2	2.83
Feb-10	8.19	733.6	1731	393	3.6	1.75
Feb-10	7.16	664	1703	302	5.6	3.33
Mar-10	7.39	599	1945	597		
Apr-10	7.65	795	1953	642	9.2	3
May-10	7.21	560	1397	360	7.2	2.67
Jun-10	7.64	762	1240	241	2.0	BDL
Jul-10	7.46	403	762	175	2.8	BDL
Aug-10	7.65	304	598	116	1.2	1.1
Sep-10	7.64	515	634	213	4.8	0.69

Annexure 25A

PERFORMANCE OF FETP AT PIRAMAN – A TREND ANALYSIS BY CPCB

Sampling Location : Outlet of FETP

Date of monitoring	Permissible Limit in mg/lit except pH									
	pH	TSS	TDS	COD	BOD	NH_3-N	CN^-	Phenol	S^-	O&G
	5.5 – 8.5	100	-	250	100	50	0.2	5	5	10
	Concentration of Parameter in mg/lit except pH									
	pH	TSS	TDS	COD	BOD	NH_3-N	CN^-	Phenol	S^-	O&G
28.11.06	7.3	375	9130	1689	514	661	--	-	1.95	227
29.11.06	7.4	370	9274	2160	408	616	--	-	1.28	17
28.06.07	7.5	395	9274	1341	94	688	--	7.3	BDL	26.8
31.10.07	7.02	353	13567	1965	175	788	--	17.3	8.9	33.8
17.01.08	7.6	489	7954	1482	659	495	3.85	18.1	13.5	23.0
07.03.08	7.9	290	10304	2112	524	661	--	5.75	12	10.2
22.04.08	7.8	470	12457	2292	351	612	1.50	14.86	--	--
27.05.08	8.04	1220	8060	3090	708	725	0.11	13.68	--	14
17.06.08	8.0	256	9216	2483	475	454	0.21	9.47	37.3	12
29.07.08	7.76	273	9629	1645	356	813	0.25	--	34.8	22.4
28.08.08	8.31	563	9162	911	487	636	0.37	11.36	26.4	27.5
26.09.08	8.45	246	6530	1223	338	756	0.39	8.65	17.3	14.0
22.10.2008	8.4	553	11420	2303	857	953	1.85	13.60	34.2	38.0
07.11.2008	8.37	386	11167	2613	885	708	0.91	10.19	38.1	20.0
19.12.2008	8.23	571	11780	3008	721	338	--	5.64	--	--
28.01.2009	7.97	430	9151	4158	728	642.6	--	19.33	65.9	47
05.03.2009	8.20	397	11853	2779	630	690.4	0.21	9.37	62.5	19.5
30.06.2009	7.82	327	9164	1764	556	475	0.19	8.04	--	18
10.09.2009	7.55	173	8798	702	39	586	0.34	0.82	0.5	13.9
10.12.2009	7.11	496	11228	1510	294	785	--	4.84	--	8.06
10.03.10	7.78	371	12413	1241	380	666	1.61	3.41	13.1	59
10.03.10(C)	--	405	9823	1498	394	664	2.12	2.75	10.4	--
24.06.2010	7.7	238	11513	1235	321	932	0.02	9.4	7.68	17.8
29.09.2010	7.78	202	8353	956	188	320	0.81	5.71	3.5	20.0

Annexure 26

Summary of EMS upgradation plan along with its financial outlay

Sr	Details	Investment made for EMS - upgradation till Dec'09 (Rs. in lakhs)	Investment made during (Rs. in lakhs)	Proposed investment for EMS upgradation Jul'10 onwards (Rs. in lakhs)
1	Total investment by identified 101 industrial units	23096.72	3128.42	12675.00
2	Investment by agencies like BEAIL, BEIL, Notified Area Authority	5980.09	2167.04	14145.00
	T O T A L	29076.81	5295.46	26820.00

Annexure 27

Summary of EMS upgradation plan along with its financial outlay for BEAIL, GIDC

Sr	Details	Investment made for EMS - upgradation till Dec'09 (Rs. in lakhs)	Investment made during (Rs. in lakhs)	Proposed investment for EMS upgradation Jul'10 onwards (Rs. in lakhs)
1	Investment by agencies like BEAIL GIDC / Notified Area Authority	4853	1877	11508

Annexure 28

Details of captive online monitoring facilities

Sr. No.	Name of Industry	Details of on-line systems	
		System attached to / provided at	Details including Parameters
1	Bayer Cropscience Limited, Ankleshwar.	Incinerator	ACE 10,000 online analyzer: Opacity, Oxygen, CO, SO2 and NOX
		ETP	KROHNE make Magnetic flow meter, online pH meter
2	Glenmark Generics Limited., Plot No. 3109, GIDC Industrial Estate, Ankleshwar	ETP	1.Magnetic Flow Meter with recorder 2. Online pH Meter 3. Online DO meter (Recently purchased : Make - Forbs Marshal) will be commissioned with in one month Rs. 1.65 Lacs)
3	Hikal Limited Plot No.629-630, GIDC, Panol	ETP	1. On line pH auto control meter for continuous monitoring of pH of treated effluent 2. Magnetic flow meter for inlet & Out let duly certified by BEAIL (Krone Marshal purchased & installed through BEAIL) 3. Central control panel which also show inlet & out let flow rate & other parameters etc.
4	Lupin limited, Ankleshwar	ETP	1. Online pH recorder on treated water discharge line. It is also connected to auto shut off valve and hooter. 2. Flow meter cum recorder on treated water discharge line. 3. Online conductivity meter on RO permeate line with auto stop based on TDS.
		Stack and ambient air	1. On line monitoring of incinerator stack (O2, SO2, NO, HCl, Opacity). Also pH indicator is installed on scrubbing media. Presently incinerator not in operation. 2. Online pH meter on scrubbing media of process stack at four places. 3. Online Ammonia sensors with hooter in Ammonia cylinder storage area. 4. Online Chlorine gas detector which will activate blower and scrubber in case leakage of Chlorine cylinder.

		Details of on-line systems	
			5. Online smoke detector with hooter in incinerable waste storage shed
5	Meghmani Organics Limited - Panoli	ETP	1. KROHNE make Magnetic Flow Meter 2. ABB Make PH Analyzer
6	Solvay Speciality	ETP	Magnetic flow meters Online pH meters
7	United Phosphorous Limited (UPL) –Unit-1 Ankleshwar.	ETP	online pH meter with Recorder TOC / TKN Meter (Shimadzu), Model # TOCN4110 for measurement of Total Organic Carbon (TOC) and Total Nitrogen (TN)

Annexure 29

Yearly Average Data for Ambient Air Quality at GIDC - Ankleshwar						
S.No.	Location	Year	Parameters			
			RSPM	SPM	SO_2	NO_x
I	NAMP M/s Ralis Pharma India Ltd, GIDC, Ankleshwar (Industrial Area)	2009 - 10	92.62	187.69	21.64	28.04
		2008 - 09	103.88	205.31	21.83	27.40
		2007 - 08	109.64	223.37	24.44	30.57
		2006 - 07	122.00	182.00	26.00	34.00
II	NAMP M/s Durga Traders, Rajpipala Road, Near ONGC Colony) Ankleshwar (Residential Area, in the North-West direction of Ankleshwar Industrial Area)	2009 - 10	76.02	153.30	17.72	25.48
		2008 - 09	76.30	153.83	14.93	24.31
		2007 - 08	84.95	171.93	16.63	24.86
		2006 - 07	113.00	166.00	21.00	28.00
III	SAMP Gram Panchayat, Piraman, Dist. Bharuch (Residential Area, Adjacent to Ankleshwar Town, in the South-West direction of Ankleshwar Industrial Area)	2009 - 10	82.20	165.44	13.77	22.14
		2008 - 09	74.38	147.60	13.86	21.34
		2007 - 08	84.28	171.12	15.14	24.13
		2006 - 07	93.00	186.00	18.00	26.00
IV	SAMP Kumkum Banglow, Village Kosamadi, Dist. Bharuch (Residential Area, In the South-East direction of Ankleshwar Industrial Area)	2009 - 10	88.45	178.41	15.72	24.09
		2008 - 09	73.65	146.54	13.41	20.87
		2007 - 08	73.43	149.40	12.81	20.70
		2006 - 07	96.00	192.00	24.00	31.00

(Source GPCB / GEMI)

Year 2010-11 Data for Ambient Air Quality at GIDC – Ankleshwar						
S.No.	Location	Month	Parameters			
			RSPM	SPM	SO_2	NO_x
I	NAMP M/s Ralis Pharma India Ltd, GIDC, Ankleshwar (Industrial Area)	Apr-10	90.29	187.58	21.56	28.2
		May10	94.93	200.17	16.93	22.56
		Jun-10	91.58	191.92	18.94	26.06
		Jul-10	75.08	156.58	16.91	23.57
		Aug-10	61.77	121.3	13.07	19.12
		Sep-10	71.54	146.17	14.72	20.46
II	NAMP M/s Durga Traders, Rajpipala Road, Near ONGC Colony) Ankleshwar (Residential Area, in the North-West direction of Ankleshwar Industrial Area)	Apr-10	74.88	155.42	16.42	23.75
		May10	82.1	173.1	15.09	22.6
		Jun-10	78.13	164.88	14.00	21.87
		Jul-10	71.25	148.50	12.99	20.70
		Aug-10	51.50	103.5	10.61	17.21
		Sep-10	61.25	126.13	12.10	18.88
III	SAMP Gram Panchayat, Piraman, Dist. Bharuch (Residential Area, Adjacent to Ankleshwar Town, in the South-West direction of Ankleshwar Industrial Area)	Apr-10	84.58	176.58	13.87	23.34
		May10	92.83	194.33	14.59	24.41
		Jun-10	80.42	169.21	13.22	22.54
		Jul-10	74.13	154.33	12.37	20.75
		Aug-10	60.11	118.10	10.54	17.51
		Sep-10	64.04	131.08	11.84	19.33
IV	SAMP Kumkum Banglow, Village Kosamadi, Dist. Bharuch (Residential Area, In the South-East direction of Ankleshwar Industrial Area)	Apr-10	99.38	205.83	16.73	24.23
		May10	104.3	217.4	17.28	25.64
		Jun-10	94.13	197.91	16.24	24.14
		Jul-10	87.13	182.08	14.49	22.81
		Aug-10	71.33	139.50	11.86	18.51
		Sep-10	68.21	138.83	13.0	20.76

(Source GPCB / GEMI)

Annexure 30

Sampling Location : Above Sports Club (Nr. Gattu School, Ankleshwar)

PERIOD OF SAMPLING	NO. OF DAYS	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
JUNE 2010	7	51.13	29.89	12.83	21.49	15.29	ND
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	ARSENIC (NG/M3)	NICKEL (NG/M3)
		ND	ND	ND	ND	ND	ND
JULY 2010	4	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		48.95	32.925	16.175	26.175	12.48	ND
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		ND	ND	ND	ND	ND	ND
AUG 2010	9	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		33.45	20.15	11.78	20.41	15.491	ND
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		ND	ND	ND	ND	ND	ND
SEP 2010	8	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		51.34	26.89	11.62	21.14	15.2	ND
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		ND	ND	ND	ND	ND	ND

Sampling Location : Nr. Blitox Plant (M/s. Rallis India Ltd. (Unit-III),

PERIOD OF SAMPLING	NO. OF DAYS	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_X ($\mu g/m^3$)	Ozone ($\mu g/m^3$)	Lead ($\mu g/m^3$)
JUNE 2010	7	90.63	54.77	26.57	36.50	12.57	ND
		Ammonia ($\mu g/m^3$)	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Benzo (α) Pyrene (BaP) (ng/m^3)	Arsenic (ng/m^3)	Nickel (ng/m^3)
		ND	ND	ND	ND	ND	ND
JULY 2010	4	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_X ($\mu g/m^3$)	Ozone ($\mu g/m^3$)	Lead ($\mu g/m^3$)
		125.35	74.4	31.67	43.62	12.49	ND
		Ammonia ($\mu g/m^3$)	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Benzo (α) Pyrene (BaP) (ng/m^3)	Arsenic (ng/m^3)	Nickel (ng/m^3)
		4.275	ND	2.2225	0.31025	ND	ND
AUG 2010	9	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_X ($\mu g/m^3$)	Ozone ($\mu g/m^3$)	Lead ($\mu g/m^3$)
		151.12	55.04	31.16	42.56	18.51	ND
		Ammonia ($\mu g/m^3$)	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Benzo (α) Pyrene (BaP) (ng/m^3)	Arsenic (ng/m^3)	Nickel (ng/m^3)
		8.31	0.044	2.025	0.363	ND	ND
SEP 2010	8	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_X ($\mu g/m^3$)	Ozone ($\mu g/m^3$)	Lead ($\mu g/m^3$)
		148.82	62.42	30.36	40.81	18.20	ND
		Ammonia ($\mu g/m^3$)	Carbon Monoxide (mg/m^3)	Benzene ($\mu g/m^3$)	Benzo (α) Pyrene (BaP) (ng/m^3)	Arsenic (ng/m^3)	Nickel (ng/m^3)
		11.3	0.2	1.686	0.35	ND	ND

Annexure 31

Sampling Location : At Gram Panchayat Office, Sanjali Village

PERIOD OF SAMPLING	NO. OF DAYS	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
JUN 2010	2	48.00	26.50	27.00	12.00	BDL	BDL
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO(A) PYRENE (BAP) (NG/M3)	ARSENIC (NG/M3)	NICKEL (NG/M3)
		BDL	BDL	BDL	BDL	BDL	BDL

Sampling Location : At P.I.Industries, GIDC, Panoli

PERIOD OF SAMPLING	NO. OF DAYS	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
JUN 2010	2	48.50	34.50	34.50	11.00	BDL	BDL
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	ARSENIC (NG/M3)	NICKEL (NG/M3)
		BDL	BDL	BDL	BDL	BDL	BDL
JULY 2010	2	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		79.00	47.00	43.13	12.67	BDL	BDL
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		BDL	BDL	BDL	BDL	BDL	BDL
AUG 2010	1	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		79.00	54.00	42.00	18.00	BDL	BDL
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		BDL	BDL	BDL	BDL	BDL	BDL
SEP 2010	2	PM10 (µG/M3)	PM2.5 (µG/M3)	SO2 (µG/M3)	NOX (µG/M3)	Ozone (µg/m3)	Lead (µg/m3)
		78.50	53.00	78.81	45.53	BDL	BDL
		AMMONIA (µG/M3)	CARBON MONOXIDE (MG/M3)	BENZENE (µG/M3)	BENZO (A) PYRENE (BAP) (NG/M3)	Arsenic (ng/m3)	Nickel (ng/m3)
		BDL	BDL	BDL	BDL	BDL	BDL

Annexure 32

CPCB Data on VOC monitoring in Ambient Air in Ankleshwar : March 2008

VOCs ↓	Sampling Locations				
	Station-1, Mahaveer Traders, Rajpipla Road, Upwind, NE Direction	**Station-2, Asian Paints Colony, Downwind, SW Direction**	**Station-3, Meghmani Organics Ltd, Cross-wind, Centre of Ind Area,**	**Station-4, Jai Glass Fibres, Cross-wind, SE Direction**	**Station-5, Durga Traders, Cross-wind, NW Direction**
	Range (Average)	**Range (Average)**	**Range (Average)**	**Range (Average)**	**Range (Average)**
Benzene	0-20 (13)	0-142 (63)	17-19 (18)	31-48 (37)	42-57 (48)
Chloroform	33-39 (35)	61-86 (70)	23-34 (29)	43-78 (57)	56-99 (78)
Toluene	40-115 (81)	83-1247 (622)	0-66 (37)	40-254 (126)	84-537 (253)
Methylene Chloride	133-269 (218)	291-381 (327)	56-229 (139)	217-335 (291)	253-459 (353)
Others	(107)	(67)	(194)	(672)	(267)
Total VOCs	311-591 (455)	483-1791 (1149)	198-586 (417)	417-212 (1183)	435-1512 (999)

Sampling Location	**Benzene** (Av Concentration- µg/m^3)
Station-1, Mahaveer Traders, Rajpipla Road, Upwind, NE Direction	13.35
Station-2, Asian Paints Colony, Downwind, SW Direction	63.00
Station-3, Meghmani Organics Ltd, Cross-wind, Center of Ind Area,	18.00
Station-4, Jai Glass Fibres Cros-wind, SE Direction	37.17
Station-5, Durga Traders, Cross-wind, NW Direction	47.67
AVERAGE	29.87

Annexure 33

CPCB Data on VOC monitoring in Ambient Air in Panoli : March 2008

VOCs ↓	Sampling Location(s)				
	Station-1 Hotel Sanman, Up-wind, NE Direction	**Station-2, Solvay Speciality Ltd, Down-wind , SW Direction**	**Station-3, Cheminova India Ltd (Intermediate Div), Centre of Ind Area**	**Station-4, Public School Kharod, Cross-wind, SE Direction**	**Station-5, Niranjan Sales, Cross-wind, NW Direction**
	Range (Average)	**Range (Average)**	**Range (Average)**	**Range (Average)**	**Range (Average)**
Methylene Chloride	162-264 (212)	230-426(324)	0-332(219)	193-425(271)	0-134 (89)
Chloroform	38-313(132)	56-794 (306)	0-504(179)	42-75 (62)	26-32 (29)
Chlorobenzene	0-30 (20)	32-38 (35)	0-30 (10)	24-39(34)	0-16 (10)
Toluene	0-30 (10)	0-32 (17)	0-70 (29)	18-66(39)	9-25 (16)
Benzene	0-73 (34)	0-45 (29)	32-35 (33)	0-46 (15)	0-18(12)
Others	(12)	(96)	(0)	(9)	(10)
Total VOCs	254-704 (420)	391-1546 (807)	35-877 (470)	322-598 (430)	85-226 (166)

Sampling Location	**Benzene** (Av Concen- $\mu g/m^3$)
Station-1,Hotel Sanman, Up-wind, NE Direction	33.61
Station-2,Solvay Speciality Ltd, Down-wind , SW Direction	28.75
Station-3, Cheminova India Ltd (Intermediate Div), Centre of Ind Area	33.17
Station-4,Public School Kharod, Cross-wind, SE Direction	15.21
Station-5, Niranjan Sales, Cross-wind, NW Direction	12.17
Average	20.49

Annexure 34

Vehicular Data : (as on 31/03/2010)	
Type of vehicle	**Number**
Truck	7929
Tanker	534
3-wheeler Goods	5009
LMV goods	4622
Stage Carriage	0
Contract carriage	471
Maxi Cab	1999
School Bus	17
Pvt. Bus	246
Police Van	29
Ambulence	123
3--wheeler Car	3
4-wheeler Car	32135
Taxi Cab	1970
Jeep	3780
Auto Rickshaw	17951
2-wheeler Motor Cycle	197779
Moped	46074
Tractor	10899
Transport Trailor	5714
Non-transport Trailer	0
Other vehicles	1502
T O T A L	**338786**

(Source : ARTO - Bharuch)

Details of vehicles on cleaner fuel				
Sr. No.	**Type of Vehicle**	**CNG**	**LPG**	**Total**
1	Auto rickshaws	9009	-	9009
2	LMV	6804	3898	10702
3	Public buses	146	-	146
4	Other Vehicles	62	-	62
	Total	16021	3898	19919

(Source : GGCL and ARTO - Bharuch)

Annexure 35

CEPI Table

Subcomponent	Basis for subcomponent rating	Maximum	Score as per CPCB Document				Predicted Score After Improvement			Justification for change	Justification for change	Justification for change
			Air	water	Land		Air	water	Land	Air	Water	Land
A1	Based on the data on the presence of toxins	**6**	5	5.75	5.75		3	5	3.5	The solvent recovery system, odour control system and use of cleaner fuel like natural Gas by concerned industries will ensure that there is no presence of any Group C toxins in the environment	The proposed Short Term Action Plan for Water Environment particularly wrt 4-R and upgradation of CETPs will help in reducing / eliminating presence of carciogens in water environment	The proposed Short Term Action Plan for Water Environment particularly wrt 4-R and upgradation of Common Facilities will help in reducing / eliminating presence of carciogens in water environment
A2	Based on the scale of industrial activities	**5**	5	5	5		5	5	5	Scale of Industrial Activities will not be altered due to implementation of proposed Action Plan	Scale of Industrial Activities will not be altered due to implementation of proposed Action Plan	Scale of Industrial Activities will not be altered due to implementation of proposed Action Plan
A	A1*A2	**30**	25	28.75	28.75		15	25	17.5			

B1	Based on the pollutant concentration data(Ambient Pollutant Concentration)	**8**	8	8	8		4	4.5	3	The new norms for PM 2.5 will be implemented by end of 2012. Till then, its excedence factor will remain as HIGH. The excedence factors for remaining pollutants will remain as MODERATE	The proposed action particularly wrt 4-Rs and upgradation CETPs & ETPs of individual unit will improve Ambient Pollutant Concentration from CRITICAL to HIGH	There is no any illegal dump site. Flow of industrial w/w will not be there in any natural drains including Amlakhadi & Chhapara Khadi. Further, lining of natural drain passing through GIDC Ankleshwar will be carried out and the flow is diverted to Final Pumping Station. Thus the proposed Action Plan will bring down the Ambient Pollutant Concentration to MODERATE level
B2	Based on the impact on people (Evidence* of adverse impact on people)	**6**	6	3	3		3	3	3	The proposed action plan will ensure that there is no fatality or diseases leading to fatality (such as cancer) due to pollutants in environment	The proposed action plan will ensure that there is no fatality or diseases leading to fatality (such as cancer) due to pollutants in environment	The proposed action plan will ensure that there is no fatality or diseases leading to fatality (such as cancer) due to pollutants in environment

B3	Based on the impact on eco-geological features(reliable evidence of adverse impact on eco-geological features)	**6**	6	3	6		3	3	3	The proposed Action plan will ensure that there is no significant damage to geo-ecological features due to pollutants in environment	The proposed Action plan will ensure that there is no significant damage to geo-ecological features due to pollutants in environment	The proposed Action plan will ensure that there is no significant damage to geo-ecological features due to pollutants in environment
B	B1+B2+B3	**20**	20	14	17		10	10.5	9			
C1	Based on potentially affected population)	**5**	3	3	3		3	3	3	Population within 2 KMs area will not be altered due to implementation of proposed Action Plan	Population within 2 KMs area will not be altered due to implementation of proposed Action Plan	Population within 2 KMs area will not be altered due to implementation of proposed Action Plan
C2	(Based on the level of exposure)	**5**	4	5	5		3	3.5	3	The proposed action plan will reduce level of SNLF from CRITICAL to HIGH (for PM 2.5) and moderate for remaining parameters, thus improve the score	The proposed action plan will reduce level of SNLF from CRITICAL to HIGH (for COD & NH3-N) and moderate for remaining parameters, thus improve the score	The proposed action plan will reduce level of SNLF from CRITICAL / HIGH to MODERATE for various parameters improve the score

C3	Based on the risk to sensitive receptors	**5**	5	5	5		5	5	3	The proposed action Plan will reduce the nos of sensitive receptors to considerable extent, but still it may remain > 500	The proposed action Plan will reduce the nos of sensitive receptors to considerable extent, but still it may remain > 500	The proposed action Plan will reduce the nos of sensitive receptors to considerable extent, but still it may remain > 500
C	(C1*C2) + C3	**30**	17	20	20		14	15.5	10			
D	Based on the information on pollution control facilities	**20**	10	10	10		5	10	10	The further upgradation of Air Pollution systems and use of cleaner fuel like Natural Gas by the Common Infrastructure as well as individual industries.	Further upgradation of EMS by Common Infrastructure facilities and also by individual units	Further upgradation of EMS by Common Infrastructure facilities and also by individual units
CEPI	A+B+C+D	**100**	72	72.75	75.75		44	61	46.5			
	max.CEPI		75.75				61					
	Aggregated CEPI		88.45				68.98*					

* Expected by December – 2010 and efforts for further reduction will be continued.

Annexure – 36

Details of Landfill Waste Received by Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar from industries located in industrial cluster of Ankleshwar	
Month & Year	GIDC, Ankleshwar In MT
Jan- 09	6335.533
Feb-09	7446.865
Mar-09	6954.885
Apr-09	9490.825
May-09	7699.525
Jun-09	7915.555
Jul-09	4762.670
Aug-09	4686.095
Sep-09	5312.245
Oct-09	7997.615
Nov-09	9475.310
Dec-09	15865.353
Jan-10	10940.265
Feb-10	11099.373
Mar-10	11749.652
Apr-10	8486.000
May-10	10427.875
Jun-10	10227.919
July-10	4868.750
Aug-10	4517.375
Sept-10	5298.255
Total	**171557.94**

(Source : BEIL)

Annexure 36A

Details of Incinerable Waste Received by Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar from industries located in industrial cluster of Ankleshwar	
Month & Year	GIDC, Ankleshwar In MT
Jan- 09	321.400
Feb-09	624.625
Mar-09	471.105
Apr-09	93.160
May-09	487.755
Jun-09	395.575
Jul-09	362.690
Aug-09	432.321
Sep-09	566.310
Oct-09	763.245
Nov-09	711.102
Dec-09	787.446
Jan-10	613.795
Feb-10	726.310
Mar-10	488.575
Apr-10	752.326
May-10	1201.232
Jun-10	1064.630
July-10	1060.655
Aug-10	783.525
Sept-10	1173.825
Total	**13881.607**

(Source : BEIL)

Annexure 37

Details of Landfill Waste Received by Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar from industries located in industrial cluster of Panoli	
Month & Year	GIDC, Panoli In MT
Jan- 09	1489.470
Feb-09	1223.470
Mar-09	1132.330
Apr-09	2223.335
May-09	1729.086
Jun-09	2181.715
Jul-09	1472.640
Aug-09	1742.595
Sep-09	1065.080
Oct-09	1882.540
Nov-09	2325.890
Dec-09	2496.620
Jan-10	2308.172
Feb-10	1827.590
Mar-10	2049.355
Apr-10	2266.585
May-10	2390.431
Jun-10	2191.475
July-10	1102.855
Aug-10	984.275
Sept-10	1235.450
Total	**37320.959**

(Source : BEIL)

Annexure 37A

Details of Incinerable Waste Received by Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar from industries located in industrial cluster of Panoli	
Month & Year	GIDC, Panoli In MT
Jan- 09	0.000
Feb-09	15.080
Mar-09	43.380
Apr-09	0.000
May-09	254.870
Jun-09	467.920
Jul-09	312.390
Aug-09	564.765
Sep-09	221.105
Oct-09	269.940
Nov-09	34.006
Dec-09	71.780
Jan-10	43.825
Feb-10	205.880
Mar-10	177.260
Apr-10	229.670
May-10	149.755
Jun-10	122.830
July-10	80.020
Aug-10	11.270
Sept-10	257.080
Total	**3532.826**

(Source : BEIL)

Annexure 38

Year Wise Data Pertaining to Solid / Hazardous Wastes Lifted & Shifted to TSDF – BEIL from Various Locations is summarized as follows :

Year	**Total quantity of waste lifted and shifted to BEIL TSDF**	**Dumpsites from where waste was lifted**
2004-05	723.565	Nr. BEIL Site, Nr. Pumping Station, Nr. Umall Road and Nr. Puping Station, Nr. Haryan Glass, Near Madhav Bag, Valia Road, Amravati River Bridge N.H. No.8, Mandvi site, Kharach Site, Kharod Village
2005-06	47.135	Kharchi Site, Nr. Approach road to Umarwada Crossing,
2006-07	349.720	Near Kanoria Chemicals, C-Pumping Station & Bapunagar, Near Village Bhadkodra
2007-08	709.890	Near Kanoria Chemicals
2008-09	Nil	---
2009-10	Nil	---
2010-11 Upto 20.10.2010	30.37	Bakrol Village (Panoli Highway)
	1.000	Panoli, Near Chacha Hotel.
	76.070	Miranagar, Near Rajpila Chowkdi, Nr. Play Ground.
	42.390	Behind Karan Paper Mill Chatral, Tal. Kalol, Dist. Gandhinagar (Incinerable Waste)
Total (2010-11)	149.830	

(Source : BEIL)

Annexure 39

HW quantity received for Secured Landfilling		
Sr No	**Financial Year**	**Quantity (MT)**
01	1998 – 1999	20,379
02	1999 – 2000	37,793
03	2000 – 2001	45,010
04	2001 – 2002	51,406
05	2002 – 2003	61,484
06	2003 – 2004	87,983
07	2004 – 2005	89,781
08	2005 – 2006	1,03,756
09	2006 – 2007	1,11,295
10	2007 – 2008	1,19,387
11	2008 – 2009	1,19,670
12	2009 – 2010	1,55,784
13	2010 – 2011 (up to 30.09.2010)	64,805
T O T A L →		10,68,538

(Source : BEIL)

Annexure 40

Details of Members for Secured Landfilling		
Sr No	**Estate**	**No. of Industries**
01	Ankleshwar	336
02	Panoli	120
03	Jhagadia	31
04	Others	116
T O T A L →		603

(Source : BEIL)

Annexure 41

Leachate quantity data		
Sr No	**Financial Year**	**Quantity (KL)**
01	1998 – 1999	30
02	1999 – 2000	26
03	2000 – 2001	75
04	2001 – 2002	670
05	2002 – 2003	1,567
06	2003 – 2004	4,775
07	2004 – 2005	8,964
08	2005 – 2006	12,500
09	2006 – 2007	13,890
10	2007 – 2008	17,140
11	2008 – 2009	14,020
12	2009 – 2010	13,460
13	2010 – 2011 (up to 30.09.2010)	5,695
T O T A L →		92,812

(Source : BEIL)

Annexure 42

Details of Waste quantity incinerated		
Sr No.	**Year**	**Quantity (MT)**
01	2004 – 2005	580.295
02	2005 – 2006	4,545.319
03	2006 – 2007	8,089.045
04	2007 – 2008	*10,095.331*
05	2008 – 2009	*11,016.859*
06	2009 – 2010	*12,950.636*
07	2010 – 2011 (up to 30.09.2010)	*5,370.412*
T O T A L →		52,647.897

(Source : BEIL)

Annexure 43

Actions Taken in Ankleshwar and Bharuch

(A) NOTICE

YEAR	AIR	WATER	HW	TOTAL
2007	11	44	01	56
2008	07	125	01	133
2009	30	76	01	107
UPTO Sept. 2010	16	141	04	161

(B) CLOSURE (AIR ,WATER & HW)

YEAR	TOTAL
2007	28
2008	95
2009	60
UPTO Sept. 2010	40

(C) BANK GUARANTEE

RECEIVED UPTO Sept. 2010 IN NUMBERS IS 77 AND

RS. 4,67,60,305/-