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**ACTION PLAN FOR CRITICALLY POLLUTED AREA
BAIKAMPADY INDUSTRIAL CLUSTER, MANGALORE,
KARNATAKA STATE**

PREAMBLE:

Ministry of Environment & Forests (MoEF), Govt. of India in association with Central Pollution Control Board (CPCB), Delhi and Indian Institute of Technology (IIT), New Delhi have, recently, carried out an environmental assessment of industrial clusters across the country based on comprehensive Environmental Pollution Index (CEPI) with the aim of identifying polluted industrial clusters & prioritizing planning needs for intervention to improve the quality of environment in these industrial clusters and the nation as a whole. The assessment so carried out has been documented in the form of a report entitled 'Comprehensive Environmental Assessment of Industrial Clusters'. In all 88 industrial clusters have been assessed.

The industrial clusters/areas having aggregated CEPI scores of 70 and above should be considered as critically polluted clusters/areas and need further detailed investigations in terms of the extent of damage and formulation of appropriate remedial action plan.

As per Ministry of Environment & Forests, Govt. of India vide office Memorandum No.J-11013/5/2010-1A.II (I) dated. 13.01.2010 Baikampady Industrial Cluster, Mangalore in Karnataka State was declared as critically polluted area with CEPI score of 73.68. In view of this, Karnataka State Pollution Control Board (KSPCB) in co-ordination with the Zonal Office Bangalore of Central Pollution Control Board and industries located in and around Baikampady Industrial Cluster has developed Action plans for the enhancement of pollution control measures to bring down the prevailing pollution loads.

1. INTRODUCTION

1.1. Area Details including brief history (background information)

Baikampady Industrial cluster, Mangalore is located in Dakshina Kannada District of Karnataka State. The Dakshina Kannada district is having 5 Taluks namely Mangalore, Bantwala, Sullia, Belthangady and Puttur. Mangalore is an important city in Karnataka and is situated on the west coast. After integration the city is developing fast in all directions viz. in the field of education, industry and commerce. Mangalore is located at 12°-52'N latitude and 74°-49'E longitude. The city is located in the confluence of Nethravathi and Gurupura rivers. It is bound in the east by the Western Ghats and in the west by the Arabian Sea. Three National Highways viz., NH-17 linking Panvel and Kanyakumari, NH-48 linking Mangalore and Bangalore, NH-13 linking Mangalore and Sholapur pass through the city. An international Airport is located at Kenjar-Bajpe, which is 12 km from city connecting it to Mumbai, Chennai, Bangalore and Arab countries. Mangalore is also linked by rail to all major cities of India and is also having all weather harbors. Mangalore is headquarters of Dakshina-Kannada District, largest urban coastal center of Karnataka and the fourth largest city in the State. The city is an administrative, commercial, educational, and industrial center. An all weather port is located in Mangalore and is the only major port of Karnataka. The topography of the city is from plain to undulating with four hilly regions natural valleys within the city. The ambient temperature varies minimum from 17°C to a maximum 37°C. There is a heavy rain fall of about 4000mm per annum of which about 90% received in the monsoon period. The relative humidity is generally very high reaching saturation levels during the summer period. The geology of the city is characterized by hard laterite in hilly tracts and sandy soil along seashore.

The cluster area is surrounded on the West by Arabian Sea, East by Kunjathbail, South by Mangalore city and North by Surathkal. The major rivers Gurupura is located adjacent to the boundary of Baikampady Industrial cluster & Nethravathi is located at a distance of 20 km from the Baikampady Industrial cluster towards South. The major source of water to the Baikampady Industrial cluster is from Nethravathi River and bore wells.

1.2. Location

Baikampady Industrial cluster is located at 8 km away on Northern side of Mangalore city. To identify the impact on human, eco-geological features & other sensitive receptors an impact zone of 2 kilometers in all directions from the boundary of the industrial cluster is identified. The Baikampady Industrial cluster consists of a major refinery, storage of crude and finished petroleum products, LPG storage & bottling, fertilizer plant, Pharmaceutical industry, Brewery, Edible oil processing units, Sea food processing units, Lead refining unit, Cashew processing units, Paint & Dispersion unit, Iron ore pelletization plant and Pig Iron plant apart from few engineering, fabrication, plywood plants and ready-mix plants.

Baikampady village comes under Surathkal Hobli of Mangalore Taluk. It is located at the northern side of Mangalore city. Now, the Baikampady village and Baikampady industrial area and maximum part of Surathkal Hobli areas come under Mangalore City Corporation limits. The Baikampady industrial area is located at 12° 56' N latitude and 74° 49' E longitude. This industrial area is located at about 12 km north of Mangalore City connected by Road. This industrial area is connected by NH-17 on the Western side and NH-48 on the Southern side. The Mangalore port is situated at a distance of 2 km from the industrial area and the nearest railway station is about 4 km towards North at Surathkal. The Mangalore Airport is situated at a distance of 10 km from the Baikampady Industrial Area towards North-East.

The Baikampady Industrial cluster is spread over in an area of about 30 Sq KM which includes 450 Acres of Baikampady industrial area developed by Karnataka State Industrial Area Development Board (KIADB). The Baikampady industrial area is having 304 operating industries. The category wise details of industries working in the said industrial area are as follows:

INDUSTRIES OPERATING:

	Red	Orange	Green	Total
Large	11	3	5	19
Medium	3	10	13	26
Small	35	30	194	259
Total	49	43	212	304

The above table reveals that, there are 14 Large & Medium Red Category industries and 13 Large & Medium Orange Category industries and 18 Large & Medium Green Category industries located in Baikampady Industrial Area.

The major industries like petroleum refineries, Paints & Dispersions unit, petroleum products storage & distribution units, LPG storage & distribution units, Fertilizers, Iron ore Pelletization unit and New Mangalore Port are operating within the Baikampady Industrial cluster.

Presently, there are 5 major 17 Category industries located in the Baikampady Industrial cluster. The major industries presently working in this Baikampady industrial cluster are:

1. Mangalore Refineries & Petrochemicals Ltd (MRPL), Kuthethur
2. BASF India Ltd., Bala
3. Mangalore Chemicals & Fertilizers Ltd., Panambur
4. Sequent Scientific Ltd., Baikampady Industrial Area.

5. Kudremukh Iron Ore Company Ltd (Pellet Plant), Panambur.
6. GWASF Quality Castings Pvt Ltd., Plot No.136, Industrial area, Baikampady,
7. New Mangalore Port Trust (NMPT), Panambur
8. United Breweries Ltd., Baikampady Industrial Area
9. Ruchisoya Industries Ltd., Baikampady Industrial Area
10. Rajshri Packagers Pvt. Ltd., Baikampady Industrial Area
11. Blue Water Foods & Exports Pvt. Ltd., Baikampady Industrial Area
12. Kalimiya Exports, Baikampady Industrial Area
13. Total Gaz Ltd., Baikampady Industrial Area
14. Bharath Petroleum Corporation Ltd (BPCL LPG Filling plant), Baikampady Industrial Area.
15. Bharath Petroleum Corporation Ltd. (BPCL), (Coastal Installation), Near APMC Yard, Baikampady.
16. Indian Oil Corporation Limited(IOCL), Panambur
17. Hindustan Petroleum Corporation Limited (HPCL LPG Import Facility), Kuthethur
18. Hindustan Petroleum Corporation Limited(HPCL POL Terminal), Kuthethur
19. Eshwari Metal Industries, Baikampady Industrial Area.

20. M/s. Kudremukh Iron Ore Company Ltd. -Blast Furnace Unit (Previously KISCO) was established in Jan-2001 and is located within Baikampady Industrial cluster. Industry is engaged in manufacture of Pig Iron of capacity 0.2 Million Ton/Annum and Slag (By Product) of 47,000 Ton/Annum using raw materials viz Iron Ore, Limestone, LAM Coke, dolomite, Manganese. The source of drinking water Mangalore City Corporation supply and for industrial purpose water is taken from Lakya Dam at Kudaremkh mines 100 kms away through pipeline. They generate 14 KLD of sewage & dispose it through septic tank & soak pit. Trade effluent generated as D.M. Back wash, BF cooling tower discharge & Lab Washings of 10 KLD are neutralized in pit & used for dust suppression/sprinkling/gardening purpose. Underflow of Sludge thickener is transported to KIOCL (Pellet Plant) through tanker. They have provided collection tank for cooling tower and the same is recycled.

The major air pollution sources are Blast Furnace Hot Stove, Captive Power Plant, Stock House Section, and Blast Furnace Flare Section. The industry has installed wet Scrubber & Cyclone Separator as pollution control equipments. **Industry is not working since August 2009.**

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

The maps showing the geographical boundaries of the industrial cluster identified and impact zone (2 kms zone), the Drainage pattern of the cluster and location of major industries in the cluster and the surrounding villages of the impact zone are presented in **Maps I to IV**

Latitude & longitude of boundaries (East, West, North, South,) of Baikampady Industrial cluster is as follows:

Direction	Latitude	Longitude	Altitude
East	12 57.750	74 50.250	6 m
West	12 57.399	74 48.493	8 m
North	13 00.208	74 50.875	35 m
South	12 55.669	74 49.529	15 m

1.4. CEPI Score (Air, Water, Land and Total)

The Baikampady Industrial Cluster is declared as critically polluted area and stands at 32nd position with a CEPI score of 73.68. The sub index score of different environment is presented as follows:

No	Industrial area/ cluster	Air	Water	Land	CEPI	
1	Baikampady Industrial Cluster, Mangalore. (Karnataka).	61.75	57.75	54.00	73.68	Ac_Ws_Ls
Note : Ac - Air Critical : Ws - Water Severe : Ls - Land Severe						

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

The Baikampady Industrial Cluster & its 2 Km surrounding impact zone are having a total population of about 85,000. The Mangalore City is having a population of about 5, 50,000 and about 15% of the total Mangalore City Corporation area comes under impact zone. There are no major hospitals within the impact zone of industrial cluster. However, there are small hospitals attached to the industrial establishments like MRPL & NMPT to cater to emergency situation. There are no other sensitive receptors within the impact zone.

The following villages/hamlets/Mangalore city corporation wards are located within the impact zone with population.

Sl.No.	Place	Direction	Lat	Long	Population		Total	Area Limit
					Male	Female		
1	Permude	NE	74.87	13.00	3233	1557	1679	
2	Kenjar	E	74.85	12.95	4789	2335	2454	
3	Kalavar	E	75.85	12.97	1881	944	937	
4	Thokur	E	74.84	12.96	6167	3150	3017	
5	Bala	W	74.82	12.98	2924	1695	1229	
6	Kuthethoor	N	74.84	13.00	2675	1334	1341	
7	Baikampady	W	74.80	12.95	20,464	20,471	40,935	City Corporation limit (Wards)
8	Kulai	W	74.80	12.96				
9	Kuloor	E	74.83	12.92				
10	Hosabettu	NW						
11	Bangre Kuloopr	SE	74.83	12.91				
12	Tannirbhavi	SW	75.81	12.89				
13	Panambur	W	75.81	12.93				
Total					42,133	31,486	73,619	

There are 6 small hospitals (having bed strength less than 100) and 54 Primary/High Schools located within the impact zone.

1.6. Eco-geological features:

There is one mangrove area located near Jokatte (within the industrial cluster).

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

The River Gurupura passes from South east to South boundary of the Baikampady Industrial Cluster & Joins Arabian Sea about 4 KM away from the cluster boundary. The width of the river Gurupura is about 200-250 meter & depth is about 7-10 meter. A small pond located in the Kulai village which lies in impact zone and is used for small fishing activity.

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

No Ecological parks, Sanctuaries are located in the cluster & impact zone. Some peacocks are seen in the Baikampady Industrial Cluster and there is one mangrove area located near Jokatte which lies within the impact zone.

Mangrove area near Jokatte

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

There are no buildings / monuments of historical importance or any structures of archeological importance within the industrial cluster & impact zone. However, a small ancient temple (Nandaneshwar Temple) is located beside New Mangalore Port Trust (NMPT) within the Baikampady Industrial Cluster. St.Antony's Church is located at Kulur (within impact zone).

1.7. Industry classification and distribution (no. of industries per 10sq. km area or fraction)

1.7.1. Highly Polluting industries (17 categories)

Sl.No.	Name & Address of industry	Type
1	BASF India Ltd., Bala Village, Surathkal, Bajpe Road, Mangalore	Dyes and Dye intermediate
2	Kudremukh Iron Ore Company Ltd.(KIOCL), Panambur, Mangalore	Integrated Iron and Steel
3	Mangalore Chemical & Fertilizers Ltd(MCF), Panambur, Mangalore-575010	Fertilizer
4	Mangalore Refinery & Petrochemicals Ltd.(MRPL), Kuthethur, Via Katipalla, Mangalore	Petrochemical
5	Sequent Scientific Ltd. (formerly Strides Arcolab Ltd.), Plot No.120 A & B, Baikampady Industrial Area, Mangalore	Basic Drugs and Pharmaceutical manufacturing

1.7.2. Red category industries (54 categories)

There are 16 Large Red category industries viz. Edible Oil Refinery, Foundry, Port, Pig iron, Brewery, Fish processing, Petroleum & LPG storage plants located in the Baikampady Industrial cluster and list of such industries are given below:

Sl.No	Type of Industry	No of industries
1	Petroleum & LPG storage	6
2	Edible oil refinery	2
3	Foundry,	1
4	Heavy Engineering	2
5	Port	1
6	Pig Iron	1
7	Fish processing	2
8	Brewery	1

	Total	16
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Apart from this 38 Medium/Small Red category industries (mostly powder coating, chemicals, Lime, foundry, galvanizing, paint formulation etc) are located in the cluster area.

1.7.3. Orange and Green category industries

There are 255 Orange & Green category industries. Most of them are engaged in engineering, fabrication, pulverizing, plastic product, plywood, vehicle serving, edible oil packing, concrete blocks & interlock etc.

The total number of industries operating in the cluster is given in the table below

Size	Orange	Green
Large	3	5
Medium	10	13
Small	30	194
Total	43	212

1.7.4. Grossly polluting industries (Industries which discharge BOD load more than 100 kgs/day in to water bodies):

Nil

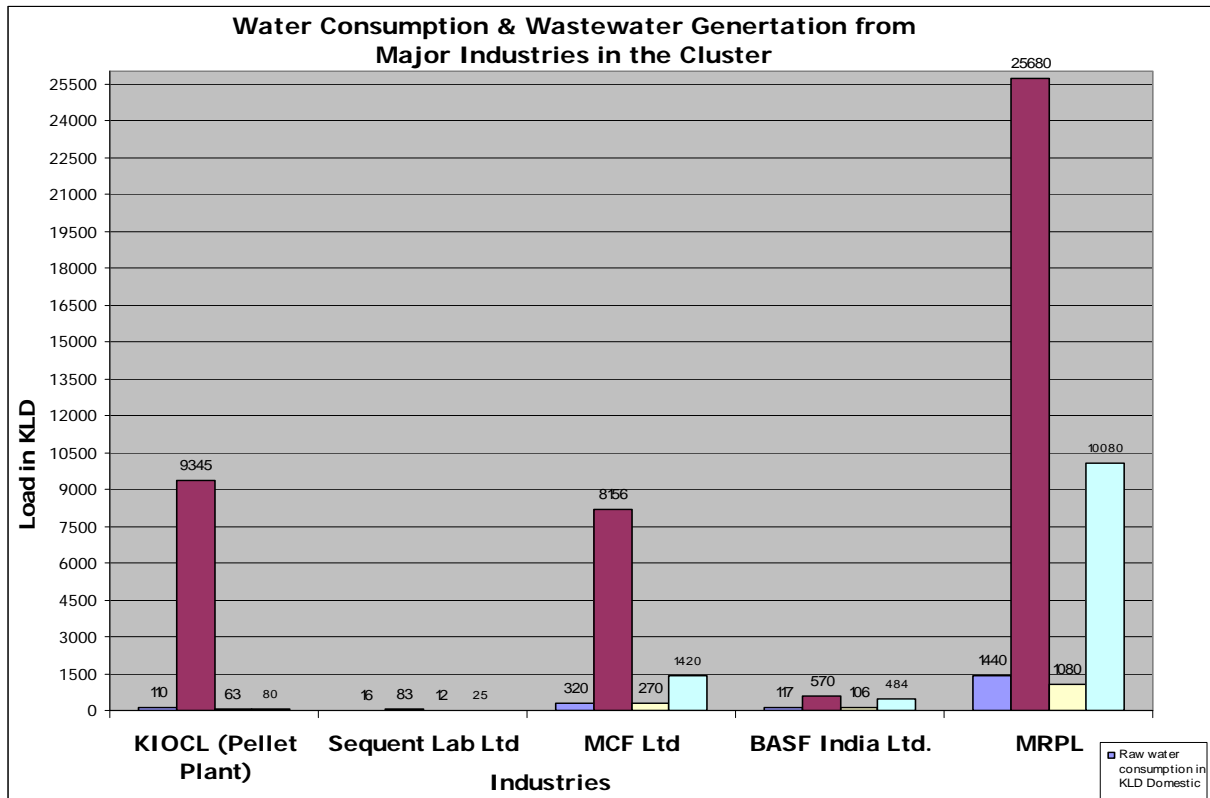
2. WATER ENVIRONMENT

2.1. Present Status of Water Environment

The quantity of water used and waste water generated from 17 category industries located in the cluster are presented below in the form of Table and Bar charts.

Name of Industries	Type	Raw water Consumption in KLD		Waste Water Generation in KLD	
		Domestic	Industrial	Sewage	Trade Effluent
MRPL	Petrochemical	1440	25680	1080	10080
BASF India Ltd.	Dyes and Dye intermediates	117	570	106	484
MCF Ltd	Fertilizer	320	8156	270	1420

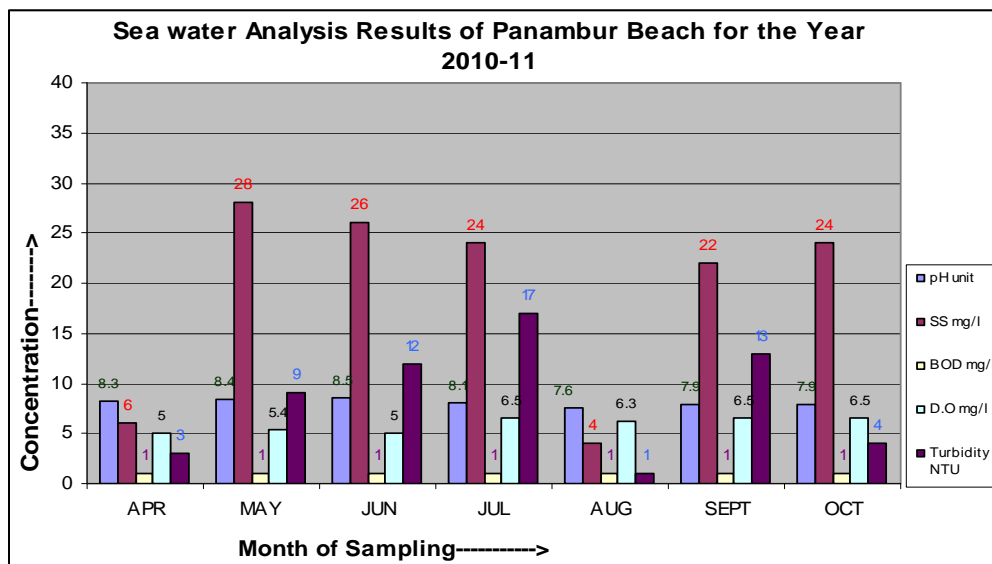
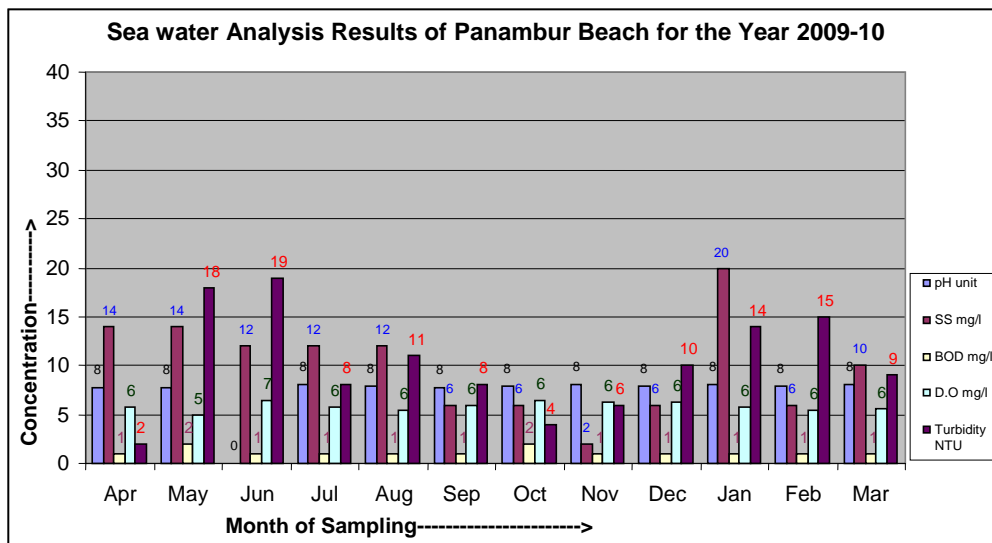
Sequent Scientific Ltd.	Basic Drugs and Pharmaceutical manufacturing	16	83	12	25
KIOCL (Pellet Plant)	Integrated Iron and Steel	110	9345	63	80

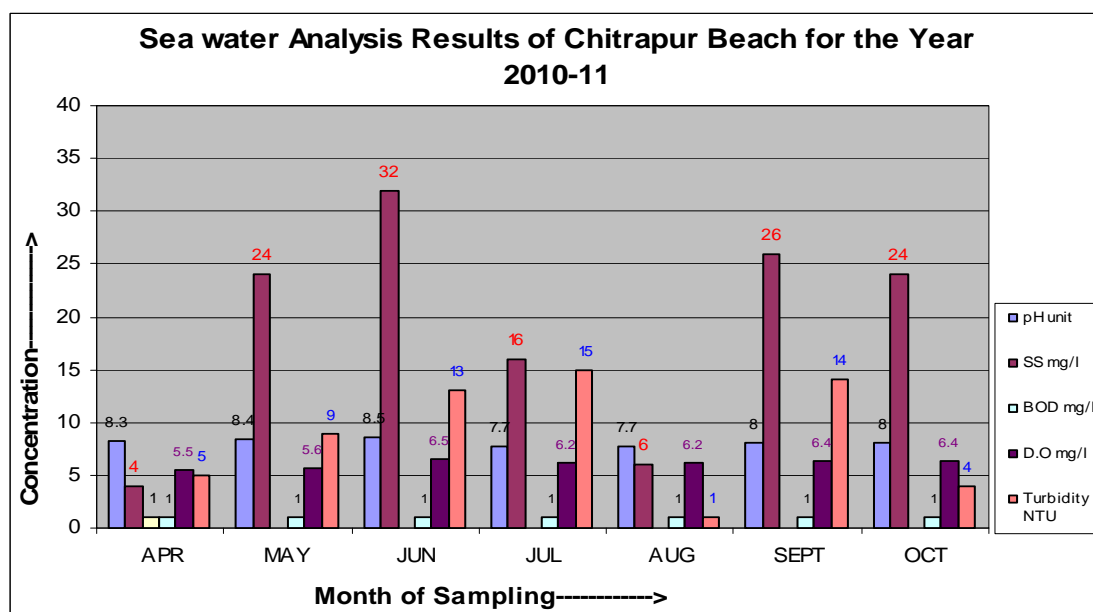
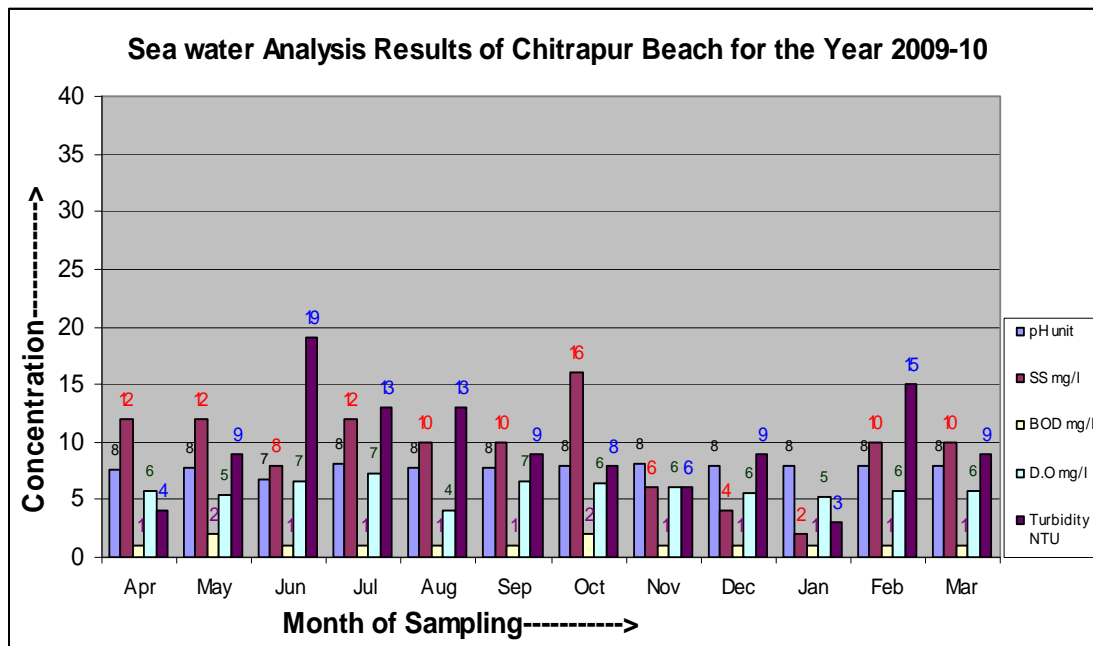


In the case of BASF treated effluent contains high Total dissolved solids (TDS) & discharging the same through lined pipe and diffusers into Arabian Sea at about 1400 m from Chitrapura Seashore. MRPL is also discharging treated effluents through lined pipe and diffusers into Arabian Sea at about 650 meter from Chitrapura seashore. Seawater monitoring around effluent discharge points is carried out by individual industries through external agencies. Due to the lack of infrastructure KSPCB is not monitoring at the said discharge points. Part of untreated sewage joins the Arabian Sea at few locations. The parameters chosen for the analysis are very limited, but however the parameters are chosen on the basis of conditions stipulated by the Board to monitor water quality.

MRPL Pumping Station-to pump treated trade effluent into Sea

KSPCB is collecting samples at the shore regularly viz at Panambur beach and Chitrapura beach to monitor the sea water quality; in addition KSPCB is interacting with Central institutions like Central Marine Fisheries Research Institute, National Institute of Technology, Karnataka, College of Fisheries & other Government agencies to understand the variations of sea water quality. It has been observed that there is no major change in Sea water quality. KSPCB is analyzing sea water sample at Panambur & Chitrapura beach every month and the results of 2009-10 and 2010-11 period are presented below in the form of Bar charts. Location of sampling points of sea water is indicated in **Map-V**.





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

No industries in the cluster are discharging effluent into surface water bodies. MRPL and BASF are discharging treated effluents through lined pipe and diffusers into Arabian Sea. However a small portion of untreated sewage generated in Mangalore city area joins the Arabian Sea.

2.1.2. Present levels of pollutants in water bodies/effluent receiving drains/ground water (routine parameters, special parameters and water topics relevant to the area in three categories-known carcinogens, probable carcinogens and other toxics):

The KSPCB is monitoring only parameters mentioned as per consent conditions arrived on the basis of the chemicals handled, process & technology used and other technical inputs specific to the industry. Central Pollution Control Board & Ministry of Environment & Forest have not specified any carcinogenic and toxic parameters for discharge of effluents into the receiving bodies. The monthly analysis reports of bore wells and open wells collected in the Baikampady Industrial Cluster are presented in **Annexure-I**. Location of sampling points are indicated in Map- V.

2.2. Sources of water pollution

2.2.1. Industrial:

At present both MRPL & BASF are discharging treated trade effluents using properly designed marine outfall system into Arabian Sea. Most of major industries have adopted water conservation measures and maximized the recycling of treated waste water. The other industries located within the industrial cluster are treating the waste water generated to a quality for usage in landscaping and other non potable uses.

2.2.2. Domestic:

A small portion of untreated sewage generated in Mangalore City Corporation limits joins Arabian Sea at few locations.

2.2.3 Others:

Non point sources from the agriculture fields, human activities, etc.

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

There is no proper drainage system (storm water drains) for surface runoff within the industrial cluster area and the adjacent area. Since the topography of the area is sloping towards the river course, the storm water/surface runoff flow towards the Gurupur River through nalas /other natural drains. It has been observed that it does not accumulate inside the industrial area, nor having any impact on the Gurupur water course.

2.3. Details of Water Polluting Industries in the area/cluster

There are 9 significant water polluting industries located in the Baikampady cluster area and the details are as given below:

Sl No	Name of Industries	Type of unit	Main Raw materials	Products
1	MRPL	17 Category	Crude Oil.	Processing crude oil to produce petroleum products.
2	BASF India Ltd.	17 Category	Acrylamide, Acticide MV, Ammonia Liquor, Dowfax, Ethyl Acrylate, Formaldehyde, Hydrogen Peroxide, Methacrylamide, Methyl Acrylate, Methyl Methacrylate, Sodium Bisulphite, Sodium Lauryl Sulphate, Butylacrylate, Styrene Monomer	Dyes and Polymer dispersions
3	MCF Ltd	17 Category	Naphtha, Fuel Oil, Ammonia, Phosphoric Acid, Muriate Of Potash, Sulphur	Urea, Di-ammonium Phosphate, Ammonia, Sulphuric Acid, ammonium bicarbonate
4	Sequent Scientific Ltd	17 Category	Different types of chemicals and solvents.	Bulk Drug, Specialty Chemicals, drug intermediates, ARV's & Anti malaria drug
5	KIOCL (Pellet Plant)	17 Category	Iron Ore, NaoH, Limestone, Bentonite, Coke.	Iron oxide Pellets
6	New Mangalore Port Trust	Red Category	Exporting/importing of various cargos through ships.	Handling cargos like petroleum products, iron ore, coal, fertilizer, granite, fish, etc.
7	United Breweries Ltd.,	Red Category	Malt, maize & sugar.	Beer
8	Ruchi Soya Industries Limited,	Red Category	Crude edible oil, phosphoric acid, bentonite.	Refined edible oil
9	Rajshree Packagers Limited,	Red Category	Crude edible oil, phosphoric acid, bentonite.	Refined edible oil

2.4. Effluent Disposal Methods

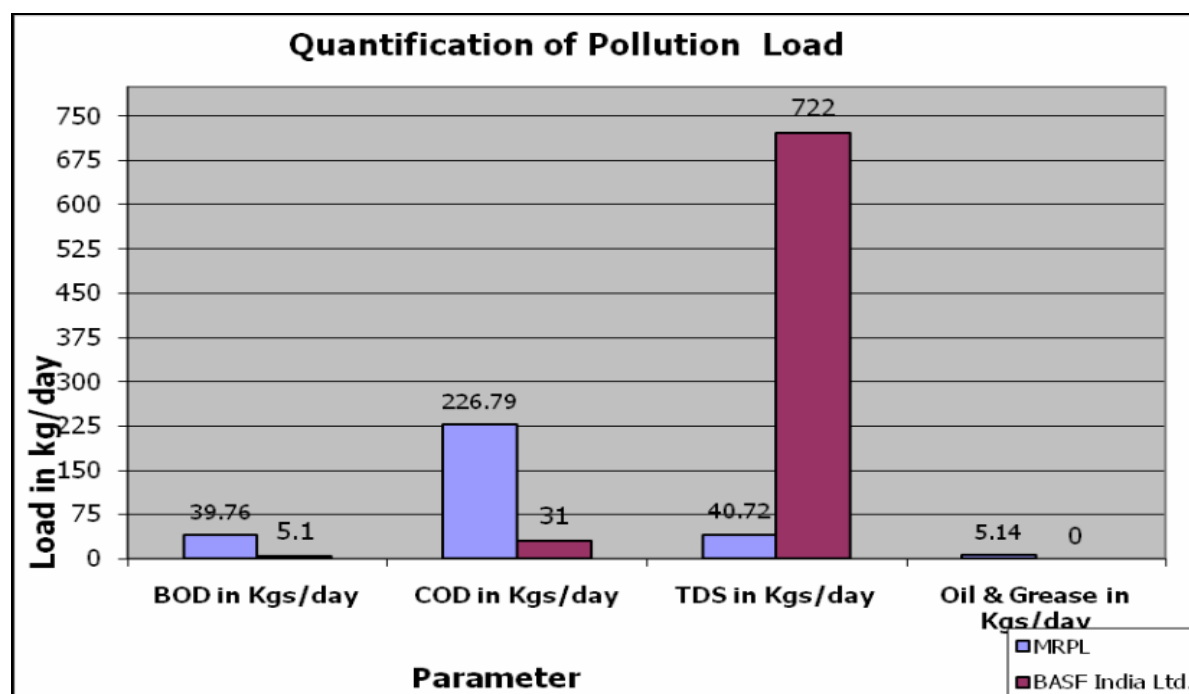
In case of BASF treated effluent contains high Total dissolved solids (TDS) & discharging the same with lined pipe and diffusers into Arabian Sea at about 1400 mts from Chitrapura Seashore. MRPL is discharging the treated effluent with lined pipe and diffusers into Arabian Sea at about 650 mts from Chitrapura seashore. The other industries have provided adequate waste water treatment systems to bring the treated effluents to a quality so as to be used in the process or for other non-portable uses.

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

Load calculated based on quantity & quality of treated waste water discharged is presented in Table and Bar chart below:

Name of industry	Year	BOD in Kgs/day	COD in Kgs/day	TDS in Kgs/day	Oil & Grease in Kgs/day
MRPL	2009-10	39.76	226.79	40.72	5.14
BASF India Ltd.	2009-10	5.1	31	722	---

Bar Chart



The requirement of water for different purposes and the Quantity of waste water generated from the industries located in the Baikampady industrial cluster are as presented in **Annexure - II**

2.6. Action Plan for compliance and control of pollution.

2.6.1. Existing infrastructure facilities-water quality monitoring network, ETPs, CETPs, Sewerage Treatment Plant of industry(STPs), surface drainage system, effluent conveyance channel/out falls in respect of the individual industries:

In the cluster area as part of consent requirements industries are carrying out effluent quality monitoring at the waste water treatment level and water quality at the outfall / receiving end. KSPCB also monitors the effluent quality at the industry as well as water quality of receiving streams under different schemes. The parameters chosen for monitoring is very limited to understand the impact of discharges at the micro level without monitoring specific carcinogens and toxins. The STPs and ETPs are monitored by the industry themselves, and the performance details are being submitted to the Board. There is no proper surface drainage system and there is no systematic monitoring of storm water quality.

As regards to the monitoring at marine disposal points both M/s. BASF India Ltd. & M/s Mangalore Refineries & Petrochemicals Ltd. (MRPL) are monitoring the Sea water quality through College of Fisheries/CMFRI, Mangalore. The monitoring is carried out at different locations around marine outfall as suggested by NIO, Goa and approved by the Board. Sample monitoring data with parameters monitored for M/s BASF and M/s MRPL are enclosed as **Annexure – III**. The Board will conduct random check on the monitoring protocols once in a quarter. Board monitors the performance of ETP in other industries and checks the quality of treated effluent regularly. Board regularly monitor STP of Mangalore City Corporation.

2.6.2. a. Pollution control measures installed by Major Industries:

Salient features of pollution control measures installed by major industries are presented in the Table below and the details are presented in **Annexure - IV**

Sl No.	Name of Industries	Type	Treatment system Provided **
1	MRPL	Processing crude oil 12.5 MTPA	Primary treatment with oil separators, activated sludge process & tertiary treatment
2	BASF India Ltd.	Dyes, dispersion, synthetic chemicals & CED emulsion 287.5 MTPA.	Physico-chemical treatment, activated sludge process.
3	MCF Ltd	Urea, Di-ammonium Phosphate, Ammonia, Sulphuric Acid, ammonium bicarbonate	Tertiary treatment for trade & activated sludge treatment for sewage

4	Sequent Scientific Ltd	Bulk Drug, Specialty Chemicals, drug intermediates, ARV's & Anti malaria drug 287.5 MTPA.	Primary, activated sludge & tertiary treatment.
5	KIOCL (Pellet Plant)	Iron oxide Pellets of 4 million Tones/annum.	Primary & tertiary treatment.
6	New Mangalore Port Trust	Port	Primary, activated sludge & chlorination.
7	United Breweries Ltd.	Brewery	Primary, anaerobic, activated sludge & tertiary treatment.
8	Ruchi Soya Industries Limited	Edible oil Refinery	Primary, activated sludge & tertiary treatment.
9	Rajshree Packagers Limited	Edible oil Refinery	Primary, activated sludge & tertiary treatment.

** For details refer Annexure-III.

MCF - Advanced waste water treatment system

ULTRA FILTRATION UNIT

REVERSE OSMOSIS UNIT

b. Pollution control measures installed by small scale industries:

Out of 35 registered small scale industries under Red category 33 have provided treatment plants and most of them are using the treated waste water for gardening. Two industries generate very small quantity of waste water (one battery manufacturing unit and another electroplating unit). The Board has directed units to provide required treatment facility by end of March 2011. The details of pollution control measures installed by small scale industries located in Baikampady Industrial Area are given in **Annexure-V**.

c. Status of the fish processing units:

- There are 5 fish processing units (only washing and freezing activity) are operating within industrial cluster and all have provided required treatment facility.
- There are 17 Fish-meal & Oil manufacturing industries located within 20 km from the Impact Zone. Out of 17 units, 3 units are located at Mukka, 8 km away from the Impact Zone. One of them has installed treatment facility and other 2 are constructing ETP which are proposed to be Commission by the end of December 2010. The remaining 14 units are located at Kotepura- Ullala & construction of CETP is under progress and proposed to be commissioned by the end of March- 2011. The details of **Common Effluent Treatment Plant (CETP) for fishmeal & fish oil plants at Ullal are follows:**

14 Fish Meal & Oil Manufacturing industries are located at Kotepur-Ullal beach and they are jointly establishing a Common Effluent Treatment Plant of capacity 600 KLPD. Land of about 1902.29 square meters has been allotted by the Government to the Association on 30 years lease basis. Also all the 14 of Fish meal & oil manufacturing industries covered under CETP project have obtained CRZ clearance.

The details of 14 industries are as follows:

Sl No	Name of the industry	Fish Processing Capacity in TPD	Expected effluent to CETP
1	Ullal Fish Meal & Oil Company	60	Sewage – 5.6 KLD & Trade-571 KLD.
2	Span Aquatic	120	
3	Indian Fish Meal & Oil Company	80	
4	Marine Enterprises	100	
5	Mangalore Marine Products	120	
6	Sherif Marine Products	100	
7	Asian Meal & Oil Company	80	
8	Indo Fish Meal & Oil Company	80	
9	Mangalore Fish Meal & Oil Company	80	
10	Super Aqua-tech	60	
11	Fahad Fish Meal & Oil Company	120	
12	United Marine Products	120	
13	Mangalore Sea Products	120	
14	S. M. Marine Products	120	

Proposed units of CETP:

Sl No	Description	Volume in KL	Size in meters
1	Bar Screen, Grit Chamber cum Oil Catcher	1.5	0.5 x 3.0 x 1.5
2	Receiving Sump	45	Dia 5.0 x 3.0
3	Neutralization Tank	5	2.0 x2.0 x 1.5
4	Anaerobic Digester Tank	3000	Dia 28.0 x 5.0

5	UASBR	1200	Dia 18.0 x 6.0
6	Aeration Tank with diffused aeration	2160	20.0 x 30.0 x 4.0
7	Secondary Settling Tank	100	Dia 8.0 x 3.0
8	Clarified Tank	120	10.0 x 5.0 x 3.0
9	Pressure Sand Filter	30	Dia 1.2 x 1.5

The final treated trade effluent is proposed to be discharged to the sea located adjacent to the CETP. Also 50 KVA DG Set is proposed to ensure continuous operation of CETP.

Board has issued CFE to the CETP project during June 2010 with condition to commission the CETP before 31-03-2011.

Progress of CETP, Ullal

d. Pollution control measures installed by Municipal City Corporation, Mangalore:

Mangalore City Corporation consists of 60 Wards with an extent of more than 132 Square Km. The Population of the city corporation is about 5.5 lakhs. Drinking water sources are river Netravathi and Bore wells. Water Supply Details

Water connection details	Number of connections	Demand for water in MLD
Residential	62922	73
Other than house hold	3828	15
Building construction	1218	6
Multi storied buildings	805	10
Commercial	686	18
Industrial	2	--
Public taps, Free water supply (schools, temples,etc)	5300	13
Total		135

Mangalore City Corporation has taken up the work of covering the entire area with underground drainage system under the ADB financed KUDCEM scheme. The sewage generated from the entire city is proposed to be collected and treated at four STPs viz. Kavoor 43.5 MLD, Pachchanadi 8.75 MLD, Surathkal 16.5 MLD and Jeppina Mogaru 20 MLD. Out of the four one treatment unit at Kavoor has been commissioned and the remaining three will be operational by December 2011. Further the secondary treated sewage from Pachchanady STP will be utilized by Pilikula Nisargadhama (600 acres) after tertiary treatment for various secondary uses. The tertiary unit is ready at Nisargadhama. The

secondary treated sewage from other three STPs are proposed to be utilized by MSEZ.(1638 acres) after tertiary treatment.

Aerial view of the newly constructed STP at Kavoor

2.6.3. Technological Intervention

2.6.3.1. Inventorisation of prominent industries with technological gaps:

Many industries have carried out water audit & they have prepared strategies to reduce water consumption. Some of the industries have indicated to install advanced waste water treatment technique to produce better quality of treated waste water so as to enhance the quantity of reuse thereby leading to the reduction in waste water load to the receiving stream. However detailed study will be undertaken to identify technological interventions needed to ensure better compliance.

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

Advanced cleaner technologies proposed by the individual industries are presented below. However detailed study will be undertaken for identification of new areas for adoption of cleaner technology within the cluster.

- MRPL proposes to install R.O system as well as Condensate Recovery Plant to reduce fresh water consumption.
- MCF Ltd has commissioned advanced waste water treatment system like RO, UF so as to reduce the fresh water consumption and leading to zero discharge.
- Sequent Scientific Ltd proposes to install UV Filtration system as a tertiary treatment for recycling treated water for secondary purposes.
- KIOCL has proposed to upgrade their existing STP and also to install treatment system for the effluent generated from De-sulphurisation plant (Captive Power Plant).
- Rajashri Packagers Pvt. Ltd has proposed to install an Activated Carbon filter to improve the quality of effluent.
- Blue Water Foods & Exports has proposed to install Activated Carbon filter, Diffused Aerator, DMF and Sludge pump for their ETP, thereby improving the quality of treated water.

2.6.4. Infrastructure renewal

2.6.4.1. Details of existing infrastructural facilities:

KSPCB has established a Laboratory at Mangalore Office headed by a Senior Scientific Officer with 4 supporting staff to carry out analysis of samples collected. The laboratory is having minimum instruments to analyze the parameters as specified in the consent conditions.

The Regional Office is headed by Environmental Officer with 2 technical staff & 2 supporting staff for inspection of units, monitoring & collection of samples, issue of consents, etc. In addition one Senior Environmental Officer of KSPCB is stationed at Mangalore to supervise the functions of Regional Office, lab and also to monitor the compliance of the major industries.

The Baikampady industrial cluster has infrastructure such as
Water supply from Mangalore City Corporation from the river Netravati.
Well connected Roads of 14 Km in length
Open storm water drains of about 20 Km.

Apart from these a Post office, Telephone exchange, Fire station, Police station, Bank, School, ESI dispensary & Canteen are functioning in this cluster area.

2.6.4.2. Need of up gradation of existing facilities:

- The number of industries has increased within the cluster area over last few years and likely to grow. Hence manpower both for administration and laboratory of KSPCB, Mangalore has to be strengthened and trained.
- The parameters chosen for computation of CEPI sub index for water environment include known carcinogens, probable carcinogens & other toxins. It is therefore necessary to upgrade the present KSPCB laboratory Mangalore by installing high precision instruments to analyze the parameters at micro level.
- The laboratory staff needs to be trained for the use of advanced & sophisticated equipments and for monitoring & analysis. There is an urgent need to possess boats with all necessary equipments for monitoring in river & sea at different depths.
- NMPT receives lot of vessels for transporting crude & finished refinery products & at present, there is no full fledged system for handling spillage of oil & other hydrocarbons. It is therefore necessary to establish a task force with required man power & equipments.
- Adequate storm water drains are to be provided besides renovating existing storm water drains within Baikampady industrial area by KIADB authorities.
- The existing service roads inside the Baikampady industrial area have to be repaired and maintained.

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

In the industrial cluster under consideration there are drains which are not properly lined leading to the siltation & requires regular maintenance.

2.6.4.4. Construction of lined drains/connections:

The drains within the industrial cluster area are not properly connected and also not laid for the entire cluster area. Therefore there is a need to do the lining first & if required covering can be done at certain places. These drains have to be connected properly taking advantage of elevation so that the storm water reaches the river without any accumulation.

2.6.4.5. Treatment and management of contaminated surface water bodies:

No industry located in the industrial cluster discharges waste water in to adjacent Gurupur River. Since the impact zone does not have proper UGD system there may be an issue of fecal contamination due to discharge of untreated sewage. The Mangalore City Corporation is in the process of providing UGD for the entire city for the collection of sewage & also proposing to install more sewage treatment plants.

2.6.4.6. Rejuvenation/Management Plan for important eco-geological features:

The situation does not warrant for rejuvenation.

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

The industries located in non-industrial location have provided adequate treatment units and presently they are not discharging to sewerage/surface drains.

2.6.4.8. Installation of Gen sets at CETPs.

There are no CETPs in the cluster area.

Impact on CEPI score after installation of full fledged water pollution control systems:

WATER ENVIRONMENT

A1 = 4.00	A2 = 5.00		(A1x A2 = A) A = 20.00
B1 = 3.00	B2 = 0.00	B3 = 0.00	(B1+B2+B3=B), B = 03.00
C1 = 3.00	C2 = 2.00	C3 = 0.00	(({C1xC2})+C3=C), C = 06.00
D = 5.00			D =05.00
			(A+B+C+D = TOTAL = 34.00

Justification:

- The presence of carcinogens is not critically high, as none of the industries in the cluster produce them as end-products and if present, are only as process intermediates (factor: A1).
- Post-implementation of Action Plan, the ambient pollution concentration will reduce as the pollutants have been reduced at their source (factor: B1) and consequently reduce the level of exposure (factor: C2).
- MRPL is in the process of modifying the existing Effluent Treatment Plant with addition of R.O system, as well as a Condensate Recovery Plant to reduce fresh water consumption and recycle water after treatment.
- MCF Ltd has operationalised a Zero Effluent Discharge system to reduce fresh water consumption and do not discharge into any of the local water bodies.
- Sequent Scientific Ltd has introduced UV Filtration system for STP and also recycles treated water for use in Cooling Towers.
- KIOCL has proposed to upgrade their existing STP and also to install treatment system for the effluent generated from De-sulphurisation plant (Captive Power Plant).
- Rajshri Packagers Pvt. Ltd has installed an Activated Carbon filter to improve discharge water quality and Rain Water harvesting system to feed the boiler, in order to reduce fresh water consumption.
- Blue Water Foods & Exports has proposed to install Activated Carbon filter, Diffused Aerator, DMF and Sludge pump for their ETP, thereby improving the quality of treated water.
- As a result of the proposed installation of pollution control measures, such as ETPs, STPs and technological up gradation of existing facilities, the Additional Risk Factor (factor: D) will thereby reduce.
- The rest of the factors that contribute to the CEPI sub-index score remain unchanged.

2.6.5. Managerial and Financial aspects.

2.6.5.1. Cost and time estimates

Approximate cost for infrastructure, monitoring equipments, etc is incorporated as **Annexure-VI**. The total amount required Rs.180.3 Lakhs.

2.6.5.2. Identified Private/Public sector potential investors and their contribution / obligation:

Appropriate agencies will be identified after finalization of action plan.

2.6.5.3. Government Budgetary support requirement:

Finalized action plan will be submitted to Government seeking financial support wherever necessary.

2.6.5.4. Hierarchical and structured managerial system for efficient implementation:

KSPCB will oversee the implementation of finalized action plan.

2.6.6. Self monitoring system in industries (ETPs etc.)

KSPCB has prescribed conditions in the consent being issued to major red category industries for carrying out self monitoring through environmental cell set up within the industry. Major industries have set up on- line monitoring facilities. Board is also encouraging industries to establish ISO 14001 (EMS). The lists of major industries in the cluster having ISO 14001 (EMS) are as follows.

Sl No.	Name of Industries
1	MRPL, Kuthetor, Mangalore.
2	BASF India Ltd. Bala, Mangalore.
3	MCF Ltd, Panambur, Mangalore.
4	Sequent Scientific Ltd Baikampady Industrial Area, Mangalore.
5	KIOCL (Pellet Plant), Panambur, Mangalore.

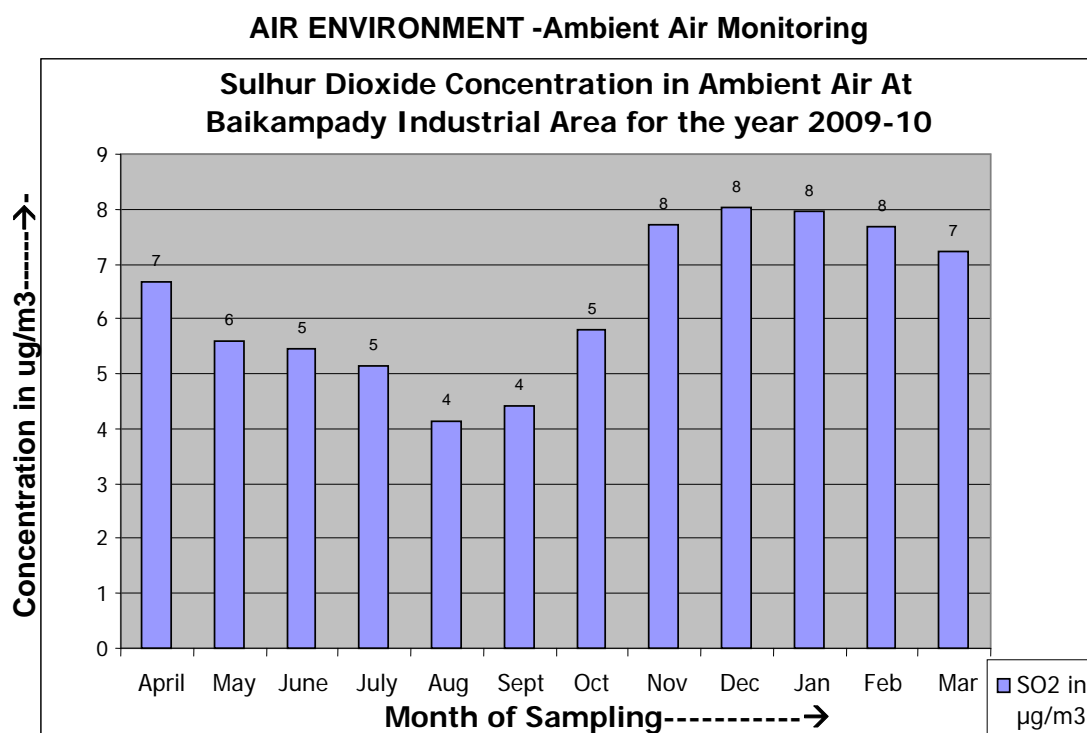
2.6.7. Data linkages to SPCB/CPCB (of monitoring devices):

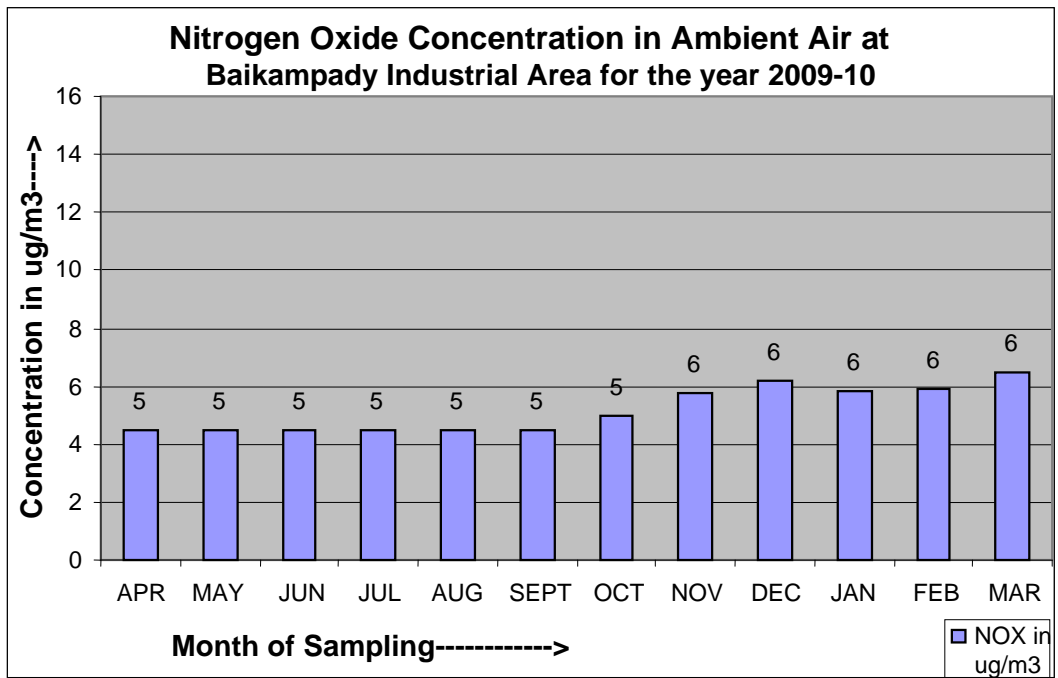
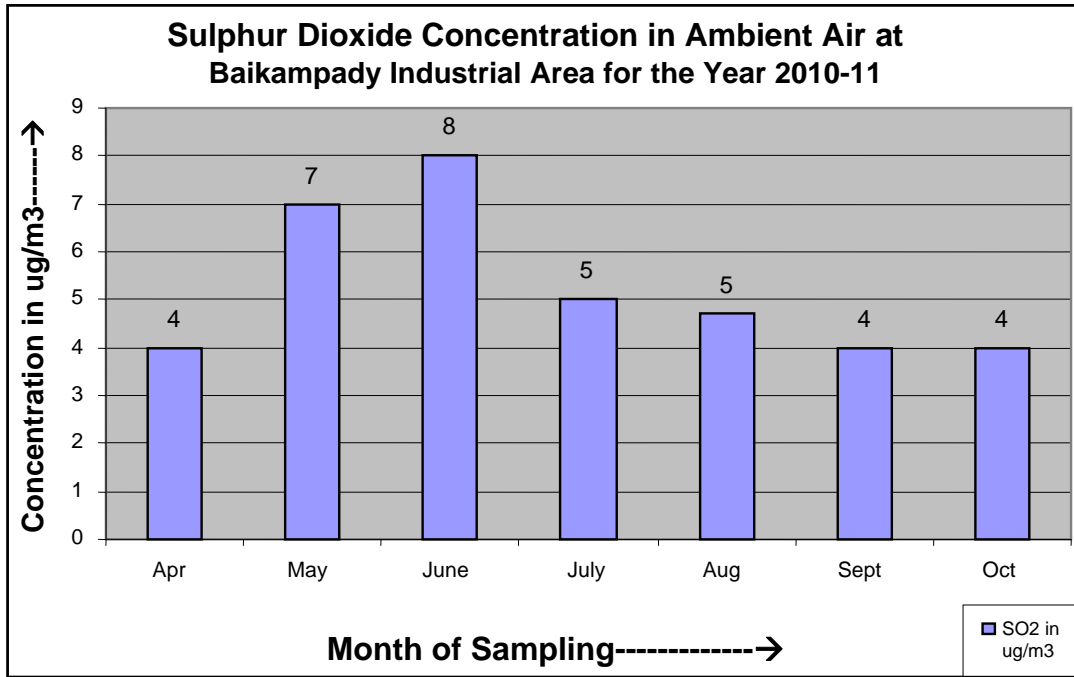
At present industries are submitting the reports of analysis regularly at prescribed intervals both in soft/hard copy form. The data available with KSPCB is shared with CPCB as & when required. KSPCB has already initiated discussions with major industries to transfer the monitoring data on a real time basis on-line to local KSPCB Office which is already having a linkage with Head Office at Bangalore. MCF is already entering the daily average result of SO₂ emissions from sulphuric acid stack in their web site <http://www.mangalorechemicals.com>.

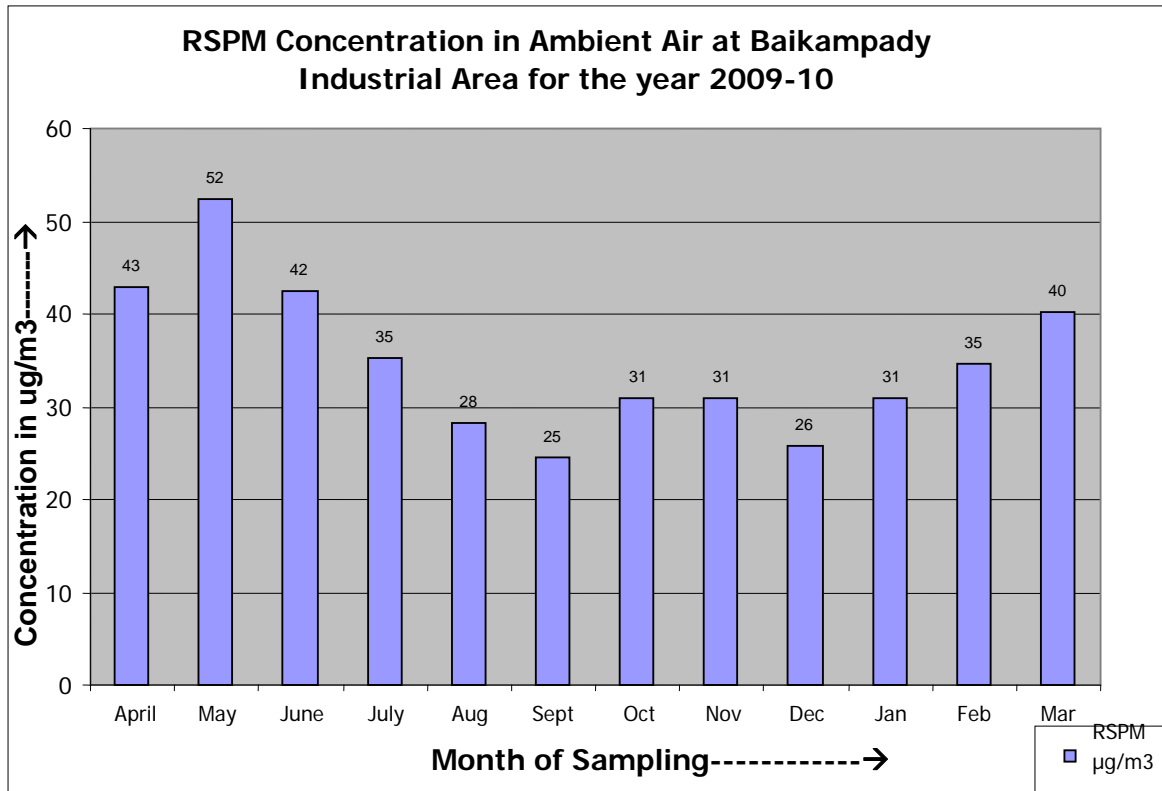
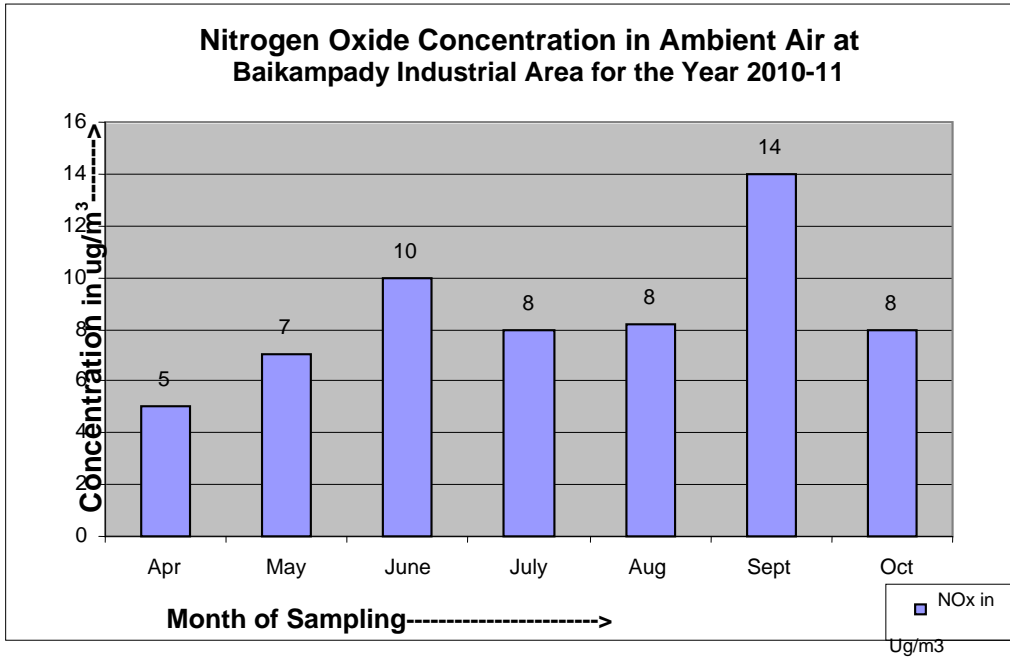
3. AIR ENVIRONMENT:

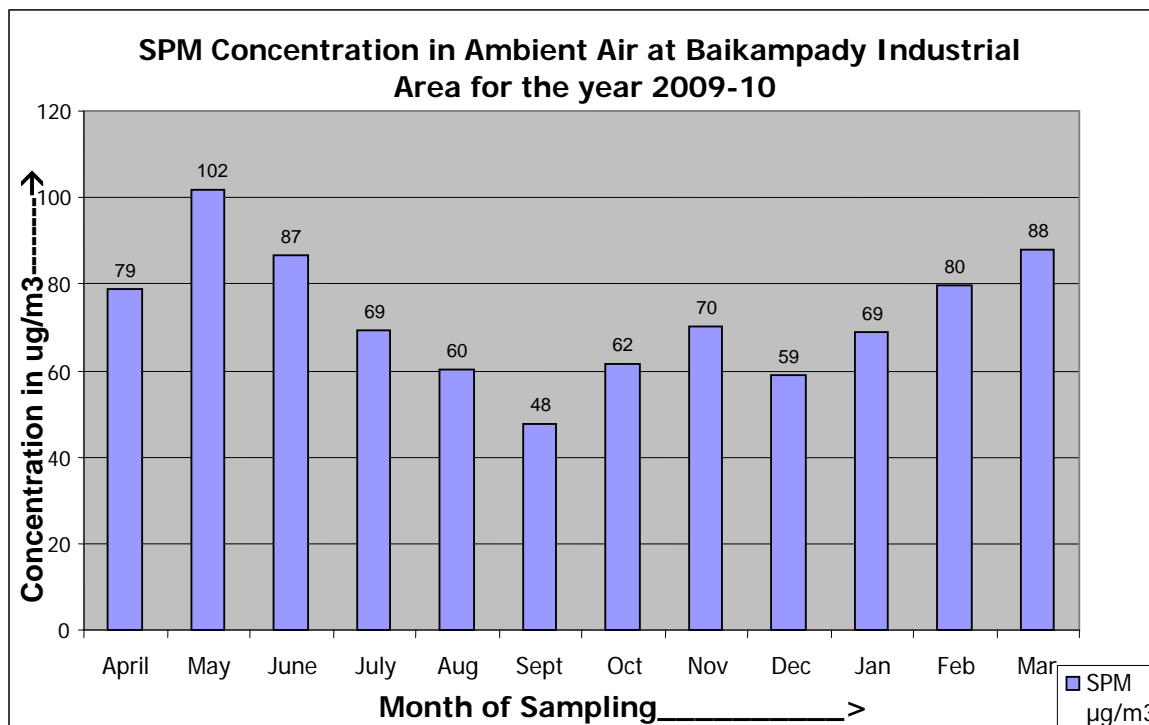
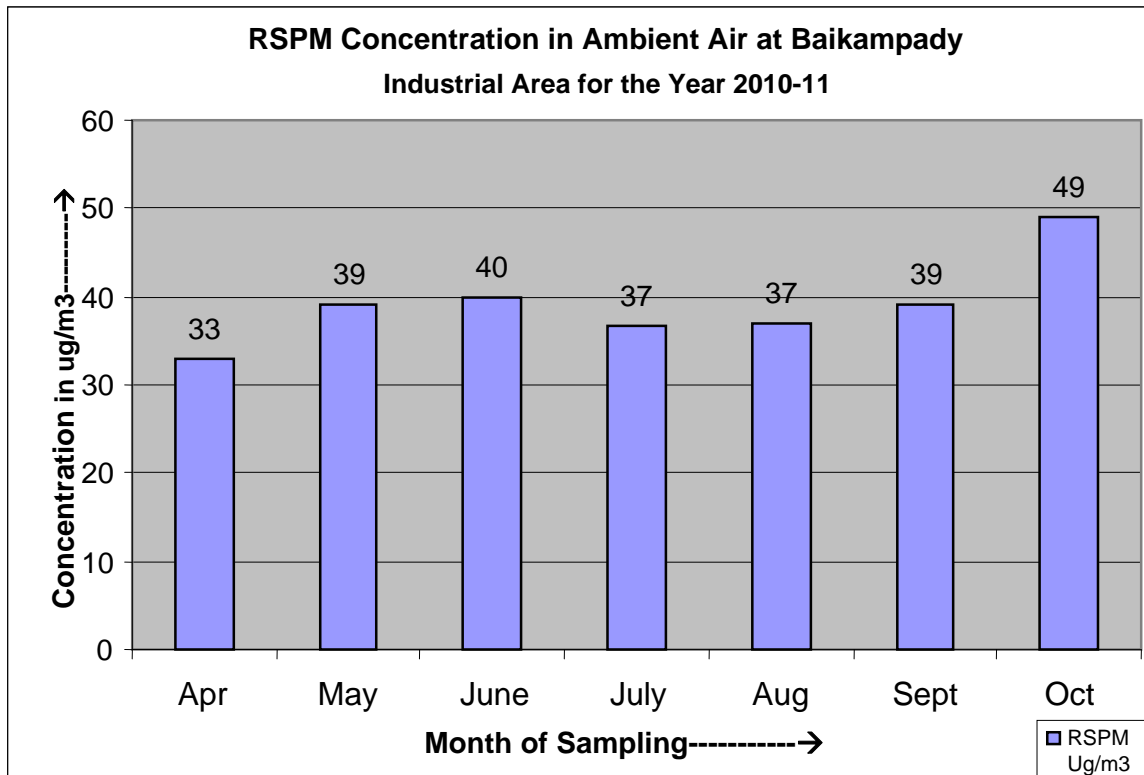
3.1. Present status of Air environment supported with minimum one year analytical data:

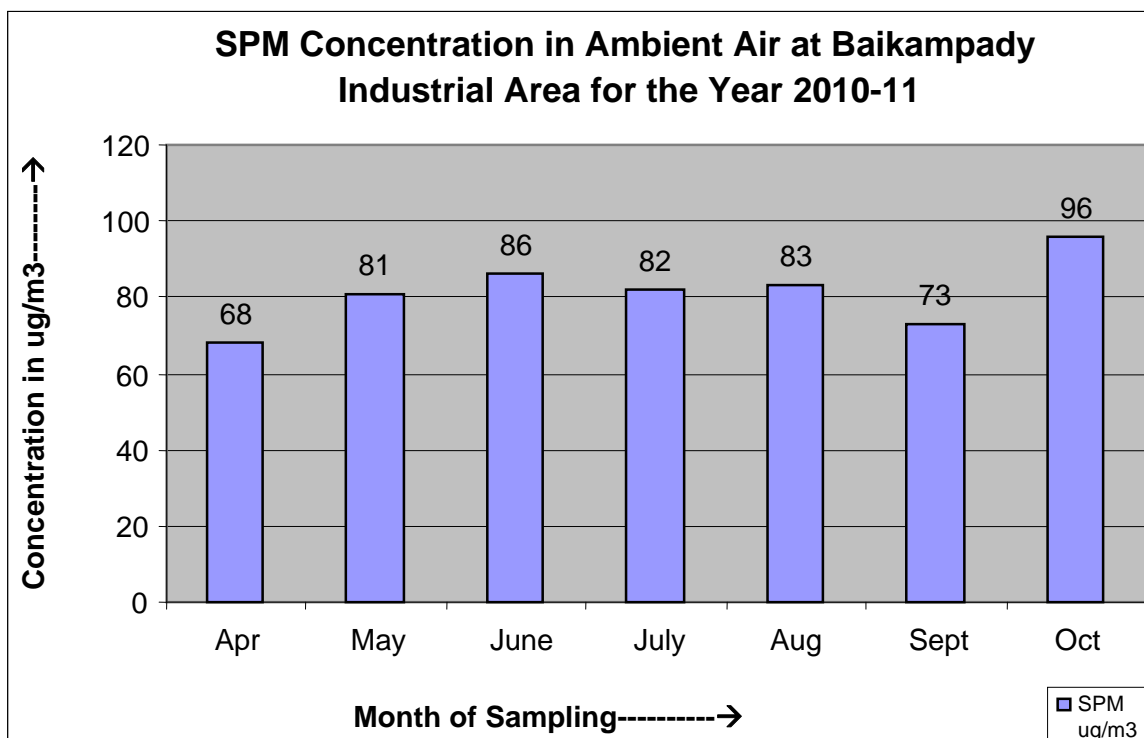
The major air pollutants monitored in the industrial cluster are SPM, CO, CO₂, SO₂, NO_x, NH₃, VOC as per the earlier norms specified for Ambient Air Quality. All the industries have provided required chimney height and other air pollution control measures to control the emissions at the source itself. Karnataka State Pollution Control Board (KSPCB) is also monitoring Ambient Air Quality in the Baikampady Industrial Area under NAAQM Programme. The results of 2009-10 and 2010-11 periods are presented in the form of Bar chart shown below. Based on the data it can be observed that, the ambient air quality is well within the standards specified.











3.1.1. Critical locations for air quality monitoring:

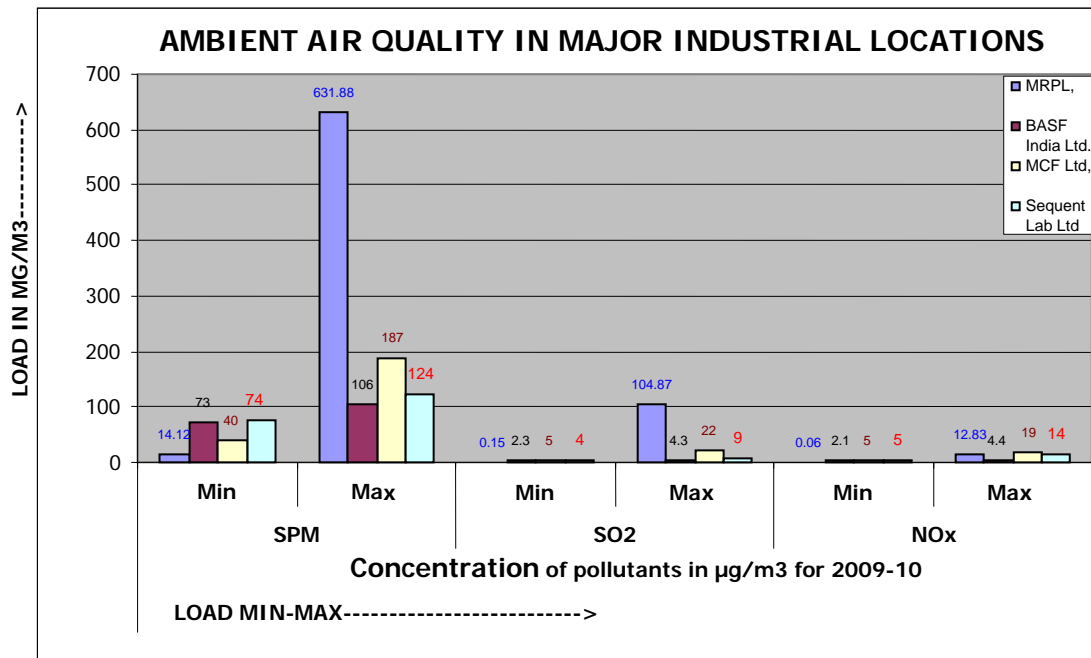
As per the earlier norms of the Ambient Air Quality Monitoring is being carried out within the industrial cluster. Based on the meteorology the critical locations for ambient air quality monitoring lies within the industrial premises viz MRPL, MCF and NMPT.

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

The routine parameters as specified in NAAQM are measured manually in Industrial cluster & it indicates that, all the parameters meets the norms specified. However the KSPCB is not monitoring any special parameters & air toxics. KSPCB has initiated necessary steps to procure the equipments needed and train the laboratory staff for monitoring new parameters as per the revised NAAQM standards.

Beside KSPCB, the major air polluting industries are also monitoring the ambient air quality regularly and submitting the reports to KSPCB. The summary of report for the period 2009-10 is presented in **Table and Bar Chart** shown below:

SL. No.	Name of location	2009-10					
		Concentration of pollutants in $\mu\text{g}/\text{m}^3$					
		SPM		SO ₂		NO _x	
		Min	Max	Min	Max	Min	Max
1	MRPL, Kuthetur	14.12	631.88	0.15	104.87	0.06	12.83
2	BASF India Ltd.	73	106	2.3	4.3	2.1	4.4
3	MCF Ltd,	40	187	<5	22	<5	19
4	Sequent Scientific Ltd	74	124	4	9	5	14
5	KIOCL (Pellet Plant)	97	465	0.6	7.85	0.85	8.4
6	KIOCL-Blast Furnace (Formerly KISCO)	30	300	1	8	2	18



3.1.3. Predominant sources contributing to various pollutants:

Industrial sources, Vehicular movement, roads.

3.2. Sources of air pollution viz industrial, domestic (Coal and Biomass burning), natural and Transport & Heavy Earth Movers.

3.3. Air Polluting Industries in the area/cluster

Sl. No.	Name & Address of industry	Type of industry	Major Sources of Air Pollution.
1	BASF India Ltd., Bala Village, Surathkal Bajpe Road, Mangalore	Dyes and Dye intermediate	Dye Plant Reactor, Spray Drier, Dispersion Reactor, Incinerator, Boiler, DG Sets.
2	Kudremukh Iron Ore Company Ltd.(KIOCL), Panambur, Mangalore	Integrated Iron and Steel	Captive Power Plant, Dedusting units, Wind box exhaust, Screening, grinding, Pellet Drying, DG Sets.
3	Mangalore Chemical & Fertilizers Ltd(MCF), Panambur, Mangalore-575010	Fertilizer	Boiler, DAP Plant, Urea Prilling tower, Sulphuric Acid Plant, Captive Power Plant, Incinerator, DG Sets.
4	Mangalore Refinery & Petrochemicals Ltd.(MRPL), Kuthethur, Via Katipalla, Mangalore	Petrochemical	CDU/VDU, HCU, SRU, H2 Reformer, NAP, UAP, CPP, DG Sets.
5	Sequent Scientific Ltd, Baikampady Industrial Area, Mangalore	Basic drug & pharmaceutical manufacturing	Process Emissions, R & D Plant Process emissions, Boiler, Thermic Fluid Heater, Forced Draft Evaporation cum Incinerator, DG Sets.
6	Kudremukh Iron Ore Company Ltd.(Blast Furnace Unit), Baikampady Industrial Area, Mangalore (Not working from August 2009)	Pig Iron	Blast Furnace hot Stove, Captive Power Plant, Stock House Section, Blast Furnace Flare Section, DG Sets.
7	New Mangalore Port Trust (NMPT), Panambur, Mangalore.	Port	DG Sets & fugitive emissions from stack yards & vehicular movement.
8	Ruchisoya Industries Ltd., Baikampady Industrial Area, Mangalore.	Edible Oil Refinery	Boilers, Thermic fluid heater, DG Sets.
9	Rajashri Packagers Pvt. Ltd., Baikampady Industrial Area, Mangalore.	Edible Oil Refinery	Boilers, Thermic fluid heater, Coal Crusher, DG Sets.

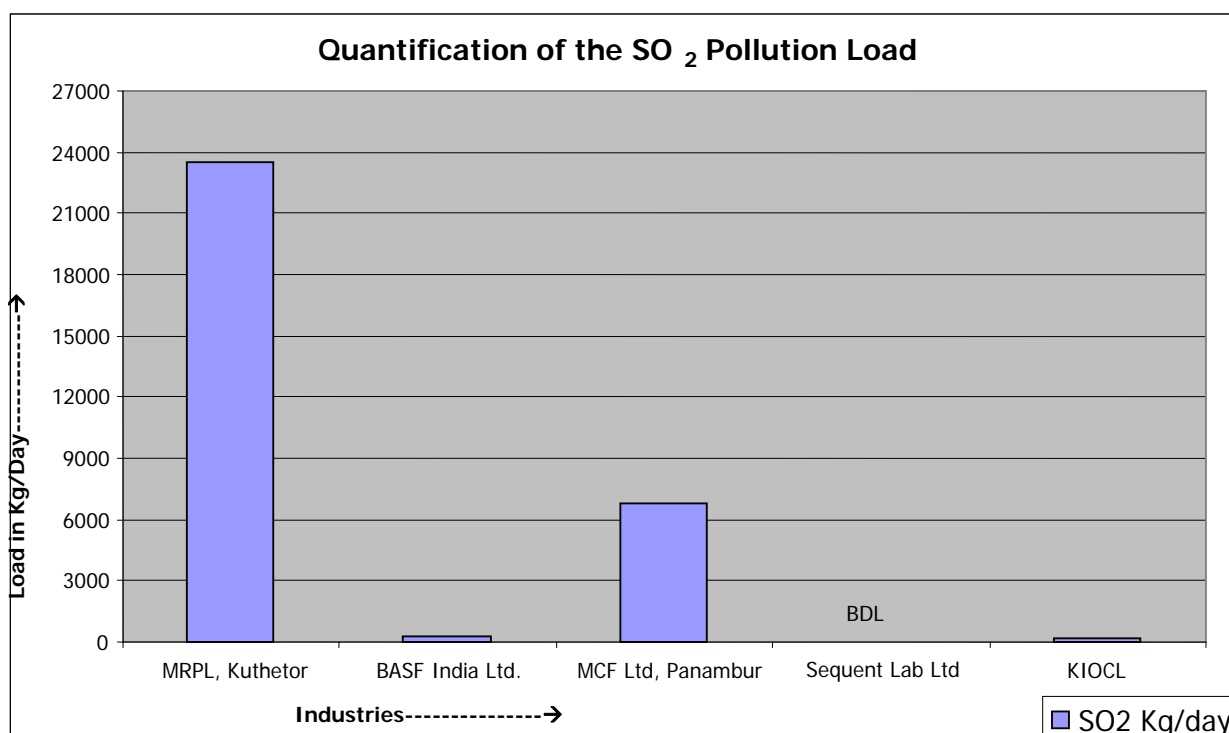
3.4. Impact of activities of nearby area on the CEPI Area:

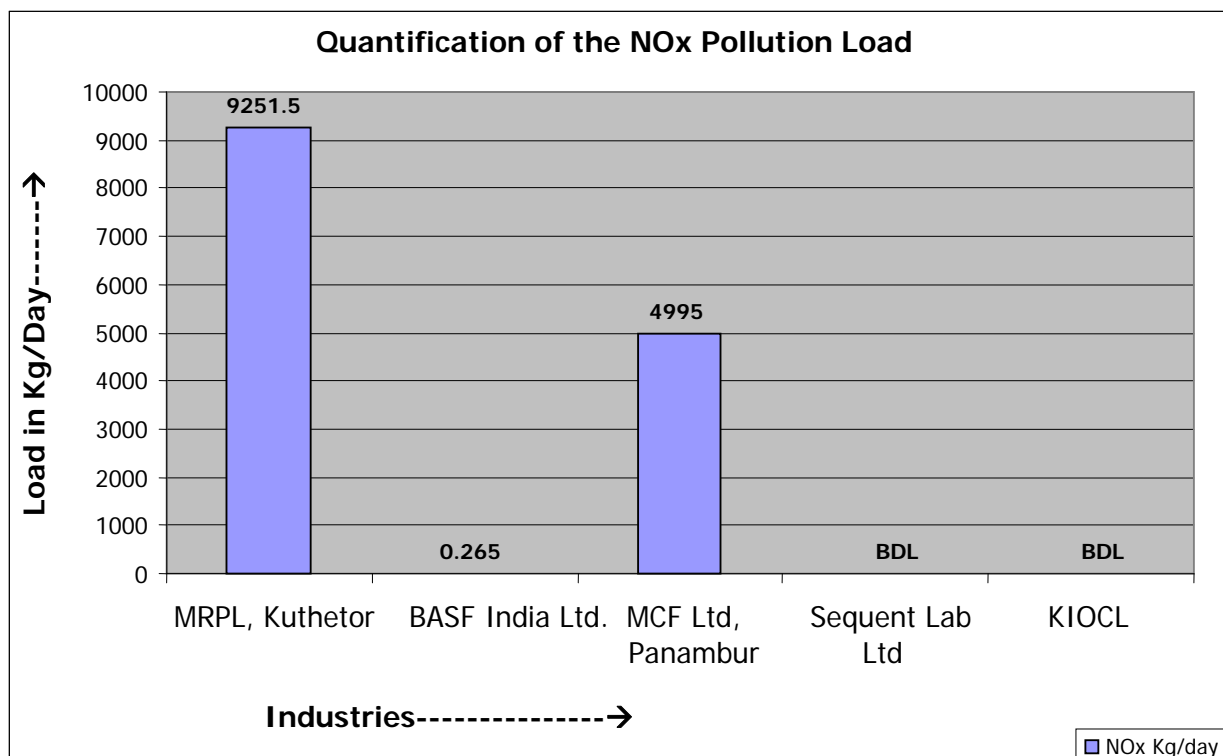
The adjacent areas are generally residential in nature and hence their activities do not have any impact on CEPI score of industrial cluster.

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

Air pollution load from the major industries is quantified and the details are shown in the table and bar chart shown below. The other sources of the area and volume of the source are not quantifiable.

Year	Industries	SPM Kg/day	SO ₂ Kg/day	NO _x Kg/day
2009-10	MRPL, Kuthetur	---	23473.59	9251.5
2009-10	BASF India Ltd. Bala	16.65	238	0.265
2009-10	MCF Ltd, Panambur	1231	6751	4995
2009-10	Sequent Scientific Ltd Baikampady Industrial Area Mangalore	1.78	0.14	0,29
2009-10	KIOCL (Pellet Plant), Panambur, Mangalore	3141.21	220.12	---





3.6. Action Plan for compliance and control of pollution:

3.6.1. Existing infrastructure facilities-Ambient air quality monitoring network.

All the major industries in the cluster are conducting ambient air quality monitoring every month & submitting reports. The KSPCB is monitoring the parameters as per earlier National Ambient Air Quality standards.

One continuous ambient air quality monitoring station (CAAQMS) is already installed in the MRPL refinery and another CAAQMS is proposed to be installed in the refinery as per the new NAAQS during 2011. Board has set up one AAQS in the cluster for monitoring of SO₂, NO_x, RSPM and SPM parameters. KSPCB has established a Laboratory at Mangalore Office headed by a Senior Scientific Officer with 4 supporting staff to assist the Board for analysis of samples collected. The laboratory is having facility to analyze the general parameters as specified in the consent conditions.

The Regional Office is headed by Environmental Officer with 2 technical staff and other supporting staff for inspection of units, monitoring & collection of samples, issue of consents, etc. In addition one Senior Environmental Officer of KSPCB is stationed at Mangalore to supervise the functions of Regional Office, lab and also to monitor the compliance of the major industries.

At present BASF is monitoring VOC within the plant premises monthly as per their own protocol. Till the CPCB evolves protocol for monitoring VOCs KSPCB will insist the industry to continue monitoring and submit the monitored results. Similarly the Board will identify industries to which this condition is applicable and insist them to monitor the VOC.

Continuous AAQM Station at MRPL

3.6.2. Pollution control measures installed by the individual sources of pollution:

All the major air polluting industries have installed air pollution control equipments like Cyclones, multiclones, Bag filters, Scrubbers for the control of air pollution. The details of the control equipments are indicated in the following table.

Sl.No.	Name of industry	Major Sources of Air Pollution.	Air Pollution Control Measures Provided
1	BASF India Ltd., Bala Village, Surathkal Bajpe Road, Mangalore	Dye Plant Reactor, Spray Drier, Dispersion Reactor, Incinerator, Boiler, DG Sets.	Packed Column, Venturi, Alkali & Jet Scrubbers, Bag filter and Cyclone.
2	Kudremukh Iron Ore Company Ltd. (KIOCL), Panambur, Mangalore	Captive Power Plant, Dedusting units, Wind box exhaust, Screening, grinding, Pellet Drying, DG Sets.	Scrubbers, FGD Scrubber, Bag filter and multiclone.
3	Mangalore Chemical & Fertilizers Ltd(MCF), Panambur, Mangalore-575010	Boiler, DAP Plant, Urea Prilling tower, Sulphuric Acid Plant, Captive Power Plant, Incinerator, DG Sets.	Scrubbers, Alkali scrubber, Mist eliminators, and cyclone.
4	Mangalore Refinery & Petrochemicals Ltd.(MRPL), Kuthethur, Via Katipalla, Mangalore	CDU/VDU, HCU, SRU, H2 Reformer, NAP, UAP, CPP, DG Sets.	Amine & sour Water treatment scrubber
5	Sequent Scientific Ltd. (Strides Arco lab Ltd.), Plot No.120 A & B, Baikampady Industrial Area, Mangalore	Process Emissions, R & D Plant Process emissions, Boiler, Thermic Fluid Heater, Forced Draft Evaporation cum Incinerator, DG Sets.	Wet Scrubbers
6	Kudremukh Iron Ore Company Ltd.(Blast Furnace	Blast Furnace hot Stove, Captive Power Plant, Stock	Wet Scrubber

	Unit), Baikampady Industrial Area (Not working from August 2009)	House Section, Blast Furnace Flare Section, DG Sets.	
7	New Mangalore Port Trust(NMPT), Panambur	DG Sets & fugitive emissions from stack yards & vehicular movement.	water sprinkling on haul roads & stack yards
8	Ruchisoya Industries Ltd., Baikampady Industrial Area	Boilers, Thermic fluid heater, DG Sets.	Multiclones & Bag filters
9	Rajashri Packagers Pvt. Ltd., Baikampady Industrial Area	Boilers, Thermic fluid heater, Coal Crusher, DG Sets.	Multiclones & Bag filters

3.6.3. Technological intervention

3.6.3.1. Inventorization of prominent industries with technological gaps:

Major industries in the cluster have prepared strategies to prevent the generation of air pollutants and have proposed plans to install advanced controlled technique. However detailed study will be undertaken to identify technological interventions needed to ensure better compliance.

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

The Following industries have proposed to install advanced technology to control air pollution.

- MRPL is in the process of installing Sulphur Pastillation unit for reducing dust, H₂S and odor emissions. They propose to utilize natural gas as internal fuel in refinery to reduce SO₂ and CO₂ emissions and also propose to recover hydrogen from fuel gas stream to reduce emissions.
- BASF has proposed to install scrubber for monomer storage tanks to control fugitive emission and also co-incinerate ETP sludge in the cement industry to reduce air emissions.
- MCF has proposed to utilize natural gas as internal fuel to reduce SO₂ and CO₂ emissions.
- Sequent Scientific Ltd has installed filtered air supply and exhausts system in the manufacturing area and proposes to install auto burner incinerator with temperature control system to reduce odor emissions.

3.6.3.3. Introduction and switch over to cleaner fuel:

Major industries have plans to switch over to low sulphur & low ash cleaner fuels. However in the case of medium & small scale industries, which uses cheaper biomass & other fuels, the KSPCB would identify possibilities and pursue such industries to switchover to cleaner fuel.

3.6.4. Need of infrastructure Renovation:

New AAQM standards have been prescribed and the CEPI computation takes in to account the presence of carcinogens and air toxics. KSPCB laboratory at Mangalore needs to be strengthened with additional man power & sophisticated instruments for air quality monitoring. The existing KSPCB staff also to be trained.

3.6.4.1. Development of roads:

Asphalting of Roads in some portion of Baikampady industrial area is needed and will be taken up with the concerned authorities' viz. KIADB which is the responsible agency.

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

By implementation of the action plan proposed by the industries and the Board CEPI score is expected to come down substantially

AIR ENVIRONMENT

A1 = 4.00	A2 = 5.00		(A1x A2 = A), A = 20.00
B1 = 2.00	B2 = 3.00	B3 = 3.00	(B1+B2+B3=B), B = 08.00
C1 = 3.00	C2 = 1.00	C3 = 0.00	({C1xC2}+C3=C), C = 03.00
D = 10.00			D =10.00
			(A+B+C+D = TOTAL = 41.00

Justification:

- The presence of carcinogens is not critically high, as none of the industries in the cluster produce them as end-products and if present, are only as process intermediates (factor: A1).
- The regions that lie within the impact zone are sparsely populated as, only a few small villages are present within this area (factor: C1).

- KSPCB's monitoring shows that, the ambient air quality meets the stipulated norms and hence the resultant decreases in the level of exposure (factor: C2).
- The major industries have installed air pollution control equipments like Cyclones, multi-clones, Bag filters, Scrubbers for the control of air pollution.
- MRPL is in the process of installing Continuous ambient air quality monitoring system and as well as a Sulphur Pastillation unit for reducing dust, H₂S and odor emissions. Further it proposed to use Natural Gas as fuel within the refinery, thereby reducing SO₂ and CO₂ emissions.
- BASF has proposed to install scrubber for storage tanks to control fugitive emission and also co-incinerate ETP sludge in the cement industry, thus reducing emissions.
- Sequent Scientific Ltd has proposed to install filtered air supply and exhaust system in the manufacturing area to reduce odor emissions.
- Eshwari Lead Industries has proposed to install Scrubber to the Lead Furnace to improve the quality of emissions.
- All the major industries in the cluster have installed appropriate air pollution control equipments and conduct regular audits on process and emissions to ensure improved process efficiency and reduction in emissions (factor: D).
- All other factors that contribute to the CEPI sub-index score remain unchanged.

3.6.6. Managerial and Financial aspects –Cost and time estimates

3.6.6.1. Cost and time estimates:

Approximate cost for infrastructure, monitoring equipments, etc to strengthen the KSPCB Lab is incorporated as **Annexure-VI**. The total amount required is Rs.180.3 Lakhs.

3.6.6.2. Identified Private/Public sector potential investors and their contribution/obligation:

Appropriate agencies will be identified after finalization of action plan.

3.6.6.3. Government Budgetary support requirement:

Finalized action plan will be submitted to the Government seeking financial support wherever necessary.

3.6.6.4. Hierarchical and structured managerial system for efficient implementation:

The KSPCB will oversee the implementation of finalized action plan.

3.6.7. Self monitoring system in industries (Stacks, APCDs):

KSPCB has prescribed conditions in the consent being issued to major red category industries for carrying out self monitoring through environmental cell set up within the industry. Major industries have set up on line monitoring facilities. Board is also encouraging industries to establish ISO 14001 (EMS). The lists of major industries in the cluster having ISO 14001 (EMS) are as follows:

SI No.	Name of Industries
1	MRPL, Kuthetor, Mangalore.
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3	MCF Ltd, Panambur, Mangalore.
4	Sequent Scientific Ltd Baikampady Industrial Area, Mangalore.
5	KIOCL (Pellet Plant), Panambur, Mangalore.

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

At present industries are submitting the reports of analysis regularly at prescribed intervals both in soft/hard copy form. The data available with KSPCB is shared with CPCB as & when required. KSPCB has already initiated discussions with major industries to transfer the monitoring data on a real time basis on-line to local KSPCB Office which is already having a linkage with Head office at Bangalore. MCF has already entering the daily average result of SO₂ emissions from sulphuric acid stack in their web site <http://www.mangalorechemicals.com>.

3.6.9 Impact due to Traffic:

National highway-17 passes through the cluster. Besides the Konkan Railway also passes through the cluster. The vehicular traffic through the highway is in the range of 15,000 – 20,000 psu per day as per the data furnished by the National Highway Authority. A number of vehicles carrying raw material s & products of industries move within the cluster. Total 3,14,951 vehicles registered with the Regional Transport Office, Mangalore as on November 2010. The NMPT is another activity which contributes to vehicular traffic within the cluster. The systematic survey will only indicate the contribution of air pollution from all the above activities. Moreover this activity is highly dynamic & unpredictable. However the following steps already been taken in this cluster by industries to reduce vehicular traffic and thus reduced air pollution:

- MRPL & other companies which were earlier transporting their products through trucks have started transport through pipeline & thus reducing the traffic & pollution.

- UPCL which was transporting coal through trucks by road has recently shifted movement of coal through rail with polythene sheet covered racks.
- The NMPT authorities have made it mandatory for the trucks carrying powdery materials like iron ore, coal, fertilizer to cover the trucks with plastic sheet/tarpaulin to prevent dust emission during transportation.
- The District administration has initiated steps to concretize the roads within city and is in the process of widening the National High way-17.

4. LAND ENVIRONEMNT (Soil and Ground Water)

4.1. Soil contamination:

No Soil contamination is observed in the Baikampady Industrial Cluster.

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

The industries are not disposing any untreated effluents and Hazardous waste within the cluster.

There are no dump sites or contaminated land sites within the cluster area. However KSPCB analyses the characteristics of the soil nearer to certain major industries as & when required. There are many EIA reports, wherein the status of land environment is documented and submitted to KSPCB. As per the data available with the Board no soil contamination is observed within the cluster.

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

Since the groundwater table is fairly high the industries have been directed not to store any leachable waste without proper lining. The Board has identified based on the groundwater movement certain critical location around major industries like MRPL, BASF & Sequent scientific Ltd. & carrying out the monitoring every month. Some of the major industries also have got self monitoring protocol of monitoring of groundwater & soil and submitting the reports to the Board as per the consent conditions.

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

There are no specific standards available for monitoring carcinogens in groundwater and the Board is monitoring groundwater against drinking water standards.

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.

Most of the major industries are storing their hazardous & other wastes in proper container or with proper lining of the ground to prevent the leachates reaching the aquifer.

4.1.5. Sources of Soil Contamination:

There may be issues with small & medium industries, where proper storage & handling of hazardous & other solid waste may not be available. However KSPCB will initiate a study to detect the details regarding such industries.

4.1.6. Types of existing pollution:

There are no reported cases of contamination of land/groundwater within the cluster.

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

There is no need for any abatement at present.

4.2. Ground water contamination:

4.2.1. Present status/quality of groundwater:

KSPCB is monitoring ground water in the cluster area every month and presently no ground water contamination is observed in the Baikampady Industrial Cluster, **Annexure- I** gives the data of ground water monitoring in one year in the cluster. Locations of ground water monitoring are presented in **Map V**.

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

In order to identify the sources of ground water pollution KSPCB is monitoring near major industries viz. MRPL, BASF and Sequent scientific Ltd.

At MRPL, during 1999-2000, oil leakage (seepage) was reported from the ground (semi surface level) in the premises of the nitrogen plant (near HGI nitrogen plant main gate). This seepage was joining nearby natural stream. The authorities have partially stopped the leakages but some quantity continues to seep through ground strata. The MRPL authorities have conducted hydro geological study of leakage areas through NGRI, Hyderabad for 2 water sheds and further hydro-geological study of remaining 11 water sheds is in progress.

Now, the MRPL has installed a permanent pumping station at Atturkodi pond to lift the contaminated pond water to their existing ETP for further treatment whenever situation arises. Also the MRPL has already made permanent arrangement for supply of drinking water to the houses located in Atturkodi village limits. The KSPCB is collecting sample of Atturkodi stream water at the upstream and downstream of the Pond every month. The monitored data reveals that the oil concentration in the downstream of pond is below detectable limits.

4.2.3. Ground water quality monitoring program:

KSPCB is collecting samples from bore wells, open wells, lakes & Sea shore located in the cluster every month & vide **Annexure-I**.

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

Presently there are no reported cases of contamination of groundwater within the cluster.

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

There are no reported cases of contamination of groundwater within the cluster.

4.2.6. Impact on CEPI score after abatement of land pollution:

Although at present no groundwater/land contamination is noticed in the cluster & impact zone, the industries within the cluster have taken up proactive measures to store the non-hazardous wastes in proper manner to prevent any contamination. Hence the CEPI score will come down on implementation of action plans.

LAND ENVIRONMENT

A1 = 3.00	A2 = 5.00		(A1x A2 = A), A = 15.00
B1 = 2.00	B2 = 2.00	B3 = 2.00	(B1+B2+B3=B), B = 06.00
C1 = 3.00	C2 = 2.00	C3 = 5.00	({C1xC2}+C3=C), C = 11.00
D = 5.00			D = 05.00
			(A+B+C+D = TOTAL = 37.00

Justification:

- As a result of recycling and scientific disposal of solid hazardous waste, the ambient pollutant concentration (factor: B1) will undergo reduction, consequently reducing the impact on people and eco-geological features (factor: B2&B3) and level of exposure of the local population (factor: C2).
- The region around the industrial cluster is sparsely populated, with only a few villages falling within the impact zone thereby reducing potentially affected population (factor: C1).
- NMPT is in the process of Mechanizing and Commissioning Iron Ore Cargo and Coal handling facilities which will help to reduce cargo spills.
- MRPL and BASF are handing over the hazardous wastes like spent carbon and ETP sludge to the Rajashri Cement plant for co-incineration in their kiln.
- MRPL has adopted mechanical / chemical treatment for oil recovery from their present operations, and the old accumulated oil sludge is bio-remediated by using oil degrading micro-organisms.
- Spent catalyst from MRPL, MCF, KIOCL, KIOCL (BF unit) are collected and sent back to the supplier for recycling and the remnants, to the authorized agents for metal recovery.
- The hazardous wastes, like spent oil, generated from the utilities and captive power plants of all the industries are collected and sent to Recyclers and landfillable Hazardous waste is sent to TSDF at Dabbospet.
- The bio-medical waste generated in the cluster is handed over to the common bio-medical waste treatment facility located in Karnad industrial area of Mulky for safe disposal.
- The up gradation of infrastructure will result in better handling of solid waste generated within the region, thus, reducing the additional risk element (factor: D).
- The remaining factors that contribute to the CEPI sub-index score are unchanged.

Mechanized handling facility at NMPT

4.3. Solid waste Generation and management

4.3.1. Waste classification and quantification:

KSPCB has classified wastes according to Rules and Notifications and quantified each category. However the work of inventorisation of different types of non-hazardous waste generated in the cluster is to be carried out by KSPCB.

4.3.1.1. Hazardous waste:

The land fillable hazardous waste generated in the cluster is 475 MTPA, recyclable hazardous waste is 6977 MTPA and Incinerable hazardous waste is 503 MTPA and the details of quantity of hazardous waste generated by industries located in the cluster is enclosed as **Annexure –VII**.

The major sources of Hazardous Waste in the cluster are oily sludge from MRPL and crude tank bottom sludge of Petroleum & edible oil storage depots. MRPL was earlier cleaning the tanks for removal of tank bottom sludge manually which was generating high oil containing sludge. Recently this activity has been mechanized and subjected to centrifuging operation resulting in reduced quantity of sludge with low oil content. The accumulated sludge is bio-remediated by using oil degrading micro-organisms by TERI. The other major sources of Hazardous Waste generated in the cluster are spent catalyst from MRPL, MCF, KIOCL, KIOCL (BF unit) and these catalysts are sent back to the supplier for recycling and remaining to the authorized agents for metal recovery. BASF is generating ETP sludge and this sludge after drying is handed over to Rajashri Cement plant for co-incineration. The spent oil generated from the utilities and captive power plants of all these industries are collected and disposed to authorized oil recyclers and some of the units have signed agreement with TSDF site at Dabbospet for scientific disposal of landfillable hazardous waste.

MRPL - Oily sludge Bioremediation Site

4.3.1.2. Bio-medical waste:

There are no major hospitals located in the cluster. However the bio-medical waste generated in the cluster is handed over to the common bio medical waste treatment facility located about 10 km away from the impact zone (Northern side on the NH) at Karnad industrial area of Mulky for final treatment and disposal.

The facility is collecting the Bio-medical waste from Dakshin Kannada & Udupi Districts and installed Incinerator of capacity 4500kg/day, Autoclave of 1350kg/day and Shredder of

3750kg/day & provided 4 Nos of vehicles for the collection of bio-medical waste. The Details of capacity of facility & quantity handled per day are as given below:

District	HCE's covered	Beds Capacity	Quantity of Incinerable Waste received in Kgs per day	Quantity of Autoclave Waste received in Kgs per day
Dakshina Kannada	256	4325	700	425
Udupi	126	2825	380	250
Total	382	7150	1080	675

Note: Common BMW facility installed incinerator-250 Kgs/Hr, Autoclave-400LT per cycle (150kgper cycle for 2hr), Big Shredder Capacity 250Kg/hr & Small shredder Capacity 125Kg /hr

4.3.1.3. Electronic waste:

No industry generates E - waste in considerable quantity in the cluster. However KSPCB will inventorise of quantity of different types of Electronic Waste generated in the cluster.

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

Municipal Solid Waste facility installed by Municipal City Corporation, Mangalore

The Mangalore City Corporation has setup MSW facility in an area of about 78 acres at Pachchanady- Kudupu village about 7 kms from the cluster under ADB project. The facility comprises of composting facility (both aerobic and Vermicompost) as well as landfill. The generation of MSW is about 210 TPD. The corporation has initiated steps to segregate waste at source.

Baikampady Industrial Area is not having proper waste disposal facilities for non hazardous solid wastes. The general solid waste generated from this industrial cluster is dumped unscientifically around the Baikampady Industrial Area. Proper scientific way of collection, segregation, disposal facilities is to be provided so as to improve the status of Air Quality, ground water quality and general aesthetic condition of Baikampady Industrial Area.

4.3.1.5. Plastic waste:

District administration along with KSPCB and Mangalore City Corporation has taken initiation for waste segregation by maximum recycle. Also Mangalore City Corporation is partially segregating the plastic waste at common MSW landfill site.

4.3.1.6. Quantification of wastes and relative contribution from different sources.

Except Hazardous & biomedical waste, other types of wastes are not quantified. **Annexure VII** provides the details of category and quantity of Hazardous Waste generated in the cluster

area. The quantification details of Bio-Medical waste provided in section 4.3.1.2. Mangalore City generates about 130 TPD of MSW. KSPCB will initiate studies to quantify the different types of non - hazardous solid waste generated in the cluster.

4.3.2. Identification of waste minimization and waste exchange options:

Steps will be taken to set up Waste minimization circles and waste exchange banks.

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

MRPL is handing over the hazardous wastes like spent carbon to the cement industries for co-incineration in their Kiln. BASF India Ltd is also handing over the hazardous wastes like ETP sludge to the cement industries for co-incineration in their Kiln.

4.3.4. Infrastructure facilities

4.3.4.1. Existing TSDF/Incineration facilities including capacities:

BASF has got Incinerator of 3 tons/day capacity for burning of hazardous & other wastes. Also Sequent Scientific Ltd has got Incinerator cum Forced Draft Evaporator (FDE) of capacity 600 Kg/Hr to incinerate the high TDS effluent & other hazardous/solid waste. Incinerable hazardous wastes are being sent to cement plants for co processing. The landfillable hazardous wastes are being sent to TSDF at Dabbospet which is located at distance of about 300km. The said facility is having the capacity to handle land fillable waste up to 8 lakh tones for 20 years. The recyclable hazardous wastes are being sent to the authorized recyclers.

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

Common engineered landfill site for final disposal of non-hazardous solid waste in scientific manner is required to be developed for Baikampady industrial area.

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

No such sites have been identified.

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

After providing solid waste management site CEPI score will come down substantially.

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.

Presently one Continuous Ambient Air quality monitoring Station is operating since May-2009 at MRPL. Installation of another Two Continuous Ambient Air quality monitoring Stations in cluster will be taken up, one by MRPL and the other on PPP model with industries. After finalization of action plan private participation will be explored.

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

After finalization of action plan private participation will be explored.

6. Other infrastructural Renewal measures:

6.1. Green Belts

very year all the major industries are planting saplings inside the industry premises. During 2010 about 1,25,000 saplings were planted by the industries located in the cluster area mainly by MRPL, MSEZ, MCF, NMPT & others. There is a for proposal of planting 1,50,000 saplings during 2011 inside the cluster area. List of major industries which planted saplings during 2010 are given below:

Sl No.	Name of the industry/organization	Number of plantations taken-up during 2010	Number of plantations proposed during 2011
1	MRPL	10000	10000
2	MSEZ AREA	42000	60000
3	NMPT	10000	5000
4	MCF	3500	3000
5	INFOSYS Technologies	20000	20000
6	BASF	3000	3000
7	KOICL (Pellet Plant)	200	10000
8	SEQUENT SCIENTIFIC	50	100
9	U.B.LTD	50	500
10	CANARA SPRINGS	500	500
11	PETRONET MHB LTD	300	350
12	BLUE WATER SEAFOOD	200	500
13	AIR PORT AUTHORITY	500	1500
14	CAPMCO CHOCOLATE	100	300
15	HIND UNILEVER	300	400
16	KIOCL(BLAST FURNACE)	650	700
17	RUCHI SOYA INDS	500	625
18	BHARATI SHIPYARD LTD	100	500
19	MANGALORE CITY COR	20000	20000

20	OTHER INDUSTRIES	13000	15000
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6.2.a) Development of Industrial Estate(s):

Not contemplated.

6.2.b) Improvement of environmental quality of existing Baikampady industrial area:

KIADB has proposed to take up gradation of existing roads and storm water drains in the area. Also proposed to take up avenue plantation in the industrial area during forthcoming monsoon season.

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

No such situation in this cluster.

7. Specific Schemes:

7.1. GIS-GPS system for pollution sources monitoring:

At present there is no such system for pollution sources monitoring. The possibility will be explored.

7.2. Hydro-geological fracturing for water bodies rejuvenation:

There is no case of hydro-geological contamination noticed in the cluster and no rejuvenation is necessary.

7.3. In-situ remediation of sewage:

No such proposal.

7.4. Utilization of MSW inert by gas based brick kilns:

No such facility in the cluster is proposed.

7.5. Co-processing of wastes in cement industries:

MRPL is handing over the hazardous wastes like spent carbon to the cement industries for co-incineration in their Kiln. BASF India Ltd is also handing over the hazardous wastes like ETP sludge to the cement industries for co-incineration in their Kiln.

8. Public awareness and training Programmes:

Regional Office of KSPCB, Mangalore is conducting both public awareness & training programmes in the field of environment management for the stakeholders in coordination with industries, NGOs, educational Institutes & other Government departments.

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

After installation/commissioning of pollution control equipments/measures CEPI score will come down substantially.

No	Industrial Area/clusters	Air	Water	Land	CEPI
32	Baikampady Industrial Cluster, Mangalore, (Karnataka)	41	34	37	48.42

As a consequence of the reduction in the individual sub-index scores, the Overall CEPI score reduces to **48.42**.

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

Study of techno-economical feasibility of pollution control systems in clusters of small/medium scale industries will be carried out.

11. Efforts shall be made to encourage use of Bio-compost and Bio-Fertilizer along with 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):

Possibilities will be explored.

12. Summary of proposed action points:

- Source apportionment study from air/water pollution point of view within the cluster & impact zone with special reference to carcinogens & other toxins.
- Preparation of feasibility report for infrastructure development in the cluster like, Storm water Management within the industrial cluster, underground drainage (UGD), common effluent treatment plant (CETP), Common engineered landfill site for final disposal of non-hazardous solid waste generated from industries.
- Water auditing in major water consuming industries in the cluster.
- Establishment of a centre to promote waste minimization and waste exchange in the industrial cluster, adoption of cleaner technologies & changeover to cleaner fuels.
- Up gradation of laboratory including strengthening of infrastructure of Regional Office.
- Promoting development of green belt within the cluster

12.1. Short Term Action Points (up to 1 year, including continuous Activities) and

12.2. Long Term Action Points (more than 1 year)

A. Short Term Action Points

Sl. No	Action Points (including Source and mitigation measures)	Responsible Stake Holders	Time limit	Approx. Cost in lakhs	Remarks
1	Monitoring of Air/water & soil in cluster for special parameters.	KSPCB	30-9-2011	30	
2	Source apportionment study from air/water pollution point of view within the cluster	KSPCB	30-12-2011	10	
3	Water auditing in the major water consuming industries in the cluster.	Industry	30-6-2011	-	To identify opportunities for Water conservation measure
4	Up gradation of Regional Laboratory, including strengthening of infrastructure of Regional Office.	KSPCB	31-12-2011	100	
5	Online effluent quality monitoring System for basic parameters.	Major Industries	31-12-2011	30	
7	Continuous Ambient Air quality monitoring Stations-1 Nos	PPP Model	31-12-2011	100	
8	Preparation of feasibility report for infrastructure development like, Storm water Management, underground drainage (UGD), common effluent treatment plant (CETP) within the industrial cluster.	KIADB	30-9-2011	15	
9	Preparation of feasibility report for infrastructure development of Common engineered landfill site	KSPCB	30-9-2011	10	

	for non-hazardous solid waste.				
10	Monitored Data transfer from the industries to Board and creation of necessary infrastructure in the Board	KSPCB/Industry	30-6-2011	15	
11	Establishment of a centre to promote waste minimization and waste exchange in the industrial cluster, adoption of cleaner technologies & changeover to cleaner fuels.	KSPCB	31-12-2011	10	
12	Setting up of waste collection centre in the cluster	KSPCB/Industry	30-9-2011	20	
13	Avenue plantations in and around Baikampady Industrial Area	KIADB & Industry	31-12-2011	10	

Industry

Sl. No.	Name of the industry	Action Plan Proposed by major industries	Cost in Lakhs	Time Schedule	Remarks
1	Mangalore Refineries & Petrochemicals Ltd, Kuthethur	a) ETP with RO Plant	14800	Oct 2011	Reduction in Fresh Water Consumption
		b) Condensate recovery system – 2 units	61	31.12.2011	Fresh Water conservation
		c) Installation of continuous ambient air quality monitoring system	75	31.03.2011	-----
		d) Utilization of natural gas as internal fuel in the refinery	To be estimated	As and when natural gas is made available in Mangalore (expected in 2012-13)	Reduction in SO2 & CO2 Emissions
		e) Installation of sulphur pastillation unit for Phase III	7000	31.10.2011	Reduction of sulphur dust
		f) Planting of 10,000 saplings	50	2011	Green belt development
2	BASF India	a) Installation of diffused	15	31-1-2011	Improve

		aerator system for biological treatment			oxygen transfer efficiency
	Ltd., Bala village.	b) Installation of scrubber for monomer storage tanks to control fugitive emissions	15	30-6-2011	Control of Air emission
		b) Planting of 1000 saplings.	4.5	2011	Green belt development
3	Mangalore Chemicals & Fertilizers Ltd., Panambur	a) Changeover of fuel from Naphtha and furnace oil to Natural Gas and Re-Liquefied Natural Gas	40000	2013	Reduction in SO2 & CO2 Emissions
		c) Planting of 4,000 saplings	6	2011	Green belt development
4	Sequent Scientific Ltd. Baikampady.	Monitoring of VOCs	5	30-6-2011	
5	Kudremukh Iron Ore Company Ltd., Panambur	a) Up gradation of the existing STP with latest technology	50	30.06.2011	Improve quality of treated water
		b) Installation of ETP for treatment of effluent generated from De-sulphurisation plant of CPP	65	31.12.2011	Improve quality of treated water
		c) Asphaltting of all internal roads	35	31.12.2011	Reduction of fugitive emissions
		d) Providing of closed sheds for raw materials storage	30	30.09.2011	Reduction of fugitive emissions
		e) Plantation of 10,000 saplings	6	31.10.2011	Green belt development
6	New Mangalore Port Trust (NMPT), Panambur	a) Mechanization of Iron Ore Cargo handling	27700	October 2012	Reduction of cargo spills
		b) Concretization of roads to minimize spillage of cargo	30	31.12. 2011	Reduction of cargo spills
		c) Green belt development along the highway NH 17 and Beach Road for one KM length, near VTMS building and at	80	2011	Green belt development

		Meenakaliya Village road			
		d) Providing permanent sprinkling system along the concrete roads 600 M	10	30.04.2011	Dust suppression
		e) Providing bunds to settling tanks and extension of settling tank	60	30.06.2011	To stop entry of ore into sea
		f) Providing acoustic enclosures for two nos of 1000 KVA DG Sets	32	30.03.2011	Reduce the noise
7	Ruchisoya Industries Ltd., Baikampady Industrial Area	a) Concreting of roads	50	30.06.2011	Dust suppression
		b) Planting of 625 saplings	-	2011	Green belt development
8	Rajashri Packagers Pvt. Ltd., Baikampady Industrial Area	a) Replacement of fuel from rice husk to imported coal	12	Dec 2010	Reduction of ash generation
		b) Incorporating closed loop ash handling system (Silo's)	35	Dec 2010	Dust suppression
		c) Facilities for in-house testing of ETP parameters	2.5	Dec 2010	-----
9	Eshwari Metal Industries, (Unit-I) Baikampady Industrial Area	Installation of Rotary Kiln furnace with Scrubber	40	31.12.2011	To minimize the emissions

- Apart from this any intervention necessary will be addressed under long term plan (1 to 3years).

B. Long Term Action Points:

- As and when natural gas is made available at Mangalore major industries will be pursued to switchover to gas.
- Health Impact Assessment in the cluster
- Based on the outcome of the feasibility report action will be taken to setup CETP and other infrastructures.

C. CREP Action Points

- The Compliances to the CREP Action Points by the following Four Units (17 category) is enclosed as **Annexure-VIII**

1. M/s. MRPL
2. M/s. Sequent Scientific Ltd.
3. M/s. BASF India Ltd.
4. M/s. MCF Ltd.

13. Actions initiated by KSPCB and Industries after the declaration of Baikampady Industrial Cluster, Mangalore as Critically Polluted Area

Actions by KSPCB

- KSPCB has not considered any new projects and expansion of the existing projects within the Baikampady Industrial Cluster
- KSPCB has initiated discussions with industries to implement cleaner technologies and to change to cleaner fuels
- KSPCB has instructed major polluting industries located within the Baikampady industrial cluster to install on-line monitoring system and establish the networking with the Head Office of KSPCB for on-line data transfer.
- KSPCB has initiated green belt development programmes in various industries in association with Forest Department

Actions by Industries

- M/s MCF earlier discharging treated waste water to Arabian Sea during monsoon season. Now they have commissioned Zero discharge units viz RO and UF.
- M/s MCF is daily updating the online stack monitoring data of sulphuric acid plant in their website.
- M/s MRPL has commissioned Sulphur Pastillation Unit.
- M/s NMPT has commissioned mechanized Coal handling facility.
- M/s. Bluewater Foods & Exports P. Ltd have installed of Activated Carbon Filter, Diffused Aerators, DMF and Sludge Pump for ETP.
- M/s. Rajashri Packagers Pvt. Ltd., installed of Activated Carbon filter and improves discharge water quality.
- M/s. BASF India Ltd has started Co incineration of ETP sludge in cement industry.
- M/s Eshwari Metal Industries (unit-I) has installed mechanized Battery breaking machine

- M/s. Sequent Scientific Ltd. has introduced UV Filtration system for STP as an additional measure & to recycle the treated water for Cooling Towers, introduced cubicles for centrifuging operation and auto burner set for Incinerator with temperature controlling system. Installed Filtered air supply & Exhaust system in manufacturing area and Closed drainage system with chambers for effluent transfer for Plant No -3.
- About 1,30,000 saplings were planted during 2010 period inside the impact zone & proposed to plant 1,50,000 saplings during 2011 period.

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE							
PARTICULARS OF THE SAMPLE		Openwell Water of D'souza Outside the Industrial Cluster							
SL. NO	MONTH	APR	MAY	JUN	JUL	AUG	SEPT	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT						
1	pH	7-8.5	6.5	6.6	5.9	7	6.6	6.9	7.2
2	Hardness	---	70	50	36	26	32	44	60
3	Calcium	75mg/l	14	12	7	5	4	6	10
4	Magnesium	50mg/l	8	5	4	3	5	7	9
5	Chloride	200mg/l	94	102	70	42	40	18	36
6	Sulphate	200mg/l	3	2	4	4	5	3	5
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	---	BDL	0.66	0.33	0.18	0.31	1.16	1.06
9	Total Dissolved Solids	---	312	250	188	106	146	110	188
10	Nitrate Nitrogen	0.3mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	D.O	---	6.7	6.8	6.9	7.2	7.6	7.5	7.3

ANNEXURE-I
ABSTRACT OF OF 2010-11

NAME OF INDUSTRY			M/S MRPL, MANGALORE						
PARTICULARS OF THE SAMPLE			Borewell sample collected near Chandrahasa Nagar in side the Industrial Cluster						
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	LIMITS(WHO)	RESULT						
1	pH	7-8.5	7.2	7.6	7	6.7	6.5	6.8	7.2
2	Hardness	---	34	50	32	36	44	52	42
3	Calcium	75 mg/l	6	10	7	8	10	11	10
4	Magnesium	50 mg/l	5	6	3	4	4	6	8
5	Chloride	200 mg/l	12	12	10	20	18	42	20
6	Sulphate	200 mg/l	5	3	2	2	2	6	2
7	Fluoride	0.5 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	0.3 mg/l	1.1	0.13	1.3	0.68	0.65	0.88	0.81
9	Total Dissolved Solids	500 mg/l	190	186	152	250	124	144	130
10	Nitrate	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectionable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	D.O	---	5.7	6.2	6.9	6.8	7.5	7.3	7

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE							
PARTICULARS OF THE SAMPLE		Openwell Water of Joseph Fernandes Outside the Industrial Cluster							
SL. NO	MONTH	APR	MAY	JUN	JUL	AUG	SEPT	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT						
1	pH	7-8.5	6.9	6.5	5.7	7.3	5.8	6.5	7.1
2	Hardness	---	26	64	42	26	26	34	34
3	Calcium	75mg/l	8	8	9	4	7	6	8
4	Magnesium	50mg/l	1	11	5	4	2	5	3
5	Chloride	200mg/l	28	100	70	36	44	40	38
6	Sulphate	200mg/l	5	4	4	4	6	4	6
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	---	0.346	0.15	0.19	0.85	0.36	0.91	0.38
9	Total Dissolved Solids	---	176	238	166	94	144	130	132
10	Nitrate	0.3mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDI	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	D.O	---	6.1	6.5	7.1	7	7.2	7.4	7.2

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE							
PARTICULARS OF THE SAMPLE		Borewell water of VPS Quarters in side the Industrial Cluster							
SL. NO	MONTH	APR	MAY	JUN	JUL	AUG	SEPT	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT						
1	pH	7-8.5	7.3	7.8	6.8	7	6.6	7	7
2	Hardness	---	40	40	44	18	50	42	36
3	Calcium	75mg/l	11	8	10	4	16	10	10
4	Magnesium	50mg/l	3	5	4	2	2	4	2
5	Chloride	200mg/l	16	14	20	14	20	10	28
6	Sulphate	200mg/l	9	4	3	4	11	6	9
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	---	0.074	1.27	0.14	0.07	BDL	0.018	0.036
9	Total Dissolved Solids	---	192	198	188	76	158	94	136
10	Nitrate	0.3mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	DO	--	6.2	6.6	7	7.2	7.4	6.7	7.4

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE						
PARTICULARS OF THE SAMPLE		Borewell water at-Thokur inside the Industrial Cluster						
SL. NO	MONTH	APR	MAY	JUN	JUL	AUG	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT					
1	pH	7-8.5	7.5	7.3	6.5	7.5	6.6	7
2	Hardness	---	100	110	94	80	110	110
3	Calcium	75mg/l	15	20	14	13	12	19
4	Magnesium	50mg/l	15	15	15	12	19	15
5	Chloride	200mg/l	22	24	24	16	26	24
6	Sulphate	200mg/l	32	25	26	27	6	15
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	---	1.39	1.78	1.45	1.42	2	1.45
9	Total Dissolved Solids	---	330	366	162	170	260	268
10	Nitrate N2	0.3mg/l	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	D.O	--	6.2	7	7.2	6.6	5.8	7.1

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY			M/S MRPL, MANGALORE						
PARTICULARS OF THE SAMPLE			Borewell Water Sample near Kuthethur in side the Industrial Cluster						
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	LIMITS(WHO)	RESULT						
1	pH	7-8.5	7.3	7.4	6.7	7.9	7	7.5	7.8
2	Hardness	---	96	66	90	92	114	106	108
3	Calcium	75mg/l	24	18	18	17	21	20	24
4	Magnesium	50mg/l	9	5	11	12	15	14	12
5	Chloride	200mg/l	16	22	210	16	26	20	26
6	Sulphate	200mg/l	7	4	4	12	4	3	4
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	---	1.23	0.19	1.06	0.08	0.26	0.84	0.84
9	Total Dissolved Solids	---	240	260	336	190	240	236	260
10	Nitrate	0.3mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
14	D.O	---	6.2	6.8	6.9	7.1	7.5	7.6	7

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, Mangalore						
PARTICULARS OF THE SAMPLE		Borewell near HG Industry-M-5 inside the Industrial Cluster						
SL. NO	MONTH	MAY	JUN	JULY	AUG	SEP	OCT	
	PARAMETERS	LIMITS (WHO	RESULT					
1	pH	7 - 8.5	6.6	5	7.3	6.2	7.1	6.8
2	Hardness	---	64	62	100	90	80	96
3	Calcium	75 mg/l	18	16	16	22	18	22
4	Magnesium	50 mg/l	5	5	10	8	8	10
5	Chloride	200 mg/l	84	80	80	112	66	90
6	Sulphate	200 mg/l	5	9	4	3	5	2
7	Flouride	0.5 mg/l	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	500 mg/l	306	264	270	340	256	354
9	DO	---	5	6.4	6.6	7.5	7.4	7
10	Iron	0.3 mg/l	1.3	1.48	1.43	1.72	1.57	1.38
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL
12	Nitrate	---	BDL	BDL	BDL	BDL	BDL	BDL
13	Colour	Colourless	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour
14	Odour	Unobjectable	Smell of HC	Smell of HC	Smell of HC	Smell of HC	Smell of HC	Smell of HC

ANNEXURE-I
ABSTRACT OF OF 2010-11

NAME OF INDUSTRY		M/S MRPL,Bala, Katipalla, Mangalore						
PARTICULARS OF THE SAMPLE		Borewell near HG Industry-M-6 inside the Industrial Cluster						
SL. NO	MONTH	MAY	JUN	JULY	AUG	SEP	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT					
1	pH	7-8.5	6.7	6.2	6.4	6.3	6.8	6.9
2	Hardness	---	52	48	68	64	50	54
3	Calcium	75mg/l	12	13	13	12	10	13
4	Magnesium	50mg/l	5	4	9	8	6	5
5	Chloride	200mg/l	100	84	92	120	88	100
6	Sulphate	200mg/l	4	14	1	3	4	10
7	Flouride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	---	256	268	284	334	364	312
9	DO	---	6.3	7	6.7	7.5	7	7.3
10	Iron	0.3mg/l	1.57	0.98	1.74	1.68	1.36	1.43
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL
12	Nitrate	---	BDL	BDL	BDL	BDL	BDL	BDL
13	Colour	Colourless	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour
14	Odour	Unobjectable	Smell of HC	Smell of HC	Smell of HC	Smell of HC	Smell of HC	Smell of HC

ANNEXURE-I
ABSTRACT OF OF 2010-11

NAME OF INDUSTRY		M/S MRPL,Bala, Katipalla, Mangalore						
PARTICULARS OF THE SAMPLE		Borewell (near old oil sludge area) inside the Industrial Cluster						
SL. NO	MONTH	MAY	JUN	JULY	AUG	SEP	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT					
1	pH	7-8.5	6.8	6.2	6.9	6.7	6.7	7.8
2	Hardness	---	82	58	80	100	90	76
3	Calcium	75mg/l	20	11	16	18	21	19
4	Magnesium	50mg/l	8	7	10	13	9	7
5	Chloride	200mg/l	20	16	20	18	22	30
6	Sulphate	200mg/l	1	7	1	3	2	4
7	Flouride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	---	244	178	196	232	232	234
9	DO	---	6.2	6.2	6.6	7.6	7.5	7.5
10	Iron	0.3mg/l	0.63	1.25	0.4	1.31	0.15	0.15
11	Oil &Grease	---	BDL	BDL	BDL	BDL	BDL	BDL
12	Nitrate	---	BDL	BDL	BDL	BDL	BDL	BDL
13	Colour	Colourless	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour	Mud colour
14	Odour	Unobjactable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, Bala, Katipalla, Mangalore	
PARTICULARS OF THE SAMPLE		Borewell near new oil sludge area inside the Industrial Cluster	
SL. NO	MONTH		MAY
	PARAMETERS	LIMITS (WHO)	RESULT
1	pH	7-8.5	8.6
2	Hardness	---	174
3	Calcium	75mg/l	33
4	Magnesium	50mg/l	22
5	Chloride	200mg/l	92
6	Sulphate	200mg/l	4
7	Flouride	0.5mg/l	BDL
8	Total Dissolved Solids	500 mg/l	390
9	DO	---	6.8
10	Iron	0.3mg/l	0.83
11	Oil &Grease	---	BDL
12	Nitrate	---	BDL
13	Colour	Colourless	Colourless
14	Odour	Unobjectable	Odourless

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE				
PARTICULARS OF THE SAMPLE		Borewell water near HGI in side the Industrial Cluster				
SL. NO	MONTH	APR	AUG	SEPT	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT			
1	pH	7-8.5	6.6	5.9	6.5	6.8
2	Hardness	---	32	106	90	92
3	Calcium	75mg/l	8	24	22	21
4	Magnesium	50mg/l	3	11	8	10
5	Chloride	200mg/l	104	120	96	120
6	Sulphate	200mg/l	6	13	6	16
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL
8	Iron	---	1.28	1.49	1.08	0.87
9	Total Dissolved Solids	---	264	392	322	302
10	Nitrate	0.3mg/l	BDL	BDL	BDL	BDL
11	Oil &Grease	---	BDL	BDL	BDL	BDL
12	Colour	Colourless	Mud colour	Mud colour	Mud colour	Mud colour
13	Odour	Unobjectable	Smell of HC	Smell of HC	Smell of HC	Smell of HC
14	D.O	---	5.8	7.2	7.6	7

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, MANGALORE	
PARTICULARS OF THE SAMPLE		Borewell near ETP in side the Industrial Cluster	
SL. NO	MONTH		APR
	PARAMETERS	LIMITS(WHO)	RESULT
1	pH	7-8.5	6.2
2	Hardness	---	30
3	Calcium	75mg/l	6
4	Magnesium	50mg/l	4
5	Chloride	200mg/l	16
6	Sulphate	200mg/l	6
7	Fluoride	0.5mg/l	BDL
8	Iron	---	1.41
9	Total Dissolved Solids	---	134
10	Nitrate	0.3mg/l	BDL
11	Oil &Grease	---	BDL
12	Colour	Colourless	Colourless
13	Odour	Unobjectable	Odourless
14	D.O	--	6.2

**ANNEXURE-I
ABSTRACT OF OF 2010-11**

NAME OF INDUSTRY		M/S MRPL, Bala, Katipalla, Mangalore			
PARTICULARS OF THE SAMPLE		Borewell near SRU No.11, inside the Industrial Cluster			
SL. NO	MONTH	AUG	SEP	OCT	
	PARAMETERS	LIMITS(WHO)	RESULT		
1	pH	7-8.5	6.9	7.3	7.8
2	Hardness	---	106	112	104
3	Calcium	75mg/l	16	20	26
4	Magnesium	50mg/l	16	15	9
5	Chloride	200mg/l	20	20	26
6	Sulphate	200mg/l	2	3	2
7	Flouride	0.5mg/l	BDL	BDL	BDL
8	Total Dissolved Solids	---	230	278	256
9	DO	---	7.3	7.6	7
10	Iron	0.3mg/l	0.289	0.19	0.16
11	Oil & Grease	---	BDL	BDL	BDL
12	Nitrate	---	BDL	BDL	BDL
13	Colour	Colourless	Colourless	Colourless	Colourless
14	Odour	Unobjectable	Odourless	Odourless	Odourless

ANNEXURE-I

ABSTRACT OF OF 2010-11

NAME OF INDUSTRY		M/S MRPL,Bala, Katipalla, Mangalore	
PARTICULARS OF THE SAMPLE		Borewell (Bio-Remidiation pit 1-H area)	
SL. NO	MONTH		OCT
	PARAMETERS	LIMITS(WHO)	RESULT
1	pH	7-8.5	7.8
2	Hardness	---	62
3	Calcium	75mg/l	12
4	Magnesium	50mg/l	8
5	Chloride	200mg/l	72
6	Sulphate	200mg/l	4
7	Flouride	0.5mg/l	BDL
8	Total Dissolved Solids	---	210
9	DO	---	7.3
10	Iron	0.3mg/l	0.1
11	Oil &Grease	---	BDL
12	Nitrate	---	BDL
13	Colour	Colourless	Colourless
14	Odour	Unobjectable	Odourless

ANEXURE-I

ABSTRACT OF OF 2010-11

Bore Well Water Sample Near ETP inside the Premises of M/s Sequent Scientific Ltd, Baikampady, Industrial Area, Mangalore									
SL. NO.	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETER	WHO STD	RESULT						
1	pH	7 - 8.5	7.3	7.2	7	6.3	6.5	6.6	6.2
2	Hardness	---	250	300	114	16	34	78	200
3	Calcium	75 mg/l	40	46	18	4	6	3	36
4	Magnesium	50 mg/l	36	45	17	1	4	11	27
5	Total Dissolved Solids	200 mg/l	896	876	732	118	138	392	702
6	Flouride	0.5 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	Sulphate	200 mg/l	4	5	25	3	1	9	14
8	DO	0.5 mg/l	5.5	5.8	6.5	7.2	7.3	7	6.4
9	Iron	0.3 mg/l	1.12	0.7	1.13	0.13	0.27	1.46	1.5
10	Chloride	200 mg/l	200	200	320	16	30	110	138
11	Nitrate	---	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Colourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

ANNEXURE-I

ABSTRACT OF OF 2010-11

Open well near ETP inside the premises of M/s BASF India Limited, Bala, Kana, Mangalore									
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	WHO STD	RESULT						
1	pH	7-8.5	6.8	7.2	7.1	7.2	5.9	6.7	6.7
2	Hardness	--	20	20	34	26	24	24	28
3	Calcium	75mg/l	5	5	6	8	6	6	6
4	Magnesium	50mg/l	2	2	4	1	2	2	3
5	Chloride	200mg/l	16	30	16	14	30	26	20
6	Sulphate	200mg/l	2	6	4	2	2	3	2
7	Fluoride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	200mg/l	62	128	76	140	136	72	120
9	D.O.	--	6.2	6	7.4	7	7.6	7.1	7.5
10	Iron	0.3mg/l	1.08	0.49	0.05	0.048	0.1	0.02	0.048
11	Nitrate	50 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

ANNEXURE-I

ABSTRACT OF OF 2010-11

Borewell near Dyes Plant inside the premises of M/s BASF India Limited, Bala, Kana, Mangalore									
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	WHO STD	RESULT						
1	pH	7-8.5	7.5	7.7	7.5	6.5	7	6.8	6.9
2	Hardness	--	60	92	82	72	76	72	94
3	Calcium	75mg/l	18	14	20	14	16	15	16
4	Magnesium	50mg/l	3	14	8	9	9	8	13
5	Chloride	200mg/l	14	14	14	12	20	18	20
6	Sulphate	200mg/l	2	1	18	5	4	6	22
7	Flouride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	200mg/l	240	262	234	200	160	214	260
9	DO	--	6.3	6	7	7.2	7.5	7.1	7
10	Iron	0.3mg/l	0.49	0.65	1.31	0.56	0.38	0.79	1.53
11	Nitrate	50 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjactable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

ANNEXURE-I
ABSTRACT OF OF 2010-11

Borewell behind Dispersion plant inside the premises of M/s BASF India Limited, Bala, Kana, Mangalore									
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	WHO STD	RESULT						
1	pH	7-8.5	6.8	7.2	6.7	7	5.8	6.7	6.5
2	Hardness	--	130	174	380	234	182	112	114
3	Calcium	75mg/l	20	26	36	40	34	26	24
4	Magnesium	50mg/l	19	27	70	33	24	11	13
5	Chloride	200mg/l	16	16	10	12	24	18	20
6	Sulphate	200mg/l	64	108	310	180	140	8	104
7	Flouride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	200mg/l	394	368	756	702	428	296	394
9	DO	--	6	5.8	7.4	7	7.6	7.2	6.4
10	Iron	0.3mg/l	1.1	1.12	1.4	1.41	1.49	0.98	1.71
11	Nitrate	50 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

ANNEXURE-I

ABSTRACT OF OF 2010-11

Borewell near Incinerator inside the premises of M/s BASF India Limited, Bala, Kana, Mangalore									
SL. NO	MONTH		APR	MAY	JUN	JUL	AUG	SEPT	OCT
	PARAMETERS	WHO STD	RESULT						
1	pH	7-8.5	7.4	7.8	7.5	6.8	6.7	7	6.7
2	Hardness	--	80	82	110	108	112	104	118
3	Calcium	75mg/l	16	12	26	22	22	27	24
4	Magnesium	50mg/l	10	13	11	13	14	9	14
5	Chloride	200mg/l	14	20	14	14	20	14	20
6	Sulphate	200mg/l	1	1	1	1	1	1	1
7	Flouride	0.5mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Total Dissolved Solids	200mg/l	302	226	188	270	250	210	292
9	DO	--	6.3	5.8	7.1	6.7	7.6	7	6.6
10	Iron	0.3mg/l	0.16	0.03	0.11	0.57	1.27	0.09	1.43
11	Nitrate	50 mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
13	Odour	Unobjectable	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless

ANNEXURE-II

The requirement of water for different purposes and the Quantity of waste water generated from the major industries located in the Baikampady industrial cluster are as presented below:

1. M/s. Mangalore Refineries & Petrochemicals Ltd., Kuthethur, via Katipalla, Mangalore.

The source of water to MRPL is from river Nethravathi through its own Sarpady pumping station.

Sl.No	Sources/ Usages	Water Consumption in KLD	Effluent generation in KLD
A	Domestic	1440	1,080
B	Industrial Purpose		
1	Industrial Process	5784	5,376
2	Cooling	10,392	1,056 – 3,000
3	Boiler feed & DM Plant	5328	1,680
4	Fire water makeup & Evaporation losses	3,000	---
5	Green belt development	1200	---
	TOTAL	27,144	11,136

2. M/s. BASF India Ltd., Bala Village, Mangalore-575030.

Water to BASF is supplied by MRPL from river Nethravathi through its own Sarpady pumping station.

Sl. No	Sources/ Usages	As per CFE/CFO		Actual	
		Water Consumption in KLPD	Effluent generation in KLPD	Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	130	110	110	100
B	Gardening & others	60	20	40	20

C	Industrial Purpose				
1	Process & washings	730	610	435	330
2	Boiler feed	120	40	35	75
3	Cooling	160	30	80	75
	TOTAL	1200	810	700	480

BASF authorities have provided ETP of 810 KLD capacity for treatment of Trade and domestic effluent generated from both M/S BASF India Ltd. and M/S BASF Coatings Pvt. Ltd.

3. M/s. Mangalore Chemicals & Fertilizers Ltd., Panambur, Mangalore-575010.

Source of water is from the river Nethravathi supplied by Mangalore City Corporation

Sl.No	Sources/ Usages	Water Consumption in KLD	Effluent generation in KLD
A	Domestic	320	270
B	Industrial Purpose		
1	Process	Water is not directly used in the process	120
2	Washings	--	--
3	Boiler feed	4104	816
4	Cooling	4052	480
	TOTAL	8476	1686

4. M/s. Sequent Scientific Ltd., Plot No 120A & 120B & 36, Baikampady Industrial Area, Mangalore.

Source of water is from Bore-well and KIADB supply.

Sl. No.	Sources/ Usages	Actual			
		Water Consumption in KLD	Effluent generation in KLD		
			ETP	FDE	Gardening
1	Domestic	16.0	12.0	-	-
2	Process	4.951	3.588	1.363	
3	washings	6.952	6.835	0.117	-
4	Boiler Feed	14.0	-	-	3.7
5	Cooling	58.0	-	-	41.0
	TOTAL	99.903	22.423 (12.0- Domestic)	1.48	44.7
Consented capacity		99.90	10.42(Process) 12.0 (Sewage)	14.8	44.7

5. M/s. KIOCL (Pellet Plant), Panambur, Mangalore.

80 KL of raw water is used for domestic purpose is drawn from bore wells from Blast Furnace unit of own concern and industrial water of 12,815 KLD is received from Lakya Dam located at Kudremukh through pipeline.

Sl. No	Sources/ Usages	Water Consumption in KLD	Effluent generation in KLD	Remarks
a	Floor Washing	800	300	Recycled back in to the process.
b	Pelletization plant process	3000	---	
c	Power generation at Captive power plant (cooling & Scrubbing)	660	80	

d	Sprinkling for dust suppression and gardening	340	---	
e	Cooling purpose	3910	820	Recycled back in to the process
f	Classifier	635	---	
	Total	9345	1200	
a	Pellet plant unit for drinking, canteen facility (Borewell water from Blast furnace unit)	80.0	38.0	20 KLD treated in STP. Remaining 18 KLD is discharged into septic tank & soak pit at different locations.
b	Drinking & bathing water for marshalling yard at NMPT(Supply from NMPT)	30.0	25.0	Discharged into septic tank & soak pit.
	Total	110.0	63.0	

6. **M/s New Mangalore Port Trust, Panambur, Mangalore-575010**

Source of water is from bore wells and from corporation supply

Sl. No.	Sources/Usages	Effluent generation in KLD	
		Water Consumption in KLD	Effluent generation in KLD
1	Domestic	1250.0	750.0
2	Gardening	1719.0	NIL
3	Used for fire fighting/cleaning	24.0	-
4	Ship feeding	194.0	NIL
	TOTAL	3187.0	750.0

The domestic effluent generated from the port area including colony which consists of 500 houses is treated in a separate sewage treatment plant of 1.20 MLD.

7. M/s. United Breweries Ltd., Plot No. 310,311 & 322 (E), Baikampady Industrial Area Mangalore-575011

Source of water is Bore well, tankers & City corporation supply.

Sl. No	Sources/ Usages	Water Consumption in KLPD	Effluent generation in KLPD
1	Process	239	148
2	Bottling	147	147
3	Cooling	15	3
4	Boiler	45	5.23
5	WTP	13.75	13.75
	TOTAL	459.75	316.98

The UBL have provided ETP of 550 KLD capacity.

8. M/s. Ruchi Soya Industries Limited, Baikampady Industrial Area, Mangalore

Source of water is from Bore well & Corporation Supply.

Sl. No	Sources/ Usages	Actual	
		Water Consumption in KLD	Effluent generation in KLD
A	Domestic	8	6
	Gardening	Treated water	--
B	Industrial Purpose		
1	Process	37.5	35
2	Washings	15	15
3	Boiler feed	300	15
4	Cooing	18	12
5	Others	33	33
	TOTAL	411.5	116

M/s. Ruchi Soya Industries Ltd have installed & operating the ETP of 300 KLD capacity.

9. M/s. Rajshree Packagers Limited, Baikampady Industrial Area, Mangalore

Source of water is from open well and MCC supply.

Sl. No	Sources/ Usages	Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	4	3
B	Gardening	Treated water	--
C	Industrial Use		
1	Process	40	Nil
2	Washings	0.5	0.5
3	Boiler	120	10
4	cooling	20	recycled
	TOTAL	184.5	13.5

M/s. Rajashree Packagers Ltd have installed ETP of 50 KLD capacity.

Annexure III

Hydrographic Parameters of Sea water collected form Marine outfall of M/s MRPL																				
MONTH			APR						MAY						JUN					
S. NO	PARAMETERS	Frequency	Ist Fortnight			2nd Fortnight			Ist Fortnight			2nd Fortnight			Ist Fortnight			2nd Fortnight		
			8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
Sampling Station	Unit		8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
1	Water Temperature °C		31.6	31.6	31.6	30.6	30.6	30.6	32.50	32.50	32.50	31.00	31.00	31.00	29.300	29.300	29.200	29.200	29.200	29.200
2	Salinity	ppt	35.1	35.2	35.1	35.40	35.40	35.40	35.60	35.60	35.60	35.40	35.4	35.50	35.800	35.800	35.800	29.700	29.100	29.800
3	Dissolved oxygen	mg/l	5.65	5.32	5.36	4.70	4.70	4.73	5.45	5.36	5.46	4.67	4.65	4.31	6.580	6.610	6.530	6.770	6.790	6.680
4	Total Suspended Solids	mg/l	6	18	10	21	20	17	14	10	24	26	19	20	61.000	85.000	80.000	91.000	92.000	92.000
5	pH	6-8.5	8.05	8.02	8.04	7.98	7.98	8.00	8.01	8.05	8.05	8.01	8.01	8.01	7.920	7.960	8.010	7.460	7.520	7.510
6	Free Ammonia	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
7	Ammoniacal Nitrogen	mg/l	0.016	0.044	0.039	0.005	0.030	0.001	0.045	0.008	nd	0.002	0.017	0.006	0.050	0.079	0.058	0.060	0.015	0.070
8	Phosphate	mg/l	0.023	0.03	0.024	0.027	0.023	0.03	0.290	0.031	0.032	0.042	0.038	0.040	0.044	0.035	0.055	0.017	0.025	0.015
9	Silicate	mg/l	0.365	0.403	0.375	0.382	0.363	0.42	0.370	0.352	0.397	0.431	0.421	0.431	0.570	0.620	0.590	0.480	0.570	0.470
10	Odour		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11	Colour		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12	Total Residual Chlorine	mg/l	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07	0.06	0.05	0.05	0.060	0.060	0.060	0.020	0.020	0.020
13	Sulphide	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14	Oil & Grease	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15	Cyanide	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16	Phenol	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17	BOD	mg/l	1.46	1.95	1.58	1.13	0.54	0.35	1.20	1.02	0.90	0.68	1.24	0.87	1.840	2.240	1.620	1.070	1.220	0.810
18	COD	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	10.500	10.300	10.350	15.500	15.200	15.800
19	Chlorophyll-a	mg/m ³	--	0.667	--	--	6.666	--	--	6.090	--	--	5.829	--	8.468	6.676	7.140	5.368	6.473	4.672
20	Chlorophyll-b	mg/m ³	--	0.065	--	--	0.326	--	--	nd	--	--	0.022	--	0.609	0.829	0.650	2.294	0.590	0.545
21	Chlorophyll-c	mg/m ³	--	0.496	--	--	4.182	--	--	2.138	--	--	3.005	--	5.762	2.756	2.570	2.091	2.075	2.369
23	Bioassay	% Mortality	--	--	--	--	--	--	--	--	--	--	--	--	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality

Note:- Sampling stations 8,9 &10 are the sampling stations on parallel transect near marine outfall.

Hydrographic Parameters of Sea water collected form Marine outfall of M/s MRPL																				
MONTH			JUL						AUG						SEP					
SL. NO	PARAMETERS	Frequency	Ist Fortnight			2nd Fortnight			Ist Fortnight			2nd Fortnight			Ist Fortnight			2nd Fortnight		
			8	9	10	8	9	10	8	9	10	8	9	10	8	9	10	8	9	10
	Sampling Station	Unit																		
1	Water Temperature °C		28.50	28.50	28.50	27.20	27.30	27.20	25.10	24.40	29.90	21.90	21.80	21.90	27.10	27.10	27.20	28.70	28.60	28.90
2	Salinity	ppt	32.10	31.50	31.70	27.10	27.10	26.30	29.00	32.90	30.62	34.30	34.40	33.70	29.40	29.30	29.30	29.40	30.80	30.50
3	Dissolved oxygen	mg/l	6.96	7.04	7.08	7.72	7.95	7.71	7.62	7.44		8.05	8.09	8.12	7.88	7.69	7.76	7.16	6.95	7.29
4	Total Suspended Solids	mg/l	219	199	71	140.00	137.00	175.00	46.00	71.00	109.0	68.00	56.00	59.00	28.00	31.00	31.00	33.00	25.00	27.00
5	pH	6-8.5	7.81	7.59	7.47	7.78	7.88	7.77	7.71	7.68	7.80	7.62	7.44	7.71	7.96	7.98	7.98	7.89	7.90	7.86
6	Free Ammonia	mg/l	nd	nd	nd	nd	nd	nd	nd	nd		nd	nd	nd	nd	nd	nd	nd	nd	nd
7	Ammoniacal Nitrogen	mg/l	0.07	0.10	0.15	0.05	0.06	0.06	0.05	0.04		0/01	0.08	0.01	0.04	0.02	0.04	0.10	0.16	0.10
8	Phosphate	mg/l	0.04	0.08	0.07	0.07	0.04	0.04	0.05	0.06	0.02	0.06	0.05	0.05	0.05	0.03	0.03	0.05	0.03	0.03
9	Silicate	mg/l	0.63	0.76	0.69	1.05	1.27	1.12	1.18	0.83	0.07	0.81	1.15	1.04	0.39	0.38	0.39	0.36	0.50	0.38
10	Odour		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
11	Colour		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
12	Total Residual Chlorine	mg/l	0.02	0.02	0.02	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
13	Sulphide	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
14	Oil & Grease	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
15	Cyanide	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
16	Phenol	mg/l	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
17	BOD	mg/l	1.06	1	2.01	2.51	2.41	2.19	1.16	0.92	1.27	1.88	1.54	1.71	2.29	2.82	2.30	2.37	1.97	2.24
18	COD	mg/l	18.2	17.9	17.6	17.17	16.78	16.7	11.19	11.80	10.85	12.85	9.75	9.20	18.20	18.00	18.00	16.20	16.80	16.80
19	Chlorophyll-a	mg/m ³	5.924	5.182	45.237	13.23	14.738	17.348	7.83	6.96	8.29	24.10	29.10	29.75	16.38	15.92	13.25	5.86	7.19	5.66
20	Chlorophyll-b	mg/m ³	1.829	nd	0.393	2.78	0.96	1.87	0.22	nd	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd
21	Chlorophyll-c	mg/m ³	3.482	2.51	1.781	10.808	7.155	10.686	4.49	3.32	4.31	10.52	13.85	13.17	9.03	9.22	8.34	2.23	3.22	1.55
23	Bioassay	% Mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality	0%No mortality

Note:- Sampling stations 8,9 &10 are the sampling stations on parallel transect near marine outfall.

Hydrographic Parameters of Sea water collected form Chitrapur Beach ,Mangalore In Case of BASF India Limited

Month			APR			MAY			JUN			JUL			AUG			SEP		
Sl. No.	Parameter	Unit	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1	Water Temp	°C	32.10	32.50	32.20	32.20	32.20	32.20	28.70	28.30	28.10	29.20	28.60	28.30	29.50	29.60	29.90	27.80	27.70	27.50
2	pH	6-8.5	7.90	7.80	7.80	8.00	7.90	7.90	8.10	7.90	8.00	7.90	7.70	7.70	8.00	7.90	7.80	7.90	8.00	7.90
3	Salinity	ppt	34.99	34.99	34.55	35.01	35.28	35.01	30.67	30.97	30.58	30.45	29.84	30.03	30.43	1.09	30.62	28.85	27.90	27.10
4	Dissolved Solids	mg/l							5.12	4.93	4.61	4.77	4.92	4.81	4.89	4.87	5.02	5.54	5.35	5.12
5	BOD	mg/l	2.28	2.28	2.69	2.28	2.04	2.46	2.69	2.17	2.32	1.57	1.40	1.21	2.39	2.03	2.54	1.99	1.84	2.04
6	Ammoniacal Nitrogen	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.09	0.06	0.02	0.05	0.05	0.05	0.06	0.03	0.02	0.08	0.09	0.08
7	Nitrite	mg/l	0.00	0.02	0.00	0.03	0.04	0.04	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
8	Nitrate	mg/l	0.03	0.04	0.05	0.01	0.04	0.06	0.20	0.19	0.13	0.18	0.13	0.19	0.23	0.21	0.20	0.13	0.12	0.13
9	Phosphate	mg/l	0.57	0.79	0.57	1.27	1.27	1.40	0.07	0.07	0.06	0.03	0.05	0.07	0.03	0.04	0.07		0.04	0.04
10	Silicate	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	1.78	2.23	2.48	1.99	1.87	2.13	2.21	2.10	2.34		1.98	1.77
11	Total S.S.	mg/l							72.00	75.00	82.00	121.00	143.00	139.00	120.00	112.00	109.00	1.46	91.00	99.00
12	Chlorophyll-a	mg/m ³							2.54	2.22	2.19	2.01	1.92	2.09	1.06	1.45	1.68	88.00	2.10	2.32

**Note:- Sampling station -1 along the effluent discharge line
 Sampling station-2 & 3 located in the south & north side of effluent discharge line**

Hydrographic Parameters of Sea water collected form Chitrapur Beach ,Mangalore In Case of BASF India Limited

Month			APR			MAY			JUN			JUL			AUG			SEP		
Sl. No.	Parameter	Unit	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1	Water Temp	°C	32.10	32.50	32.20	32.20	32.20	32.20	28.70	28.30	28.10	29.20	28.60	28.30	29.50	29.60	29.90	27.80	27.70	27.50
2	pH	6-8.5	7.90	7.80	7.80	8.00	7.90	7.90	8.10	7.90	8.00	7.90	7.70	7.70	8.00	7.90	7.80	7.90	8.00	7.90
3	Salinity	ppt	34.99	34.99	34.55	35.01	35.28	35.01	30.67	30.97	30.58	30.45	29.84	30.03	30.43	1.09	30.62	28.85	27.90	27.10
4	Dissolved Solids	mg/l							5.12	4.93	4.61	4.77	4.92	4.81	4.89	4.87	5.02	5.54	5.35	5.12
5	BOD	mg/l	2.28	2.28	2.69	2.28	2.04	2.46	2.69	2.17	2.32	1.57	1.40	1.21	2.39	2.03	2.54	1.99	1.84	2.04
6	Ammoniacal Nitrogen	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.09	0.06	0.02	0.05	0.05	0.05	0.06	0.03	0.02	0.08	0.09	0.08
7	Nitrite	mg/l	0.00	0.02	0.00	0.03	0.04	0.04	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
8	Nitrate	mg/l	0.03	0.04	0.05	0.01	0.04	0.06	0.20	0.19	0.13	0.18	0.13	0.19	0.23	0.21	0.20	0.13	0.12	0.13
9	Phosphate	mg/l	0.57	0.79	0.57	1.27	1.27	1.40	0.07	0.07	0.06	0.03	0.05	0.07	0.03	0.04	0.07		0.04	0.04
10	Silicate	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	1.78	2.23	2.48	1.99	1.87	2.13	2.21	2.10	2.34		1.98	1.77
11	Total S. S.	mg/l							72.00	75.00	82.00	121.00	143.00	139.00	120.00	112.00	109.00	1.46	91.00	99.00

Note:- Sampling station -1 along the effluent discharge line

Sampling station-2 & 3 located in the south & north side of effluent discharge line

ANNEXURE-IV

The quantity of water consumption & waste water discharge & treatment units provided by the major industries located in the Baikampady industrial cluster are as follows:

1. M/s. Mangalore Refineries & Petrochemicals Ltd., Kuthethur, via Katipalla, Mangalore-575030.

The source of water to MRPL is from river Nethravathi through its own Sarpady pumping station.

Purposes of Water consumed	Water consumed in m3/hr
1) Domestic	: 60
2) Industrial purpose	: 241
3) Cooling	: 433
4) Boiler feed & DM Plant	: 222
5) Fire water makeup & Evaporation losses	: 125
6) Green belt development	: 50
Total	: 1131

The quantity of effluent generated in m3/hr from different sections of MRPL are as follows:

1) Domestic effluent	: 45
2) Industrial effluent	: 224
3) Boiler blow down	: 30
4) Cooling tower blow down	: 44-125
5) Condensate water from process units	: 40
Total	: 464

The factory authorities have constructed and operating 2 separate effluent treatment plants for their phase-I and phase-II plants and the quantity of effluent generation in m3/hr during dry weather and wet weather are as follows:

	Dry weather	Wet weather
1) Phase-I ETP	100	300
2) Phase-II ETP	300	650

The ETP both Phase -I & phase -II ETP units consist of following units:

Receiving Sump
Oil removal system
Equalization tank
Dissolved air flotation tank
Biological trickling filter
Aeration tanks with activated sludge process
Clarifiers
Sand filter
Activated carbon filter
Treated effluent storage sump

During wet weather the treated effluent is completely discharged into sea or part of it is recycled back to cooling tower and during dry weather, 70% of treated effluent is recycled back to cooling tower and remaining 30% is discharged into Arabian sea 650 m off Chitrapur shore seaward.

2. M/s. BASF India Ltd., Bala Village, Mangalore-575030.

Water to BASF is supplied by MRPL from river Nethravathi through its own Sarpady pumping station.

Sl. No	Sources/ Usages	As per CFE/CFO		Actual	
		Water Consumption in KLPD	Effluent generation in KLPD	Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	130	110	110	100
B	Gardening & others	60	20	40	20
C	Industrial Purpose				
1	Process & washings	730	610	435	330
2	Boiler feed	120	40	35	75
3	Cooling	160	30	80	75
	TOTAL	1200	810	700	480

BASF authorities have provided ETP of 810 KLD capacity for treatment of Trade and domestic effluent generated from both M/S BASF India Ltd. and M/S BASF Coatings Pvt. Ltd. The ETP is consisting of following units:

Sl No.	Description	Size
1	Raw Effluent Collection Tank Cum Neutralization Tanks	300 cum & 500 cum
2	Cascade Tank	1.86 X 1.86 X 1.45 m
3	Clariflocculator	7.31 m dia
4	Aeration Tank	13 X 13 X 3.0 m
5	Secondary Clarifier	10m Dia
6	Sludge Collection Sump	2.5 X 2.5 X 2.5 m
7	Pressure Sand Filter.	1 No.
8	Activated Carbon Filter	1 No.
9	Final Treated Holding Tank	300 cum

The industry is discharging the treated trade effluent into Arabian sea at a distance of 1400 m from the Chitrapur Sea Shore.

3. M/s. Mangalore Chemicals & Fertilizers Ltd., Panambur, Mangalore-575010.

Source of water is from the river Nethravathi supplied by Mangalore City Corporation

Sl.No	Sources/ Usages	Water Consumption in KLD	Effluent generation in KLD
A	Domestic	320	270
B	Industrial Purpose		
1	Process	Water is not directly used in the process	120
2	Washings	--	--
3	Boiler feed	4104	816
4	Cooling	4052	480
	TOTAL	8476	1686

The industry has installed 240 m³/day STP consisting of following units:

Sl. No.	Name of the Units	Size in Meters
1	Bar Screen	1 m x 1 m x 1.5 m
2	Oil & Grease Trap	2 m x 2 m x 1 m
3	Equilization Tank: 100 M3	7.1 m x 7.1 m x 2.0 m
4	MBR Tank: 29.2 m ³	2.5 m x 3.5 m x 3.9 m (3.5 swd)
5	Treated Effluent Tank	1 no.

The final treated sewage is reused as cooling tower makeup water.

The effluent water recovery unit mainly consisting of Lamella Clarifier, Ultra Filtration & Reverse Osmosis system installed by the industry to recover & reuse the water under concept of reduce, reuse and recycle. These effluent recovery units are integrated to the main plant of Ammonia, Urea, DAP and Cooling tower in usage of treated water stream.

The industry uses the thickened slurry from lamella clarifier unit and RO reject from RO plant in DAP plant as additive.

However, only during summer and annual shutdown/maintenance, the industry proposes to utilize the treated effluent for the greenbelt development or discharge to the Arabian Sea.

4. M/s. Sequent Scientific Ltd., Plot No 120A & 120B & 36, Baikampady Industrial Area, Mangalore.

Source of water is from Bore-well and KIADB supply.

Sl. No.	Sources/ Usages	Actual			
		Water Consumption in KLD	Effluent generation in KLD		
			ETP	FDE	Gardening
1	Domestic	16.0	12.0	-	-
2	Process	4.951	3.588	1.363	
3	washings	6.952	6.835	0.117	-
4	Boiler Feed	14.0	-	-	3.7
5	Cooling	58.0	-	-	41.0
	TOTAL	99.903	22.423 (12.0- Domestic)	1.48	44.7
Consented capacity		99.90	10.42(Process) 12.0 (Sewage)	14.8	44.7

They are treating the trade effluent in a 25 KLD ETP. The details of ETP units are given below;

Sl No.	ETP Units	Quantity in No's	Dimensions in m
1	Screen	1	Fine & Coarse
2	Equalization tank/neutralization tank	1	5.8 x 5.8 x 3.0
3	Flash mixer	1	100 litres capacity
4	Flocculator	1	500 litres capacity
5	Primary settling tank	1	2.0 x 2.0 x 1.0
6	Closed anaerobic digester	1	6.5 m dia x 3.0
7	Aerated lagoon (Primary aeration tank)	1	7.0 x 9.0 x 3.0 with diffusers
8	1st stage extended aeration tank(Primary aeration tank)	1	2.0 x 2.0 x 1.0 with diffusers
9	1st stage settling tank	1	2.0 x 2.0 x 1.0
10	1st stage extended aeration tank(ter. aeration tank)	1	3.2 x 3.2 x 2.5 with diffusers
11	2nd stage settling tank	1	2.0 x 2.0 x 1.0
12	Activated carbon filter	2	0.6 m dia x 2.0 h
13	Sludge drying beds	4	2.0 x 2.0

They are treating the sewage in 35 KLD STP & the details of STP units are as follows:

Sl No.	STP Units	Quantity in No's	Dimensions in m
1	Bar Screen	1	0.3 x 1.2 x 0.3
2	Oil & grease trap	1	1.2 x 1.7 x 1.2
3	Equalization tank with Air grid	1	2.2 x 2.2 x 2.0
4	FAB reactor	2	1.1 m dia x 2.5 SWD
5	Tube settler	1	1.2 x 1.2 x 2.5 SWD
6	Chlorine Dosing system	1	100 litres capacity
7	Chlorine contact tank	1	8.0 x 2.0 x 1.1
8	Filer feed tank	1	1.6 x 2.0 x 1.0 SWD
9	Treated water tank	1	1.6 x 2.0 x 1.0 SWD
10	Dual media sand filter	1	0.4 m dia x 1.5 h
11	Activated carbon filter	1	0.4 m dia x 1.5 h
12	Water Softer	1	0.335 m dia x 1.2 h
13	Sludge holding tank	1	1.6 x 2.0 x 1.0 SWD
10	Final treated water tank	1	2.0 x 0.8 x 2.0
10	Filter press	1	

The non-bio-degradable effluent generated from the industry is incinerated in the FDE.

They are utilizing the treated trade effluent and treated sewage on land for gardening & plantations.

5. M/s. KIOCL (Pellet Plant), Panambur, Mangalore.

80 KL of raw water is used for domestic purpose is drawn from bore wells from Blast Furnace unit of own concern and industrial water of 12,815 KLD is received from Lakya Dam located at Kudremukh through pipeline.

Sl. No	Sources/ Usages	Water Consumption in KLD	Effluent generation in KLD	Remarks
a	Floor Washing	800	300	Recycled back in to the process.
b	Pelletization plant process	3000	---	
c	Power generation at Captive power plant (cooling & Scrubbing)	660	80	
d	Sprinkling for dust suppression and gardening	340	---	
e	Cooling purpose	3910	820	Recycled back in to the process
f	Classifier	635	---	
	Total	9345	1200	
a	Pellet plant unit for drinking, canteen facility	80.0	38.0	20 KLD treated in STP.

	(Borewell water from Blast furnace unit)			Remaining 18 KLD is discharged into septic tank & soak pit at different locations.
b	Drinking & bathing water for marshalling yard at NMPT(Supply from NMPT)	30.0	25.0	Discharged into septic tank & soak pit.
	Total	110.0	63.0	

The F/A's have installed 20 KLD STP with the following units:

1. Raw sewage holding sump cum settling tank.
2. Alum dosage system.
3. Sand filter.
4. Sodium hypochlorite solution dosage system.
5. Activated carbon filter.

The final treated sewage is used for plantations. The industry has proposed to upgrade the sewage treatment plant to 80 KLD with activated sludge process & ultra-filtration unit & applied for consent of the Board.

The F/A's have installed 3 DG sets of capacity 9.36 MW each. Furnace oil having 2.8 to 3.2 % Sulphur is being used as fuel for power generation. The emissions from the stacks are scrubbed with NaOH solution for reducing the Sox. 12 grams of NaOH (100% solution) is consumed for every unit of power generated. The total scrubbed effluent (5 % Conc Sodium Sulphite solution) generated is of about 80 KLPD is stored in katchha earthen pit unscientifically inside industry premises, which percolates in to ground & contaminates under ground water. The F/A's have proposed in action plan to install ETP to treat the scrubbed effluent generated.

6. M/s New Mangalore Port Trust, Panambur, Mangalore-575010

Source of water is from bore wells and from corporation supply

Sl. No.	Sources/Usages	As per Consent		Actual	
		Water Consumption in KLD	Effluent generation in KLD	Water Consumption in KLD	Effluent generation in KLD
1	Domestic	—	1200	1250.0	750.0
2	Gardening	-	-	1719.0	NIL
3	Used for fire fighting/cleaning			24.0	-
4	Ship feeding			194.0	NIL
	TOTAL	—	1200	3187.0	750.0

The domestic effluent generated from the port area including colony which consists of 500 houses is treated in a separate sewage treatment plant of 1.20 MLD capacities consisting of following units:

1. Equalization Tank – 16m x 16m x 1m.
2. Stilling Chamber- 1.5m x 1.5m x 1.5 m.
3. Grit Channel- 2 Nos – 18m x0.75m x 0.45m.
4. Aeration Tank – 30m x 16m x 2.5m with 2 No. fixed surface aerators of 15 & 20 HP.
5. Secondary Clarifier- 10.1 Q x 2 m.
6. Chlorination Baffle
7. Final treated effluent collection tank-9m x9m x 2m.
8. Sludge Drying Beds-4 Nos of 15m x 7 m.

The treated effluent is utilized on land for gardening and also for dust suppression inside & outside the port area.

The NMPT authorities have got three de-ballast tanks of 5000 KL, 500 KL & 20 KL capacity to separate the slop oil from ballast tank water of ships and also the separated water is passed through the treatment plant consisting of primary oil removal section, multimedia filter and coalescer column to separate traces of oil remaining and finally treated water with oil content less than 10 ppm is discharged in to sea.

7. M/s. United Breweries Ltd., Plot No. 310,311 & 322 (E), Baikampady Industrial Area Mangalore-575011

Source of water is Bore well, tankers & City corporation supply.

Sl. No	Sources/ Usages	Water Consumption in KLPD	Effluent generation in KLPD
1	Process	239	148
2	Bottling	147	147
3	Cooling	15	3
4	Boiler	45	5.23
5	WTP	13.75	13.75
	TOTAL	459.75	316.98

The F/A's have provided ETP of 550 KLD capacity consisting of following units:

1. Screen
2. Equalization Tank.
3. Anaerobic Digester (UASB).
4. Aeration Tank with Diffused Aeration.
5. Clarifier-2 Nos.
6. Activated Carbon Filter
7. Sludge Drying Beds- 6 No
8. Final treated effluent holding sump.

The final treated trade effluent is utilized on land for gardening & plantations and domestic sewage is disposed in to septic tank & soak pit.

8. M/s. Ruchi Soya Industries Limited, Baikampady Industrial Area, Mangalore

Source of water is from Bore well & Corporation Supply.

Sl. No	Sources/ Usages	Actual	
		Water Consumption in KLD	Effluent generation in KLD
A	Domestic	8	6
	Gardening	Treated water	--
B	Industrial Purpose		
1	Process	37.5	35
2	Washings	15	15
3	Boiler feed	300	15
4	Cooling	18	12
5	Others	33	33
	TOTAL	411.5	116

The factory authorities have installed & operating the ETP of 300 KLD capacity consisting of following units:

1. Oil & grease separator.
2. Equalization & Storage Tank-2 Nos.
3. Flash Mixer with Alum & lime Doser.
4. Primary Clarifier
5. Aeration Tank-I with three fixed surface aerators.
6. Secondary Clarifier.
7. Aeration Tank-II with three fixed surface aerators.
8. Secondary Clarifier.
9. Effluent Storage Tank.
10. Sand Filter
11. Activated Carbon Filter.
12. Final Treated Storage Tank.
13. Sludge Drying Beds-6 Nos.

The final treated trade effluent is reused for ash quenching, for toilet flushing & for plantations/gardening inside the industry premises.

9. M/s. Rajshree Packagers Limited, Baikampady Industrial Area, Mangalore

Source of water is from open well and MCC supply.

Sl. No	Sources/ Usages	Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	4	3
B	Gardening	Treated water	--
C	Industrial Use		
1	Process	40	Nil
2	Washings	0.5	0.5
3	Boiler	120	10
4	cooling	20	recycled
	TOTAL	184.5	13.5

The factory authorities have installed ETP of 50 KLD capacity consisting of following units:
Equalization & Neutralization Tank.

1. Aeration Tank-I with two fixed surface aerators.
2. Settling Tank-I.
3. Aeration Tank-II with one fixed surface aerator.
4. Settling tank-II.
5. Sand media Filter.
6. Chlorination
7. Final Treated Storage Tank.
8. Sludge Drying Beds-4 Nos.

The final treated trade effluent is reused for cooling tower, used for ash quenching & also for plantations inside the industry premises.

10. M/s. Blue Water Foods & Exports Pvt. Ltd., Plot No.281/282, Baikampady Industrial Area, Mangalor

Source of water is from bore well & city corporation supply.

Sl. No	Sources/ Usages	Actual	
		Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	3.0	2.0
B	Industrial		
1	Process	100.50	153
2	Washings	52.0	
3	For Glazing	64.0	NIL-used as glazing
4	Cooling	1.0	recycle
	TOTAL	221.0	155.0

The factory authorities generating effluent of 153 KLD and installed ETP of 360 KLD capacity consisting of following units:

1. Screen
2. Oil & Grease Trap.
3. Settling Tank-I
4. Primary Aeration Tank with diffused aeration.
5. Settling tank-II.
6. Secondary Aeration Tank with diffused aeration
7. Membrane Filter.
8. Chlorination
9. Final Treated Storage Tank.

The final treated trade effluent is being utilized for gardening/plantations.

11. M/s Kalimiya Exports, Plot No. 413(P) & 414, Baikampady Industrial Area, Mangalore-575011.

Source of water is from Tankers & corporation supply.

Sl. No	Sources/ Usages	Actual	
		Water Consumption in KLPD	Effluent generation in KLPD
A	Domestic	5.0	3.0
B	Industrial		
1	Process	13	24
2	Washings	12	
	TOTAL	30	27

The factory authorities generating effluent of 24 KLD and installed ETP of 25 KLD capacity consisting of following units:

Sl. No.	Name of the Units	Quantity	Dimensions in m
	Design Flow Rate	25.00 KLD	
1	Bar Screen	1 no.	
2	Oil & Grease trap	1 no.	2.0 x 1.5 x 1.0
3	Grit chamber	1 no.	2.0 x 1.5 x 1.0
4	Collection tank	1 no.	6.0 x 3.5 x 3.0
5	Aeration tank with diffused aeration	1 no.	7.5 x 3.0 x 2.5
6	Settling tank	1 no.	3.7 x 3.7 x 2.7
7	Treated water tank	1 no.	6.0 x 4.0 x 2.0
8	PSF	1 no.	0.8m dia x 1.5 h
9	ACF	1 no.	0.8m dia x 1.5 h
10	SDB	1 no.	2.0 x 3.0 x 1.0

The final treated trade effluent is being utilized for gardening/plantations.

ANNEXURE-V

Sl No	Industry Name & Address	Category	Sewage generated in liters/day	Mode of disposal of sewage	Trade effluent generated in liters/day	STATUS OF ETP	Mode of disposal of Trade effluent
1	Akolite Synthetic Resins, Plot No.192-C, Baikampady Industrial Area, Mangalore	SMALL-RED	350	Septic tank & soak pit	4000	PROVIDED	On land for gradening
2	Benaka Asphalts, Plot No 222, Baikampady Industrial Area, Mangalore	SMALL-RED	100	Septic tank & soak pit	Nil	--	-
3	Bharath Micron Industries, Shed No. SM 143, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-RED	100	Septic tank & soak pit	200	NOT PROVIDED	dischraging out side the industry
4	Bitox Asphalt Industries, Plot No.87, Baikampady Industrial Area, Mangalore	SMALL-RED	250	Septic tank & soak pit	50	PROVIDED	On land for gradening
5	Bitutech Industries, Plot No. 88, Baikampady Industrial Area, Mangalore-575011	SMALL-RED	800	Septic tank & soak pit	Nil	---	-
6	Colortek Paints India Pvt. Ltd., Plot No.453, Baikampady Industrial Area, Mangalore	SMALL-RED	200	Septic tank & soak pit	500	PROVIDED	Recycled back into the process
7	Rainbow Industries, Dhirajlal Brothers, Plot No.156C, Baikampady Industrial Area, Mangalore	SMALL-RED	1000	Septic tank & soak pit	500	PROVIDED	On land for gradening
8	Eshwari Metal Industries (Unit II), Plot No.96 & 97, Baikampady Industrial Area, Mangalore	SMALL-RED	800	Septic tank & soak pit	Nil	---	-
9	Eshwari Metal Industries (Unit I), Plot No.101-A, Baikampady Industrial Area, Mangalore	SMALL-RED	1500	Septic tank & soak pit	Nil	---	-
10	Falcon Impex Corporation, Plot No 9a/10a, Baikampady Industrial Area, Mangalore-575011	SMALL-RED	500	Septic tank & soak pit	2000	PROVIDED	On land for gradening
11	Haji U Hasanabba & Sons, Plot No 89 & 90, Baikampady Industrial Area, Mangalore-575011	SMALL-RED	300	Septic tank & soak pit	100	PROVIDED	On land for gradening
12	Hot Dip Galvanising, Plot No.142-I, Baikampady Industrial Area, Mangalore	SMALL-RED	300	Septic tank & soak pit	200	PROVIDED	On land for gradening

13	JK Industries, Plot No.443, Baikampady Industrial Area, Mangalore	SMALL-RED	800	Septic tank & soak pit	Nil	---	-
14	Jyestha Engineers, Plot No.315, Baikampady Industrial Area, Mangalore	SMALL-RED	200	Septic tank & soak pit	Nil	---	-
15	Karnataka Foundry, Plot No.142-C Baikampady Industrial Area, Mangalore	SMALL-RED	200	Septic tank & soak pit	Nil	---	-
16	Karthik Enterprises, Shed No. 37, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-RED	500	Septic tank & soak pit	Nil	---	-
17	Laboratories Daffodil P. Ltd., Plot No. 34, Baikampady Industrial Area, Mangalore-575011	SMALL-RED	2100	Septic tank & soak pit	2400	PROVIDED	On land for gradening
18	Mangala Biotech, Plot No.141/J, Baikampady Industrial Area, Mangalore	SMALL-RED	300	Septic tank & soak pit	Nil	---	-
19	Mangalore Lime & Marine Industries, Plot No.140 A, Baikampady Industrial Area, Mangalore	SMALL-RED	500	Septic tank & soak pit	Nil	---	-
20	Mangalore Metal Rolling Mills, Shed No.B-33, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-RED	400	Septic tank & soak pit	Nil	---	-
21	Marine Food Packers, Plot No.55, Baikampady Industrial Area, Mangalore	SMALL-RED	900	Septic tank & soak pit	24700	PROVIDED	On land for gradening
22	Moogambigai Metal Refineries, Plot No. 89 & 90, Baikampady Indl. Area, Mangalore	SMALL-RED	800	Septic tank & soak pit	Nil		-
23	Mookambika Chemicals, Plot No.156/B Baikampady Industrial Area, Mangalore	SMALL-RED	300	Septic tank & soak pit	2000	PROVIDED	On land for gradening
24	Bola Surendra kamath & Sons(Mysore Mercantile Co. Ltd.), Plot No.158 A & B, Baikampady Industrial Area, Mangalore	SMALL-RED	750	Septic tank & soak pit	Nil	---	-
25	Bola Surendra Kamath & Sons(Mysore Mercantile Pvt. Ltd. (Formerly Lanyard Foods Ltd.)), Plot No.188-A, Baikampady Industrial Area, Mangalore	SMALL-RED	1000	Septic tank & soak pit	Nil	---	-
26	Pilot Paints, Plot No.242 B, Baikampady Industrial Area, Mangalore	SMALL-RED	200	Septic tank & soak pit	Nil	---	-

27	Polali Industries, Plot No.442-A Baikampady Industrial Area, Mangalore	SMALL-RED	200	Septic tank & soak pit	450	PROVIDED	On land for gradening
28	Powerpak Batteries, Shed No.C-51, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-RED	800	Septic tank & soak pit	150	NOT PROVIDED	dischraging out side the industry
29	Premium Foods, Plot No.174, Baikampady Industrial area, Mangalore	SMALL-RED	500	Septic tank & soak pit	Nil	---	-
30	Kiran Global Chems Ltd. (Sagar Chemicals (I) P. Ltd. (Kiran PONDY Chemicals)), Plot No. 175/B, Baikampady Industrial Area, Mangalore-575011	SMALL-RED	2000	Septic tank & soak pit	Nil	---	-
31	Sri Ganesh Bitumen Products, Plot No.86, Baikampady Industrial Area, Mangalore	SMALL-RED	500	Septic tank & soak pit	800	PROVIDED	On land for gradening
32	Sri Ram Industries, Plot No. 320-B, Baikampady Industrial Area, Mangalore, DK District	SMALL-RED	300	Septic tank & soak pit	50	PROVIDED	On land for gradening
33	United Paints, Shed No.B-110, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-RED	400	Septic tank & soak pit	Nil	---	-
34	V & G Industrial Testing Laboratories, Plot No. 323G (P), Baikampady Industrial Area, Mangalore-575011	SMALL-RED	1500	Septic tank & soak pit	10	PROVIDED	On land for gradening
35	Ashapura Minechem Ltd., Plot No. 182, Baikampady Industrial Area, Mangalore	SMALL-RED	1500	Septic tank & soak pit	Nil	---	-
36	Abhay Marbles & Granites, Plot No 407, Baikampady Industrial Area, Mangalore-575011	SMALL-ORANGE	300	Septic tank & soak pit	1500	PROVIDED	On land for gradening
37	Accurate Veneers & Wood Products, Plot No 305, Baikampady Industrial Area, Mangalore-575011	SMALL-ORANGE	200	Septic tank & soak pit	50	PROVIDED	On land for gradening
38	Amit Plywoods & Boards(P) Ltd. (Vishal Timbers (P) Ltd.), Plot No.278, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	450	Septic tank & soak pit	Nil	---	-
39	Arvind Motors Ltd., Plot No.152-A, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	400	Septic tank & soak pit	1000	PROVIDED	On land for gradening

40	Asian Plywoods, Plot No.448, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	500	Septic tank & soak pit	Nil	---	-
41	Brahmas Engineering Co. Ltd., Plot No.233 & 234, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	1500	Septic tank & soak pit	Nil	---	-
42	Cauvery Motors Pvt. Ltd., Plot No. 124-C-1, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	1000	Septic tank & soak pit	2500	PROVIDED	On land for gradening
43	Elespee Products Pvt. Ltd., Plot No.446, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	1750	Septic tank & soak pit	Nil	---	-
44	Fabina Granites, Shed No.C-167, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	150	Septic tank & soak pit	1000	PROVIDED	Recycled back into the process
45	GR Stone Specialities Pvt. Ltd., Plot No.298/299, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	1000	Septic tank & soak pit	2000	PROVIDED	Recycled back into the process
46	JK Boards, Plot No.443, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	800	Septic tank & soak pit	Nil	---	-
47	Nafisa Board Products(Karnataka Metal & Wood Industries), Plot No.140-C Baikampady Industrial Area, Mangalore	SMALL-ORANGE	500	Septic tank & soak pit	Nil	---	-
48	Lancy Constructions, Plot No.309, 312 & 313, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	800	Septic tank & soak pit	Nil	---	-
49	MA Boards Products (P) Ltd., Plot No 192-C, Baikampady Industrial Area, Mangalore-575011	SMALL-ORANGE	400	Septic tank & soak pit	500	PROVIDED	On land for gradening
50	Mangala Bleaching & Dyeing Industry, Plot No.288, Baikampady Industrial Area, Mangalore, DK District	SMALL-ORANGE	500	Septic tank & soak pit	4000	PROVIDED	On land for gradening
51	Mangalore Bio Tech Lab, Plot No.142-S, Baikampady Industrial Area, Mangalore-575011	SMALL-ORANGE	500	Septic tank & soak pit	30	PROVIDED	On land for gradening
52	Manmet Engineering Products, Shed No.N-3, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL-ORANGE	1750	Septic tank & soak pit	50	PROVIDED	Recycled back into the process
53	Metalco Panels, Plot No.193-A, Baikampady Industrial Area, Mangalore	SMALL-ORANGE	1000	Septic tank & soak pit	Nil	---	-

54	Plama Boards (P) Ltd., Plot No.154-B, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	8000	Septic tank & soak pit	Nil	---	-
55	Premier Anadol Industry, Plot No.95 A, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	500	Septic tank & soak pit	1800	PROVIDED	On land for gradening
56	RK Industries, Plot No.191-A1, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	500	Septic tank & soak pit	1500	PROVIDED	On land for gradening
57	Simcon Laboratories, Plot No.202, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	1000	Septic tank & soak pit	2250	PROVIDED	On land for gradening
58	Sri Ram Enterprises, Plot No. 292-A, Baikampady Industrial Area, Mangalore-575011	SMALL- ORANGE	300	Septic tank & soak pit	150	PROVIDED	On land for gradening
59	Swadesh Board Products, Plot No.292-A, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	500	Septic tank & soak pit	Nil	---	-
60	Swadesh Industries, Plot No.193, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	200	Septic tank & soak pit	Nil	---	-
61	Trishul Granites, Shed No.B-152, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL- ORANGE	320	Septic tank & soak pit	200	PROVIDED	Recycled back into the process
62	Vega Springs Pvt. Ltd., Plot No.196-C, Baikampady Industrial Area, Mangalore	SMALL- ORANGE	500	Septic tank & soak pit	Nil	---	-
63	West Coast Drugs & Pharmaceuticals, Shed No.C-6, KSSIDC Industrial Estate, Baikampady, Mangalore	SMALL- ORANGE	600	Septic tank & soak pit	400	PROVIDED	On land for gradening
64	Lucky Star Industries, Plot No.396-B, Industrial area, Baikampady, Mangalore- 11	SMALL- ORANGE	420	Septic tank & soak pit	350	PROVIDED	On land for gradening
65	AJ Distilleries , Plot No.289-A Baikampady Industrial Area, Mangalore	SMALL- ORANGE	800	Septic tank & soak pit	400	PROVIDED	On land for gradening

ANNEXURE-VI

Equipments Required for Regional Laboratory, Mangalore.				
Sl. No.	Name of the Items	Requirement	Approx Amount Rs.	Remarks
1	D.O.Meter	Two sets	200000	Required for online dissolved oxygen measurement in river water
2	pH meter- (Mettler)	Two	100000	Required for online pH meter for river water
3	Flame photometer (Digital)	One set	100000	For measurement of Sodium & % Sodium Potassium, SAR & Irrigation parameters
4	Extractor for Orbit Oil Analyser	One set	500000	For extraction of Oil & Grease in water sample with accuracy
5	Specific Ion meter with Electrodes	One set	400000	For analysis of Nitrate, Sulphide, Ammonia Nitrogen, TKN, Free Ammonia, Fluoride, Cyanide, Phosphate, Chloride, Calcium etc.,
7	Atomic Absorption Spectrophotometer	One set	2000000	For All major industries Heavy metal analysis has to be carried out as per consent order and to know the quality of waste water discharged regularly. Hood for the exhaust gases made of stainless steel has already been installed in 2001 itself in the instrumentation room.
10	Gas Chromatograph with Massspectrometer	One set	5000000	For the analysis of organic compounds in rivers, water bodies, Haz.waste, waste water & Air samples
15	Double Distillation system	One set	100000	For procuring double distil / pure water for analysis work
16	RO system	One set	250000	To get pure water for testing purposes
19	Volatile Organic (VOC) Compounds analyser	One set	1000000	For analysing VOC's in air
20	Dust Sampler PM 2.5	Two No's	380000	For monitoring PM 2.5 particles as per MOEF latest notification for AAQM
21	Stack Monitoring Kit	Two Set	500000	For monitoring of Industrial Stack
21	25 KVA UPS	One unit	500000	For uninterrupted supply of power for analysis of samples and some equipments require continuous power supply
22	Sampling Boat	One unit	5000000	required as leakage of oil is observed due to capsizing of ship.
23	Monitoring Vehicle	One	2000000	For sampling in River, Industries & others.
		Total	18,030,000	

Annexure VII

SL. No.	Name & Address of unit	Sch-1HW Process	Sch-1 HW Stream	Sch-2 HW	Total Qty HW Generation In MT/A	Landfillable HW MT/A	Recyclable HW MT/A	Incinerable HW MT/A	Category
1	Achal Industries 206/207, Industrial Area, Mangalore	Cashew Processing	5.1	0	0.024	0	0.024	0	SO
2	Advance Surfactants (I) Ltd, Plot no.450 Baikampady indl. Area mangalore	Sulfonic acid manufacture	5.1,5.2	0	0.04	0	0.03	0.01	MR
3	BASF Coating (P) Ltd, Surathkal-Bajpe Road,	paints manufacture	5.1,20.2,33.3,34.1,31.1	0	0.8	0.5	0.3	0	LR
4	BASF India ltd, Bala Mangalore	paints manufacture	5.1,26.2,33.3,34.3,36.2	0	585	60	40	485	LR
5	Bell Paints 243 Baikampady Mangalore	paints manufacture	21.1	0	0.05	0	0	0.05	SG
6	Bharath petroleum corporation ltd coastal installation near apmc yard baikampady mangalore	Petroleum Storage	5.1,3.1,3.3	0	2.51	0.01	2.5	0	LR
7	Bharath petroleum corporation ltd LPG Filling Plant, Baikampady Mangalore	LPG	5.1,21.1,31.1,33.3	0	1.4	0.8	0.6	0	SR
8	Cauvery Motors, PlotNo.124-c-1, BIA, Mangalore, DK	Vehicle Servicing	5.1	0	0.5	0	0.5	0	SO
9	ELF Gas India ltd 62, Thokur village, Baikampady Indl area, Mangalore	LPG storage	5.1,33.3,5.2	0	0.33	0	0.3	0.03	LR
10	Eswari Metal Industries(Unit-II),Plot No.96 & 97,Industrial Area,Baikampady,Mangalore-11	Lead Reprocessor	5.1,9.0, 9.1	0	170.05	170	0.5	0	SR
11	Eshwari Metal, Industries 101-A,Baikampady Indl. Area, Mlore	Lead Reprocessor	5.1,9.0,9.1,9.2	0	226.925	226.895	0.05	0	SR

12	Falcon Impex Corporation No 9A/10A, Baikampady Mangalore	Barrel Cleaning	33.1,33.3	0	0.02	0.02	0	0	SR
13	Haji U Hassanabba & Sons Plot No.89 & 90, KIADB Indl Estate, Mangalore	Barrel Cleaning	33.3,34.3	0	0.06	0.06	0	0	SR
14	Hpcl - LPG bottling plant bala village, via katipalla mangalore	LPG Bottling	21.1,33.3	0	1	1	0	0	LR
15	HPCL LPG Import, Bala village via Katipalla, Mangalore	LPG Storage	21.1,33.3	0	1	0	0	1	LR
16	IMC ltd, P.B. No. 31, Near oil jelly, Panambur,Mangalore	Chemical industries	3.1,5.1,5.2	0	0.43	0.25	0.18	0	LR
17	Indian oil corporation limited, panambur, mangalore dk	Petroleum Storage	5.1	0	0.1	0	0.1	0	LR
18	J.K.industries, plot no. 443, baikampady industrial area mangalore dk	plywood and resin plant	5.1	0	0.05	0	0.05	0	SR
19	Kudremukh iron & ore company ltd., panambur, mangalore dk	iron pellets	5.1,5.2,33.3	SH-4 Sl.No.1 8	0.5	0	0.5	0	LR
20	Kuduremukh iron & steel company plot no. 456- 457, baikampady indl. Area, mangalore dk	iron pellets	5.1,31.1	0	53.5	0	53	0.5	LR
21	L & T Ltd., cement bagging plant, nmpt premises mangalore dk	Cement	5.1	0	0.21	0	0.21	0	LR
22	Lamina suspensions products ltd, plot no. 17-19, baikampady industrial area, mangalore dk	Automobile Serviceing	5.1,5.2	0	0.1	0	0.1	0	LO
23	CICB-Chemicon (P) Ltd, plot no.132, Baikampady Indl Area, Manglore.	Manufacture of pressure vessels, storage tanks.	5.1	0	0.15	0	0.15	0	SG
24	Mangalore Chemicals & Fertilisers Ltd, Panambur, Mangalore	Fertilizers	5.1,5.2,18.1,18 .2, 18.4,33.3	0	1221.4	0	1221.4	0	LR

25	Manipal springs ltd. Baikampady industrial area, mangalore dk	Automobile leaf springs	5.1,5.2	0	1.1	0	0.1	1	MO
26	MRPL, Kuttethoor via Kattipalla,Mangalore	Petroleum Refinery	4.2,33.3,4.6,5. 1,	D5	15	15	0	0	LR
27	Oriental Aromatics Ltd, plot no.7D, Baikampady Indl area, Manglore.	Chemical industries	5.1,33.3,34.3	0	0.11	0	0.1	0.01	MO
28	New Mangalore Port Trust, Panambur-10, Dakshina kannada	Port	5.1,3.4,31.1,9. 0	0	1.2	0	1.2	0	LR
29	Primacy Industries Pvt ltd, # 7A,Industrial area, Baikampady, Mangalore.	Manufacturing perfund decorative candles.	5.1,33.3	0	0.2	0	0.2	0	MG
30	Rajashri packages pvt. Ltd. Sy.no.5(p), 6(p) baikampady indl. Area mangalore	Edible oil	5.1,33.3,35.2	0	0.2	0	0.1	0.1	LR
31	Ruchisoya industries ltd. Sy no. 2(p). 3(p) & 4(p) baikampady indl. Area mangalore	Edible oil	5.1	B6	1.5	0	0.4	0	LR
32	Sequent Scientific Lab ltd. 120 A&B Indl area, Balkampady, Mangalore	Pharmaceutical s	33.3	0	0	0	0	0	LR
33	HPCL POL Terminal,Bala Village,Via Katipalla,Mangalore	Petroleum Products	5.1,3.1,33.3	0	0.4	0	0.4	0	LR
34	Petronet MHB Limited,C/O.HPCL POL Terminal,Bala Village,Katipalla,Mangalore	Petroleum Products	5.1,5.2	0	15.5	0	0.5	15	R
35	Bharat Petroleum Corporation Ltd, Tanir Bavi Installation, C/O.GRM Energy Ltd, Tanir bavi Village, Panamur, Mangalore-575 010.	Petroleum Products	5.1,3.1	0	20.16	0	20.06	0.1	LR
36	Mangalore Liquid Impex(P) Ltd,Opp costum House Panambur ,Mangalore	Edible oil	5.1,5.2	0	0.15	0	0.15	0	LR
37	KIOCL Ltd, Blast furnace unit, panambur, Mangalore.	pig iron	5.1,31.1	0	0.73	0	0.73	0	

38	New Mangalore Port Turst, Panambur, Mangalore - 575 010.	Extraction Iron	5.1,3.4,31.1,9.0	0	5592.2	0	5592.2	0	MR
39	Mangalore Refinery & Petrochemicals Ltd, Sarapady Village, Mangalore - 575 030.	pumping Station	5.1	0	2	0	2	0	
40	Blue Water Foods & Exports Pvt Ltd, Plot No.281 & 282, Indi Area, Baikampady Mangalore	Food Processing	5.1	0	0.1	0	0.1	0	
41	Ultratech Cement Ltd, Beach Road, Panambur, Mangalore - 575 010.	Cement	5.1	0	0.21	0	0.21	0	
42	GWSAF Quality Coating (P) Ltd, Plot No.136, Industrial Area, Baikampady, Mangalore - 575 011.	Alloy & Stainless steel castings	5.1,5.2	0	0.55	0	0.05	0.5	LR
43	BASF Constrcations chemicals (I) (P) Ltd, No.185, 131, Thokur village, Mangalore - 30.	constrcations chemicals	5.1,33.3	0	35.5	0	35.5	0	LO
44	Indian Oil Corporation Ltd., Mangalore Terrminal, Panambur, Mangalore-575030, Dakshina Kannada District	Petroleum products	3.3, 5.1, 5.2	0	3.21	0	3.2	0.01	LR
					7956.169	474.535	6977.694	503.3	

Annexure-VIII

COMPLIANCE TO CREP ACTION POINTS

1. MRPL

S.NO	CREP Stipulation	Compliance
AIR POLLUTION MANAGEMENT		
1	All the Refineries located in the Critically polluted areas, identified by CPCB, will submit an action plan (within six months) for phase-wise reduction of SO ₂ emission from the present level.	MRPL authorities have submitted the action plan and same is forwarded to Board Office..
2	Future Refineries will have Sulphur Recovery Unit (SRU) with minimum 99% efficiency.	Three Sulphur recovery units are provided in the refinery with more than 99 % efficiency.
3	To enhance the efficiency of SRUs in the existing Refineries, an expert committee will be constituted to look into various aspects and suggest a road map within six months.	Not in MRPL scope.
4	With regard to NO _x emission, the new Refineries / process units will install low NO _x burners. For retrofitting of low NO _x burners in existing units, the expert committee will suggest the strategies and action plan within six months including NO _x standard.	All the heaters in MRPL are provided with Low NO _x burners.
5	The flare losses will be minimized and monitored regularly.	Flare losses are kept minimum and continuous monitoring is done through the CCTV. Energy Conservation cell daily monitors the quantity of flaring.
6	Refineries will install continuous emission monitoring systems for SO _x and NO _x in major stacks with proper calibration facilities. Action plan for this will be submitted within six months.	MRPL has provided continuous emission monitoring systems for SO _x and NO _x on all major stacks with proper calibration facilities.

7	<p>Refineries will also monitor total HC and Benzene in the premises (particularly at Loading / Unloading operations and ETP). The Status and action plan will be submitted within six months.</p> <p>The Expert committee will also suggest an action plan, within six months, for control and monitoring of Hydrocarbon loss & VOC emissions, leak detection and repair (LDAR) programme and vapour recovery systems (for Loading & Unloading operations within Refineries only).</p>	<p>Monitoring of HC and Benzene is Already being done.</p> <p>LDAR is implemented in the refinery. Monitoring schedule as per new MoEF guidelines TO be followed.</p> <p>Expert committee to provide suggestion.</p>
WASTEWATER MANAGEMENT		
1	<p>Refineries will prepare action plan for conservation of water resources and maximizing reuse/recycling of treated effluent within 6 months. The treated effluent discharge quantity (excluding once through cooling water) will be limited to 0.4 m³/per tonne (for 90% of time) except for the monsoon season.</p>	<p>Many water conservation schemes are implemented in the refinery. The water consumption is well within the stipulation of Karnataka State Pollution Control Board. 70% of the treated effluent is recycled consistently in the refinery. MRPL do not have Once through cooling system in the Refinery.</p>
2	<p>Oil Spill Response facilities at coastal Refineries will be in position within two years. To facilitate this, MoEF will co-ordinate with Coast Guards, Port Trust and other Departments.</p>	<p>A detailed oil spill response plan is prepared for tacking oil spills in the refinery. Oil spills at jetty is in NMPT's scope.</p>

SOLID WASTE MANAGEMENT		
1	Refineries will explore new technologies for reduction in the generation of Oily sludge. Strategy and action plan for liquidation of existing sludge will be submitted within six months.	<p>By adopting innovative Hydrogen Peroxide treatment for treating wastewater, sludge generation from WWTP operation has reduced drastically. Online mixers are provided in the crude tanks for reducing the oily sludge generation from the crude tanks.</p> <p>M/s The Energy and Resources Institute, New Delhi is conducting the bioremediation of oily sludge. Bioremediation of oily sludge of about 1000 T is completed. and bioremediation of another 1000 T of oily sludge is in the final stages of completion.</p>
2	The Petroleum coke having High sulphur content will only be sold to / reused by organized Industries (having consent from SPCBs), which have systems to control SO2 Emissions. This will be ensured by June 2003.	MRPL do not generate Petroleum coke, as there is no Coker unit.

2. M/s. Sequent Scientific Ltd.,

No	CREP Stipulation	Compliance
1.	Segregation of waste streams: Waste streams should be segregated into high COD waste, toxic waste, low COD waste, inorganic waste etc. for the purpose of providing appropriate treatment, implementation by December 31, 2003 and action plan to be submitted to SPCB by June 30, 2003.	All the waste streams are segregated as low COD, high COD and inorganic waste. The low COD waste is treated in a Biological treatment plant & Inorganic waste treated in a Forced Draft Evaporator and high COD waste is treated in Incinerator.
2.	Detoxification and treatment of high COD streams: High COD streams should be detoxified and treated in ETP or thermally destroyed in incinerator – Implementation by March 2004 and action plan to be submitted to SPCB by June 2003.	Installed combined system Forced Draft Evaporator (FDE) for treating inorganic waste, Incinerator for treating Hi COD (Organic) waste and ETP for treating low COD wastes.
3.	Management of Solid Waste: Proper facilities should be provided for handling and storage of Hazardous waste. For final disposal of hazardous waste, recycling and reuse should be given priority, either within premises or out side with proper manifest system. In case of incinerable waste, properly designed incinerator should be installed within the premises or out side as a common facility. The non incinerable hazardous waste should be disposed of in properly designed secure – land fill either within the industry premises or in a common facility – Implementation by March – 2004 and action plan to be submitted to SPCB by June – 2003.	The hazardous waste generated is being incinerated in the incinerator and incineration ash generated is being stored inside shed and finally disposed at TSDF site. The hazardous waste like Spent oils and containers are being recycled through Board authorized contractors,
4.	Minimum scale of production to afford cost of pollution control: For few industries which are not connected with CETP & TSDF and which do not have the economics to install treatment facilities may not be considered for granting consent to establishment. Industry association shall submit proposal to SPCB / CPCB- Implementation by December – 31, 2003 and action plan to be submitted to SPCB by June 30, 2003.	Not Applicable as they have well equipped facility to treat all the wastes that are being generated during the process.

5.	Long term Strategies for reduction in waste: Consent for establishment and consent for operation under the water Act will be based on pollution load and concentration of pollutants. Each industry will submit pollution load, concentration of final discharge along with water balance to SPCB / CPCB for formulation of strategy – action plan to be submitted to SPCB by June 2003.	The details on Pollution load; concentration of final discharge along with water balance has submitted to KSP
6.	Control of Air Pollution: Industry will take up on priority, the control of hazardous air pollutants (such as benzene carbon tetra chloride, 1-4 dioxane, toluene, methyl chloride etc.) and odorous compounds (mercaptan & hydrogen sulphide) – Implementation by Dec. 2004 and action plan to be submitted to SPCB by June 2003.	The two stage scrubber, lye scrubbers and water scrubbing systems and stipulated chimneys heights are provided for controlling the emissions.
7.	Self – regulation by industry though regular monitoring and environmental auditing: Industries on their own will carry our monitoring of environmental parameters, audit it at regular interval and submit the same to SPCB – Implementation by June 2003. Comment of BDMA – There shall be a policy for accrediting the auditors and the policy guidelines may be issued by MoEF.	They are ISO 14001 certified organization and maintaining the system since from 5 years. The internal audits are being conducted once in quarter by certified internal auditors to ensure the compliance of the system.
8.	Organizational restructuring and accreditation of Environmental Manager of Industry: a) Environmental management cell will be created for each industry reporting to CEO directly – Implementation by June 2003. b) There should be certification system for the environmental managers at individual level and common facility level. BDMA may evolve the programme along with SPCB/CPCB – Implementation by March 31, 2004 and action plan to be submitted to SPCB by July 2003.	They have Environmental Health & Safety (EHS) department taking care of all EHS related activities.
9.	Optimizing the inventory of hazardous chemicals: The information shall be submitted to SPCB regularly along with rational – action plan to be submitted to SPCB by May 31, 2003.	They have internal Inventory Management System which ensures the optimization of inventory of all the chemicals.

3. BASF India Limited, Mangalore.

I.No	CREP Stipulation	Compliance
1	Industry Associations will conduct feasibility study for adoption of cleaner technologies for H-Acid manufacture (catalytic hydrogenation and others) within one year.	Not applicable as BASF do not manufacture H-Acid.
2	Industries will submit a proposal for recovery and purification of by-products by June 2003.	Not applicable as BASF do not generate any by-products during the manufacture of Dyes and Dispersion products.
3	Dye Intermediate industries will install salt recovery systems in case of sodium sulphate from dyestuff and reuse recovered salt in the process by December 2003.	BASF is not manufacturing Dye intermediates and they are not generating any salt during the process.
4	An action plan for installation/up –gradation of incineration systems as per CPCB guidelines to handle concentrated wastewater and reuse of treated weak wastewater will be submitted with in six months.	<p>The waste water generated during the process is treated in our waste water treatment plant. The treated effluent meeting the standards is discharged in to the Sea.</p> <p>The salt content in the treated wastewater is around 0.3% which is discharged into the Sea. The Sea also has about 3.3 % salt and discharge of treated waste water will not have any adverse impact on the sea as per the study report of University of Agricultural Sciences, College of Fisheries, Mangalore</p>
5	Industry Associations will encourage waste exchange for proper use of weak acids. (Action within one year).	Not applicable as they do not generate any weak acids during manufacturing operation.
6	Wherever possible, waste generated from one industry will be utilized by others (e.g. use of effluent generated from Vinyl Sulphone plant in H-Acid plant). Action plan in this regard will be submitted by April 2004.	They have obtained permission from the Karnataka State Pollution Control Board to use our effluent treatment plant sludge as a co fuel in cement industries. Therefore they are now sending the ETP Sludge to Cement industry.
7	Industries will regularly monitor ground water quality. This will be	They have three bore wells and open well for monitoring the ground water

	Proper on-site facilities and final disposal of solid waste on secured landfill will be ensured immediately.	The entire solid waste generated within their site is collected stored in an impervious covered storage area with the drain connecting to ETP. The ETP sludge is then disposed as co fuel in the cement manufacturing. The ash is sent to TSDF landfill site. All other incinerable waste is incinerated in their incinerator
	Better Management Practices:	
	Improvement of house keeping such as concreting of floors, sealing of breaches/leakage's in the system, replacement of corrosive pipelines, etc. to prevent spillage, leakage, fugitive emissions will be done in three months.	Good housekeeping is maintained in the plant and maintenance of all equipment and pipelines are done as per schedule to prevent leakage/ spillage.

4. MCF Ltd, Mangalore.

Waste water Management

No.	CREP Stipulation	Compliance
1	Efforts will be made for conservation of water, particularly with a target to have consumption less than 8, 12 and 15 m ³ /tonne of urea produced for plant based on gas, naphtha and fuel oil, respectively. In case of plants using Naptha and Gas both as feed stocks, water consumption target of less than 10 m ³ /tonne will be achieved. An action plan for this will be submitted by June 2003 and targets will be achieved by March 2004.	The average water consumption for the year 2004-05, 2005-06, 2006-07, 2007-08 and 2008-09 are 9.09, 7.88, 8.30, 7.91 and 6.98 m ³ /MT of urea produced respectively. Thus as MCF is based on Naphtha and the water consumption is well within the target of less than 12 M ³ /MT of Urea produced.
2	Use of arsenic for CO ₂ absorption in ammonia plants and chromate based chemicals for cooling systems, which is still continuing in some industries, will be phased out and replaced with non-arsenic and non-chromate systems by December 2003. In this regard, action plan will be submitted by June 2003.	<p>They are using Benfield solution for CO₂ absorption in Ammonia plant ever since commissioning of their plants. Thus there is no source arsenic. Hence there is no Arsenic waste generation or pollution due to arsenic from their industry.</p> <p>They have changed over chromate to non-chromate cooling water treatment programme in 1991. Thus there is no chromate waste generation or pollution due to chromate from MCF</p>
3	Adequate treatment for removal of oil, chromium (till non-chromate based cooling system is in place) and fluoride will be provided to meet the prescribed standards at the source (end of respective process unit) itself. Action plan will be firmed up by June 2003 for compliance by March 2004.	<p>They have procured mechanical oil skimmers for removing oil from oil separators in our plants. The oil content in final treated effluent is less than 10 ppm.</p> <p>They have changed over their Cooling Water treatment system from chromate to non chromate since 1991. Their DAP Plant is zero liquid effluent plant. They do not have Phosphoric Acid plant or any other process generating effluents bearing fluoride. Hence, chromium and fluoride are not present in their liquid effluent.</p>

4	Proper and complete nitrification and de-nitrification will be ensured, wherever such process is used for effluent treatment, by September 2003.	MCF is employing thermal urea hydrolysis and stream stripping system for treating ammonia and urea bearing effluent streams from their Ammonia and Urea plants. they are not following any biological nitrification method for effluent treatment. Hence this clause is not applicable to MCF.
5	Ground water monitoring around the storage facilities and beyond the factory premises will be carried out at regular intervals particularly for pH, fluoride. CPCB will finalize the guidelines for groundwater monitoring by December 2003.	They are monitoring ground water by collecting and analyzing the well water outside their factory boundary. They are also analyzing the water from the test borewells provided near hermit storage area.
6	No effluent arising from process plants and associated facilities will be discharged to the storm water drain. The quality of storm water will be regularly monitored by all the industries.	The effluent streams arising from process plants are treated in ultra filtration & reverse osmosis plant & recycled back for cooling towe. The effluent streams are not discharged to storm water drain.
7	The industries, where waste water/effluent flows through the storm water drains even during the dry season will install continuous systems for monitoring the storm water quality for pH, ammonia and fluoride. If required, storm water will be routed through effluent treatment plant before discharging. An action plan will be submitted by June 2003 and necessary action will be taken by June 2004.	As mentioned in Point No. 6 the effluent streams are not discharged to storm water drain. Hence this is not applicable to MCF.

Air Pollution Management

No.	CREP Stipulation	Compliance
1	All the upcoming urea plants will have urea prilling towers based on natural draft so as to minimize urea dust emissions	Their Urea plant was commissioned in 1976 and hence not applicable to us.
2	The existing urea plants, particularly, the plants having forced draft prilling towers, will install appropriate systems (e.g. scrubber, etc.) for achieving existing norms of urea dust emissions. In this regard, industries will submit action plan by June 2003 and completion of necessary actions by June 2004.	MCF not installed any dust scrubbing system for urea prilling tower & not submitted the action plan in this regard.
3	The sulphuric acid plants having SCSA system will switch over to DCDA system by March 2004 to meet the emission standard for SO ₂ as 2 kg/tonne of H ₂ SO ₄ produced. An action plan for this will be submitted by June 2003.	Their Sulphuric acid Plant was commissioned during 2006 and is DCDA technology.
4	Sulphuric acid plants having DCDA system will improve the conversion and absorption efficiencies of the system as well as scrubbers to achieve SO ₂ emissions of 2 kg/tonne of acid produced in case of plants having capacity above 300 tpd and 2.5 kg/tonne in case of plants having capacity upto 300 tpd. An action plan will be submitted by June 2003 and emission levels will be complied with by September 2004.	The Sulphuric Acid plant SO ₂ emission is <2 kg/tonne of acid produced
5	Stack height for sulphuric acid plants will be provided as per the guidelines and on the basis of normal plant operations (and not when the scrubbers are in use) by June 2003. The scrubbed gases are to be letout at the same height of the stack.	Stack height of 50m AGL provided for sulphuric acid plant and the scrubbed gases are let out of the stack.

No.	CREP Stipulation	Compliance
6	An action plan for providing proper dust control system at rock phosphate grinding unit in Phos Acid/SSP Plants.	This is not applicable to MCF as they are not having Phosphoric Acid /Single Super Phosphate plants.
7	Particulate as well as gaseous fluoride will be monitored and adequate control systems will be installed by June 2004 to achieve the norms on total fluoride emissions (25mg/Nm ³)	Present emission levels are well within the limits in their DAP plant. SPM level is in the range of 50-65 mg/Nm ³ and fluoride is <5 mg/Nm ³ .
8	Continuous SO ₂ emission monitoring systems will be installed in sulphuric acid plants (having capacity 200 tpd and above) by March 2004. Action plan for this will be submitted by June 2003.	Continuous SO ₂ emission monitoring systems has been installed at Sulphuric Acid plant and the system is working satisfactorily.
9	Regular monitoring of ambient air quality with regard to SO ₂ , NO _x , PM, SO ₃ , fluoride and acid mist will be carried out.	Monitoring of ambient air quality with regard to SO ₂ , NO _x , SPM, fluoride and acid mist are being carried out.

Solid Waste Management

Sl.No.	CREP Stipulation	Compliance
1	Gypsum will be effectively managed by providing proper lining, dykes with approach roads and monitoring of groundwater quality around storage facilities. Accumulated gypsum will be properly capped. In this regard, action plan will be submitted by June 2003 and for compliance by	This is not applicable to MCF as there is no process plant which generates gypsum.

Sl.No.	CREP Stipulation	Compliance
	December 2003.	
2	An action plan for proper handling, storage and disposal of spent catalyst having toxic metals will be submitted by June 2003 and implemented by September 2003. The industry will also explore recovery/buy-back of spent catalyst by September 2003.	Spent catalysts are sold to outside parties who are having Authorisation from CPCB for reprocessing the waste and recovery of metals.
3	Carbon slurry, sulphur muck and chalk will be properly managed and disposed of in properly designed landfill either within premises or in common facility. Action plan on this will be submitted by June 2003 and implemented by March 2004.	Sulphur Cake generated at Sulphuric Acid Plant is used as filler material in DAP Plant. There is no generation of Carbon slurry, and chalk at MCF industry
4	Existing stock of chromium and arsenic bearing sludge will be properly disposed by December 2003. Industries will also explore recovery of chromium from the sludge. CPCB will provide guidelines for proper disposal of the sludge.	<p>Presently they are not generating any chromate sludge because cooling water treatment system has been changed over from chromate to non-chromate programme in September 1991.</p> <p>Chromate sludge generated prior to September 1991 was disposed in a secured on-site landfill during February 2006.</p> <p>They are using Benfield solution for CO₂ absorption in Ammonia plant ever since commissioning of their plants. Hence they do not use any arsenic containing chemical in their plant and there is no arsenic bearing sludge generation.</p>