Report on Implementation Status of Action Plan for Manali Industrial Area, Chennai

Submitted by TNPCB Committee
to
Tamil Nadu Pollution Control Board, Chennai

August 2011

REPORT ON IMPLEMENTATION STATUS OF ACTION PLAN FOR MANALI INDUSTRIAL AREA

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REPORT ON IMPLEMENTATION STATUS OF ACTION PLAN FOR MANALI INDUSTRIAL AREA

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CHAPTER 1

PREAMBLE

1.1 Comprehensive Environmental Pollution Index (CEPI)

Central Pollution Control Board (CPCB), Ministry of Environment & Forests (MoEF), Govt. of India, developed a "Comprehensive Environmental Pollution Index (CEPI)", a rational number to characterize the environment quality at a given location following the algorithm of source, pathway and receptor. The index captures various health dimensions of environment including air, water and land.

The CEPI was intended to act as an early warning tool. It can help in categorizing the industrial cluster / area in terms of priority of planning needs for interventions.

The CEPI was applied to 88 selected industrial clusters / areas in the country. In the exercise of application the CPCB, concerned State Pollution Control Boards/Pollution Control Committee and IIT Delhi, were involved.

The results of application of the CEPI to the selected industrial clusters/areas were released in December 2009. The main aim of this exercise was to identify the polluted industrial clusters/areas in order to take concerted action and to centrally monitor them at the national level, to improve the current status of their environmental components such as air, water quality data, ecological damage and visual environmental conditions. When the CEPI applied to the industrial clusters / areas was finally awarded CEPI score in the range of 1 – 100.

It was suggested that clusters/areas having aggregated CEPI scores of 70 and above should be considered as critically polluted industrial clusters/area, whereas the areas having CEPI between 60 to 70 should be considered as severely polluted areas and shall be kept under surveillance and Pollution control measures should be effectively implemented.

The critically polluted individual clusters/areas need further investigation in terms of the extend of damage and of a formulation of appropriate remedial action plan. Totally there were 43 critically polluted areas in India.

1.2 Critically Polluted areas in Tamil Nadu:

The following four industrial clusters in Tamilnadu were defined "critically polluted industrial clusters" since, their CEPI score was 70 and above.

Industrial cluster	CEPI Score
1. Vellore (North arcot)	81.79
2. Cuddalore	77.45
3. Manali	76.32
4. Coimbatore	72.38

1.3 Remedial Action Plan

The CPCB then requested the concerned SPCB's to formulate action plans to reduce the pollution loads and the SPCB's accordingly submitted the action plans. The action plans were reviewed by CPCB in July 2010 and certain modifications recommended. After these developments the TNPCB submitted the final version of the action plan for Manali in November 2010 to CPCB.

While reviewing the action plan the CPCB also proposed that the SPCB should constitute a committee to review the implementation of the action plans. The committee after reviewing the action plan shall prepare a status report and submit to CPCB through the SPCB.

1.4 Committee for Manali Industrial Area:

Inline with the proposal of the CPCB, the TNPCB constituted a committee by TNPCB) for Manali Industrial Area (MIA) consisting of the following experts

i. Dr.K.Thanasekaran, Professor, CES, Anna University, Chennai

ii. Dr. Kurian Joseph, Associate Professor, CES, Anna University,Chennai

iii. Dr Kalpana Balakrishnan, Professor, Department of Environmental Health Engineering Sri Ramachandra University Chennai

iv. Dr R.Swaminathan Ex- Assistant Director NEERI

v. Thiru R. Kumar, JCEE, TNPCB, Co-ordinator

The TOR for the committee was to make the field visits and verify the implementation of the short term and long terms action plan submitted by TNPCB.

1.5 Strategy adopted by the committee:

The following aspects of the Manali Industrial Area (MIA) were considered by the committee in formulating its strategies

- Manali Industrial Area is one of the largest petrochemical complexes in India and the only petrochemical complex in Tamilnadu.
- This is located in the suburb of Chennai city at about 20 km north of Chennai. It borders Thiruvottiyur on the East, South by Chennai City, North by Kossathaliyar river, and west by villages of Manjambakkam, Mathur and Madhavaram.
- This industrial complex spreads over an area of about 2000 hectares in the villages of manali, Amualavoil, Vayakkadu, Chinnasekkadu, Periyasekkadu, Sathangadu, Thiruvottiyur, Mathur, Madhavaram, Sadayankuppam, Elandancherry and Kosapur.
- This complex is connected by Ennore High Road and by Chennai – Kolkata NH-5A. The Ennore port is situated at a distance of 15 km from here and the nearest Railway station is Thiruvottiyur at 3 km.
- The Manali Town is the nearest residential and commercial area to this complex on the west. The population of Manali is 35,305 as per 2011 Census.
- The Buckingham canal, Amullaivoyal canal, Manali Eri and Amullavoyal Eri are the surface water sources in this area.
- The core of the Manali Ennore Zone is a highly developed Industrial area, falling within the jurisdiction of Thiruvallur District of Tamilnadu.
- The type of the industries in the Manali industrial area are:

a.	Highly Polluting Industries (17 Categories)	= 12
b.	Red Category Industries	= 11
c.	Orange & Green Category Industries	= 5

- Present air quality data shows that both the criteria air pollutants and the air toxins are of concern in the Manali industrial area:

1.5.1 A meeting was held exclusively to familiarize the following

a. CEPI & its application,
b. Action plan proposed by the industries,
c. Dates for the field visits,
d. Nature of involvement of the industries in Manali and
e. Data to be collected & analyzed.

1.5.2 The committee decided to make visits to the individual industries in the Manali area for appraisal of the pollution control actions being implemented.

1.5.3. The committee requested the Chennai Petroleum Corporation Limited to act as the nodel agency from the industry side to help the committee in the visits and data collection.

1.5.4 The members of the committee visited the industries, gathered first hand knowledge about the pollution control actions being implemented in the industry & the nature of the pollution monitoring being followed.

1.5.5 In the subsequent meetings after the visits, the committee analyzed the data and information collected and finalized its observations and recommendations.

The information and data collected and committee's observations and recommendations are presented in the following chapters.

Chapter No	Title of the chapter
2	Executive Summary
3	Environment monitoring data
4	Revised CEPI for Manali Industrial Area
5	Committee's Findings & recommendations

CHAPTER 2

EXECUTIVE SUMMARY

2.1 List of Ultra red & Red category industries forming part of MIA is presented as Table 2.1

Table 2.1 Ultra Red & Red category industries

Sl.No.	Name of the Industry	Abbreviation	Type
1	Chennai Petroleum Corporation Limited	CPCL	Petroleum Refinery
2	Madras Fertilizers Limited	MFL	Fertilizer
3	Tamilnadu Petroproducts Limited (Epichlorohydrine Plant)	TPL -ECH	Petrochemical
4	Tamilnadu Petroproducts Limited (Heavy Chemicals Division)	TPL -HCD	Petrochemical
5	Tamilnadu Petroproducts Limited (Linear Alkyl Benzene Plant)	TPL- LAB	Petrochemical
6	Manali Petro Chemical Limited-1	MPL -1	Petrochemical
7	Manali Petro Chemical Limited-2	MPL-2	Petrochemical
8	Manali Petro Chemical Limited-3	MPL -3	Power generation
9	Balmer & Lawrie (Leather division)	B&L-L	Leather chemicals
10	Balmer & Lawrie (Grease Division)	B&L -G	Grease chemicals
11	Supreme Petrochemicals Limited	SPC	Petrochemical
12	Kothari Petrochemicals Limited	KPL	Petrochemical
13	Futura Polyesters Limited (Fiber)	FPL-F	Polyester fiber
14	Futura Polyesters Limited (Polymer)	FPL-P	Polymers
15	SRF Limited (Nylon)	SRF (IYB)	Nylon Fiber

Table 2.1 contd

Sl.No.	Name of the Industry	Abbreviation	Type
16	SRF Limited (Nylon Card Fabric)	SRF (EBP)	Nylon Card Fabric
17	Indian Additives Limited	IAL	Additives
18	CETEX Petrochemicals Limited	CEPL	Petrochemical
19	Petro Araldite	PAL	Additives
20	Natco organic	NOL	Organic chemicals
21	Eveready industries	EIL	Dry cells
22	Madras Fluorine Private limited	MFPL	Fluorine chemicals
23	Indian oil tanking & energy	IOT	LPG filling

2.2 The present environmental Monitoring programmes In MIA are as listed in Table 2.2

Table 2.2 Environment monitoring program in MIA

Sl. No.	Organization responsible	Env. being Monitored Air/water/ soil	Pollutants being monitored	Periodicity of sampling
1	TNPCB	Ambient Air (By High volume sampler)	SO_2,NOx,SPM	Once in a month
		Ambient Air	SO_2,NOx,SPM	Continuous monitoring
2	TNPCB	Surface water	pH, TDS, TSS,BOD, COD, Cl^-,TKN, NH_3-N, Oil & Grease, PO_4,Zinc,CN,Total Cr, Hexa Cr, Phenol, Flouride, Iron, Sulfides, Lead, Copper, Nickel, Cadmium, Arsenic	Once in a month
3	TNPCB	Ground water	Same as above	Once in a month
4	CPCL	Ambient Air	SO_2,,NOx, SPM by high volume samplers	twice a year
5	CPCL	Ambient Air	SO_2,NOx, SPM, RSPM, CO, HC	Continuous monitoring 8 stations
6	CPCL	Surface water	pH, oil& Grease, sulfides, BOD, Cl^-, M-alk, TH, CaH, MgH	Once in a month
7	CPCL	Under ground water	pH, oil& Grease, sulfides,BOD, Cl^-,M-alk, TH, CaH, MgH	Once in a month
8	CPCB	Ambient Air	SO_2,NOx, SPM, RSPM, CO, HC	Continuous monitoring

2.3 Industries Response

In response to the imposition of moratorium by MoEF on Manali Industrial Area in Jan 2010, the members of industrial community sprang into immediate action for reduction of pollution to Water, air and ground environment

Various action plans were initiated immediately & at present some have been completed and some are in progress.

Major actions are :

1. Reduction of effluent water quantity reaching nearby surface water bodies

2. Various actions to reduce VOC emission namely (i) provision of closed roof tank for ETP surge pond in place of open surge pond, (ii)VOC adsorption system, (iii)Oily sludge reduction, (iv)Domed roof tank for Volatile products in place floating roof tanks (v) fugitive emission survey & leak repair programme including inventorisation.

3. Fuel quality improvement to reduce stack emission SO_2, SPM and low Nox burners to reduce NOx emission.

4. Alternative method of handling tank bottom oily sludge to reduce sludge generation.

5. Linking of data from continuous monitoring of effluent quality, stack emission and ambient air quality to TNPCB through internet.

6. Rain harvesting and green belt development to improve ground water quality and air pollution abatement.

All industries have taken up projects for continuous monitoring critical environment related parameters and infrastructure for data transfer to TNPCB worth Rs 1600 lakhs.

The summary of industry-wise descriptions of action plans and the status is presented in Table 2.3 (a) for select completed projects and in Table 2.3 (b) for select on-going projects. The detailed descriptions of actions are presented in Annexure A. The additional actions (apart from what are listed in TNPCB report) are presented in Table 2.3(c) and actions common to all industries are presented in table 2.3 (d) The summary of the industry-wise status of implementation in terms of No.of projects is presented in Table 2.3(e). The industries in Manali Area have formed an exclusive environment monitoring committee to review the status implementation of the action plan. The minutes of meeting of the committee recently held is enclosed as Annexure B.

2.4 Benefits

Benefits that can be achieved by implementing all action points have been worked out and the consolidated total cumulative pollutant reduction is summarized in Tables2.4 to table 2.6.

Table 2.3(a) Industry-wise Actions that have been already completed for select projects

Industry S.No/ Abbreviation	Action Point Ref.No	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget	Benefits
1/ CPCL	In-situ sludge treatment in crude tanks ST-4	Continuous for all tanks	Sludge shifted to sludge lagoon and treated mechanically	In-situ treatment in tank itself for oil recovery. Residual sediments for bio remediation or co-processing in cement kiln	Job for tank no 610 by M/s Balmer Lawrie Completed in June'11. Same will be continued for the other Maintenance & inspection tanks in future	Budget provision is Rs 1/- crore per tank	Reduction of oily sludge storage, VOC Control. Reduction of VOC emission by 2.48 MT/day
	Fugitive emission inventorisation and control ST-8	Nov'10/ continuous	Leak detection and repair (LDAR)	LDAR & Inventorisation	completed in Refinery 1 &2	Rs 25 lakhs per year	VOC emission reduced by 2.40 MT/year in Refinery 2 during Dec 2010 to Feb 2011 inventorisation

ST: Short term actions of TNPCB report (page 105)
for other projects in this category refer to Annexure A

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Table2.3 (a) contd

Industry S.No/ Abbreviation	Action Point Ref No	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget	Benefits
	Provision of two additional sludge storage pits ST 10	Completed	Oily sludge after mechanical treatment stored in lined pit of 500 KL capacity	Additional two pits constructed	Competed in Dec 2010	cost of Rs 10 lakhs	Reduction in pollutants reaching underground water as given below: Oil & Grease: 0.10 kg/hr BOD: 1.00 kg/hr COD: 2.00 kg/hr
5/TPL LAB	Advanced process control ST 3	March '11	DCS	DCS upgraded to Advanced process control	Completed in March 11	at a cost of Rs 11.00 lakhs	Reduction of Sulphur dioxide emission - 278.61 MT of SO_2. / Annum

Table2.3 (a) contd

Industry S.No/ Abbreviation	Action Point Ref No	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget	Benefits
6/MPL-1	To reduce SPM level in the boiler stack.Retofit burner ST 1	Completed	Furnace oil consumption is only 500 Kg/Hour. By adoptig various energy saving measures..	Based present Furnace oil firing of 400 to 500 Kgs / Hour consumption .Nozzle renewed. Perodically checked and cleaned the nozzle.Diffuser Plate renewed. Modulation serviced.	The project is completed in Feb 2011	Budget is Rs 25 Lakhs	Reduction in pollutants SPM well below the limit: SPM – Reduction 50 kg/day
13,14/ FPL	SPM monitoring ST-1	Completed	Manual monitoring of SPM emission	On line continuous monitoring & linking to TNPCB	Completed	Rs 7.50 lakhs	Better Monitoring of emissions

Table2.3 (a) contd

Industry S.No/ Abbreviation	Action Point Ref no	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
17/IAL	New Cleaning method for plant area ST-1	Nov 2010	Cleaning by water washing	Cleaning by oil-adsorbent sheets	Regularly followed	Rs 1.25 lakhs/year	Reduction of oil & grease by 65 Kg/day
	Use of Vacuum pump in place of steam ST 2	Sept 2010	Steam ejector	Vacuum pump	Completed	Rs 50 lakhs	Reduction of COD by 1300 kg/day
	Use of aspirator in bio treatment St 4	Dec'10	Surface aerators	Additional aspirotor	Completed	Rs 6.00 lakhs	Reduction of BOD by 390 kg/day

Table 2.3(a) contd

Industry S.No/ Abbreviation	Action Point ##	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget	Benefits
18/CEPL	VOC emission monitoring	completed	Manual monitoring of VOC emission	On line continuous monitoring & linking to TNPCB	Completed in Oct 10	Rs 5.00 lakhs	Better Monitoring of emissions
19/PAL	Powder transport	Completed	Manual transport	Pneumatic transport	Completed in Oct 10		Reduction of SPM emission
	VOC emission monitoring	completed	Manual monitoring of VOC emission	On line continuous monitoring & linking to TNPCB	Completed in Nov 10	Rs 5.00 lakhs	Better Monitoring of emissions
20/NOL	AAQ,Stack, VOC emission monitoring	completed	Manual monitoring of VOC emission	On line continuous monitoring & linking to TNPCB	Completed in Oct'10	Rs 12.00 lakhs	Better Monitoring of emissions
21/EIL	Closed system for Zn-ash	completed	Open system for Zn Ash	Closed system for handling Zn Ash	Completed inOct10		Reduction of SPM emission

Refer item 3.6 of page 57 of TNPCB report

Table2.3 b Industry-wise Actions under implementation for select projects

Industry S.No/ Abbreviation	Action Point Ref no	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
1/CPCL	Disposal of entire quantity of RO reject water to neighboring industry. ST 1 (a)	Aug 2011/ Dec 2011	Out of total 100m3/hour of RO reject water only30m3/hour is being disposed to neighboring industry and balance 70 m3/hour is discharged in nearby water body, b-canal.	Entire quantity of RO reject water 100 m3/hour will be supplied to neighboring industry.	The project is 75% completed. Target Dec 2011	Budget provision is Rs 2 crore	Reduction in pollutants reaching B-canal as given below: TSS : 1.70 kg/hr BOD: 1. 20 kg/hr COD: 9. 97 kg/hr TKN : 1.48 kg/hr NH3-N 0.89 Kg/hr. Cl- 181 kg/hr TDS 411 KG/HR

ST : Short term

for other projects in this category refer to Annexure A

Table2.3 (b) contd

Industry S.No/ Abbreviation	Action Point Ref no	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
CPCL	Maximizing recycle water 1(b)	Aug 2011/ Dec 11	Storm water drain run-off discharged to nearby water bodies	Storm water drains run-off proposed for reprocessing in ETP and discharge to nearby water bodies will be stopped	The project is 75% complete	Budget provision is Rs.2 crore	Reduction in pollutants reaching B-canal as given below: O&L: 0.60 kg/hr TSS : 2.00 kg/hrK BOD: 1.00 kg/hr COD: 6.00 kg/hr Cl- 200 kg/hr

Table2.3 (b) contd

Industry S.No/ Abbreviation	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
1/CPCL	Revamp of ETP-1 & ETP -2 ST 2	Dec'10/Dec'11	Pressure sand filter and activated carbon adsorber not present in ETP-1 and ETP-2. Old type Dissolved Air floatation unit , surface aeration system	Provision of Pressure sand filter and activated carbon adsorber in ETP-1 and ETP-2. Provision of New DAF & diffused aeration in ETP-2	The project is 60% complete	Budget provision is Rs 40 crore	Reduction in pollutants reaching underground water as given below: Oil & Grease: 0.50 kg/hr TDS 581 kg/hr Cl- 193 kg/hr BOD: 3.30 kg/hr COD: 25.0 kg/hr
1/CPCL	Conversion of open surge ponds to closed tanks in ETP ST 3	Sept'11/ Dec'11	Oily water stored in open surge ponds	Oily water will be stored in closed tanks with vapor adsorption system	3X10000 M3 tanks being executed by M/s Bridge &Roof. Present progress 50% complete Target Dec '11	Budget provision is Rs 15/- crore	VOC emission Control, Better oil separation. Reduction of VOC emission by 7.95 MT/day

Table2.3 (b) contd

Industry S.No/ Abbreviation	Action Point Ref .No	Original Target/Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
1/CPCL	Provision of VOC adsorption system for ETP-s ST -7	Sept'11/ Dec'11	Equipment handling with Oily water like API separator etc are open type	Equipment handling with Oily water like API separator etc will be covered and vapor adsorption system will be provided.	Progress 30% Target Dec'11	Budget provision is Rs 2.0 Crore	Reduction of 2.88 MT/day of VOC
1/CPCL	Prevention of oil ingress in storm water canal & improvement in separation & removal of oil in storm canal ST-9	Dec'10/ March'12	Presence of choked / damaged Oil water sewer, use of pipe skimmer, floating skimmer, portable skimmer with transfer pump	Repair of entire OWS, Provision of larger deeper pond for easy separation of oil, provision water underflow oil catcher, floating suction arrangement for oil transfer & oil transfer pumps	The project is 50% complete Target: March12	Budget provision is Rs 2 crore	Reduction in pollutants reaching B-canal as given below: Oil & Grease: 0.30 kg/hr BOD: 1.00 kg/hr COD: 6.00 kg/hr

Table2.3 (b) contd

Industry S.No/ Abbreviation	Action Point Ref no	Original Target / Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
1/CPCL	Use of Natural gas in all heaters boilers/GTs LT-3	Dec 12/ Dec 12	Fuel used is mix of all kinds of fuels contributing to SO2 and SPM emission	Total switchover to Fuel gas with very low emission of SO2 & SPM	Technical scope for modification in CPCL finalised .	Estimated cost Rs 240 Crore	Reduction of SO2 emission by 15.26 MTPD Reduction of SPM by 0.76MTPD
1/CPCL	Co-processing of Haz.waste in Cement plant LT-4	Dec 2011	Residual sediments with oil content of 5-10% treated by microbes to make it suitable for landfill	Co processing in cement kiln	Authorization from TNPCB pending Target Dec 2011	Rs 1.2 crore per year	Fast disposal of oily sludge. Conversion of waste to wealth. CO2 Emission reduction by 55000 MT/YR SPM Emission reduction by 500 MT/YR

Table2.3 (b) contd

Industry S.No/ Abbreviation	Action Point Ref No	Original Target/ Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
2/MFL	Use of LNG as feed LT 5	Dec'12	Naphtha as feed	LNG as feed	Feasibility completed		Reduction CO2 by 6000NM3/hr Reduction SO2 by 5 kg/hr Reduction of NOx by 2.5 kg/hr
3/TPL ECH	Use of Eco friendly coagulant ST 5	Sept 2011/Mar'12	FeCl3 being used coagulant	Use of eco-friendly coagulant like Flocool 120/1020	Trial in progress	Budget Rs 2.0 lakhs	Reduction of sludge by 31 MT/year
3/TPL HCD	Modification in chlorine cylinder filling system ST1	March'11/Oct'11	Use of high pressure air for transfer of Chlorine	Use of transfer pump	Under implementation	Budget Rs 30 lakhs	Reduction chlorine emission by 250 MT/year

LT –Long term actions

Table 2.3 b contd

Industry S.No/ Abbreviation	Action Point Ref No	Original Target/ Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
6/ MPL 1	To reduce SO2 level in the boiler stack ST 2	With in a year	Furnace oil is used as a fuel. 450 to 500 Kgs/hour only used.	As per board advice exploring the possibility of installing scrubber.	The project under discussion with Thermax.	Budget provision is Rs 20 lakes	Reduction in pollutants So2 in the Boiler Stack. 44 kg/dayNote;- As per Board advice action planned. SO2 limit not prescribed.
9&10/ B&L	Stack Monitoring ST 1	Nov 2011	Manual Monitoring	Continuous monitoring	Under installation Compln Nov 2011	Rs 25/- lakhs.	Better monitoring of emission
12/ KPL	Stack Monitoring ST 1	Nov 2011	Manual Monitoring	Continuous monitoring	Under installation Compln Nov 2011	Rs 25/- lakhs.	Better monitoring of emission
13,14 FPL	CAAQM ST 1	Sept 11	Manual Monitoring	Continuous monitoring	Under installation Completion Sept 2011	Rs 25/- lakhs.	Better monitoring of AAQ
17/ IAL	Additional oil skimmer ST 3	April'11/Sept'11	One skimmer	Two skimmers in operation	Under installation	Rs 5.00 lakhs	Reduction of oil & grease by 130 kg/day

Table2.3 (c) Additional action points for Manali Industrial Area

Industry Abbreviation	Action Point Ref No	Original Target / Revised	Present practice	Proposed practice	Present status of project	Budget provision	Benefits
CPCL	Provision of rain water harvesting facility	Mar'10/ Mar'12	Rain water routed to storm canal	Rain water harvesting to improve quality and quantity of UG water	Completed for 30000 M2	Proposed in all buildings for Rs 20 lakhs	Total about 80000Kl/year of rain water will be harvested
	Switch over low Nox burners in Ref II	July12	Out of 45 heaters 22 heaters with low Nox burners	Out of 45 heaters 26 heaters will be having low nox burners	Burner order placed implemented in the shutdown of July 2012	Budget provision is Rs 25 lakhs	Reduction in NOX emission by 180 KG/day
	Provision of dome tanks for Naphtha service	completed	Floating roof with Double seal	Dome roof with Nitrogen blanketing	Completed	Included in Euro Iv project	Reduction of Voc emission 4 MT/year

Table 2.3 (d) Common action point for Manali Industrial Area

S.No	Action Point	Responsibility	Target	Estimated Cost (`)	Benefits/Remarks
1	Clearing the canal for free flow of storm water near MPL Cetex	MPL & CETEX	Dec 2011	10 Lakhs	No stagnation of water
2	Provision of toilets for truck drivers & cleaners at CPCL West Gate 1 & 2	CPCL	Dec 2011	15 Lakhs	Prevention of Ground water pollution
3	Area Improvement & Greenbelt development to maximize green cover	By all members	regular	As per requirement	Pollution abatement
4	Prevention and vigil on Hazardous waste dumping by outsiders	By all members	regular	As per requirement	Prevention of Ground water pollution

Table 2.3 (e)
Summary of status of implementation in terms of no.of projects
Short term projects

Sl.No.	Industry - Abbreviation	Total No.of projects			Completed projects			Projects in progress		
		A#	B#	Total	A	B	Total	A	B	Total
1	CPCL	8	3	11	3	2	5	5	1	6
2	MFL	0	2	2	-	-	-	0	2	2
3	TPL -ECH	1	6	7	0	3	3	1	3	4
4	TPL -HCD	3	4	7	2	2	4	1	2	3
5	TPL- LAB	3	7	10	3	2	5	0	5	5
6	MPL -1	6	1	7	2	0	2	4	1	5
7	MPL-2	3	3	6	-	-	-	3	3	6
8	B&L	2	1	3	2	0	2	0	1	1
9	SPC	4	2	6	3	1	4	1	1	2
10	KPL	0	1	1	-	-	-	0	1	1
11	FPL	4	0	4	2	0	2	2	0	2
12	SRF	3	1	4	2	0	2	1	1	2
13	IAL	4	5	9	3	5	8	1	0	1
	TOTAL	41	36	77	22	15	37	19	21	40

A# Projects with direct pollution reduction potential B# Environment Monitoring projects

Long term Action points:

Sl.No.	Name of the Industry/ Abbreviation	Total No. of projects			Completed projects	Projects in progress		
		A	B	T		A	B	T
1	CPCL	2	2	4	-	2	2	4
2	MFL	1	4	5	-	1	4	5
3	IAL	1	1	2	-	1	1	2
	Total	4	7	11	-	4	7	11

Table 2.4 Benefits --Water Environment

Pollutant	Reduction MT/year			Total Reduction as percent of load
	Already achieved	Reduction expected	Total	
Oil & grease	24	57	81	78
TSS	0	32	32	50
BOD	151	48	199	75
COD	492	358	850	60
TKN	0	43	43	58
NH3-3	0	26	26	59
TDS	0	8690	8690	48
Chloride	0	3476	3476	46

Table 2.5 Benefits - Reduction of pollutant to ambient air

Pollutant	Reduction MT/year			Total Reduction as percent of load
	Already achieved	Reduction expected	Total	
VOC	308	1316	4318	73
SO2	278	5629	5907	34
SPM	18	777	797	70
NOx	0	87.6	87	3
Cl2	0	250	250	87

Table 2.6 Benefits -Land Environment

Pollutant	Reduction of Sludge generation KL/year			Total Reduction as percent of load
	Already achieved	Reduction expected	Total	
Hazardous waste	1682	213	**1895**	**34**

CHAPTER 3

ENVIRONMENTAL MONITORING DATA

From

Air Quality and Water Quality Monitoring Stations in the Manali Industrial Area

The Committee reviewed the environmental monitoring data (for the period 2008-2010) from air and water quality monitoring stations operated by TNPCB and select industries. For air quality, TNPCB provided monthly average data from the National Ambient Air Monitoring Program site located in Manali for criteria air pollutants including SPM, PM_{10}, NO_x, SO_2 and Ammonia. In addition avaliable daily data for the 3years from 5 continuous ambient air quality monitoring stations was provided by industries. For water quality, monthly average data on pH, TSS, TDS, Oil & Grease, BOD and COD were provided from 5 ground water and 3 surface water quality monitoring locations within the Manali area. The summary of the raw data provided are presented in Tables 3.1 & 3.2 and in Figures 3.1, 3.2, 3.3, 3.4

Table 3.1: Summary of data from air quality monitoring stations

NAAQM

	SPM(µg/m^3)			PM_{10}(µg/m^3)			SO_2(µg/m^3)		
Year	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
2008	150.75	141.00	32.61	71.65	59.00	27.96	14.30	14.05	2.05
2009	181.42	170.50	59.54	90.08	71.50	43.76	12.61	12.10	1.61
2010	169.92	145.00	55.24	88.50	76.00	39.14	11.63	11.50	0.97

	NO_x(µg/m^3)			NH_3(µg/m^3)		
Year	Mean	Median	SD	Mean	Median	SD
2008	21.35	20.65	1.99	68.51	67.15	28.56
2009	19.87	19.85	2.15	49.53	45.45	20.26
2010	19.18	19.20	1.04	48.10	46.65	11.27

Table 3.2 Summary of Data

CAQM Stations

	SO_2(µg/m^3)			NO_x(µg/m^3)			PM_{10}(µg/m^3)		
Year	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
2007	23.63	19.6	14.544	13.94	13.38	4.085	78.7	72.93	37.035
2008	16.46	15.43	4.371	32.19	29	14.06	84.43	80.94	37.887
2009	22.3	17.68	15.589	28.07	23.03	25.532	90.1	85.46	43.552
2010	37.81	31.36	18.869	17.77	15.14	9.352	106.7	101.1	37.34

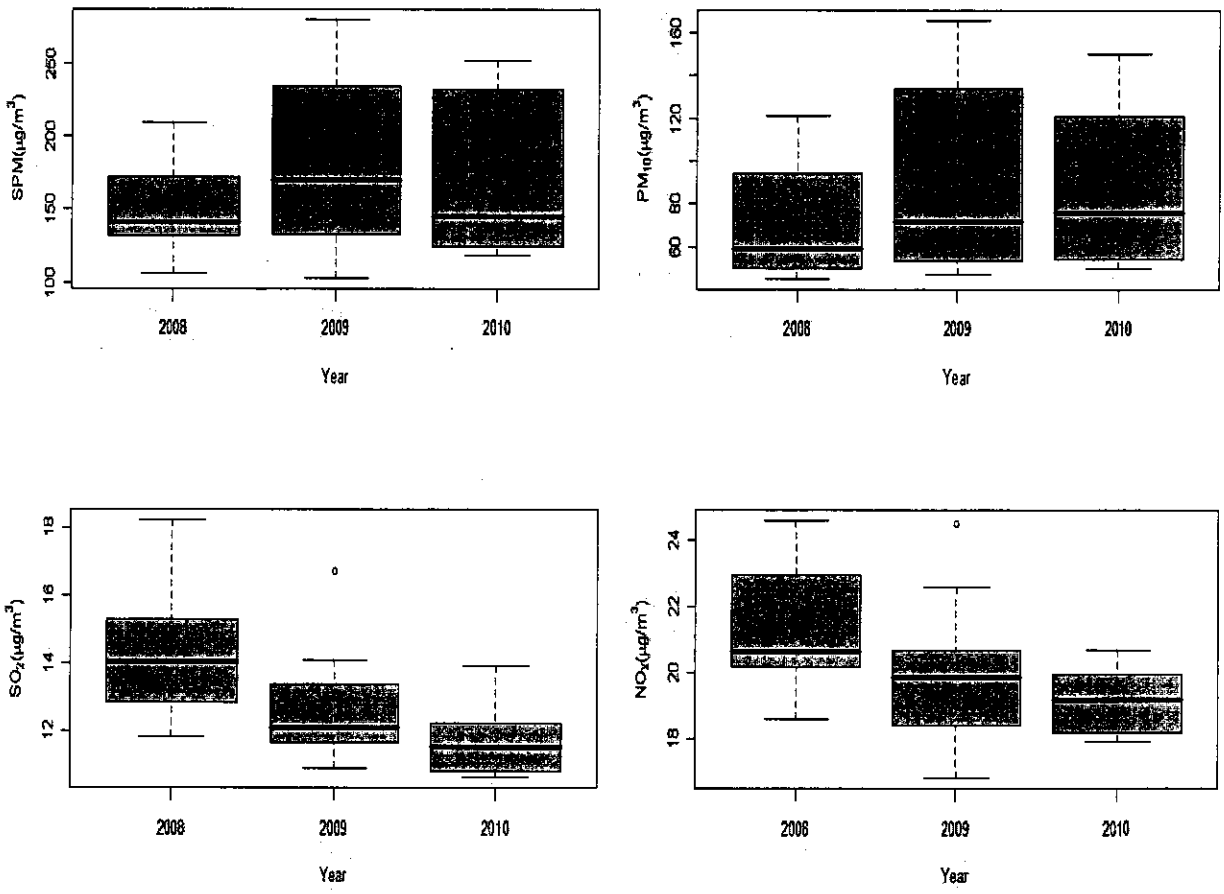

Figure 3.1: Monthly average concentrations of SPM, PM_{10}, SO_2 and NO_x recorded at the National Ambient Air Quality Station in Manali industrial area for the period 2008-2010

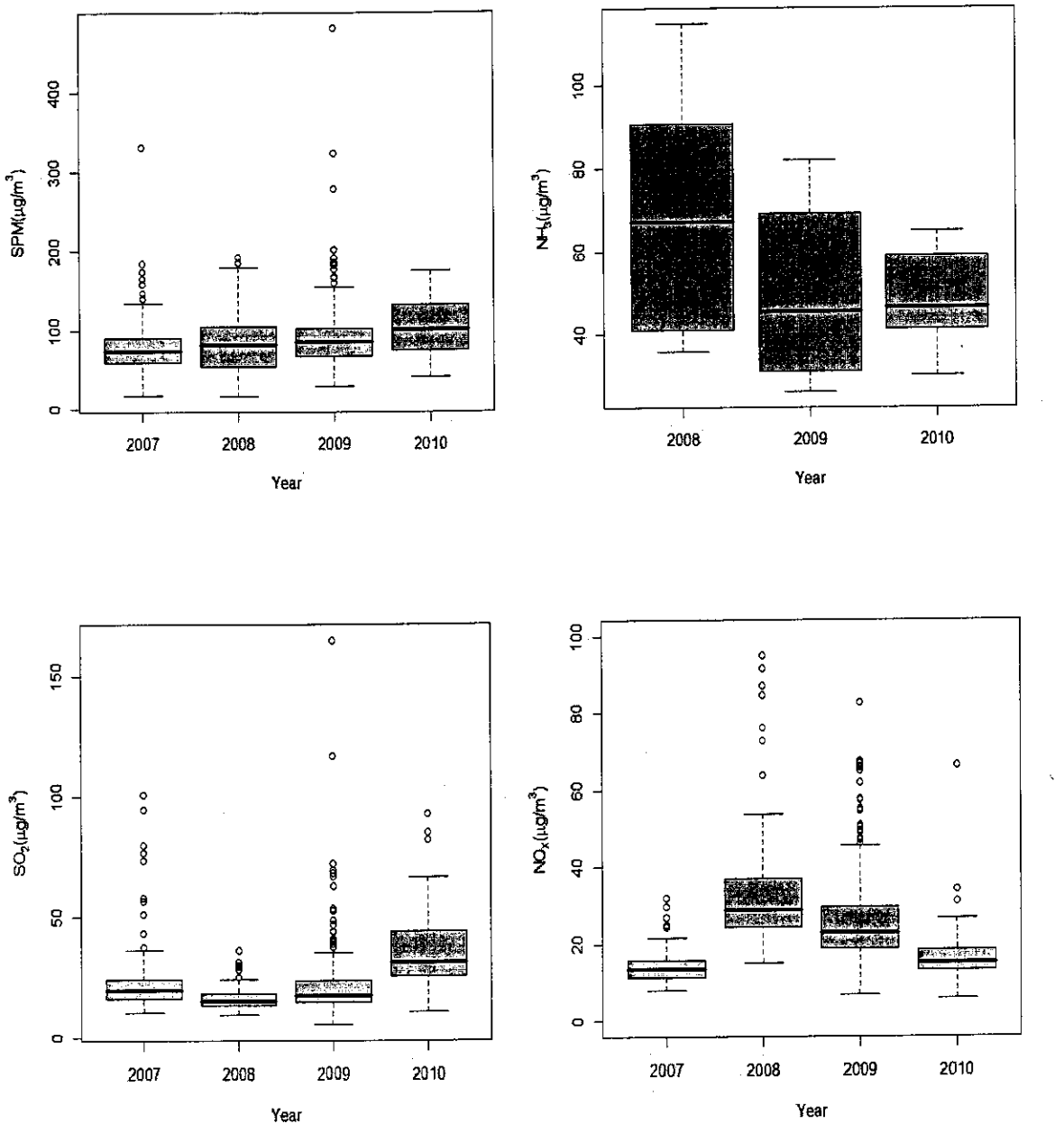

Figure 3.2 : Mean of daily average concentrations of SPM, PM_{10}, SO_2, NO_x and NH_3 recorded at Continuous Air Quality Monitoring Stations (5) operated by industries in the Manali industrial area

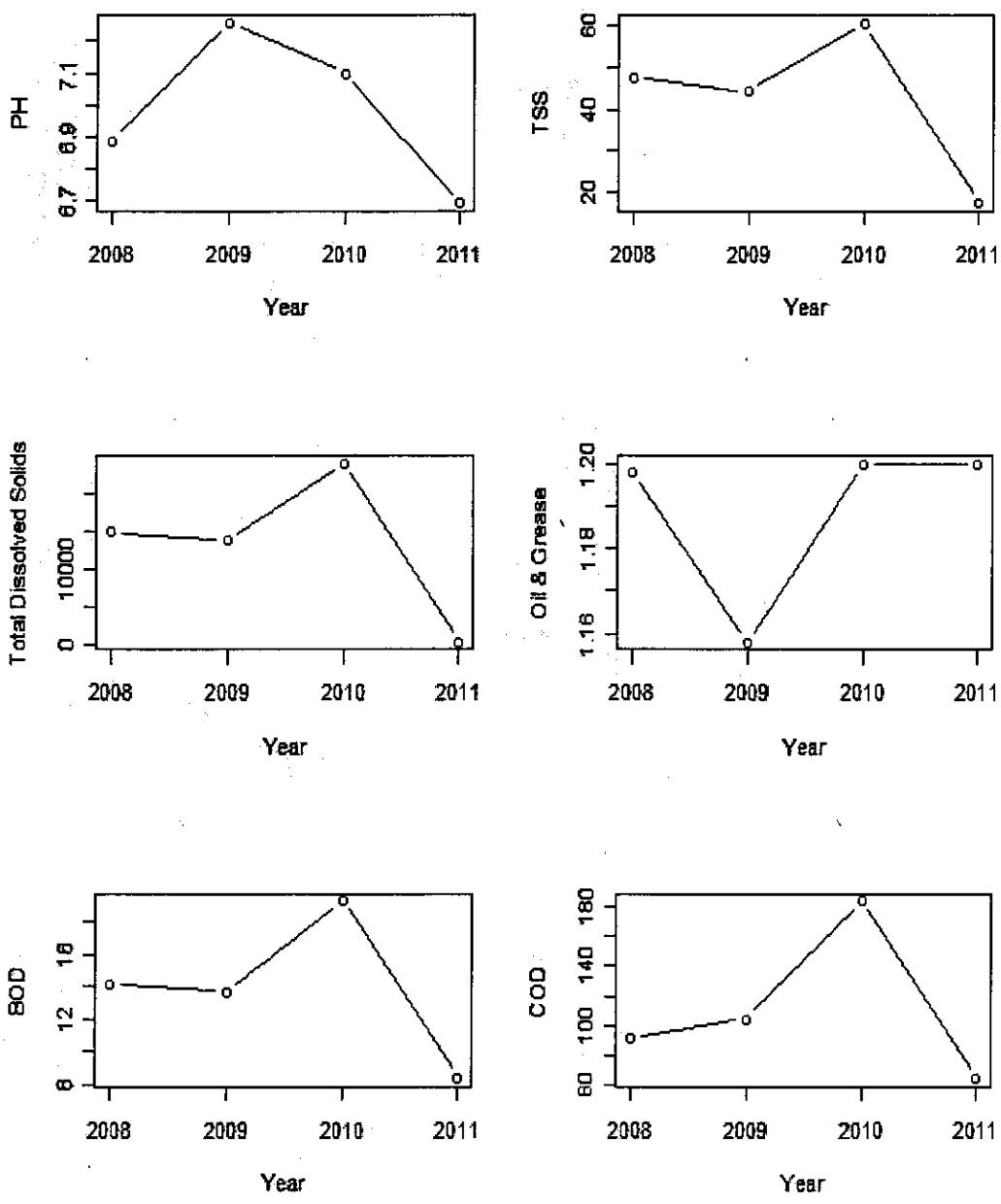

Figure 3.3 : Yearly averages for select water quality parameters across ground water sampling locations

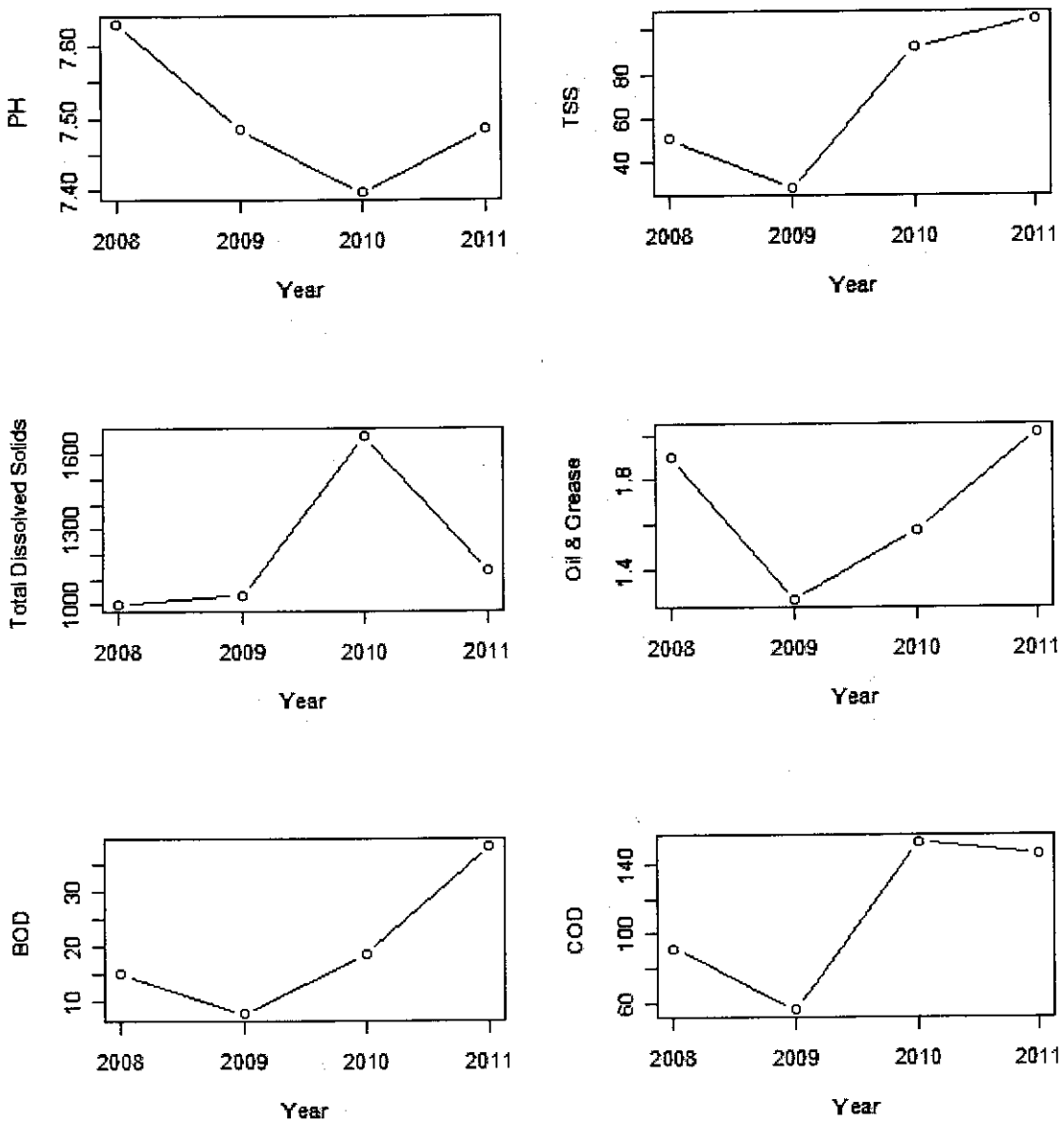

Figure 3.4: Yearly averages for select water quality parameters across surface water sampling locations

CHAPTER 4

REVISED COMPREHENSIVE ENVIRONMENTAL POLLUTION INDEX FOR MANALI INDUSTRIAL AREA

4.1 Introduction:

MoEF / CPCB has devised the methodology for calculation of comprehensive Environmental Pollution Index (CEPI) which involves the following attributes.

a) Presence of pollutants/toxins
b) Exceedence level of Pollutants/toxins above standards
c) Percent samples exceeding the limit out of total sample population
d) Effect on health of residents
e) Effect on flora fauna
f) No.of industries present in the area
g) Pollution Control measures existing in the industries

The first three items depend on pollutant level and balance items depend other factors/attributes. MoEF/CPCB has published in December 2009 the CEPI for Manali industrial area is 76.32 based on data available with them.

Fresh samples have been drawn by CPCB in Feb 2011 and based on the results of these samples (Annexure C) CEPI has been re-evaluated keeping other factors (d,e,f,& g above) at the same level

The CEPI score was re-evaluated to be 67.06. The methodology and results of re-evaluation are provided in the remainder of the chapter.

4.2 Methodology adopted for Evaluation of CEPI

The calculation procedure & formula to be used have been prescribed by MoEF. The salient points and factors pertaining to Manali Industrial area, are summarized below:

Factor	Air	Water	Land	Remarks/Type/(Pollutant dependent or not)
A1	**5**	**3**	**2**	**Based on presence toxins**
A2	5	5	5	Based presence of number of industries
A= A1XA2	25	15	10	Calculated from A1 & A2
B1	**6**	**8**	**7.75**	**Based Exceedence of pollutants above standard**
B2	3	3	3	Based on evidence of impact on people
B3	3	3	3	Based on evidence of impact on geological features
B= B1+B2+B3	12	14	13.75	Calculated from B1, B2 & B3
C1	3	3	3	Based on population of area
C2	**4**	**5**	**4.75**	**Based on percent sample exceeding limit out of total**
C3	0	5	5	Based on presence of eco-sensitive habitat, park etc
C=(C1XC2) +C3	**12**	**20**	**19.25**	Calculated from C1, C2 & C3
D	15	10	15	Based on adequacy of pollution control measures
Sub index A+B+C+D	**64**	**59**	**58**	**Sub index= A+B+C+D**

Composite CEPI for the area CEPI is calculated from sub-indices for Air, water & land by the formula

Comprehensive Environmental Pollution Index = im +{(100-im) x (i2/100) x (i3/100)}

Where im = maximum sub index; i2 & i3 are sub-indices for other media

As can be seen from the above factors A1, B1, & C2 are only linked to pollutants levels in the Air, water & land environments respectively and other factors namely A2,B2, C1, C3 & D are based on factors other than presence of pollutants say presence No.of industries, population etc.

Since no guidelines are available for these factors (A2,B2, C1, C3 & D) calculation has been made to evaluate A1, B1 & C2 for Air, water & land environments based on the results of analysis of samples taken in Feb' 2011 (Annexure C) keeping these factors (A2,B2, C1, C3 & D) at the same level.

Further since no information is available about the specific pollutant that have been used in calculating the CEPI (76.32) various combinations of pollutants are chosen to calculate CEPI- sub index for Air, water & land environments as well as overall CEPI

4.3 Evaluation of CEPI

Pollutants Considered (for Air environment)

S. No	Pollutant	Category	Mean Concentration ($\mu g/m^3$)
1	Sulphur di Oxide	A	35.8
2	NO_2	A	46.9
3	PM_{10}	B	89.7

Pollutants Considered (for water environment)

S. No	Pollutant	Category	Mean Concentration ($\mu g/m^3$)
1	TDS/Conductivity	A	1446 µs/cm
2	BOD	B	18.25
3	Oil & Grease	C	6.75

Pollutants Considered (for Land environment)

S. No	Pollutant	Category	Mean Concentration ($\mu g/m^3$)
1	TDS/Conductivity	A	2200µs/cm
2	BOD	B	5.25
3	Oil & Grease	C	<1

JUSTIFICATION FOR POLLUTANT SELECTION

SO_2, NOx & PM_{10} are important air emissions from heaters, boilers & furnaces

Oil & grease is an important pollutant for petrochemical industries

TDS/Conductivity is also important pollutant where RO process used extensively

BOD has been chosen as it affects oxygen availability for aquatic life. In addition these are also criteria pollutants for which longitudinal data are available.

Factor A_1: for air

A_1 = 2 (due to the presence of toxins) + 0 (Combination of Pollutants (A, A, B) = 2+0=2

A_2 = 5 (based on number of industries)

A = A1 X A2

Pollutant Factor = 2 X 5 = 10

A. Pathway Factor -Air

B= B1 (based on exceedence factor) + B2 (Evidence of Symptoms on people) + B3 (Evidence of adverse impact on ecological features)

B1: Exceedence Factor

- SO_2
  - Standard for SO_2: 80 $\mu g/m^3$
  - Concentration of SO_2: 35.8 $\mu g/m^3$
- EF= 35.8/80= 0.45

The exceedence factor of SO_2 falls in **Low** Pollution Category (< 0.5)

- NO_2

➢ Standard for NO_2: 80 $\mu g/m^3$
➢ Concentration of NO_2: 46.9 $\mu g/m^3$
➢ EF= 46.9/80= 0.59

The exceedence factor of NO_2 falls in **Moderate** Pollution Category (between 0.5 and 1.0)

PM_{10}

Standard of PM_{10}: 100 $\mu g/m^3$

Concentration of PM_{10}: 89.7 $\mu g/m^3$

EF= 89.7/100= 0.897

The exceedence factor of PM_{10} falls in **Moderate** Pollution Category (between 0.5 and 1.0)

B1 = 2+ 0 (Low, Moderate, Moderate) = 2

B2 = 3 (evidence of adverse impact on people)

B3 = 3 (symptoms of evidence of impact on eco-geological features

B= 2+ 3+ 3= 8 for Air

B. Receptor Factor for Air

Population of Manali: 28,174; Number of people affected is between 10,000 to 1, 00,000

C1= 3

C2:

(i) SO_2

Number of samples collected =4

Number of samples exceeded the standards =1

Surrogate Number representing Level of Exceedence = 1/4*0.45 =0.1125

SNLF= 0.12 which is <0.25

Moderate = 1.5

(ii) NO_2

Number of samples collected =4

Number of samples exceeded the standards =1

Surrogate Number representing Level of Exceedence = 1/4*0.59 =0.1475

SNLF= 0.15 which is <0.25

Moderate=1.5

(iii) PM_{10}

Number of samples collected =4

Number of samples exceeded the standards =0

Surrogate Number representing Level of Exceedence = 0/4*0.897 =0

SNLF= 0

Low=1

C2= 1.5 (Moderate) + 0 (Moderate, Moderate, Low) = 1.5

C3:

C3= 0 (No eco sensitive areas)

C= (C1XC2) + C3

C= (3X1.5) +0= 4.5 for air

C. High Risk Element Factor –Air D= 15

Air -Sub Index= A+B+C+D = 10+8+4.5+15= 37.5

Sub-Index - Water

Pollutants Considered

S. No	Pollutant	Category	Mean Concentration
1	Conductivity	A	1446 µs/cm
2	BOD	B	18.25
3	Oil & Grease	C	6.75

A. Pollutant Factor -water

Factor A_1:

A_1 = 4 (due to the presence of toxins) + 1.5 (Combination of Pollutants (A, B, C) = 4+1.5=5.5

A_2 = 5 (based on number of industries)

A = A1 X A2

Pollutant Factor = 5.5 X 5 = 27.5

Pathway Factor

B= B1 (based on exceedence factor) + B2 (Evidence of Symptoms on people) + B3 (Evidence of adverse impact on ecological features)

B1: Exceedence Factor

- Conductivity

  Standard for Conductivity : 4000 µs/cm

  Concentration of Conductivity: 1446 µs/cm

  EF= 1446/4000= 0.36

The exceedence factor of Conductivity falls in **Low** Pollution Category (< 0.5)

- BOD

  Standard for BOD : 30 mg/l

  Concentration of BOD : 18.25 mg/l

  EF : 18.25/30= 0.61

The exceedence factor of Conductivity falls in **Moderate** Pollution Category (between 0.5 and 1.0)

- Oil & Grease

  Standard for Oil & Grease : 10 mg/l
  Concentration of O & G : 6.75 mg/l
  EF : 6.75/10= 0.68

The exceedence factor of Oil & Grease falls in **Moderate** Pollution Category (between 0.5 and 1.0)

B1 = 2+ 0 (Low, Moderate, Moderate) = 2

B2 = 3 (evidence of adverse impact on people)

B3 = 3 (symptoms of evidence of impact on eco-geological features

B= 2+ 3+ 3= 8 for water

B. Receptor Factor

Population of Manali: 28,174; Number of people affected is between 10,000 to 1, 00,000

C1= 3

C2:

(i) Conductivity

Number of samples collected =4

Number of samples exceeded the standards =0

Surrogate Number representing Level of Exceedence = 0/4*0.36 =0

SNLF= 0

Low = 1

(ii) BOD

Number of samples collected =4

Number of samples exceeded the standards =1

Surrogate Number representing Level of Exceedence = 1/4*0.61 =0.15

SNLF= 0.15 which is <0.25

Moderate=1.5

(iii) Oil & Grease

Number of samples collected =4

Number of samples exceeded the standards =1

Surrogate Number representing Level of Exceedence = 1/4*0.61 =0.17

SNLF= 0.17 which is <0.25

Moderate=1.5

C2= 1.5 (Moderate) + 0 (Moderate, Moderate, Low) = 1.5

C3: C3= 5

C= (C1XC2) + C3

C= (3X1.5) +5 = 9.5 for water

C. **High Risk Element Factor- for water D= 10**

Water- Sub Index= A+B+C+D = 27.5+8+9.5+10= 55

Sub Index – Land

Pollutants Considered

S. No	Pollutant	Category	Mean Concentration
1	Conductivity	A	2200µs/cm
2	BOD	B	5.25
3	Oil & Grease	C	<1

A: Pollutant Factor- Land
Factor A_1:

A_1 = 4 (category C) + 1.5 (Combination of Pollutants (A, B, C) 4+1.5= 5.5

A_2 = 5 (based on number of industries)

A = A1 X A2

Pollutant Factor = 5.5 X 5 = 27.5

B Pathway Factor

B= B1 (based on exceedence factor) + B2 (Evidence of Symptoms on people) + B3 (Evidence of adverse impact on ecological features)

B1: Exceedence Factor

- Conductivity

Standard for Conductivity : 4000 µs/cm

Concentration of Conductivity: 2200 µs/cm

EF= 2200/4000= 0.55

The exceedence factor of Conductivity falls in **Moderate** Pollution Category (between 0.5 and 1.0)

- BOD

Standard for BOD : 100 mg/l

Concentration of BOD : 5.25 mg/l

EF : 5.25/100= 0.0.0525

The exceedence factor of Conductivity falls in Low Pollution Category (between <0.25)

Oil & Grease

Standard for Oil & Grease : 10
Concentration of O & G : <1 mg/l (BDL)
EF : <0.1

The exceedence factor of Oil & Grease falls in **Low** Pollution Category (<0.5)

B1 = 2+ 0 (Moderate, Moderate, Low) = 2

B2 = 3 (evidence of adverse impact on people)

B3 = 3 (symptoms of evidence of impact on eco-geological features

B= 2+ 3+ 3= 8

D. Receptor Factor

Population of Manali: 28,174; Number of people affected is between 10,000 to 1, 00,000

C1= 3

C2:

(i) Conductivity

Number of samples collected =4

Number of samples exceeded the standards =0

Surrogate Number representing Level of Exceedence = 0/4*0.55 =0

SNLF= 0

Low = 1

(ii) BOD

Number of samples collected =4

Number of samples exceeded the standards =0

Surrogate Number representing Level of Exceedence = 1

SNLF= 0.0.12 which is <0.25

Low=1

(iii) Oil & Grease

Number of samples collected =4

Number of samples exceeded the standards =0

Surrogate Number representing Level of Exceedence = 0/4*0 =0

SNLF= 0

Low = 1

C2= 1.0 (Low) + 0 (Low, Low, Low) = 1.0

C3:

C3= 5 (for Manali)

C= (C1XC2) + C3

C= (3X1.0) + 5= 8

E. High Risk Element Factor D= 15

Land -Sub Index= A+B+C+D = 27.5+8+8+15= 58.5

Overall CEPI

Comprehensive Environmental Pollution Index = im +{(100-im) x (i2/100) x (i3/100)}

Where im = maximum sub index; i2 & i3 are sub-indices for other media

Area	Air	Water	Land	CEPI	
Manali (Tamilnadu)	37.5	55.0	58.5	67.06	An_Wn_Ln
Revised CEPI index for Manali industrial area = 67.06					

CHAPTER 5

COMMITTEE'S FINDINGS AND RECOMMENDATIONS

5.1 Findings

Following are the physical action events during the period January 2010 – July 2011:

5.11 Since the declaration of the Manali Industrial Area as a "Critically Polluted Area", the industries in the area have been responding positively to the direction of the TNPCB and CPCB. Within a short period, they formulated the proposal for the remedial action and submitted to TNPCB.

5.1.2 Once the Action Plan was approved by TNPCB and CPCB, the industries took earnest action to implement the plans both short term and long term.

In TNPCB report, totally 77 short term action points and 11 long term actios ponts have been listed. Further 3 additional points were added by CPCL and 4 additional points were added as common projects. for the MIA.

Regarding the TNPCB listed points the status regarding of implementation is as under;

Category	Total	Completed	In progress
Short term	77	37	40
Long Term	11	-	11

Regarding additional points of CPCL and common projects, the status is

Category	Total	Completed	In progress
Additional CPCL	3	1	2
Common projects	4	-	4

Out of the 77 projects, 41 projects have the direct pollution reduction potential; out of these 41 projects 22 have been completed {Table 2.3 (e)} There are 36 projects under Environment Monitoring category, out of which 15 have been completed

5.1.3 The remedial action plans have targeted against various pollutants including VOC ad listed below:

SO_2, NOx, SPM,VOC, Oil & Grease, BOD, TDS,

In addition, the action plan covers other pollutants of concern also.(Refer tables 2.3 (a), 2.3 (b), 2.3 (c), 2.3(d) and 2.3(e)

5.1.4 Monitoring system of Ambient Air Quality, and Stack emission have been strengthened by way of establishing connectivity to Care Air Centre (CAC) TNPCB which enables real time data transfer of emissions and Ambient air Quality, to CAC, which is being monitored at TNPCB also. This will help the regulatory authorities to manage the environment in Manali better.

5.1.5 All the industries in the polluting category have joined in the remedial action. The industries have shown commitment in improving the environmental quality in Manali. This is done through two mechanisms:

1) Manali Industrial Association
2) Environmental Committee of the Association

The Environmental Committee has been formed as a part of the action plan and it is hoped that it will play a vital role in improving the Manali environmental quality.

5.1.6 Air quality in the Manali industrial area is driven for the most part by industrial emissions with some additional contributions to concentrations of some pollutants including SPM, PM_{10}, NO_x and VOCs from vehicular emissions as well. Concentrations of SO_2 and NO_x were generally within the national ambient air quality standards over the 3 year period (2008-2011). Further, over the 3 year period both pollutants show a general decline. The trends in the concentration of NH_3 also indicate a decline. The trends in PM 10 and SPM show a modest increase and often exceed recommended guidelines but without data on contributions from vehicular emissions over the same period, it would not be possible to conclude if industrial emissions were alone responsible for the underlying trend. Several action plans seek to reduce emissions of particulate matter. The collective actions taken by the industry on air related emissions could thus be expected to achieve full compliance with existing ambient air quality standards for criteria air pollutants. There is limited historical data on air toxics including VOCs. The actions in progress estimate a 73% reduction in emission load. The continuous monitoring network deployed by the industry in partnership with TNPCB represents a pragmatic first step to estimate how these actions would impact short-term and long-term trends in VOC concentration.

Substantial reductions in TDS are already observed in both ground water and surface water samples. With additional actions proposed, it may be expected that the TDS values may be well within control. Several actions proposed also seek to make substantial reductions in chloride, oil and grease discharge.

5.1.7 The revised CEPI for the Manali industrial area has been estimated to the 67.06 Since, the CEPI score is less than 70, Manali Industrial Area is no longer a `Critically Polluted Area'.

5.2 Recommendations:

Considering the facts:

i. All the industries in the Manali Industrial area have joined together and have initiated actions to reduce the pollution load in Manali,

ii. There are indications that the deterioration in environmental quality has been arrested and there is evidence that it will turn for better in future if the actions (Annexure- A) are fully implemented, and.

iii. The revised CEPI score for the Manali Industrial area is less than 70

The Committee of the TNPCB recommends that the ban imposed on industrial expansions in Manali industrial area be lifted.

19.8.2011
(Dr.K.Thanasekaran)

(Dr. Kurian Joseph)

Kalpana Balakrishnan 19/8/2011
(Dr Kalpana Balakrishnan)

19/8/2011
(Dr R.Swaminathan)

(Thiru R. Kumar, JCEE, TNPCB, Co-ordinator)

ANNEXURE - A

Detailed Description of the Action Plan for Pollution Reduction

A.1 CHENNAI PETROLEUM CORPORATION LIMITED

A.1.1 INTRODUCTION

Chennai Petroleum Corporation Limited (CPCL) is a public sector unit, a group company of Indian Oil Corporation Ltd with 51.88% share holding by IOCL.CPCL is in the business of refining crude Petroleum Oil & production of various petroleum products including Lube stocks, Petrochemical feed stock and Wax

CPCL has two refineries with a combined refining capacity of 11.5 Million Tonnes Per Annum (MMTPA). The Manali Refinery has a capacity of 10.5 MMTPA and is one of the most complex refineries in India with Fuel, Lube, Wax and Petrochemical feed stocks production facilities. CPCL's second refinery is located at Cauvery Basin near Nagapattinam.

Manali Refinery has three Refining units Ref I, II & III with corresponding effluent treatment plants. Refinery has its own captive power plant, City sewage reclamation and Desalination plant to reduce the dependency on Tamilnadu Electricity Board & Chennai Metro Water Supply Board. The total complex is spread over an area of 800 acres.

A.1.2 Action plan for reduction of CEPI

In response to MoEF/CPCB's report on Comprehensive Environmental Pollution Index (CEPI), Manali cluster had been declared as critically polluted area as the index is 76.34 > 70. TNPCB prepared an action plan for reducing the CEPI on industry-wise in coordination with respective industries .CPCL has 11 short term and four long term action points. CPCL has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short Term Measures by CPCL (Refer Table 12.1 Page 105 of TNPCB Report)

Action Point No.1

Zero discharge of effluent to Buckingham canal

Under this the following two measures have been initiated

a) Disposal of entire quantity of RO reject to neighboring industry.
b) Reclamation of storm drain water and reuse within the refinery

The present practice of Water & Wastewater management in CPCL, effluent treatment are as under

Presently the requirement of the CPCL Manali Refinery is met from the following sources:

i. Municipal water (CMWSSB)
ii. Reclaimed water from city sewage
iii. Desalinated water

The water consumption points are as under

i. Drinking & sanitary out of which a part returned back as internal sewage to for reclamation.
ii. Process water, cooling water, & boiler feed water out of which a part is retuned as effluent to effluent treatment plants
iii. Green belt /plantations
iv. Fire water make up out of which a part returns as storm-water drain off to effluent treatment.(pipe line leaks whenever occur)

The effluent collected from units and storm water runoff, due to occasional leaks of firewater, are treated, in effluent treatment plants and reused within the refinery with use of Ultra filtration and Reverse Osmosis plants. The net discharge from the refinery to the nearby water body is the reject water from Reverse Osmosis & storm water run-off from drains

Under short term action points two schemes of wastewater management for reduction in pollutant reaching nearby water bodies are in under implementation

Action point 1 a: Total disposal of RO reject water to neighboring industry:

Presently CPCL generates Ro reject water around 100m3/Hr and facilities exist to pump out 30m3/hr of reject water to MPL. Balance 70 M3/Hr is being let out to Buckingham canal through our Eco Pond.

Actions have been initiated for supplying entire quantity of RO reject water (100 m3/hour) to neighboring industry, M/s Manali Petrochemicals Limited (MPL) by installing the following facilities.

i. RO reject water sump
ii. 3 number of RO reject water transfer pump (150 m3/hour) capacity
iii. 8"Dia transfer line from CPCL to MPL (Existing is only 3"dia pipe only)

The benefits of the project is reduction of following pollutant loads to B-canal

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load to B-canal before implementation **Kg/hr ##**	Pollutant load to B-canal after implementation **Kg/hr ##**
1	TSS	24	1.7	Nil
2	BOD	17	1.19	Nil
3	COD	142	9.97	Nil
4	TKN	21.2	1.48	Nil
5	NH3-N	12.72	0.89	Nil
6	Chloride	2597	181	Nil
7	TDS	5882	411	Nil

Considering additional 70 m3/hour of discharge to B-canal is diverted to MPL

Status :

RO reject sump- contract awarded .

Pumps order placed.

Project Scheduled completion : Dec-11

Progress made so far : 75%

Summary of Action point No1 (a)

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1	Disposal of entire quantity of RO reject water to neighboring industry.	Aug 2011/ Dec 2011	Out of total 100m3/hour of RO reject water only30m3/hour is being disposed to neighboring industry and balance 70 m3/hour is discharged in nearby water body, b-canal.	Entire quantity of RO reject water 100 m3/hour will be supplied to neighboring industry.	Budget provision is ` 2 crore and the project is 75% complete.	Reduction in pollutants reaching B-canal as given below: TSS : 1.70 kg/hr BOD: 1. 19 kg/hr COD: 9.97 kg/hr TKN : 1.48 kg/hr NH3-N 0.89 Kg/hr. Cl- 181 kg/hr TDS 411 kg/hr

Action point 1.b :Maximizing recycle water

Presently, during dry weather condition, water collected in storm pond from storm drains are let out to Buckingham canal.

Action have been initiated for reclaiming the water discharged to Buckingham canal from ponds (collected from storm drain).The water collected from ponds are pumped to two numbers of surge tanks in ETP -3 and processed through contaminated rain water polishing system, namely Tilted Plate Interceptor(TPI) & Multimedia filter . The following four schemes are involved for the above.

a. Installation of additional high pressure pumps in all storm water ponds
b. Maximum utilization of CRWS & ETPS
c. Reuse of backwash & chemical wash streams in STP
d. Capacity augmentation of ETP 3 by use of TPI & multimedia filter

Benefits

The benefits from the project is reduction of following pollutant loads to B-canal

S.NO	Pollutants	Pollutant lelevl gm/m3	Pollutants load to B-canal before implementation **Kg/hr ##**	Pollutants load to B-canal after implementation **Kg/hr ##**
1	Oil & grease	3.0	0.6	Nil
2	TSS	10	2	
3	BOD	5	1.00	Nil
4	COD	30	6.00	Nil
5	Chloride	1000	200	Nil

considering 200 m3/hour discharge flow diverted to treatment

Status:

i. Transfer pumps 8 nos for transferring storm water collections to ETP 3- Order placed
ii. Modifications in ETP 3 for feeding water through TPI & filter- Contract lined up.
Project Scheduled completion ; Dec-11
Percentage progress made so far : 75%

Summary

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
2	Maximizing recycle water	Aug 2011/ Dec 11	Storm water drain run-off discharged to nearby water bodies	Storm water drains run-off proposed for reprocessing in ETP and discharge to nearby water bodies will be stopped	Budget provision is ₹ 2 crore and the project is 75% complete	Reduction in pollutants reaching B-canal as given below: O & G : 0.60 kg/hr TSS : 2.0 kg/hr BOD: 1.00 kg/hr COD: 6.00 kg/hr Cl- 200.00kg/hr

Short Term Measures by CPCL (Refer Table 12.1 Page 105)
Action Point No.2

Consistency in Effluent quality as per New MINAS by Revamp of Dissolved Air Floatation (DAF) unit in ETP -2

Existing practice

Presently for aerobic bio reaction air supply is by mechanical surface aerators which consumes more energy and causes damage of flocs by vigorous agitation resulting in poor settling

The existing Dissolved Air Floatation (DAF) unit is old type with compressed injected in the pipeline and its performance is not up to the desired level as well as not equivalent to present day modern Dissolved Air Floation with air saturation vessel and spargers.

Present treatment plant (ETP-1 & ETP-2) do not have Pressure Sand Filter & Activated Carbon Filter at the downstream of activated sludge process to take care of slippage of TSS and MLSS.

Proposed practice

To overcome the above constraints/deficiencies the following facilities have been planned in ETP-1 & ETP 2 for improvement in treated water quality.

- New Dissolved Air Floatation Unit in ETP-2
- New Diffused aeration system in ETP -2
- Pressure Sand Filter & Activated Carbon Filter in ETP-1 & ETP-2

Present status and benefit

Since the part of treated water is used for fire water & green belt development this action will reduce pollutants reaching ground water as detailed below:

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load to groundwater before implementation **Kg/hr ##**	Pollutant load to groundwater after implementation **Kg/hr ##**
1	Oil & grease	1.33	1.0	Nil
2	TDS	1454	581	Nil
3	Chloride	483	193	Nil
4	BOD	8	3.25	Nil
5	COD	63	25.00	Nil

400 m3/hour combined flow from ETP 1 & ETP 2 for Green belt & fire water make up

Since the balance part of treated water (100 m3/hour) is used for further treatment to recycle for process water in the reclamation unit namely Ultra-filtration. Since the quality of feed to UF got improved, the frequency of replacement of membranes will be reduced. This in turn will reduce the frequency of disposal of pollutant membranes disposal. (less frequency of generation of used membranes)

Status:

The project is under implementation. M/s TCE (Tata Consultancy Engineers Ltd) and M/s Hindustan Dorr Oliver are executing the job. The estimated cost of the project is Rs 40 Cr.

Project scheduled completion : Dec-11
Percentage progress made so far : 60%

Summary

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
2	Revamp of ETP-1 & ETP -2	Dec'10/ Dec'11	Pressure sand filter and activated carbon adsorber not present in ETP-1 and ETP-2. Old type Dissolved Air floatation unit	Provision of Pressure sand filter and activated carbon adsorber in ETP-1 and ETP-2.Provision of New DAF in ETP-2	Budget provision is Rs 40 crore and the project is 60% complete	Reduction in pollutants reaching underground water as given below: Oil & Grease : 0.50 kg/hr TDS 581 kg/hr Cl- 193 kg/hr BOD 3.23 kg/hr COD 25.30 kg/hr

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.3: Conversion of open surge ponds in ETP-1 & 2 to closed tanks

Present practice

Presently the oily water feed to effluent treatment plants (ETP-1 & ETP-2) are stored in open ponds to absorb surges in quality and quantity. This results in VOC evaporation by sunlight and dispersion of evaporated VOC in atmospheric air.

Proposed practice

To eliminate VOC emission from open surge ponds Conversion of open surge ponds to closed tanks and provision of vapor adsorption system for tanks in ETP-2 have been taken up at an estimated cost of Rs 15 crore. The following facilities are provided

3X10000 KL closed tanks with fixed roof (17 meter height)
All tanks vents will be linked to vapor adsorption system

Benefit

Benefit is estimated based on evaporation loss calculation with average temperature and wind velocity. It is estimated with the provision of above facilities there will be reduction of 19.87 MT/day of VOC.

Status:

The project Scheduled completion: Dec-11
Percentage progress made so far : 60%

Summary

S.NO	Action point	Original Target/ Revised Target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
3	Conversion of open surge ponds in ETP-1 & 2 to closed tanks	Sept'11/ Dec'11	Oily water stored in open surge ponds	Oily water will be stored in closed tanks with vapor adsorption system	3X10000 M3 tanks being executed by M/s Bridge &Roof. Present progress 50% complete	VOC emission Control, Better oil separation. Reduction of VOC emission by 7.95 MT/day

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.4 In-situ sludge treatment in crude tanks

Present practice

Major source of oily sludge in Refinery is tank bottom sludge of crude oil tanks. Due to long period of storage say from 9-10 years, sludge gets generated and accumulated at the tank-bottom. As per Maintenance & Inspection schedule once in 10 years, these tanks are to be taken for Maintenance. During maintenance, the sludge has to be removed from tank for mechanical works. This sludge contains 60-75% oil and balance water& sediments which is a semi solid, too difficult to get processed in distillation units. To recover oil from the sludge solvent extraction method is used by mixing with diesel as solvent and maximum oil is recovered from the tank itself with mixing of de-sludging chemicals.

The residual sludge is physically transferred and stored in to open sludge lagoon. This sludge is processed through high speed centrifuge (Mechanical separation of oil & sediments) at the rate approximately 50Kl per day. The centrifuged oil is pumped to the slop recovery system and the residual sludge to Bio-remediation.

The above process is time consuming as sludge gets congealed in sludge lagoon and needs to be reheated. From the storage, VOC is emitted due to evaporation and gets dispersed in atmospheric air

Proposed practice

In-situ mechanical treatment at crude oil storage tank itself thereby reducing the sludge generation. The proposed treatment is eliminating the intermittent storage and thereby preventing VOC emission. The residual sludge generated in this process contain only 10% oil and can be directly process in Bio-Remediation.

Benefit

Benefits estimated around 9.94 MT/Day VOC reductions and the estimate is enclosed in (Annexure B)

Status:

Project completed in June -11
This process will be adopted for future tanks also.

Summary

S.NO	Action point	Original Target/ Revised Target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
4	In-situ sludge treatment in crude tanks	Continuous for all tanks	Sludge shifted to sludge lagoon and treated mechanically	In-situ treatment in tank itself for oil recovery. Residual sediments for bio remediation or co-processing in cement kiln	Job in progress for tank no 610 by M/s Balmer Lawrie Completion by June'11. Same will be continued for all tanks	Reduction of oily sludge storage, VOC Control. Reduction of VOC emission by 2.48 MT/day

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.5 : Mobile ambient air quality monitoring station

Present practice

For monitoring ambient air quality 8 Nos. of Continuous ambient Air Quality Monitoring (CAAQM) stations are provided within the premises of the refinery. With the existing facilities ambient air quality in nearby areas during complaints or exigencies could not be ascertained by continuous monitoring.

Proposed practice :

Provision of Mobile ambient air quality monitoring station at a cost of Rs 80 lakhs

Benefits :

(i) Counter checking of existing AAQMs data with another set of instruments apart from calibration.
(ii) Attending to complaints of any abnormality in nearby areas
(iii) Scheduled checking of Ambient air quality inside and outside the company at designated places.

Status: Van reached on 16.05.2011 and is commissioned

Summary

S.No	Action Point	Original/ revised target	Present practice	Proposed practice	Present status/budget	Benefits
5	Mobile Ambient Air quality monitoring Station	Dec'10/ June-11	Ambient air quality measured by portable instruments	Continuous Air Quality Monitoring at various places	Rs 80.00 lakhs Vehicle reached on May 16th & commissioned in June'11.	Cross checking of existing AAQM data and monitoring at places outside refinery

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.6: Linking data from Continuous Ambient Air Quality /Stack Monitoring Stations with TNPCB

Present practice: AAQM data is being submitted to TNPCB regularly in report form.

Proposed practice: Continuous on line transmission of data to TNPCB(Real time data transmission) from AAQMS & CSM

Benefits: Strengthening of Monitoring of Air quality

status :

One AAQM station already linked to TNPCB.

Balance 7 stations work is in progress.

Present the job is 50% completed and will be completed by Dec'2011

Summary

S.No	Action Point	Original/revised target	Present practice	Proposed practice	Present status/budget	Benefits
6	Linking AAQM	Dec'11/ Dec'11	AAQM data submitted to TNPCB regularly	Continuous on line transmission of data	Rs 50 lakhs One AAQM station already linked to TNPCB. Balance 7 stations working progress 50% completed	Strengthening of Monitoring of Air quality

Short Term Measures by CPCL (Refer Table 12.1 Page 105)
Action Point No.7: Provision of vapor adsorption system in ETP 2 & 3

Present practice: Presently the oily water feed is handled in equipment like API separator,
TPI & DAF in open condition. The VOC emitted from these open vessels
and ponds are let out to atmosphere.

Proposed practice: The oil separation of ETP equipments will be covered and vapor adsorption system will be provided.(like API separator etc) for adsorption of VOC into activated carbon bed. The absorbed carbon bed will be sent for incineration after the cycle time.

Benefits : Existing API,DPI ,DAF (Oil separation portion of ETP) will be covered the vapors will be extracted and absorbed in ACF . It is estimated that there will be reduction of 5.67 MT of VOC by implementing the above action point

Status:

Process Design has been completed and detail Engg is in progress.
Overall project is 30% completed and will be completed by Dec'2011

Summary

S.No	Action Point	Original /revised target	Present practice	Proposed practice	Present status/budget	Benefits
7	Provision of VOC adsorption system for ETP-2 & ETP-3	Sept'11/ Dec'11	Equipment handling with Oily water like API separator etc are open type	Equipment handling with Oily water like API separator etc will be covered and vapor adsorption system will be provided.	Progress 30%	Reduction of 2.88 MT/day of VOC

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.8: Inventorisation of fugitive emission

Present practice

Leak detection and repair programme being followed. HC, H2S, CO Gas detectors are provided in all units. Audio visual alarms will alert if any VOC emission crosses specified limit (TLV)

Proposed practice: Measuring and controlling VOC emissions, Fugitive emission inventorisation and continuous reduction has been carried continuously in Process units, ETPs and storage tanks.

The probable leaky /weak points like flanges, glands, bonnets are identified on plant wise. Scheduled measurements of VOC emissions are being taken and inventoried. The exceedence of VOC points are immediately attended and brought under control.

The above practice shall be repeated at regular intervals in all units to control the fugitive emission. This program is called Leak Deduction & Repair Program.

Benefits: VOC emission reduced by 2.40 MT/year in Refinery 2 during Dec 2010 to Feb 2011 inventorisation.

Status : A schedule is prepared for all the units for LDAR. 15000 points completed in Ref-II in Feb-11. All leaks detected were rectified. Job is in progress for Ref 1 units completed in June 2011. Balance units and offsite contract awarded will be completed in Dec'11.

Summary

S.No	Action Point	Original/revised target	Present practice	Proposed practice	Present status/ budget	Benefits
8	Fugitive emission inventorisation and control	Nov'10/ continuous	Leak detection and repair (LDAR)	LDAR & Inventorisation	Rs 25 lakhs per year Completed in Refinery 1& 2. Ref-3 units & offsite contract awarded	VOC emission reduced by 2.40 MT/year in Refinery 2 during Dec 2010 to Feb 2011 inventorisation

Short Term Measures by CPCL (Refer Table 12.1 Page 105) Action Point No.9 : Oil sewage system identification deficiencies & rectification

Present practice

During dry weather conditions water leaks from fire water network, water kept open used for precautionary measures near hot job site, site cleaning etc are routed to storm water canal. Occasional this water gets contaminated with oil wherever there is overflow oil water sewerage or leak in oil pipelines. This oil ingress into storm water canal results in overloading of polishing system as well as reaches B-canal along with storm water.
Some systems are not having OWS.
Some systems have OWS, but blocked.

Proposed practice

The following actions have been taken to overcome the above problems.

i. Repair of OWS sewage system wherever damaged/choked
ii. Provision water-underflow baffles and oil over flow weir to trap the oil in storm canal
iii. Oil skimming & transfer facilities with floating oil skimmer & oil transfer pumps
iv. Provisions of OWS wherever not there(Identified points)

Benefits

The benefits from the above facilities will be as detailed below. In addition to this VOC also will be reduced.

S.NO	Pollutants	Pollutant level gm/m3	Pollutant loads to B-canal before implementation **Kg/hr ##**	Pollutant loads to B-canal after implementation **Kg/hr ##**
1	Oil & grease	3	0.3	nil
2	BOD	10	1.00	nil
3	COD	60	6.00	nil

assuming 100 m3/hour of oily water is improved

Status: The above activities are 50% completed and balance will be completed by March 2012

Summary

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
3	Prevention of oil ingress in storm water canal & improvement in separation & removal of oil in storm canal	Dec'10/ March'12	Presence of choked / damaged Oil water sewer, use of pipe skimmer, floating skimmer, portable skimmer with transfer pump	Repair of entire OWS, Provision of larger deeper pond for easy separation of oil, provision water underflow oil catcher, floating suction arrangement for oil transfer & oil transfer pumps	Budget provision is ` 2 crore and the project is 50% complete	Reduction in pollutants reaching B-canal as given below: Oil & Grease: 0.30 kg/hr BOD: 1.00 kg/hr COD: 6.00 kg/hr

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.10: Provision of additional sludge storage pit

Existing Practice

Oily sludge after mechanical treatment is stored in two pit of total volume 500 KL which is inadequate for the present generation of oily sludge

Proposed practice

Two number of additional sludge storage has been constructed to act as buffer before bio-remediation. This will reduce the contamination of underground water by leachate of oily sludge percolating the earth. The quantity of leachate water prevented by this facility is 200 kl per year.

S.NO	Pollutants	Pollutant levelgm/m3	Pollutants load to groundwater before implementation **Kg/year ##**	Pollutants load to groundwater after implementation **Kg/year ##**
1	Oil & grease	0.5	0.1	nil
2	BOD	5	1.0	nil
3	COD	10	2.00	nil

considering 200 kl /year of leachate entering underground

Status: Additional pit was constructed.

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
10	Provision of two additional sludge storage pits	Completed	Oily sludge after mechanical treatment stored in lined pit of 500 KL capacity	Additional two pits constructed	Competed at a cost of Rs 10 lakhs	Reduction in pollutants reaching undergroun d water as given below: Oil & Grease: 0.10 kg/hr BOD: 1.00 kg/hr COD: 2.00 kg/hr

Short Term Measures by CPCL (Refer Table 12.1 Page 105)

Action Point No.11: Use of GPS/GIS for air quality monitoring

Existing Practice :

Air quality and stack emissions are being monitored and data being captured in computer for 8 AAQM Stations. The near by eqpts and the locations of the AAQMS can be identified in P&ID only.

Proposed practice

It is proposed to locate the 8 AAQMS in Google Map so that the installations of the equipments including the surrounding area can be viewed with background nearby roads. Any exceedence of the pollutants, the possible source & the direction can be visualized from this provision.

Benefits: with the data on Air quality, stack emissions and wind velocity/direction it will easier for identification of prominent emission source

Status :

Locations of all CAAQM stations have been configured in Google Map. Data link is being established & completed in June 2011

Summary

12	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
11	Use of GPS/GIS for air quality monitoring	Dec'10/ June 2011	Presently Air quality data cannot be viewed with map background	Air quality data can be viewed with map background	Rs 1.00 lakhs 80% completed	Better air quality monitoring/ identification of prominent emission source

Long Term Measures by CPCL (Refer Table 12.2 Page 116)
Action Point No.1:Provision of facilities for RORR reject to sea

Already covered under point 1 Short term.: summary given below:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1	Disposal of entire quantity of RO reject water to neighboring industry.	Aug 2011/ Dec 2011	Out of total 100m3/hour of RO reject water only30m3/hour is being disposed to neighboring industry and balance 70 m3/hour is discharged in nearby water body, b-canal.	Entire quantity of RO reject water 100 m3/hour will be supplied to neighboring industry.	Budget provision is ` 2 crore and the project is 75% complete.	Reduction in pollutants reaching B-canal as given below: TSS : 1.70 kg/hr BOD: 1.20 kg/hr COD: 9.97 kg/hr TKN : 1.48 kg/hr NH3-N 0.89 Kg/hr Cl- 181 kg/hr TDs 411 kg/hr

Long Term Measures by CPCL (Refer Table 12.2 Page 116)
Action Point No.2:Linking all Continuous Stack Monitoring with TNPCB

Already covered in Short term point-6

2	Linking CSM with TNPCB	Dec'10/ Dec'11	CSM data submitted to TNPCB regularly	Continuous on line transmission of data	work in progress 50% completed	Strengthening of Monitoring of Air quality with the data on Air quality, stack emissions and wind velocity/direction it will easier for identification of prominent emission source

Long Term Measures by CPCL (Refer Table 12.2 Page 116)
Action Point No.3: Use of Natural gas in place of liquid fuel

Existing practice

The present fuel mix used for internal requirement for Boilers, Furnaces, and Gas Turbines as given below:

Type of fuel	Qty TMT/year	Fuel mix wt%
LSHS	465	51.49
Fuel Gas	84.5	9.35
Naphtha	315	34.87
COKE	38.7	4.29
Total	903	100

LSHS : low sulfur heavy stock

Proposed practice

It is proposed to use Natural gas in place of LSHS and fuel mix will be as under

Type of fuel	Qty TMT/year	Fuel mix wt%
LSHS	0	0
Fuel Gas	550	60.9
Naphtha	315	34.8
COKE	38.7	4. 3
Total	903	100

Scheme:

1. Conversion of boilers to burn natural gas instead of LSHS.
2. Conversion of furnaces including reformer furnace to burn natural gas.
3. Conversion of Gas turbines to burn natural gas instead of naphtha.
4. Provision of gas receiving station and internal distribution net work.

Benefits

Natural gas is a clean fuel the stack emission like SO2, SPM will be considerably reduced as detailed below

Pollutant	Present emission level MTPD	Emission after implementation MTPD
SO2	16.43	1.17
SPM	1.68	0.92

Status

Technical scope for modification eqpts and CPCL distribution piping network is finalized. Estimated cost Rs 240 Crore
Project will be completed by Dec' 2012

S.No	Action Point	Original/revised target	Present practice	Proposed practice	Present status/budget	Benefits
3	Use of Natural gas in all heaters boilers/GTs (Long term)	Dec 12/ Dec 12	Fuel used is mix of all kinds of fuels contributing to SO2 and SPM emission	Total switchover to Fuel gas with very low emission of SO2 & SPM	Technical scope for modification in CPCL finalised . Estimated cost Rs 240 Crore	Reduction of SO2 emission by 15.2(MTPD Reduction of SPM by 0.76MTPD

Long Term Measures by CPCL (Refer Table 12.2 Page 116)
Action Point No.4:Co processing of Hazardous waste in cement kiln

Existing practice

Land environment is affected by hazardous solid wastes generated during the operation. The details of solid wastes generated in CPCL-Manali Refinery and methodology of handling and disposal are as under:

S.No	Solid wastes	Sources	Handling & Disposal methods
1	Oily sludge	Tank Bottom sludges	This is the major source & around 4000 KL/year. Presently being handled at sludge lagoon by mechanical centrifuge for oil removal followed by bio remediation
		ETP oily Sludges	Minor source, around 500 KL per year being generated. Presently being handled at sludge lagoon by mechanical centrifuge for oil removal followed by bio remediation
2	Chemical sludge	ETP chemical Sludges	Around 100 KL/year is being sent to TDSF Gummidipoondi for disposal
3	Other Hazardous waste	Spent Catalyst, Ion Exchange resins, Activated carbon adsorbents etc	Around 100 MT/year being generated. The disposal is as under: • Sale of certain catalysts to authorized recyclers • Balance catalysts to TSDF Gummidipoondi

After mechanical treatment the residual oily sediments are subjected to microbial treatment to reduce its oil content Bio remediation so that the material is suitable for landfill. However this process is very slow and time of completion vary from 6 months to one year.

All Incinerable hazardous wastes are sent to TSDF for incineration which involves additional fuel for auxiliary firing as well as gaseous emission from incinerator.

Proposed practice

In order expedite the disposal and also to convert waste material to useful material it has been planned to dispose in cement industries. Residence time in cement kiln burning is more and also at higher temperature. This will help to reduce the emissions due to burning of hazardous waste.

Benefits

Since Bio remediation takes more time, the backlog sludge has to be stored in lagoon and will emit VOC. This VOC emission will be eliminated if co processing adopted. Residence time in cement kiln burning is more and also at higher temperature. This will help to reduce the emissions due to burning of hazardous waste

The benefits from the projects are estimated to be reduction on MT/year of CO2 emission by fuel saving in cement industry

S.No	Pollutant	Reduction MT/year
1	CO2	55000
2	SPM	500

Status:

M/s Ultratech has already accepted to take oily sludge and spent activated carbon. TNPCB authorization is now getting amended for entering into an agreement with M/s Ultratech and continuous supply of incinerable waste to Cement Kiln

Summary

S.No	Action Point	Original /revised target	Present practice	Proposed practice	Present status/budget	Benefits
2	Co-processing of Haz.waste in Cement plant	2012/Dec'2011	Residual sediments with oil content of 5-10% treated by microbes to make it suitable for landfill	Co processing in cement kiln	Rs 12000/MT of oil sediments as per offer from M/s Ultratech	Fast disposal of oily sludge. Conversion of waste to wealth. CO2 Emission reduction by 55000 MT/YR SPM Emission reduction by 500 MT/YR

Additional points

Al Rain water harvesting

Existing practice

Rain water routed to storm canal

Proposed practice

Rain water harvesting to improve quality and quantity of UG water

Status of the project

Rain water harvesting has been provided for 30000 M2 area near Flare system with percolation pit. This is expected to improve the ground water quality with rain water. Estimated quantity is 30000 KL per year. (Assuming 1000 mm rain in one year)

Additional rain water harvesting (in progress)

Rain water harvesting has been taken up all the buildings (total 36 numbers) with coverage of around 50000M2 and is in progress. At present the project completion is 10% of the total activities and will be completed by March2012. Estimated quantity of

rain water harvested for improving underground water quality will be 50000 KL per year. (assuming 1000 mm rain in one year)

Benefits

It is estimated that with the implementation about 80000KL/year of rain water will be harvested which will improve underground

S.No	Action Point	Original/revised target	Present practice	Proposed practice	Present status/budget	Benefits
3	Provision of rain water harvesting facility	Mar'12	Rain water routed to storm canal	Rain water harvesting to improve quality and quantity of UG water	Completed for 30000 M2 Proposed in all buildings for Rs 20 lakhs	Total about 80000Kl/year of rain water will be harvested

Additional points

A.II Provision of low Nox burners

Existing practice

Presently out of 45 numbers of heaters and boilers 22 numbers are having Low NOx burners

Proposed Practice

It has been planned to replace all burners with Lox Nox burners in balance 23 heaters

Status of Project

Four numbers heaters in Refiner2 will be switching over to Low Nox burners after maintenance shutdown in Dec 2012

Balance heaters will be either phased out or replaced with low-Nox burners.

Benefits

With the above measures it is estimated the overall Nox Emission will be reduced by 180 kg/day from present level

Summary

S.No	Action Point	Original/ revised target	Present practice	Proposed practice	Present status/budget	Benefits
2	Switch over low Nox burners in Ref II	Dec'12	Out of 45 heaters 22 heaters with low NOx burners	Out of 45 heaters 26 heaters will be having low NOx burners	Burner order placed implemented in the shutdown of July 2012	Reduction in NOX emission by 180 KG/day

Additional point

A.III Provision of Dome Roof tanks for Naphtha tanks with Nitrogen Blanketing

Existing Practice:

Presently for storage light Products floating roof tanks with double seals are being provided to reduce VOC emission

Proposed Practice

Instead of floating roof tanks (4X 3000 KL) with double seal pressurized Dome Roof tanks with nitrogen blanketing have been provided for Naphtha tanks in Euro IV projects

Present status of the project

The tanks have been commissioned

Benefits

The benefit estimated from the above measure is reduction of 4 MT/year of VOC

A.2. Madras Fertilizers Ltd

A.2.1 Introduction

Madras Fertilizers Ltd.,Chennai Tamilnadu is one of the leading Public Sector Enterprises and played a vital role in green revolution of south India. The commercial production started in 1971.The main raw material Raw Naphtha required for Ammonia production is supplied by CPCL, the neighbouring Public Sector Enterprises. The current share holders are GOI(59.5%) National Iranian Oil company (25.77%) and public (14.73%). In the year 1997 the capacity of the all the three major plants were increased. At the same time a lot of innovative technologies were introduced for lower energy level for ammonia and urea , water conservation and recycle of effluents in the process plants . MFL is one of the pioneers in ISO 9001 and ISO 14001 certification in Fertilizer sector and proposes to go in for natural gas for Naphtha /Fuel oil conversion. The total complex spread over an area of 330 acres.

A.2.2 Action plan for reduction of- **CEPI**

The detail of the proposed actions is given below:

Air Pollution Control

a. Ammonia Emission :Ammonia and urea plant are operated by DCS (Distributed control system) and any upset Is communicated and corrective action can be taken at once. All the pressure safety valves, Other type of relief valves are shop tested on regular basis.

Ammonia storage tank : Ammonia is stored in two tanks at atmospheric pressure. The vapour generated are compressed by the refrigeration compressors during normal plant run and exclusive one separate compressor is kept as standby during emergengy. One flare is operated with LPG pilot burner to burn all the escaping ammonia vapours at the time of any trip in the compressor during a short period.

From Urea prill tower emission : A demister arrangement(2 Nos.) has been provided to absorb Urea dust and ammonia with continuous condensate spray arrangement. The recovered weak urea solution is sent to the concentrator for recovery.

Ammonia plant : Ammonia relief valves connected to the vent stack is provided with DM water scrubbing system to scrub ammonia during plant upset conditions.

Urea plant : Urea process relief valves connected to the vent stack which is provided with DM water scrubbing system to scrub ammonia during plant upset conditions.

NPK Plant: Fumes(ammonia) and dust generated in Pre Nutralizer, Blunger/granulator, dryer, cooler, coating drum etc., are scrubbed with dilute

phosphoric acid.(dust scrubber, fumes scrubber, cooler scrubber, Dryer scrubber with phosphoric acid as absorbing medium are available.)

Ammonia leak developed in the process during plant run in pipelines, control valves, exchangers etc., are immediately attended by using furmunite injection Technology which is a latest development.

Due to our constant efforts there is significant reduction in the public complaint during this winter season.

The QC lab which is working round the clock check the ammonia during complaints and inform to the concerned plant personnel for immediate action.

Action Point 1 A

Online Monitoring of Ammonia

One cable less remote Ammonia sensor of latest technology analyzer is in operation now and real time data uploaded to TNPCB from March 2011.

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
1	Installati -on of ammoni a--a sensors	Oct. 2011	One cable less remote Ammonia sensor of latest technology analyser is in operation now and real time data uploaded to TNPCB from March 2011.	Remaining 11 No.s of Ammonia monitors are being purchased to install around the plant premises as well as in Manali village to get immediate feed back for remedial action with in 6 months (by November 11).	Ammonia level in ambient air will be known around the plant and immediate remedial action will be possible.	Budget provision is ` 0.8 crore and the final stage for putting Purchase order to the qualified vendor is in progress

Remaining 11 No.s of Ammonia monitors are being purchased to install around the plant premises as well as in Manali village to get immediate feed back for remedial action.(with in 6 months - by November 11).

Action Point No. 1B

b. "Ambient Air Continuous Monitoring" envisaged by MFL.

As per latest Air standards the arrangements have been made to include new parameters like PM10, PM2.5 and O3 for routine schedule analysis. Procurement of the apparatus required has been made ready available for analysis.

MFL will install one station of **continuous ambient air monitoring station (AAQMS)** with data uploading facility to monitor all parameters as notification made by MoEF by October 2011. The procurement action for other four more AAQMS has also been initiated and will be installed before 2012 end.

Action Point No. 1C

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
1 C	Installation of Five station of continuous ambient air monitoring stations	Oct. 2011	As per latest Air standards the arrangements have been made to include new parameters like PM10, PM2.5 and O3 for routine schedule analysis. Procurement of manual analytical apparatus for all the required parameters has been made available for analysis.	The procurement action of CAAQMS for five locations have been initiated and One will be installed before Oct.2011 and other 4 will be before Oct.2012.	Air pollutants in ambient air will be known around the plant and immediate remedial action will be possible.	Budget provision is ` 4.0 crores and the final stage for putting Purchase order for one AAQMS is in progress. Quotations are received from vendors for Other 4 AAQMS.

C.continuous stack monitoring system : one stack continuous monitoring system at 110 ata/PCB common stack with data uploading facility and the installation is expected by August 2011. Remaining two will be procured as per chart given.

Action Point No. 3

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
3	Installation of Stack Monitoring station at common stack of 110 ATA and Process condensate Boiler.	Oct. 2011	parameters has been made available for emission control by manual analysis.	The procurement action of CSMS for three stacks have been initiated and One will be installed before Oct.2011 and other 2 will be before Oct.2012.	Immediate Control of emission from stacks.	Budget provision is ` 2.0 crores and the final stage for putting Purchase order for one CSMS is in progress. Purchase to be initiated after the successful completion of one station

II Water use and effluent control

Municipal water from CMWSSB (approximately1.0 IMGD).Reclaimed water from city sewage (app.2.5 IMGD) are the sources of water.

a.Restart of CWBD (Cooling water Blow Down treatment Plant)

MFL takes all efforts to minimize the discharge of treated effluent to achieve zero discharge : Around 50-60 KLPD of cooling water blow down and water through filter backwash is going to facultative lagoons where it is allowed to evaporate and MFL remains as a ZERO effluent discharge unit. The cooling water blow down treatment was restarted in December 2010 after necessary maintenance to treat the "Cooling water blow down" water with out any additional financial out go, the expenses being the regular operational cost. Other effluent treatment plants like Hydrolyser stripper, NPK-ETP and CETP are on continuous run.

Action Point No.4

No	Action Point	Original Target/Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
4	Restart of Cooling water blow down treatment plant.	Oct. 2011	The cooling water blow down treatment was restarted in December 2010 after necessary maintenance to treat the "Cooling water blow down" water	The cooling water blow down treatment will be operated with application software with higher load capacity.	Per day 720 –840 KL (35KL/Hr)of cooling water will be recycled, thus reuse, recycle of effluent is achieved and also reduction in fresh water consumption. Due to this Blow down is reduced and the effluent pollution is reduced by AN 2.5Kg/Hr : Sulphate 20.0Kg/Hr; Chloride 50Kg/Hr PO4 - 0.5 kg/hr	with out any additional financial out go, the expenses being the regular operational cost.

b.Repairing of Cooling water Tower cells.

Twelve No.s of cooling water tower cells were completely repaired during the past two years on a phased manner. The spraying of water from these cells to the surroundings caused corrosion of metal pipe lines and damage to green belt area. After the completion of the work, the above problems were solved and the spillages and spraying of about 125 KL of water is saved.

Action Point No.5

Sl. No	Action Point	Original Target/Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
5	Twelve No.s of cooling water tower cells repair in a phased manner	March 11	The work was completed recently	-	After the completion of the work, the spraying of water from these cells to the surroundings causing corrosion of metal pipe lines and damage to green belt area were solved and about 125 KL of water is saved per day.Due to this effluent pollution is reduced by AN 7.5Kg/Day : Sulphate 68.0Kg/day; Chloride 168 Kg/day	Twelve No.s of cooling water tower cells were completely repaired during the past two years sep. 2009 to March. '11

Action point No. 6

LNG as a replacement for Naphtha feed stock

Sl. No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Benefits	Present status of project/Budget provision
6	Conversion to LNG from Napth a feed stock	Before end of 2012	Naphtha is used as feed stock	LNG will replace Naphtha as feed stock as well as fuel	6000 NM3/hr of CO2 emission will be reduced (approximately.) Emission of SO2 and NOx will be below traceable quantity From 5 Kg/Hr of SO2 & 2.5 Kg/Hr of NOx of the present level	Feasibility study completed. Project implementation by PDIL. From the date of Gas availability , the conversion will be completed in Twelve Months.

Details on ETP provided to control pollutants before CEPI notification

WATER ENVIRONMENT -

Sl. No. :	Criteria Pollutants generated from the process.	Sources of Pollutants.	ETP provided to control each pollutant before CEPI notification.	ETP provided to control each pollutant after CEPI notification.	Quality of treated trade effluent data before and after CEPI notification. *(Quality remains the same under this ETP's)	Details of supporting documents on implementing CEPI action plan viz. purchase order/Photographs.
1	NH3	Low level NH3 bearing condensates from Ammonia plant	Process Condensate boiler to generate process steam	NA	-	NA
2	NH3,CO2,	Ammonia & Urea plant effluents containing CO2 & NH3	Hydrolyser stripper to recover Ammonia & CO2 and recycled to Urea plant.the pure condensate is recycled to DM water system	NA	-	NA
3	Nitrogen, Phosphat & Potash nutrients	NPK effluents	NPK Effluent treatment system. The clear water is recycled to NPK process, the solid phase with nutrient after drying is used in NPK.	NA	-	NA

4	BOD, COD	Canteen washings & sewage water	Combined canteen waste and sewage treatment plant. The trated water is used for NPK process and green belt development.	NA	-	NA
5	SiO2 & NH3	Cooling water blow down	Cooling water blow down treatment plant treats the blow down with lime softner and ultra filtration to knock out SiO2 and processed with RO system and recycled to cooling water system.	NA	-----	NA
6	Water with high saline	RO Reject	Supplied to neighbour industry for process use.	NA	-	NA

Soil contamiantion.

HW Status

The spent catalyst /Used Oil are sold to recyclers by e tender as per HW norms. Quantity accumulation is minimised. Now e- Tendering are being practiced for spent catalyst and used oil for early disposal. The disposal action under e auction is completed with in 90 days.

Quantification of wastes and relative contribution from different sources

Non Hazardous			Hazardous		
Name	Waste generation (Tons /year)	Treatment & disposal mechanism	Name	Waste generation (Tons / Year)	Treatment & disposal mechanism
Wood scrap	Total quantity May be around 4 MT/day All put together	By auction	Spent catalyst(18.1) (Actual stock as on 31.03.2011)	100 MT 32.0. MT	Stored in ear marked location in steel drums with lid in impervious ground without causing pollution to Air, Water and soil and Sold to vendors authorised by CPCB thru' MSTC as per HW act. e - action initiated for disposal.Three months ia required to dispose off the above.
Spent lime		Dumped in ear marked impervious land area inside factory			
Metal scrap		By auction	Spent oil (5.1) (Actual stock as on 31.03.2010)	40 MT 2.5 MT	
Wet garbage		By composting In pits	Oil soaked cotton(5.2) Stock (Actual stock as on 31.03.2010)	1.5 MT NIL	
Stationery		Shredding & selling			
			HW empty drums(33.3) (Actual stock as on 31.03.10	100 barrel NIL	

Summary Of proposed action points :

Short Term Action Points

Action Points (including source & mitigation measures)	Responsible Stake Holder	Time limit	Cost
Installation of 11No.s of continuous monitoring ammonia sensors with data transfer to TNPCB server	MFL	Nov 2011	ì 60 lacs
Installation of one No. AAQMS with uploading facility to TNPCB server	MFL	Before Oct.11	ì 100lacs
Installation of one Stack Monitor with uploading facility to TNPCB server	MFL	Before Oct.11	ì 100 lacs

Long Term Action Points (more than 1 year)

Sl. No	Action Points (including source & mitigation measures)	Responsi-ble Stake Holder	Time limit	Cost
1	Installation of Four AAQMS with uploading facility to TNPCB server	MFL	Four No.s before end of 2012	ì 400lacs
2	Installation of TWO Stack Monitor with uploading facility to TNPCB server	MFL	One in 2012 & One in 2013.	ì 200 lacs
3	Installation of TWO Flare Monitor with uploading facility to TNPCB server	MFL	in 2012.	ì 200 lacs
4	Conversion to LNG from Naptha feed stock	MFL	Before 2012	Plant Conversion cost ì 30 Cr. But other capital/ infrastructure will vary depending on supply source of LNG through GOI nodal agency

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

Sl No	Pollution abatement Measures including cleaner technologies implemented	Expenditure incurred	Savings in natural resources (NG, Naphtha, F.O., water etc.) (Annually)		Reduction in waste generation and pollution load.
		Rs Lacs		Rslacs	Per Annum
1.	Optimization of Membrane usage through timely replacement.	50	14400 KL of DM water usage reduced.	56.4	14400 KL of effluent generation reduced.
2	Usage of Treated water from City Sewage for Processes.	1448 (cost for production)	4074490 Kl of Raw water	999	4074490 Kl of City Sewage burden reduced by way of Recycle – Reuse – Reduction method.
3	CT Cell repair job completed in all (TEN)Cells, leading to reduction in windage & evaporation loss	180	Water – 41250 M3	24.75	Fresh water usage reduced and effluent discharge reduction.NH3
4.	Optimization of energy level, through, energy saving measures	20	19369 MT of FO per	5518	Reduction in CO2 emission by

	like arresting of steam leaks, improving the efficiency of Boilers by way of Periodical APH tubes replacement, Chemical external cleaning of economizer coils, Providing "Auto start " provision for Turbine pumps and keeping Motor pumps in line. **Energy level achieved for Urea production is 7.492 Gcal/MT against design 8.337 Gcal/MT**		annum		**60367** MT per annum.
5	Replacement of Methanator catalyst with Super Methanation Catalyst resulted in Higher thermal efficiency by way of reduction in inlet temp by 55 degree Celsius, with additional steam generation of 4 MT/Hr		2263 MT of FO per Annum	645	Reduction in CO2 emission by **7053** MT per annum.
6	1st Decomposer Heat exchanger vessel tubes were partially replaced, leading to higher energy efficiency with savings of 5 MT per hour.		2829 MT of FO per Annum	806	Reduction in CO2 emission by **8817** MT per annum.

MFL is in the process of changing the feed stock to LNG from naphtha based ammonia plant as a long term measure .The proposal is in advanced implementation stage by the Fertilizer ministry. GOI proposed GAIL as the nodal agency for gas supply. Negotiation are under way. This technology transfer will reduce the pollutant load in air.

A.3 TAMILNADU PETROPRODUCTS LIMITED - Epichlorohydrine plant

A.3.1 INTRODUCTION

Tamilnadu Petroproducts Ltd (TPL) was incorporated in 1984 as a joint venture between Tamilnadu Industrial Development Corporation Limited (TIDCO) and M/s. Southern Petrochemical Industries Corporation Limited (SPIC).

Tamilnadu Petroproducts Ltd (TPL) is a manufacturer of Linear Alkyl Benzene, Epichlorohydrin & Caustic Soda having its manufacturing facilities at Manali Industrial Area at the outskirts of Chennai.

A.3.2 Action plan for reduction of CEPI

In response to MoEF / CPCB's report on Comprehensive Environmental Pollution Index (CEPI), Manali cluster had been declared as critically polluted area as the index is 76.34.

TNPCB has prepared industry-wise action plan in coordination with respective industries to reduce the CEPI.

TPL – ECH plant has 7 short term / long term action points.

TPL – ECH has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short / Long term measures by TPL - ECH

Action Point – 1 Online sensors for monitoring chlorine will be provided and monitoring data will be uploaded to TNPCB server.

Present practice
Online sensors for monitoring chlorine will be provided and monitoring data will be uploaded to TNPCB.

Proposed practice with project details
Proposed to monitor continuously and monitoring data uploading to TNPCB.

Status of the project
Chlorine online sensor is provided in Ambient Air and in stack and monitoring data has been uploaded to Care Air Centre, TNPCB server on 15.07.2010
Project Scheduled completion: Completed
Progress made so far : 100%

Benefits from the project
To ascertain that the ambient air quality are within the stipulated specifications

Summary of Action point No: 1

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Online sensors for monitoring chlorine will be provided and monitoring data will be uploaded to TNPCB server by July 2010.	July 2010	Being monitored through external accredited laboratory.	Proposed to monitor continuously	Completed. Chlorine online sensor is provided in Ambient Air and in stack and monitoring data has been uploaded to Care Air Centre, TNPCB server on 15.07.2010.	To ascertain that the ambient air quality are within the stipulated specifications

Action Point – 2 To conduct AAQ survey as per the new MINAS

Present practice
Presently TPL is monitoring some of the MINAS parameters through external accredited laboratory.

Proposed practice with project details
Actions have initiated to conduct AAQ survey (all parameter) as per the MINAS standards and based on the report further action will be taken.

Status of the project
Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards.
Project Scheduled completion: Completed
Progress made so far : 100%

Benefits from the project
Results are within the prescribed standards.

Summary of Action point No: 2

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	To conduct AAQ survey as per the new MINAS	July 2010	Some of the MINAS parameters are being monitored through external accredited laboratory.	Proposed to conduct AAQ survey [all parameters] as per the new MINAS standards	Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards Budget – 1.0 Lacs	Results are within the prescribed standards.

Action Point – 3 **Environmental monitoring will be carried out through accredited laboratory also.**

Present practice
Periodic monitoring is being carried out by internal laboratory

Proposed practice with project details
Environmental monitoring will be carried out through external accredited laboratory in an improved frequency.

Status of the project
Environmental monitoring is being carried out through external accredited laboratory from October 2010.

Benefits from the project
Monitoring frequency is improved and to take any corrective / preventive action.

Summary of Action point No: 3

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Environmental monitoring will be carried out through accredited laboratory also.	March 2011	Periodic monitoring is being carried out by internal laboratory.	Environmental monitoring will be carried out through external accredited laboratory in an improved frequency.	Environmental monitoring is being carried out through external accredited laboratory from October 2010 Budget – 2.5 Lacs	Monitoring frequency is improved and to take any corrective / preventive action.

Action Point – 4

Present practice
TPL ECH plant's treated effluent is disposed to sea by utilizing MPL's existing sea disposal line, for which Marine impact study has already been done in Oct 1993 by National Institute of Oceanography (NIOT), Goa, India
Proposed practice with project details
Proposed to conduct Marine impact study for the treated effluent discharge into the sea through an accredited EIA consultant.
Status of the project
Marine impact study for the treated effluent discharge into the sea will be conducted through accredited EIA consultant.
The Work order has been released on 9th June 2011 and report will be submitted to TNPCB by Aug 2011. [Time schedule – 3 months].
Project Scheduled completion: Aug 2011
Progress made so far : 25%

Benefits from the project
To ascertain the impact of marine due to discharge of treated effluents in to sea and based on the report further action will be taken.

Summary of Action point No: 4

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	The marine impact study will be conducted either jointly with M/s. MPL or stand-alone.	Dec 2010	TPL ECH plant's treated effluent is disposed to sea by utilizing MPL's existing sea disposal line, for which Marine impact study has already been done in Oct 1993 by National Institute of Oceanography (NIOT), Goa, India	Proposed to conduct Marine impact study for the treated effluent discharge into the sea through accredited EIA consultant	Marine impact study for the treated effluent discharge into the sea will be conducted through accredited EIA consultant. Work order has been released on9th June 2011 and report will be submitted to TNPCB by Oct'2011. [Time schedule – 3 months].	To ascertain the impact of marine due to discharge of treated effluents in to sea. Based on the report further action will be taken.

Action Point – 5 Replacing of Ferric chloride with environment friendly coagulant in ETP to improve Colour.

Present practice
Ferric chloride is used as coagulant in flocculation tank of Effluent Treatment Plant.

Proposed practice with project details
Proposed to replace ferric chloride with environment friendly coagulant (Flocool – 120 and Flocool – 1020) in the Flocculation tank of ETP to improve colour.

Status of the project
A trial run is being done by using an environment friendly coagulant in place of Ferric chloride in the Flocculation tank of ETP.
Results are encouraging in colour / quality improvement in the treated effluent and upon complete switch over of coagulant, quality of treated effluent will be further improved.
Switch over of coagulant in the Flocculation tank of ETP will be completed by March 2012
Project Scheduled completion: Mar 2012
Progress made so far : 50%

Benefits from the project
Improvement in Colour

Summary of Action point No 5

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Replacing of Ferric chloride with environment friendly coagulant in ETP to improve Colour	Sep 2010 / Mar 11	Ferric chloride is used as coagulant in flocculation tank of Effluent Treatment Plant	Proposed to replace ferric chloride with environment friendly coagulant (Flocool – 120 and Flocool – 1020) in the Flocculation tank of ETP to improve colour.	A trial run is being done by using an environment friendly coagulant in place of Ferric chloride in the Flocculation tank of ETP. Results are encouraging in colour and quality improvement in the treated effluent and upon complete switch over of coagulant, quality of treated effluent will be further improved. Switch over of coagulant in the Flocculation tank of ETP will be completed by March 2012 Budget – 2.0 Lac	Improvement in Colour.

Action Point – 6 Replacing of Ferric chloride with environment friendly coagulant in ETP to reduce generation of ETP Sludge (Hazardous waste)

Present practice

Ferric chloride is used as coagulant in flocculation tank of Effluent Treatment Plant.

Proposed practice with project details

Proposed to replace ferric chloride with environment friendly coagulant (Flocool – 120 and Flocool – 1020) in the Flocculation tank of ETP to reduce ETP Sludge (Hazardous waste) generation.

Status of the project

A trial run is being done by using an environment friendly coagulant in place of Ferric chloride in the Flocculation tank of ETP.
Results are encouraging in reduction of ETP sludge (Hazardous waste) generation and upon complete switch over of coagulant, generation of sludge will be further reduced.
Switch over of coagulant in the Flocculation tank of ETP will be completed by March 2012
Project Scheduled completion: Mar 2012
Progress made so far : 25%

Benefits from the project

Reduction in ETP sludge (Hazardous waste) generation.

S.NO	Pollutants	Generation of ETP Sludge - Before addition of Coagulant (Flocool – 120 and Flocool – 1020) in ETP	Generation of ETP Sludge - After addition of Coagulant (Flocool – 120 and Flocool – 1020) in ETP	Reduction sludge, MT
1	ETP Sludge (Hazardous waste)	150 MT	119 MT	31.0 MT

Summary of Action point No 6

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Replacing of Ferric chloride with environment friendly coagulant in ETP to reduce ETP sludge (hazardous waste) generation.	Sep 2010 / Mar 11	Ferric chloride is used as coagulant in flocculation tank of Effluent Treatment Plant	Proposed to replace ferric chloride with environment friendly coagulant (Flocool – 120 and Flocool – 1020) in the Flocculation tank of ETP to reduce ETP sludge (hazardous waste) generation.	A trial run is being done by using an environment friendly coagulant in place of Ferric chloride in the Flocculation tank of ETP. Results are encouraging. Switch over of coagulant in the Flocculation tank of ETP will be completed by March 2012 Budget – 2.0 Lac	Achieved in reduction sludge (hazardous waste) generation in ETP. ETP sludge generation Apr 09 – Mar 10 : 150 MT [Before CEPI] Apr 10 – Mar 11 : 119 MT [After CEPI]

Action Point – 7 Green belt development

Present practice
Green belt development is being developed inside and outside the factory premises.

Proposed practice with project details
Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location.

Status of the project
Identified the locations for green belt development.
54 Nos of tree saplings were planted on 06.06.2011 within the premises of TPL - ECH plant.
Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by June 2011.
Project Scheduled completion: Oct' 2011
Progress made so far : 25%

Benefits from the project
Abatement of air and noise pollution.

Summary of Action point No: 7

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
11	Green belt development	March 2011	Green belt development is being developed inside and outside the factory premises.	Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location	Identified the locations for green belt development. 54 Nos of tree saplings were planted on 06.06.2011 within the premises of TPL – ECH plant. Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by Oct' 2011. Budget 2.5 Lac	Abatement of air pollution and noise pollution.

A. 4 TAMILNADU PETROPRODUCTS LIMITED - Heavy Chemicals Division

A.4.1 INTRODUCTION

Tamilnadu Petroproducts Ltd (TPL) was incorporated in 1984 as a joint venture between Tamilnadu Industrial Development Corporation Limited (TIDCO) and M/s. Southern Petrochemical Industries Corporation Limited (SPIC).

Tamilnadu Petroproducts Ltd (TPL) is a manufacturer of Linear Alkyl Benzene, Epichlorohydrin & Caustic Soda having its manufacturing facilities at Manali Industrial Area at the outskirts of Chennai.

A.4.2 Action plan for reduction of CEPI

In response to MoEF / CPCB's report on Comprehensive Environmental Pollution Index (CEPI), Manali cluster had been declared as critically polluted area as the index is 76.34.

TNPCB has prepared industry-wise action plan in coordination with respective industries to reduce the CEPI.

TPL – HCD plant has 8 short term / long term action points.

TPL – HCD has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short measures by TPL - HCD

Action Point – 1 Modification in chlorine cylinder filling system

Present practice
Liquid Chlorine presently is being transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant by using high pressure dry air. After completion of chlorine transfer, storage is depressurized and the air with traces of chlorine will be sent to Chlorine scrubber (Waste Air Dechlorination Plant) for absorption

Proposed practice with project details
Liquid Chlorine will be transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant using canned pump instead of using pressurized air.

Status of the Project
Modification in chlorine cylinder filling system P&ID drawing has been prepared. Vendor identification for procurement of materials is in progress. System will be implemented by Sep 2011

Project Scheduled completion : Oct' 2011
Progress made so far : 25%

Benefits from the Project
Proposed to modify the chlorine cylinder filling system to reduce Chlorine load to scrubber – [Waste Air Dechlorination Plant - WAD Plant] and also to achieve energy consumption.

Estimated Chlorine emission reduction:
Chlorine emission load to Scrubber (WAD Plant) – 250 MT/Annum [Before CEPI]
Chlorine emission load to Scrubber (WAD Plant) – Nil [After CEPI]

Besides an energy savings of 229.3 KW / Day

S.No	Pollutants	Present status - Chlorine emission load to scrubber, MT / Annum	Proposed practice - Chlorine emission load to scrubber, MT / Annum
1	Chlorine	250.0 / Annum	Nil Besides an energy saving of 229.3 KW / Day.

Details are attached as Annexure – A.4.3

Summary of Action point No.1

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Modification in chlorine cylinder filling system	Marc 2011	Liquid Chlorine presently is being transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant by using high pressure dry air. After completion of chlorine transfer, storage is depressurized and the air with traces of chlorine will be sent to Chlorine scrubber (Waste Air Dechlorination Plant) for absorption	Liquid Chlorine will be transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant using canned pump instead of using pressurized air.	Modification in chlorine cylinder filling system P&ID drawing has been prepared. Vendor identification for procurement of materials is in progress. System will be implemented by Oct' 2011 Budget – 30 Lac	Proposed to modify the chlorine cylinder filling system to reduce Chlorine load to scrubber – [Waste Air Dechlorination Plant - WAD Plant] and also to achieve energy consumption. Estimated Chlorine emission reduction: Chlorine emission load to Scrubber (WAD Plant) – 250 MT/Annum [Before CEPI] Chlorine emission load to Scrubber (WAD Plant) – Nil [After CEPI] Besides an energy savings of 229.3 KW / Day and Chlorine storage pressure will reduce from 10 to 3 KSc(g) thus improving safety enormously. Details are attached as Annexure – A.4.3

Action Point – 2 **Continuous monitoring system for the parameters chlorine, HCl vapour, PM, SO2, NOx, and CO will be provided and data will be uploaded to TNPCB server**

Present practice
Presently TPL is monitoring HCl vapour, Chlorine, PM, SO_2, NOx, CO in stacks through internal / external accredited laboratory

Proposed practice with project details
Actions have initiated to monitor HCl vapour, Chlorine , PM, SO_2, NOx, CO in stacks on continuous basis.

Status of the project

- Online continuous sensors for monitoring Chlorine in WAD stacks are provided and will be connected to Care Air Centre, TNPCB by July 2011.
- Online continuous sensors for monitoring Hydrochloric Acid vapour in HCl production unit stacks are provided and will be connected to Care Air Centre, TNPCB by July 2011.
- Online continuous sensors for monitoring PM in Captive Power Plant 3 - stacks are provided and will be connected to Care Air Centre, TNPCB by July 2011
- Online continuous sensors for monitoring SO_2, NOx, CO in Captive Power Plant 3 - stacks will be provided and connected to Care Air Centre, TNPCB by Sep 2011

Project Scheduled completion: October 2011
Progress made so far : 80 %

Benefits from the project

Summary of Action point No: 2

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Continuous monitoring system for the parameters chlorine, HCl vapour, PM, SO2, NOx, and CO will be provided and data will be uploaded to TNPCB server	Sep 2010	Being monitored through external accredited laboratory.	Proposed to monitor continuously.	Online continuous sensors for monitoring Chlorine in WAD stacks are provided and will be connected to Care Air Centre, TNPCB by Oct'2011. Online continuous sensors for monitoring Hydrochloric Acid vapour in HCl production unit stacks are provided and will be connected to Care Air Centre, TNPCB by July 2011. Online continuous sensors for monitoring PM in Captive Power Plant 3 - stacks are provided and will be connected to Care Air Centre, TNPCB by Oct 2011 Online continuous sensors for monitoring SO_2, NOx, CO in Captive Power Plant 3 - stacks will be provided and connected to Care Air Centre, TNPCB by Oct 2011 Budget – 5.5 lac	To ascertain that the stack emission quality are within the stipulated specifications and to take corrective / preventive measure at source.

Action Point – 3 To conduct AAQ survey as per the new MINAS

Present practice
Presently TPL is monitoring some of the MINAS parameters through external accredited laboratory.

Proposed practice with project details
Actions have initiated to conduct AAQ survey (all parameter) as per the MINAS standards and based on the report further action will be taken.

Status of the project
Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards.
Project Scheduled completion: Completed
Progress made so far : 100%

Benefits from the project

Results are within the prescribed standards.

Summary of Action point No: 3

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
3	To conduct AAQ survey as per the new MINAS	July 2010	Some of the MINAS parameters are being monitored through external accredited laboratory.	Proposed to conduct AAQ survey [all parameters] as per the new MINAS standards	Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards Budget – 1.0 Lacs	Results are within the prescribed standards.

Action Point – 4 **Environmental monitoring will be carried out through accredited laboratory also.**

Present practice
Periodic monitoring is being carried out by internal laboratory

Proposed practice with project details
Environmental monitoring will be carried out through external accredited laboratory

Status of the project
Environmental monitoring is being carried out through external accredited laboratory from October 2010.

Benefits from the project
Monitoring frequency is improved and to take any corrective / preventive action.

Summary of Action point No: 4

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
4	Environmental monitoring will be carried out through accredited laboratory also.	March 2011	Periodic monitoring is being carried out by internal laboratory.	Environmental monitoring will be carried out through external accredited laboratory in a improved frequency.	Environmental monitoring is being carried out through external accredited laboratory from October 2010 Budget – 2.5 Lacs. Adhered to action point.	Monitoring frequency is improved and to take any corrective / preventive action.

Action Point – 5 Zero Liquid Effluent Discharge

Present practice
Treated effluent from HCD plant is used in TPL – ECH plant process

Proposed practice with project details
Ensuring complete utilization of Treated effluent from HCD plant is used in TPL – ECH plant process

Status of the project
70679 m^3 of treated effluent generated from HCD plant is used in TPL – ECH plant process for the year 2010 – 2011.
Project Scheduled completion: Mar 2011
Progress made so far : 100%

Benefits from the project
Zero liquid discharge is achieved for the year 2010 – 2011

Summary of Action point No: 5

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
5	Zero liquid discharge	March 2011	Treated effluent from HCD plant is used in TPL – ECH plant process	Ensuring complete utilization of Treated effluent from HCD plant in TPL – ECH plant process	70879 m^3 of treated effluent generated from HCD plant is used in TPL – ECH plant process for the year 2010 – 2011. Continuous process	Conservation of resource. 70879 m3/annum of fresh water conserved.

Action Point – 6 **Integrity assessment study to be conducted by Prof. Dr. S. Mohan, M/s. NITTTR to Strengthen the Mercury bearing sludge storage pit**

Present practice
Mercury bearing brine sludge [generated before 20.05.1998] is stored in LDPE lined impervious pits within the premises.

Proposed practice with project details
Proposed to conduct Integrity assessment study to be conducted by
Prof. Dr. S. Mohan to Strengthen the Mercury bearing sludge storage pit to keep the sludge within the premises.

Status of the project
Integrity assessment study of Mercury bearing sludge storage pit has been conducted by Prof. Dr. S. Mohan, Director, M/s. National Institute of Technical Teachers Training and Research (NITTTR), Centre for Environmental Management, Chennai as per SCMC observations and subsequent directive from TNPCB & has advised the following measures to strengthen the sludge storage pit:

- To construct the containment wall below ground level on the western side to evade ground water flow.
- Brick retaining wall to be constructed at the suggested locations.
- Protective LDPE top layer with drain facility to be provided to prevent water stagnation.

Containment wall drawing approval has been obtained from M/s.NITTTR, Chennai on 08.02.2011.
The recommendations specified in the report, will be implemented during the financial year 2011 – 12.
Project Scheduled completion : March 2012
Progress made so far : 25%

Benefits from the project
Additional strengthening measure of sludge storage pit and to eliminate land & ground water contamination

S.No	Pollutants	Present status	Proposed practice
6 .1	Mercury bearing brine sludge (Hazardous Waste)	Mercury bearing brine sludge [generated before 20.05.1998] is stored in LDPE lined impervious pits within the premises. Mercury in test bore well water – Nil	Additional strengthening measures will be carried out to ensure the stability of storage pit and to further eliminate land & ground water contamination Mercury in test bore well water – Nil.

Summary of Action point No 6

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
6. 2	Integrity assessment study to be conducted by Prof. Dr. S. Mohan to Strengthen the Mercury bearing sludge storage pit	Mar 2011	Mercury bearing brine sludge [generated before 20.05.1998] is stored in LDPE lined impervious pits within the premises.	Proposed to conduct Integrity assessment study to be conducted by Prof. Dr. S. Mohan to Strengthen the Mercury bearing sludge storage pit to keep the sludge within the premises.	Integrity assessment study of Mercury bearing sludge storage pit has been conducted by Prof. Dr. S. Mohan, M/s. NITTTR, Chennai as per SCMC observations and subsequent directive from TNPCB & has advised the following measures to strengthen the sludge storage pit: To construct the containment wall below ground level on the western side to evade ground water flow. Brick retaining wall to be constructed at the suggested locations. Protective LDPE top layer with drain facility to be provided to prevent water stagnation. Containment wall drawing approval has been obtained from M/s.NITTTR, Chennai on 08.02.2011. The recommendations specified in the report, will be implemented during the financial year 2011 – 12. Budget – 84 lac	Elimination of Land and ground water contamination Additional strengthening measure. Ensuing safety of the storage pit

Action Point – 7 **Analysis of Brine sludge generated from membrane cell process for waste categorization**

Present practice
Presently sludge generated from membrane cell process is being analysed by internal laboratory

Proposed practice with project details
Proposed to analyse Brine sludge generated from membrane cell process through Prof. Dr. S. Mohan, Director, National Institute of Technical Teachers Training and Research (NITTTR),, Centre for Environmental Management for waste categorization

Status of the project
Brine sludge analysis was carried out by Prof. Dr. S. Mohan, Director, M/s. NITTTR, Centre for Environmental Management, Ministry of Human Resource Development, Government of India, Chennai

Results of analysis has concluded that "the brine sludge generated during the production of caustic Soda through membrane cell at TPL – Heavy Chemicals Division, Manali is **'Non- Hazardous'** in nature as per the Hazardous Waste (Management, Handling & Transboundary Movement) Rules 2008

Benefits from the project
Results of Analysis concluded that brine sludge generated during production of caustic soda through Membrane cell process is '**Non- Hazardous**' in nature as per the Hazardous Waste (M,H & TM) Rules 2008

Progress made so far : 100%

Summary of Action point No 7

S.No.	Action Point	Original Target / Revised	Present Practice	Proposed Practice	Present status of Project / Budget Provision	Benefits
7	Analysis of Brine sludge generated from membrane cell process for waste categorization	Sept 2010	Presently sludge generated from membrane cell process is being analysed by internal laboratory	Proposed to analyse Brine sludge generated from membrane cell process through Prof. Dr.S.Mohan, Director, NITTTR, Centre for Environmental Management for waste categorization	Brine sludge analysis was carried out by Prof. Dr.S.Mohan, Director, NITTTR, Centre for Environmental Management, Ministry of Human Resource Development, Government of India, Chennai. Budget – 1 Lakh	Results of analysis has concluded that "the brine sludge generated during the production of caustic Soda through membrane cell at TPL – heavy Chemicals Division, Manali is 'Non-Hazardous Waste' (Management, Handling & Transboundary Movement) Rules 2008".

Action Point – 8 Green belt development

Present practice
Green belt development is being developed inside and outside the factory premises.

Proposed practice with project details
Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location.

Status of the project
Identified the locations for green belt development.
54 Nos of tree saplings were planted inside TPL – ECH plant on 06.06.2011.
Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by June 2011.
Project Scheduled completion: Oct 2011
Progress made so far : 25%

Benefits from the project
Abatement of air and noise pollution.

Summary of Action point No: 8

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
8	Green belt development	March 2011	Green belt development is being developed inside and outside the factory premises.	Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location	Identified the locations for green belt development. 54 Nos of tree saplings were planted inside TPL – ECH plant on 06.06.2011. Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by June 2011. Budget 2.5 Lac	Abatement of air pollution and noise pollution.

Action Point – 1 **Modification in chlorine cylinder filling system**

S.No	Description	Present System	Proposed Modification
1	Liquid Chlorine filling system	Liquid Chlorine presently is being transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant by using high pressure dry air. After completion of chlorine transfer, storage is depressurized and the air with traces of chlorine will be sent to Chlorine scrubber (Waste Air Dechlorination Plant) for absorption	Liquid Chlorine will be transferred to Chlorine Bottling Plant and Chlorine Evaporation Plant using canned pump instead of using pressurized air.
2	**Estimated Chlorine load to Scrubber Waste air Dechlorination Unit (WAD) during filling of cylinders.**	0.69 MT / Day	Nil
		250.3 MT / Annum	Nil
3	**Energy Conservation**		
	Power for Air compressor	90 KW	-------
	Running hours	4 Hrs / Day	-------
	Power consumption per day for air Compressor	360 KW	-------
	Power consumption per day for Instrument air drying	37.3 KW	-------
	Total power consumption	**397.3 KW / Day**	-------
	Power for Canned pump	-------	7 KW
	Running hours	-------	24 Hrs
	Power consumption per day for Canned pump	-------	**168 KW / Day**
	Proposed power savings	-------	**229.3 KW / Day**
3	**Storage - Safety benefit**	Chlorine storage is operated at 10 KSc(g).	Reduction in chlorine storage pressure from 10 to 3 KSc(g). Thus improving safety enormously.

A.5 TAMILNADU PETROPRODUCTS LIMITED – LAB REPORT

A.5.1 INTRODUCTION

Tamilnadu Petroproducts Ltd (TPL) was incorporated in 1984 as a joint venture between Tamilnadu Industrial Development Corporation Limited (TIDCO) and M/s. Southern Petrochemical Industries Corporation Limited (SPIC).

Tamilnadu Petroproducts Ltd (TPL) is a manufacturer of Linear Alkyl Benzene, Epichlorohydrin & Caustic Soda having its manufacturing facilities at Manali Industrial Area at the outskirts of Chennai.

A.5.2 Action plan for reduction of CEPI

In response to MoEF / CPCB's report on Comprehensive Environmental Pollution Index (CEPI), Manali cluster had been declared as critically polluted area as the index is 76.34.

TNPCB has prepared industry-wise action plan in coordination with respective industries to reduce the CEPI.

TPL – LAB plant has 10 short term / long term action points.

TPL – LAB has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short term measures by TPL- LAB

Action Point – 1 **Provision of $PM_{2.5}$ online sensors for monitoring**

Present practice
Presently TPL monitoring $PM_{2.5}$ through external accredited laboratory.

Proposed practice with project details
Actions have initiated to monitor $PM_{2.5}$ on continuous basis.

Status of the project
Online sensor for monitoring Particulate Matter $PM_{2.5}$ has been provided and will be connected to Care Air Centre, TNPCB by June 2011
Project Scheduled completion: Oct 2011
Progress made so far : 90%

Benefits from the project
To ascertain that the ambient air quality are within the stipulated specifications

Summary of Action point No1

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
1	Provision of $PM_{2.5}$ online sensors for monitoring	Sep 2010/Oct' 2011	Being monitored through external accredited laboratory.	Proposed to monitor continuously.	Online sensor for monitoring Particulate Matter $PM_{2.5}$ has been provided and will be connected to CAC, TNPCB by Oct'2011. Budget – 6 Lac	To ascertain that the ambient air quality are within the stipulated specifications.

Action Point – 2 **Provision of Benzene online sensors for Continuous monitoring**

Present practice
Presently TPL is monitoring Benzene through external accredited laboratory.

Proposed practice with project details
Actions have initiated to monitor Benzene on continuous basis.

Status of the project
Online sensor for monitoring Benzene has been provided and will be connected to Care Air Centre, TNPCB by October 2011
Project Scheduled completion: October 2011
Progress made so far : 90%

Benefits from the project
To ascertain that the ambient air quality are within the stipulated specifications

Summary of Action point No: 2

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
2	Provision of online sensors for monitoring Benzene	Sep 2010 / Oct 2011	Being monitored through external accredited laboratory.	Proposed to monitor continuously.	Online sensor for monitoring Benzene has been provided and will be connected to CAC, TNPCB by Oct 2011. Budget – 12 Lac	To ascertain that the ambient air quality are within the stipulated specifications.

Action Point – 3 **Upgradation of Advance process Control System**

Present practice
DCS control system

Proposed practice with project details
Proposed to upgrade the Advance process control system to ensure more stable operation, resulting in reduction of fuel oil consumption and consequent reduction of Sulphur dioxide emission.

Status of the project
Upgradation of Advance process control' has been completed

Benefits from the project
Achieved in reduction of Sulphur dioxide emission.

S.NO	Pollutants	Sp.consumption of fuel oil before implementation of advance process control system. MT/MT of product	Sp.consumption of fuel oil after implementation of advance process control system. MT/MT of product	Reduction of Pollution level SO_2, MT / Annum
1	SO_2	0.6204	0.5821	278.61 MT / Annum

Summary of Action point No: 3

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
3	Upgradation of Advance process Control System	March 2011	DCS control system	Upgradation of Advance process Control System will be implemented to ensure more stable operation resulting in reduction of Fuel oil consumption and consequent reduction of Sulphur dioxide emission.	Upgradation of Advance process control' has been completed. Budget – 11 Lac	Reduction in Air pollution. Achieved in reduction of Sulphur dioxide emission. Sp. Consumption Apr 09 – Mar 10 : 0.6204 T/Product [Before CEPI] Sp. Consumption Apr 10 – Mar 11 : 0.5821 T/Product [After CEPI] Reduction of Sulphur dioxide emission - 278.61 MT of SO_2. / Annum Details are given in Annexure 1A, 1B, 1C

Action Point – 4 **Continuous monitoring system along with data uploading facility for 3 stacks attached to Captive Power Plant**

Present practice
Presently TPL is monitoring PM, SO_2, NOx, CO through external accredited laboratory.

Proposed practice with project details
Actions have initiated to monitor PM, SO_2, NOx, CO on continuous basis.

Status of the project

Online sensors for monitoring Particulate Matter PM, SO_2, NOx, CO will be provided and connected to Care Air Centre, TNPCB by July 2011
Received sensors and installation job is in progress.
Project Scheduled completion : October 2011
Progress made so far : 80%

Benefits from the project
To ascertain that the ambient air quality are within the stipulated specifications

Summary of Action point No: 4

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
4	Continuous monitoring system along with data uploading facility for 3 stacks attached to Captive Power Plant	Sep 2010	Being monitored through external accredited laboratory.	Proposed to monitor continuously.	Online sensors for monitoring Particulate Matter PM, SO_2, NOx, CO will be provided and connected to Care Air Centre, TNPCB by Oct 2011 Received sensors and installation job is in progress Budget – 25 Lacs	To ascertain that the stack emission quality are within the stipulated specifications.

Action Point – 5 **To conduct AAQ survey as per the new MINAS**

Present practice
Presently TPL is monitoring some of the MINAS parameters through external accredited laboratory.

Proposed practice with project details
Actions have initiated to conduct AAQ survey (all parameter) as per the MINAS standards and based on the report further action will be taken.

Status of the project
Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards.
Project Scheduled completion: Completed
Progress made so far : 100%

Benefits from the project
Results are within the prescribed standards.

Summary of Action point No: 5

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
5	To conduct AAQ survey as per the new MINAS	July 2010	Only few parameters of MINAS standards are being monitored through external accredited laboratory.	Proposed to conduct AAQ survey as per the new MINAS standards covering all parameters	Ambient Air quality survey was conducted on 03.12.2010 through external laboratory as per the new standards Budget – 1.0 Lacs	Results are within the prescribed standards.

Action Point – 6 **Environmental monitoring will be carried out through accredited laboratory also.**

Present practice
Periodic monitoring is being carried out by internal laboratory

Proposed practice with project details
Environmental monitoring will be carried out through external accredited laboratory in an improved frequency.

Status of the project
Environmental monitoring is being carried out through external accredited laboratory from October 2010.

Benefits from the project
Monitoring frequency is improved and to take any corrective / preventive action.

Summary of Action point No: 6

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
6	Environmental monitoring will be carried out through accredited laboratory also.	March 2011	Periodic monitoring is being carried out by internal laboratory.	Environmental monitoring will be carried out through external accredited laboratory in an improved frequency.	Environmental monitoring is being carried out through external accredited laboratory from October 2010 Budget – 2.5 Lacs. Continuous in progress. Adhered to action point.	Re assuring of emitting emissions well within allowable limits.

Action Point – 7 **Zero Liquid Effluent Discharge**

Present practice
Treated effluent from LAB plant is used in TPL – ECH plant process

Proposed practice with project details
Ensuring complete utilization of Treated effluent from LAB plant is used in TPL – ECH plant process

Status of the project
112562 m^3 of treated effluent generated from LAB plant is used in TPL – ECH plant process for the year 2010 – 2011.
Project Scheduled completion : Mar 2011
Progress made so far : 100%

Benefits from the project
Zero liquid discharge is achieved for the year 2010 – 2011

Summary of Action point No: 7

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
7	Zero liquid effluent discharge	March 2011	Treated effluent from LAB plant is being used in TPL – ECH plant process	Ensuring complete utilization of treated effluent from LAB plant in TPL – ECH plant process	112562 m^3 of treated effluent generated from LAB plant is used in TPL – ECH plant process for the year 2010 – 2011.	Conservation of resource. 112562 m^3 / annum of fresh water conserved.

Action Point – 8 Upgradation of Advance process Control System

Present practice

DCS control system

Proposed practice with project details

Proposed to upgrade the Advance process control system to ensure more stable operation resulting in reduction of fuel oil consumption and consequent reduction of reduction Calcium Fluoride sludge generation.

Status of the project

Upgradation of Advance process control' has been completed

Benefits from the project

Achieved in reduction of Sludge (hazardous waste) generation.

S.NO	Pollutants	Calcium Fluoride (hazardous waste) generation before implementation of advance process control system, MT	Calcium Fluoride (hazardous waste) generation after implementation of advance process control system, MT	Reduction of Calcium Fluoride (hazardous waste) generation, MT/Annum
1	Calcium Fluoride sludge (Hazardous waste)	15.86	13.90	1.96 MT / Annum

Summary of Action point No: 8

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
8	Upgradation of Advance process Control System	March 2011	DCS control system	Upgradation of Advance process Control System will be implemented to ensure more stable	Upgradation of Advance process control' has been completed. Budget –11 Lac	Elimination of Land and ground water contamination. Achieved in reduction of Sludge (hazardous

				operation resulting in reduction Calcium Fluoride sludge generation.		waste) generation. Calcium Fluoride sludge generation Apr 09 – Mar 10: 15.86 MT [Before CEPI] CaF2 sludge generation Apr 10 – Mar 11: 13.9 MT [After CEPI] Details attached as Annexure - 1D

Action Point – 9 **Transportation of accumulated Hazardous waste to the authorised Landfill facility for permanent disposal**

Present practice
Hazardous wastes are stored in concrete pits within the premises

Proposed practice with project details
Proposed to transport the accumulated hazardous waste to the authorized landfill facility (M/s. Tamilnadu Waste Management Limited, Gummidipoondi) for safe permanent storage and to eliminate land and ground water contamination.

Status of the project
193.61 MT of accumulated hazardous waste was transported for the period April 10 to Mar 2011 to M/s TNWML, Gummidipoondi.
Balance quantity will be disposed to M/s TNWML by Sep 2011

Project Scheduled completion : October 2011
Progress made so far : 70%

Benefits from the project
Transportation of accumulated hazardous waste to authorized landfill facility for safe permanent storage and to eliminate land & ground water contamination,

S.NO	Pollutants	Transportation of hazardous waste to authorized facility Before CEPI [before Dec 2009]	Transportation of hazardous waste to authorized facility after CEPI [Jan 2010 – May 2011]
1	Hazardous Waste	0.0	349.11 MT

Summary of Action point No: 9

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
9	Transportation of accumulated Hazardous waste to the authorized Landfill facility for permanent disposal	March 2011	Stored in pits within the premises	Proposed to transport to authorized landfill facility.	349.11 MT of accumulated hazardous waste was transported for the period April 10 to May 2011 to M/s TNWML, Gummidipoondi. Balance quantity (161.21)will be disposed to M/s TNWML by Oct 2011 Budget – 8 Lac	Elimination of Land and ground water contamination Transportation of accumulated hazardous waste to authorized landfill facility for safe permanent storage and to eliminate land & ground water contamination

Action Point – 10 Green belt development

Present practice
Green belt development is being developed inside and outside the factory premises.

Proposed practice with project details
Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location.

Status of the project
Identified the locations for green belt development.
54 Nos of tree saplings were planted on 06.06.2011 within the premises of TPL – ECH plant.
Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by June 2011.
Project Scheduled completion: Oct'2011
Progress made so far : 25%

Benefits from the project
Abatement of air and noise pollution.

Summary of Action point No: 10

S.No	Action Point	Original target / Revised	Present practice	Proposed Practice	Present status of project / Budget provision	Benefits.
10	Green belt development	March 2011	Green belt development is being developed inside and outside the factory premises.	Proposed to develop additional green belt development along Manali express highway and inside the factory premises and identified the location	Identified the locations for green belt development. 54 Nos of tree saplings were planted on 06.06.2011 within the premises of TPL – ECH plant. Around 150 Nos of tree saplings will be planted in LAB, ECH & HCD plants by October 2011. Budget 2.5 Lac	Abatement of air pollution and noise pollution.

A.6 MANALI PETROCHEMICAL LIMITED – PLANT - I

ACTION PLAN FOR REDUCTION OF CEPI

A.6.1 INTRODUCTION

Manali Petrochemical Limited (MPL) operates two production plants at Manali near Chennai to manufacture Propylene Oxide (PO), Propylene Glycol (PG) and various grades of Polyol and formulations. MPL was promoted by Southern Petrochemical Industries Corporation (SPIC).

Plant – I located on the Ponneri High Road, Manali Industrial belt, Chennai (adjacent to Chennai Petroleum Corporation Ltd- CPCL) and is capable of manufacturing 18000 MT of PO, 10,000 MT of PG and 25000 MT of Polyol, .

PO is an intermediate product produced and is utilized for conversion into PG and Polyol. PG is widely used for Pharmaceutical formulations, in Food Flavour and Fragrance industries and in the manufacture of unsaturated polyester Resins. Polyol is the raw material for manufacture of Polyurethanes. Polyol of different grades are allowed to react with Isocyanates to produce several grades of Polyurethane with distinctively different, desired properties.

Plants Profile

Plant - I was promoted by SPIC and was incorporated in the year 1987. The construction of the plant commenced in 1988 and commercial production started in the year 1990. Plant – I was set up with the technology of Atochem for PO and PG, and the basic engineering was done by Technip of France and the detailed engineering executed by Engineers India Ltd. The Polyol technology was provided BY ARCO, USA through Technip.

Major supplier of the raw material is Chennai Petroleum Corporation Ltd (CPCL). There are no other manufacturers of PO, PG and Polyol in India

A.6.2 Action plan for reduction of CEPI

In response to MoEF/CPCB's report on Comprehensive Environmental Pollution Index (CEPI) . Manali cluster had been declared as critically polluted area as the index is 76.34 > 70. TNPCB prepared an action plan for reducing the CEPI on industry-wise in coordination with respective industries .MPL Plant - I has 8 short term action points.MPL has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short Term Measures by MPL-I

Action Point No.1

To reduce SPM level in the boiler stack.Retrofit burner

By periodical renewal/ servicing of following burner assembly, SPM level is reduced.

a) Boiler burner nozzle renewed.
b) Diffuser plate renewed.
c) Modulation unit serviced

The present practice of above action

- SPM level is with in the limit.
- Online stack Monitoring installed for SPM,SO2, NOX, CO. Online data uploading connected to TNPCB.

The benefits of the project is reduction of following pollutant loads in the Boiler stack

S.NO	Pollutants	Pollutant level mg/Nm3	Pollutant load before implementation	Pollutant load after implementation
1	SPM	81.33	86.36 Kg/day	30.67Kg/day

Status : Completed. SPM well with in the limit

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1	To reduce SPM level in the boiler stack.Retofit burner	With in a year	Furnace oil consumption is only 500 Kg/Hour. By adoptig various energy saving measures..	Based present Furnace oil firing of 400 to 500 Kgs / Hour consumption .Nozzle renewed. Perodically checked and cleaned the nozzle.Diffuser Plate renewed. Modulation serviced.	Budget provision is Rs 25 Lakhs and the project is completed.	Reduction in pollutant: SPM well below the limit: SPM - Reduction

Action point 2 : To reduce SO2 level in the boiler stack:

The following action proposed to reduce SO2 level in boiler stack..

a) To discuss with oil companies ,
b) Provide scrubber

Presently in MPL Plant – I Boiler, Furnace oil is used as fuel in the boiler..Furnce oil Consumption is only 450 to 500 Kgs/hour only..

During discussion with Thermax (Boiler supplier) they have indicated that is not possible for further reduction of SO2 in the boiler stack. The exit may come around 60 to 80 PPM only but because of difficult material of construction and safety aspects the matter is progressing slowly.It is understood from them no one has implemented such type of scrubber in the boiler stack in India. We are discussing with Thermax for further action.

The benefits of the project is reduction of following pollutant in the Boiler stack

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant load after implementation
2	SO2	150 to 300mg/Nm3 Expected 100 mg.m3	81.08Kg/day	37.71kg/day * (under discussion stage for implementation)

Note:- NO limit prescribed by the Board.
Further action is in progress

Status :

Being discussed with oil companies
Discussing with Thermax (Boiler supplier) for any scrubber provision

Summary of Action point No 2

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
2	To reduce SO2 level in the boiler stack	With in a year	Furnace oil is used as a fuel. 450 to 500 Kgs/hour only used.	As per board advice exploring the possibility of installing scrubber.	Budget provision is Rs 20 lakes and the project under discussion with Thermax.	Reduction in pollutants So2 in the Boiler Stack. Note;- As per Board advice action planned. SO2 limit not prescribed.

Action point 3 : Ambient air quality SPM levels

Presently, during dry weather condition, due to vehicle movement SPM level in the ambient is slightly high .

By following measures ,SPM level is reduced .

Road cleaning being carried out with vaccum cleaner weekly

The following action taken.

a. Installation of PM 2.5 and PM 10 on line monitorig instruments istallation work is I progress tomonitor SPM level. Equipmets received from Chemtrols.
b. On line data uploading of PM 2.5 and PM 10 to TNPCB work is in progress

Benefits

The benefits from the project is reduction in SPM levels

S.NO	Pollutants	Pollutant level gm/m3	Pollutants before implementation	Pollutants after implementation
1	Ambient SPM – PM-2.5,PM10	To be installed	To be installed	To be installed

Status:

a. Installation of PM 2.5 and PM 10 on line monitorig instruments istallation work is in progress. Equipmets received from Chemtrols.

b. On line data uploading of PM 2.5 and PM 10 to TNPCB work is in progress

Project Scheduled completion : Nov 2011
Percentage progress made so far : 75%

Summary

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
3	Ambient air quality SPM levels	Nov 2011	Road weekly cleaned by vaccum cleaner.	Installation of PM 2.5 and PM 10 on line monitorig instruments istallation is in progress	Budget provision is Rs 25 lakes and the project is 75% completed	Reduction in pollutants Ambient SPM level

Action Point No.4

Renewal of old DG sets to reduce diesel Consumption

Under this the following measures taken

a. New two 1500 KVA DG sets installed and commissioned with acoustic hood.

The present practice of above action

Old DG sets are 20 years old and consumes more diesel. As per Management commitment renewed with new requirement.

The benefits of the project is reduction of following pollutant loads in the DG stack

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant load after implementation
1	N/A	N/A	N/A 2.80 to 3.00 units/Litre of Diesel	N/A. Reduction in diesel consumption 3.50 units/Litre of Diesel DG will run only during TNEB power failure for lighting and safe shutdown of plant. It will not run continuously. So no need of pollutant calculation.

Status : Completed.

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
4	Renewal of DG sets	With in six months	Old DG sets are 20 years old	New DG set two numbers 1500 KVA installed and commissioned .	Budget provision is Rs 2 crore and the project is completed. Each DG is Rs 1.25 crore. Total cost Rs 2.50 crores invested.	Reduction in pollutant: SPM,Nox,HC,CO. Reduction in diese consumption

Action Point No.5

Treated effluent Disposal line to sea

Under this the following measures taken

a) New sea disposal line laid

The present practice of above action

- **Old treated effluent disposal line to sea is being used. Due to 20 years old line and to avoid any leakage renewal was planned.**

The benefits of the project is

S.NO	Pollutants	Pollutant level	Pollutant load before implementation	Pollutant after implementation
1	Treated effluent	N/A	N/A	N/A

Status : Line laying completed.

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
5	Treated effluent disposal line to Sea (Marine disposal line)	With in a year	Old line is used.	NewTreated effluent disposal line laid.	Budget provision is Rs 8 crores and the project is completed.	Meeting all th requirements.

Action Point No.6

Rain Water collection system at Solid waste collection area and route the rain water to Bio – reactor system.

Under this the following measures taken.

a.Concrete floor provided.
b.Dyke construction work started.
c.Planned for rain water collection pit with pump for pumping to Bio reactor system

The present practice of above action

Solid waste Solardryed in the floor

The benefits of the project is

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant load after implementation
1	Wasre water with solids	N/A	N/A	No seepage in to soil

Status : Work started. 50% work completed

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
6	Rain water collection system at solid waste collection area and route the rain water to Bio-rector system	With in a year	Solid waste stored in the open yard for solar drying	Solid waste stored in the open yard for solar drying with rain water collection syastem.	Budget provision is Rs 3 Lakhs and the work is in progress .	To meet the requirement No seepage in to soil

Action Point No.7

Installation of Ambient Chlorine, SPM, VOC monitoring system and data uploading to TNPCB.

Under this , the following instruments already installed and other is under installation. Reduction in diesel consumption .

a..Chlorine sensors installed and online data uploading connected to TNPCB
b.Two VOC sensors provided and online data uploading connected to TNPCB
c.Ambient SPM - PM 2.5 , PM 10 equipments received from chemtrols. Installation work is in progress.

The present practice of above action

- All parameters are well with in the limit. and meet the requirements

The benefits of the project is

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant after implementation
1	Chlorine	BDL	BDL	BDL(To monitor ambient Cl2)
2	VOC	BDL	BDL	BDL(To monitor ambient VOC)
3	SPM – PM 2.5, PM 10	To be installed	To be installed	To be installed(To monitor ambient SPM)

Status : 75% work completed. PM2.5 and PM10 installation is in progress

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
7	Installatio of ambient chlorine ,SPM, VOC Monitorig system and data uploading to TNPCB	With in a year	All storages under nitrogen blaketing system	On line moitoring ambient chlorine ,SPM, VOC Monitorig system and data uploading to TNPCB	Budget provision is Rs 10 Lakhs and the project is 75% completed.	Online monitoring and t meet the requirement

Action Point No.8

Installation of Suitable Dust containment system.

Under this the following measures SPM level reduced.

a. Dust extraction system designed ,procurement and fabrication work on equipments is in progress
b. Dust scrubber system designed , fabrication work is in progress

The present practice of above action

Lime bag charging area dust generation is high. Work is in progress for installing Dust extraction with scrubber system.
The benefits of the project is reduction of in dust at lime charging area and in MOL plant

1	SPM	To be installed	To be installed	To be installed

Status : Designing completed procurement and fabrication work is in progress

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
8	Istallation of suitable containment system	With in a year	Lime bags unloaded in the closed shed	Dust extraction with scrubbing system work is in progress	Budget provision is Rs 25 Lakhs and the project is in progress.	Reduction in pollutant SPM in the ambient

A.7 & A.8 MANALI PETROCHEMICAL LIMITED – PLANT - II

A.7.1 INTRODUCTION

Manali Petrochemical Limited (MPL) operates two production plants at Manali near Chennai to manufacture Propylene Oxide (PO), Propylene Glycol (PG) and various grades of Polyol and formulations. MPL was promoted by Southern Petrochemical Industries Corporation (SPIC).

MPL Plant – II located at Sathangadu Village, Chennai (adjacent to Balmer Lawrie Ltd) and is capable of manufacturing 18000 MT of PO, 10,000 MT of PG and 25000 MT of Polyol respectively.

PO is an intermediate product produced and is utilized for conversion into PG and Polyol. PG is widely used for Pharmaceutical formulations, in Food Flavour and Fragrance industries and in the manufacture of unsaturated polyester Resins. Polyol is the raw material for manufacture of Polyurethanes. Polyol of different grades allowed to react with Isocyanates of different grades to obtain several grades of Polyurethane with distinctively different,and desired properties.

Plants Profile

Plant-II was promoted By UB Group and TIDCO and this was incorporated in 1986. The commercial production started in the year 1990 and it was taken over by M/s. SPIC in 1995 and merged with MPL in the year 2000. Plant –II uses the technology of Enichem of Italy for PO and PG. The polyol technology was provided by Pressindustria (Scientific Design, USA) Unde, India carried out the detailed engineering.

Major supplier of the raw material is Chennai Petroleum Corporation Ltd (CPCL). These are no other manufacturers of PO, PG and Polyol in India

A.7.2 Action plan for reduction of CEPI

In response to MoEF/CPCB's report on Comprehensive Environmental Pollution Index (CEPI) . Manali cluster had been declared as critically polluted area as the index is 76.34 > 70. TNPCB prepared an action plan for reducing the CEPI on industry-wise in coordination with respective industries .MPL Plant - II has 7 short term action points.MPL has initiated several actions both long term &short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short Term Measures by MPL

Action point 1 : Ambient air quality SPM levels

Presently, during dry weather condition, due to vehicle movement SPM level in the ambient is slightly high .

Following measures are taken to reduce SPM level.

Road cleaning being carried out with vaccum cleaner weekly

The following action taken.

a. Installation of PM 2.5 and PM 10 on line monitorig instruments istallation work is in progress. Equipments received from Chemtrols.
b. On line data uploading of PM 2.5 and PM 10 to TNPCB work is in progress

Benefits

The benefits from the project is reduction of following pollutant

S.NO	Pollutants	Pollutant lelevl gm/m3	Pollutants before implementation	Pollutants after implementation
1	Ambient SPM – PM-2.5,PM10	To be installed	To be installed	To be installed

Status:

a. Installation of PM 2.5 and PM 10 on line monitorig instruments istallation work is in progress. Equipmets received from Chemtrols.

b. On line data uploading of PM 2.5 and PM 10 to TNPCB work is in progress

Project Scheduled completion : Nov 2011
Percentage progress made so far : 75%

Summary

S.No	Action Point	Original Target/ Revised target	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1	Ambient air quality SPM levels	Nov 2011	Road weekly cleaned by vaccum cleaner.	Installation of PM 2.5 and PM 10 on line monitorig instruments istallation is in progress	Budget provision is Rs 25 lakes and the project is 75% completed	Reduction in pollutants Ambient SPM level

Action Point No.2

Renewal of old DG sets to reduce diesel consumption

Under this the following measures taken

a. New two 1500 KVA DG sets installed and commissioned

The present practice of above action

Old DG stes are 20 years old and consumes more diesel. As per Management commitment renewed with new requirement.

The benefits of the project is reduction of following pollutant loads in the DG stack and reduced in diesel consumption

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant load after implementation
1	N/A	N/A	N/A 2.80 to 3.00 units/Litre of Diesel	N/A. Reduction in diesel consumption 3.50 units/Litre of Diesel DG will run only during TNEB power failure for lighting and safe shutdown of plant. It will not run continuously. So no need of pollutant calculation.

Status : Completed.

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
2	Renewal of DG sets	With in six mothsr	Old DG sets are 20 years old	New DG set two numbers 1500 KVA installed and commissioned as committed	Budget provision is Rs 2 crore and the project is completed.	Reduction in pollutants SPM ,Nox,HC,CO and reduced in diesel consumption

Action Point No.3

Treated effluent Disposal line to sea

Under this the following measures taken

a) New sea disposal line laid

The present practice of above action

Old treated effluent disposal line to sea is being used. Due to 20 years old line and to avoid any leakage renewal was planned.

The benefits of the project is

S.NO	Pollutants	Pollutant level	Pollutant load before implementation	Pollutant after implementation
3	Treated effluent	N/A	N/A	N/A

Status : Line laying completed.

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
3	Treated effluent disposal line to Sea (Marine disposal line)	With in a year	Old line is used.	NewTreated effluent disposal line laid.	Budget provision is Rs 8 crores and the project is completed.	Meeting all tl reqirements.

Action Point No.4

Rain Water collection system at Solid waste collection area and route the rain water to Bio – reactor system.

Under this the following measures taken.

a.Concrete floor provided.
b.Dyke construction work started.
c.Planned for rain water collection pit with pump for pumping to Bio reactor system

The present practice of above action

Solid waste Solardryed in the floor

The benefits of the project is

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant load after implementation
4	Waste water with solids	N/A	N/A	No seepage in to soil

Status : Work started. 50% work completed

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
4	Rain water collection system at solid waste collection area and route the rain water to Bio-rector system	With in a year	Solid waste stored in the open yard for solar drying	Solid waste stored in the open yard for solar drying with rain water collection syastem.	Budget provision is ` 10 Lakhs and the work is in progress .	To meet the requirement No seepage in t soil

Action Point No.5

Installation of Ambient Chlorine, SPM, VOC monitoring system and data uploading to TNPCB.

Under this the following instruments already installed and oother is under installation.

a..Chlorine sensors installed and online data uploading connected to TNPCB
b.Two VOC sensors provided and online data uploading connected to TNPCB
c.Ambient SPM - PM 2.5 , PM 10 equipments received from chemtrols. Installation work is in progress.

The present practice of above action

- All parameters well with in the limit. To meet the requirements

The benefits of the project is reduction of following pollutant loads in the Boiler stack

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant after implementation
1	Chlorine	BDL	BDL	BDL.(To monitor ambient Cl2)
2	VOC	BDL	BDL	BDL.(To monitor ambient VOC)
3	SPM – PM 2.5, PM 10	To be installed	To be installed	To be installed .(To monitor ambient SPM)

Status : 75% work completed. PM2.5 and PM10 installation is in progress

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
5	Installatio of ambient chlorine ,SPM, VOC Monitoring system and data uploading to TNPCB	With in a year	All storages under nitrogen blaketing system	On line moitoring ambient chlorine ,SPM, VOC Monitorig system and data uploading to TNPCB	Budget provision is Rs 10 Lakhs and the project is 75% completed.	Online monitoring and meet the requirement

Action Point No.6

Provision of Landscape/ green belt on accumulated sludge

Under this the following measures .

a. Old accumulated sludge area greenbelt development done. Already 350 trees planted. Further tree plantation planned and for developing land scapes.
b. Total sludge will be covered with green belt/land scaping

The present practice of above action

Sludge is non hazardous nature. It is normally used for brick manufacturing and land filling at lowlying area for green belt development
The benefits of the project is to develop green belt development in the sludge stored area

S.NO	Pollutants	Pollutant level gm/m3	Pollutant load before implementation	Pollutant after implementation
6	Sludge (Non hazardous)	N/A	No green belt above sludge stored area	Green belt above sludge stored area

Status : Tree plantation done. Further green belt development work is in progress

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
6	Provision of Landscape green belt on accumulated sludge	With in a year	sludge used for brick manufacturing and land filling at lowlying area for green belt development	Green belt development at accumulated sludge stored area. Already 350 trees planted. Further tree plantation work is in progress.	Budget provision is Rs 10 Lakhs and the project is in progress.	Green be development/ Reduction in pollutants

Action Point No.7

Installation of Suitable Dust containment system.

Under this the following measures SPM level reduced.

a. Dust extraction system designed,procurement and fabrication work of equipments is in progress
b.Dust scrubber system designed and fabrication work in progress

The present practice of above action

Lime bag charging area dust generation is high. Work is in progress for installing Dust extraction with scrubber system.

The benefits of the project is reduction dust level at lime charging area and MOL plant

7	SPM	To be installed	To be installed	To be installed

Status : Designing completed and fabrication work is in progress

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
7	Istallation of suitable dust containment system	With in a year	Lime bags unloaded in the closed shed	Dust extraction with scrubbing system work is in progress	Budget provision is Rs 25 Lakhs and the project is in progress.	Reduction in pollutan SPM in the ambient

A.9 & A.10 Balmer & Lawrie Limited (Leather & Grease)

A.9.1 INTRODUCTION

Balmer & Lawrie limited Manali, Chennai is situated in Manali industrial area with production facilities for leather chemicals Grease & MS barrels

A.9.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt. Balmer & Lawrie has initiated the following measures for improvement in pollution/emissions

- Revamping of Sewage treatment already completed
- Disposal of Hazardous waste in Common TSDF Gummidipoondi regularly
- Continuous monitoring stack emission at a cost of Rs 105.0 lakhs and will be completed by Nov 2011.

A.9.3 Benefits

- Discharge of treated effluent to nearby surface body
- Proper disposal of Hazardous waste
- Better control of stack emission by continuous monitoring

A.11 SUPREME PETROCHEM LIMITED

A.11.1 INTRODUCTION

Supreme Petrochem Limited (SPL) Manali, Chennai operate a state of art, Zero discharge, Expandable Polystyrene Plant with an installed capacity of 2750 MTPM.

A.11.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt.SPL has envisaged 6 short term objectives and 2 long term objectives in regard to reduction of CEPI. SPL has completed all the 6 short term measures. Status of the long term measures are described as found hereunder

Long Term Measures by SPL

Action Point No.1

Under water act:

Present practice:

Under the present scheme, As per water balance 250 KLD of treated water is being recycled.

Proposed scheme:

A closed loop scheme for circulating 120 KLD of water is envisaged. This will be done for physical washing of product in our drying section. This will be installed with an investment of rupees 25 lakhs.

Status of the Project:

Details	Status	Remarks
Engineering	Completed	
Ordering & Purchase	Completed	
Erection & Commissioning a) Civil b) Mechanical & Piping	 Completed In progress	 Target date: 1st Oct-2011

Benefits of the project:

Present scheme involves taking of the entire water to ETP for treatment & reuse. After completion of treatment in ETP, this water is sent to a pond and pumped back to process for reuse.

Under the proposed scheme, since water is locally recirculated, there will be a reduction in load to ETP. Moreover, because of reduced handling, associated water losses will also reduce.

Summary:

Under the proposed scheme, total effluent load will reduce from 250 KLD to 120 KLD. This is almost 50% of the present volume.

Action Point No.2

Under Land act:

Present practice:

Original process generated 450 MT/Year of solid waste. This is essentially from tri calcium phosphate which is a suspending agent for our process.

Proposed scheme:

SPL has been actively pursuing process improvement related activities and has been continuously searching for technologies for reducing generation of hazardous wastes. With the improved process in places, it is expected that there will be a substantial reduction in sludge generated and total sludge quantity will reduce to approximately 15 MT/month.

Status of the Project:

Presently the project is under trial. Various sources of raw materials have been tried and the results are encouraging. Target completion by Oct'2011

Benefits of the project:

Besides bringing a big reduction in the generation of solid wastes, this project will also reduce TSS in the effluent.

Summary:

With the implementation of the project, the total solid waste generated will come to less than 40% of the original envisaged value.

A.12 Kothari Petrochemicals Limited

A.12.1INTRODUCTION

Kothari Petrochemicals Limited Manali, Chennai operate a state of art Petrochemical plant for production of Poly-isobutylene with an installed capacity of 22000 MTPA.

A.12.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt. KPL has initiated measures for continuous monitoring of Stack emission SO2 & SPM and will be completed by Nov 2011.

A.12.3 Benefits

Better control of Stack emission by continuous monitoring

A.13 & A.14 FUTURA POLYESTERS LTD.

(Fibre, Polymers& Preforms and ARM Divisions)

Futura Polyesters Ltd a PET manufacturing industry Produces Polyesters fibres, Resins, Preforms and
Flakes. We supply these Products within India and abroad.

A.13.1Particulars:

Name and address of the industry	FUTURA POLYESTERS LIMITED, No.1, Kamarajar Salai, Manali, Chennai 600068.
Type of unit	Red
Product (Tons per month)	Fibre - 3750 MT/Month Polymer & Preforms - 2800 MT/Month
Raw material (Tons / month)	Fibre – PTA (Dicarboxylic acids) - 3250 MT/Month MEG (Diols) - 2500 MT/Month Polymer & Preforms - PTA (Dicarboxylic acids) - 1350 MT/Month MEG (Diols) - 1000 MT/Month ARM Division - PET bottle Scrap - 3500 MT/Month

A.13.2 FUTURA POLYESTERS LTD CEPI ACTION PLAN

Sl.No	Action point	Critical pollutants	Target date	Budget	Status as on 10.08.2011	Benefits
1	Installation of On-line SPM analyser in Biomass Boiler stack and connecting with TNPCB.	SPM	September 2010	7.5 Lakhs	Completed	Continuous monitoring for flue gas emission there by maintaining and reducing the SPM level in the flue gas.
2	Installation of On-line CAAQMS and connecting with TNPCB in 3 months time	PM10, PM2.5, SO2, NOX	March 2011.	25 lakhs	CAAQMS received on July 2011 and the supplier need supply accesorries for commissioning. It is expected in 2 days time. Hence it will be commisioned and connected with TNPCB's Care Air Centre before Nov'11	Continuos monitoring of the ambient air quality inside the company premises and take appropriate steps to reduce if the values exceeds the norms.

Sl.No	Action point	Critical pollutants	Target date	Budget	Status as on 10.08.2011	Benefits
3	Providing accoustic sheds for all wood chippers to bring down noise level in two months time.	Noise	Nov-2010.	1 Lakh	Asbestos Shed was provided as a trail and founded yielding favourable result. Now as an improvement brick wall enclosure is being built – Work under progress and it will be completed by end of october 2011.	Ambient noise level will be maintained within the norms.
4	Carryout Energy audit to bring down the energy consumption (eg. Water and other utilities).	---	March 2011	1 lakh	Filter water is replaced with UF water in Siko & Erema plants for strands cooling, thereby reduced about 450 m3 of fresh water consumption. Energy audit conducted in ETP,Water Works and RO Plants and energy audit is under progress in utilities and Biomass plant.	Energy Coservation
5	To make sure all effluents goes only through seperate hume pipes to ETP to avoid land contamination.	PH,COD, BOD,TDS etc.	Sep-2010	1 Lakh	Completed. All effluents goes only through seperate hume pipes.	Avoiding Land Contamination.

Note: CEPI action plan of FUTURA POLYESTERS LTD includes action plan for all 3 divisions (Fibre ivision, Polymers& Preforms division and ARM Division).

A.15 & A.16 SRF Limited

A.15.1 INTRODUCTION

1. Name and Address of the Industry: **SRF Limited,**
Manali Industrial Area,
Manali,
Chennai – 600 068.

2. Industry Brief : SRF is a multi-business entity engaged in the manufacturing of chemical based industrial intermediates. Established in 1973, SRF has today grown into a global enterprise with operations in 4 countries. With head quarters in Gurgaon, India, the $450 million company has operations in three more countries, UAE, Thailand and South Africa. Apart from Technical Textiles Business, in which it enjoys a global leadership position, SRF is a domestic leader in Refrigerants, Engineering Plastics and Industrial Yarns as well. The company also enjoys a significant presence among the key domestic manufacturers of Polyester Films and Fluorospecialities.

3. Type of Unit : Red

4. Product : Nylon Yarn
Nylon Tire card Fabric and Dipped fabric

5. Raw Materials : Caprolactum
Nylon chips
Tire card fabric

A.15.2 Action plan for reduction of CEPI

In response to MoEF/CPCB's report on Comprehensive Environmental Pollution Index (CEPI) . Manali cluster had been declared as critically polluted area as the index is 76.34 > 70. TNPCB prepared an action plan for reducing the CEPI on industry-wise in coordination with respective industries .SRF has four action points.SRF has initiated many actions to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Action plan by SRF

Action Point No.1.1: To shift the MDC before bag filter in boiler

Under this the following measure has been initiated

In the Bio mass boiler The MDC assembly was shifted to before bag filter.

Present Practice: Bio mass boiler MDC is fixed in parallel with Bag filter

Proposed practice: The Biomass boiler MDC to be shifted to before the bag filter.

Benefits: Arresting glowing sparks and reduces the dust load to bag filter.

Status: Biomass boiler MDC to be shifted to before the bag

Project schedule completion- July -10. **Completed**

Summary of the action point1.1

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1.1	To shift the MDC before bag filter in boiler	July 2010	Bio mass boiler MDC is fixed in parallel with Bag filter	The biomass Boiler MDC to be shifted to before the bag filter.	Rs. 1.3 Lacs Completed	Arresting glowing sparks and reduces the dust load to bag filter.

Action point 1. 2: To extend the shed flooring, Ash yard Fabrication, Dumping Fly Ash In new Storage Yard.

Under this the following measure has been initiated

Extended the shed flooring, Ash yard Fabricated and dumping the fly ash in the new Storage Yard.

Present Practice: Husk is stored on the land, no storage shed yard and the fly ash dumped in the land.

Proposed practice: The husk storage flooring to be extended from 400 Sq.M to 700 Sq.M. Ash yard storage shed to be constructed and the fly ash to be stored inside Shed.

Benefits: Control the dust flying out and being controlled the SPM

Status: The husk storage RCC flooring extended from 400 Sq.M to 700 Sq.M. Ash yard storage shed constructed and the fly ash stored inside Shed.

Project schedule completion- July -10. **Completed**

Summary of the action point 1.2

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1.2	To extend the shed flooring, Ash yard Fabrication, Dumping Fly Ash In new Storage Yard	July -10	Husk is stored on the land, no storage shed yard and the fly ash dumped in the land.	The husk storage flooring to be extended from 400 Sq.M to 700 Sq.M. Ash yard storage shed to be constructed and the fly ash to be stored inside Shed.	Rs. 9.5 Lacs Completed	Control the dust flying out and being controlle the SPM

Action point 1.3: Dispose the ash from new ash storage yard, make the agreement with ash disposal vendor, Shed to cover the entire Husk Storage area

Under this the following measure has been initiated

Ash disposing to the new ash storage yard.

Shed to cover the entire hush storage

Present Practice : Ash accumulation in new ash storage area, the vendor is not take action to clear ash. Husk shed not covered fully

Proposed practice: Ash to be disposed from the new ash storage yard. The vendor to be cleared the dumped ash from the shed and the Husk shed to be covered

Benefits: Control the dust flying out and control the SPM

Status: 1) Ash is disposing from the new ash storage yard. – Completed

2) The vendor is clearing dumped ash from the shed - Completed

3) Husk shed covering work under progress

Project schedule completion- Oct -2011

Percentage progress made so far : It is budgeted in the year 2011-12

Summary of the action point 1.3

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
1.3	Dispose the ash from new ash storage yard, make the agreement with ash disposal vendor, Shed to cover the entire Husk Storage area	Original July -10 Revisited – Oct - 2011	Ash accumulation in new ash storage area, the vendor is not take action to clear ash. Husk shed not covered fully	1.Ash to be disposed from the new ash storage yard. 2.The vendor to be cleared the dumped ash from the shed and the 3. Husk shed to be covered.	Budget provision for covering the Husk storage Shed is Rs 22.0 Lacs It is budgeted in the year 2011-12	Control the dust fly ou and control the SPM

Action Point No 2.0: To provide on line stack monitoring of SPM in boiler and heater chimney

Under this the following measure has been initiated

Both stack Husk boiler and heater SPM online monitoring system provided and connected to TNPCB care air centre through internet.

Present Practice: Both stack (Husk boiler and heater) SPM online monitoring system not provided.

Proposed practice: Both stacks (Husk boiler and heater) SPM online monitoring system to be provided.

Benefits: To control the SPM

Status: Both stacks (Husk boiler and heater) SPM online monitoring system provided and connected to care air centre through intemet.

Project schedule completion- July -10. **Completed**

Summary of the action point 2.0

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
2	To provide on line stack monitoring of SPM in boiler and heater chimney	July -10	Both stack (Husk boiler and heater) SPM online monitoring system not provided.	Both stacks (Husk boiler and heater) SPM online monitoring system to be provided.	Rs 3. 0 Lacs Completed	control the SPM

Action Point No 3.0: To dispose cracker Residue and Latex.

Under this the following measure has been initiated

Cracker residue proposed to send to cement industries for co processing.

Latex residue is sending to TNWML. Gummidipoondi

Present Practice: we are storing cracker residue and Latex sludge under the closed shed

Proposed practice: Cracker residue proposed to be sent to cement industries

Latex residue is sending to TNWML. Gummidipoondi for disposal.

Benefits: Cracker residue sends for cement industries for co processing.

Latex residue is sending to TNWML. Gummidipoondi for disposal

Status: Co processing of Cracker Residue to cement industries is under progress

Project schedule completion- Oct 2011.

Percentage progress made so far : 75 %

Summary of the action point 3.0

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
3	To dispose cracker Residue and Latex.	July -2011 Revisited Oct -2011	storing cracker residue and Latex sludge under the closed shed	1.Cracker residue proposed to be sent to cement industries 2. Latex residue is sending to TNWML. Gummidipoondi for disposal.	Rs 50.0 Lacs	Co processing Disposal

Action Point No 4.0: Revamping of ETP sludge pit

Under this the following measure has been initiated

The sludge drying bed was cleared and made for further usage. In addition to that we are going to provide the Filter press.

Present Practice: We have four nos.of sludge drying bed to store the sludge in rainy season unable to store the sludge.

Proposed practice: Empty out the ETP sludge pit and Filter press to be installed in the ETP.

Benefits: Used in rainy and winter season and reduce the turbidity

Status: Sludge pit cleaning completed.

Filter press received and installation work is under progress.

Project schedule completion – Oct 2011.

Percentage progress made so far : 80 %

Summary of the action point 4.0

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/Budget provision	Benefits
4	Revamp ETP sludge pit	May -2011 Revisited – Oct 2011	We have four nos.of sludge drying bed to store the sludge in rainy season unable to store the sludge.	Empty out the ETP sludge pit and Filter press to be installed in the ETP.	Rs 5.0 Lacs Filter press erection under progress.90 % of work completed	Used in rainy and winter season and reduce the turbidity

A.17 INDIAN ADDITIVES LIMITED

A.17.1 Introduction:

Indian Additives Limited (IAL) is a joint venture of Chennai Petroleum Corpn. Ltd. (a group company of Indian Oil Corporation) & Chevron Oronite Company LLC. with 50:50 equity participation respectively. IAL is into the business of manufacturing & marketing lubricating oil additives and viscosity index improvers.

A.17.2 Action plan for reduction of CEPI:

In response to MoEF/CPCB's report on Comprehensive Environmental Pollution Index (CEPI). Manali cluster had been declared as critically polluted area as the index is 76.34 > 70. TNPCB prepared an action plan for reducing the CEPI on industry-wise in coordination with respective industries and IAL has nine short term and two long term action points. IAL has initiated several actions on both long term & short term measures to improve environmental impact so as to reduce CEPI.

The details of the proposed actions are given below:

Short Term Measures by IAL

Action Point No.1

Implementing dry cleaning methods in plant area:

The old method of cleaning the plant floor area is water washing and treating the washed water in effluent treatment plant. This method increases load to effluent treatment plant.

Now dry cleaning methods have been implemented in complete plant area i.e., all floors are cleaned with oil absorbing material like sawdust instead of washing down with water and this eliminates the effluent load to ETP.

Benefits

The benefit from this action item is reduction of pollutant load particularly oil & grease levels in the effluent to ETP.

Status:

Project Status: Completed.

Progress made so far: 100%

Summary of Action point No 1

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Implementing dry cleaning methods in plant area for minimizing oil & grease in effluent	Nov 2010	Cleaning plant floor area through water washing	Cleaning the plant area using oil absorption sheet.	Completed. Nil	Reduction in pollutants as given below: Oil & Grease : 65kgs/day

Action Point No.2

Installation and running of vacuum pump instead of ejectors:

In order to create vacuum in the reactors for processing, steam ejectors were used. Steam used for this purpose as motive energy will get condensed along with process vapors and the same will be sent to effluent treatment plant for treatment.

Now vacuum pumps (mechanical equipment) have been installed for creating vacuum in reactors instead of steam ejectors which in turn will reduce the effluent load as there won't be any steam condensation.

Benefits

The benefit from this action item is reduction of pollutant load particularly oil & grease levels in the effluent to ETP.

Status:

Project Status: Completed.

Progress made so far: 100%

Summary of Action point No 2

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Installation and running of vacuum pump instead of ejectors for minimizing high COD effluent generation from process	Sep 2010	Running of steam ejectors for vacuum pulling operation	Installation and running of vacuum pump instead of steam ejectors	Completed. Rs.50 lakhs	Reduction i pollutants a given below: COD : 130 kgs/day

Action Point No.3

Installation of additional oil skimmer in ETP:

IAL being a lubricating oil additive manufacturing plant, one of the key raw materials was lube oil and hence the trade effluent will have higher oil & grease levels which are skimmed using mechanical oil skimmer in ETP. In order to further improve the oil skimming efficiency, additional oil skimmer was planned for installation in ETP and this will reduce the oil & grease levels in the effluent further.

Benefits

The benefit from this action item is reduction of pollutant load particularly oil & grease levels in the effluent to ETP.

Status:

Material received at site and installation being started.

Project Scheduled completion : Oct 11

Progress made so far : 75%

Summary of Action point No 3

S.No	Action Point	Original Target/ Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Installation of additional oil skimmer in effluent treatment plant for minimizing the oil content in effluent	Apr 2011/ Oct 2011	Running of one oil skimmer to remove oil from the effluent	Installation of additional oil skimmer to remove the oil effectively.	Installation being carried out. Rs 5 lakhs	Reduction in pollutants as given below: Oil & Grease : 130 kgs/day

Action Point No.4

Installation of additional aspirator in ETP:

IAL has activated sludge aerobic process for treating its effluent which has 2 stage surface aeration systems. In order to improve the performance of ETP particularly towards reduction of BOD, additional diffused type aerators were planned and installed in the ETP aeration tanks.

Benefits

The benefit from this action item is reduction of pollutant load particularly BOD levels in the treated water into ETP.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 4:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Installation of additional aspirator in ETP for improving outlet water BOD.	Dec 2010	Running of surface aeration systems for minimizing BOD levels in effluent	Installation of additional aspirator for improving treated water BOD through diffused aeration	Completed Rs 6 lakhs	Reduction in pollutants as given below: BOD : 390 kgs/day

Action Point No.5

Provide online connectivity of H2S sensor & ambient VOC analyser to TNPCB:

IAL has installed continuous monitoring equipments for H2S in process stack and VOC in ambient and real data from the same has been hooked upto DCS for monitoring and control. Now IAL has hooked the output from these instruments to TNPCB server for 24/7 monitoring at CARE AIR CENTRE set up TNPCB.

Benefits

The benefit from this action item is that third party monitoring was made for effective control actions in case of any abnormalities.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 5:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Provide online connectivity of H2S sensor & ambient VOC analyzer to TNPCB	Aug 2010	Continuous monitoring of H2S & VOC values in DCS.	Providing online real time connectivity to TNPCB for monitoring & control	Completed Rs 10 lakhs	Continuous monitoring for effective and immediate corrective actions.

Action Point No.6

Install continuous ambient air quality monitoring station:

IAL monitors ambient air quality within its premises by collecting and analyzing samples from local volume samplers installed at 2 different locations of the plant. Readings of the same are shared to TNPCB at regular intervals. Now based on the directions from TNPCB, IAL has installed continuous ambient air quality monitoring station to track the quality of ambient on continuous basis and hook up the real time data to TNPCB CARE AIR CENTRE for monitoring at TNPCB office.

Benefits

The benefit of this action item is that ambient air quality within factory premises is monitored continuously instead of random samples for initiating appropriate corrective actions.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 6:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Install continuous ambient air quality monitoring system and provide online connectivity to TNPCB server	Aug 2010	Sampling through volume samplers and analysis at lab	Installing continuous ambient air quality monitoring system and provide online connectivity to TNPCB server	Completed Rs 80 lakhs	Continuous monitoring for effective and immediate corrective actions.

Action Point No.7

Provide analyzers for continuous SO2 & NOx monitoring in thermic fluid heater and boiler stack:

IAL has 2 stacks attached to its boilers and thermic fluid separately. Flue gas quality from these stacks is analyzed by collecting samples and carrying out analysis at laboratory at periodic intervals. Now based on the directions from TNPCB, IAL has installed continuous stack monitoring system in the stack attached to boilers for tracking pollutant levels like SO2 & NOx on continuous basis and hook up the real time data to TNPCB CARE AIR CENTRE for monitoring at TNPCB office.

Benefits

The benefit of this action item is that continuous stack monitoring is available for taking immediate corrective actions.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 7:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Install continuous stack monitoring system and provide online connectivity to TNPCB server	Apr 2011/ June 2011	Sampling through portable samplers and analysis at lab	Installing continuous stack monitoring system and provide online connectivity to TNPCB server	Completed Rs 20 lakhs	Continuous monitoring for effective and immediate corrective actions.

Action Point No.8

Installation of ground water monitoring piezometers **at specified depth within the factory area:**

IAL has not using ground water for any purpose and all its water requirement is being met from Chennai Metro Water Corporation. Now based on the directions from TNPCB, IAL has installed test bore wells at 4 different locations inside factory premises for monitoring ground water quality at periodic intervals.

Benefits

The benefit from this action item is periodic monitoring of ground water quality and take corrective actions if there is a need.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 8:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Installation of ground water monitoring bore wells at specified depth within the factory area	Jan 2011	No monitoring bore wells available within factory premises	Installing monitoring bore wells and collecting samples once in 3 months analyzing all the parameters as per TNPCB standard	Completed Rs 1 lakhs	Understanding the ground water quality and taking corrective actions.

Action Point No.9

Increase covered hazardous waste storage space area within the factory:

IAL has covered hazardous waste storage shed of 150 sq.m area for storing various hazardous wastes. There are some wastes for which authorization is available only for collection and storage. IAL has already applied with TNPCB for getting authorization for disposing theses wastes at Common hazardous wastes treatment and disposal facility at Gummidipoondi. Meanwhile IAL has planned to increase its hazardous wastes storage space by another 150 sq.m.

Benefits

The benefit from this action item is to have sufficient storage space for hazardous wastes storage.

Status:

Project Status : Completed

Progress made so far : 100%

Summary of Action point No 9:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Increase covered hazardous waste storage space area within the factory	Dec 2010	Hazardous wastes are stored in similar covered storage shed	Hazardous wastes generated from plant are stored in covered shed.	Rs 10 lakhs	To have additional space for hazardous wastes storage in case of delays in disposal.

Long Term Measures by IAL

Action Point No.1

Installation of reverse osmosis cum evaporation system for treating effluent water and reusing it process:

IAL has well established effluent treatment plant for treating combined effluent of capacity 147 KL/day and the treated effluent from ETP is presently being used mainly for greenery development within plant premises apart from small usage for process requirements. In order to conserve water, it has been planned to treat the treated effluent in reverse osmosis system and maximize the reuse requirements for process needs. The reject from the reverse osmosis system will be concentrated in evaporators and disposed of.

Benefits

The benefit from this action item will be water conservation and maximizing the reuse of treated effluent for process purpose.

Status:

All materials received at site and civil work under progress.

Project Scheduled completion: Oct 11

Progress made so far : 50%

Summary of Action point No 1:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Installation of reverse osmosis cum evaporation system for treating effluent water and reusing it for process	Oct 2011	Treated effluent is used for greenery development and small process needs	Treated effluent is treated in reverse osmosis plant and reused for process requirements	Under progress Rs 150 lakhs	Maximizing the reuse of treated effluent for process requirements.

Action Point No.2

Additional greenery development in and around factory:

IAL has allotted considerable area for greenery development and has planted various saplings in that area. As a continual environmental improvement item, IAL has planned to enhance the greenery development inside its factory premises in phases.

Benefits

The benefit from the project is infra structure development.

Status:

First phase of greenery development completed.

Project Scheduled completion : Oct 11

Progress made so far : 50%

Summary of Action point No 2:

S.No	Action Point	Original Target/Revised	Present practice	Proposed practice	Present status of project/ Budget provision	Benefits
1	Additional greenery development in and around factory	Oct 2011	Greenery development at regular intervals	Additional greenery development in and around factory in phased manner	Rs 2 lakhs	Environmental improvement initiative.

A.18 Cetex Petrochemicals Limited

A.18.1INTRODUCTION

Cetex Petrochemicals Limited Manali, Chennai operate a state of art, Zero discharge, e Petrochemical plant for production of the following petrochemicals and solvents

- Secondary Butyl Alcohol
- Methyl Ethyl Ketone

A.18.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt. Cetex Petrochemicals has initiated & completed measures for continuous monitoring of Stack emission SO2 & SPM as well as VOC.

A.18.3 Benefits

Better control of emissions like SO2, SPM & VOC by continuous monitoring

A.19 Petro Araldite Limited

A.19.1INTRODUCTION

Petro Araldite limited Manali, Chennai operate a state of art Petrochemical plant for production of adhesives and the entire treated effluent is supplied to TPL, Zero discharge,

A.19.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI). In that, Manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt. Petro Araldite has initiated measures for continuous monitoring VOC emission at a cost of Rs 5.0 lakhs and completed the project.

The unit has also completed the erection of powder transport system using Nitrogen as gas media to reduce emission of particulate matter

The unit has obtained authorization for disposal of used Filter & filter material in cement kilns for co processing.

A.19.3 Benefits

- Better control of VOC emissions by continuous monitoring
- Reduction of SPM by powder transportation system
- Reduction of Hazardous waste by Co-processing in cement kiln

A.20 Natco Organics Limited

A.20.1INTRODUCTION

Natco Organics limited Manali, Chennai operate a state of art Petrochemical plant for production of various Organic chemicals including bulk drugs.

A.20.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, Manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of Manali belt in co-ordination with the respective industries in the belt. Natco Organics limited has initiated measures for continuous monitoring of Stack emission SO2 & SPM and VOC at a cost of Rs 12.0 Lakhs and completed the project.

A.20.3 Benefits

Better control of SO2, SPM 7 VOC emission by continuous monitoring

A.21 Eveready Industries Limited

A.21.1INTRODUCTION

Eveready Industries Limited Manali, Chennai operate their plant for production of battery components (zinc carbon dry cells)

A.21.2 Action plan for reduction of CEPI

MoEF/CPCB has published Comprehensive Environmental Pollution Index (CEPI) . In that, manali has been categorized as critically polluted and the score is 76.34. Accordingly, TNPCB has prepared an action plan for reducing the over all CEPI of manali belt in co-ordination with the respective industries in the belt. Eveready Industries has initiated measures for handling of zinc ash in a closed system for reduction of SPM

A.21.3 Benefits

Reduction of SPM

A.22 Madras Fluorine Private limited

The capacity of plant is only 3 MT/day and as such it is very small to have any impact on environment

The plant produces various inorganic fluorine chemicals and operates on Zero discharge basis.
Emissions from the plant is made minimal by operating scrubber

Hence no action plan has been envisaged

A.23 IOT infrastructure & energy Services

IOT is being operated on behalf of CPCL and the principle activity is only receiving, storing and dispatching LPG in bulk quantities in tanker trucks and also by bottling in cylinders. The entire operation is being carried out in a closed circuit system under pressure and there is no process emitting pollutants into atmosphere. Gas detectors have been installed on strategic points all over operational area to detect the presence of gas concentration in case of LPG vapor emission

There is No effluent generation since there is no manufacturing activity and water is being used for only domestic purpose.

Two nos of DG sets (500KVA & 180KVA) for back up power and these have been provided with stack height of 8.8Mtr. These DG sets will be operated whenever there was power failure. However ambient air & stack monitoring is being carried out by TNPCB lab once in a year.

Good housekeeping is being maintained and the open area is planted with trees and saplings.

Hence no action plan has been envisaged

Manali Industries Association

Environmental Monitoring committee of Manali Indusrial Belt

Minutes Of Meeting

Venue: CPCL Materials Conference hall **Date & Time:** 09.08.2011, 15.00 Hrs

Present:

Sri R.Kannan, Executive Director , CETEX Petrochemical Ltd- **Coordinator**
Sri K.Pattabi , GM, Operations (ECH&HCD) Tamil Nadu Petro –Products Limited - Member
Sri G.Balasubramanian GM (Works) ,Manali Petrochemicals limited. – Member
Sri.K Duraisamy DGM (Environment Protection & Safety), CPCL - Member
Sri Venkatakrishnan , Head of Environment ,Madras Fertilizers Limited -Member
Sri.M.Natarajan Chief Manager, EP&S CPCL

- MIA has constituted "Environmental Monitoring committee of Manali Industrial Belt " consists of above members based on the action point recommended by CPCB/TNPCB Steering committee for monitoring the CEPI Improvement action plan.
- DGM (EP&S), CPCL welcomed the members and briefed about the activities & the progress made so far for improving the CEPI by the industries and TNPCB.
- The committee deliberated the role and modalities of the contributions were discussed at length.
- The following issues & actions were discussed

1. **Dumping of Hazardous & Non Hazardous waste along the roads& common area:**
   - Nearby Industries are asked to be vigil for possible identification & prevention.
   - Caution boards to be displayed at strategic locations by MIA.
   - Assistance from local authorities & TNPCB will be sought.

2. **Common area canals thru which storm water being let out by the industries during monsoon cleaning:** Respective industries have to take-up the job immediately. Funding may be sought from MIA based on the merits. Some of the identified canals are as given below. Similarly industries are asked to identify and take up the jobs.
   -Canal in south of TVT- Ponneri highway near Kothari, Cetex & CPCL.
   -Canal in front of TPL
   -Canal In front of MFL.

3. All Industries shall plan & plant sapling for improving green belt outside the premises, near the compound wall.
4. The progress of implementation of action plan for CEPI reduction will be monitored by the committee once in a month and industries will be asked to meet the schedule if any shortfall.
5. MIA may put efforts to enroll the industries to become members for those who do not presently members in Manali belt.
6. AAQM data will also be reviewed by the committee once in a month
7. The trucks are parked near CPCL & Balmer lawire. There is no public convenience for drivers and cleaners.MIA to arrange for construction of toilet facilities and also arrange for maintenance through NGO, similar to IOCL lube blending plant.

- The committee is scheduled to meet once in a month on every first Tuesday 1500hrs and the venue will be on rotation basis.
  The next meeting is scheduled on 6th Sept-11, 1500 hrs at CPCL, Materials Conference Hall.

The meeting concluded with a word of thanks to all participants

Annexure C

CPCB DATA

CPCB	***Sampling and Analysis of Ambient Air Quality and Water Quality In selected Industrial/Clusters Areas***
	MANALI - TAMIL NADU

SAMPLING LOCATIONS WITH GPS COORDINATES

I. AAQ LOCATIONS

Location ID	Name of the Location	Date of Sampling	Longitude	Latitude
AAQ-1	SRF Polymers Ltd	2011-02-12	13° 10' 26.7"	80° 15' 35.2"
AAQ-2	NATCO Organics Ltd	2011-02-13	13° 11' 13.5"	80° 15' 57.8"
AAQ-3	Chennai Petroleum Corporation Ltd (CPCL)	2011-02-14	13° 08' 54.7"	80° 16' 34.0"
AAQ-4	Indian Additives Ltd	2011-02-16	13° 10' 16.0"	80° 17' 00.8"

II. GROUND WATER

Location ID	Name of the Location	Date of Sampling	Longitude	Latitude
GW-1	Chinna Mathur	2011-02-14	13° 10' 19.7"	80° 15' 18.1"
GW-2	Chinna Chekadu	2011-02-14	13° 09' 37.4"	80° 15' 41.4"
GW-3	Rajathotam, Manali Town	2011-02-14	13° 10' 10.1"	80° 15' 34.0"
GW-4	Manali Town	2011-02-14	13° 09' 52.0"	80° 15' 46.4"

III. SURFACE WATER

Location ID	Name of the Location	Date of Sampling	Longitude	Latitude
SW-1	Bankingham Canal, U/S	2011-02-16	13° 08' 35.0"	80° 16' 30.2"
SW-2	Bankingham Canal, D/S	2011-02-16	13° 10' 31.1"	80° 17' 27.7"
SW-3	Amullavail Canal, D/S	2011-02-14	13° 10' 49.0"	80° 16' 11.7"
SW-4	Amullavail Canal, U/S	2011-02-14	13° 10' 46.9"	80° 15' 22.8"

AMBIENT AIR QUALITY MONITORING ANALYSIS RESULTS

City : Manali, Tamil Nadu
Scientist : Mr. Siva Rama Krishna & Mr. Sudarshan
State : Tamil Nadu

Sr. No	Category	Air Pollutant	Monitoring Values				Method of Analysis
			Sample 1 (AAQ-1)	Sample 2 (AAQ-2)	Sample 3 (AAQ-3)	Sample 4 (AAQ-4)	
1	C	Lead	0.098	0.13	0.192	0.104	ASTM D 4185-90/USEPA Method-IO 3.4
2	C	Benzene	7.8	7.2	6.9	5.2	USEPA Method TO-17/ 8260
3	C	Benzo(O) Pyrene	0.36	0.80	0.56	0.38	USEPA Method TO-9A/ 8270
4	C	Arsenic	4.6	5.2	5.2	3.6	ASTM D 4185-90/USEPA Method-IO 3.4
5	B	PM_{10}	82.4	96.8	98.2	81.2	SOP 09/10
6		$PM_{2.5}$	32.8	36.9	32.4	24.9	Internal SOP & CPCB Guidelines
7	B	Ammonia	62.4	106.4	82.4	68.4	APHA 401
8	B	Nickel	12.6	14.2	18.9	12.6	ASTM D 4185-90/USEPA Method-IO 3.4
9	A	SO_2	92.4	24.8	13.6	12.4	IS:5182 (PART -2) - 2001
10	A	NO_2	80.2	42.4	40.2	24.8	ASTM Method D 1607
11	C	CO	602.4	582.6	612.4	646.2	IS: 5182 P-X
			684.9	712.9	736.8	789.6	
			612.8	636.4	588.6	602.8	
12	C	O_3	4.1	4.3	4.4	4.9	IS:5182 (Part-IX)
			9.2	7.1	6.2	6.7	
			3.0	2.9	2.9	3.2	

All values are in $\mu g/m^3$ except BAP, Nickel & Arsenic
BAP, Nickel & Arsenic values are in ng/m^3
A- Pollutants with no acute or systemic carcinogenicity
B- Probable Carcinogens
C- Known carcinogen

GROUND WATER QUALITY

S. No	Category	Test Parameter (S)	UOM	Method of Analysis	GW-1	GW-2	GW-3	GW-4
01	A	pH	-	SM 4500-H+B	7.3	6.8	6.8	7.0
02	A	Conductivity	µS/cm	SM 2510-B	3300	1547	1991	1962
03	A	Suspended Solids	mg/l	SM 2540-D	04	08	05	15
04	C	Oil and Grease	mg/l	SM 5220 B	<1.0	<1.0	<1.0	<1.0
05	B	Total Residual Chlorine	mg/l	IS: 3025 (Part-26)19B6	<1.0	<1.0	<1.0	<1.0
06	A	Ammonical Nitrogen	mg/l	SM 4500-NH3 B	<1.0	<1.0	<1.0	<1.0
07	A	Total Kjeldahl Nitrogen	mg/l	SM 4500- Norg B	<1.0	<1.0	<1.0	<1.0
08	A	Free ammonia as NH3	mg/l	SM 4500-NH3 F	<0.1	<0.1	<0.1	<0.1
09		Dissolved Oxygen	mg/l	SM 4500-O C	-	-	-	-
10	B	Biochemical Oxygen Demand	mg/l	IS : 3025 (Part-44)	12	<3	<3	<3
11	B	Chemical Oxygen Demand	mg/l	SM 5220 B	80	<5	<5	<5
12	C	Arsenic	mg/l	SM 3500-As	<0.01	<0.01	<0.01	<0.01
13	C	Mercury as Hg	mg/l	SM 3112	<0.001	0.001	<0.001	0.001
14	C	Lead as Pb	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
15	C	Cadmium as Cd	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
16	C	Chromium as Cr^{+6}	mg/l	SM 3500-Cr B	<0.05	<0.05	<0.05	<0.05
17	C	Total Chromium as Cr	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
18	A	Copper as Cu	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
19	A	Zinc as Zn	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
20	B	Selenium as Se	mg/l	SM 3114	<0.01	<0.01	<0.01	<0.01
21	B	Nickel as Ni	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
22	C	Cyanide as CN	mg/l	SM 4500-CN- B & E	<0.02	<0.02	<0.02	<0.02
23	B	Fluoride as F	mg/l	SM 4500 F-D	0.4	0.3	0.3	0.3
24	A	Dissolved Phosphates as P	mg/l	SM 4500 P D	0.4	0.18	0.59	0.13
25	B	Sulphide as S	mg/l	SM 4500 S D	<0.2	<0.2	<0.2	<0.2
26	C	Phenolic Compounds as C_6H_5OH	mg/l	SM 5330 B/C	<0.001	<0.001	<0.001	<0.001
27	A	Manganese as Mn	mg/l	USEPA 200.8	0.04	<0.01	0.13	<0.01
28	A	Iron as Fe	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
29	B	Vanadium as V	mg/l	USEPA 200.8	<0.01	0.02	<0.01	<0.01
30	A	Total Nitrogen (Nitrate + Nitrite) as N	mg/l	SM 4500-NO_3 & NO_2	25.41	16.45	33	12.12
31	A	Sodium absorption Ratio	mg/l	-	8.68	1.73	3.01	3.12
32	B	Boron	mg/l	USEPA 200.8	<0.01	0.02	0.03	0.03
33	B	Total Coliforms	MPN/ 100ml	SM 9221	8	<2	6	5
34	B	Fecal Coliform	MPN/ 100ml	SM 9221 E	<2	<2	<2	<2
35	B	Surface Active Agents	mg/L	SM 4500 C	<0.1	<0.1	<0.1	<0.1
36	A	Total Phosphorus	mg/L	SM 4500 P	0.59	0.32	0.69	0.28
37	C	Polynuclear Aromatic Hydrocarbans	mg/L	SOP 15/31 A	ND	ND	ND	ND
38	C	Polychlorinated Biphenyls	mg/L	SOP 15/31 A	ND	ND	ND	ND
39	C	Polychlorinated terphenyls	mg/L	SOP 15/31 A	ND	ND	ND	ND
40	C	Organo-Chlorine Pesticides	mg/L	SOP 15/31 A	ND	ND	ND	ND

SURFACE WATER QUALITY

S. No	Category	Test Parameter (S)	UOM	Method of Analysis	SW1	SW2	SW3	SW4
01	A	pH	-	SM 4500-H+B	7.4	7.5	6.6	7.3
02	A	Conductivity	µS/cm	SM 2510-B	1395	2140	1482	767
03	A	Suspended Solids	mg/l	SM 2540-D	25	40	45	22
04	C	Oil and Grease	mg/l	SM 5220 B	07	11	06	03
05	B	Total Residual Chlorine	mg/l	IS: 3025 (Part-26)1986	1.2	0.6	0.4	<0.2
06	A	Ammonical Nitrogen	mg/l	SM 4500-NH3 B	1.6	3.9	<1.0	<1.0
07	A	Total Kjeidahl Nitrogen	mg/l	SM 4500- Norg B	1.2	2.4	<1.0	<1.0
08	A	Free ammonia as NH3	mg/l	SM 4500-NH3 F	<0.1	<0.1	<0.1	<0.1
09		Dissolved Oxygen	mg/l	SM 4500-O C	<1.0	<1.0	1.6	3.6
10	B	Biochemical Oxygen Demand	mg/l	IS : 3025 (Part-44)	22	36	11	04
11	B	Chemical Oxygen Demand	mg/l	SM 5220 B	85	140	60	35
12	C	Arsenic	mg/l	SM 3500-As	<0.01	<0.01	<0.01	<0.01
13	C	Mercury as Hg	mg/l	SM 3112	<0.001	<0.001	<0.001	<0.001
14	C	Lead as Pb	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
15	C	Cadmium as Cd	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
16	C	Chromium as Cr^{+6}	mg/l	SM 3500-Cr B	<0.05	<0.05	<0.05	<0.05
17	C	Total Chromium as Cr	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
18	A	Copper as Cu	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
19	A	Zinc as Zn	mg/l	USEPA 200.8	<0.01	<0.01	0.76	<0.01
20	B	Selenium as Se	mg/l	SM 3114	<0.01	<0.01	<0.01	<0.01
21	8	Nickel as Ni	mg/l	USEPA 200.8	<0.01	<0.01	<0.01	<0.01
22	C	Cyanide as CN	mg/l	SM 4500-CN- B & E	<0.02	<0.02	<0.02	<0.02
23	B	Fluoride as F	mg/l	SM 4500 F-D	0.7	0.8	0.5	0.4
24	A	Dissolved Phosphates as P	mg/l	SM 4500 P D	0.24	0.3	0.66	0.27
25	B	Sulphide as S	mg/l	SM 4500 S D	<0.1	<0.1	<0.1	<0.1
26	C	Phenolic Compounds as C6H5OH	mg/l	SM 5330 B/C	<0.001	<0.001	<0.001	<0.001
27	A	Manganese as Mn	mg/l	USEPA 200.8	0.11	0.14	0.55	<0.01
28	A	Iron as Fe	mg/l	USEPA 200.8	0.02	0.03	<0.01	<0.01
29	B	Vanadium as V	mg/l	USEPA 200.8	<0.01	0.02	0.01	<0.01
30	A	Total Nitrogen as N	mg/l	SM 4500-NO_3 & NO_2	1.74	1.64	3.42	0.03
31	A	Sodium absorption Ratio	mg/l	-	2.35	3.20	2.97	2.31
32	B	Boron	mg/l	USEPA 200.8	0.11	0.23	0.09	0.05
33	B	Total Coliforms	MPN/ 100ml	SM 9221	14	8	16	<2
34	B	Fecal Coliform	MPN/ 100ml	SM 9221 E	<2	<2	<2	<2
35	B	Surface Active Agents	mg/L	SM 4500 C	<0.1	<0.1	<0.1	<0.1
36	A	Total Phosphorus	mg/L	SM 4500 P	0.34	0.38	0.72	0.41
37	C	Polynuclear Aromatic Hydrocarbans	mg/L	SOP 15/31 A	ND	ND	ND	ND
38	C	Polychlorinated Biphenyls	mg/L	SOP 15/31 A	ND	ND	ND	ND
39	C	Polychlorinated terphenyls	mg/L	SOP 15/31 A	ND	ND	ND	ND
40	C	Organo-Chlorine Pesticides	mg/L	SOP 15/31 A	ND	ND	ND	ND

Note:

A- Pollutants with no acute or systemic carcinogenicity
B- Probable Carcinogens
C- Known carcinogen

Annexure C

cpcb	***Sampling and Analysis of Ambient Air Quality and Water Quality in selected Industrial/Clusters Areas***
	MANALI - TAMIL NADU

PRESERVATIVES & CONTAINERS USED FOR WATER SAMPLING –CPCB PROJECT

Sr. No.	*Test Parameter*	*Preservatives*	*Container*
1	pH, TSS, O &G, EC, Nitrate and Nitrite, Free Ammonia, Total Residual Chlorine, Fluoride, Sulphide, Dissolved Phosphate, Dissolved Oxygen, BOD.	Refrigerate	Plastic or Glass container
2	Total Phosphorus, TKN, Ammonical Nitrogen, Phenol, Surface Active Agents, COD, Oil & Grease	Add H_2SO_4 to get pH<2	Plastic or Glass container
3	Organo-Chlorine pesticides, PAH, PCB & PCT	Refrigerate at 4 degrees	Glass Container
4	Zinc, Nickel, Copper, Chromium, Arsenic, Lead, Cadmium, Mercury, Hexavalent chromium, Manganese, Iron, Vanadium, Selenium & Boron	Add. Nitric Acid to get pH<2	Plastic or Glass
5	Cyanide, Sulfide	Add NaOH to pH>12	Plastic or Glass
6	Total Coliform, Fecal Coliform	Refrigerate	Plastic or Glass container

Method of Sampling: As per APHA 21st Edition