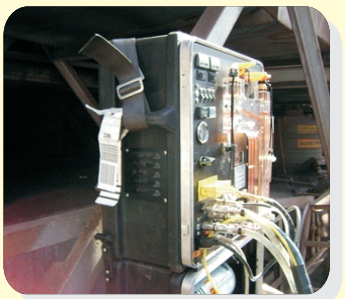
Annual Report 2009-10



Central Pollution Control Board,
Ministry of Environment & Forests
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CENTRAL POLLUTION CONTROL BOARD

APEX STATUTORY ORGANISATION FOR POLLUTION PREVENTION & CONTROL

IN PURSUIT OF CLEAN ENVIRONMENT

INDIA

India has experienced multi-sectoral growth, at a geometrical progression rate, in manufacturing, transport, infrastructure, etc; in post-independence era. Therefore, the need for curbing an ever-increasing pollution due to change in the life style, is being seriously felt.

Central Pollution Control Board (CPCB) was established under statutory provisions of Water (Prevention and Control of Pollution) Act, 1974 with the main objective of maintaining the wholesomeness of water (surface and ground water) in India. The purview of the Board was widened further by provisions of other Acts and Rules there under, so as to cover compliance of other environmental components.

FUNCTIONS OF CENTRAL BOARD:

Besides main function of maintaining the wholesomeness of the water and improve air quality in India. The following are the other important supportive functions:

- Advise Central Government on prevention and control of environmental pollution;
- Coordinate activities of State Boards;
- Provide technical assistance and guidance to the State Boards;
- Organize training on pollution prevention & control;
- Organize Mass Awareness programs on pollution prevention & control;
- Perform as a State Board, as & when directed by Central Government;
- Collect, compile & publish technical & statistical data and also, prepare manuals, codes or guides related to prevention & control of environmental pollution;
- Lay down, modify and annul standards for quality of air & water;
- Execute nation-wide program on prevention & control of environmental pollution;
- Perform such other functions as may be prescribed by Government of India ;

The Board may establish or recognize laboratories to perform its functions.

CONTRIBUTION OF CPCB :

1. **Development of Standards:**
- For Industrial effluent discharge: **43** Nos.
- For Industrial emission release: **49** Nos.

2. **Preparation of Guidance Documents:**
- CPCB publications : >**500** Nos.
- Guidelines on Waste Management: **32** Nos.
- Manuals on Laboratory Management: **18** Nos.

3. **Training programs in last 5 years: 200** Nos.

4. **National Ambient Monitoring Network:**

- Air quality Monitoring Stations: **386** Nos. (including 40 continuous AAQM Stations)
- Water Quality Monitoring Stations: **1429** Nos.

5. **Environmental surveillance of selected industries:** Approx. **300** Nos. per annum

6. **Compliance monitoring efforts led to Setting up of Common Environmental Infrastructure:**

- Effluent Treatment Plants: **131** Nos. (Total 750 MLD Treatment capacity)
- Waste Management Facilities for Hazardous Wastes: **34** Nos.
- Bio-Medical Waste Management Facilities: **170** Nos.

7. **Patents obtained on R&D : 13** Nos.

WAYFORWARD FOR IMPROVED POLLUTION PREVENTION & CONTROL:

1. Escalated deployment of on-line monitoring systems enabling better environmental compliance by self-regulation at pollution sources.

2. Creation of a centralized data base on Process Technologies in use vis-à-vis Cleaner Technologies available globally.

3. Application of GIS based Environmental Impact Assessment of the Project under planning to improve the environmental decision-making process.

4. Promotion of common Environmental Infrastructural facilities for comprehensive waste management with various recycling options.

ANNUAL REPORT 2009-10

Central Pollution Control Board

Ministry of Environment & Forests

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Prepared & Published by PR Division, Central Pollution Control Board on behalf of Sh. J.S. Kamyotra, Member Secretary, CPCB

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CHAPTER I

INTRODUCTION

Under the provisions of The Water (Prevention & Control of Pollution) Act, 1974, the Central Government constituted the **'Central Board for the Prevention and Control of Water Pollution'** on September 23, 1974. The Central Board and the State Pollution Control Boards have been entrusted with the added responsibilities of Air Pollution Control since May, 1981 under the provisions of the Air (Prevention and Control of Pollution) Act, 1981. The name of the Central Board was amended to **Central Pollution Control Board (CPCB)** under the Water (Prevention & Control of Pollution) Amendment Act, 1988 (No. 53 of 1988). The enactment of the Environment (Protection) Act, 1986, which is an umbrella legislation for enforcement of measures for protection of environment and several notifications of Rules under the Act widened the scope of activities of the Central Board.

The main functions of CPCB, as spelt out in The Water (Prevention and Control of Pollution) Act, 1974, and The Air (Prevention and Control of Pollution) Act, 1981, are:

(i) To promote cleanliness of streams and wells in different areas of the States through prevention, control and abatement of water pollution; and,

(ii) To improve the quality of air and to prevent, control or abate air pollution in the country.

The Central Pollution Control Board has been continuously playing a key role in abatement and control of pollution in the country by generating, compiling and collating data, providing scientific information, rendering technical inputs for formation of national policies and programmes, training and development of manpower and through activities for promoting awareness at different levels of the Government and Public at large. The Central Pollution Control Board is a continuously growing organization with consistent output and continuous improvements in its infrastructure facilities, human resource development and development of expertise to meet the challenges of unending task of environment protection in the country

1.1 FUNCTIONS OF THE CENTRAL BOARD

In addition to the main functions of promoting cleanliness of streams and wells, improving the quality of air and to prevent, control or abate air pollution, CPCB has been assigned following National Level functions:

- Advise the Central Government on any matter concerning prevention and control of water and air pollution and improvement of the quality of air;

- Plan and cause to be executed a nation-wide programme for the prevention, control or abatement of water and air pollution;
- Co-ordinate the activities of the State Boards and resolve disputes among them;
- Provide technical assistance and guidance to the State Boards, carry out and sponsor investigations and research relating to problems of water and air pollution, and for their prevention, control or abatement;
- Plan and organise training of persons engaged in programmes for prevention, control or abatement of water and air pollution;
- Organise through mass media, a comprehensive mass awareness programme on prevention, control or abatement of water and air pollution;
- Collect, compile and publish technical and statistical data relating to water and air pollution and the measures devised for their effective prevention, control or abatement;
- Prepare manuals, codes and guidelines relating to treatment and disposal of sewage and trade effluents as well as for stack gas cleaning devices, stacks and ducts;
- Disseminate information in respect of matters relating to water and air pollution and their prevention and control;
- Lay down, modify or annul, in consultation with the State Governments concerned, the standards for stream or well, and lay down standards for the quality of air;
- Establish or recognize laboratories to enable the Board to perform, and;
- Perform such other functions as and when prescribed by the Government of India.

1.2 FUNCTIONS OF THE CENTRAL BOARD AS STATE BOARD FOR THE UNION TERRITORIES

- Advise the Governments of Union Territories with respect to the suitability of any premises or location for carrying on any industry which is likely to pollute a stream or well or cause air pollution;
- Lay down standards for treatment of sewage and trade effluents and for emissions from automobiles, industrial plants, and any other polluting source;
- Evolve efficient methods for disposal of sewage and trade effluents on land;
- Develop reliable and economically viable methods for treatment of sewage, trade effluents and air pollution control equipment;
- Identify any area or areas within Union Territories as air pollution control area or areas to be notified under The Air (Prevention and Control of Pollution) Act, 1981; and

- Assess the quality of ambient air and water, and inspect wastewater treatment installations, air pollution control equipment, industrial plants or manufacturing processes to evaluate their performance and to take steps for the prevention, control and abatement of air and water pollution.

1.3 DELEGATION OF POWERS BY CENTRAL POLLUTION CONTROL BOARD

As per the policy decision of the Government of India, the Central Pollution Control Board, delegated its powers and functions from time to time under Section 4, Sub Section 4 of The Water (Prevention and Control of Pollution) Act, 1974 and Section 6 of The Air (Prevention and Control of Pollution) Act, 1981 with respect to Union Territories to respective Pollution Control Committees under the administrative control of local Administration (Annexure-I).

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CHAPTER II

CONSTITUTION OF THE CENTRAL BOARD

2.1 According to the provisions of The Water (Prevention & Control of Pollution) Act, 1974, the Central Board consists of the following members:

- a full-time Chairman, being a person having special knowledge or practical experience in respect of matters relating to environmental protection or a person having knowledge and experience in administering institutions dealing with the matters aforesaid, to be nominated by the Central Government;
- such number of officials, not exceeding five, to be nominated by the Central Government to represent Government;
- such number of persons, not exceeding five, to be nominated by the Central Government, from amongst the members of the State Boards, of whom not exceeding two shall be from amongst the members of the local authorities;
- such number of non-officials, not exceeding three to be nominated by the Central Government, to represent the interest of agriculture, fishery or industry or trade or any other interest which, in the opinion of the Central Government, ought to be represented;
- two persons to represent the companies or corporations owned, controlled or managed by the Central Government, to be nominated by the Government; and
- a full-time Member Secretary, possessing qualifications, knowledge and experience of scientific, engineering or management aspects of pollution control, to be appointed by the Central Government.

2.2 List of Board Members during year 2009-2010 is provided at Annexure-II. The organisation structure of the Central Pollution Control Board is provided at Annexure-III. Staff strength as on March 31, 2010 is furnished in Annexure-IV & V.

***

CHAPTER III

MEETINGS OF CENTRAL POLLUTION CONTROL BOARD

3.1 MEETINGS OF THE CENTRAL BOARD

During the reporting period (i.e. April 01, 2009 to March 31, 2010), four meetings of the Central Board were held as under :

S.No.	Meeting No.	Date	Place
1.	151st	June 12, 2009	Delhi
2.	152nd	August 20, 2009	Delhi
3.	153rd	December 19, 2009	Delhi
4.	154th	March 03, 2010	Delhi

3.2 MAJOR DECISIONS TAKEN BY THE BOARD

- Audited accounts approved for the year 2008-2009 for placing it to both the Houses of Parliament;
- Effluent standards for Soda Ash manufacturing;
- Standards and Guidelines for Incinerator of Organic Chemical Manufacturing Industry;
- Standards and Guidelines for Incinerator of Dye and Dye Intermediate Sector;
- Acceptance of recommendations of Expert Committee constituted by CPCB under the Chairmanship of Prof. J.M. Dave for phasing out of cyanide usage in electroplating industry;
- Approved Telecasting of the "Paryavaran Darshan' programme on Doordarshan Channel;
- Approved the educational qualification for the post of Data Processing Assistant (DPA) and procedure for regularization of services of DPA;
- Creation of 11 posts of Field Attendants;
- Environmental Standards for Wheat Processing / Flour Mills, Pulse Making / Grinding Mills, Rice Mills and Dry Rice Grinding Mills;
- Policy on Co-incineration of Plastics waste in Cement Kilns;
- Procurement of one Ambient Air Quality Monitoring system based on DOAS from M/s. OPSIS, Sweden;
- Applicability of notified standards for Pesticide industry under the Environment (Protection) rule, 1986 - Removal of standards at S.No. 71 & 101 with the proposed modification at S.No. 40 and sending it to MoEF for consideration under Environment (Protection) Rule, 1986;
- Recruitment Rules for Flexible Complementing Scheme (FCS) and forwarding them to Government of India;
- Implementation of Central Services (Medical Attendance) Rules 1944;

- Proposal for Delegation of Powers (Administrative & Financial);
- Adopting the Modified Assured Career Progression Scheme also in respect of the Central Pollution Control Board employees;
- Annual Action Plan for CPCB for the Year 2010 – 2011.
- Renewal of recognition granted to the environmental laboratory of Punjab Pollution Control Board at Patiala; recognition to the Regional Laboratory of Maharashtra Pollution Control Board, Pune and the analysts and granted Renewal of recognition of Zonal Laboratory, Central Pollution Control Board, Kolkata under the Environment (Protection) Act, 1986; and
- Approved the criteria prescribed for grant of permission for higher studies to the employees of CPCB.

3.3 NATIONAL CONFERENCE ON CHAIRMEN & MEMBER SECRETARIES

The Interactive meeting of Shri Jairam Ramesh, Hon'ble Minister for Environment & Forests, Government of India with Chairmen & Member Secretaries of Pollution Control Boards / Pollution Control Committees was held on August 17, 2009 at New Delhi. Over 140 participants from 34 States/UTs, MoEF and CPCB attended the Conference.

The major issues discussed during the conference are as follows:

- Status of Compliance and enforcement of pollution laws and related issues;
- Road Map for Strengthening of Pollution Control Boards (Central Pollution Control Board, State Pollution Control Boards & Pollution Control Committees);
- Data Base Management for Pollution Control including inventorization of Hazardous Waste;
- Environment Management of critically polluted Areas; and
- Issues between CPCB and SPCBs/PCCs or SPCBs/PCCs and CPCB.

3.4 CONFERENCES/ VISITS OF DIGNITARIES TO CPCB

- Third Regional Conference of Chairpersons and Member Secretaries of Southern SPCBs and PCCs held on 29th and 30th May, 2009 in Bangalore;
- First Regional Conference of Chairpersons and Member Secretaries of Western SPCBs and PCCs held at Cambay Resort, Gandhinagar on June 09, 2009;
- First Regional Conference of Chairpersons and Member Secretaries of Eastern SPCBs and PCCs held on 30th July, 2009 at CPCB, Zonal Office, Kolkatta;
- First Regional Conference of Chairpersons and Member Secretaries of Northern SPCBs and PCCs held at Chandigarh on August 08, 2009; and
- Fourth Regional Conference of Chairpersons and Member Secretaries of Southern SPCBs and PCCs held on 5th and 6th January 2010 at Alappuzha, Kerala.

***

CHAPTER IV

COMMITTEES CONSTITUTED BY THE BOARD & THEIR ACTIVITIES

4.1 RESEARCH ADVISORY AND MONITORING COMMITTEE (RAMC) AT CENTRAL POLLUTION CONTROL BOARD

The Central Pollution Control Board regularly formulates programmes and undertakes research and development activities covering different thrust areas related to prevention and control of pollution. The Central Pollution Control Board constituted its first Research Advisory Committee on 24th April, 2002 comprising experts from the leading environmental laboratories of CSIR, Department of Science and Technology and Ministry of Environment & Forests and other eminent scientists for guiding and reviewing the research activities of the organization.

The RAMC was reconstituted twice in view of WII (Wildlife Institute of India) Guidelines and as per discussion & minutes of the Review meeting chaired by Secretary, Ministry of Environment & Forests on 28.7.2006 and 16.1.2007. The Research Advisory Committee has been renamed as Research Advisory and Monitoring Committee (RAMC) having stakeholders from farming sector, industrial sector, mining sector, transport sector, infrastructure developer and representative of various sections of societies such as teachers, doctors, lawyers, women and youth. Representatives from various government agencies, eminent scientists and NGOs are also represented to the RAMC. Further, in-house scientists in various cadres from CPCB have also been inducted.

4.2 TERMS OF REFERENCE (TOR) OF RAMC

The Research Advisory & Monitoring Committee (RAMC) is overseeing the research activities of Central Pollution Control Board as per guidelines of Department of Scientific & Industrial Research, Ministry of Science & Technology, New Delhi.

4.3 FUNCTIONS OF RAMC:

(a) The RAMC recommends research projects for approval and monitor progress of on-going research projects. The approval of the project is being guided by the guidelines for research projects spefified by RE Division of MoEF.

(b) It advises the Central Pollution Control Board regarding areas of research to be undertaken.

(c) It provides directions to consolidate the ongoing pollution control activities and meet twice in a year for guidance of research activities as well as for monitoring of ongoing research activities.

(d) It proposes to ensure adequate resources and effective models are provided for interface between research proponent(s) and user(s).

The thrust areas identified for research are :

- Prevention, abatement and control of water pollution;
- Prevention, abatement and control of air pollution;
- Abatement and control of industrial pollution;
- Air/Water pollution and its effect on human health;
- Assessment and development of river basins and river pollution /polluted stretches of rivers;
- Restoration of environmental quality in problem areas;
- Bio-assessment, bio-monitoring and bio-remediation;
- Abatement of pollution from non-point sources;
- Environment Standards development;
- Pollution Prevention and Resource Recycling;
- Environmental mapping and planning;
- Hazardous waste management, Clean Technology for Hazardous Waste Management;
- Bio-medical Waste Management;
- Pollution Control Technologies / Clean Technologies – ways and means for their adoption;
- Clean Coal Technologies;
- Solid Waste Management;
- Alternate uses of fly ash;
- Waste Minimization;
- Treatability Studies;
- Development of Analytical/Monitoring methodology;
- Scientific R & D project to prevent and mitigate pollution;
- Climate Change;
- Ozone Depletion;
- Sulfur dioxide emission control;
- Chemical characterization of Fine Particulate Matter PM_{10} / $PM_{2.5}$;
- Anthropogenic aerosol, particularly assessment of generation of Black Carbon;
- Ground Level Ozone formation, assessment and prevention aspect;
- Various technological solutions for reduction of Environmental Pollution and Green House Gas;
- Distillery Effluent Management (feasibility of technology, Evaporation cum Incineration / Power Generation);
- Mercury Waste Management from CFL Lamps;
- Assessment of Health effect due to use of Bio Fuel;
- Toxicological assessment of alternate transport fuel in India;
- Utilization of Plastic waste in cement kiln and blast furnace;
- Co-incineration of hazardous waste;
- Conversion of plastic waste into liquid fuel – technology assessment;
- Odour monitoring and prevention technology;
- TDS management – New dimension;

- Use of high calorific value hazardous waste in cement kiln as partial fuel;
- Secured land filling and
- Waste utilization and e-waste management.

4.4 RESEARCH ADVISORY & MONITORING COMMITTEE (RAMC) OF CENTRAL POLLUTION CONTROL BOARD – ACTIVITIES DURING YEAR 2009-10

During the year 2009-2010, the following three members of RAMC have been superannuated or transferred from their position, therefore, re-nomination was sought from their respective organizations:

1. Dr. R. Saha, Advisor, DST, New Delhi – Retired
2. Dr. S. Makhija, Ex. Director, R&D Centre, IOCL, Faridabad - Transferred
3. Dr. H. G. Joglekar, Senior Scientist, NCL, Pune – Retired

The respective organizations have confirmed following nominations in place of above RAMC members:

1. Dr. S. S. Kohli, Director, SERC, DST, New Delhi – Nominee of Dept. of Science & Technology.
2. Dr. R. K. Malhotra, Executive Director (R & D), IOCL, Faridabad – Nominee of R&D Centre, Indian Oil Corporation Ltd., Faridabad.
3. Dr. M. S. Qureshi, Scientist, NCL, Pune – Nominee of National Chemical Laboratory, Pune.

The composition of Research Advisory & Monitoring Committee (RAMC) during year 2009-2010 is enclosed in Annexure VI-A.

4.5 CONSTITUTION OF PEER AND CORE EXPERT COMMITTEE– REAFFIRMATION OF EXPERT MEMBERS

The Peer & Core Expert Committee has been constituted (Refer Annexure 6-B) to evolve standards for effluents and emissions, ambient air and water quality for notification under the Environment (Protection) Act, 1986. The Terms of Reference for Peer & Core Committee are to identify and suggest new areas for initiating studies for formulation of standards for effluent, emission, water quality and air quality and to guide and suggest line of action to the Group or the consultant constituted/appointed by the Board for formulation of the standards before initiation/and during formulation of standards; and to review and finalise the proposed standards under the Environment (Protection) Act, 1986.

4.6 EXPERT COMMITTEE ON VEHICULAR POLLUTION CONTROL

An Expert Committee on Vehicular Pollution Control has been constituted by Central Pollution Control Board on April 10, 2009. The Terms of Reference of the Committee are as follows:

- To propose and recommend policies, programmes & best practices related to Vehicular Pollution Control;

- To advise for implementation of the existing interventions/regulations and identify options for better implementation framework;
- To advise and guide on thrust areas (related to Vehicular technology, Fuel quality, Alternate Vehicles & Fuels etc) wherein R&D activities should be undertaken for controlling Vehicular Pollution;
- To advise and guide on issues related to fiscal policies as well as administrative matters (I&M, Traffic management, land use planning etc.) for Vehicular Pollution Control;
- To scrutinize various matters those undertaken for Vehicular Pollution Control, which includes R&D work (Carried out internally as well as outsourced), Formulation of technical guidelines etc and
- To guide CPCB/SPCB to formulate action plan for controlling Vehicular Pollution in non-attainment cities.

4.7. COMMITTEE ON NATIONAL AMBIENT NOISE MONITORING PROGRAMME (NANMP).

Consequent upon the announcement by Hon'ble Minister for Environment & Forests, Government of India in January, 2010 in New Delhi for setting up of a National Ambient Noise Monitoring Network.

CPCB is in the process of developing Noise Monitoring Network in India and has planned for installation of Real Time Ambient Noise Monitoring Network in seven cities Delhi, Kolkata, Mumbai, Chennai, Bangalore, Hayderabad and Lucknow by 2010. A Committee comprising of the following members to supervise the procurement and installation of the noise monitoring systems has been constituted:

1.	Sh. R.S. Kori, Additional Director	-	Chairman
2.	Dr. D.D. Basu, SS	-	Member
3.	Sh. A.K. Sinha, Scientist 'C'	-	Member
4.	Sh. G. K. Mendiratta, Technical Expert	-	Member
5.	Sh. Virendra Bansal, AAO	-	Member
6.	Sh. M. Verghese AO (M)	-	Member Convener

Terms of Reference of the Committee are as follows:

- Opening & Evaluation of the Bid for NANMP as per Tender Document;
- Preparation of the Comparative statement;
- Identifying the party/organisation for placement of order;
- Supervising the installation & performance of the system;
- Tenure of the Committee six months and
- Sitting Allowance of Rs. 1000/- per meeting alongwith local conveyance as per actual for non-official member.

***

CHAPTER - V

AIR & WATER QUALITY MONITORING NETWORK

5.1 CONCEPT OF WATER QUALITY MANAGEMENT IN INDIA: POLLUTED STRETCHES

The water quality management in India under the Water (Prevention and Control of Pollution) Act, 1974 has the basic objective to maintain and restore the wholesomeness of national aquatic resources by prevention and control of pollution. For this "designated best use" (DBU) was developed wherein out of several uses a water body is put to, the use which demands highest quality of water is termed as "designated best use", and accordingly the water body is designated. Primary water quality criteria for different uses have been identified.

The entire water resources of the country were classified according to their designated best uses and a "Water Use Map" was prepared. Similarly it was felt important to assess the water quality to prepare "Water Quality Map" of India. The idea was to superimpose "Water Quality Map" on "Water Use Map" to identify the water bodies or their parts that need improvement (restoration). Today almost all policies and programmes on water quality management are based on this concept including the Ganga Action Plan and National River Action Plans.

5.2 NATIONAL WATER QUALITY MONITORING PROGRAMME

5.2.1 National Water Quality Monitoring (NWQM) Network

Salient features of NWQM network are given below:

i. There are 1700 stations spread over 27 States and 6 Union Territories;

ii. The monitoring network covers 353 Rivers, 107 Lakes, 9 Tanks, 44 Ponds, 15 Creeks/Seawater, 14 Canals, 18 Drains and 490 Wells and

iii. Out of 1700 stations, 980 are on rivers, 117 on lakes, 18 on drains, 27 on canals, 9 on tank, 15 on creeks/seawater, 44 on pond and 490 are groundwater stations.

Water samples are being analyzed for 28 parameters consisting of physico-chemical and bacteriological parameters for ambient water samples apart from the field observations. Besides this, 9 trace metals and 28 pesticides are analyzed in selected samples. The sampling is done on monthly or quarterly basis for surface waters and on half yearly basis in case of groundwater.

Bio-monitoring is also carried out on specific locations. In view of manpower and resource constraints organic pollution related parameters are chosen for frequent monitoring i.e. monthly or quarterly while major cations, anions, other inorganic ions and micro pollutants (toxic metals & POP's) are analyzed once in a year to keep a track of water quality over large period of time. The water quality data are brought out as 'Water Quality Status Year Book'.

5.2.2 Water Quality Trend

The water quality monitoring data collected between 1995 to 2009 indicate that the organic and bacterial contamination continued to be critical, primarily due to increasing discharge of untreated sewage generated from urban centers which the municipal bodies are unable to handle. Besides, the receiving water bodies have inadequate water for dilution.

The water quality monitoring results analysed w.r.t. Bio-chemical Oxygen Demand (indicator of oxygen demand) and Total coliform and Faecal coliform (indicator of pathogenic bacteria) are presented in Figures 5.1 to 5.3.

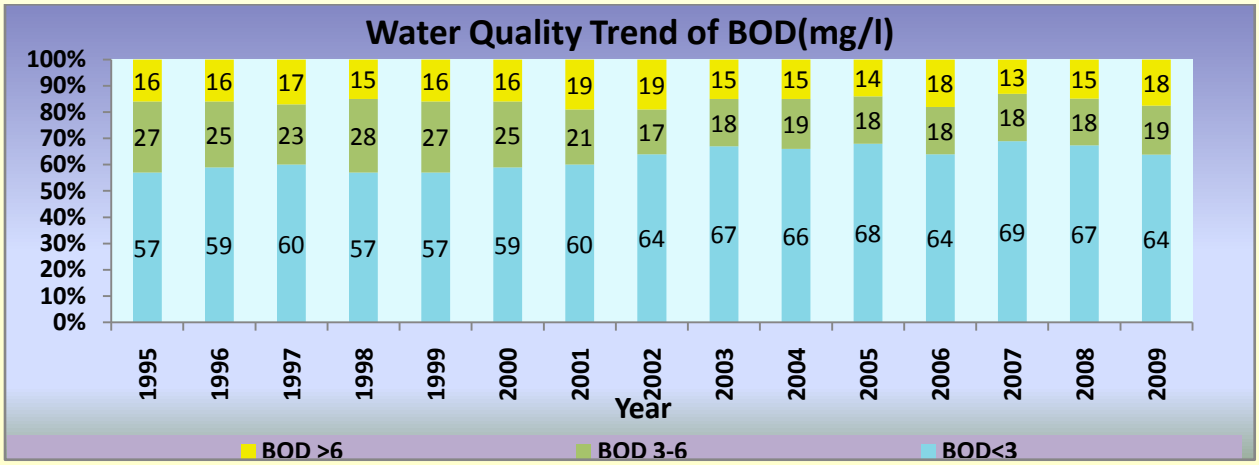


Figure 5.1: Water Quality Trend (BOD, mg/l)

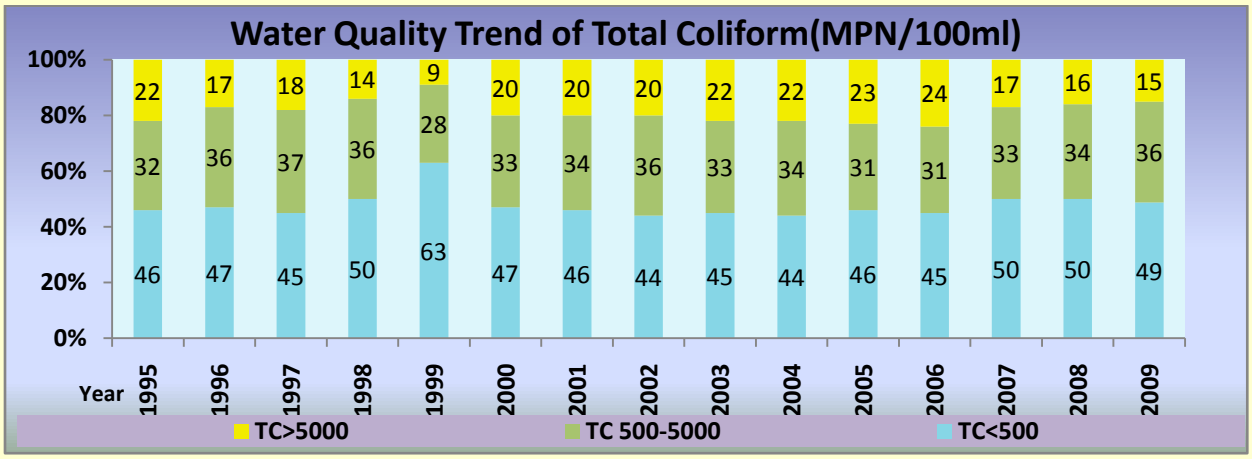


Figure 5.2: Water Quality Trend (Total Coliform (TC), MPN/100 ml)

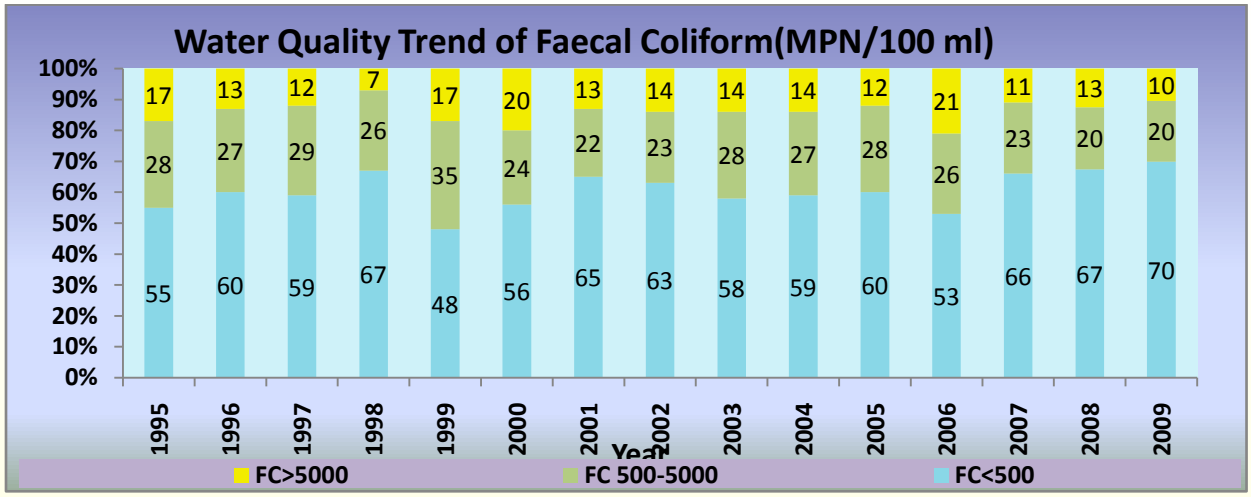


Figure 5.3: Water Quality Trend (Faecal Coliform (FC), MPN/100 ml)

5.2.3 Water Quality of Rivers – Bhagirathi, Alaknanda and Ganga

The river Bhagirathi from its source, flows about 200 km before meeting river Alaknanda at Devprayag at an elevation of 475 m (1,558 ft). Downstream of this confluence the river is known as the Ganga. The stretch of river Alakananda from Joshimath to Devprayag and river Ganga from Devprayag to Haridwar was surveyed to assess the impact of untreated sewage on the river quality.

The water quality of river Ganga is regularly monitored at

- D/s Missarpur, Haridwar;
- U/s Laxmanjhula, Rishikesh;
- River Alaknanda at Devprayag b/c Bhagirathi;
- River Alaknanda at Deoprayag a/c Bhagirathi;
- River Bhagirathi at Deoprayag b/c Alaknanda;
- River Alaknanda at Rudraprayag a/c Mandakini;
- River Alaknanda at Rudraprayag b/c Mandakini and
- River Mandakini at Rudraprayag b/c Alaknanda in the stretch under reference by CPCB.

The monitoring data collected indicates that the water quality was meeting desired criteria w.r.t. pH, dissolved oxygen (DO) and BOD; however for faecal coliform the criteria limits for bathing waters were exceeded.

The river Ganga and its tributaries d/s of Haridwar are monitored for water quality in the States of Uttarakhand, Uttar Pradesh, Bihar and West Bengal at 57 locations. The ranges of water quality observed in river Ganga with respect to pH, conductivity, DO, BOD, total coliform and faecal coliform was computed. The main constraints in improvement of water quality are :

- ✓ Inadequate dry weather flow in Ganga at Kannauj, Kanpur, Allahabad & Varanasi and significant inflow of wastewater in the river.
- ✓ Existing sewage treatment plants (STPs) are not operating optimally/efficiently

The proposed strategies for improvement of water quality are :

i. Renovation of existing STPs and sewage pumping stations ;
ii. Augmentation and installation of new STPs in all towns discharging sewage to river;
iii. Interception of all the drains and diversion of wastewater to STPs;
iv. Use of treated sewage for irrigation ;
v. Ownership of assets by State Public Health Departments and
vi. Augmentation of river flow during lean periods.

5.2.4 Water Quality Status of River Yamuna

The river Yamuna (entire 1376 Km. stretch) is regularly monitored by CPCB at 21 locations , the monitoring frequency is once a year at two uppermost locations, quarterly at three locations and monthly at remaining locations.

The deterioration in the water quality of river Yamuna is caused by indiscriminate wastewater discharges from various sources. The condition aggravated further as there is insufficient water in the river for dilution or to enhance self purification capacity of the river though there is a slight improvement during monsoon period. There was hardly any flow in river Yamuna River during the period April to September 2009 except at few locations in a stretch of about 210 km between Hathnikund barrage upto Palla.

River Yamuna at Agra

5.2.5 Water quality of River Kaushalya

River Kaushalya flows passing through major towns of Dharampur, Parwanoo, Kalka and Pinjore where it joins river Ghaggar. A major drain named Anhaech Nalai discharges into River Kaushalya. Bio-monitoring of two rivers viz. River Kaushalya and River Markanda in critically polluted areas, Parwanoo and Kala-Amb was done along with monitoring of physico-chemical and bacteriological parameters of water quality of River Kaushalya at seven locations beginning from origin to the confluence.

In cases where the values for total coliforms were exceeded can be attributed to open defecation, cattle wading and discharge of domestic waste.

5.3 METHODOLOGY & CRITERIA FOR IDENTIFICATION OF POLLUTED RIVER STRETCHES

The uses of rivers for various purposes require specific physio-chemical and bacteriological characteristics. The river stretches not meeting the water quality criteria and having BOD > 3 mg/l are identified as polluted stretches. These polluted stretches are further classified under different priority levels on the basis of extent of pollution. The water quality data for the years 2002-2008 was analyzed and the monitoring locations exceeding the water quality criteria identified as polluted locations with respect to risk.

Priority levels of polluted stretch are based on the risk defined as;

RISK = FREQUENCY OF VIOLATION OF CRITERIA X CONSEQUENCE (MAGNITUDE)

The degree of violation is with reference to water quality criteria for drinking water source with conventional treatment in respect of BOD. The polluted locations in a continuous sequence are defined as polluted river stretches.

The criteria formulated for identification of polluted river stretches for priority 1 to 5 based on BOD was found to be applicable for 150 stretches listed as '**Priority polluted river stretches'** as follows and presented in Table 5.1 to 5.5

- Priority 1 (BOD>30mg/l and BOD exceeding 6mg/l on all occasions)
- Priority 2 (BOD between 20 & 30 mg/l)
- Priority 3 (BOD between 10 & 20 mg/l)
- Priority 4 (BOD Between 6-10 mg/l)
- Priority 5 (BOD between 3 & 6 mg/l)

Table 5.1: Polluted River Stretches - Priority 1 (BOD>30mg/l and BOD exceeding 6 mg/l on all occasions)

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
ANDHRA PRADESH				
1. Musi	D/s Hyderabad & Rangareddy	Hyderabad & Secundrabad	1.Nagole, Rangareddy	34
			2. Hyderabad D/s	23
2. Nakkavagu	D/s Medak	Medak	1.Bachugudem, Medak	50
ASSAM				
3. Bharalu	D/s Guwahati	Guwahati Sewage	1.D/S Guwahati	31.5
4. Kalong	D/s of Nagaon (Elangabeel System)	Nagaon- Sewage	1. Elangabeel System Pond	50

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
CHANDIGARH				
5. Patiala ki Rao	Patiala Ki Rao	Chandigarh	1.Patiala Ki Rao	50
6. Attawa Choe	Attawa Choe (N-Choe)	Chandigarh	2.Attawa Choe (N-Choe)	50
7. Sukhna Choe	Sukhna Choe	Chandigarh	3.Sukhna Choe	50
DELHI				
8. Yamuna	Wazirabad to Okhla	Industrial & Domestic Waste from Delhi	1.Nizamuddin	55
			2.Okhla Bridge	32
			3.D/s of Okhla A/C Shahdara Drain	70
GUJARAT				
9. Sabarmati	Ahmedabad to D/s of Vautha	Discharge from Meshwa & Ahemdabad	1. After Conf. With Meshwa At Vautha (Near Dhokla),	48
			2. At V.N. Bridge, Ahmedabad	31
			3. At Vill. Miroli Taluka Dascroi, Ahmedabad	103
			4. At railway Bridge,Ahmedabad	29
			5. At Kheroj Bridge	12
			6. At Hansol Bridge	15
10. Amlakhadi	Along Ankeshwar	Industrial & Domestic waste from Ankeshwar	1.Amlakhedi after confluence of wastewater from Ankleshwar	46
11. Bhogavo	Surendranagar		1.D/s of Surendranagar	50
12. Daman Ganga	Vapi D/s to Confl. with sea	Industrial & Domestic wastes from Vapi,Silvassa,Daman & Kachigaon	1.Kachi Gaon D/s	30
HARYANA				
13. Ghaggar	Interstate border of Punjab & Haryana to Ottu wier at Sirsa	Industrial & Municipal waste from Patiala, Derabassi, Sirsa	1. Before Ottu Weir (Before Mixing Of Satluj Canal Water)	50
			2. Gh-1 At Road Brdg. Sirsa,Debwali Road	33.2
			3. Gh-2 At Chandarpur Syphon,	40
			4. Near Bankarpur, Dera Bassi	22
			5. U/S Dhakansu Nallah	21
14. Markanda	Kala Amb to Narayan Garh	Industrial & Domestic waste from Kala Amb	1.Kala Amb D/s	590
15. Western Yamuna Canal	D/s of Yamuna Nagar	Yamuna Nagar Industrial & Domestic wastewater	1.100 metre D/s after receiving Industrial effluent & Sewage	247
			2.At Damla D/s of Yamuna Nagar	188
HIMACHAL PRADESH				
16. Sukhna	D/s Parwanoo	Parwanoo sewage	1.At Parwanoo, Solan	36

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
MADHYA PRADESH				
17. Khan	Indore	Indore Sewage	1.Sakkar Khadi (Near Indore)	50
			2.Sanwer	50
			3.Kabit Khedi	50
18. Chambal	Nagda D/s	Industrial & domestic wastewater of Grasim Township & Nagda	1.Nagda D/s	34
MAHARASHTRA				
19. Bhima	Vithalwadi to Takli	Pune – Sewage	1. Pune, D/s Of Bundgarden	40
		Daunt -Sewage	2. Pune U/s Vithalwadi	28.2
			3. Pargaon (After confluence with Mule Martha)	16
20. Godavari	Nashik D/s to Paithan	Nasik Sewage	1.Nashik D/s	36
			2.Jayakwadi Dam, Raher	6.5
			3.U/s Of Gangapur Dam, Nasik	6
			4.U/s of Paithan, Jayakwadi	6.8
			5.D/s of Paithan, Pathegaon	7.4
			6.Near Someshwar Temple	7.5
			7.Hanuman Ghat, Nashik	9
			8. Nasik D/s	18
			9.Panchavati At Ramkund	12
			10.KapilaGodavari, confl.Point, Tapovan	14
			11.Saikheda	16
			12. Tapovan	20
21. Mula & Mutha	D/s Pune city	City Sewage of Pune	1.Mula-Mutha River at Mundhawa Bridge	36
			2.Mula at Aunth Bridge	
			3.Mula –Harrison Bridge	50
			4.Mutha at Sangam Bridge	32
22. Pawana	Pune-Sangavi Gaon	Pune Sewage	1.Pune-Sangavi Gaon	36
23. Indrayani	Alandi to confluence with Bhima	Pune Sewage	1.Alandi Gaon	36
24. Koyna	Karad D/s	Karad Sewage	1.At Karad	35.5
25. Mithi	Mumbai Stretch	Mumbai	1.Mithi river	50
26. Kundalika	Are Khurd	Roha sewage	1.Are Khurd	50
			2. Kundalika At Roha city	6.5
PUNJAB				
27. Satluj	D/S of Zenith Paper Mill to Bridge Harike, Amritsar	Sewage from Ludhiana & Jalandhar	1.100m D/s Budha Nala Confl.,Ludhiana	48
			2. D/s East Bein	6.2
			3.Boat Bdg. Dharmkotna-	18

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
			kodar Road, Jalandhar	
			4. 1 Km. D/s of Zenith	22
28. Ghaggar	Mubarkpur to Sardulgarh (Entire length in Punjab)	Municipal & Industrial discharge from Patiala, Chandigarh, Sukhna paper mills & Derra Bassi, Sardulgarh, Moonak,	1.D/s Dhakansu Nallah	32
			2.D/s Jharmal Nadi	32
			3.D/s Sardulgarh	45
			4.100m D/s Conf. With R. Saraswati (Patiala)	40
			5. Ratanheri, D/s of Patiala Nadi (After Confl.)	50
			6.Moonak	38
			7.U/s Jharmal Nadi,	40
			8.U/s Sardulgarh,	45
			9.D/s Chhatbir	10
			10. Mubarakpur Rest House(Patiala)	10
			11. Near Bankarpur, Dera Bassi	12
			12. U/s Dhakanshu Nallah	18
TAMIL NADU				
29. Adyar	Along Chennai	Chennai- Industrial & Municipal Wastewater	Nandambakkam, Ekattuthangal, Jaferkhanpet, Maraimalai bridge, Kotturpuram bridge, Boat club	43
30. Coovum	Along Chennai	Chennai- Industrial & Municipal wastewater	Annanagar, Arumbakkam, Amanjikarai, Poonamalle, College Road, Central Jail, Napier Bridge	105
31. Cauvery	Erode D/s	Erode Sewage	1.Erode near Chirapalayam	38
UTTAR PRADESH				
32. Yamuna	Kosi Kalan to Juhika	Sewage from Agra, Mathura, Bateshwar, Vrindavan & Etawah	1.D/s Of Agra, U.P.	33
			2.Mazawali	37
			3.Bateswar, U.P	26
			4.Etawah, U.P.	27
			5.Mathura U/s , U.P.	20
33. Hindon	Saharanpur to confluence with River Yamuna	Sewage & Industrial effluent from Ghaziabad, Saharanpur & Muzaffarnagar	1.Ghaziabad D/s, U.P.	36
			2. Confl. With R. Krishni & Kali Near Binauli Town, Meerut	36
			3.Pura mahadev	34
			4. Saharanpur D/s	24
34.Western Kali	Muzaffar Nagar to Confluence with Hindon	Sewage & Industrial effluents from Muzaffar nagar & Mansoorpur	1.Kalinadi At U/s Of Muzaffar Nagar	32
			2.Kalinadi At D/s Of Muzaffar Nagar	364
35. Kali Nadi Eastern	Kannauj	Industrial and Municipal sewage from Meerut,Modinagar, Bulandsahar, Hapur, Gulaothi and Kannauj	1. At Kannauj (Before Conf.)	120
			2. U/s Of Gulaothi Town In Bulandsahar	183

Table 5.2: Polluted River Stretches- Priority 2

(BOD between 20 & 30 mg/l)

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
KARNATAKA				
1. Bhadra	D/s of Bhadravathi to confluence with Tunga	Industrial & Domestic Waste water from Bhadravathi	1.D/s Of Bhadravathi	22.5
			2. D/s of KIOCL Road Bridge, Near Holehunnur	7.8
MAHARASHTRA				
2. Tapi	M.P. Border to Bhusaval	Bhusaval Sewage	1.Ajnand Village	21
			2.Uphad Village	22
			3. Bhusawal U/s	19
3. Girna	Malegaon to Jalgaon	Malegaon Sewage	1.Malegaon (Manmad)	23
		Jalgaon Sewage	2. Jalgaon	10
4. Nira	D/s of Jubilant Organosis, Pune	Industrial wastewater	1. D/s of Jubilant Organosis, Pune	21. 2
MANIPUR				
5. Nambul	Hump Bridge to Heirangoithong	Sewage	1. Heirangoithong	24
			2. Hump Bridge	26
RAJASTHAN				
6. Jojari	Along Jodhpur	Industrial & Domestic waste from Jodhpur	1.D/s Jodhpur	10.5-25.1
7. Bandi	Along Pali	Industrial & Domestic waste from Pali	1.D/s Pali	30-141
8. Berech	D/S of Udaipur	Industrial & Domestic waste from Udaipur and Chittorgarh	1.D/s Udaipur	6.2-22.1
9. Khetri	Along Khetri	Industrial & Domestic waste from Khetri	1.D/s Khetri Complex	8.1-31.2
TAMIL NADU				
10. Noyyal	Along Coimbatoor, Tirupur, Palyanakotti	Industrial & domestic wastewater from Coimbatoor, Tirupur, Palyanakotti	1.Vicinity of Tirupur	>26
UTTAR PRADESH				
11. Bagad	D/s of Gajraula	Industrial effluent of Jubilant Organics	1.D/s of Jubilant Organics	BOD - >26
12. Ganga	Kannauj D/s to Kanpur D/s(Jajmau Pumping station	Industrial effluent from Kanpur	1.Kanpur D/s (Jajmau Pumping Station	21
			2. Kannauj D/s, U.P.	6
			3.Kanpur U/s (Ranighat), U.P.	6.4
UTTARAKHAND				
13. Kosi	D/s of Kashipur	Sewage & Industrial waste from Kashipur	1.D/s of Kahsipur	13
14. Dhela & Kichha	D/s of Kashipur	Sewage & Industrial waste from Kashipur	1.Dhela D/s of Kashipur	187
			2.Kichha D/s of Kashipur	17
15. Bahella	D/s of Kashipur	Sewage & Industrial waste from Kashipur	1.D/s of Kashipur	15-22

Table 5.3: Polluted River Stretches - Priority 3
(BOD between 10 & 20 mg/l)

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
ANDHRA PRADESH				
1. Manjira	D/s Gowdicharla	Industrial effluent of Ganpati sugar & Impact of Nakavagu	1.Gowdicharla a/c with Nakavagu	16
			2.Near Ganpati sugars	18
ASSAM				
2. Deepar Bill	D/s Guwahati	Guwahati	1.Deepar Bill	11
GUJARAT				
3.Khari	Lali village, Ahemdabad	Municipal & Industrial waste from Ahemdabad	1.Lali Village Near Ahmedabad	19
4.Kolak	D/s Patalia.		1.At Patalia Bdg.	12
			2. At Railway Bridge	8
			3. Vapi,Valsad	
5. Mindhola	D/s State Highway Bridge Sachin		1.Mindhola At State Highway Bridge Sachin	12
6. Shedi	Along Kheda	Kheda Sewage	1. At Kheda	19
HARYANA				
7. Gurgaon Canal	D/s of Delhi	Delhi	1. GC-1 Near Badarpur Border	24
JHARKHAND				
8. Subarnrekha	D/s of Ranchi (Tatisilwal)	Industrial & domestic waste from Ranchi	1.Ranchi (tatisilwal)	10. 5
			2. Namkum Road bridge	6.8
KARNATAKA				
9. Tunga	D/s of Shimoga	Shimoga Sewage	1.D/s Of Shimoga Town	13.5
10. Tungabhadra	Harihar D/S to Hara eahalli Bridge. & Ullanur	Harihar Sewage & Grasim waste	1.Haralahalli Bridge	16.5
11. Laxmantirtha	D/s of Hunsur Town	Hunsur Sewage	1.D/s of Hunsur town	10
KERALA				
12. Karamana	Karamana At Moonnattumukku		1.Karamana At Moonnattumukku	11
MADHYA PRADESH				
13. Kshipra	Ujjain to confluence with Chambal	Ujjain- sewage	1.Ramghat At Ujjain,	15
			2.Trivenisangam (1 Km. D/s Of Sangam)	14
			3.Siddhawat D/S of Ujjain	8
14. Narmada	Hoshangabad	Industrial & Domestic Wastewater	1.Hoshangabad D/s	11.4
MAHARASHTRA				
15. Weinganga	D/s Ashti	Municipal sewage of Ashti town	1.At Ashti	10.5
			2.After Confluence of Kanhan	9

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
			3. D/s of Ellora Paper mill	9.4
			4.U/s of Ellora paper mill	8.6
			5.U/s of Gaurav paper mills, Jackwell	9
			6. D/s of Gaurav paper mills, Jackwell	7.8
16. Wardha	Along Rajura village	Paper mill waste	1.Rajura Bridge	11
			2.D/s of ACC Ghuggus	13
			3.At confluence point of Pangange & Wardha at Jaud	8.5
17. Bhima	Narsinghpur D/s	Nira – discharge	1. Narsinghpur,(D/s After.Confl.With R.Nira),	16.2
18. Krishna	Dhomdam to Kolhapur	Sewage & Industrial waste from Karad & Sangli	1. Krishna Bridge, Karad,	11. 6
			2. At Kshetra Mahuli	12
			3. Krishna Vennasangam at Mahuli	17.6
			4. At Wai	12.6
			5. Mahabaleshwar Dhom Dam Near Koina Dam,	8.6
19. Purna	Andura village		1. D/s of confl. of Morna & Purna, Andura village	10.2
			2. Purna at Dhupeshwar	
20. Nira	Along Pulgaon	Pulgaon Cotton Mill	1.Pulgaon Cotton Mill, Wardha	11.8
			2.Sarole Bdg.On Pune-Banglore Highway	
21. Chandrabhaga	Along Pandharpur Town	Sewage Of Pandharpur Town	1. D/s Of Pandharpur Town	12
			2. U/s Of Pandharpur Town	10.5
22. Venna River	Varye, Satara		1. Satara D/s	12
TRIPURA				
23. Agartala Canal	D/s Agartala	Agartala sewage	1.Near Pragati Vidyabhawan, Agartala,	14.6
UTTAR PRADESH				
24. Gomti	Lucknow to Jaunpur	Sewage & Industrial effluent from Lucknow and Jaunpur.	1. Jaunpur D/s, U.P.	12
			2. Lucknow D/s, U.P.	14
25. Ganga	Varanasi D/s	Discharge through Kalinadi & Ramganga sewage & Industrial effluent from Kannauaj and Kanpur	1.Varanasi D/s (Malviya Bridge)	14
26. Ramganga	Upstream Kannauj	Sewage & Industrial waste water from Ramnagar & Moradabad	1. Ramganga At Kannauj (Before Conf.)	16

Table 5.4: Polluted River Stretches- Priority 4 (BOD between 6-10 mg/l)

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
ANDHRA PRADESH				
1. Krishna	Wadepally	Rajamundary	1.Krishna at Wadepally A/c with River Musi	8
2. Godavari	D/s of Rajamundary	Rajamundary	1.Rajamundary D/s	6
3. Maner	Warangal U/s	Warangal	1.Warangal U/s	6.1
ASSAM				
4. Burhidihing	Margherita to Duliajan	Margherita	1.Burhidihing At Margherita	7.9
			2.Burhidihing at Duliajan	7
BIHAR				
5. Sikrana	Sikrana At Chanpatiya	Chanpatiya	1.Chanpatiya	8
CHATTISGARH				
6. Arpa	Arpa river D/s of Bilaspur	Bilaspur	1.D/s Bilaspur	7
7. Seonath	U/s Rajnandgaon	Bilaspur	1.U/s Rajnandgaon	7.1
GUJARAT				
8. Mahi	D/s Sevalia and Vasad	Municipal waste from Sevalia & Vasad	1.Vasad	6.8
			2.Near Rajasthan border at Kadana Dam	8.2
9. Dhadar	D/s Kothada	Kothada	1.River Dhadar At Kothada	9
10. Tapi	Rander Bridge to Surat	Municipal & Industrial waste from Surat	1.Rander Bridge, Surat	7.4
			2.Tapi at ONGC bridge, Surat	6
11. Kim	D/s Surat	Municipal Sewage	1.Sahol Bridge, Olpad Hansol Road, Surat	6
HIMACHAL PRADESH				
12. Markanda	D/s of Paonta Sahib	Waste from Paonta Sahib	1.Markanda At Paonta, Distt. Sirmour	8.2
13. Beas	D/s of Mandi	Domestic waste from Mandi	1. D/s Mandi	7.6
JHARKHAND				
14. Sankh	Along Bolba	Municipal Sewage	1.Bolba	6.2
KARNATAKA				
15. Kali	Along Dandeli Town	West Coast Paper Mill waste	1.D/s West Coast Paper Mill	7
16. Krishna	U/s Of Ugarkhurd Barrage		1. U/s Of Ugarkhurd Barrage	9.8
MADHYA PRADESH				
17. Tons	Tons Along Madhavgarh	Sewage	1.Tons At Madhavgarh	8
18. Kalisot	Mandideep	Sewage & industrial effluent	1.Near road bridge, Mandideep	6
19. Betwa	Raisen	Sewage from Raisen	1.At Nayapur D/s, Mandideep Industrial Area No.1, Raisen	6.8
MAHARASHTRA				
20. Kalu	Atale village to Confl. with Ulhas	Municipal & Industrial waste water	1.Atale village	7.5
21. Kanhan	D/s Nagpur	Industrial & Domestic Waste	1.D/s of Nagpur	8.8
			2.U/s of M/s Vidharbha paper mill,	8.8

River	Polluted Stretch	Source/Town	Monitoring Location	BOD (mg/l)
		of Nagpur	Sinora	
			3.D/s of M/s Vidharbha paper mill, Sinora	9.8
22. Kolar	Along Kamptee	Municipal waste water	1.Before Confluence To Kanhan At Kamptee	7
23. Ulhas	Mohane	Industrial & Domestic runoff Ulhasnagar	1.U/s Of NRC Bund At Mohane	6
			2.Jhambul Water Works	7.5
24. Panchganga	Kolhapur	Industrial & Municipal sewage of Kolhapur	1.D/s Of Kolhapur Town	6.4
25. Patalganga	Khopoli to Esturaine region	Industrial & Municipal sewage from khopoli, Rasayani & Paundh	1. Shilphata	6
			2. Near Intake Of Midc W/W	9
26. Rangavali	Along Navapur	Sewage of Navapur	1.D/s Of Navapur	8.4
MEGHALAYA				
27. Kharkhala	Near Sutnga Khlieri, Jaintia Hills		1.Near Sutnga Khlieriat,Jaintia Hills Dt.	7
28. Umtrew	Umtrew At Byrnihat East		1.Umtrew At Byrnihat East	7.7
ORISSA				
29. Kathjodi	Along Cuttack	Cuttack Sewage	1.Cuttack D/s	6.4
PONDICHERRY				
30. Arasalar	Along Karaikal	Domestic waste of Karaikal	1.Arasalar River Karaikal Region,	7
RAJASTHAN				
31. Chambal	D/s Kota city	Industrial & Domestic waste from Kota	1.Kota D/s (2 Km. From City)	6.2
TAMIL NADU				
32. Vaigai	Along Madurai	Madurai-Industrial & domestic wastewater	1.Vicinity of Madurai	>6
33. Tambiraparani	Along Ambasamudam	Madura Coats Indusitrial waste	1.Rail Bdg. Nr. Ambasamudam	6
34. Cauvery	Tiruchirapalli to Grand Anaicut	Municipal sewage of Erode, Tiruchirapalli	1.Tiruchirappalli D/S	6
			2.Trichy,Grand Anaicut	7.8
			3.1Km D/s of Bhavani river confluence	7.3
35. Bhavani	Bhavani	Municipal sewage	1.Bhavani Sagar Bhavani	7.6
			2..Bhavani at Bhavani	6.8
UTTAR PRADESH				
36. Ganga	D/s of Haridwar		1.D/s of Haridwar	7.6
WEST BENGAL				
37. Damodar	D/s Asansol		1. Narainpur A/C Of Nunia Nallah	6.8
			2.Near Mujher Mana Village A/C of Tamla Nallah	6.8
38. Ganga	D/s Dakshineshwar	Industrial waste & sewage from Dakshineshwar	1.Dakshineshwar	6

Table 5.5: Polluted River Stretches - Priority 5
(BOD between 3 & 6 mg/l)

River	Polluted Stretch	Monitoring Location	BOD (mg/l)
ANDHRA PRADESH			
1. Tungabhadra	D/s Manthralayam	1. Manthralayam , Kurnool	3.3
2. Krishna	Thangadi , Mahaboobnagar	1. Thangadi , Mahaboobnagar	3.1
3. Pennar	Puspagini,	1. A/C Papagni, Puspagini	3.2
CHHATTISGARH			
4. Mahanadi	Rajim U/s to interstate boundary with Orissa	1.U/s Rajim	3.2
		2.Interstate Boundry	3.1
GUJARAT			
5. Mahi	D/s Mujpur	1. At Umeta Bridge	3.1
		2. At Mujpur	3.2
6. Panam	D/s Lunawada	1. At Lunawada	3.7
7. Sabarmati	Dharoi Dam to Mahudi jain Temple	1. Dharoi Dam	3
		2. At Mahudi Jain Temple	3.5
8. Ambika	D/s Bilimora	1. At Bilimora	4.2
9. Anas	D/s Dahod	1. Anas At Dahod,(Kushalgarh),Dist. Panchmahal	3.8
10. Baleshwar Khadi		1. Baleshwar Khadi At N.H. No. 8	4.5
11. Kaveri		1. Bridge At Billimora-Valsad Road	3
HARYANA			
12.Yamuna	Kalanaur to Sonepat	1.Hathnikund	3
		2. At Kalanaur	4
		3. At Sonepat	5
		4. U/s Paonta Sahib	3
KARNATAKA			
13 Tungabhadra	Ullanur D/s	1. At Ullanur	3.1
14 Hundri	Joharpur D/s	1. Joharpur(V), Near Temple, Kurnool	3.1
15 Kundu	Nandayal D/s	1. Nandyal, Near Over Bdg., Kurnool	3.1
16 Arkavati	D/s of Kanakapura	1. D/s of Kanakapura Town	5
17 Malprabha	D/s of Khanapur	1. D/s of Khanapur Village	4.1
KERALA			
18 Puzhackal		1. At Puzhackal Bridge	4
19 Kadambayar	D/s Brahmapuram	1. At Brahmapuram	3
MADHYA PRADESH			
20 Narmada	Hoshangabad D/s	1.At Sethanighat	3.1
		2. At Hoshangabad	3.2
21 Mandakini	D/s Chitrakut	1. At Chitrakut	5

River	Polluted Stretch	Monitoring Location	BOD (mg/l)
MAHARASHTRA			
22 Ulhas	Along Badlapur	1. U/s of Badlapur,	3.4
23 Bhatsa	Along Pise village	1. D/s of Pise Dam Near Pise Village (Ulhas)	3.3
NAGALAND			
24 Dhansiri	Along Dimapur	1. Near Check Gate (Dimapur Khutkhuti Road)	3.2
		2. Full Nagarjan	3.6
		3. Nuton Basti	4.8
		4. Town Boundary Bridge (Diphu Road)	3.2
ORISSA			
25 Brahmani	Panposh to Rourkela	1.D/s Panposh	4.6
		2.Rourkela D/s	3
26 Mahanadi	Cuttack D/s	1.Cuttack D/s	4.6
27 Kuakhai	Along Bhubaneshwar	1. At Bhubaneshwar	3.2
SIKKIM			
28 Teesta	D/s Gangtok	1. A/C with River Ranichu at Singtam	3
		2. A/C with Rangichu after meeting the industrial effluents from the Town Ranichu	3.1
		3. At Melli downstream	3.2
29 Ranichu	D/s Gangtok	1. B/C with River Teesta at Singtam	3.5
		2. A/C of Ranichu and Rorachu at Ranipool	3.2
30 Dikchu	D/s Gangtok	1. B/C with River Teesta Near NHPC Hydroelectric Power Project	3.4
31 Maney Khola	D/s Gangtok	1. A/C with Ray Khola at Adampool after meeting waste of STP	3.2
		2. At Burtuk near Army Base Camp, 4 Km U/s of Gangtok	3.2
TAMILNADU			
32 Palar	Along Vellore	1. Vaniyambadi Water Supply Head Work	4
TRIPURA			
33 Haora	Agartala D/s	1. Chandrapur, Agartala D/s of Haora	3.5
UTTAR PRADESH			
34 Saryu	Along Ayodhya	1. At Ayodhya at main Bathing Ghat	3
35 Rihand	Along Renukut	1. Renukut U/s	3.3
		2. Renukut D/s	3.2
WEST BENGAL			
36 Barakar	D/s Asansol	1. At Asansol (Water Intake Point)	3.8

5.4 RIVER WATER QUALITY MONITORING PROGRAM AT INTERSTATE BOUNDARIES

One of the function of the Central Pollution Control Board, under the Section 16 2(b) of the Water (Prevention and Control of Pollution) Act, 1974 is to "coordinate the activities of the State Boards and resolve disputes among them".

In the light of above, the CPCB is monitoring the water quality of rivers at the interstate boundaries since 2005. At present, the monitoring is carried out 4 times in a year at 82 locations (as given in table 1) spread over 40 rivers. Observations with Dissolved Oxygen (DO) and Bio-Chemical Oxygen Demand (BOD) are summarized in table 2.

It is observed that 40 locations (on 26 rivers as given in table 3) out of 82 locations monitored are polluted with respect to Bio-Chemical Oxygen Demand (BOD), one of the most important indicator of water quality.

The concerned SPCBs/ PCCs were requested and pursued to take remedial measures to restore water quality of the identified polluted rivers at Interstate borders.

Table 5.6 List of water quality monitoring locations at Interstate Boundaries

S.No.	River	Location	Interstate Boundary
1.	Satluj	Nangal, (H.P.)	H.P/Punjab
2.	Beas	Talwara, U/S (Pong Dam), (H.P.)	H.P/Punjab
		Talwara D/S , (Punjab)	H.P/Punjab
3.	Markanda	Kala Amb, (H.P.)	H.P/Haryana
		Naraingarh, (Haryana)	Haryana/H.P.
4.	Ghaggar	Parwanoo U/S ,(H.P)	H.P/Haryana
		Parwanoo, D/S (Amravati), (Haryana)	Haryana/H.P.
		Mubarakpur, (Punjab)	Punjab/Haryana
		Tiwana Village, (Punjab)	Punjab/Haryana
		Sirsa Dabwali Road, (Haryana)	Haryana/Punjab
		Chandrapur Siphon, (Haryana)	Punjab/Haryana
		Sirdulgarh, (Punjab)	Punjab/Haryana
		Ottu Weir, (Haryana)	Haryana/Rajasthan
		Sirsa Hanumangarh Road, (Rajasthan)	Rajasthan/Haryana
5 5.	Ganga	Sultanpur, (Uttrakhand)	Uttrakhand/U.P.
		Bijnor , (U.P.)	UP/ Uttrakhand
		Tarighat, Gazipur, (U.P.)	U.P./Bihar
		Dari Ganj, Sonepur, Bihar	U.P/Bihar
6.	Yamuna	Dak Pather , (Uttrakhand)	Uttrakhand /H.P.
		Paonta Sahib, (H.P.)	HP/ Uttrakhand
		Buriya U/S (Jagadhari), (Haryana)	Haryana/HP

S.No.	River	Location	Interstate Boundary
		Sonipat Baghpat Rd., (Haryana)	Haryana/U.P.
		Palla, (Delhi)	Delhi/Haryana
		Asgarpur Village, (U.P.)	U.P./Delhi
		Mohena Palwal Road, (Haryana)	Haryana/U.P.
		Shergarh, (U.P.)	UP/Haryana
		Hasanpur, maholi (Haryana)	UP/Haryana
7.	Chambal	Udi ,(M.P.)	U.P./M.P.
		Eklingpura Village, Rawatbhata, (Rajasthan)	Rajasthan/MP
8.	Dhela	Adampur Village, (U.P.)	UP/Uttrakhand
9.	Kitchha	Pul Bhatta, Bareli Road, (Uttrakhand)	UP/Uttrakhand
10.	Koshi	Dadyal Bridge, (U.P.)	UP/Uttrakhand
11.	Bahela	Lohia bridge, Kashipur, (Uttrakhand)	UP/Uttrakhand
12.	Pilakhar	Rampur, Bhot (Uttar Pradesh)	UP/Uttrakhand
13.	Sarsa	Badhi D/S, (Ghanoli Village) Punjab (B/C to R. Satluj)	H.P./Punjab
		U/S at Saini Mazra, Punjab	H.P./Punjab
14.	Swan	Dhangla Village, Santoshgarh (Punjab)	H.P./Punjab
15.	Ravi	Madhopur U/S , Punjab	Punjab/J&K
		Lakhanpur, D/s, Madhopur, Jammu	Punjab/J&K
16.	Vardha	Pandhurana Village, (M.P.)	MP/Maharashtra
		Belur Dharmadabad, (Maharashtra)	Maharashtra/M.P.
17.	Mahi	Bajna,R., Ratlam, (M.P.)	M.P./Rajasthan
		Bajaj sagar, nr. Bansawara, (Rajasthan)	Rajasthan/MP
		Kadaa Dam, (Gujarat)	Bangladesh/W.B.
18.	Cauvery	Satyagala Bridge, (Karnataka)	Karnataka /Tamilnadu
19.	Thenpennai	Mugalur Bridge, (Karnataka)	Karnataka/ Tamilnadu
20.	Krishna	Deodurg (Karnataka)	Maharashtra/ Karnataka
		Kurundwad, Kolhapur, (Maharashtra)	Maharashtra/A.P.
21.	Tungabhadra	Hochchelli (Karnataka)	Karnataka/A.P.
22.	Bhima	Gangapur (Karnataka)	Maharashtra/Karnataka
		Takli, Solapur, (Maharashtra)	Maha./Karnataka
23.	Pennar	Mothukapalli (Karnataka)	Karnataka
		Hindupur (Andhra Pradesh)	A.P./Karnataka
24.	Manjira	Janwada (Karnataka)	Karnataka
25.	Godavari	Kavalguda (Maharashtra)	Karnataka/ Maharashtra
26.	Betwa	Kanjia bridge sagar , (M.P.)	M.P./U.P.
		D/S Dukwan Dam at Babina,Birdha Road,Distt. Lalitpur (U.P.)	UP/MP
27.	Sone	Chopan, (D/S before Reservoir Rihand), (U.P.)	M.P./U.P
28.	Ramganga	Deora, (U/S before Reservoir Rihand), (M.P.)	M.P./U.P
		D/S Kalagarh Dam, (Uttrakhand)	Uttrakhandl/U.P.

S.No.	River	Location	Interstate Boundary
		D/S Sherkot, (U.P.)	UP/Uttrakhand
29.	Indravati	Nowrangpur (Orissa)	Orisssa/M.P.
30.	Mahanadi	Hirakud (Orissa)	Orisssa/M.P.
31.	Churni	Bijoypur, (West Bengal)	Bangladesh/W. B.
32.	Damodar	Sindri (Jharkhand)	Jharkhand/W.B.
		Dishergarh (West Bengal)	WB/Jharkhand
33.	Sabarmati	Khedbrahma (Gujarat)	Gujarat/Rajasthan
34.	Manjara	Aurad Shahajani, Maharashtra	Maharashtra/ Karnataka
35.	Subarnarekha	Bheragora (Orissa)	Jharkhand/Orissa
		Gopiballavpur (West Bengal)	WB/Orissa
		Lakhannath (Orissa)	Orissa/W.B.
36.	Tapi	Nizhar, Maharashtra	Maharashtra/Gujarat
		Prakasha, Gujarat	Maharashtra/Gujarat
		Ajnad, Maharashtra	Maharashtra/M.P.
37.	Narmada	Navagam, (Gujarat)	Gujarat/M.P.
38.	Wainganga	Bapera, Bhandara (Maharashtra)	M.P./ Maharashtra
39.	Damanganga	Jarry Causeway D/S of CETP discharge, (Gujarat)	Gujarat/UT of Daman
		U/S of CETP discharge GIDC,	Gujarat/UT of Daman
40.	Dhansiri	Ganesh nagar , Nagaland	Nagaland/ Assam
		Bokajan, Assam	Assam/Nagaland
		Nagarjan Bridge,Nagaland	Nagaland/ Assam
		Khatkati Gate,Nagaland	Nagaland/ Assam
		Numaligarh, Assam	Assam/Nagaland

Table 5.7 Summary of observation of locations being monitored under Interstate River Boundries Monitoring (IRBM)

S. No.	Name of river	Location	N	Period of Observations	BOD(mg/l)			DO(mg/l)		
					Min	Max	Avg	Min	Max	Avg
1.	Yamuna	Paonta Sahib, (H.P.)	12	2005-2010	1	3.6	1.3	6.6	10.7	8.9
		Sonipat Baghpat Road, (Haryana)	10	2005-2010	1	7	3	6.1	8.2	7.2
		Palla, (Delhi)	14	2005-2010	1	6	2.7	5.5	10.7	8.0
		Asgarpur Village, (U.P.)	13	2005-2010	6	50	30.1	0	0	0
		Dak Pather (Uttrakhand)	10	2005-2010	1	2	1.2	6.8	10.2	9
		Buriya U/S Jagadhari (Haryana)	13	2005-2010	1	4	1.6	7	10.5	8.7
		Mohena Palwal Road (Haryana)	16	2005-2010	4	37	18.6	0	12.1	2.8
		Shergarh (U. P.)	18	2005-2010	2	10	4.6	6.6	18.6	10.1
		Hasanpur, Maholi, (Haryana)	2	2009-2010	11	26	18.5	0	0	0
2.		Parwanoo,(H.P.)	12	2006-2010	1	27	4.3	3.8	18	9.1

S. No.	Name of river	Location	N	Period of Observations	BOD(mg/l)			DO(mg/l)		
					Min	Max	Avg	Min	Max	Avg
	Ghaggar	Sirsa Dabwali Road, (Haryana)	11	2006-2010	2	128	33.6	0	12.2	4.0
		Mubarakpur, (Punjab)	12	2006-2010	3	24	11.2	1.8	7.4	5
		Tiwana Village, (Punjab)	12	2006-2010	2	46	16.4	0.8	19.8	4.8
		Chandrapur Siphon, (Haryana)	12	2006-2010	4	95	22.6	0	4.5	2.6
		Sirdulgarh, (Punjab)	12	2006-2010	3	84	23.5	0.1	10.2	4.1
		Parwanoo D/S , Amravati, (Haryana)	12	2006-2010	1	27	6	3.8	11.2	7.9
		Ottu Weir (Haryana)	12	2005-2010	2	70	20.6	1.3	7	4.4
		Sirsa Hanumangarh Road (Rajasthan)	9	2005-2008	1.3	4	2.6	1.57	6.3	4.6
3.	Ganga	Tarighat, Gazipur, (U.P.)	6	2005-2008	1	6	3.2	6.9	8.7	7.9
		Sultanpur (Uttrakhand)	8	2005-2008	1	3	1.6	6.8	12	8.9
		Bijnor Deoband Road (U. P.)	13	2005-2008	1	4	2	6.6	9.5	8
		Dari Ganj, Sonepur, (Bihar)	3	2008	2	3	2.3	5.81	5.81	5.8
4.	Beas	Narainpur (Talwara), (Punjab)	12	2006-2010	1	5	1.7	6.1	17.1	10.3
		Talwara U/S (Pong Dam) Distt. Kangra, (H.P.)	11	2005-2010	2	6	1.8	6.4	9	7.8
5.	Markanda	Naraingarh, (Haryana)	13	2005-2010	1	784	120	0	6.7	3.8
		Kala Amb U/S (H. P.)	13	2005-2010	1	4	2	4.4	11.2	7.5
6.	Satluj	Nangal (H. P.)	12	2006-2010	1	11	2.2	6	9.4	8.1
7.	Dhela	Kashipur-Muradabad Road, Adampur Village(U.P.)	6	2008-2010	20	20	20	0	0	0
8.	Bahela	Lohia Bridge, Kashipur-Bazpur Road, (Uttrakhand)	6	2008-2010	2	145	58	0	0	0
9.	Kosi	Dadyal Bridge(U.P.)	6	2008-2010	2	10	4	3.5	7.8	6.6
10.	Kitchha	Pull Bhatta, Bareli road, (Uttrakhand)	6	2008-2010	4	12	7.4	0	12	7.4
11.	Sarsa	Badhi D/S, (Ghanoli Village) Punjab (B/C to R. Satluj)	3	2009-2010	1	10	5.3	3	7.8	4.8
		U/S at Soni	2	2009-2010	5	30	17.5	10.4	12.8	11.6

S. No.	Name of river	Location	N	Period of Observations	BOD(mg/l)			DO(mg/l)		
					Min	Max	Avg	Min	Max	Avg
		Mazra, Punjab								
12.	Swan	Dhangla Village, Santoshgarh (Punjab)	3	2009-2010	1	4	2.5	2.4	11.2	6.8
13.	Pilakhar	Rampur, Bhot (Uttar Pradesh)	2	2009-2010	1	2	1.5	0	9.6	4.8
14.	Ravi	Madhopur U/S , Punjab	2	2009-2010	1	1	1	8.2	9.2	8.7
		Lakhanpur, D/s, Madhopur	1	2010	2	2	2	7.4	7.4	7.4
15.	Vardha	Pandhurana Village, (M.P.)	7	2006-2009	1	6	2.4	6.2	9.1	7.1
		Belur Dharmadabad & Karwar (Mosi) village (Maharashtra)	4	2006- 2007	0.1	2.1	1.1	6.6	9.2	7.7
16.	Mahi	Bajna,R., Ratlam, (M.P.)	12	2006-2010	1	20	3.4	4.7	9.7	6.8
		Bajaj Sagar, near Bansawara, (Rajasthan)	13	2006-2010	1	6	2.8	4	8.7	6.6
17.	Chambal	Fish farm, Gandhisagar Dam, (M.P)	13	2006-2010	1	26	3.8	6.1	9.8	7.2
		Udi (U.P.)	16	2006-2010	1	4	2	6.7	11	8.3
18.	Churni	Bijoypur (West Bengal)	12	2006-2009	2	12	5.7	0.7	5.8	2.6
19.	Betwa	D/S Dukwan Dam at Babina,Birdha Road,Distt. Lalitpur, (U.P.)	9	2005-2008	0.3	6	2.2	5.3	10.8	6.9
		Kanjia bridge sagar, (M.P.)	6	2005-2008	0.8	4	1.8	2.8	10.4	6.7
20.	Thenpennai	Mugalur Bridge, (Karnataka)	5	2005-2008	5.2	33	17	1	3	2
21.	Sone	Chopan, (D/S before Reservoir Rihand), (U.P.)	7	2005-2008	1	3.3	1.77	5.5	5.6	5.4
		Deora (U/S before Reservoir Rihand), (M.P.)	7	2005-2008	0.5	2.5	1.18	5.7	8.3	7
22.	Tapi	Prakasha, (Maharashtra)	4	2006-2008	0.5	8.3	4	7	8.8	7.6
		Nizhar, (Gujarat)	4	2006-2008	1	1.5	1.3	7.1	8.1	7.6
		Ajnad (Maharashtra)	3	2006-2008	0.7	3	2	7.1	14.5	9.9
23.	Manjara	Aurad Shahajani, (Maharashtra)	2	2006-2007	4.3	4.3	4.3	7.3	7.3	7.3
24.	Bhima	Takli, Solapur, (Maharashtra)	6	2005-2008	1	5.7	2.5	6.8	10.4	8.6
		Jewargi, (Ganagapur),(Karnataka)	5	2005-2008	0.5	1.6	1.0	6.2	8	7.2
25.	Krishna	Khurundward,	6	2005-2008	0.6	4.6	1.7	5.4	11.5	8.4

S. No.	Name of river	Location	N	Period of Observations	BOD(mg/l)			DO(mg/l)		
					Min	Max	Avg	Min	Max	Avg
		Kolhapur, (Maharashtra)								
		Deodurg (Karnataka)	3	2005-2008	0.2	1.6	0.6	7	7.8	7.8
26.	Damangan-ga	Jerry Causways, D/S of CETP, (Gujarat)	5	2007-2008	2.3	15	7.7	1.5	6.4	3.3
		U/S of CETP discharge GIDC Weir	5	2007-2008	0.7	2.3	1.4	6.1	7.4	7
27.	Dhansiri	Bokajan, (Assam)	10	2005-2008	1.6	5	3.0	4.8	9	7.6
		Ganeshnagar, (Nagaland)	11	2005-2008	0.3	2.8	1.2	5.2	10	8.6
		Nagarjan Bridge, (Nagaland)	11	2005-2008	0.1	10.2	2.9	1	10	7.4
		Khatkati Gate, (Nagaland)	11	2005-2008	0.3	12.6	2.8	5.8	10.5	7.9
		Numaligarh, (Assam)	11	2005-2008	0.6	2.5	1.7	0.6	9.5	7.3
28.	Damodar	Sindri (Jharkhand)	7	2005-2009	1	3	2.2	6.9	8.2	7.5
		Dishergarh (West Bengal)	7	2005-2009	1	3	2.2	6.5	8.2	7.4
29.	Indravati	Nowrangpur (Orissa)	6	2005-2009	1.1	3	2.0	6.8	8	7.3
30.	Cauvery	Satyagala Bridge, Narsipur (Karnataka)	5	2005-2008	0.3	1.6	0.9	6.9	8.6	7.6
31.	Tungabhad-ra	Hochchelli (Karnataka)	5	2005-2008	1.6	1.6	1.6	7.3	9	8.1
32.	Pennar	Mothukapalli (Karnataka)	2	2005	1.1	1.1	1.1	5.3	5.3	5.3
		Hindupur (Andhra Pradesh)	3	2005-2008	1	1.5	1.0	0.8	4	3
33.	Manjira	Janwada (Karnataka)	3	2005-2008	1.3	3.6	2.1	6.3	6.6	6.4
34.	Godavari	Basra Kavalguda, (Maharashtra)	3	2005-2008	1	3	2.0	4	568	193
35.	Ramganga	D/S Kalagarh, Dam (Uttrakhand)	7	2005-2008	1.2	2	1.6	7.5	8.4	8
		D/S Sherkot, Kalagarh (U. P.)	9	2005-2008	1.2	2.1	1.8	7	8.5	7.9
36.	Mahanadi	Hirakud (Orissa)	6	2005-2009	1	3	2.3	7	7.4	7.2
37.	Narmada	Navagam (Gujarat)	6	2006-2008	0.8	2.2	1.4	4.8	9	7.0
38.	Wainganga	Bapera, Bhandara (Maharashtra)	6	2006-2008	0.3	1.7	1.1	5.8	8.2	6.9
39.	Sabarmati	Khedbrahma (Gujarat)	2	2005-2007	1.1	1.1	1.1	6.7	10.5	8.6
40.	Subarnarekha	Bheragora (Jharkhand)	7	2005-2009	1	3	2	6.8	8.5	7.6
		Gopiballavpur (West Bengal)	7	2005-2009	2	3	2.3	6.4	8.5	7.6
		Lakhannath, Orissa	7	2005-2009	2	2	2	6.8	8.2	7.5

Table 5.8: Status of identified polluted river stretch at Inter State Boundaries

S. No.	River	Sample Location	State Boundary
1.	Yamuna	Paonta Sahib,(H.P.)	HP/Haryana
		Sonipat Baghpat Road, (Haryana)	Haryana/U.P.
		Palla, (Delhi)	Haryana/Delhi
		Asgarpur Village, (U.P.)	Delhi/U.P.
		Hasanpur, maholi (Haryana)	UP/Haryana
2.	Ghaggar	Parwanoo,(H.P.)	H.P/Haryana
		Sirsa Dabwali Road, (Haryana)	Punjab/Haryana
		Mubarakpur, (Punjab)	Haryana/Punjab
		Tiwana Village, (Punjab)	Punjab/Haryana
		Chandrapur Siphon, (Haryana)	Haryana/Rajasthan
		Sirdulgarh, (Punjab)	Punjab/Haryana
3.	Chambal	Eklingpura village, Rawatbhata, (Rajas-than)	M.P./Rajasthan
4.	Mahi	Bajna,R., Ratlam, (M.P.)	M.P./Rajasthan
		Bajaj sagar, near Bansawara, (Rajasthan)	Rajasthan/Gujarat
5.	Wardha	Pandhurana Village, (M.P.)	MP/Maharashtra
6.	Churni	Bijoypur, (West Bengal)	Bangladesh/ West Bengal
7.	Betwa	D/S Dukwan Dam at Babina,Birdha Road,Distt. Lalitpur, (U.P.)	M.P./U.P.
		Kanjia bridge sagar, (M.P.)	M.P./U.P.
8.	Ganga	Tarighat, Gazipur, (U.P.)	U.P./Bihar
9.	Thenpennai	Mugalur Bridge, (Karnataka)	Karnataka/ Tamilnadu
10.	Beas	Narainpur Talwara, (Punjab)	HP/Punjab
11.	Markanda	Naraingarh, (Haryana)	HP/Haryana
12.	Sone	Chopan,(D/S before Reservoir Rihand), U.P.)	M.P./U.P
13.	Tapi	Prakasha, (Maharashtra)	Maharashtra/Gujarat
		Nizhar, (Gujarat)	Gujarat/Maharashtra
14.	Manjara	Aurad Shahajani, (Maharashtra)	Maharashtra/Karnataka
15.	Bhima	Takli, Solapur, (Maharashtra)	Maharashtra/ Karnataka
16.	Krishna	Khurundward, Kolhapur, (Maharashtra)	Maharashtra/ Karnataka
17.	Daman-ganga	Jerry Causways, D/S of CETP, (Gujarat)	Gujarat/ UT Daman
18.	Dhansiri	Bokajan, (Assam)	Nagaland/ Assam
19.	Damodar	Sindri (Jharkhand)	Jharkhand/W.B.
		Dishergarh (West Bengal)	W. B./Jharkhand
20.	Indravati	Nowrangpur (Orissa)	Orissa/M.P.
21.	Dhela	Adampur Village(U.P.)	Uttrakhand/ U.P.
22.	Bahela	Lohia Bridge, (Uttrakhand)	Uttrakhand/ U.P.
23.	Kosi	Dadyal Bridge (U.P.)	Uttrakhand/ U.P.
24.	Kitchha	Pull Bhatta, Bareli road, (Uttrakhand)	Uttrakhand/ U.P
25.	Sarsa	Badhi D/S, (Ghanoli Village) Punjab (B/C to R. Satluj)	H.P./Punjab
		U/S at Soni Mazra, Punjab	H.P./Punjab
26.	Swan	Dhangla Village, Santoshgarh (Punjab)	H.P./Punjab

5.4 AIR QUALITY NETWORK

5.4.1 National Ambient Air Quality Standards (NAAQS)

The ambient air quality objectives/standards are pre-requisite for developing programme for effective management of ambient air quality and to reduce the damaging effects of air pollution. The previous National Ambient Air Quality Standards (NAAQS) were notified in year 1994 for six pollutants (SO2, NO2, RSPM /PM10, SPM, CO and lead). The pollutant Ammonia was added in 1996. The revised National Ambient Air Quality Standards notified on November 2009 for the pollutants (SO2, NO2, PM10, SPM, CO, NH_3, Benzo(a)pyrene B(a)P, O_3, Lead, Nickel and Arsenic) is given in Table 5.9

Table 5.9 Revised National Ambient Air Quality Standards (NAAQS)
[NAAQS Notification dated 18th November, 2009]

S. No.	Pollutants	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (notified by Central Government)	
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	1. Improved West and Gaeke 2. Ultraviolet Fluorescence
		24 Hours**	80	80	
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	1. Modified Jacob & Hochheiser (Na-Arsenite) 2. Chemiluminescence
		24 Hours**	80	80	
3	Particulate Matter (Size <10µm) or PM_{10} µg/m³	Annual*	60	60	1. Gravimetric 2. TOEM 3. Beta attenuation
		24 Hours**	100	100	
4	Particulate Matter (Size <2.5 µm) or $PM_{2.5}$ µg/m³	Annual*	40	40	1. Gravimetric 2. TOEM 3. Beta attenuation
		24 Hours **	60	60	
5	Ozone (O_3), µg/m³	8 hours**	100	100	1. UV photometric 2. Chemiluminescence 3. Chemical Method
		1 hours **	180	180	
6	Lead (Pb), µg/m³	Annual *	0.50	0.50	1. AAS/ICP Method after sampling using EPM 2000 or equivalent filter paper 2. ED-XRF using Teflon filter
		24 Hour**	1.0	1.0	
7	Carbon Monoxide (CO), mg/m³	8 Hours **	02	02	Non dispersive Infra Red (NDIR) Spectroscopy
		1 Hour**	04	04	
8	Ammonia (NH_3), µg/m³	Annual*	100	100	1. Chemiluminescence 2. Indophernol blue method
		24 Hour**	400	400	
9	Benzene (C_6H_6) , µg/m³	Annual *	05	05	1. Gas chromatography based continuous analyzer 2. Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP)- particulate phase only, ng/m³	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m³	Annual*	06	06	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual*	20	20	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

5.4.2 National Ambient Air Quality Monitoring Programme

Central Pollution Control Board is executing a nation-wide National Air Quality Monitoring Programme (NAMP). The air quality network has 411 operating stations covering 167 cities/towns in 26 States and 5 Union Territories. The objectives of the NAMP are:

i) To determine the status and trends of ambient air quality;
ii) ii) To ascertain whether the prescribed ambient air quality standards are violated;
iii) To identify non-attainment cities with respect to national standards and
iv) To obtain the knowledge and understanding necessary for developing preventive and corrective measures.

The monitoring under the NAMP is being carried out with the help of Central Pollution Control Board; Zonal Offices; State Pollution Control Boards; Pollution Control Committees and National Environmental Engineering Research Institute (NEERI), Nagpur. CPCB co-ordinates with these agencies to ensure uniformity, consistency of air quality data and provides technical and financial support to them for operating the monitoring station. As the monitoring under the NAMP is being operated through various monitoring agencies, large number of personnel and equipment are involved in the sampling, chemical analyses, data reporting etc. because of which personnel biases are sometimes reflected in air quality data. This limitation needs to be considered by the users while using the data. CPCB is strengthening NAMP is terms of number of stations and number of parameters being monitored. The growth of operating Air Quality Monitoring Stations in the country is given in Figure 5.1.

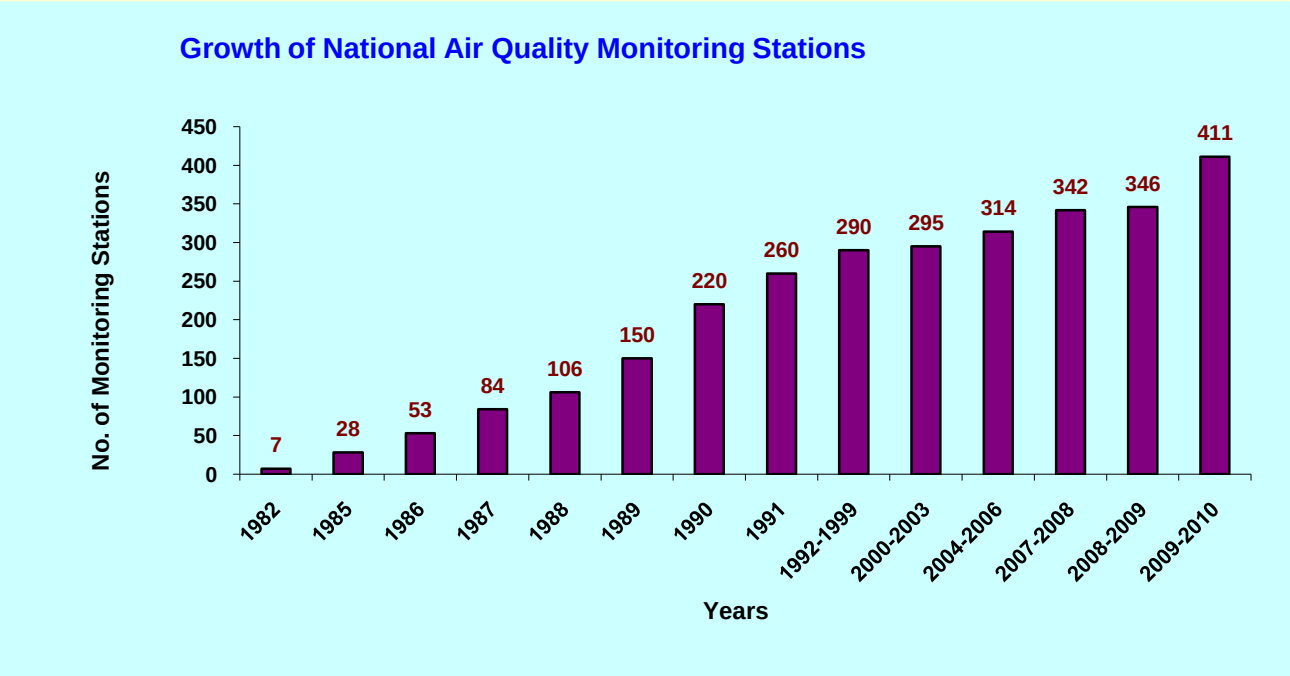


Figure 5.1: Growth of Operating Ambient Air Quality Monitoring Stations in the country

Under NAMP, four air pollutants *viz.*, Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Suspended Particulate Matter (SPM) and Particulate Matter size less than 10 µg (PM_{10}), have been identified for regular monitoring at all the locations. The monitoring of meteorological parameters such as wind speed, wind direction, relative humidity and temperature was also integrated with the monitoring of air quality. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with twice a week frequency to have 104 observations in a year.

5.4.3 Pollution levels falls under different air quality categories in cities of India

CPCB depicts ambient air quality in terms of low, moderate, high and critical levels by calculating an exceedence factor as follows:
The Exceedence Factor (EF) is calculated as follows:

$$\text{Exceedence Factor} = \frac{\text{Observed annual mean concentration of criteria pollutant}}{\text{Annual standard for the respective pollutant and area class}}$$

The four air quality categories are:

- Critical pollution (C) : when EF is more than 1.5;
- High pollution (H) : when the EF is between 1.0 - 1.5;
- Moderate pollution (M) : when the EF between 0.5 - 1.0; and
- Low pollution (L): when the EF is less than 0.5.

Table 5.10: Pollution Level Classification

Pollution level	Annual Mean Concentration Range (µg/m³)					
	Industrial, Residential,Rural & others areas			Ecologically Sensitive Area		
	SO_2	NO_2	RSPM	SO_2	NO_2	RSPM
Low (L)	0-25	0-20	0-30	0-10	0-15	0-30
Moderate (M)	26-50	21-40	31-60	11-20	16-30	31-60
High (H)	51-75	41-60	61-90	21-30	31-45	61-90
Critical (C)	>75	>60	>90	>30	>45	>90

5.4.4 Major Findings

5.4.5 Air Quality Assessment for Air Pollutants

A). Sulphur Dioxide (So_2)

Air Quality wrt SO_2

Number of monitoring stations with low and moderate levels of Sulphur Dioxide (SO_2) is depicted in Figure 5.2. SO_2 levels at all the monitoring stations in residential and indus-

trial areas were low except at ten monitoring stations in residential and industrial areas, where moderate levels were observed. The NAAQS (Annual average) of SO_2 was not exceeded at any of the monitoring stations in residential and industrial areas during 2009.

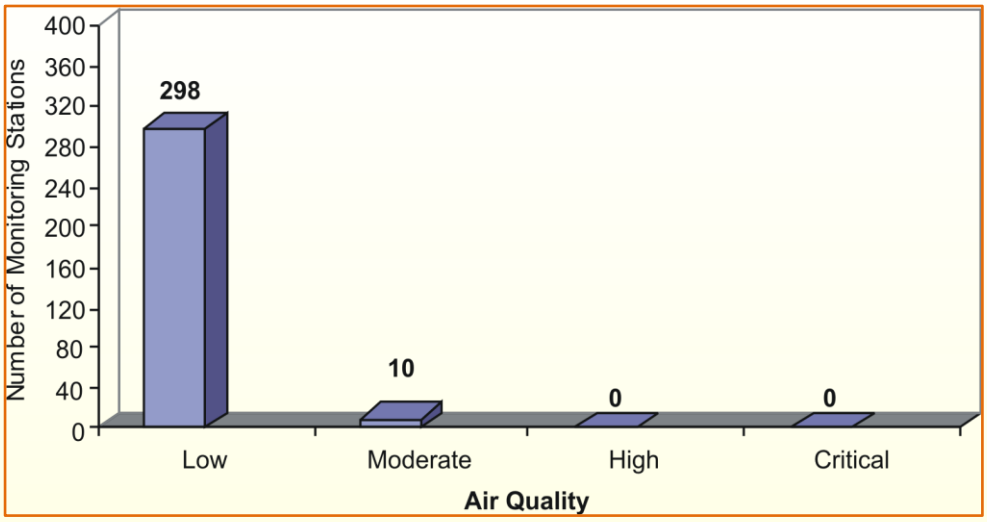
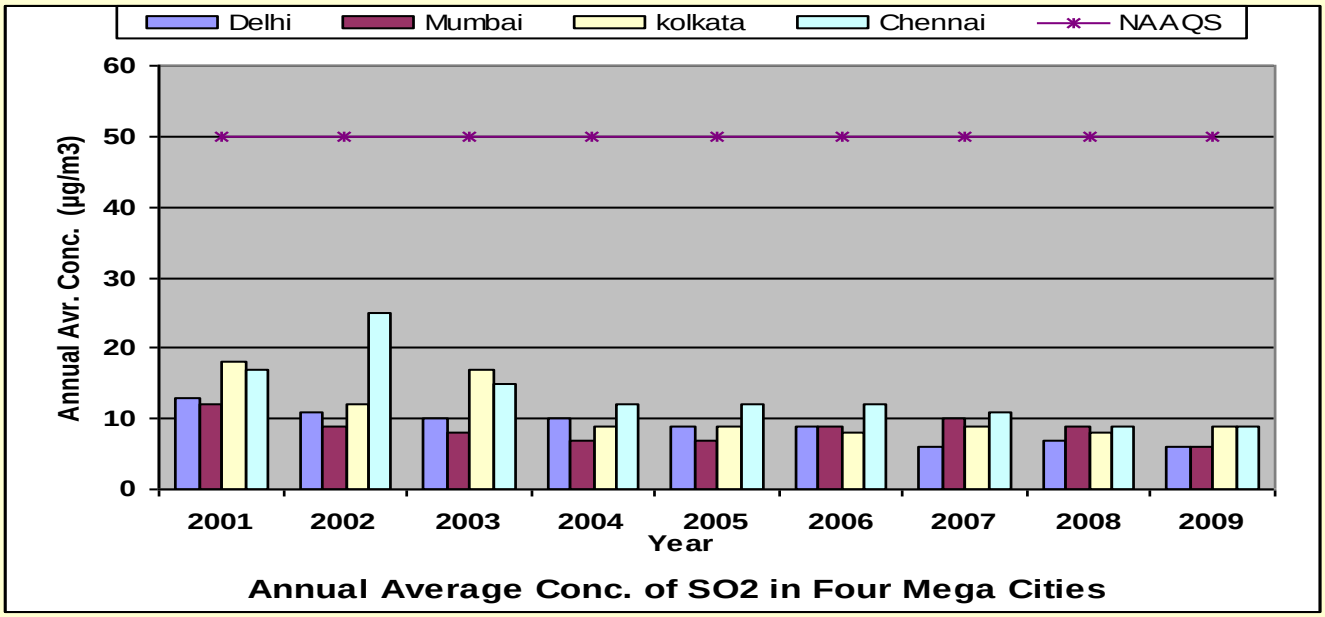


Figure 5.2: Number of Monitoring Stations with low, moderate, high and critical level of SO_2.

Trends in Annual Average Concentration of SO_2

Trend in annual average concentration in SO_2 levels in various cities is depicted in Figure 5.3. A decreasing trend has been observed in sulphur dioxide levels Delhi, Kolkata, Mumbai, Chennai etc., during last five years. The decreasing trend in sulphur dioxide levels may be due to various measures taken such as reduction of sulphur in diesel, use of LPG instead of coal as domestic fuel conversion of diesel vehicles to CNG etc.



NAAQS- National Ambient Air Quality Standards 2009

Figure 5.3: Trends in SO_2 in Residential and Industrial Areas in various Metropolitan cities.

B) Nitrogen Dioxide (NO_2)

Air Quality wrt NO_2

Number of monitoring stations with low, moderate and high levels of NO_2 is depicted in Figure 5.4. NO_2 levels at 35 % of the monitoring stations in industrial and residential areas were low. High levels of NO_2 were observed at 48% and Critical levels of NO_2 were observed at 13% of the locations.

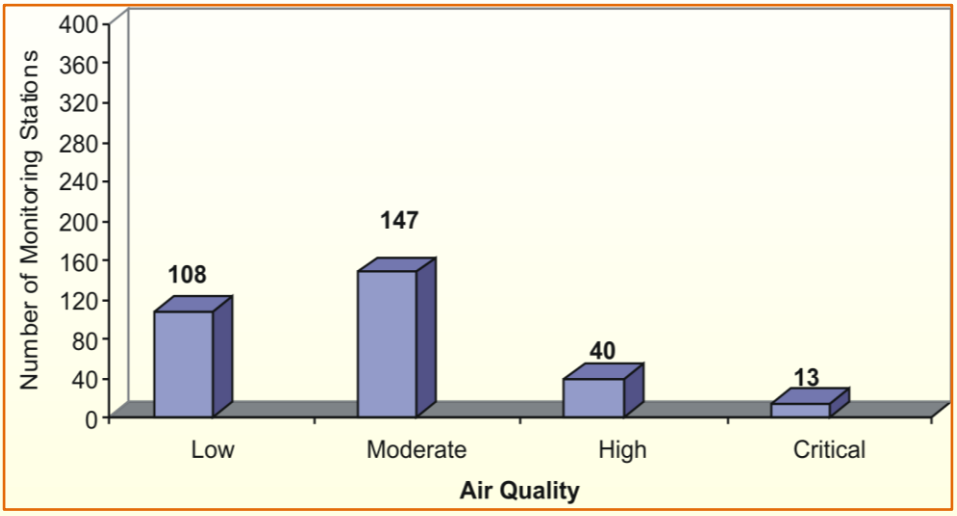
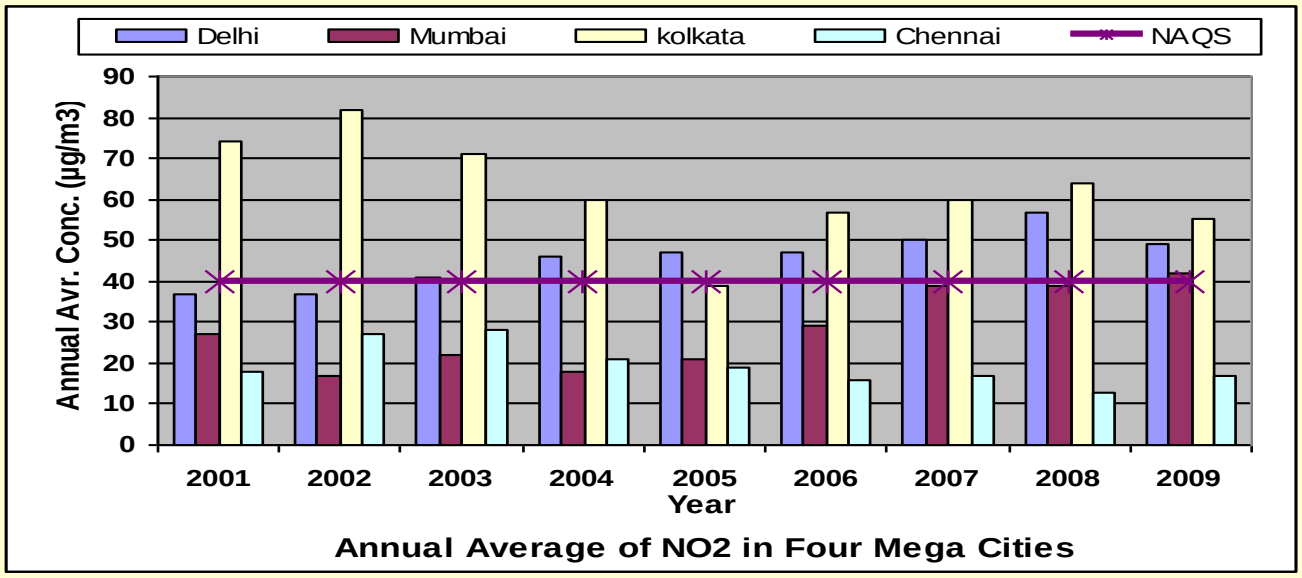


Figure 5.4: Number of Monitoring Stations with Low, Moderate, High and Critical levels of Nitrogen Dioxide

Trends in Annual Average Concentration of NO_2

Trend in annual average concentration in NO_2 levels in various Metropolitan cities is depicted in Figure 5.5. Fluctuating trends have been observed in NO_2 levels but well within the national standards. Various measures such as implementation of Bharat Stage-III norms have been taken to mitigate ambient NO_2 build up but exponential increase in number of vehicles encountered these measures.



NAAQS- National Ambient Air Quality Standards 2009

Figure 5.5: Trends in NO_2 in Residential and Industrial Areas in various Metropolitan cities

C) Respirable Suspended Particulate Matter (Rspm)

Air Quality wrt RSPM

Number of monitoring stations with low, moderate, high and critical levels of RSPM is depicted in Figure 5.6. RSPM levels at 16 % of the monitoring stations in industrial and residential areas were Moderate, High levels of RSPM were observed at 28% and Critical levels of RSPM were observed at 56% of the locations.

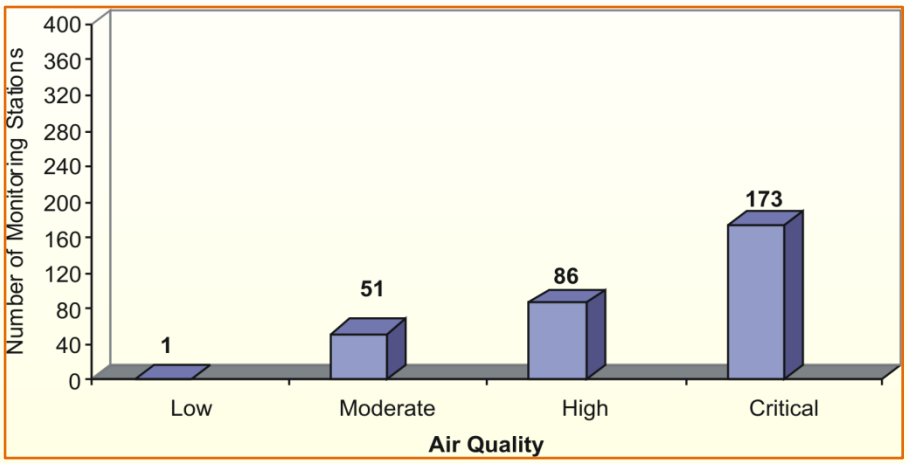
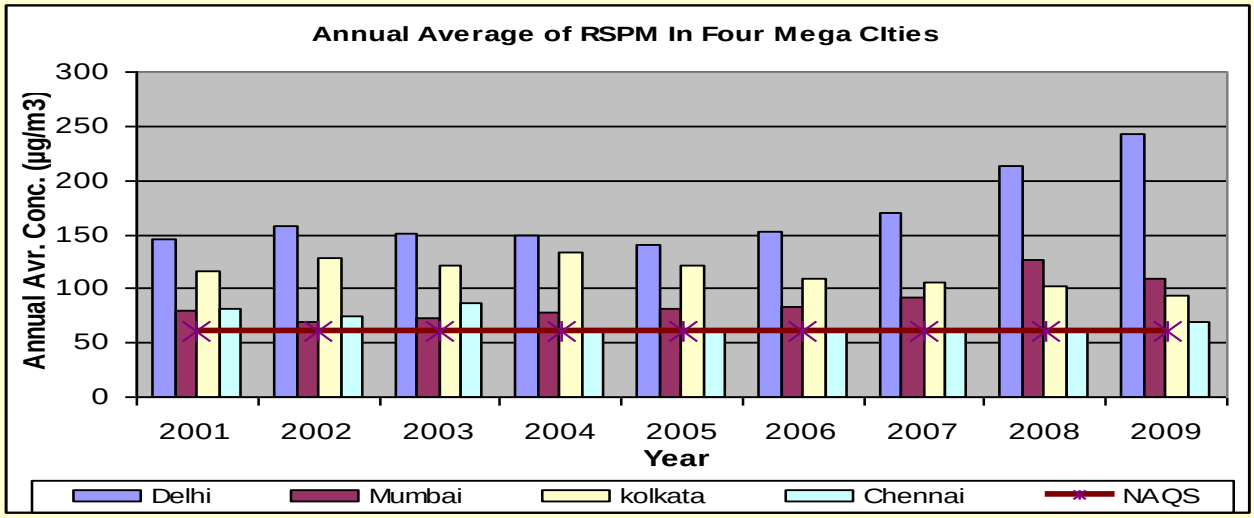


Figure 5.6: Number of Monitoring Stations with Low, Moderate, High and Critical levels of RSPM

Trends in Annual Average concentration of RSPM

Trend in annual average concentration in RSPM levels in residential areas of various cities is depicted in Figure 5.7. Fluctuating trends have been observed in RSPM levels but indicates increasing trend in Delhi, Mumbai and Kolkata but for Chennai it shows decreasing trend. Various measures such as implementation of Bharat Stage-III norms etc have been taken to mitigate ambient RSPM which have been quartered exponential increase in number of vehicles. The reason for high particulate matter levels may be attributed by vehicular traffic, Diesel/Kerosene gensets, small-scale industries, biomass incineration, resuspension of traffic dust, commercial and domestic use of fuels etc.



NAAQS- National Ambient Air Quality Standards 2009

Figure 5.7: Trends in RSPM in Residential and Industrial Areas in various Metropolitan cities

D) Air Quality Status in India

SO2 levels are decreases and within the prescribed National Ambient Air Quality Standards across the country due to various measures taken such as reduction of sulphur in diesel, conversion of diesel vehicles to CNG in Delhi, use of LPG instead of coal as domestic fuel etc. Lead in ambient air has been controlled due to policy intervention, i.e. supply of unleaded petrol and its levels are also within norms. NO2 levels are fluctuating but within the prescribed NAAQS in most of the cities. PM10 levels exceed prescribed NAAQS in most of cities. The number of cities with low, moderate, high and critical categories is given in Table 5.11.

Table 5.11: Ambient Air Quality during year 2009 in terms of pollution level (L: Low, M: Moderate, H: High, C: Critical)*

*** Pollution Level Classification**

STATE, UT / CITY	SO_2 (µg/m³)	Air Quality	NO_2 (µg/m³)	Air Quality	RSPM (µg/m³)	Air Quality
Andhra Pradesh						
Hyderabad	5	L	22	M	82	H
Visakhapatnam	13	L	32	M	97	C
Vijayawada	5	L	14	L	80	H
Ramagundum	4	L	15	L	106	C
Kurnool	4	L	9	L	79	H
Patencheru	17	L	26	M	87	H
Assam						
Guwahati	8	L	16	L	119	C
Bongaigaon	6	L	15	L	81	H
Tezpur	5	L	13	L	83	H
Dibrugarh	5	L	13	L	44	M
Sivasagar	5	L	13	L	89	H
Silcher	6	L	14	L	57	M
Chattisgarh						
Bhilai	15	L	25	M	112	C
Korba	13	L	21	M	117	C
Raipur	19	L	46	M	260	C
Chandigarh						
Chandigarh	2	L	15	L	81	H
Dadra & Nagar Haveli						
Silvassa	9	L	17	L	71	H
Daman & Diu						
Daman	7	L	19	L	57	M
Delhi						
Delhi	6	L	49	M	243	C
Gujarat						
Ahmedabad	16	L	21	M	95	C
Ankleshwar	19	L	27	M	89	H
Jamnagar	14	L	28	M	106	C

Rajkot	12	L	19	L	105	C
Surat	19	L	26	M	91	C
Vadodara	16	L	30	M	86	H
Vapi	16	L	24	M	78	H
Goa						
Vasco	4	L	16	L	73	H
Murmugao	4	L	9	L	67	H
Himachal Pradesh						
Damtal	3	L	17	L	69	H
Parwanoo	3	L	11	L	82	H
Paonta Sahib	2	L	16	L	118	C
Shimla	3	L	11	L	68	H
Baddi	4	L	13	L	63	H
Kala Amb	2	L	17	L	141	C
Jharkhand						
Jharia	17	L	41	H	261	C
Sindri	16	L	40	M	166	C
Jamshedpur	36	M	49	H	172	C
Ranchi	18	L	32	M	182	C
Karnataka						
Bangalore	16	L	40	M	122	C
Mysore	15	L	30	M	48	M
Hubli-Dharwad	3	L	13	L	107	C
Belgaum	2	L	15	L	30	L
Hassan	4	L	22	M	46	M
Mangalore	7	L	6	L	41	M
Kerala						
Kochi	4	L	12	L	40	M
Kottayam	6	L	19	L	45	M
Kozhikode	2	L	9	L	32	M
Thiruvananthapuram	11	L	25	M	65	H
Palakad	3	L	7	L	49	M
Maharashtra						
Mumbai	6	L	42	H	109	C
Chandrapur	36	M	33	M	107	C
Kolhapur	12	L	14	L	82	H
Nagpur	6	L	30	M	99	C
Nashik	23	L	29	M	89	H
Pune	23	L	40	M	82	H
Solapur	18	L	36	M	71	H
Thane	13	L	19	L	58	M
Aurangabad	7	L	25	M	86	H
Navi Mumbai	15	L	42	H	111	C
Madhya Pradesh						
Bhopal	7	L	18	L	115	C
Indore	6	L	11	L	114	C
Jabalpur	2	L	24	M	136	C

Nagda	22	L	24	M	105	C
Sagar	4	L	18	L	124	C
Dewas	13	L	20	L	113	C
Ujjain	11	L	12	L	86	H
Meghalaya						
Shillong	2	L	5	**L**	**55**	M
Mizoram						
Aizwal	2	L	6	L	38	M
Orissa						
Angul	7	L	20	L	115	C
Bhubaneshwar	2	L	18	L	75	H
Cuttack	2	L	24	M	83	H
Rourkela	6	L	11	L	106	C
Talcher	12	L	23	M	104	C
Rayagada	3	L	21	M	60	M
Sambalpur	4	L	16	L	54	M
Berhampur	2	L	20	L	87	H
Punjab						
Gobindgarh	10	L	29	M	206	C
Jalandhar	12	L	29	M	140	C
Ludhiana	9	L	37	M	254	C
Naya Nangal	8	L	20	L	162	C
Khanna	9	L	36	M	249	C
Rajasthan						
Alwar	8	L	23	M	153	C
Jaipur	6	L	36	M	151	C
Kota	7	L	24	M	91	C
Jodhpur	6	L	23	M	164	C
Udaipur	5	L	26	M	85	H
Tamil Nadu						
Chennai	9	L	17	L	70	H
Coimbatore	6	L	29	M	42	M
Madurai	10	L	25	M	42	M
Salem	9	L	25	M	82	H
Tuticorin	23	L	14	L	108	C
Uttar Pradesh						
Anpara	18	L	29	M	136	C
Allahabad	3	L	24	M	160	C
Kanpur	8	L	31	M	211	C
Firozabad	21	L	32	M	187	C
Lucknow	8	L	36	M	197	C
Ghaziabad	30	M	31	M	236	C
Jhansi	21	L	29	M	192	C
West Bengal						
Howrah	14	L	81	C	115	C
Kolkata	16	L	56	H	187	C

E) National Mean

CPCB publishes annual average concentration of SO_2, NO_2 and RSPM in annual status reports. Average of annual average concentrations is calculated considering all the ambient air quality monitoring stations under NAMP. As well as 90th percentile and 10th percentile of annual average concentrations is calculated considering all the ambient air quality monitoring stations under NAMP.

Trend in average of annual average, 90th percentile and 10th percentile is depicted in figure 8 to figure 10 for SO_2, NO_2 and RSPM. National mean SO_2 concentration has decreased over the years indicating that there has been a decline in SO_2 levels. National mean NO_2 and RSPM concentration has remained stable over the years despite increase in sources like vehicles.

The reason for this may be various intervention measures that have taken place such as improvement in vehicle technology and other vehicular pollution control measures like alternate fuel etc.

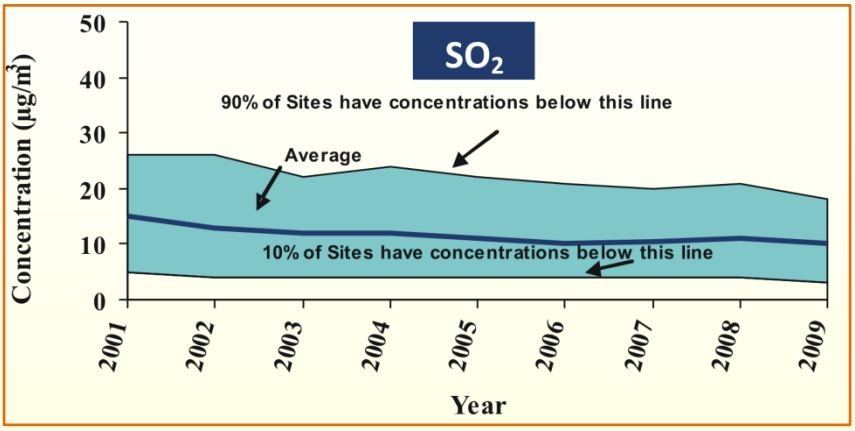


Figure 5.8: National Mean Concentrations of SO_2 at different sites (locations) fall under 10 percentile and 90 percentile area in India

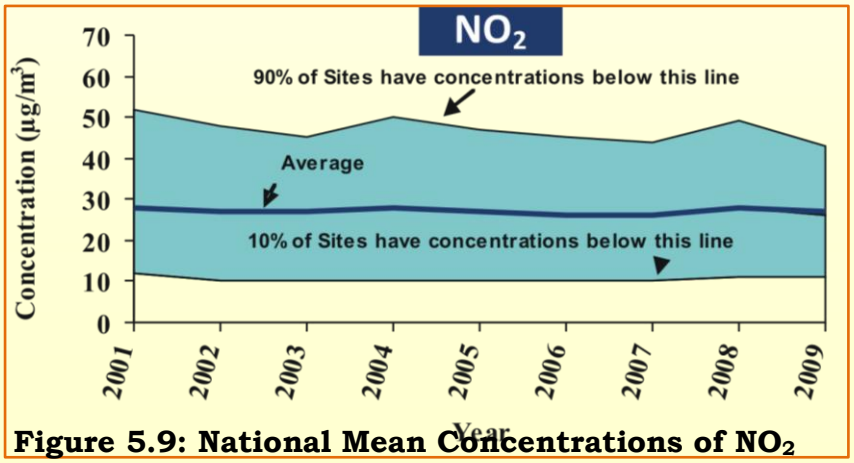


Figure 5.9: National Mean Concentrations of NO_2 at different sites (locations) fall under 10 percentile and 90 percentile area in India

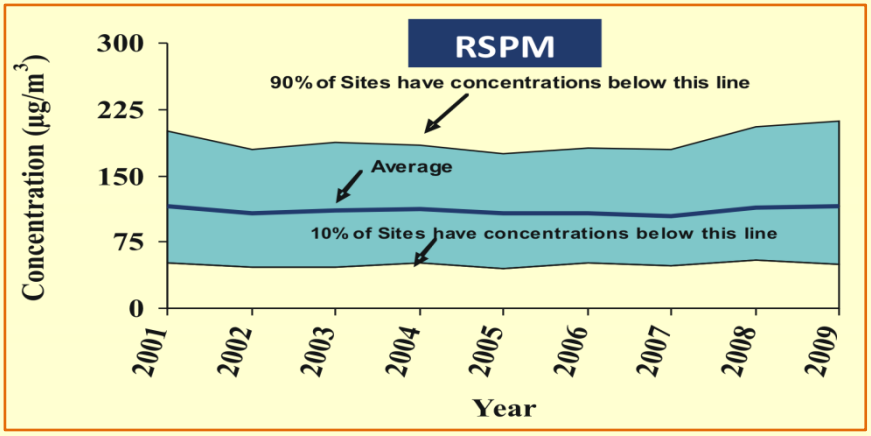


Figure 5.10: National Mean Concentrations of RSPM at different sites (locations) fall under 10 percentile and 90 percentile area in India

5.4.6 Ambient Air Quality Studies in Cities

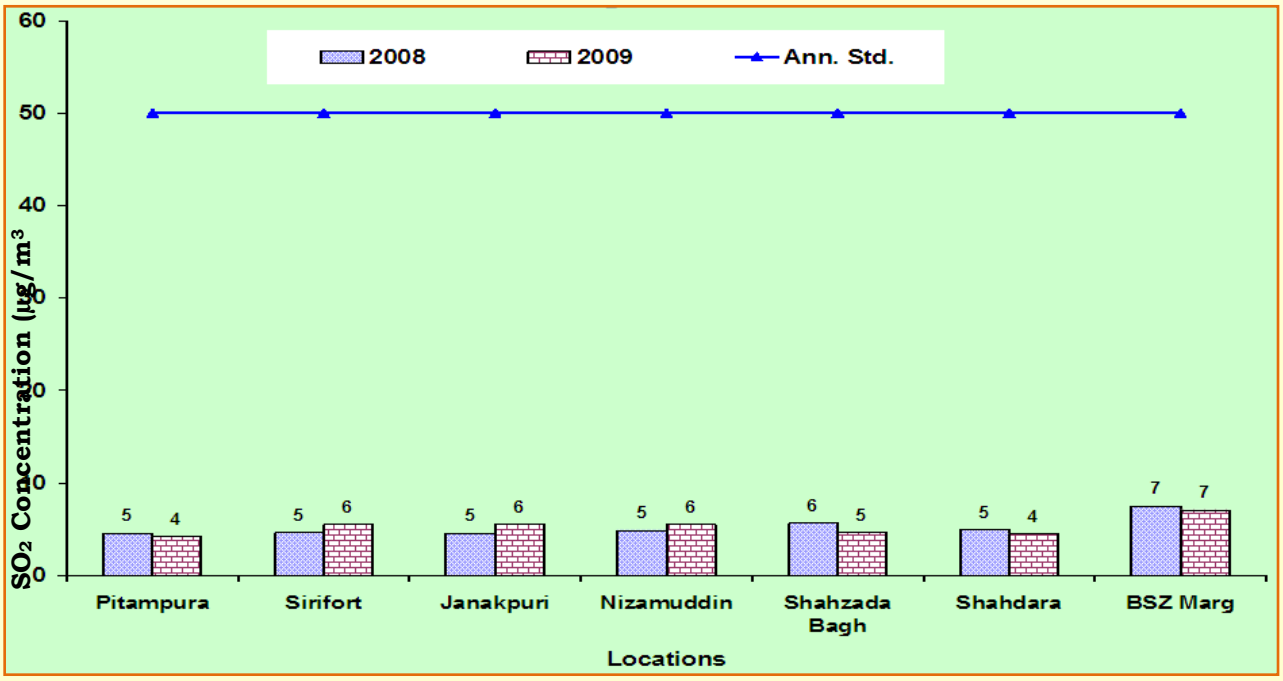
5.4.6.1 Air Quality In Delhi

A.1 Ambient Air Quality

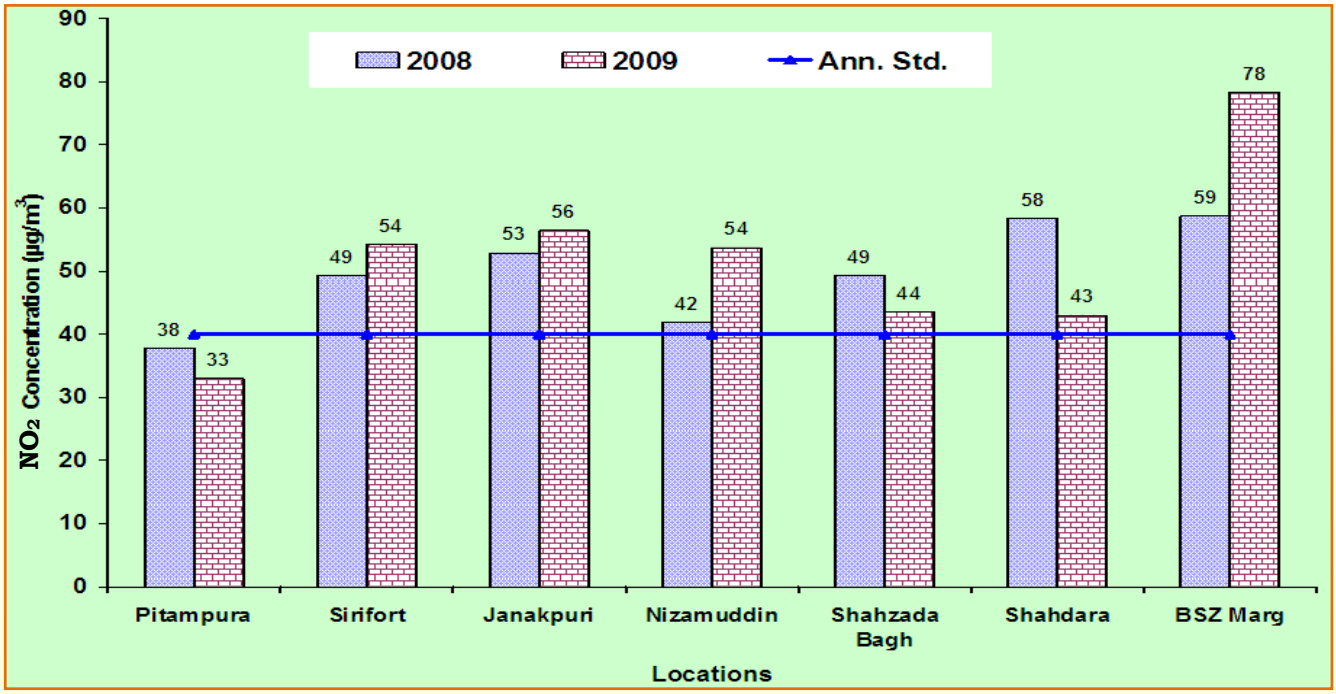
Air quality monitoring was conducted at SEVEN locations in 2009 by the Central Laboratory at Delhi:

S.No.	Locations	Parameters
1.	Pitampura	The parameters monitored are : • Sulphur dioxide (SO_2), • Nitrogen dioxide (NO_2), • Suspended particulate matter (SPM) • Respirable SPM (PM_{10})
2.	Sirifort	
3.	Janakpuri	
4.	Nizamuddin	
5.	Shahzadabagh	
6.	Shahdara	
7.	Bahadur Shah Zafar (BSZ) Marg	

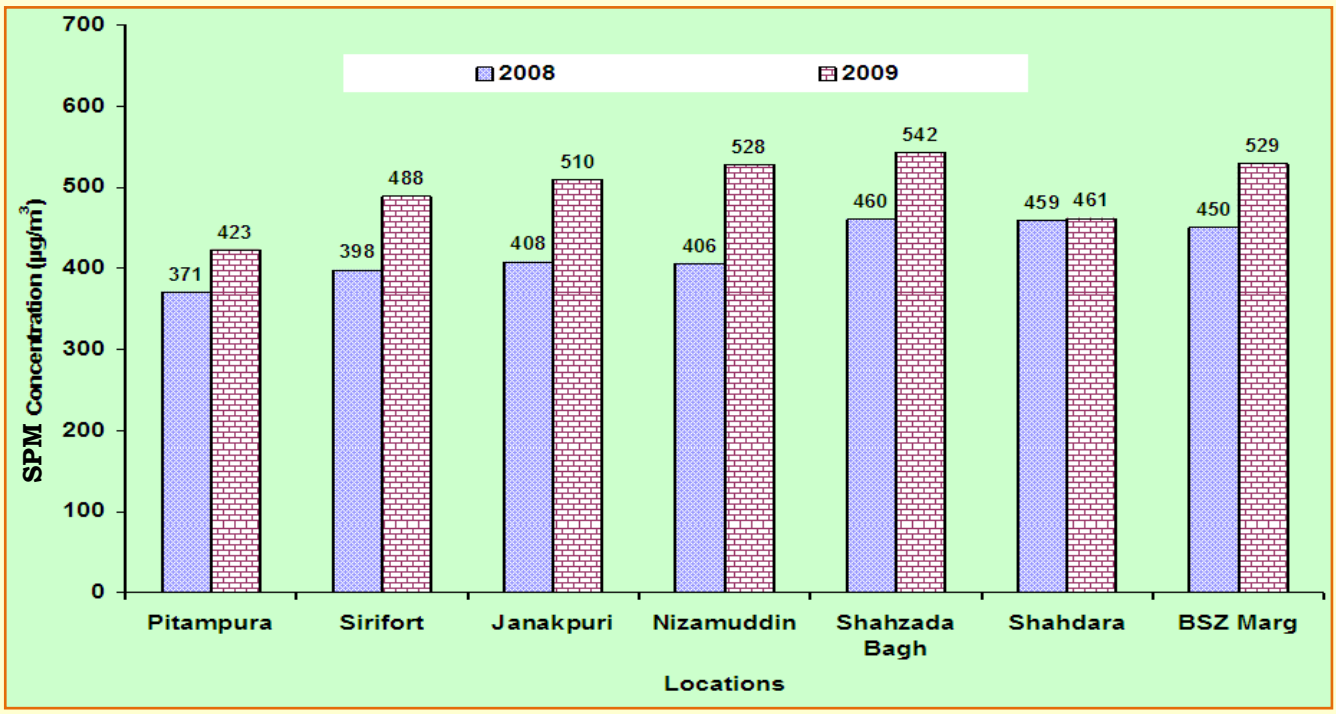
i. Sulphur dioxide (SO_2): All values are well below the mean value stipulated in National Ambient Air Quality standards (2009) i.e. i.e. 50 µg/m³.



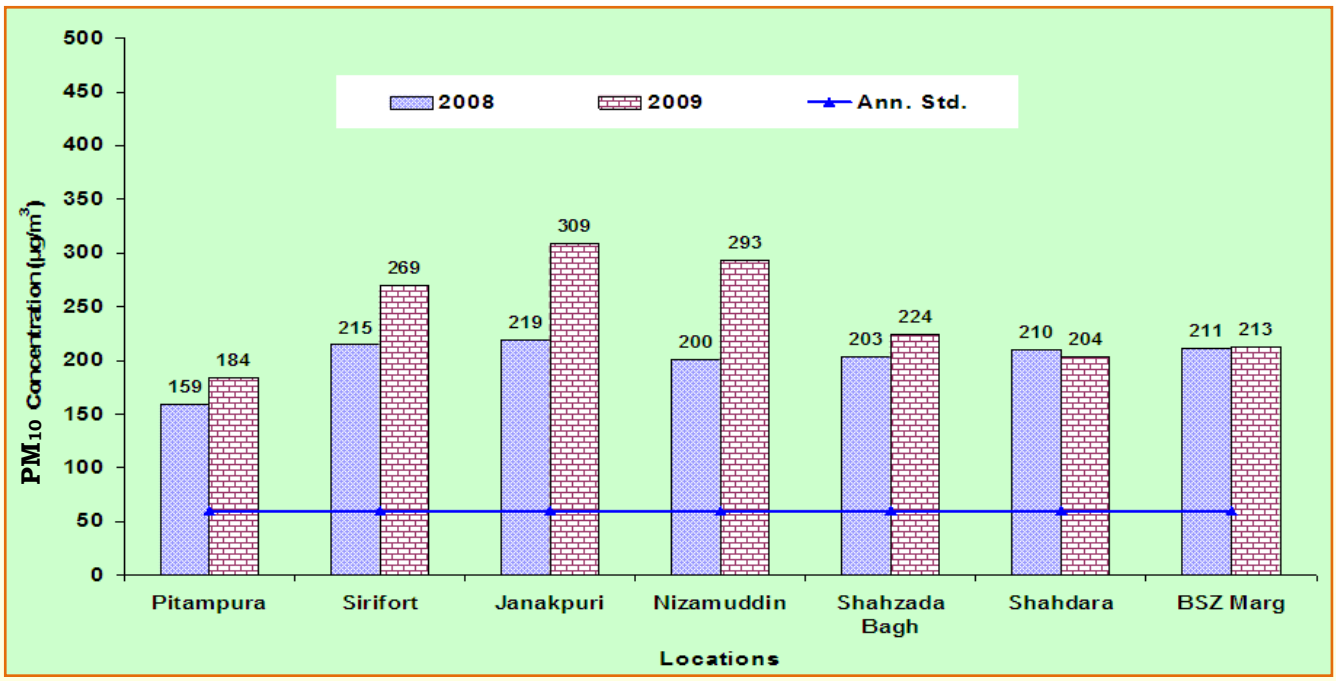
ii. Nitrogen dioxide (NO_2) Four out of the seven stations have mean values exceeding the stipulated mean in National Ambient Air Quality standards (2009) i.e. 40 µg/m³. The annual mean concentrations of nitrogen dioxide for the years, 2008 and 2009 are compared in the adjoining figure. The concentrations ranged between 33 – 78 µg/m³ in 2009 while it ranged between 38 – 59 µg/m³ in year 2008.



iii. Suspended Particulate Matter (SPM) - The annual mean concentrations of SPM for the years, were > 300 µg/m³ at all locations in 2008 and 2009.



iv. Respirable Suspended Particulate Matter (PM_{10}) Mean values from all the stations were more than the stipulated mean in National Ambient Air Quality standards (2009) i.e 60 µg/m³.



A.2 Monitoring of VOCs in Delhi

The CPCB Central Laboratory monitored Volatile Organic Compounds (VOCs) in two rounds of sampling in Delhi during April 28-29, 2009 at three stations near traffic intersection points and one petrol pum as follows :

- ✓ ITO ;
- ✓ Connaught Place
- ✓ Pitampura, and
- ✓ Petrol pump at Preet Vihar

Benzene exceeded the national ambient air quality limit of 5 µg/m^3 at all locations.

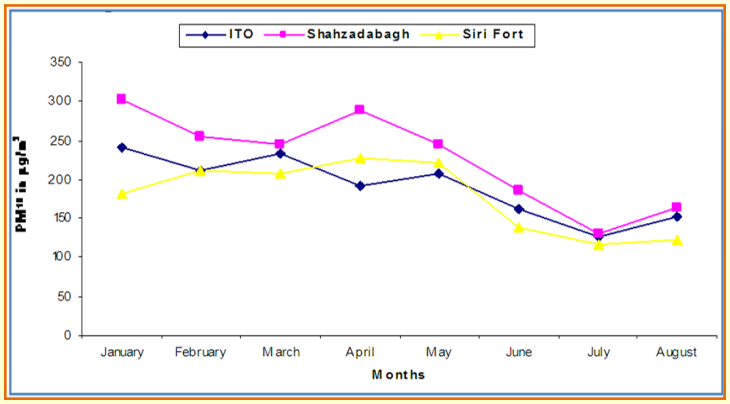
Table 5.11: VOCs in Delhi

VOCs in Delhi in April 2009		
Sampling Stations	Date & Time of Sampling	Conc. (µg/m3)
ITO	29.04.09 ; (10 am -2 pm)	Toluene -45 ; Benzene – 14
	29.04.09; (2 pm – 6 pm)	Toluene -38
Connaught Place	29.04.09 (10 am – 6 pm)	Benzene – 16 ; Toluene -34 Ethyl Benzene - 4
Pitampura	28.04.09; 10 am – 6 pm)	Trichloro methane - 21 Benzene - 4.2; Toluene -57 m,p -Xylene - 2.5

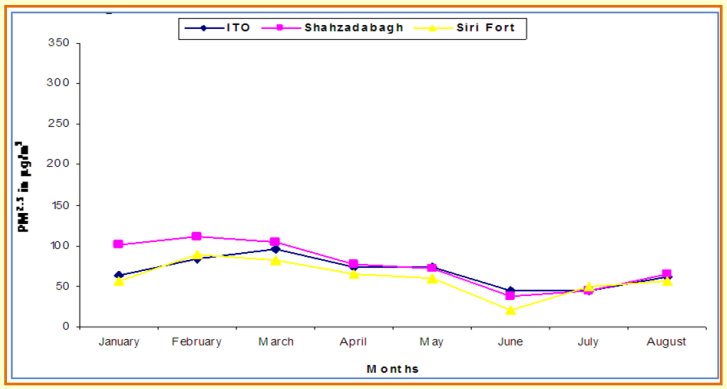
VOCs in Delhi in April 2009		
Preet Vihar Petrol Pump	28.04.09; (10 am -2 pm)	Trichloro methane - 131 Benzene -68;Toluene -76 Ethyl Benzene -38 o-Xylene-24;m,p -Xylene -15 Propyl Benzene -8 1,3,5-Trimethyl Benzene -25 1,2,4 -Trimethyl Benzene -9
	28.04.09; (2 pm – 6 pm)	Trichloro methane -127 Benzene – 25; Toluene -90 Ethyl Benzene -17 o-Xylene -67;m,p-Xylene -29 Propyl Benzene - 41 1,3,5-Trimethyl Benzene -28

A.3 Air Particulate Characterizations - Delhi

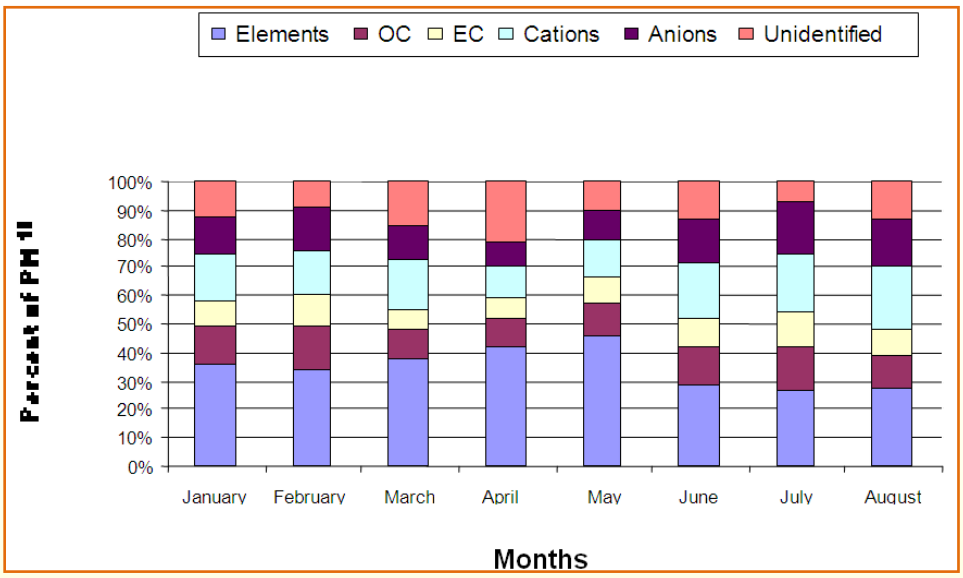
Air quality in urban centers is affected by a variety of complex sources. Detailed scientific studies are required for identification of major sources, assessing their contributions to urban air pollution and suggesting mitigative measures taking into consideration the techno-economic feasibility and other social factors.

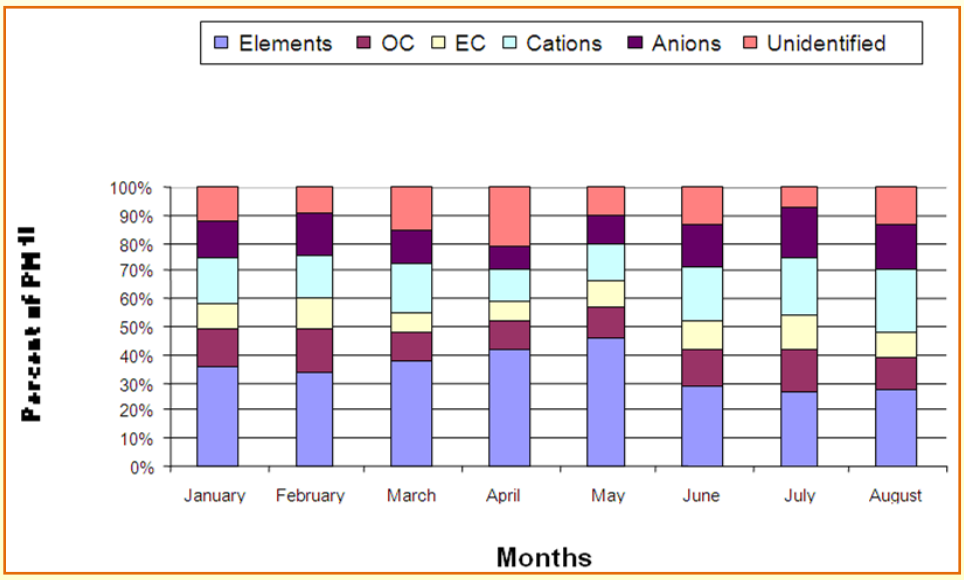


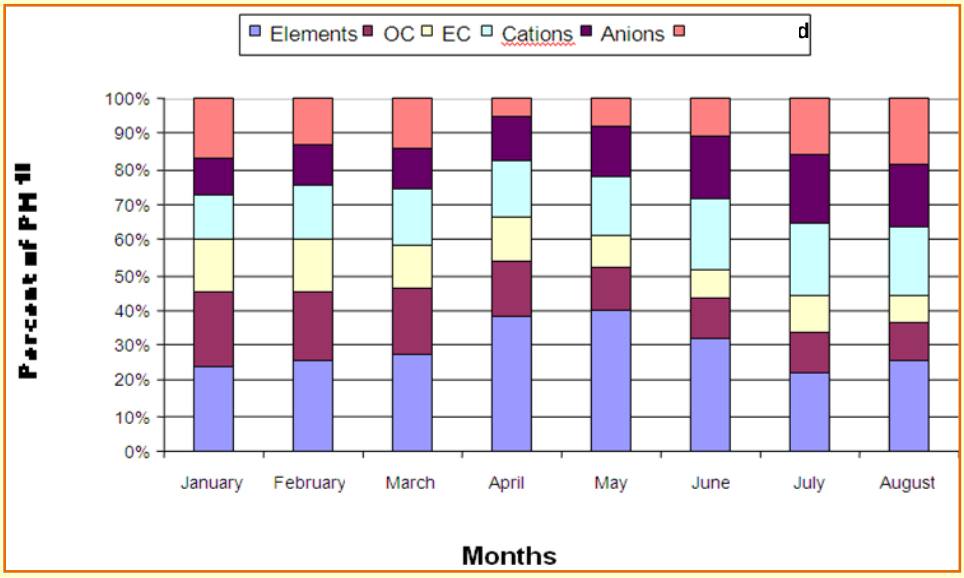
Under this activity, characterisation of air pollutants at three locations in the city viz. ITO, Siri Fort and Shahzadabagh was done. Weekly samples were analyzed for mass concentrations, elements, soluble inorganic ions and OC (organic carbon) & EC (elemental carbon) in both size fraction (PM_{10} and $PM_{2.5}$).

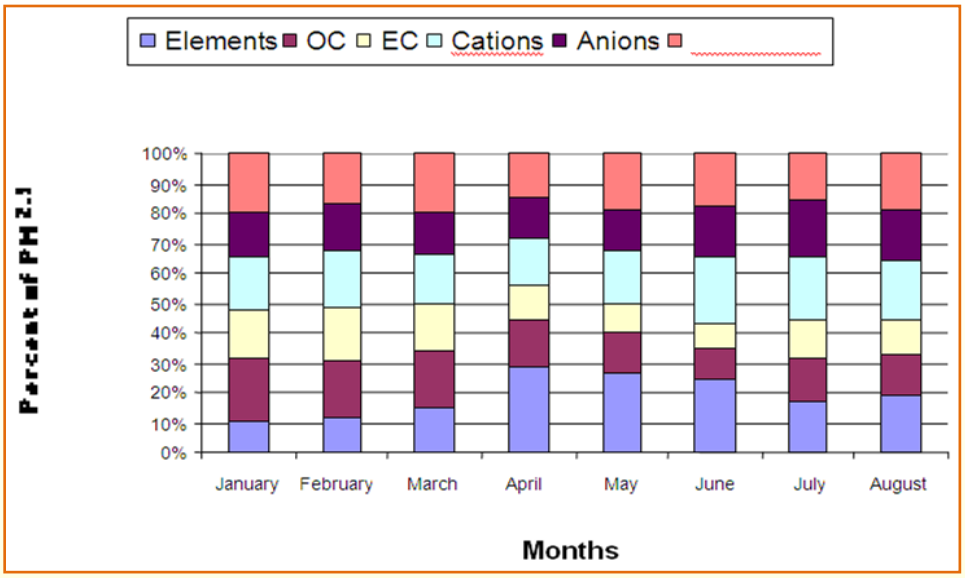


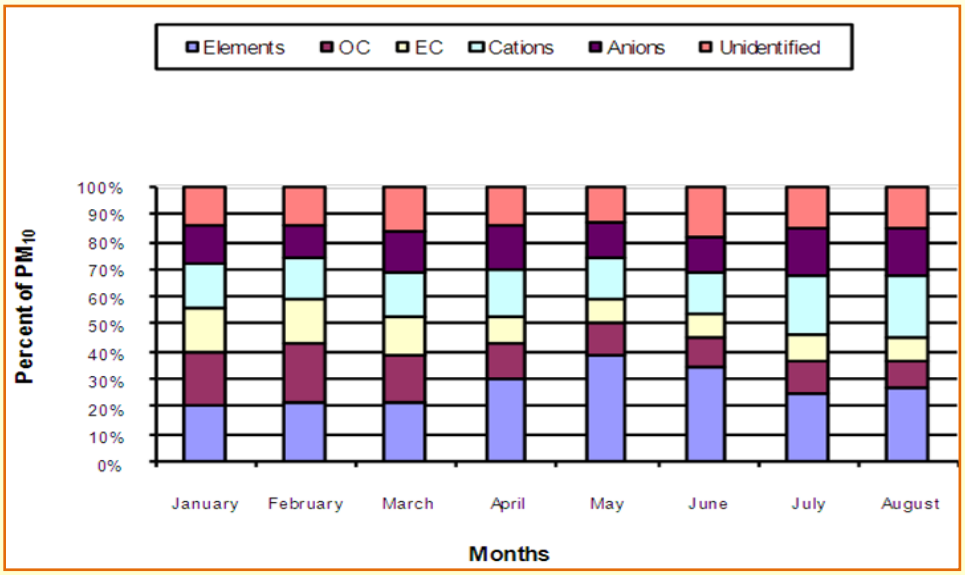
The month wise pattern of concentration of PM_{10} and $PM_{2.5}$ shows direct influence of meteorological conditions. $PM_{2.5}$. concentrations do not reflect much variations as the sources remain almost constant through all the seasons, however, marked variations in PM_{10} is evident in dry season. The composition of particulates in PM_{10} and $PM_{2.5}$ fractions at ITO, Shahzadabagh and Siri Fort are depicted below.

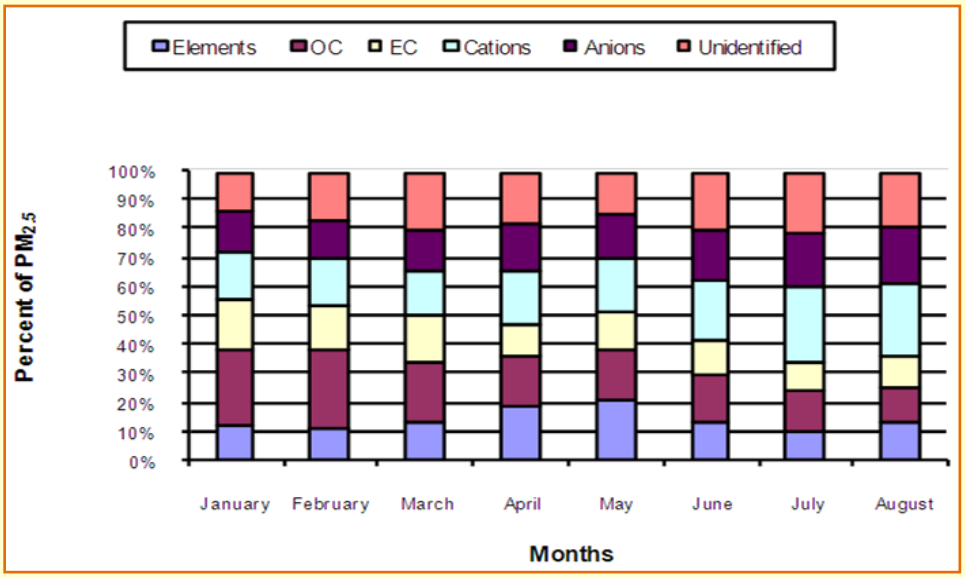

Elements
OC
EC
Cations
Anions
Unidentified
Percent of PM 11
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months


Elements
OC
EC
Cations
Anions
Unidentified
Percent of PM 11
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months


Elements
OC
EC
Cations
Anions
Percent of PM 11
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months


Elements
OC
EC
Cations
Anions
Percent of PM 2.1
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months


Elements
OC
EC
Cations
Anions
Unidentified
Percent of PM10
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months

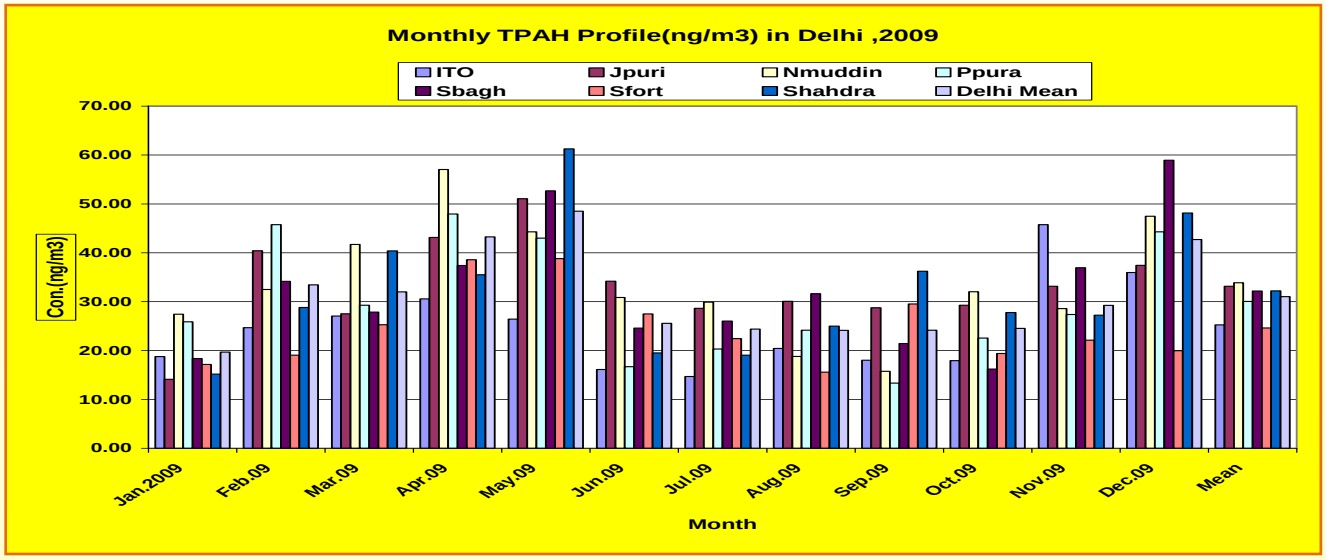

Elements
OC
EC
Cations
Anions
Unidentified
Percent of PM2.5
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
February
March
April
May
June
July
August
Months

In PM_{10} the dominance of element fraction was evident at all the locations which is mainly contributed by silica natural state. However organic carbon (OC) and elemental carbon (EC), ions were found predominant in $PM_{2.5}$ fraction mainly contributed by combustion and secondary aerosols. Seasonal variations govern the speciation of constituents in particulate was also evident.

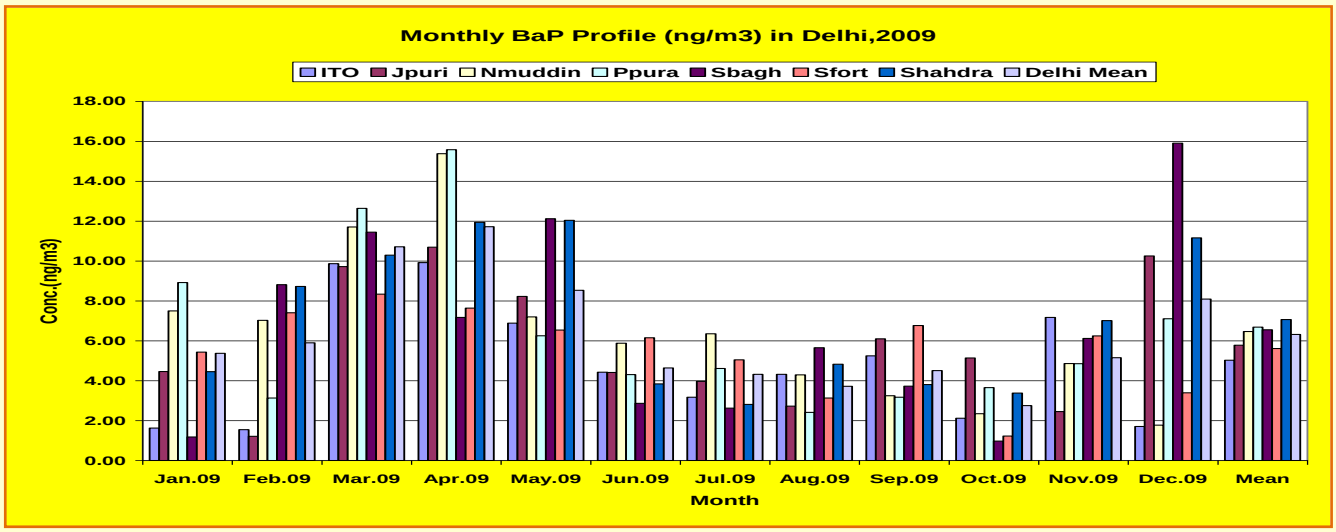
A.4 Polycyclic Aromatic Hydrocarbons (PAHs) - Delhi

Particulate PAH samples were collected at five locations in Delhi.

Total PAH : The mean value of TPAH for Delhi observed was 31.0 ng/m3. The monthly minimum and maximum values ranged between 13.33 & 58.93 ng/m3.



PAH - BaP (Benzo –a-pyrene) : The overall mean value of BaP for Delhi observed was 6.36 ng/m3. The limit as per new ambient air quality standard for BaP of 1 ng/m3 was exceeded at all locations.



A.5 SODAR (sound detection & ranging) system - Delhi

Measurement & monitoring of atmospheric mixing height using a monostatic (transmission & receipt at same point) SODAR (sound detection & ranging) system is in continuous operation at Parivesh Bhawan, CPCB to measure mixing height of the lower atmosphere. The observations and details of data are as follows:

- Between April 2009 to December 2009, December 2009 showed shorter period (10 am to 5:00 pm) of high convective activity and minimum monthly average mixing height of 349 m.
- Variation of pollutant concentration at ITO (data from CAAQMS) with mixing height data from Parivesh Bhavan for period of high convective activity and low convective activity has been presented graphically below.

- Diurnal variation of mixing height is also depicted below.

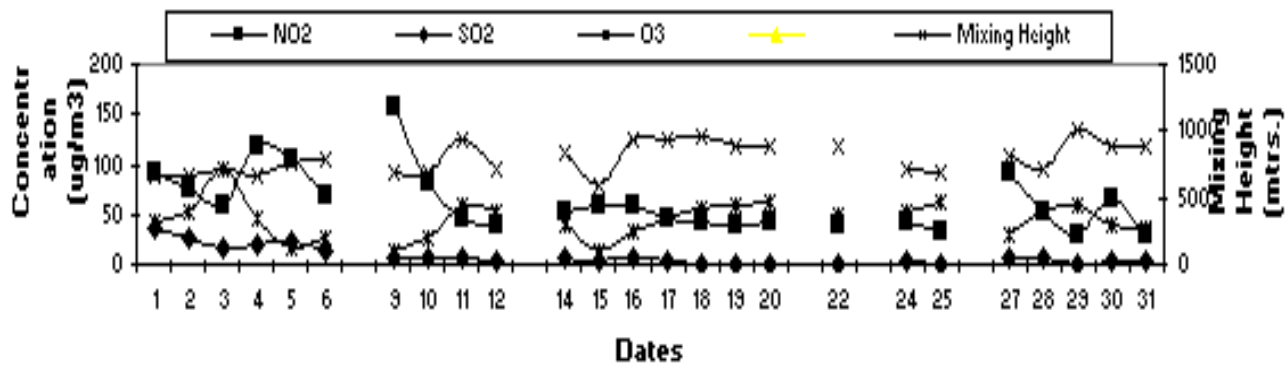


Fig. : VARIATION OF CONCENTRATION OF NO2, SO2 AND O3 AT ITO WITH MIXING HEIGHT DURING PERIOD OF HIGH CONVECTIVE ACTIVITY (DECEMBER 2009)

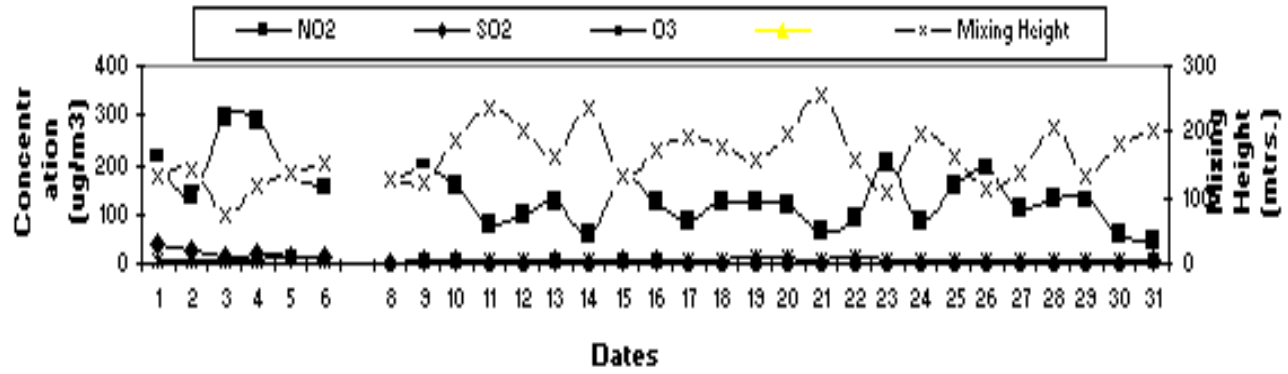


Fig. : VARIATION OF CONCENTRATION OF NO2, SO2 AND O3 AT ITO WITH MIXING HEIGHT DURING PERIOD OF LOW CONVECTIVE ACTIVITY (DECEMBER 2009)

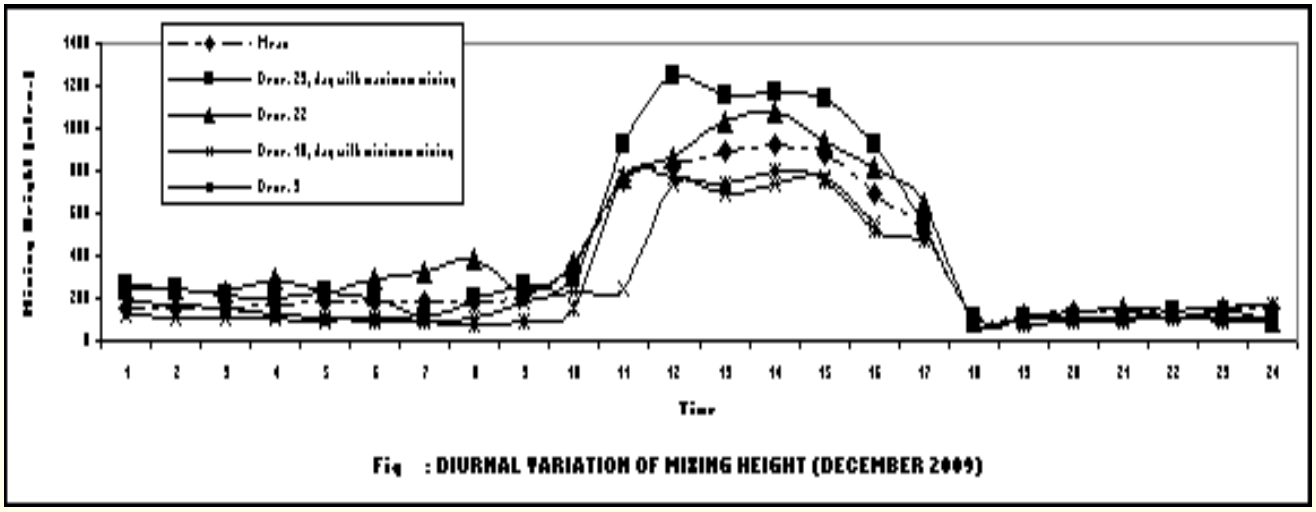


Fig : DIURNAL VARIATION OF MIXING HEIGHT (DECEMBER 2009)

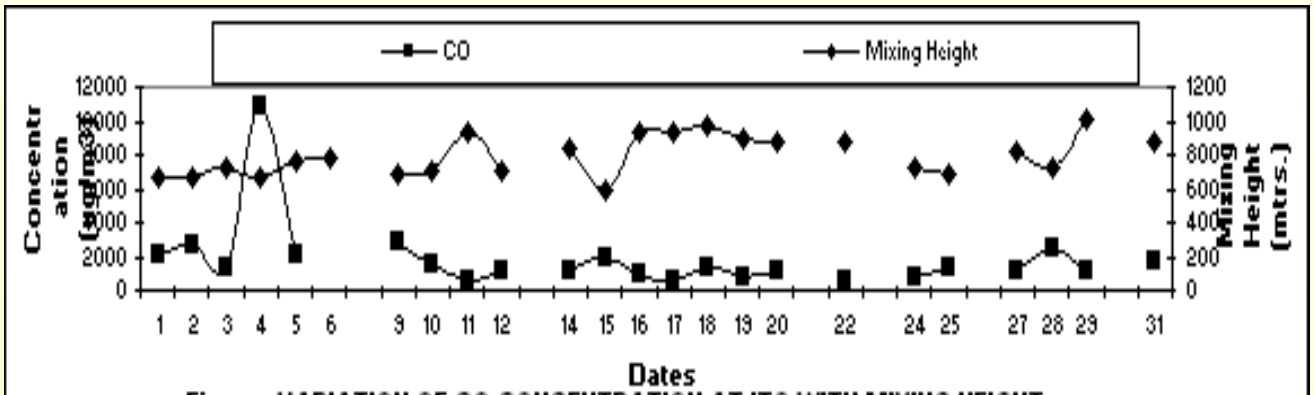


Fig. : VARIATION OF CO CONCENTRATION AT ITO WITH MIXING HEIGHT DURING PERIOD OF HIGH CONVECTIVE ACTIVITY (DECEMBER 2009)

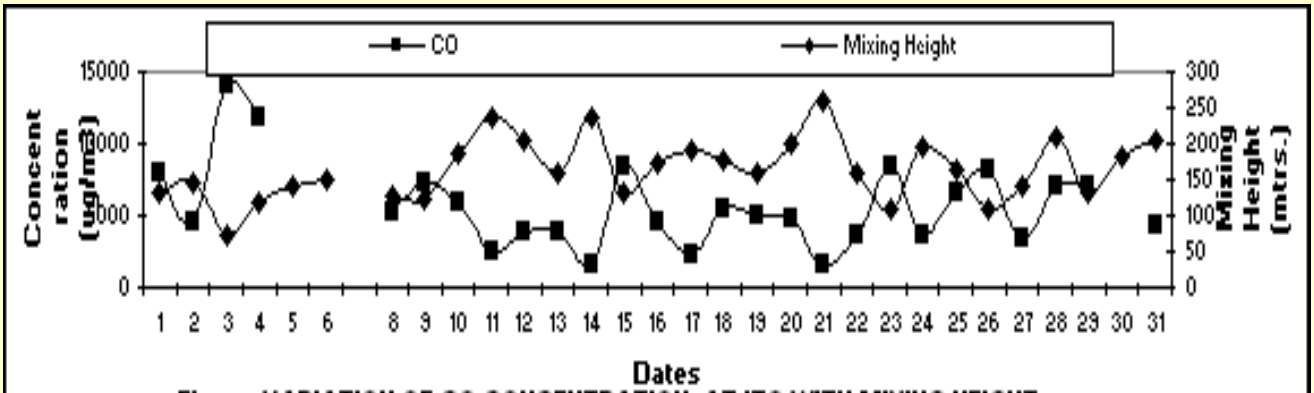


Fig : VARIATION OF CO CONCENTRATION AT ITO WITH MIXING HEIGHT DURING PERIOD OF LOW CONVECTIVE ACTIVITY (DECEMBER 2009)

Figure 5.11: Mixing Height (in m) between April 2009 to December 2009

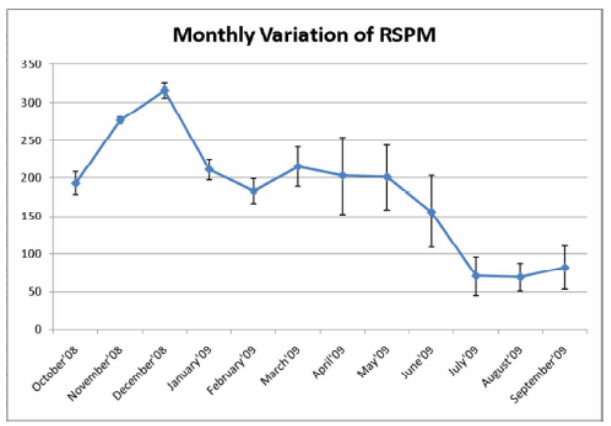
5.4.6.2 Ambient Air Quality - Lucknow

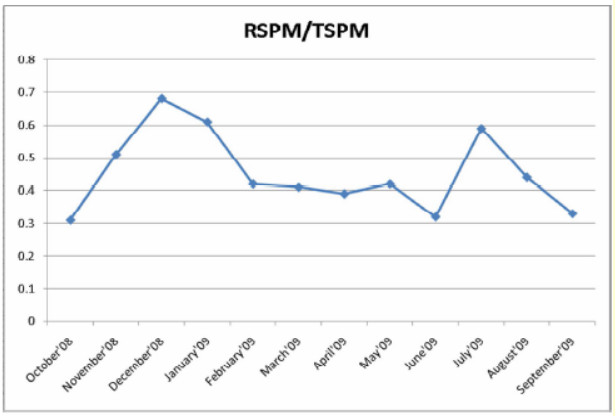
CPCB's Zonal Office Lucknow monitors air quality in a residential area at Vikas Khand, Gomti Nagar, Lucknow since January 2008 on regular basis, five days in a week. The main observatios were:

- Monthly average value of RSPM exceeded National Ambient Air Quality Standard (NAAQS) for RSPM of 100µg/m^3 on several occasions.
- Monthly average of NO_2 concentration was below the prescribed limit of 80µg/m^3 as per National Ambient Air Quality Standard (NAAQS).
- The sulfur di-oxide levels were well below the prescribed limit of 80 µg/m^3 of NAAQS.

5.4.6.3 Ambient Air Quality - Kanpur

Ambient air quality monitoring station located in residential area of Kanpur (Vikasnagar) was conducted for assessing the level of pollution in the city and to formulate the control strategy. The data is being disseminated for Kanpur (Vikasnagar) on web site of CPCB. Monthly variations over 24-hour average for PM_{10}, TSPM, NOx levels and PM_{10}/TSPM ratio was computed and shown graphically below:





5.4.6.4 Ambient Air Quality - Kolkata

The Zonal Office, Kolkata has been monitoring ambient air quality at Southend Conclave at Kasba in Kolkata city. This data is provided for daily telecast on national TV. The results indicated that RSPM is of major concern as the concentration levels exceed the national ambient air quality standards (NAAQS) throughout the year except during rainy months. The air quality with respect to RSPM is within the norms for few days only during rainy season.

5.4.6.5 Ambient Air Quality - Agra

B.1 Ambient Air Quality for criteria pollutants - Agra

With reference to the Writ Petition (C) No. 13381/1984 M.C. Mehta Vs Union of India and in compliance to directives of Hon'ble Supreme Court in 2000, the CPCB's Agra Project Office is monitoring ambient air quality since year 2001 at four locations basis. The data collected is submitted to the Hon'ble Supreme Court and Taj-Trapezium Zone Authority (TTZA). The locations are :

- Tajmahal,
- Etmad-ud-daulah,
- Rambagh (all above three are protected monuments) and
- Nunhai (industrial Area)

Observations were compared as per the revised national ambient air quality standards (NAAQS) indicate that the annual general trends of the four criteria pollutants at the four stations from year 2002 to 2009 showed that SPM concentration was lower than that in year 2002, the RSPM values in general were higher w.r.t. year 2002, where no major changes were observed for SO_2 & NO_2 between years 2002 to 2009.

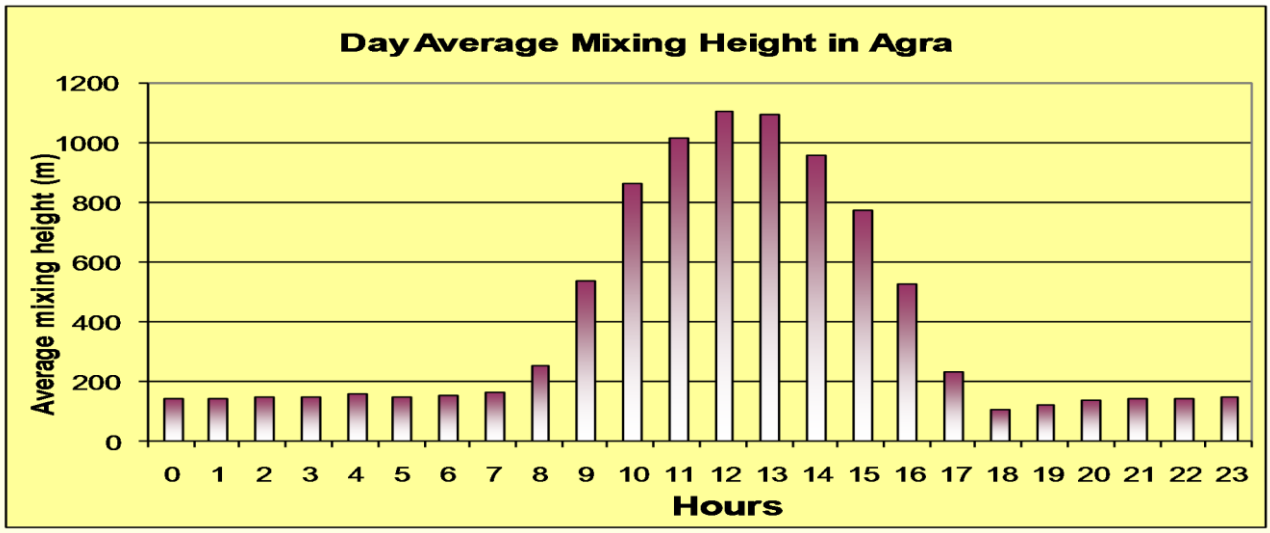
The similar trend was observed for ratio of SPM/RSPM, which varies from 1.65-3.17 at Tajmahal (Least), 1.25-3.78 at Etmad-ud-daulah, 1.85-4.38 at Rambagh and 1.86-3.40 at Nunhai (Highest).

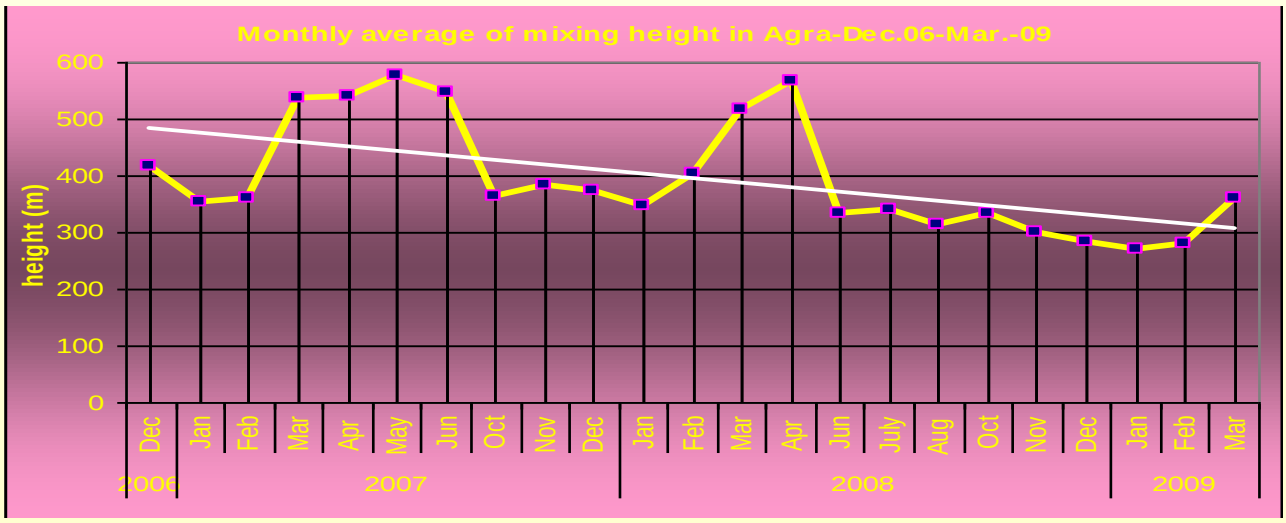
B.2 SODAR (sound detection & ranging) system & BAM – Agra

The CPCB undertakes operation of SODAR (sound detection & ranging) with following objectives:

- Data collected for mixing heights of Atmosphere in Agra on daily basis.
- Data compiled for the entire period since installation.
- Data analyses in progress for environmental planning.
- Data of atmospheric boundary layer/ mixing height is proposed to be correlated with air pollution trends of Agra city.

The general profile of mixing height indicated that mixing height increases during day time (peaked between 12-13 hrs) with values around 1100 meters.





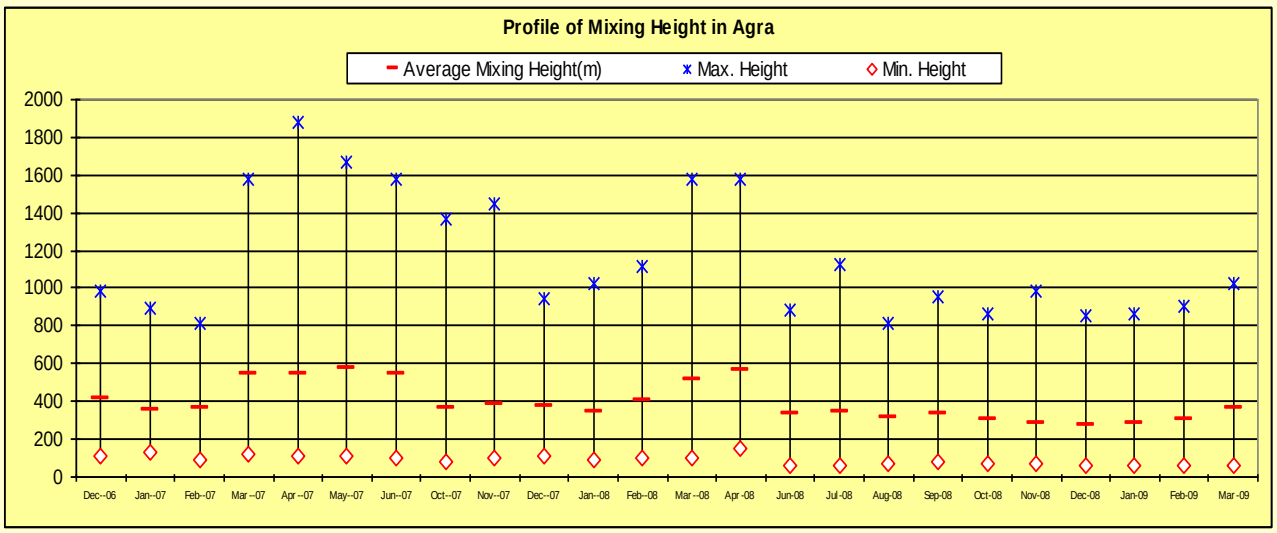
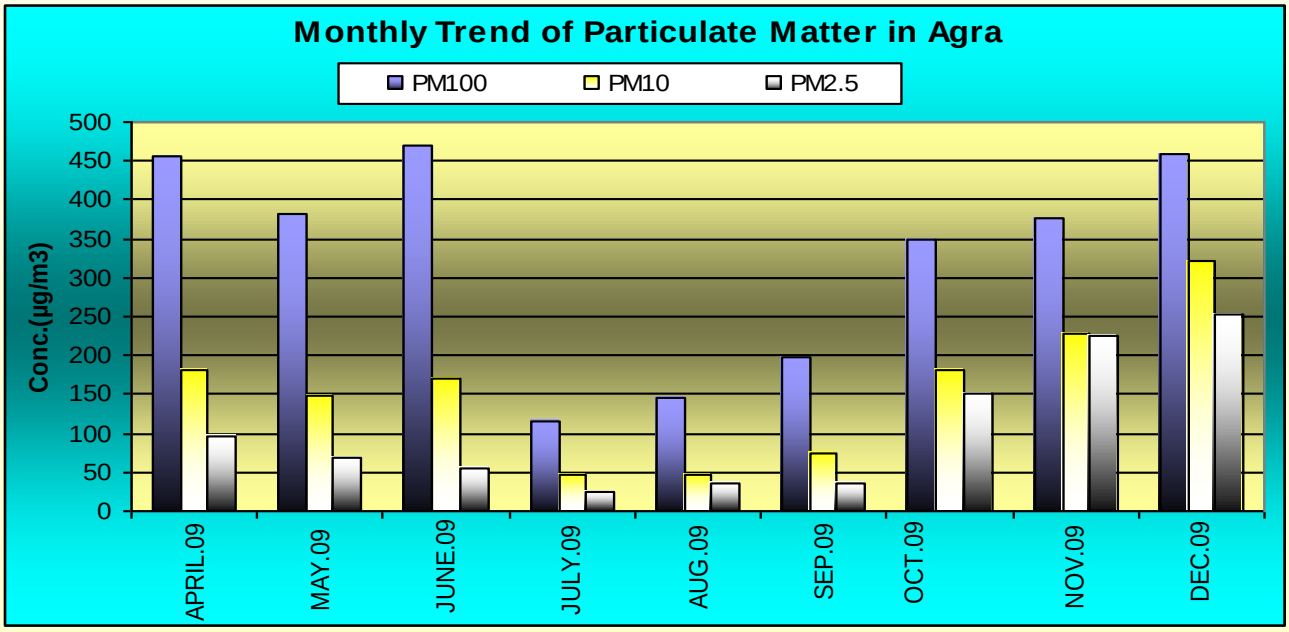


Figure 5.9: SODAR data (Mixing Height) Profile:

Agra is an important historical and tourist city of India. In Agra temperature ranges from 9.4°C during December (winter) to 44.1°C during May (summer). Wind speed in Agra varies from calm conditions to 20.6 m/s .The dominant wind direction was from South West.

B.3 Particulate Matter Monitoring : Taj Mahal Agra

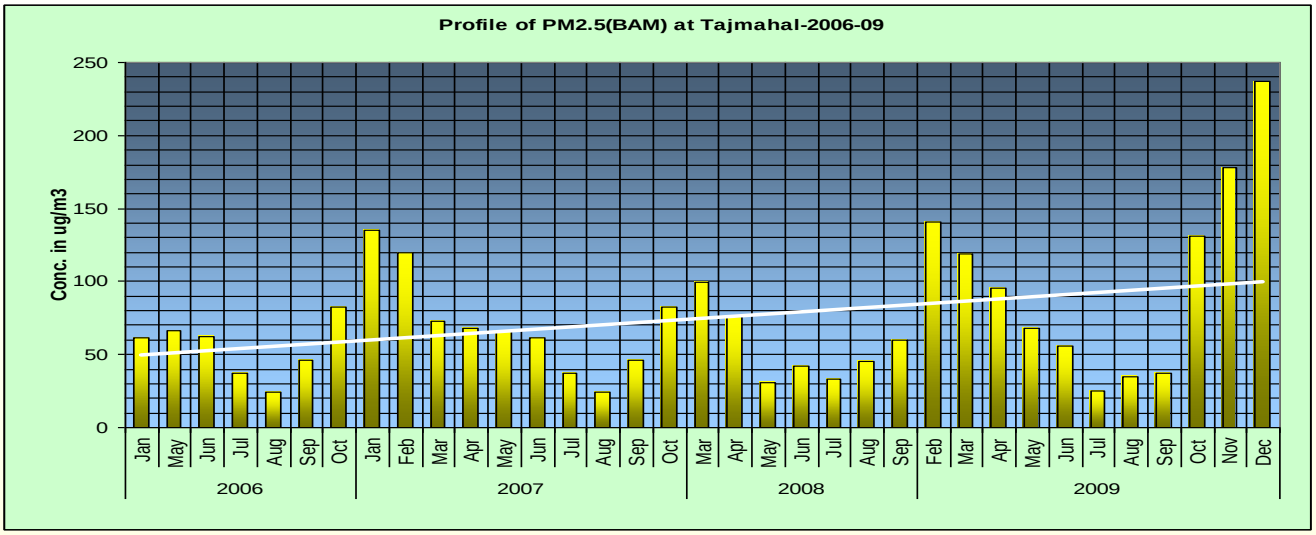
- The particulate matter SPM-**PM_{10}-$PM_{2.5}$** are continuously monitored by CPCB's Agra Project Office at Tajmahal station. The concentration trend for the individual particulate matter **SPM, PM10, and PM2.5** were similar.



- The seasonal variations as percentage fraction of SPM, PM_{10} and **$PM_{2.5}$** were studied for the Tajmahal station. Relatively high values of finer particulate matter during winter months may be attributed to prevailing meteorological conditions with low temperature and lower atmospheric mixing heights resulting in lesser dispersion of fine particles.

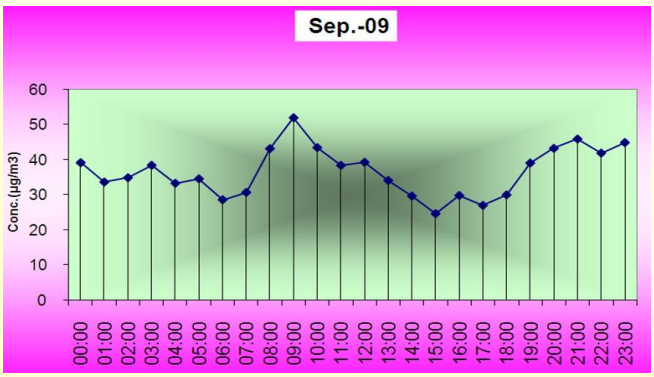
B.4 Profile of $PM_{2.5}$ BAM (Beta Attenuation Method) AM) at Taj Mahal , Agra

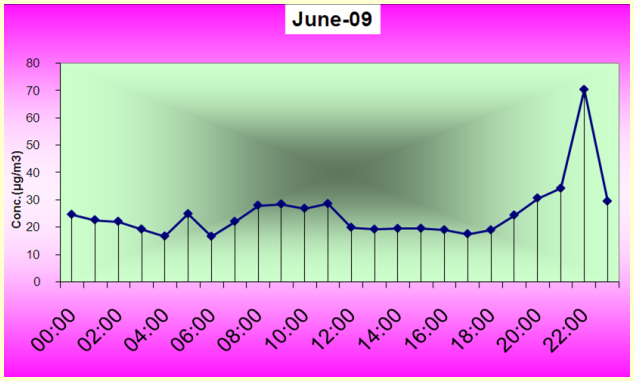
Trend between years 2006 – 2009 for $PM_{2.5}$, Agra**:** Due to increase in anthropogenic activities in and around the city; the fine particulate matter showed continuously increasing trends at Tajmahal between 2006-2009, the same is presented graphically below:

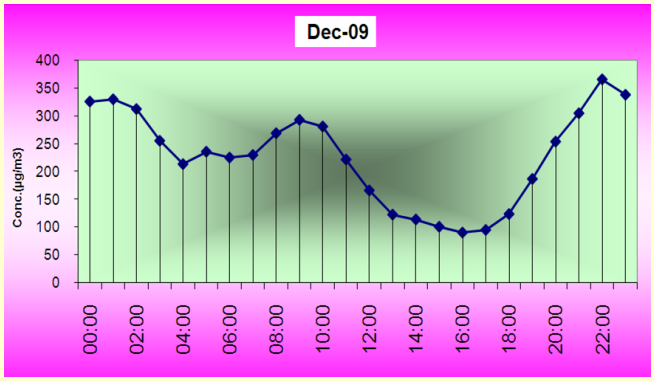


B.5 Hourly Variation of $PM_{2.5}$ season-wise at Taj Mahal, Agra

The hourly variation of **$PM_{2.5}$** concentration at Tajmahal during the months (average concentration of all monitoring days) June (summer), September (rainy) and December (winter) indicated that the concentration increased between 7 pm to 12 midnight (10 pm highest peak) and morning 7 to 11 am (9 am highest peak) hours in general during all months, indicating higher pollutant concentration during peak hours of vehicular movement in the city.







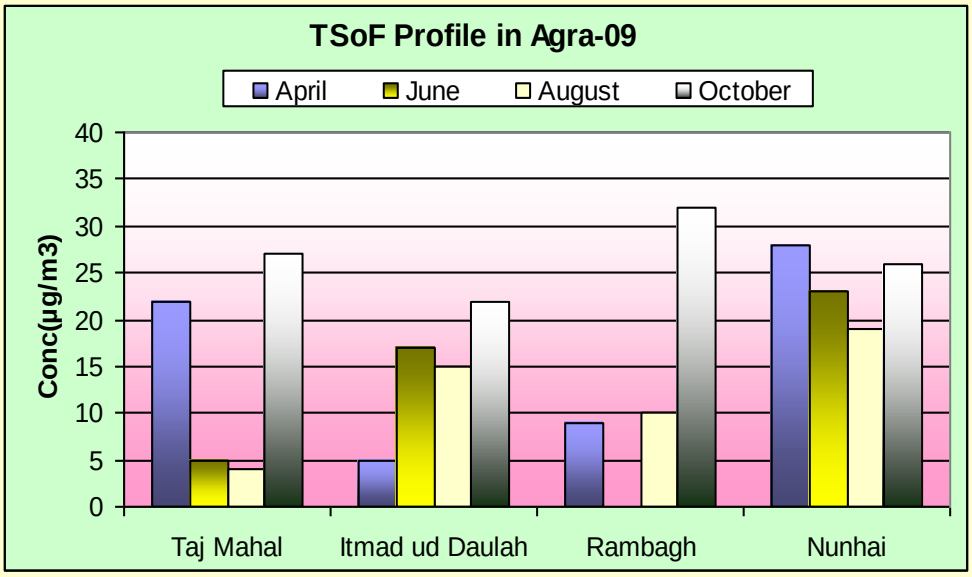
B.6 Ozone Profile at Tajmahal, Agra

The monitoring of ozone was carried out at Tajmahal station, which varied from 2 to 10 µg/m^3 with average value of 4 µg/m^3. The concentration of O_3 increased with sunrise and peaked around noon and then decreased as light intensity decreased, the minimum average concentration level of O_3 of 2µg/m^3 was observed at the monitoring site. The concentration was within prescribed standards in ambient air.

B.7 Ambient Air Quality Monitoring: Taj-Trapezium Zone, Agra

The Taj Trapezium Zone (TTZ) has been defined as a trapezoid region between 26⁰ 45' N & 77⁰ 15' E to 27⁰ 45' N & 77⁰ 15' E in the West of the Taj Mahal and in the East of Taj Mahal between 27⁰ 00' N & 78⁰ 30' E to 27⁰ 30' N & 78⁰ 30' E. The TTZ is spread over six districts viz. Agra, Mathura, Firozabad, Hathras, Etah, Bharatpur and also includes small parts of Aligarh and Dholpur. The region as a whole encompasses an area of 10,400 sq. kms. CPCB-Agra office conducted Ambient Air Quality monitoring at five locations in the four districts of TTZ viz. Agra, Mathura, Firozabad, Hathras (all in UP) and Bharatpur (Rajasthan) during May-June (Summer), and August-September (Rainy) for primary criteria pollutants (viz. RSPM, SPM, SO_2 and NO_2) for 24 hours . In addition to the above, toluene soluble organic fraction in SPM at the above locations was also analyzed to assess the anthropogenic impact in organic fraction of SPM. Salient features are as follows:

- Criteria pollutants : SPM was found highest near Krishna Temple at Mathura and Sheetal Khan in Firozabad. RSPM was maximum during summer at Sheetal Khan in Firozabad. SO_2 was below detectable limit at most of the locations except in Firozabad where it was 41µg/m³. NO_2 of 73 µg/m³ was found high in industrial area Firozabad. Comparatively high pollutant levels in Firozabad may be due to contribution of emission from coal based 'PAKAI BHATTIES' (A unit where bangles are baked in layers on metal sheets) along with other sources.
- The Toluene soluble organic fraction (TSOF) largely represents organic fraction present in the particulate matter. Firozabad and Bharatpur had the maximum concentration of organic matter in SPM.
- Aerosol Profile or ionic profile study of RSPM was carried out at four locations in Agra , wherein the collected samples were analyzed using Ion chromatograph and the order of ions found was $SO_4^{--} > Na^+ > NO_3^- > Cl^- > Ca^{++} > K^+ > NH_4^+ > F^- > Mg^{++} > PO_4^{--} > Br^- < Li^+$. Among all the ions, sulphate ion was found to be predominant at all sites associated with low values of sulphur dioxide (SO_2) . Ionic profile study was also done for Taj Trapezium Zone in order to assess the ionic composition of aerosol



in the different cities (Bharatpur, Firozabad, Mathura and Hathras) of the Zone in the month of May-June and August-September 2009.

B.8 Toluene Soluble Organic Fraction Profile at Agra

TSOF was analysed in RSPM samples at four locations in Agra city. The maximum TSOF was observed at Rambagh in October 2009, the percentage fraction of TSOF in RSPM was found to be maximum 28 % at Itmad ud daulah in the month of August besides percentage fraction was higher in Nunhai Industrial Area.

5.4.6.6 Benzene Soluble Organic Fraction In PM_{10} at Bangalore

Benzene Soluble Organic Fraction (BSOF) of the pollutants associated with the ambient particulate matters was conducted by Zonal Office Bangalore between June 08 to March 09. PM_{10} samples using glass fiber filter papers were collected from five locations in Bangalore city and BSOF was extracted, quantified and an attempt made to prepare the Air Quality Index and classification of the study area based on pollution level. The results indicate that the BSOF values varied from 1.36 to 38.76 µg/m³ with an average of 8.8 µg/m³. BSOF constitutes between 1.6 % and 55.4 % of PM_{10} with an average of 10.7%. The industrial area (Graphite India) showed higher values and the area is unhealthy as per USEPA classification of air quality index.

Table 5.12: BSOF in PM_{10} in Bangalore city

Station	Graphite India			KHB Ind. Area			Victoria hospital			Yeshwantpur			Amco batteries		
Category	**Industrial**			**Industrial**			**Sensitive**			**Residential**			**Residential**		
DETAILS	**BSOF, µg/m³**	**PM_{10}, µg/m³**	**% BSOF**	**BSOF, µg/m³**	**PM_{10}, µg/m³**	**% BSOF**	**BSOF, µg/m³**	**PM_{10}, µg/m³**	**% BSOF**	**BSOF, µg/m³**	**PM_{10}, µg/m³**	**% BSOF**	**BSOF, µg/m³**	**PM_{10}, µg/m³**	**% BSOF**
No. of data	79	79	79	80	80	80	80	80	80	80	80	80	82	82	82
Max. Value	24.8	583	10.8	38.8	140	55.4	20.9	255	32.5	20.7	396	24.3	24.9	263	42.4
Min. Value	2.3	30	2.24	1.36	23	2.00	3.42	23	4.78	2.5	28	2.16	3.29	15	1.60
Avg. Value	11.5	224	5.72	5.20	71	8.31	9.59	63	16.4	9.1	141	8.54	8.54	71	14.4
Std. Dev.	5.3	117	2.05	4.16	29.7	6.42	3.87	31.6	6.23	3.3	85.7	4.9	3.84	47	5.99
Co-eff. Of variation	45.9	52.0	35.8	79.9	42.1	77.2	40.3	49.8	38.1	35.7	60.8	56.9	45	66	41.7
Exceedance factor	0.58	3.7	-	0.3	1.2	-	0.5	1.1	-	0.5	2.3	-	0.4	1.2	-
Percent Violations	8.86	84.8	-	1.3	17.5	-	1.3	7.5	-	1.3	57.5	-	1.2	19.5	-
Coef.of range	0.83	0.90	-	0.9	0.7	-	0.7	0.8	-	0.8	0.9	-	0.8	0.9	-
Air quality Index	138	135	-	106	59	-	128	55	-	126	94	-	122	59	-
Pollution level	**M**	**C**	**-**	**L**	**H**	**-**	**L**	**H**	**-**	**L**	**C**	**-**	**L**	**H**	**-**
	Pollution level - L: Low, M: Moderate, H: High and C: Critical														

5.4.7 VOCs Monitoring in National Capital Region (NCR)

The CPCB monitored BTX samples in the air quality of the National Capital Region - Ghaziabad, Noida, Gurgaon and Faridabad in June 2009 at the following locations:

i. Near Mohan Makins (Ghaziabad);
ii. Near MDI Chowk (Gurgaon);
iii. Near Orient Fan (Faridabad);
iv. Near NTPC (Noida);
v. Near Ranbaxy (Industrial Estate, Gurgaon) and
vi. Near Uflex Ltd (Sector 60, Noida).

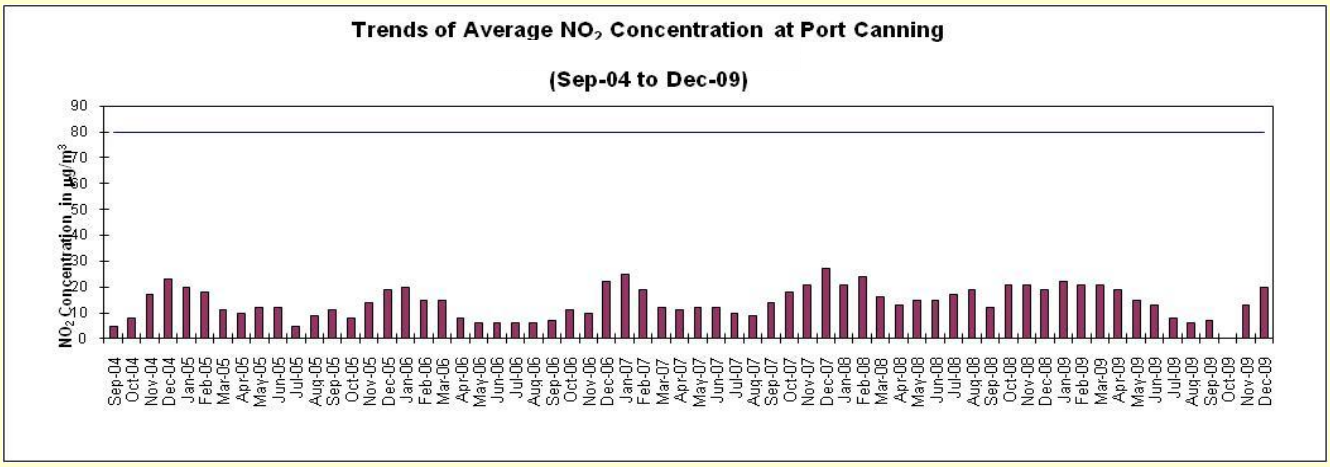
Eight hours sampling was conducted at all the stations from 12.00 hrs to 20.00 hours. The samples were analysed and the ranges observed are given below :

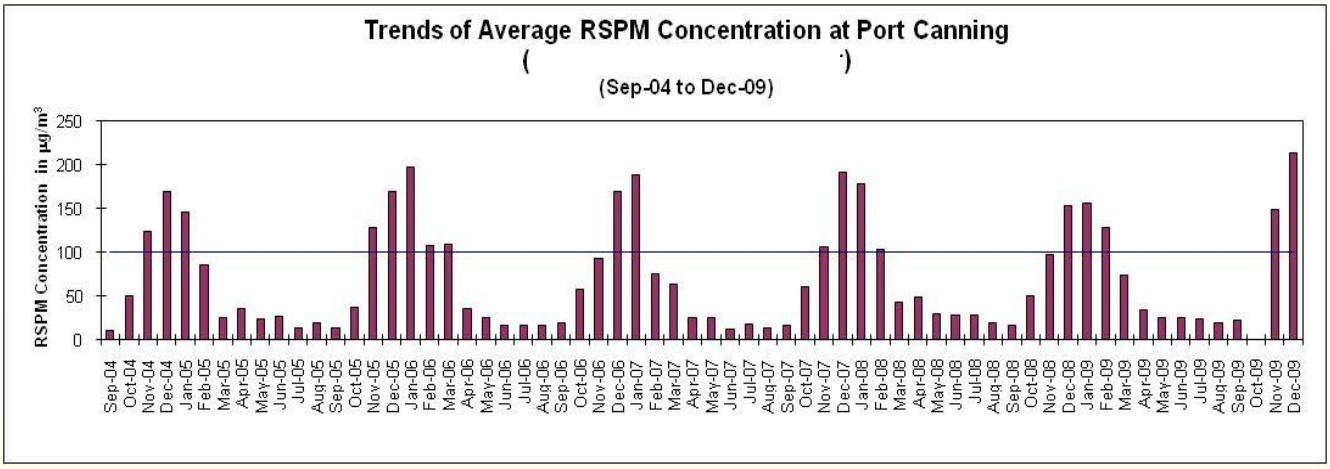
- Benzene - 18.9 - 56.49 $\mu g/m^3$,
- Toluene - 117.97 - 209.64 $\mu g/m^3$,
- Ethyl Benzene - 3.88 - 38.69 $\mu g/m^3$,
- o- Xylene - 11.82 - 62.63 $\mu g/m^3$,
- m,p-Xylenes - 3.78 - 17.84 $\mu g/m^3$ and
- Naphthalene - 20.38 - 59.04 $\mu g/m^3$

Benzene and toluene levels were highest near Uflex Ltd (Sector 60, Noida) and near MDI Chowk (Gurgaon) respectively. Note, Benzene is one of the pollutants in the revised NAAQS (2009) for which 104 readings are required in a year to compare with the concerned norm.

5.5 AIR QUALITY MONITORING UNDER MALE DECLARATION

Ambient Air Quality Monitoring under Male Declaration at international boundary with Bangladesh is being done at Port Canning, West Bengal under the program "Male Declaration for the study of trans-boundary movement of pollutants". The site is located about 70 km. east of Kolkata bordering Bangladesh. 24-hour ambient air quality monitoring is conducted for atleast ten days in a month, for parameters RSPM, NO_2, SO_2 and meteorological data. The salient findings of the air quality monitoring from the year 2004 till December '09 are as follows :





- The annual average concentration of RSPM exceeded the National Ambient Air Quality Standards (NAAQS) however the 24-hour daily concentrations were within permissible limits between March and October.

- Annual average concentration of SO_2 and NO_2 level has been below the permissible limit.

- Besides air quality, rainwater water quality, in adjoining water bodies, soil / sediment was also analyzed. Samples collected during initial rains showed higher conductivity and higher ion concentration compared to subsequent rains till September 2009.

5.6 CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM)

5.6.1 Status Report on "Private Participation in the Management of Continuous Ambient Air Quality Monitoring Station / Network under the proposed option of Operation Contract"

Central Pollution Control Board (CPCB) has started National Air Quality Monitoring Programme (NAMP) in 1984 to assess air quality & the effectiveness of pollution control programmes and air quality trends.

NAMP presently includes a network of 424 National Air Quality Monitoring Stations (NAMP) covering 175 cities in 26 States and 5 union territories. These stations are manually operated twice a week (24 hourly) with involvement of various State Pollution Control Boards (SPCBs) & local or State agencies, University etc. The air quality parameters that are regularly monitored are SPM, RSPM, SO_2 and Nox.

In Delhi CPCB has been operating 3 stationary CAAQMS at Siri fort, ITO and DCE and one mobile laboratory at East Arjun Nagar. On line air quality data (updated every 15min) of these four stations is displayed on CPCB website (www.cpcb.nic.in).

The present Indian (National) Air quality Monitoring Network is limited in its scope of application and hence, there is need to modernize the existing system to International standard. Internationally use of continuous Automatic Ambient Air Quality Monitoring is widely accepted. In most of the countries it is the requirement to do air quality monitoring using automatic analyzers and the manual monitoring is done as a complement to online measurements.

The Indian air quality monitoring system requires modernization by gradually replacing the manual stations with CAAQMS and also integrating the private sector in the development and the operation of the system.

To begin with CPCB has taken up the project "Private Participation in the Management of Continuous Ambient Air Quality Monitoring Station / Network under the proposed option of Operation Contract". The project is being executed as Pilot Project in four cities namely Delhi, Lucknow, Bangalore and Chennai under Operational Contract. Each identified city will be having a Pilot Network of three CAAQM Stations (One in residential area, one in industrial area and one in traffic hotspot area).

5.6.2 Highlights of the Project

- Supply, Installation, Commissioning of 12 Sets CAAQMS—3 Sets each in Cities of Delhi, Lucknow, Chennai & Bangalore.
- Operation & Maintenance of the Equipment for a period of 5 years from the date of Commissioning
- On Line Transfer of Individual city Data to Central Data Management System at Regional office in each City & complete Data to Central Pollution Control Board, HQ, Delhi
- Daily reporting of Data to Central Pollution Control Board and respective State Pollution Control Boards.
- Parameters being monitored in each city being Sulphur Dioxide (SO_2), Oxides of Nitrogen (NO_X), Ammonia (NH_3), Carbon Monoxide (CO), Ozone (O_3), Total - Methane - Non-Methane Hydrocarbons (HC), Benzene - Toulene - Xylene (BTX), Suspended Particulate Matter (SPM - PM_{10}, $PM_{2.5}$) and Meterological Parameters like Wind Speed, Wind Direction, Vertical Wind Speed, Ambient Temperature, Relation Humidity, Solar Radiation & Barometric Pressure
- The Complete set of On-Line, Continuous Analysers are mounted in a Self Contained Analyser Room equipped with Air Conditioners, Uninterrupted Power Supply (UPS), Rack Cabinets, Sampling Systems etc.
- The complete system will be Calibrated regularly using Multi-point Calibrators mounted at each location & checks with Portable Calibrators
- Monitoring Network configuration for the proposed three Stations in each identified cities under the said Pilot Project is given below

Location	Pollutants to be Measured
Station 1 (Residential)	PM_{10} /$PM_{2.5}$, CO, SO_2, NO-NO_2-NO_X, O_3
Station 2 (Industrial)	PM_{10} /$PM_{2.5}$, CO, SO_2, NO-NO_2-NO_X, O_3, BTX
Station 3 (Traffic Hot Spot)	PM_{10} /$PM_{2.5}$, CO, SO_2, NO-NO_2-NO_X, HC-NmHC, BTX

5.6.3 Data Management and Quality Checks

Data shall be collected and validated according to US EPA standards, using the methodologies included in 40 Code of Federal Regulations. All analyzers shall have current US EPA reference or equivalent method designation and shall be of the latest design.
The Standard Operating Procedure approved by the Board prior to award contains the following:

- Operating procedures for all analyzers and meteorological sensors
- Calibration procedures
- Calibration schedule
- Maintenance procedures
- Maintenance schedule
- Data validation procedures

Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to the Board along with the Air Quality Data.

Operator shall also participate in Proficiency Testing Exercise organized by reputed organization.

5.6.4 Major Post Award Activities Performed Under Operation Contract

- Standard Operating Procedure (SOP) was reviewed and approved after incorporating required amendments.
- Obtained required Contract Performance Security both from the Contractor as well as by his O&M partner.
- Finalized three format of agreement to be used appropriately (case- to- case basis) for acquisition of selected site/land for setting up of CAAQMS.
- Technical Working Group including representative(s) of NTPC was constituted for the purpose of pre-dispatch inspection of the Continuous Ambient Air Quality Monitoring Station (container based) and demonstration of specified Day light and Night visible data display system.
- Detailed drawing (13 nos) for the CAAQMS container have been reviewed commented and provided approval on modified drawings.
- Letter of credit has been established in favor of the contractor.
- Party has submitted the inspection check list of indigenous item to NTPC for required approval and issuance of Material Dispatch Clearance Certificate (MDCC).

- Issue regarding payment of custom duty is resolved with NTPC. Estimated fund in this regard was transferred to NTPC in advance for onward payment.
- Obtained authorization/No Objection Certificate of AERB to procure and use of Radioactive Sources to be imported along with SPM analyzer MP 101M .
- After verification of airway bill, invoices & packing list, CPCB issued required documents for custom clearance.
- Released payment for sale tax to NTPC.
- After required inspection, approval of the sample of Continuous Ambient Air Quality Monitoring Station (CAAQMS) container/shelter and Data Display Board was given .
- Issued Material Dispatch Clearance Certificate (MDCC) for CAAQMS container/shelter , 19"rack, Data Display Board , UPS, AC, Computer system,
- Handed over all the 12 sites to the contractor.
- Following the abrupt termination of services being provided by M/s CTPL (as per NOA), M/s ESA France, opened its subsidiary M/s Environnement S.A., India Pvt. Ltd and proposed M/s Environnement S.A., India Pvt. Ltd as their O&M partner in place of CTPL. After review, obtaining required clarifications/agreements, considering status of the matter of litigation in this regard, finalizing future mode of payment, the Committee of CPCB recommended for consideration of ESA India Pvt. Ltd as O&M operator in place of M/s Chemito.
- As on date all 12 stations are operational for their final acceptance. The data will be posted on the CPCB website after required QA/QC checks towards data validation & final acceptance.
- The erection of data display boards is completed.
- Connectivity between Regional station & Local station and Installation of Data Acquisition System at Regional & Central station is completed.

Features of Telescopic Meteorological Mast, Platform

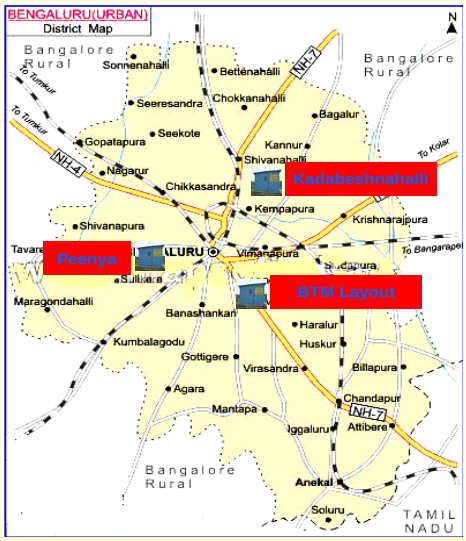
- Fully Welded construction
- External GI Sheet external 1.6 mm thickness
- Internal Sheet of PVC coated Aluminium 2 mm thickness
- 100 mm Polyurethane Foam (PUF) insulation on all sides & roof
- Flooring of 19 mm Marine Ply covered with 2mm Vinyl sheet
- Double structural constructions with Mild Steel members
- Two Door system opening on opposite sides with Panic bar
- "C" Channels made of Mild Steel on internal & external walls on all sides for mounting of equipment
- Dimensions 4200 mm (L) x 3500 mm (W) x 2300 mm (H)

5.6.5 CAAQM by Zonal Office

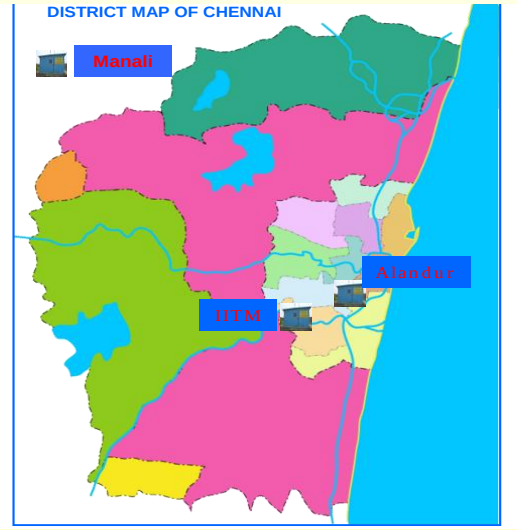
Continuous ambient air quality monitoring network of six stations are operational in Chennai and Bangalore for the past one year, the locations are:

Chennai city	1. **Alandur**
	2. IIT- Madras
	3. Manali
Bangalore city	1. BTM Layout
	2. Kadubeesanahalli
	3. Peenya

Monitoring stations are also equipped with multipoint calibrators the calibration of the analyzers as and when required. The data generated is displayed through digital display board at respective monitoring station or near for dissemination to the public access. PC based data acquisition, storage, transfer and reporting system has been established using advanced Envi Software in all the CAAQM stations.



CAAQM Stations at Bangalore



CAAQM Stations at Chennai

Inside View of CAAQM station

Display Panel of CAAQM

5.6.6 CAAQM by CPCB

a). Delhi

Continuous air quality monitoring (CAAQM) using online monitoring instruments in Delhi is conducted at three fixed locations and using mobile van at one location :

i. Delhi College of Engineering (DCE),
ii. Bahadur Shah Zafar Marg (ITO)
iii. Siri Fort
iv. Besides ONE mobile van stationed at CPCB Parivesh Bhavan, East Arjun Nagar.

The on-line data generated from these CAAQM stations is being displayed on CPCB's web-site : www.cpcb.nic.in . The parameters monitored are :

- Sulphur dioxide (SO_2),
- Nitrogen dioxide (NO_2),
- Respirable SPM (PM_{10})
- Respirable SPM ($PM_{2.5}$)
- Carbon monoxide
- Ozone

The table below indicates whether the annual values have exceeded (↑) or are below (↓) the national ambient air quality standards. Carbon monoxide was critical at all locations.

Table 5.13: Whether the annual values have exceeded (↑) or are below (↓) the national ambient air quality standards

Parameters	SO_2	NO_2	CO	O_3	PM_{10}	$PM_{2.5}$
National Standards µg/ m³	**50**	**40**	**2000**	**100**	**60**	**40**
Delhi College of Engineering	↓	↓	↑	↓	↑	-
ITO (BSZ Marg Xing)	↓	↑	↑	↓	-	↑
Sirifort	↓	↓	↑	↓	-	-
East Arjun Nagar (CPCB HQ)	↓	↓	↑	↓	-	-

b). Lucknow

A network of three CAAQM stations have been installed by CPCB in Lucknow located in Talkatora (industrial area), Lalbagh (commercial/high traffic zone) and Aliganj (residential area) areas. The monitoring stations are linked with the Central Computer at CPCB, Delhi. Monitoring network configuration of said stations is as follows

Table: 5.14: Monitoring network configuration

Location	Pollutants being monitored
Aliganj (Residential)	$PM_{10}/PM_{2.5}$, CO, SO_2, NO-NO_2-NOx, O_3
Lalbagh (Traffic hot spot)	$PM_{10}/PM_{2.5}$, CO, SO_2, NO-NO_2-NOx, O_3, BTX
Talkatora (Industrial)	$PM_{10}/PM_{2.5}$, CO, SO_2, NO-NO_2-NOx, O_3 , BTX, HC

All the three stations are equipped to monitor meteorological parameters like temperature, wind speed, wind direction, atmospheric pressure, relative humidity (RH) and solar radiation. Meteorological parameters are important for governing the ambient air quality trend. The data collected at the station is disseminated to the public (for awareness) through online data display board (12' X 5' size) installed at prominent locations in the city.

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CHAPTER VI

PRESENT STATE OF ENVIRONMENT, ENVIRONMENTAL PROBLEMS AND COUNTER MEASURES

6.1 STATUS OF WATER SUPPLY, WASTEWATER GENERATION AND TREATMENT IN CLASS-I CITIES AND CLASS-II TOWNS

The status of water supply and sanitation indicates the environmental quality in terms of aquatic pollution load. The Central Pollution Control Board (CPCB) published three reports in the last three decades on the status of water supply and waste water generation, collection, treatment and disposal in Class-I cities and Class-II towns (1978-79, 1989-90 and 2000). The present slides is the fourth in the series which provides the status of water supply, sewage generation and treatment of 498 Class-I cities and 410 Class-II towns along with the information on 53 coastal class-I cities and 35 coastal class-II towns.

6.1.1 Water Supply

Table 6.1: State-wise WATER SUPPLY (%) in Class-I Cities & Class-II Towns

S. No.	State/UT	Total no. of Class-I cities & Class-II towns	Total Population (including Class-I cities and Class-II Towns)	Total Water Supply (in MLD)
1	Andaman & Nicobar	1	107200	15
2	Andhra Pradesh	99	23591660	2477.03
3	Assam	13	1991110	503.28
4	Bihar	37	6897354	1396.43
5	Chandigarh	1	994820	537.2
6	Chhattisgarh	14	3081180	489.12
7	Goa	3	295180	29.53
8	Delhi	1	14858800	4346
9	Gujarat	59	16858830	2385.64
10	Haryana	27	6038150	833.07
11	Himachal Pradesh	1	163490	36.18
12	Jammu & Kashmir	6	2155050	302.26
13	Jharkhand	24	5790471	1135.86
14	Karnataka	59	16902631	2529.78
15	Kerala	34	5465176	883.03
16	Madhya Pradesh	48	12540050	1724.55
17	Maharashtra	84	42758250	12750.05
18	Manipur	1	249870	43.43
19	Meghalaya	2	267780	40.12

S. No.	State/UT	Total no. of Class-I cities & Class-II towns	Total Population (including Class-I cities and Class-II Towns)	Total Water Supply (in MLD)
20	Mizoram	1	282550	39.56
21	Nagaland	2	298330	41.76
22	Orissa	24	4240440	923.97
23	Pondicherry	3	583820	80.56
24	Punjab	33	7439530	2033.94
25	Rajasthan	45	11210750	1912.72
26	Tamilnadu	84	20107890	1577.4
27	Tripura	1	214327	30
28	Uttar Pradesh	107	29144800	4814.77
29	Uttarakhand	7	1318840	232.55
30	West Bengal	87	21822911	3949.09
	Total	**908**	**25,77,54,640**	**48093.88**

6.1.2 Sewage generation

The total estimated sewage generation from Class-I cities and Class-II towns was 35,558 MLD out of which only 35% is being treated and the balance quantity needs urgent attention.

Table 6.2: Sewage generation

S. No.	State/Union Territory	No. of Cities	Population (in Year 2008)	Sewage Generation (In MLD)	Sewage Treatment Capacity (in MLD)
1	Andaman & Nicobar	1	107200	12	-
2	Andhra Pradesh	47	20143050	1760.60	654
3	Assam	5	1417820	380.14	-
4	Bihar	23	5783554	1009.7	135.5
5	Chandigarh	1	994820	429.76	164.79
6	Chhattisgarh	7	2515100	350.47	69
7	Delhi	1	14858800	3800	2330
8	Goa	1	122330	9.79	-
9	Gujarat	28	14678240	1680.92	782.5
10	Haryana	20	5494110	626.69	312
11	Himachal Pradesh	1	163490	28.94	35.63
12	Jammu & Kashmir	2	1910060	213.93	-
13	Jharkhand	14	4964171	830.47	-
14	Karnataka	33	15102373	1790.40	43.44
15	Kerala	8	3778516	575.17	-
16	Madhya Pradesh	25	10795000	1248.72	186.1
17	Maharashtra	50	40255170	9986.29	4225.25
18	Manipur	1	249870	26.74	-
19	Meghalaya	1	186030	20.84	-

S. No.	State/Union Territory	No. of Cities	Population (in Year 2008)	Sewage Generation (In MLD)	Sewage Treatment Capacity (in MLD)
20	Mizoram	1	282550	5.71	-
21	Nagaland	1	171810	13.62	-
22	Orissa	12	3335930	660.73	53
23	Pondicherry	2	504130	56.46	-
24	Punjab	19	6329860	1528.26	411
25	Rajasthan	24	9611490	1382.37	54
26	Tamilnadu	42	16852940	1077.21	333.42
27	Tripura	1	214327	24	-
28	Uttar Pradesh	61	25762280	3506.01	1240.13
29	Uttarakhand	6	1249380	176.97	18
30	West Bengal	60	19818471	2345.21	505.92
	Total	**498**	**22,76,52,872**	**35558.12**	**11553.68**

Table 6.3: State wise sewage generation in Class-II Towns

S. No.	State/Union Territory	No of Class-II Towns	Population in Year 2008	Sewage generation of Class-II Towns (in MLD)	Sewage Treatment Capacity (in MLD)
1	Andhra Pradesh	52	3448610	217.59	10.42
2	Assam	8	573290	6.46	-
3	Bihar	14	1113800	107.42	2
4	Chhattisgarh	7	566080	40.82	
5	Goa	2	172850	13.89	18.18
6	Gujarat	31	2180590	227.55	-
7	Haryana	7	544040	43.52	-
8	Jammu & Kashmir	4	244990	27.86	-
9	Jharkhand	10	826300	78.21	-
10	Karnataka	26	1800258	233.37	12.18
11	Kerala	26	1686660	231.32	-
12	Madhya Pradesh	23	1745050	130.9	9.00
13	Maharashtra	34	2503080	213.73	29
14	Meghalaya	1	81750	11.25	-
15	Nagaland	1	126520	1.36	-
16	Orissa	12	904510	78.42	-
17	Pondicherry	1	79690	7.984	-
18	Punjab	14	1109670	157.4	42.80
19	Rajasthan	21	1599260	147.79	-
20	Tamilnadu	42	3254950	184.67	29.3
21	Uttarpradesh	46	3382520	345.7	12.61
22	Uttarakhand	1	69490	9.07	6.33
23	West Bengal	27	2004440	180.42	61.88
	Total	**410**	**3,00,18,398**	**2696.70**	**233.7**

Table 6.4: Wastewater generation in Ganga basin

Category	Wastewater Volume (MLD)	Disposal
Class - I (36)	2637.7	Ganga river
Class - II (14)	122	Ganga river
	Total=2759.7	
Class - I (113)	7841.5	Other rivers (tributaries)
Class - II (18)	134.6	Other rivers (tributaries)
	Total=7976.1	
Class - I (30)	907.4	Land
Class - II (115)	767.3	Land
	Total=1674.7	
	Grand Total = 12410.5 MLD	

6.2 ENVIRONMENTAL STATUS OF FRESH WATER

6.2.1 Bio-monitoring in Aquatic Sources in Problem Areas

Central Pollution Control Board initiated the water quality evaluation of Indian rivers through Biological Water Quality Evaluation Criteria (BWQC) in 1988 as a tool for Bio-mapping the water quality of the rivers. Bio-mapping is the technique of transformation of biological water quality information of a river basin in the form of coloured maps on a river basin map indicating water quality classes in terms of clean (blue), slight pollution (light blue), moderate pollution (green), heavy pollution (orange) and severe pollution (red) of a water body. Bio-monitoring studies of environmental components in problem areas, are important pre-requisite to evaluate the extent of pollution in water bodies in a cost-effective manner.

The water quality assessment through bio-monitoring in various aquatic sources (water bodies / rivers) located in and around problem areas was conducted during the year in problem areas of Gujarat, Chhattisgarh, Himachal Pradesh and Haryana. The bio-monitoring results were compared with the studies undertaken during the year 2001 and 2009. All the rivers were monitored from their origin to confluence except for River Narmada, Damanganga, River Kolak in Gujarat and River Hasdeo in Korba. The results bio-monitoring are summarized in Tables 6.5 to 6.11.

Table 6.5: BWQC in River Damanganga near Vapi , Gujarat

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	None	None
Slight pollution	Piperia, Silvassa	None
Moderate pollution	D/s Madhuban Dam	D/s Madhuban Dam Labachha Piperia, Silvassa
Heavy pollution	None	D/s GIDC Vapi, Zarrycause Way GIDC Water weir D/s NH8 Bridge Namdha Village(high Tide zone)
Severe pollution	None	D/s GIDC Vapi, Zarrycause Way GIDC Water weir D/s NH8 Bridge Namdha Village(high Tide zone)

Table 6.6: BWQC in River Kolak near Vapi, Gujarat

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	None	None
Slight pollution	None	None
Moderate pollution	U/s Vapi, NH8	Nanapondha, U/s, D/s check dam, Nanapondha, Goima,Pandor Near Paper Mill, NH8
Heavy pollution	D/s confluence of Billkhadi drain, Koteshwar	Shri Koteshwar Temple Patalia Bridge (Tidal Zone)
Severe pollution	None	None

Table 6.7: BWQC in River Narmada near Ankleshwar, Gujarat

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	None	None
Slight pollution	None	None
Moderate pollution	U/s Ankleshwar,Nand Head WaterWorks, Bharuch	Navagam,Gurudeshwar, Tilakwada, Malsar, Nareshwar, Zanor
Heavy pollution	Furga at Bharuch	Chandod
Severe pollution	D/s Amlakhadi, Juna Dhanturia village	Golden Bridge, Bharuch

Table 6.8: BWQC in River Hasdeo near of Korba, Chhattisgarh

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	None	None
Slight pollution	U/s Bango Dam at Kathghora D/s Bango Dam,A/c of cooling water from Bango Hydal Power Plant	A/c with River Ahiran
Moderate pollution	U/s of Lotlota ash dyke and Dhanras ash dyke at Ghamota village	U/s Korba,Manchodoli Korba D/s
Heavy pollution	None	None
Severe pollution	None	None

Table 6.9: BWQC River Mahanandi near Korba, Chhattisgarh

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	None	Megha, Balpur
Slight pollution	None	Balpur, Rudri Barrage Shiverinarayan, Surajgad village, Aurang
Moderate pollution	B/c River Hasdeo at Kera village and Manjhia village ,A/c River Hasdeo at Salia Ghat, Bhatgaon	Surajgad village, Origin Point, Sihava Rajim, Rudri Barrage, Shiverinarayan Kharot (Bilaspur), Chandrapur, Balpur, Aurang
Heavy pollution	None	Aurang, Origin Point, Sihava, Aurang, Rajim
Severe pollution	None	Shiverinarayan, Kharot

Table 6.10: BWQC in River Kaushalya near Parwanoo, Himachal Pradesh

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	U/s water supply scheme of Kamli village near Eicher school	U/s water supply scheme of Kamli village near Eicher school
Slight pollution	D/s water supply scheme of Kamli village, Himachal Oxygen factory	River Kaushalya U/s Parwanoo, River Kaushalya at Kalka, River Kaushalya D/s Pinjore and B/c Ghaggar
Moderate pollution	None	River Kaushalya B/c Anhaech nala, River Kaushalya A/c Anhaech nala, River Kaushalya A/c Sahardi khud coming from Dharmpur, River Kaushalya D/s Parwanoo
Heavy pollution	None	None
Severe pollution	None	None

Table 6.11: BWQC in River Markanda near Kala Amb, Himachal Pradesh

Biological Water Quality Class (BWQC)	Year, 2002	Year, 2009
Clean	Kharjuna village near Shambhuwala 16 km U/s of Kalamb (H.P.)	At Origin called River Saraswati
Slight pollution	12 km D/s Kharajuna opp. Suketi Fossil Park, Near Vashisht Chemicals	M-2 at Markanda Bridge U/s Kala Amb Nahan Boarder
Moderate pollution	D/s Jattawala Nalla, near Ruchira Paper Mills	River Markanda D/s Kala Amb
Heavy pollution	None	River Markanda D/s Kala Amb
Severe pollution	None	None

6.3 GROUND WATER QUALITY (GWQ)

6.3.1 Ground Water Quality near Treatment Storage Disposal Facilities (TSDFs) in Gujarat & Maharashtra.

The industrial processes also generate hazardous waste (HW) belonging to different HW categories as given under the HW (MH & TM) Rules 2008. HW needs to be collected, treated, stored, disposed off in a scientific manner, hence the concept of Treatment Storage Disposal Facilities (TSDFs) of HW. Gujarat, Maharashtra, UT of Daman & Dadra Nagar Haveli have 13 TSDFs, as detailed below :

✓ **Gujarat**

1. Naroda Environment Project Ltd., Naroda, Ahmedabad
2. Green Environment Co-op.Soc. Ltd., Vatva, Ahmedabad
3. Nandesari Environ Control Ltd., Nandesari, Vadodara
4. Bharuch Environmental Infrastructure Ltd., Ankleshwar
5. Gujarat Environ Protection & Infrastructure Ltd., Surat
6. Vapi Waste & Effluent Management Co. Ltd., Vapi
7. Gujarat Maritime Board, Alang, District Bhavnagar
8. Surashtra Enviro Projects Pvt. Ltd. at District Kutch

✓ **Maharashtra**

1. Mumbai Waste Management, Taloja
2. TTC Waste Management Association, Navi Mumbai
3. Maharashtra Enviro Power Ltd. at Ranjangaon, Pune
4. Vidarbha Enviro Protection Ltd. at Butibori, Nagpur

✓ **UT of Daman & Dadra & Nagar Haveli**

1. Gujarat Environ Protection & Infrastructure (Dadar & Nagar Haveli) Pvt. Ltd. at Silvassa

CPCB's Zonal Office Vadodara analysed ground water quality in and around TSDF sites located at TTC MIDC, Taloja MIDC in Maharashtra, and at Naroda, Vatva, Surat and Ankleshwar in Gujarat. The salient observations are as follows :

1. The GWQ at TSDF GEPIL revealed that the highest COD value was 181 mg/l at B/W No.3B at U/s TSDF, and the lowest value reported was 15 mg/l at B/W No.4B at D/s TSDF.
2. The highest TDS was 3293 mg/l observed at B/W No.2A at D/s TSDF, Surat.
3. The highest TSS was 1263 mg/l observed at B/W No.2A at D/s TSDF, Surat.
4. The presence of TKN, NO_3-N, NH_3-N, hardness, phenols were also observed.
5. It was inferred that the above values may be due to the sea water intrusion in the area however the position of seepage of effluent into ground water cannot be ruled out.
6. GW quality around Taloja TSDF did not indicate any contamination.

6.3.2 Impact of waste disposal from pesticide unit on GW quality

A study by CPCB Zonal Office, Lucknow was conducted to assess impact on GW quality in Chinhat Industrial area by M/s India Pesticides Ltd. (IPL) , Lucknow, was the following objectives:

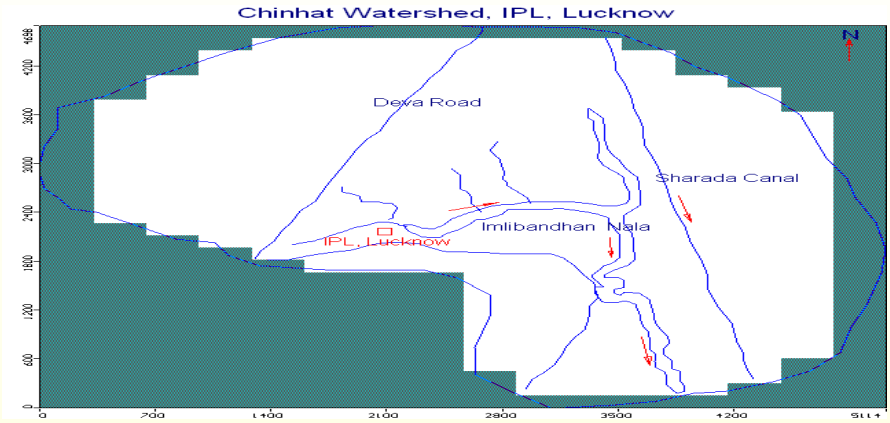


Figure 6.1: Location Map of the Chinhat with Inactive Flow

1. Preliminary investigation of the study area
2. Random characterization of waste generated by the identified industry
3. Monitoring of GW, surface water and soil quality;
4. Preparation of conceptual plan of watershed, GW level elevation and flow path.

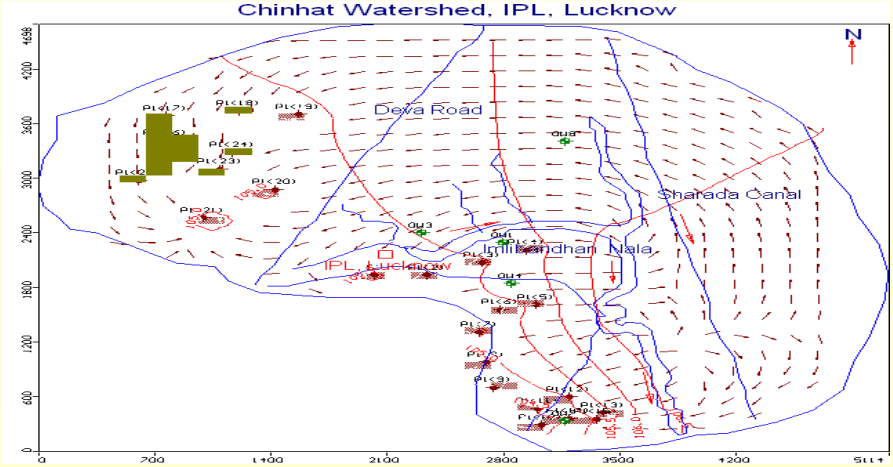


Figure 6.2: Groundwater Velocity Vectors, Chinhat Watershed

The salient observations are as follows:

- Hexa-chloro-cyclohexane (HCH) waste has α, β and γ isomers of BHC. Their relative content (by weight) is 80%,15% and 5% respectively ;
- Sediment samples in drain adjacent to the industry were observed to possess α, β and γ isomers of BHC. Their relative concentration was 165.86 mg/g, 56.95 mg/g and 4.03 mg/g respectively

6.4 COASTAL ISSUES

6.4.1 Status of water supply, wastewater generation, treatment in Class-I cities & Class-II towns in coastal areas

The Central Pollution Control Board (CPCB) published three reports in the last three decades on the status of water supply and waste water generation, collection, treatment and disposal in Class-I cities and Class-II towns (1978-79, 1989-90 and 2000). The fourth study which was conducted in 2008 includes information on 53 coastal class-I

cities and 35 coastal class-II towns also. The coastal states covered were Andhra Pradesh, Gujarat, Maharashtra, Tamilnadu, West Bengal and Kerala. The per capita water supply was higher in West Bengal, Kerala, Maharashtra and Orissa. Maximum wastewater generation was in the coastal towns in Kerala and West Bengal. The two mega cities Mumbai and Kolkata are major contributor to wastewater generation.

Table 6.12: Status of water supply & wastewater generation, treatment in coastal areas in Class-I cities and Class-II towns in year 2008

S.No.	State /UT	Popula-tion Estimated	Water Supply (MLD)	Per Capita Water Supply (lpcd)	Wastewater Generation (MLD)	Treatment Capacity (MLD)
1	Andhra Pradesh	5343940	532.67	99.68	425.83	30.04
2	Goa	295180	29.53	100.04	23.47	10
3	Gujarat	5426029	562.2	103.61	449.3	40.04
4	Karnataka	701270	134.89	192.35	107.91	12
5	Kerala	4555591	1080.51	237.18	864.27	-
6	Maharashtra	15790854	3198.78	202.57	2559.02	2139.7
7	Orissa	1338860	317.06	236.81	253.64	53
8	Tamilnadu	6847419	654.7	95.61	523.74	264
9	West Bengal	6959260	1875.45	269.49	906.22	235.9
10	Andaman and Nicobar Islands	107200	15.008	140	12.0064	-
11	Pondicherry	333550	45.52	136.47	36.41	-
	Total	**47699153**	**7321.918**		**5263.2164**	**2784.68**

6.4.2 Pollution status of fish processing units in Kerala

Seafood processing and fishery products are important industries in Kerala generating revenue particularly through exports. This industry generates large quantities of effluent and solid wastes. In Alleppey-Kerala about 175 seafood processing units are located.

Solid waste from shrimp processing units

CPCB's Zonal Office Bangalore monitored the processes, waste generation, control measures adopted, etc. in 22 such units. Different processing technologies are used to make salted, dried, frozen, canned, suremi, fillets, fish meal and fish oil products.

Approximately 75% of fish production is used for human consumption and the remaining 25% to produce fishmeal and oil. Fishmeal is used as feed for livestock such as poultry, pigs and farmed fish and fish oil is used as an ingredients in paints and margarine. The main observations are:

i. Large quantity of fresh water is consumed in filleting / canning processes while fish meal and fish oil production activities consume comparatively less fresh water.

ii. Effluent generated in fish processing units include the handling and storage of raw fish prior to processing, fluming of fish, defrosting, gutting, scaling, portioning and filleting of fish and washing of the fish products. For operations where skinning is carried out, the effluent can have a high pH due to the presence of caustic.

iii. Most of the units have installed ETP, however units not having any treatment system were discharging untreated wastewater into Vembanad Lake through different canals which ultimately joins the Arabian Sea. Untreated wastewater generated from the fish processing activity has high TSS, TDS, BOD & COD. Quality of effluent depends on the type of fish being processed. Processing of oil fish species generates high pollution load due to high oil content particularly if not gutted or cleaned on the fishing vessel.

iv. Storage and handling of putrescible waste materials, cooking/drying processes, etc generate odour.

v. Solid wastes generated during fish processing include scales, tissue pieces, floating oil, offal, fin, head and bones. They are used to produce other products like chitin, ink, lime powder, etc.

6.4.3 Environmental Status of Coastal Aquaculture in Orissa

Aquaculture has been identified as one of the fastest food producing sector in the world. This sector has raised environmental issues such as loss of mangroves, salinization of ground water, agricultural land and pollution of coastal waters leading to high turbidity (suspended solids), salinity, BOD (organic load) and nutrients such as nitrogen and phosphorous. The CPCB's Zonal Office Kolkata conducted a survey in 2009 on selected aquaculture ponds in Orissa, the salient findings are provided below :

i. Intensive aquaculture is predominant in Orissa State.

ii. Management of manure is the major concern in intensive aquaculture as the settled manure was being disposed in un-organized manner at the time of changing the pond water.

iii. The pond waters prior to discharge had COD and BOD levels as high as 100 mg/l and 12 mg/l.

6.4.4 Oil-Slick in the Sea Coast of Paradeep Port Area, Orissa

A cargo ship namely "MV BLACK ROSE" (Nationality-Mongolia) sunk in the anchorage area of Paradeep Port on 09.09.2009 at a distance of about 1.5 nautical miles from the coast. The ship reportedly set sail with about 26000 MT of iron ore, besides about 942 MT of furnace oil, 48 MT of diesel oil and unknown quantity of lube oil. About 2/3rd portion of the ship was drowned in water while the remaining portion was visible above the surface of the water.

The officials of Orissa State Pollution Control Board (OSPCB) visited the Port on 10th September 2009, and issued directions to Paradeep Port Trust Authority under Section 33 of the Water (Prevention and Control of Pollution) Act, 1974 to take all measures for containment of oil spill. Analysis of water samples by OSPCB showed oil & grease in the range of 0.6 to 251.2 mg/l in coastal beach line. A team of officials from MoEF, OSPCB , CPCB HQ and its Zonal Office Bangalore visited the Paradeep Port on 26th September 2009 , the salient observations of the inspecting team are given below :

1. Oil was oozing from the sunken portion of the ship. During initial days after sinking of the ship the spilled oil was near shore line. It was informed that three tanks containing about 942 MT of fuel oil (furnace oil) ares intact.
2. The Coast guard officials informed that they are working in close coordination with Paradeep Port authorities and are well prepared for any contingency plan for major oil spill from the drowned large storage tanks. The port authorities had attempted to clean the contaminated stretch of sand along the Balijatra Podia beach area and had ploughed the beach sand having oily patches formed during early days after sinking of the ship. At the time of visit, the oily matter was found dispersed.
3. A bloom of about 30 m diameter was laid around the engine portion of the sunken ship. Thick layer of oil was found within bloom area, however the bloom was not effective due to turbulence of waves resulting into spillage to area outside the bloom. The team observed plume of thin-oil-layer up to a distance of about

500 m from the sunken ship. The plume of oily layer was gradually thinning further and breaking with waves when traversed further away from the sunken ship site.

6.5 MONITORING OF MAJOR WASTEWATER DRAINS / OUTFALLS IN NCT DELHI

Twenty five major wastewater drains joining River Yamuna / Canals from National Capital Territory (NCT) - Delhi are being monitored regularly by CPCB on monthly basis. Out of the twenty five drains, seventeen drains discharge into river Yamuna, six into Agra canal and remaining two drains into Gurgaon canal. Major observations are :

i. The two drains i. e. Najafgarh and Shahdara drain also receive waste water from neighbouring State of Haryana and Uttar Pradesh. The annual average discharge and pollution load (in terms of BOD) of these two drains were 46.42 m^3/sec. and 261.14 tonnes / day (TPD) respectively in year 2009. The discharge and BOD load have been 8.2% and 3.1% lesser than the previous year.

ii. River Yamuna receives about 82% of the total pollution load carried by all these drains. Najafgarh and Shahdara drains contribute about 71% of the total discharge and about 58% of the total BOD load to the river Yamuna.

iii. Annual average of discharge and pollution load of the 25 wastewater drains showed reducing trend in the year 2009 by 8.2% and 3.1% respectively as compared to the previous year. This reduction may be attributed to less rainfall, reduced water supply, high decomposition/settlement of organic matter in the transportation system with increased retention time provided by the reduced flow.

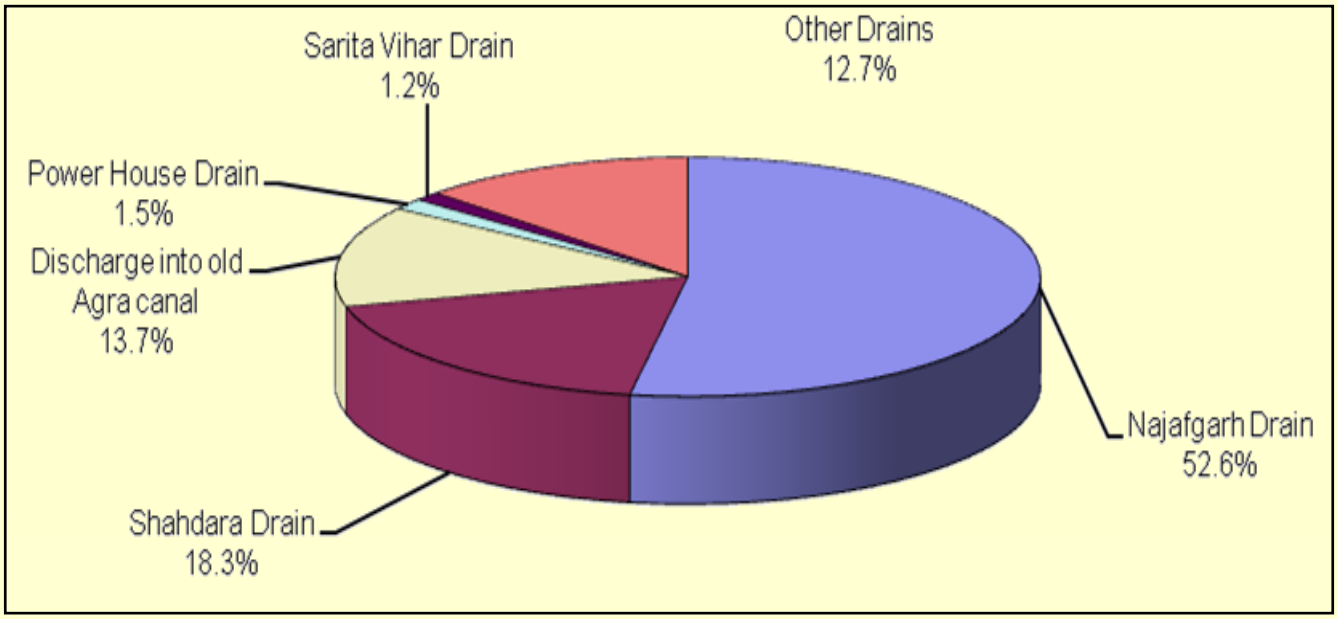


Figure 6.3: Percentage Discharge to river Yamuna through various drains in Delhi (Year in 2009)

6.6 AIR QUALITY DURING DEEPAWALI

Deepawali is a major festival celebrated throughout India. Crackers emitting noise and emissions are burnt in the night time CPCB monitors air quality at Delhi and in the cities where its Zonal Offices are located.

a. Delhi : Air quality monitoring of VOCs during Deepawali 2009 was conducted in Delhi both pre & post festival between 16-18 October 2009. The sampling was done at three locations :

i. At ITO;
ii. Parivesh Bhawan and
iii. Pitampura.

Eight VOCs analyzed had values in the following ranges :

a. Benzene (1.95-28.64 µg/m^3);
b. Toluene (0.1-0.85 µg/m^3);
c. Ethyl benzene(3.73-67.33 µg/m^3);
d. M,P-xylene (detectable) -76.16 µg/m^3);
e. O-xylene (not detectable (not detectable) -44.1 µg/m^3);
f. 1,3,5-trimethyl benzene (not detectable -85.06 µg/m^3);
g. 1,2,3, -trimethyl benzene (34.31 – 34.43 µg/m^3) and
h. Naphthalene (not detectable – 87.73 µg/m^3).

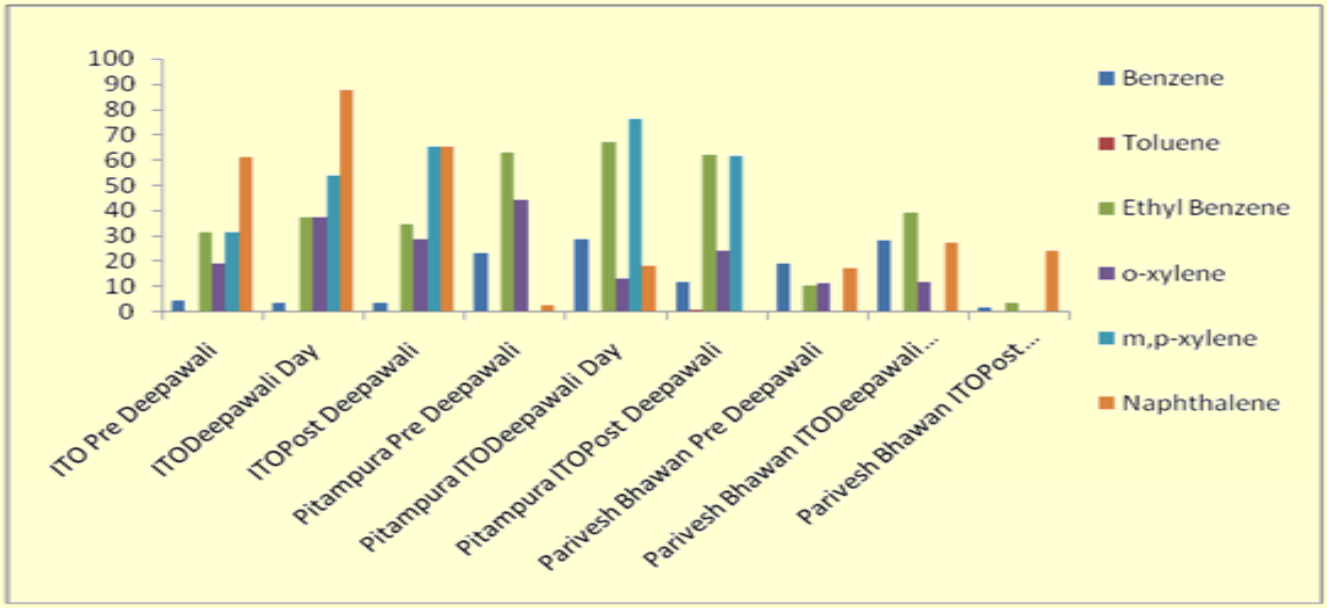


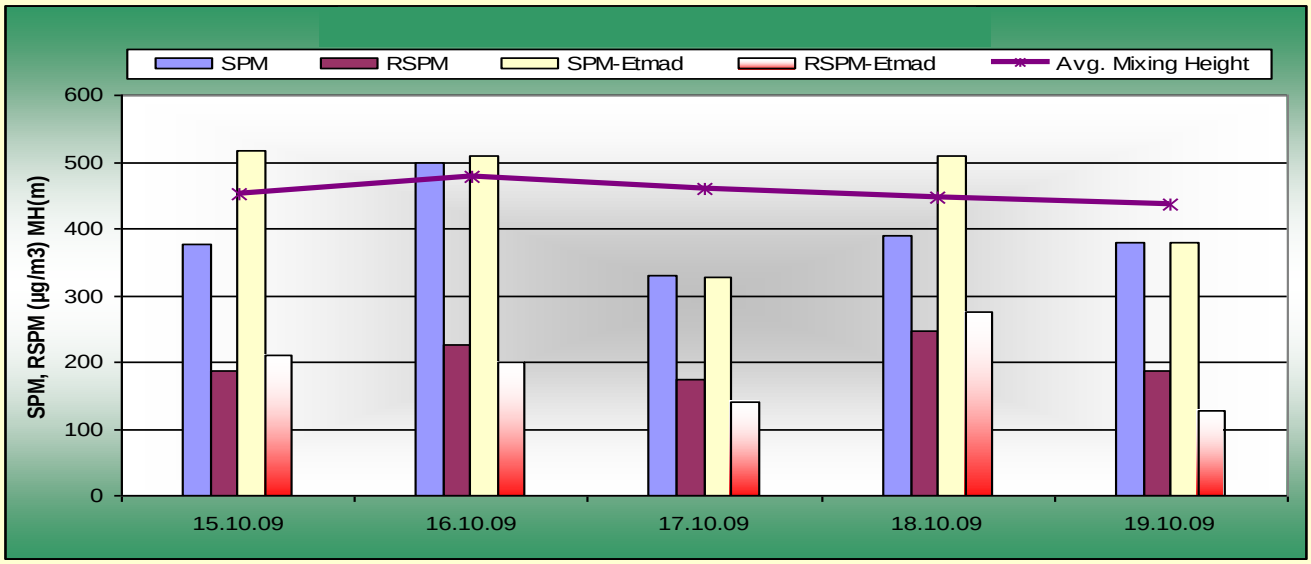
Figure 6.4: Air Quality during Deepawali in Delhi

b. Kolkata : Air quality monitoring in Kolkata was done during Deepawali / Kali Puja. Sale of all types of noise polluting fire crackers is banned by the local authorities in Kolkata city. Hence, majority of the fireworks sold in the city are of non-noise polluting types but of air polluting in nature. The salient observations were:

1. There was 3 – 5 fold increase in concentration of RSPM in residential areas.
2. Concentration of NO_2 was high and ranged between 60 -120 µg/m^3 compared to average city level of around 20 µg/m^3 before the festival day.

c. Bangalore : Ambient air quality was monitored at 05 locations in Bangalore during Deepawali festival season between 17-20 Oct 2009 for RSPM, SO_2 & NOx. The SO_2 & NOx concentration during the entire period of monitoring was below the prescribed 24 hrs norms. The highest concentration of RSPM observed was 319 µg/m^3 and 362 vg/m^3 at Rajaji Nagar on 17th and 18th of October 2009. Out of the five locations RSPM exceeded the prescribed standard for 24 hours at most of the places on all the days except at Kurubarahalli between 16th and 20th of October and at Nagarbhavi on 20th October 2009. Decrease in particulate matter (RSPM) was observed at all the locations as compared the last year except at Rajaji Nagar on 18th October 2009. The gaseous pollutant concentration in ambient air quality during 2009 was found to be generally lower as compared to the values observed during Deepawali 2008.

d. Agra : Ambient air quality was monitored during Deepawali at Agra between 15-19 October (covering pre-Deepawali Deepawali and post Deepawali days) at Tajmahal and Etmad-ud-daulah stations for SPM, RSPM, FPM, NO_2, SO_2, and ozone along with average mixing and inversion height and meteorological parameters. Further analyses of RSPM samples for TSOF, ionic profile & PAH was also carried out.



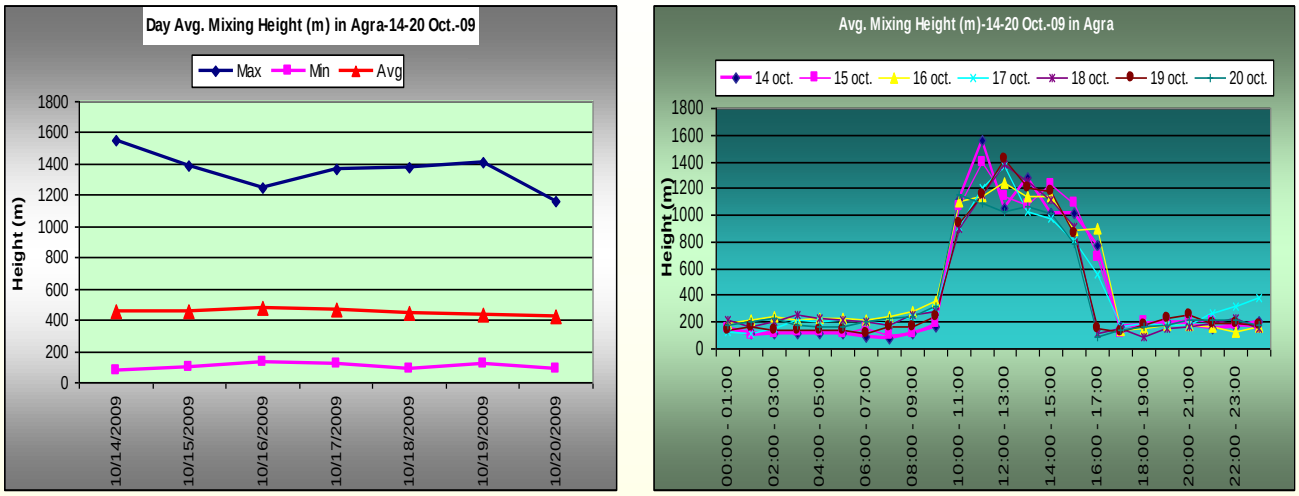


Figure 6.4: SPM & RSPM Vs Mixing Height at Agra during Deepawali

The particulate matter (SPM and RSPM) have shown decreasing concentration on Deepawali, however these values was higher in post Deepawali day. This may be due to lesser contribution from transport sector/ traffic on festival day.

e. Lucknow : Ambient air quality monitoring was conducted in Lucknow at Gomti Nagar and Karamat Market between October 14-15, 2009 (pre-Deepawali) and on October 17-18, 2009 during Deepawali, the salient observations are as follows :

1. During Deepawali average SO_2 values ranged between below detectable level (BDL) to 23 µg/m^3. The highest concentration of 48 µg/m^3 was observed at Karamat Market during peak hours on the Deepawali day. The peak hour value of SO_2 at Gomtinagar was 22 µg/m^3. However the 24 hour average value of SO_2 remained well below the prescribed standard.

2. Decreased concentration of NOx levels was observed at both the locations.

Decrease in the monitored pollutants in 2009 may be attributed to meteorological conditions, less bursting of crackers or change in quality of fire crackers as compared to year 2008. It has been observed that chinese crackers sold in the market during the Deepawali festival which could have impected the air quality.

f. Bhopal : CPCB monitored ambient air quality during Deepawali Festival in Bhopal between October 16-18, 2009. Besides, monitoring was also done on normal day on October 09, 2009.

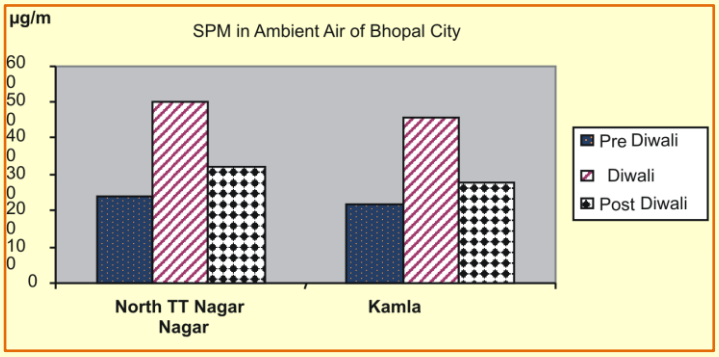


Figure 6.5: SPM in Bhopal (Deepawali)

6.7 NOISE MONITORING DURING DEEPAWALI

The ambient noise monitoring during Deepawali was carried out for 24 hours starting from 00.00 to 2400 hours as per the protocol provided by the CPCB Head Office, Delhi

6.7.1 Noise Monitoring During Deepawali

a. **Lucknow :** The ambient noise monitoring was carried out at two locations namely Gomti Nagar and Karamat market between October 14-15, 2009 (pre Deepawali) and Oct.16-17, 2009 (Deepawali Day). The observations are summarized below as follows:

- The noise standards were not exceeded ;
- It was observed that the noise levels recorded in 2009 were less than the noise levels recorded in the year 2008, which can be attributed to bursting light releasing crackers as compared to noisy crackers.

Table 6.6 : Ambient Noise Leq dB(A) in Lucknow during Deepawali festival

Locations	Pre Deepawali		Deepawali	
	10.00 PM to 06.00 AM	6:00 am to 10.00 pm	10.00 PM to 06.00 AM	6:00 am to 10.00 pm
Gomti Nager	41.5 dB (A) to 49.7 dB (A)	40.2 to 49.9 dB (A)	50.6 dB (A) to 76.9 dB (A)	55.6 dB (A) to 65.4 dB (A) .
Karamat Market	70.3 dB (A) to 86.0 dB (A)	65.0 to 85.9 dB(A)	68.0 dB (A) to 88.5 dB (A)	67.9 to 91 dB(A).

b. **Bhopal** : Noise levels were monitored during Deepawali Festival between October 16-18, 2009, besides monitoring was also done on a normal day on October 09, 2009. Significant increase in noise levels was observed. Noise was measured continuously from 18 hours to 24 hours.

Table 6.7: Ambient Noise in residential area at Bhopal during Deepawali festival

Location	Normal day (09.10.2009)			Pre- Deepawali (16.10.2009)			Deepawali (17.10.2009)			Post- Deepawali (18.10.2009)		
	Min.	Max	Leq.	Min.	Max.	Leq.	Min.	Max.	Leq.	Min.	Max.	Leq.
T.T. Napal	93.1	53.2	67.7	51.4	97.0	66.7	45.6	**115.2**	75.5	51.2	90.8	65.2
Kamla Nagar	51.6	92.1	60.2	53.6	90.1	65.8	58.7	**113.1**	77.0	51.6	110.7	75.6

c. **Bangalore :** Ambient noise levels was monitored at different places in Bangalore during Deepawali festival season (17-20 Oct 2009) starting from evening 17.00 hrs to mid night 24.00 hrs. Noise levels ranged between 57 dB(A) to 74 dB(A) which exceeded the day standard for residential and silence zone on all the days monitored during Deepawali period.

Table 6.8: Ambient Noise Levels at Bangalore in the years 2008 & 2009

S. No.	Bangalore	Average Ambient Noise level in Leq.dB (A)				
		Normal day year		Deepawali day		Standard Limit
		2008	2009	2008	2009	
1	Rajaji Nagar (R)	79	60	81	71	55
2	Mathikere (S)	66	68	75	69	50
3	Malleswaram* (R)	-	71	-	66	55
R – Residential, S – Silence						

d. **Kolkata :** Sound level monitoring was conducted in different parts of Kolkata city before and during the Depawali / Kalipuja. The measurements were taken in the evening period between 6 pm and midnight to assess the impact. The results indicated that ambient noise level increased by 8 dB(A) in highly populated northern and southern parts of the city, however some reduction in sound levels in central commercial parts of the city was observed which can be due to reduction in traffic and closure of commercial establishments on festival occasion.

e. **Agra :** Ambient noise levels were monitored during Deepawali between 15-19 October (covering pre-Deepawali Deepawali and post Deepawali) at night hours (6 PM to 2AM) at three locations in Agra viz. Tajmahal (silence zone), Tajgunj (residential zone) and Sadar (commercial zone). Except for silent zone the norms were exceeded at the other two locations.

6.7.2 Noise monitoring in Southern State Capitals

Ambient Noise monitoring were carried out at 64 locations in Chennai, 29 locations in Puducherry and 31 locations in Thiruvananthapuram representing all zones during day and night time, in order to generate the data on prevailing ambient noise level to assess compliance status and initiate the mitigation measures.

The main observations are :

✓ The ambient noise level monitored during day and night time at different zones in various places in Chennai , Puducherry exceeded the prescribed standard for all the zones except during night time in the industrial zone.

✓ The ambient noise level monitored during day and night time at different zones in various places in Thiruvananthapuram exceeded the prescribed standards for all the zones except during day time in industrial zone and night time in the commercial zone.

6.8. ASSESSMENT OF POLLUTION / CASE STUDIES

6.8.1. IOCL Depot Fire at Jaipur in October 2009

A massive fire broke out due to an explosion in an Indian Oil Corporation Ltd. (IOCL) depot at Sitapura industrial area, Jaipur on 29th October 2009 at 7.15 pm. The IOCL depot (Jaipur Terminal of Marketing Division) is situated in Sitapura industrial area, south west of Sanganer Airport , about 6.7 km distance by road. The fire ceased in the early morning hours (06.00 am) on November 11, 2009. The IOCL could not deploy /use control measures due to non-accessibility of the site. Jaipur is 260 km from Delhi (south of Delhi) and about 225 km west of Agra city. A survey was conducted both by CPCB laboratory at Delhi and its Project Office, Agra. Highlights are given below

Table 6.9: Fuels at IOCL depot (highly inflammable fuels)

Fuel Category	No. of tanks	Total capacity (KL)	Stock on October 29,2009 (KL)
Petrol	03	16,500	17,810
	02	17,000	
Diesel (HSD)	03	54,000	39,966
Kerosene oil	03	13,500	2,099
	Total	1,01,000	59,875
Apart from this there was storage facility for barrels of lubricating oil (quantity not informed by IOCL)			

1. Emission Load : As emission factors were are not available for uncontrolled partially open combustion, however, anticipated emission factors were assumed from Ref: Emission Factors from National Environmental Technology Centre Report, AEA/ENV/R/2168, May 2006.

Table 6.10: Estmated Emission Load
(Minimum 14540 T and Maximum 16127 T)

Fuel	Qty KL on 29/10/09	Quantity* (Kg)	Pollutants	Emission factor mg/Kg	Emission load	
					Min load (Kg)	Max load (Kg)
Petrol	17810	47617206 – 52812786	NOx	561	26713	29628
			PM10	170000	8094925	8978174
Diesel*	39966		PM2.5	102000	4856955	5386904
			B(a)P	5	238	264
Kerosene	2099		CO	30000	1428516	1584384
			NMHC	1770	84282	93479
			Benzene	1022	48665	53975
Total	**59875**	**47617206 – 52812786**	**Total emission load in Tonnes →**		**14540**	**16127**
***Maximum and minimum possible load is due to variation in density of diesel. ; *NMHC-non methane hydro carbon**						

2. Monitoring the dispersion of pollutants: Dispersion of pollutants depends on prevailing atmospheric conditions. Monitoring was carried at the following locations below:

   i. In the neighborhood Jaipur & its immediate surroundings
   ii. At Alwar & Kota (North East & South East of Jaipur)
   iii. Agra (North East of Jaipur)
   iv. Haryana and
   v. Delhi (North of Jaipur).

3. The Moderate Resolution Imaging Spectro-radiometer (MODIS) on NASA's terra satellite showed the fire as fume image on the morning of October 30, 2009, confirming the fire was a massive one, moving from North to South and East-South direction i.e. movement of pollutants was till river Banas.

Another image, taken on November 02, 2009, indicated the movement of smoke from North to South and East-South direction with pollutants being dispersed

towards the river Banas, about 200 km from Jaipur city. As per the meteorological data from Sanganer Airport (about 3-5 Km from the accident site) the predominant wind direction reported was from North, South-East and West.

4. For neighborhood impacts the higher values of criteria pollutants were observed between October 31- and November 01, 2009 in the down wind direction of the accident site. Analyses of surface soil samples from six locations did not indicate any significant impact on ground level pollution, however the soil sample collected from IOCL depot showed higher Loss on Ignition (LOI), Total Organic Carbon (TOC) and organic matter which can be attributed to the local impact or historical deposits.

a. The analysis of VOCs, BTX and napthalene showed maximum values of benzene at Sriram ki Nangal (39 µg/m^3), maximum concentration of toluene (75.9 µg/m^3) at Chokhi Dhani (down wind direction of the accident spot). Data analyses also indicated presence of toxic Benzo (a) Pyrene (B (a) P) and PAHs across the study area in Jaipur.

b. The maximum concentration of total PAHs 81.39 ng/m3 was observed at Chokhi Dhani, while B (a) P 11.55 ng/m3 was observed at STP Delawas during November 3-4, followed by 9.51ng/m3 at Chokhi Dhani, this could be due to incomplete burning of fuel during the period.

c. Thus it may be concluded that impact observed at the down wind direction of the accident site can be attributed to lateral movement of pollutants. This was corroborated from meteorological data, the predominant wind direction, was from NW and NNW (19% during October 27 to November 04); E, ESE (about 30% of same duration), and variable (38% during the same period).

d. The air quality criteria pollutants for four locations at Alwar and three locations at Kota (from Rajasthan Pollution Control Board) indicated higher concentration at all areas compared to annual average data of NAMP, this can be attributed to their downwind locations and prevalent wind pattern.

e. Agra: (NE of Jaipur): No changes in the air quality was observed even after eight days of incessant fire at Jaipur. The city is not located in the down wind direction of the fire.

f. Dharuhera and Gurgaon (north of Jaipur): The ambient air quality data at nine locations showed no deterioration in the air quality due to IOCL fire. The meteorological data recorded at Delhi also confirms that the towns were not lying in the wind direction of the fire.

g. Delhi (North of Jaipur) : The data of all the seven NAMP stations and two continuous ambient air quality monitoring stations showed no impact from the fire

The study concluded that though the fire accident was major one, the impact was found to be not so severe as far as the criteria pollutants were concerned, however presence of volatile and semi-volatile hydrocarbons in the downwind direction were observed. Pollutant accumulation was minimum in and around Jaipur due to changing wind direction and lateral movement of pollutants, while the pollutants dispersed along the Banas river basin due to long distance transportation. Timely preventive measures like evacuation of residents from nearby areas, closing of schools and educational institutions by the local administration helped to restrict health implications

6.8.2 Water Quality Assessment of Thermal Springs (Hot Springs) in Himalayan Sub Region of Uttarakhand State and Himachal Pradesh

Hot springs are geo-thermally heated GW within the earth crust. The above project study was undertaken by CPCB in collaboration with Pollution Control Research Institute (PCRI), Bharat Heavy Electricals Ltd. with the following objectives:

1. Survey and inventorization of hot springs in Himachal Pradesh and Uttarakhand

2. Collect and analyze physical, chemical and biological parameters to assess water quality of identified hot springs.

The hot springs identified for study in States Himachal Pradesh and Uttarakhand for two rounds of study viz. in monsoon and in winter are given ahead.

Table 6.11: Hot springs identified for study in States of Himachal Pradesh and Uttarakhand

State	Hot spring	Location and Importance
Himachal Pradesh	Mannikaran	Located 45 km from Kullu in Parvati Valley Spring releases water with high pressure and high temperature.
	Vashishtha	Located 6 km from Manali near river Beas water temperature was nearly 110 ^{0}F. Tourism Department was promoting this hot spring.
	Taptapani	Located about 51 km from Shimla on the banks of Satluj River. Natural sulphur springs are reported to have curative properties.
	Kusol	Located about 32 km from Bhuntar Kullu Airport. Near Mannikaran, water had lower tempeature than Mannikaran.
	Khairganga	Located at about 26 km from Kullu Tourism importance.
Uttarakhand	Tapt Kund	Holy spring with hot water at Badrinath (below the temple). Sulphurous water had temperature about 45 ^{0}C.
	Gouri Kund	Located at 6500 feet before Kedarnath, water has spiritual values.
	Gangnam	Thermal spring enroute Gangotri. 14 km from Bhatwari. Meditation place important for rejuvenation and relaxation.
	Surya Kund	Located near freezing glaciers of Yamunotri. Water is extremely hot.
	Tapovan Hot spring	Located at about 15 km from Joshimath. Water is believed to posses miraculous healing powers.

6.8.3 Impact of Jhum cultivation on Ambient Air Quality in North East

A survey on the impact of Jhum cultivation on ambient air quality in the North East was conducted by CPCB Zonal Office, Shillong. The traditional and main occupation of the various hill tribes is **Jhum Cultivation** (shifting cultivation). The practice involves cutting down all kinds of plants in the area and keeping it for two to three

Burning of Jhum Field in Sakawrdai Mizoram in 2009

months for stubble biomass treatment drying. Before sowing new crop the dried plants are burnt in spring / winter. In a year, over thousand of hectares of land are burnt up for cultivation. Most of the hilly areas in the region fall under this cultivation practice in rotation (hence called shift cultivation) at an interval of three to seven years depending upon the size of land for each village and population of the village. This practice also leads to soil erosion and disappearance of many precious plant species.

The CPCB's study for ambient air quality in Assam, Manipur, Mizoram and Nagaland indicated air quality deterioration. The major observations are :

1. There was substantial increase of particulate matter on burning. Before burning the concentration was less than 100 $\mu g/m^3$ and during burning operations it ranged between 400-1600 $\mu g/m^3$.

2. SO_2 and NOx levels were low , CO levels increased as high as 23 mg/m^3 during burning

3. An average of 10cm to 20 cm (in thickness) of topsoil is carried away in one year of Jhum cultivation in the hill sides during monsoon which cannot be recovered in the shifting rotation period of 3 to 7 years. The levels of TSS, TDS, alkalinity, increased in the recipient water bodies from the Jhum cultivation areas.

Recommendations proposed include adopting alternative cultivation / occupation by the Hill Tribes, burning duration for all states to be shortened , hunting of wild animals mainly in day time to be banned and issues on loss of topsoil to be given wide publicity.

6.8.4 Environmental Impact of Agrochemicals in West Bengal

Agrochemicals will continue to be used for pest management to ensure abundant food supply. The CPCB's Zonal Office Kolkata conducted a survey to analyse pesticide residue in water and soil in and around the four government managed agriculture farms and three private farms in Nadia and Krishnanagar popular for intensive production of rice, the major crop. The results are shown in Table 6.19. Although degradation of these pesticides may be rapid in soil and water under tropical conditions, the presence in the adjoining water bodies indicated that they have persisted. It is necessary to adopt integrated pest management principles for sustainable use of pesticides.

Table 6.12: Impacts from intensive agriculture of rice in West Bengal

Area	Name of the Farms	pH	OC	Sand	Silt	Clay	Textural class	Endosulfan	Lindane	ßHC	Dieldrin
			Chemical characteristics of the soil (%)					Pesticide residue in the adjoining water bodies (µg/l)			
Nadia	Bidhan Chandra Krishi Viswa Vidyalay (University farm)	7.2	0.51	18.5	45.3	36.20	Silty loam	0.209	0.36	BDL	0.03
	State Seed Farm	7.0	0.58	9.7	56.1	34.18	Silty loam	0.101	0.28	0.42	-
	State Horticulture Farm	7.0	0.8	7.5	48.7	43.78	Silty loam	0.18	0.85	-	-
Krishnanagar	Private Farm (1)	7.5	0.5	9.5	50.0	40.50	Silty loam	0.002	0.24	-	0.01
	ISCON Private Farm	7.2	0.57	10.0	47.6	42.38	Silty loam	0.126	-	0.06	2.2

6.9 ENVIRONMENTAL STATUS IN INDUSTRIES AND INDUSTRIAL AREAS

6.9.1. Critically Polluted Area

6.9.1.1 Ankleshwar

Ankleshwar is one of the critically polluted areas due to two chemical industrial estates viz Panoli and Jhagadia. The area has over 1000 operating industrial units, manufacturing a wide range of products covering pharmaceuticals, dyes & dye intermediates, pesticides, engineering, plastic, paints, textile, food processing and packaging, etc. CPCB, Zonal Office, Vadodara monitored the CETPs at Ankleshwar & Panoli and Final Effluent Treatment Plant (FETP), Ankleshwar, which have the final discharge through marine outfall. The CETPs and FETP were not complying with the norms prescribed by GPCB.

6.9.1.2 Vapi

Vapi Industrial Estate, has been "declared" chemical estate, about 70% of the industries are chemical and chemical related such as dyes & dyes intermediates, pigments, pesticides, fine chemicals and pharmaceuticals etc. River Damanganga receives treated effluent from CETP and two distilleries at Daman as it flows through Vapi-Daman region before joining the Arabian Sea. Several complaints from NGOs have been

received by Administration at UT of Daman, Diu & Dadra Nagar Haveli, due to water pollution and fish kills observed in the Daman-Ganga Estuary. CPCB issued Direction (in December 2006) under Section-5 of the E (P) Act, to M/s VWEMCL i.e. CETP, Vapi. Over the period CETP has been improved by additional treatment units such as Up-flow Anaerobic Sludge Blanket Reactor (UASB), Tertiary Treatment Units consisting of Dyna Sand Filter, CAACO (Catalytic Autotrophic Activated Carbon Oxidation) , some works are under upgradation. CETP was not complying with the stipulated norms.

Ammonical Nitrogen: As some of the industries have high NH_3-N thereby contributing to major pollution load in CETP, Vapi, the CPCB Zonal Office monitored such industries. The results indicated that most of the industries lack proper treatment of NH_3-N and hence unable to comply with the inlet norms applicable to the CETP. Sampling locations of high ammonical nitrogen industries at GIDC, Vapi is given below.

i. Inlet to ETP of M/s Navin Chemicals (P) Ltd, Vapi
ii. Outlet of ETP of M/s Navin Chemicals (P) Ltd, Vapi
iii. Out let to ETP of M/s Omkar Chemicals, Vapi
iv. Inlet to ETP of M/s Essel Mining. GIDC, Vapi
v. Out let of ETP of M/s Essel Mining, GIDC, Vapi
vi. Stripping water from NH_3Treatment system of Essel Mining, GIDC, Vapi
vii. Inlet to ETP (Collection Tank) of M/s Nascent Chemicals,Vapi
viii. Spillage & Blowdown effluent of M/s Nascent Chemicals, Vapi
ix. Inlet to ETP of M/s Unimark Remedies Ltd. GIDC,Vapi
x. Outlet of ETP of M/s Unimark Remedies Ltd, GIDC, Vapi
xi. Untreated effluent before Ammonia treatment system of M/s Unimark Remedies Ltd, GIDC, Vapi
xii. Treated effluent after Ammonia treatment system of M/s Unimark Remedies Ltd, GIDC, Vapi
xiii. Inlet to ETP (Collection Tank) of M/s Graur & Well(India) Ltd, GIDC, Vapi
xiv. Outlet of ETP of M/s Graur & Well (India) Ltd, GIDC, Vapi
xv. Inlet to ETP of M/s India Gelatin & Chemicals Ltd, Vapi

To assess efficiency of FACCO (Fenton Activated Catalytic Carbon Oxidation) Treatment CPCB jointly with GPCB monitored M/s C.S. Speciality Chemicals Pvt. Ltd, GIDC, Vapi for the reduction of COD, NH_3-N in the effluent.

Table 6.13: Analysis results of the samples collected on two different days with due consideration of retention time of the FACCO treatment system

Parameter	Inlet to FACCO2 (i.e. outlet of tank N4 before cartridge filter)	Outlet of FACCO2 (i.e. before IBC tank)	% reduction	Remarks
pH	4.25	4.0		Inlet & outlet samples with two hours gap of retention time of the system on 27.08.2009.
TSS	226	101	55%	
TDS	15707	11134	29%	
COD	4113	3245	21%	
BOD	1379	839	39%	
NH_3-N	95	68	28%	
TKN	160	106	33%	
Phenol	151	114	24%	
TOC**	1056	683	35%	
pH	4.55	3.93		Inlet & outlet samples with two hours gap of retention time of the system on 03.09.2009.
TSS	532	135	75%	
TDS	22274	18621	16%	
COD	7182	4760	33%	
BOD	965	576	40%	
NH_3-N	92	82	10%	
TKN	134	112	16%	
Phenol	791	529	33%	

** All the parameters are in mg/l except pH. ** Monitored by SGS Laboratories.*

The results indicated that the treatment system has shown reduction in concentration of parameters. Reduction in COD ranged between 21 % to 33%, NH_3-N ranged between 10 % to 28%, phenol ranged between 24 %to 33% and TDS ranged between 16 % to 29%. The reduction in TOC concentration ranged between 0 to 35%. The percent reduction in concentration ranges are partly contributed by addition of H_2O_2 and ferrous sulphate solutions. An indepth study of the system needs to be explored, as it has been informed that aromatic amines get destroyed by FACCO reaction but ineffective for inorganic ammonia.

6.9.1.3 Tarapur

Tarapur is one of the critically polluted area identified in Maharashtra by Central Board because of the pollution potential of industries. The action plan for the problem area

was reviewed in the year 2008. Illegal discharge of untreated effluent by industrial units, inadequacy of effluent carrying system in the estate and non-compliance of the effluent norms by CETP are the major issues. Directions under Section 18 (1) (b) of the Water Act & Air Act were issued to Maharashtra Pollution Control Board on the basis of the findings in June 2008. The hydraulic treatment capacity of the CETP has been augmented. There are issues that need to be addressed jointly by MPCB, Industries and Maharashtra Industrial Development Corporation.

6.9.1.4 Chembur

In Maharashtra Chembur is another critically polluted area, the action plan for the area was prepared and efforts made for its implementation. A detailed survey / monitoring was conducted for ambient air monitoring, source emission monitoring, effluent discharge sampling and HW management in the identified industries. Shifting from vehicular mode to pipelines transfer of petroleum products has greatly reduced the traffic load. The following suggestions have been made to MPCB :

- Networking of ambient air quality monitoring stations operated by individual industries.
- Implementation of revised standards and source monitoring for compliance verification as per new standards in RCF & Oil refineries.
- Monitoring of Hazardous Air Pollutants (HAPs) in ambient air
- Traffic Decongestion programme

6.9.1.5 Singrauli

A meeting of all the major stakeholders was convened at Renukoot on September 18, 2009 to review the status of implementation of Action Plan for prevention and control of pollution in Singrauli from all the industries identified under the Singrauli Action Plan. The major issues for implementation were suggested for Thermal Power Plants (NTPC-Shaktinagar, NTPC- Rihand, NTPC Vindhyachal) , UPPCL- Obra, UPPCL-Anpara, HINDALCO Captive power plant at Renusagar, M/s HINDALCO, Renukoot, Kanoria Chemicals Ltd., Northern Coal Fields Ltd., Stone Crusher Units, Dala Cement Plant and Hi-Tech Carbon.

6.9.2 Environmental Monitoring Of Mettur Region (Salem), Tamilnadu

Mettur is an industrial town municipality famous for the METTUR DAM (or Stanley reservoir) on Cauvery river with a length of 1700 metres and a capacity touching 120 feet. The TNPCB has identified Mettur as one of the 'hot spots' in Tamilnadu on acount of spate of public complaints regarding pollution due to industral activity in the region. Mettur has eight large scale and several small scale industries.

Table 6.14: Environmental Monitoring of Mettur Region (Salem), Tamilnadu

S. No.	Name of the industry	Year of establish -ment	Products manufactured	Effluent generation	Final disposal point of treated effluent
1	M/s. Chemplast Sanmar Ltd., Plant 1, Mettur Dam - 636402.	1988	Carbon tetrachloride, Chloroform, Anhydrous hydrogen fluoride, Alkaline bromide solution, 30% Hydrochloric acid, Hydrogen, Potassium hydroxide	200 KLD	River Cauvery (surplus course)
2	M/s. Chemplast Sanmar Ltd., Plant-II, PVC Division, Mettur Dam - 636402.	1967	PVC resin , Hydrochloric acid, Ethylene, Ethylene dichloride, Vinyl chloride monomer	1603 KLD	River Cauvery (surplus course)
3	M/s. Chemplast Sanmar Ltd., Plant-III, Mettur Dam - 636403.	1997	Caustic soda, Chlorine, 30% hydrochloric acid, Hydrogen, Methyl chloride, Methylene chloride, Chloroform, Carbon tetra chloride, Silicon tetra chloride, Ethyl silicate, 73% sulphuric acid, Trichloro ethylene, Perchloro ethylene, Dichloro ethylene, Calcium hydroxide, Bleach liquor.	397 KLD	River Cauvery (surplus course)
4	M/s. Chemplast Sanmar Ltd., Plant-IV, Mettur Dam - 636403.	1985	Silicon (metal) pure electronic grade (semi conductor silicon)	ZLD	-
5	M/s. Cabot Sanmar Ltd., Mettur Dam - 636403.	1997	Fumed Silica, 30% hydrochloric acid, Sodium hypochlorite	ZLD	-
6	M/s. Mettur Thermal Power Station, Mettur Dam - 636406.	1987	Electricity 840 MW	42123 KLD	River Cauvery (surplus course)
7*	M/s. The	1998	Aluminium, Power,	3690 KLD	River

S. No.	Name of the industry	Year of establish -ment	Products manufactured	Effluent generation	Final disposal point of treated effluent
	Madras Aluminium Company, Mettur Dam - 636403		Anode Paste, Calcined Alumina,	(Cooling + boiler feed)	Cauvery (surplus course)
8	M/s. JSW steel Ltd., Salem Works, Pottaneri, Mecheri, Mettur taluk, Salem - 636453.	1995	Pig Iron, Steel products (mild/ carbon/ alloy/special), Captive Power	225266 KLD	Closed loop recirculatiio n
* Presently the unit is not working and stopped its production (except power)					

In addition to the above large scale industries, many small-scale industries are also located in the SIDCO industrial estate of Mettur Dam. The details are as under:

Table 6.15: Industrial profile of Mettur Region (Salem), Tamilnadu

S. No.	Product manufactured	No. of industries
1	Magnesium sulphate	21
2	PVC pipe	14
3	Barium salts	2
4	Service station	4
5	Sodium sulphide	9
6	Calcium chloride	5
7	Bleach liquor	1
8	Other chemical industries	3
9	Paper industries	1
10	Rubber lining	1
11	Engineering fabrication	18
12	Other	5
TOTAL		84

Environmental status of the Mettur region was studied covering ambient air, surface water, GW, stack emission and wastewater. The main observation are :

- ✓ surface water showed presence of 26 VOCs with chloroform, vinyl-chloride, 1,2-Di-chloroethane and 1,1-Di-chloroethane recording max concentration of 6262 µg/L, 1866 µg/L, 400.8 µg/L and 57.56 µg/L respectively.

- ✓ In openwell / borewell samples 16 VOC compounds were observed with chloroform (3073 µg/L), bromo-dichloromethane (20.17 µg/L) and Di-bromo-chloromethane (9.15 µg/L).

6.9.3 Sponge Iron Industry: Taraimal Industrial Area near Raigarh, M.P

Inventorization and assessment of pollution load in Taraimal Industrial Area, Raigarh was done by CPCB's Zonal Office Bhopal in January 2010. The area which has been identified as a major sponge iron production centre has 22 units with daily production of 10,050 MT. The survey included source emission monitoring, fugitive emissions and ambient air quality. The following sponge iron units were surveyed :

i. M/s Anjani Steels Ujalpur
ii. M/s Tirumala Balaji Alloys, Jindal Industrial Park
iii. M/s Vandana Energy & steel ltd, Jindal Industrial Park
iv. M/s Orion ferro Alloys Pvt Ltd, Jindal Industrial Park
v. M/s Navdurga Fuels,Saraipalli
vi. M/s Raigarh iron Industries Ltd, Punjipatra

The major observations are as follows :

a. The units need to have pucca flooring in all the raw material handling areas and paved internal roads to reduce fugitive emissions. The fugitive emissions in the units are more due to open storage of iron ore fines, slag and char.
b. For source emission monitoring, stacks need to be provided with proper arrangements to access porthole ex. ladder , platform etc.
c. The particulate matter in source emissions ranged between 40-127 mg/Nm^3, indicating that attention on O&M of pollution control devices is a priority.
d. The ambient air quality values were higher than the norms applicable for industrial areas. The reasons being heavy vehicular movement carrying raw materials like coal, iron ore and products.
e. House keeping of solid wastes need to be improved, units to submit solid waste disposal / management plans. Most of the units have not applied for authroization under HW Rules, they need to install display as per the Supreme Court directives.
f. Drainage facilities are poor, rain water carries away wastes to river Kelo. The solid waste dumping areas need to be provided with bunds.
g. In the Jindal Industrial Park more units of ferro alloys are operating and the slag are dumped in open area.

Table 6.23: Ambient Air Quality at Taraimal Industrial Area, Raigarh, MP

Location and time	VIP Dhaba Girwani Village		Taraimal village		Jindal Institute, Hostel		M/s Navdurga Fuels, Admn.office		M/s Anjani steel & power Nr. Admn. buiding		Brick p M/s Anjani steel & power lant near	
24 Hours Average	Date of monitoring: 05 to 07 January 2010											
	RPM	SPM	RPM	SPM	RPM	SPM	RPM	SPM	RPM	SPM	RPM	SPM
2:00 PM - 10:00 PM	342	753	301	731	270	601	201	511	514	933	1201	1081
10:00 PM -06:00AM	437	823	439	968	210	606	170	459	420	770	719	1349
0600 AM - 02:00 pm	281	710	373	810	246	619	189	561	311	713	477	988
-	353	762	371	836	242	608	187	510	415	805	799	1473

Note: All the values are in µg/m³.

6.9.4 Sponge Iron plants in Chhatisgarh State

Chhattisgarh State has become a steel hub due to availability of abundant natural resources like iron ore and coal reserves. The industrial growth has improved economy due to rapid industrialization, however, this has led to growing environmental problems mainly air pollution and indiscriminate solid wastes disposal practices. CPCB's Zonal Office, Bhopal organised a meeting with the industries & SPCB officials for better Environmental Management in Sponge Iron Plants in Chhattisgarh State, on February 01, 2010 at Raipur. The main issues discussed were :

a. Need for control of fugitive emissions,
b. Units to reduce emissions from frequent start up & shut down operations.
c. Failure in operation of ESPs tripping,
d. Maintain records of the following : ESP trippings, calibration & readings of opacity meters, production, solid waste generation, storage & disposal data.
e. Need to prepare solid waste management plans for ash, char and dolochar,
f. Energy conservation measures per tonne of sponge iron production.
g. Tree plantation measures
h. Need for adaptation of self regulatory mechanism
i. Measures for utilization of reject coal & iron, waste recycling and adaptation of cleaner technology besides the importance to have technically qualified persons.

The Secretary of Sponge Iron Manufacturers Association Raipur requested the Authorities to permit to install AFBC boilers for utilization of solid waste and also allocation of land or abandoned mines for disposal of solid waste generated by the sponge iron units.

6.9.5 Pollution Control in Large Dyeing units, Ludhiana (Punjab)

Poor management of effluent generated from dyeing units has created serious environmental problems. Effluent from dyeing sections is either being discharged directly into city sewer or used for irrigation. To assess the gravity of the problem CPCB jointly with Punjab PCB conducted a survey in some of the textile mills operating in Ludhiana in August'09 , the major findings are given below :

i. Dyeing units located at Focal point and Near GT Road are discharging their effluent into sewers where as industries which are located in Machiwara are utilizing treated effluent for irrigation.
ii. The ETPs are identical in all the units having three stage treatment - first stage- chemical treatment followed by second stage aerobic biological treatment and finally filtration through pressure sand filter and activated carbon column. Units having only chemical treatment do not conform to effluent norms.
iii. High effluent temperatures (> 45 degree centigrade) is unsuitable for biological treatment, units needs to address this issue.
iv. Emphasis should be on recycling and reuse of treated effluent in order to conserve the water.
v. O & M of ETP needs improvement
vi. Units were mixing biological sludge with chemical sludge thereby increasing HW sludge load. This practice needs to be stopped.

6.9.6 Project on 'Assessment of Industrial Pollution Load Discharges in the Ghaziabad area'

CPCB executed the above study through Department of Civil Engineering, IIT Delhi. The objectives of the survey are :

i. Preparation of data base of industries under different categories.
ii. Inventory of major industries and their environmental pollution control strategies.
iii. Assessment of ecological quality of surface water resources, especially River Hindon.
iv. Groundwater quality monitoring in Ghaziabad area.
v. Assessment of ambient air quality in major Industrial Areas of Ghaziabad.
vi. Land pollution sources and industrial contribution.
vii. Socio-ecological impact of pollution discharges in Ghaziabad.
viii. Development of an Environmental Pollution Index for an industrialized urban or sub-urban area.

The report is under finalization.

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CHAPTER VII

ENVIRONMENTAL RESEARCH

7.1 ENVIRONMENTAL LABORATORIES

7.1.1 Adoption of Revised Guidelines for Recognition of Environmental Laboratories under the Environment (Protection) Act, 1986.

Ministry of Environment and Forest (MoEF) has constituted an Expert Committee at CPCB vide letter no. Q-15018/8/2006-CPW dated 28.1.2009 for operationalization / adoption of revised Guidelines for recognition of Environment laboratories under the Environment (Protection) Act, 1986. The members are :

a. Two Expert Members from Central Pollution Control Board (Chairman & Member Convener of Expert Committee)
b. One External Expert Member
c. One Expert Member from Ministry of Environment & Forests

The Expert Committee held eleven meetings. New / renewal cases of recognition of Govt. Environmental Laboratories were considered, their inspection reports examined and evaluated by the Expert members.

7.1.2. Environmental Laboratories Approved for Recognition by Central Pollution Control Board under the Environment (Protection) Act, 1986

In exercise of power conferred on Central Pollution Control Board, Delhi vide Gazette Notification No. SO 145 (E) dated February 21, 1991 for recognition off environmental laboratories of Govt. / semi Govt. organization, Public Sector Undertaking and Educational Institutions to carry out the functions entrusted to the Environmental Laboratories under section 12(1)(b) & 13 of the Environment (Protection) Act, 1986., CPCB has approved the following laboratories (new / renewal) on recommendation from the Expert Committee between April, 2009 to March, 2010

✓ *152nd Board Meeting (Held on 20.8.2009)*

1. Central Laboratory , Central Pollution Control Board, `Parivesh' Bhawan., East Arjun Nagar, Delhi-110 032

✓ *153rd Board Meeting (Held on 19.12.2009)*

1. Central Laboratory, Punjab Pollution Control Board, Patiala, Punjab
2. Regional Laboratory, Maharashtra Pollution Control Board, Pune, Maharashtra
3. Zonal Laboratory, Central Pollution Control Board, Kolkata

7.1.3 Participation in Joint Inspection of Private and Government Laboratories for Consideration of Recognition under the Environment (Protection) Act, 1986

A. Private Sector Laboratories : CPCB jointly with MoEF and SPCBs inspected the following private environmental laboratories :

(i) M/s S V Enviro Consultants, Vishakapatnam.
(ii) M/s Industrial Testing Laboratory and Consultancy House, Patiala, Punjab.
(iii) M/s AES Laboratories, Noida.
(iv) M/s ITL laboratories Mangolpuri, Delhi.
(v) M/s Hitech Research Centre, Okhla, New Delhi.
(vi) M/s Mantec Environmental Laboratory, Noida, U.P.
(vii) M/s SIMA Laboratory, Okhla , Delhi.
(viii) M/s Haryana Test House Panipat, Haryana.

B. Government / Public Sector Laboratories : CPCB , its Zonal Offices and SPCBs jointly inspected the following laboratories :

(i) Regional office laboratory , Maharashtra State Pollution Control Board, Pune
(ii) Central Laboratory, Gujarat State Fertilizers and Chemicals Ltd., Vadodara, Gujarat
(iii) Central Laboratory, Punjab Pollution Control Board, Patiala, Punjab.
(iv) Zonal Laboratory, Central Pollution Control Board, Kolkata

7.1.4 Strengthening of SPCBs Laboratories

Proposals from the following State Pollution Control Boards for financial assistance for strengthening of laboratories were received :

1. Madhya Pradesh State Pollution Control Board, Bhopal
2. Orissa Pollution Control Board, Bhubaneshwar
3. Bihar State Pollution Control Board, Patna
4. Maharashtra State Pollution Control Board, Mumbai
5. Meghalaya State Pollution Control Board, Shillong
6. Himachal Pradesh State Pollution Control Board, New Shimla
7. Tripura State Pollution Control Board, Tripura

7.1.5 Participation of CPCB Laboratories in International Proficiency Testing (PT) Programme Conducted by New York State Department of Health, USA

To ensure analytical quality, the CPCB laboratories at Delhi and at its Zonal Offices located at– Kolkata and Lucknow participated in Proficiency Testing Programmes organized by New York State Dept. of Health, Wadsworth Centre, Environmental

Laboratory Approval Programme (ELAP), Albany New York. Samples related with potable water chemistry and non-potable water chemistry were received and analyzed by CPCB laboratories. The analytical results were sent to the Proficiency Testing provider, New York State Dept. of Health, Albany, New York. The PT results have been satisfactory in most cases, except for some parameters, where improvement in analysis is envisaged.

7.1.6 Participation In NABL Proficiency Testing (PT) Programme conducted by National Physical Laboratory, New Delhi

CPCB's Instrumentation Laboratory participated in the NABL Proficiency Testing Programme for testing of metals in water (TC-44 Part-II) during June, 2009. conducted by National Physical Laboratory, Council of Scientific & Industrial Research (CSIR) , New Delhi. The PT samples comprising various trace metals such as As, Cu, Fe, Zn, Pb, Cd, Ni were received by Central Pollution Control Board Laboratory and analyzed using Atomic Absorption Spectrophotometer / Inductively Coupled Plasma and results reported to National Physical Laboratory (NPL) New Delhi. The Z-Scores secured by CPCB Laboratory during the PT Programme (TC-44) is summarized below:

Table 7.1: Results of NABL PT (TC-44 Part-II) for metals in water

S. No.	Metal Solutions	Average value (ppm)	Z Bi (Z-Score between labs)	Z Wi (Z-score within lab)
1.	Arsenic	0.73	-1.28	-0.56
2.	Copper	5.47	1.59	-0.27
3.	Iron	5.90	1.91	0.18
4.	Zinc	5.93	2.42	2.62
5.	Lead	0.95	-0.24	1.29
6.	Cadmium	1.00	0.36	1.72
7.	Nickel	0.94	0.07	0.59
Results key:	Z-Score < ± 3.00 Satisfactory; Z-Score > ± 3.00 Unsatisfactory			

There has been no unsatisfactory Z-Score for the trace metals parameters analyzed during the proficiency testing and the performance of the laboratory was satisfactory.

7.1.7 Analytical Quality Control (AQC/WATER) for Central and State Pollution Control Boards, Pollution Control Committees and for Laboratories recognised under Environment (Protection) Act.

CPCB maintains a large water quality network covering lakes, wells, and ground water stations spread over 27 States and 6 Union Territories operated through various State Pollution Control Boards (SPCB). Comparability of data within the collaborative programme becomes the key challenge to the water testing laboratories. The quality of data generated in the monitoring programmes must be of the desired quality for policy formulation by the decision makers. Therefore, to obtain reliable data, the analytical

process has to proceed under a well established quality assurance with external proficiency test as an inherent component. To ensure the reliability of the data, a programme called "Analytical Quality Control (AQC)" was initiated with 20 laboratories in 1991.

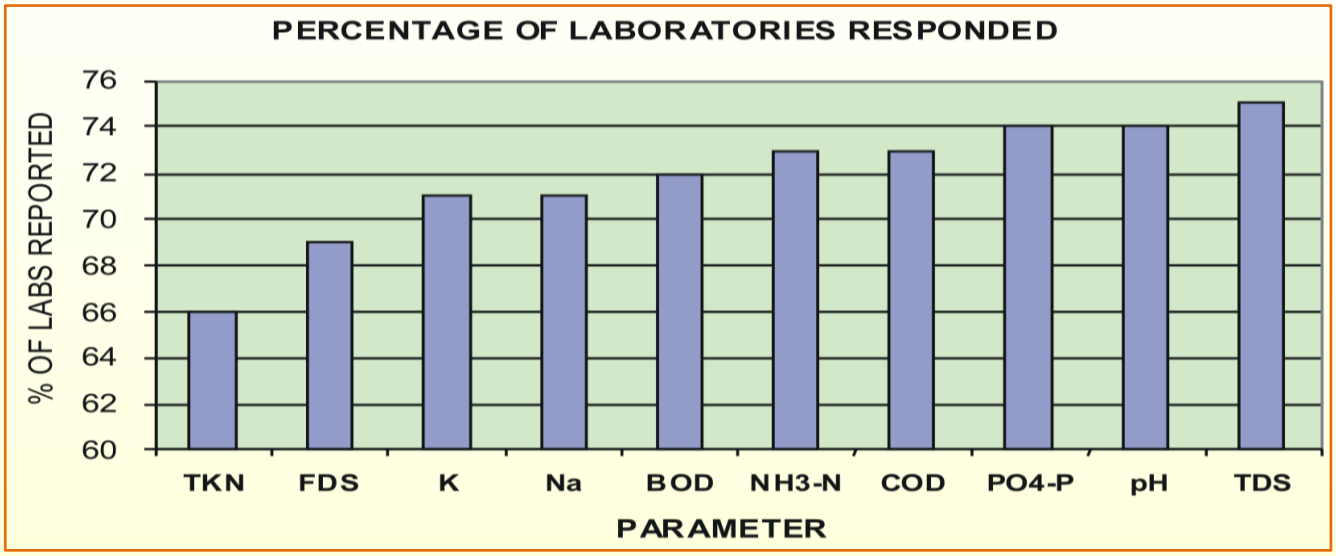


Figure 7.1: Percentage of laboratories response

In 2009, number of laboratories participating in this exercise have increased to 194 laboratories of SPCB / PCC, Environment (Protection) Act recognized laboratories. As on 31st December, 2009, 25 rounds of exercises were conducted and performance reports were communicated to the participating laboratories. In the 25th Silver Jubilee AQC exercise for 10 parameters organized in April, 2009, samples were sent to 192 laboratories. In 2009-2010 , 10 parameters covered under this scheme were taken up. The details of laboratories participating in the AQC Exercise (25th) in terms of analyzing different parameters is shown in figure below. The percentage of response varied from 66 to 75.

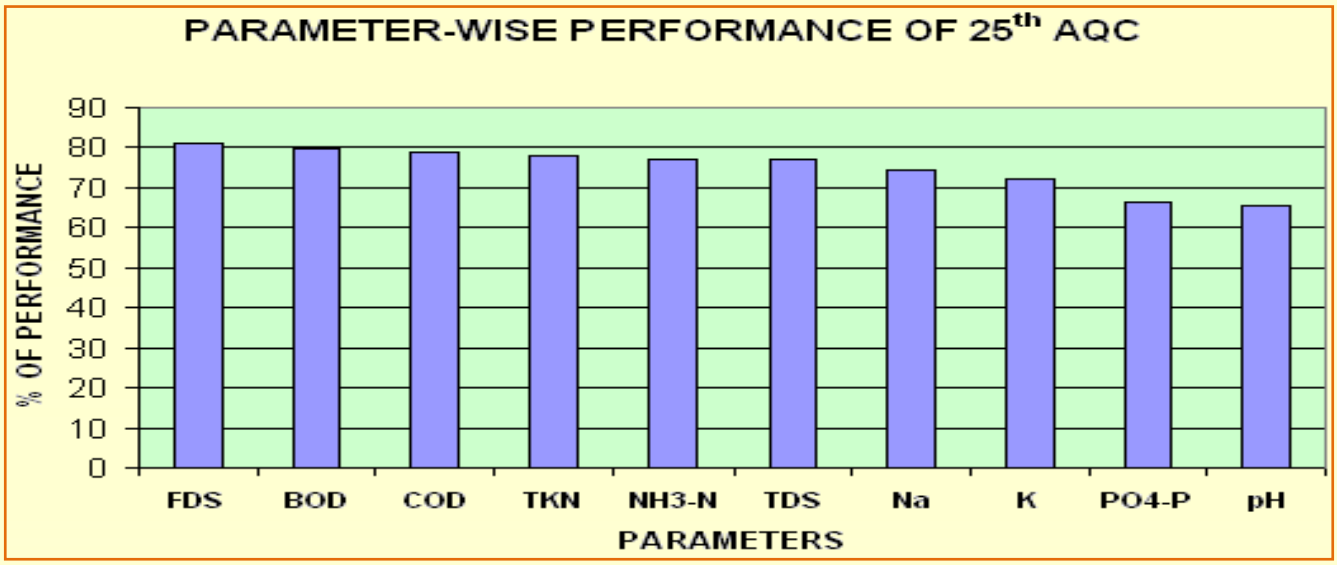


Figure 7.2: Parameter-wise performance of 25th AQC

The overall analytical performances of the laboratories were satisfactory. Laboratory Performances in different parameters is presented in Fig. 7.2.

7.1.8 Inter - Labortory QA / QC Study on Persistent Organic Pollutants (POPs) in Asia Region

National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi was registered as POPs laboratory representing the country having analytical facilities for POPs in India with UNEP Chemicals during January / February, 2009 (Table 7.2). The first worldwide Inter-laboratory study on POPs for Asia-Pacific Region has been organized by UNEP Chemicals during year 2009 under Stockholm Convention, in which 37 laboratories from 13 countries (Asia & OECD Countries) including National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi participated.

UNEP Chemicals organized 'Inception Workshop' of First Worldwide UNEP Inter-calibration QA/QC Study on POPs in Peoples Republic of China between 6-8 April, 2009, which was attended by Central Pollution Control Board, Delhi. As a follow up of the inception workshop, inter-calibration test samples comprising Standard Test Solution, Sediment and Fly Ash samples from Municipal Solid Waste incinerator from Sweden were received at National Reference Trace Organics Laboratory.

These samples were analyzed and results reported to Inter-calibration Study Coordinator at Orebro University, Sweden. The analytical results were presented and discussed during First Worldwide Meeting at Hong Kong held from 26th to 28th February, 2010, which was also attended by Central Pollution Control Board. The analytical results reported by various laboratories were statistically evaluated and Z-Score assigned by the inter-calibration study coordinators at Orebro University, Sweden. The performances of National Reference Trace Organics Laboratory Z-Scores were excellent for PCDD/PCDF for test solutions and fly ash and majority of PCDD / PCDF isomers in sediments. However, further improvements are envisaged for analytical results for dl-PCBs, Marker PCBs and OCPs through method development and quality assurance.

Table 7.2: Website Page from UNEP Chemicals Website for Registration of National Reference Trace Organics Laboratory of CPCB

ASSESSMENT OF EXISTING CAPACITY AND CAPACITY BUILDING NEEDS TO ANALYZE POPS IN DEVELOPING COUNTRIES

Home | Laboratories | Tiers

List of Laboratories 93 of 218

LABORATORY : National Reference Trace Organics Laboratory, Central Pollution Control Board, Ministry of Environment and Forests (India)

General	Personnel	Clients	Sampling	Extraction and Determination	Identification Methods

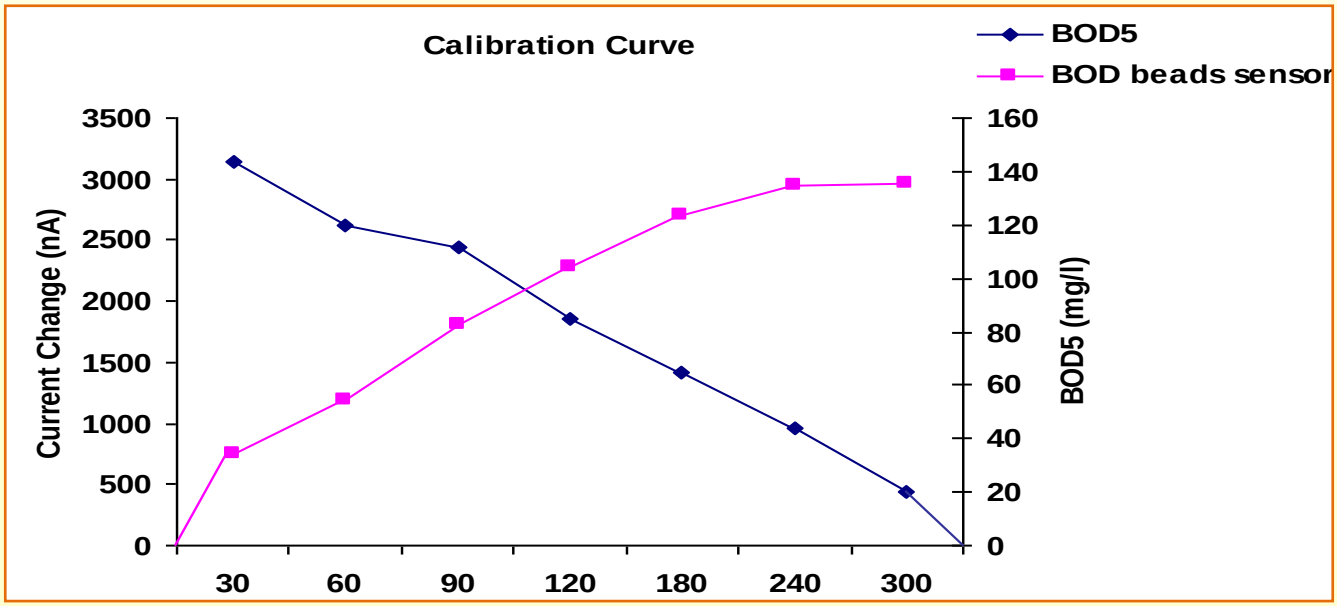
Number of samples	External Cost	QA	Accreditation	Inter-calibration	Publications	Comments

1. Identity and General Description

Name of Laboratory :	National Reference Trace Organics Laboratory, Central Pollution Control Board, Ministry of Environment and Forests
Address :	Parivesh Bhawan East Arjun Nagar
City / State :	Delhi
Country :	India
Postal Code :	110 032
Telephone :	+91 (11) 43102336, -376, -361
Fax :	+91 (11) 22301844
E-mail :	Contact us
Web Site :	http://212.203.125.2/databank/Laboratory/www.cpcb.nic.in
Contact Person :	Dr. S. D. Makhijani, Dr. C.S. Sharma

7.2 TESTING AND VALIDATION OF BOD BIOSENSOR BASED ON MICROBIAL MIXED CULTURE FOR RAPID BOD DETERMINATION IN WASTEWATER

Biochemical Oxygen Demand (BOD) is an important parameter in water quality monitoring and in designing effluent treatment plants. The test takes considerable time say 3 days at 27°C or 5 days at 20°C and consumes energy too. To overcome these constraints, attempts were made to carry out the test in short time by using BIO-SENSOR probes. This technique involves selection of suitable microbial composition to degrade a wide range of wastes. In this endeavor, CPCB conducted a study in collaboration with Institute of Genomics & Integrative Biology (IGIB), CSIR, Delhi to develop BIO-SENSOR an instrument for rapid BOD test. The BIO-SENSOR membrane has been developed and analysis was carried out using GGA (Glucose Glutamic Acid) standard and different effluent samples. The analytical results exhibited close agreement between conventional method and bio-sensor method. A standard calibration graph showing linear relationship is produced below



GGA Conc. mg/L

Figure 7.3: GGA vs BOD Biosensor Calibration Curve

The typical response curves of the microbial electrode sensor was employed for the experiments. A linear relationship was observed between the current difference (between initial steady-state current and final steady-state current) and the 5-day BOD of the standard solutions. The lower limit of detection was 1 mg O_2 / L, by the developed sensor. The developed BOD sensor was used to analyze real wastewater samples. The comparisons of BOD-5 and Biosensor values of inlet & outlet for different types of industries is shown ahead.

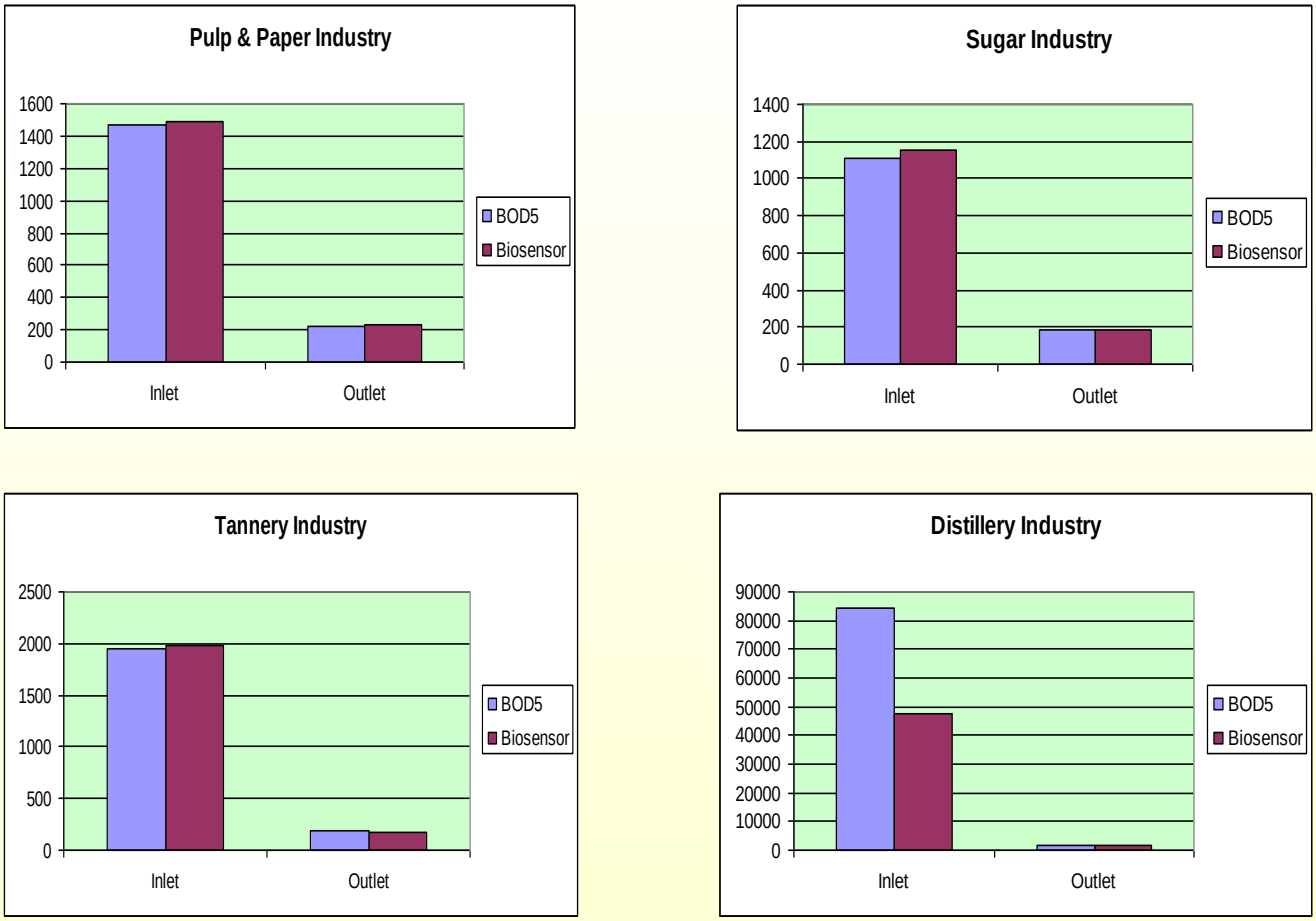


Figure 7.4: Comparison of BOD-5 & Bio Sensor values of inlet & outlet of different types of industries

The above studies clearly showed that it is possible to determine the BOD load of waste water collected from various sources with the help of the developed BOD biosensor.

7.3 DEVELOPMENT AND DISTRIBUTION OF WATER TESTING KIT

Assessment of water quality in a particular water body to understand any impact of water pollution needs a laboratory facility, which may not be available everywhere. Keeping this fact in view, the Central Pollution Control Board has developed a Water Testing Kit (WTK) to assess the water quality of surface, ground and potable water bodies in field condition. The kit designed and developed by a team of scientists of the Board is intended for students, NGOs and public. During the year 2009, six water

testing kits were distributed to various NGOs, schools, and others, under the mass awareness programme.

7.4 STUDIES ON CORRELATION BETWEEN TOC, BOD and COD IN COMPLEX ENVIRONMENTAL MATRICES

Measuring organic and inorganic carbon in surface and ground waters is of significant interest to assess environmental quality. During pollution abatement studies the measurement of organic carbon provides a quick assessment of biodegradable or refractory organic materials. Efficiency of waste water treatment plants and kinetics characteristics of biological process are usually studied through BOD and COD. Studies on correlation between total organic carbon (TOC), biochemical oxygen demand (BOD) and chemical oxygen demand (COD) in complex environmental matrices were done as determination of total organic carbon (TOC) is considered more rational for measurement of organic contamination in the environmental samples and being considered as a potential replacement of time consuming BOD and COD analysis. The organic parameters (BOD or COD) can be replaced with Total Organic Carbon (TOC) if a significant relationship could be established between these parameter With this in view, the Instrumentation Laboratory of Central Pollution Control Board initiated the project on `Studies on correlation between TOC and COD, BOD in complex environmental matrices' with following objectives:

- To strengthen methodology for measurement of TOC (Total Organic Carbon) in complex environmental matrices samples.
- To derive relationship between BOD, COD and TOC
- Implementation of TOC as a consent parameter for industrial pollution control.

During the first phase of study, environmental samples were collected from various stages of waste water treatment plants from pharmaceutical industries at Ankleshwar, Gujarat. COD analysis was undertaken in the collected samples through conventional open reflux method, Bio-chemical Oxygen Demand by BOD 5-day test with azide modification, Total and Dissolved Organic Carbon (TOC & DOC) measurements were undertaken with "Shimadzu" Organic Carbon Analyzer, model TOC VCPH. The analytical data were obtained from six replicates for BOD, three for COD and two or three injections for DOC (third injection was made if the coefficient of variation was above 2 %) in relation to each sample was processed.

The preliminary analytical results indicated that the correlation between COD and DOC or BOD and DOC was influenced by several factors. As long as some key physico - chemical and biological characteristics of a given effluent remains fairly constant over time then DOC can be significantly correlated with the values of BOD and / or COD.

7.5 PILOT PLANT STUDY USING SLUDGE-REAGENT-PRODUCT (SRP) TECHNOLOGY

An innovative technology called "Sludge-Reagent-Product (SRP) Technology" has been developed by CPCB to recover alum in the sludge used in water treatment. This technology showed 80 to 90% recovery of chemical coagulant (alum) from discarded alum-treated-sludge which can be recycled for reuse. Thus reducing the need for use of fresh alum besides being both economically and environmentally viable options in water treatment processes. The treatment technology entitled "An Integrated Plant for Treatment of Raw Water Using Discarded Sludges to Produce Drinking Water" has been patented vide Indian Patent No. 215808, filed in April 2001 and granted in March 2008.

A bench scale working Model Plant (based on SRP Technology) has been initiated. Construction work for 0.5 MLD pilot water treatment plant, based on SRP technology at Bhagirathi Water Works (Delhi Jal Board), Yamuna Vihar, Delhi is under progress.

7.6 SOURCE APORTIONMENT OF AMBIENT AIR QUALITY PARTICULATES

7.6.1 Source Apportionment of Ambient Air Particulates through Non-Destructive Analytical Technique Using Energy Dispersive X-Ray Fluorescence (ED-XRF) Spectrometer

Trace metals cause health disorders in human beings and ecological damage too. Metals enter into various component of environment in several ways from different sources. To control heavy metal pollution and limit its harmful impact, stringent regulations are being implemented by government and regulatory bodies worldwide. Meeting these regulations requires appropriate and accurate assessment of metallic species through reliable monitoring techniques. Energy Dispersive X-ray Fluorescence (EDXRF) spectrometry is a non-destructive analytical technique having wide application in measurement of heavy metals on particulate air filters using US Environmental Protection Agency (EPA) methods. CPCB used "Panalytical" Energy Dispersive X-ray Fluorescence (EDXRF) Spectrometer, a highly sophisticated instrument for Source Apportionment studies of ambient air particulates in various cities through ED-XRF. This instrument is first of its kind in the country for analysis of suspended particulate matter (SPM) fractions of 10 and 2.5 microns sizes in ambient

Panalytical Epsilon EDXRF Spectrometer

air for different metallic elements.
During operation and analysis, an air filter application has been set up in EDXRF according to EPA Method IO 3.3. The instrument had been calibrated with air filter standards to assess and determine 44 elements on particulate air filters. The elements, which can be measured from air filter samples through EDXRF are Na, Mg, Al, Si, P, S, Cl, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Rb, Sr, Y, Mo, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Cs, Ba, La, W, Au, Tl and Pb.

During 2009 several ambient air particulate samples on air filters under the Project "Source Apportionment studies of ambient air particulate from various cities" were analyzed for 44 trace elements using ED-XRF.

7.6.2 Trace Metal Characterization in Solid Waste through ED-XRF

Energy Dispersive X-ray Fluorescence (EDXRF) is a non destructive analytical technique, wherein digestion of the solid sample is not required. The analysis allows increase in measurement time, in case higher degree of precision is needed. The development of facilities for trace metal characterization in solid waste / hazardous waste through ED-XRF was undertaken at the Instrumentation Laboratory of CPCB, Delhi. The procurement of various sample preparation equipments such as ball mill grinder, pallet making machine, has been done during the year. In addition, the ED-XRF standard reference material have been procured from NIST, USA to facilitate calibration of ED-XRF before analysis of solid waste samples. The ED-XRF analysis of solid waste samples is very fast, accurate and because of the non-destructive nature of analysis, very small sample quantity is required for analysis of large number of trace metals.

7.7 Trace Metal Characterization in Solid and Hazardous Waste Using Inductively Coupled Plasma – Optical Emission Spectrometer (ICP-OES)

The detection of trace metals in environmental samples could be accomplished by various methods such as colorimetric, polarographic, atomic absorption spectrophotometer, ICP technique, but trace metal analysis using ICP-OES is relatively simple, accurate versatile and

'Perkin Elmer' Inductively Coupled Plasma – Optical Emission Spectrometer

free from interferences and several trace metals can be analyzed simultaneously in a sample. In order to assess the hazardous nature of municipal and industrial solid wastes and the environmental impact caused by dumping of such waste trace metals were detected by ICP-OES. In municipal solid waste and industrial solid waste which are reported to contain various toxic and hazardous metals such as Arsenic, Cadmium, Chromium, copper, iron, manganese, nickel, lead, selenium, antimony, cobalt, vanadium and zinc etc. The samples of solid waste / hazardous wastes were analyzed for various trace metals analysis by ICP-OES. The samples were found contaminated with various trace metals such as arsenic, cadmium, chromium, copper, iron, manganese, nickel, lead, and zinc etc. The minimum and maximum ranges of metals found are as below:

Table 7.3: Trace Metal (mg/g) in various solid and hazardous waste samples

Metals (mg/g)	As	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Minimum	NT	NT	NT	0.014	0.026	0.014	NT	0.017	3.27
Maximum	2.41	83.8	0.307	41.7	291	33.7	2.35	629	188

7.8 BIO-REMEDIATION OF CONTAMINATED SITE IN RANIPET AREA, TAMIL NADU

More than two lakh tonnes hazardous waste (HW) generated over a period of 20 years was dumped by M/s. Tamil Nadu Chromates and Chemicals Limited (TCCL) on an unsecured land area of 3.5 hectares within its premises located at Ranipet industrial area, Tamil Nadu. The leachate from the dump having Cr (VI) has contaminated the surrounding soil and water environment, with ground water samples showing Cr (VI) concentration in the range of 50 to 200 mg/l. CPCB has sponsored a demo-project the IIT Madras for field level bio-remediation of Cr (VI) contaminated soil and aquifer in Ranipet area.

Ex-situ treatment by mixing homogenized sludge with enriched bacterial biomass, along with molasses on a cement concrete platform is made within the premise. Water is added periodically to this in order to maintain moisture content of approximately 40%. Concentrations of Cr (VI) and total chromium were monitored. In-situ bio-remediation of aquifer is carried out by injecting enriched microbes, along with appropriate amount of molasses and nutrients into bore wells to be monitored. The fate and transport of chromium [both Cr (VI) and Cr (III)] and molasses are monitored.

The concentration of Cr (VI) has been observed to reduce from 2500 mg/kg to less than 200 mg/kg within 41 days. The results indicate that Cr (VI) reduction occurred in most of the wells surrounding the injection wells. The remediation was more significant in well no. 7, 8, 9, 10 and 12, which are on the downstream side of the injection well. Cr

(VI) concentrations in well no. 5, 7, 8, 9 and 12 reduced to less than 2 mg/L within 17 days.

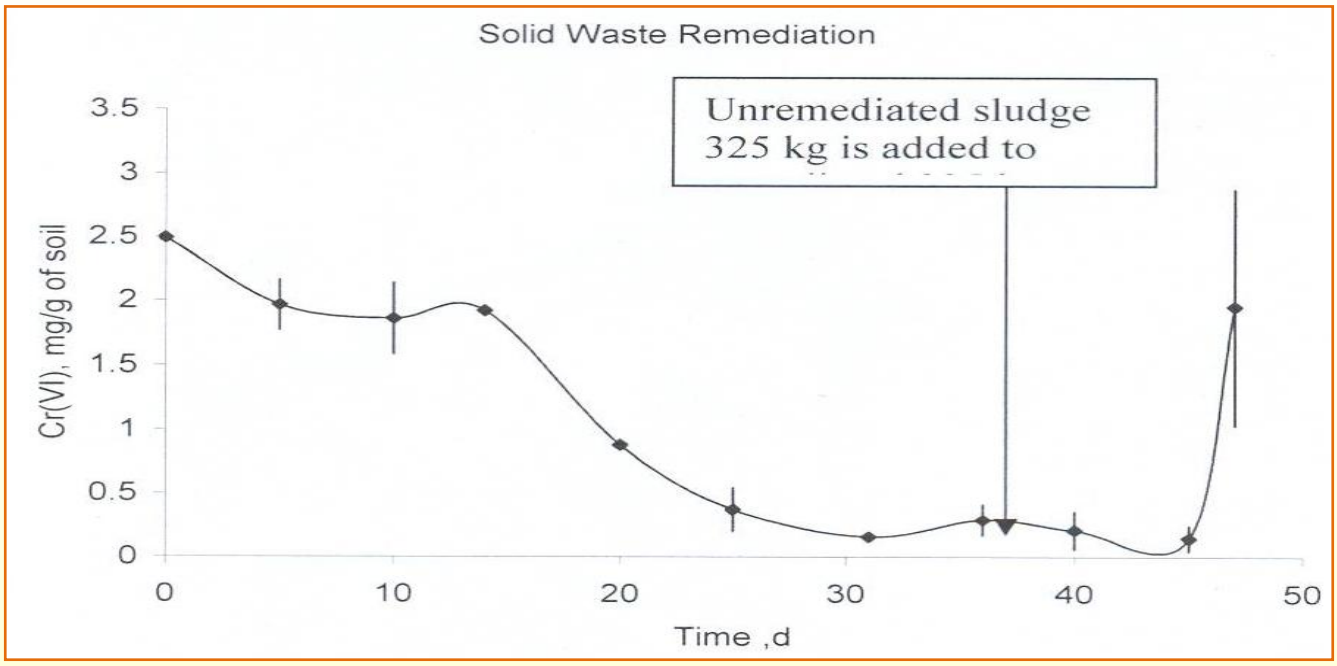


Figure 7.5: Cr (VI) Concentration profile in the soil during remediation

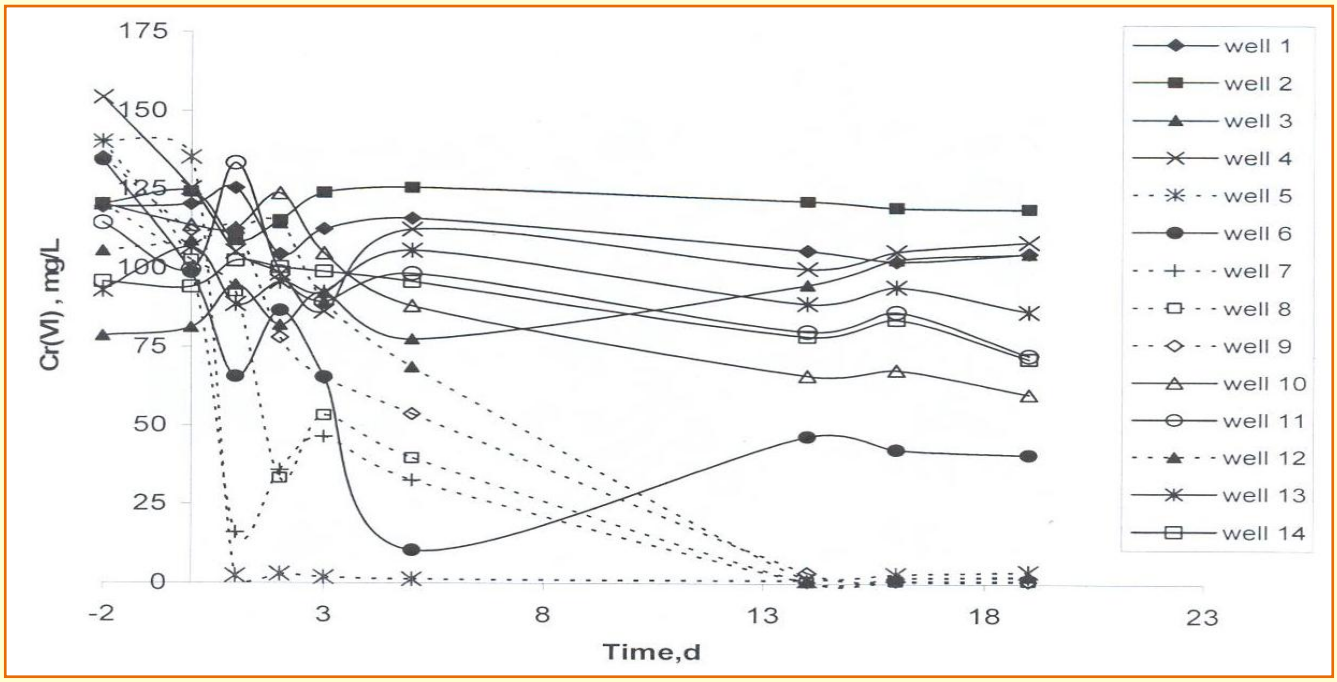


Figure 7.6: Cr (VI) Concentration profile in injection and monitoring wells during remediation

Ex-Situ Bioremediation of sludge

In-Situ Bioremediation of Cr (VI) contaminated aquifer

7.9 PROJECT "MONITORING OF PESTICIDE RESIDUES" AT NATIONAL LEVEL

Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, New Delhi and Project Directorate, All India Network Project (AINP) on Pesticide Residues, Indian Agricultural Research Institute New Delhi sponsored the above project to Central Pollution Control Board. It is inter-ministerial project scheme involving Ministry of Agriculture, Ministry of Health, Ministry of Chemicals and Fertilizers, Ministry of Commerce, Ministry of Environment and Forest and Agricultural Universities.

During the project study, the surface water samples were collected from about 100 locations within nine districts of National Capital Region comprising river, lakes, ponds, drain & canal and Soil Samples from 60 locations within National Capital Region i.e. Uttar Pradesh, Haryana and Delhi. Samples of Surface water at various locations in Uttar Pradesh (Ghaziabad, Guatam Budh Nagar & Baghpat), Haryana (Sonepat, Faridabad & Ballabhgarh) and Delhi (Alipur Block, Kanjhawala Block, Najafgarh & Nizamuddin Bridge) were collected and analyzed for pesticide residues on monthly basis. Four groups of pesticides viz. Organo-chlorines, Organo-phosphates, Synthetic Pyrethroids and Herbicides (total 32 individual pesticides) were analyzed.

Table 7.4: Pesticides analyzed under Project Monitoring of Pesticides Residues at National Level

Group	Pesticides Analyzed
Organochlorines (OCPs)	α-HCH, β-HCH, γ-HCH, δ-HCH, Endosulfan-I, Endosulfan-II, Endosulfansulfate, Dicofol, *p,p'*-DDE, *p,p'*-DDD, *p,p'*-DDT, Aldrin, Heptachlor
Organophosphates (OPPs)	Chlorpyriphos, Dimethoate, Ethion, Malathion, Parathion-methyl, Phorate, Phosphamidon, Quinalphos, Profenophos
Synthetic Pyrethroids (SPs)	α-Cypermethrin, Deltamethrin, Fenpropethrin, Fenvalerate, λ-Cyhalothrin, β-Cyfluthrin
Herbicides	Pendimethalin, Alachlor, Butachlor, Fluchlorali

Soil & Water Sampling for pesticide residues analysis3

Between April, 2009 to December, 2009, a total of 559 surface water samples and 41 soil samples were collected and analyzed for pesticides residues, the data reports were forwarded to Project Coordination Cell of the Indian Agricultural Research Institute, Pusa, New Delhi at monthly interval.

7.10 DEVELOPMENT AND STANDARDIZATION OF METHODOLOGY FOR SAMPLING AND ANALYSIS FOR MEASUREMENT OF HAZARDOUS ORGANIC COMPOUNDS DIOXIN (PCDDs) & FURAN (PCDFs)

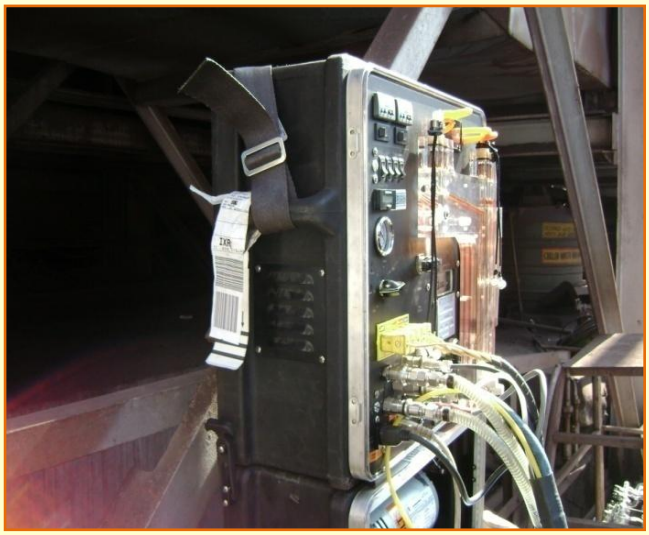
7.10.1 Dioxin-Furan levels in Stationary Emission Sources

During the financial year 2009-2010, National Reference Trace Organics Laboratory (NRTOL) monitored stationary emission source for assessment of dioxin-furan (PCDD / PCDF) levels. The monitored sources are summed below in the Table 7.5.

Table 7.5: -Furan levels in Stationary Emission Sources

Month / Year	Industry	Industry Type	Source Monitored	PCDD / PCDF Samples Collected & analyzed
June 2009	Chemplast Sunmar (P) Ltd., Mettur, Tamil Nadu	Organic Chemicals Manufacturing Plant Complex	Incineration Stack	Two
July – August 2009	Vulcan Waste Management Company, Dam Dama Road, Village Bhondsi, Gurgaon, Haryana	Common Bio-medical Waste Incineration	Incineration Stack	Two
July – August	Metro Bio-Care Technogical Services (P) Ltd.,	Common Bio-medical Waste Incineration	Incineration Stack	Two

Month / Year	Industry	Industry Type	Source Monitored	PCDD / PCDF Samples Collected & analyzed
2009	55 Railway Road, Samaypur, Delhi - 110 042			
July – August 2009	Synergy Waste Management Pvt. Limited, Near Composite Plant, Sukhdev Vihar, Okhla, New Delhi	Common Bio-medical Waste Incineration	Incineration Stack	Two
October 2009	Semb Remky Waste Management Pvt. Limited, Belgachia, Howrah, West Bengal	Common Bio-medical Waste Incineration	Incineration Stack	Two
October 2009	West Bengal Waste Management Pvt. Limited, Shriramchandrapur, Haldia West Bengal	Treatment, Storage and Disposal Facility	Incineration Stack	One
December 2009	Bhilai Steel Limited, Bhilai, Madhya Pradesh.	Iron and Steel Manufacturing	Sinter Plant Stack	Four
January – February 2010	Tata Steel Limited, Jamshedpur, Jharkhand	Iron and Steel Manufacturing	Sinter Plant Stack	Six
February, 2010	Jaiprakash Associates Ltd., Chandigarh	Solid Waste Incinerator	Incineration Stack	One



Source Emission Monitoring for Dioxin and Furan in Sinter Plant Stacks of Tata Steel Plant, Jamshedpur, Jharkhand

7.10.2 Monitoring Of Dioxin-Furan (PCDDs / PCDFs) Levels In Ambient Air surrounding m/s Chemplast Sunmar Ltd., Mettur, Tamilnadu

National Reference Trace Organics Laboratory, Central Pollution Control Board monitored ambient air of area surrounding the industrial complex of Chemplast

Sunmar Limited, Mettur, Tamilnadu in 2009 for assessment of dioxin-furan levels. The levels of RSPM and total PCDDs / PCDFs recorded during the study are presented below:

Table 7.6: Total PCCD / PCDF in RSPM in ambient air in industrial complex at Mettur, Tamil Nadu.

Locations	Total PCDDs / PCDFs pg I-TEQ/m³	RSPM in Ambient Air µg/m³
Mr. Thangadurai's House	0.150	35.158
Near Plant - 1 Hostel	0.108	32.183
Plant - 2 Guest House	0.129	34.610
Sheshsayee Nagar Plant 3 Quarters	0.121	48.653

PUF Sampler used for PCDD / PCDF Sampling in Ambient Air

7.10.3 Assessment of Dioxin-Furan Levels in Product and Treated Solid Waste from Municipal Solid Waste Treatment Facility of M/S Jai Prakash Associates Ltd., Chandigarh

National Reference Trace Organics Laboratory, Central Pollution Control Board analyzed facility for management samples from M/s. Jai Prakash Associates Ltd., Chandigarh. It was reported that dioxin-furan was formed during processing of MSW into fuel (RDF pellets). Fly ash, bottom ash and cyclone dust were also analyzed for Dioxin & Furan.

Table 7.7: Total PCCD / PCDF in RSPM in MSW samples , Chandigarh

Samples	Total PCDDs/PCDFs pg I-TEQ/g	
	Sample - 1	Sample – 2
Product – RDF (Refuse Derived Fuel)	705.092	385.106
Bottom Ash of Furnace (HAG-I Ash)	21.065	28.577
Cyclone Dust	681.162	681.352

7.10.4 Development of National Implementation Plan (NIP) Under Stockholm Convention - Harmonization of Monitoring Protocols for Dioxin Furan in Environmental Matrices

Ministry of Environment & Forests (MoEF), Govt. of India entrusted CPCB to undertake the inventory of POPs being released from sources in Northern and Eastern regions of the country as part of Development of National Implementation Plan (NIP) under Stockholm Convention, a UNDP Sponsored project.

National Reference Trace Organic Laboratory was assigned to collate and compile the monitoring and analysis protocols after consensus with the participating organizations. Three harmonized protocols were collated and compiled for monitoring of Dioxin Furan congeners in stationary source emissions, ambient air and solid waste. The draft protocols were circulated to various participating laboratories. The comments received have been incorporated and following protocols finalized. The finalized protocols were circulated to UNDP, MoEF and other participating laboratories such as NEERI, Nagpur; NIIST, Thiruvananthpuram and released.

1. Method for Determination of Dioxin & Furan in Environmental Matrices; Part I: Stationary Source Emission.
2. Method for Determination of Dioxin & Furan in Environmental Matrices; Part II: Ambient Air.
3. Method for Determination of Dioxin & Furan in Environmental Matrices; Part III: Solids & Hazardous Waste.

High Resolution Gas Chromatograph – High Resolution Mass Spectrometer (HRGC-HRMS) `JEOL 800D' for Measurement of PCDD & PCDF

7.10.5 Sampling of Dioxin-Furan from particulate and Vapour Phase of ambient air at Delhi for phase distribution assessment study

Dioxin-Furan congeners have the tendency to be distributed between particulate and vapour phase of ambient air and stationary source emissions. Central Pollution Control Board had

initiated a study of phase distribution of dioxin-furan in particulate phase and vapour phase of ambient air. Particulate phase and vapour phase samples were collected at ITO traffic inter-section and Residential area of East Arjun Nagar during December 2008, May 2009, August 2009 and December 2009, with PUF samplers, which have inbuilt provision to collect separate particulate phase and vapour phase PCDDs / PCDFs and analyzed for 17 congeners for reporting status of phase distribution.

7.10.6 Disposal of Plastics waste through Plasma Pyrolysis Technology (PPT)

Disposal of thin plastic bags, metalized plastics such as gutka pouches, wafer packing etc., multi-layer plastics such as packaging materials, PVC materials i.e. PVC tiles, pipes etc. is a serious environmental concern all over the world. Moreover, polyethylene, polypropylene and few other plastics are recycled 3 to 4 times, there after they are disposed.

Incineration is commonly used technology at present for the disposal of plastic and other organic waste material in developed countries. However, Plasma Pyrolysis is State- of the- Art technology for the disposal of plastics and hazardous waste. In India, FCIPT, Institute for Plasma Research had taken initiative to develop Plasma Pyrolysis technology (PPT) with financial support from Department of Science and Technology (DST), New Delhi. In PPT extremely high temperature produced using plasma torch in oxygen starved environment destroys plastic waste efficiently in an environment friendly manner. CPCB sponsored a R&D to FCIPT on MoU basis. The objective of the study was to assess the emissions and evaluate the performance of Plasma Pyrolysis Technology for safe disposal of non-recyclable plastic waste.

Findings : During experimental trials when different plastic waste was disposed off using plasma pyrolysis system emission monitoring was conducted. The samples for monitoring dioxins, furans, particulate matter, NOx, SOx etc. were collected and analysed by M/s Vimta Laboratory, Hyderabad. Dioxins and furans from the plasma pyrolysis system was lower than the norms stipulated for hazardous waste incinerators. The summary of the results are given ahead:

Table 7.8: Emissions from Plasma Pyrolysis System (Feb. 26-27, 2009)

S. No	SPECIFICATIONS	CPCB NORMS	EMISSION - PLASMA SYSTEM	
			TRIAL -1	TRIAL – 2
1.	O_2	---	14.6%	13.6%
2.	CO_2	>7%	5.3%	3.9%
3.	CO	100 mg/NM^3	43.7 mg/Nm^3	25 mg/Nm^3
4.	SO_2	200 mg/Nm^3	60.3 mg/Nm^3	55.6 mg/Nm^3
5.	NOX	400 mg/Nm^3	111.24 mg/Nm^3	127.7mg/Nm^3
6.	SPM	50 mg/Nm^3	38.3 mg/Nm^3	19.9 mg/Nm^3
7.	HCI	50 mg/NM^3	30.2 mg/Nm^3	41.3 mg/Nm^3
8.	Dioxins & Furans (Stack)	0.1 ng/NM^3	0.02655 ng/NM^3	0.14078 NG/NM^3
9.	Dioxins & Furans (Scrubber Water)	(Norms Are Not Mentioned)	20.19 pg/L	157.58 pg/L
10	Dioxins & Furans (Primary Residue)	(Norms Are Not Mentioned)	0.14 ng/kg	6.13 ng/kg

7.11 STANDARDIZATION OF METHODOLOGY FOR ASSESSMENT OF VOLATILE ORGANIC COMPOUNDS (VOCS)

Volatile Organic Compounds (VOCs) are the group of organic compounds that readily evaporate at normal air temperature. Fuel oils, gasoline, industrial solvents, paints, and dyes are the major sources of VOCs in environmental matrices, ambient air, soil, sediments, surface water, ground water. 84 individual VOCs are listed in USEPA analytical method, of these the chlorinated VOCs are associated with commercial and industrial use and include dozens of chemicals that are typically very mobile, persistent, and toxic in the environment. Non-chlorinated VOCs are associated with gasoline, fuel oils, and industrial solvents. These chemicals are also mobile, but are generally less toxic and persistent than the chlorinated solvents.

Table 7.9: Methodology Standardization of Typical Analytes among VOCs

1.	Benzene	7.	Chlorobenzene
2.	Bromochloromethane	8.	Chloroform
3.	Bromodichloromethane	9.	2-Chlorotoluene
4.	Bromoform	10.	4-Chlorotoluene
5.	*tert*-Butylbenzene	11.	Dibromochloromethane
6.	Carbon tetrachloride	12.	1,2-Dibromoethane

13.	Dibromomethane	27.	Toluene
14.	1,2-Dichlorobenzene	28.	1,1,2-Trichloroethane
15.	1,3-Dichlorobenzene	29.	Trichloroethylene
16.	1,4-Dichlorobenzene	30.	1,2,3-Trichloropropane
17.	1,1-Dichloroethane	31.	1,2,4-Trimethylbenzene
18.	Dichloromethane	32.	1,3,5-Trimethylbenzene
19.	1,2-Dichloropropane	33.	1,2 Dichloroethene
20.	1,3-Dichloropropane	34.	*o*-Xylene
21.	1,3-Dichloropropene	35.	*m*-Xylene
22.	Ethylbenzene	36.	*p*-Xylene
23.	Isopropylbenzene	37.	Tetrachloroethene
24.	n-Propylbenzene	38.	1,2 Dibromomethane
25.	1,1,1,2-Tetrachloroethane	39.	1,1 Dichloropropene
26.	1,1,2,2-Tetrachloroethane	40.	1,1,1 trichloroethane

VOCs are very mobile, readily dissolve and leach into ground water. The most common sources of VOCs in ground water include gasoline and fuel oils from leaking tanks and spills; solvents, paints, pigments, and dyes from leaking tanks and improper waste storage and disposal, leaching of chemicals from atmospheric deposition of automotive and industrial emissions; and residuals from well disinfection. It has been established that most VOCs found in the environment are the result of human activity.

National Reference Trace Organics Laboratory (NRTOL) of CPCB initiated the project for standardization of methodology for assessment of VOCs in surface water, drinking water and groundwater by purge & trap sample pre-concentration followed by GC-MS analysis, the study is in progress.

7.12 STANDARDIZATION OF METHODOLOGY FOR DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBON (PAHs)

Polycyclic Aromatic Hydrocarbons (PAHs) are organic compounds induced into the environment mainly during the combustion processes, such as burning of fossil fuels.. Many of these compounds are carcinogenic and are often found in water, air (e.g. PAHs absorbed on airborne particulates) and other environmental locations. Thus monitoring of PAHs is very crucial from environment at consideration. The United States Environment Protection Agency has designated sixteen PAHs - Napthalelene, Acenaphthylene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)athracene, Chrycene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Benzo(gh)perylene and Indeno(1,2,3,cd)pyrene as priority pollutants.

EPA method 610 is a commonly used method for determination of 16 priority Polyclic Aromatic Hydrocarbons in the water. High sensitivity detection is required for the analysis of PAHs as their levels are usually low in aquatic samples.

The common analytical method for PAHs employs HPLC with UV detection at 254 nm wavelength another analytical option is fluorescence detection for PAHs as these compounds have high natural fluorescence. With above in view, CPCB's National Reference Trace Organics Laboratory initiated the project on standardization of methodology for determination of PAHs by reversed-phase HPLC. The methodology for standardization is in progress adopting HPLC with UV and Fluorescence detector with following programming option:

✓ HPLC Parameters with Ultra Violet (UV) Detector

Analytical Column : SUPELCOSIL™ LC-PAH, 25cm x 4.6 mm, 5 µm
GuardColumn : Eclipse XDB-C8, 4.6 x 12.5 mm, 5 µm
Injection : 20µl (with calibrated loop)
Mobile Phase : Acetonitrile: water
Solvent Program : Gradient

Table 7.10: Operations HPLC with Ultra Violet (UV) Detector

Time	Acetonitrile (%)	Water (%)
0.0	50	50
7.0	50	50
20.0	80	20
25.0	80	20
35.0	95	5
40.0	50	50

Flow rate : 0.5 ml/min ; Detector: UV-DAD at 254 nm

✓ HPLC parameters with Fluorescence Detector

Analytical column : SUPELCOSIL™ LC-PAH, 25cm x 4.6 mm, 5 µm
GuardColumn : Eclipse XDB-C8, 4.6 x 12.5 mm, 5 µm
Injection : 20µl (with calibrated loop)
Mobile Phase : Acetonitrile: water
Solvent Program : Gradient
Flow rate: 0.5 ml/min

Detector: Fluorescence. Excitation: 280 nm, Emission: 290 nm

Table 7.11: Operations of HPLC with Fluorescence Detector

Time	Acetonitrile (%)	Water (%)
0.0	40	60
5.0	40	60
30.0	100	0
45.0	100	0

It has been established from preliminary observation that both UV and Fluorescence detectors can be effectively used for PAH determination in aqueous samples. However, more sensitivity and selectivity can be achieved with HPLC with florescence detector in comparison to UV Detector.

7.13 PROJECT "ASSESSMENT OF PERSISTENT ORGANIC POLLUTANT (POPs) RESIDUES IN HUMAN POPULATION OF DELHI WITH REFERENCE TO ADVERSE EHALTH EFFECTS

The POPs persist in the environment at very low levels and are linked to many health and environmental effects. The Stockholm Convention has identified 12 POPs for priority action during May 23, 2001. The identified Persistent Organic Pollutants include organo-chlorine chemicals such as DDT, Aldrin, Dieldrin, Endrin, Chlorodane, Heptachloro, Mirex Texaphene; industrial chemicals, like PCBs, HCB and combustion by products – Dioxin & Furan. Exposure to Persistent Organic pollutants of human beings through food, water, accidents and occupational environment is a common phenomena because of which these are of global concern. The organo-chlorine pesticides are highly hazardous chemicals and their widespread use makes them available in food chain and is absorbed in human body through skin, inhalation, oral and placental routes.

Most of the organo-chlorine pesticides are persistent toxic contaminants having long half-life and tendency to accumulate in fatty tissues. Women having higher body fat percentage are prone to bio-accumulation of pesticides due to exposure. The hormonal changes during pregnancy, lactation and menopause, mobilizes the bio-accumulated pollutants in the body and exposure to organo-chlorine pesticides can interfere in normal endocrine system, resulting in reproductive disorders and breast cancers.

The above study was a collaborative project with University College of Medical Sciences (UCMS) Delhi to generate epidemiological data and establishment of relative risk / relationship between the incidence of adverse health outcomes including cancer due to exposure to pesticides with special reference to organo-chlorine Persistent Organic Pollutants residues and Poly-chlorinated Biphenyls (PCBs). The following are the salient objectives of the project:

- Determination of blood POPs levels such as organo-chlorine pesticides in infants with special reference to pre-term and IUGR infants.
- Determination of blood POPs levels such as organo-chlorine pesticides, organo-chlorine residue levels in children and teenagers of various age groups.

- Determination of blood and tissue organo chlorine and Polychlorinated biphenyls (PCBs) residue levels in adult and senior citizens with special reference to breast cancer tissue and prostate cancer patients.

The study groups are illustrated below.

Table 7.12 Study group in assessment of POPs residues in Delhi population

Group and No. of Samples (n)	Characteristics	Sample to be Collected
A (n=40)	Infants	Blood
B (n=40)	Children < 12 years Age	Blood
C (n=40)	Teenager Age between 13-19 years	Blood
D (n=60)	Adult Age between 20-40 years	Blood & Tissue
E (n=60)	Adult Age between 40-60 years	Blood & Tissue
F (n=60)	Senior Citizen Age > 60 years	Blood & Tissue

The study will help in generation of epidemiological data, establishment of relative risk/ relationship between incidence of various adverse health effects and human exposure to pesticides. During the year, about 160 blood samples from different age group were processed ,extracted, clean up undertaken at University College of Medical Sciences & GTB Hospital laboratories and the concentrated samples were analyzed with Perkin Elmer GC-ECD at National Reference Trace Organics Laboratory of Central Pollution Control Board. The preliminary results indicate presence of Total BHC, Endosulfan and Total DDT in the adult population group 20-40 years age and 40-60 years age, while the blood samples drawn from infants children and teenager were comparatively free from pesticides residue. Further studies with more number of blood and tissue samples from respective population groups are being continued.

7.15 MoU with Bhutan

A Memorandum of Understanding (MoU) was signed between Central Pollution Control Board and National Environment Commission Secretariat (NECS), Royal Government of Bhutan (RGoB) for the period 2009-2012 for the Technical Assistance for developing a strategy and plan for monitoring and management of Air and Water quality in Bhutan in the benign presence of Hon'ble Prime Minister of India and His Excellency King of Bhutan.

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CHAPTER VIII

ENVIRONMENTAL TRAINING

8.1 ENVIRONMENTAL TRAINING UNIT (ETU)

a. Environmental Training Unit (ETU) of CPCB had organized 15 training programmes using the expertise available in officials training/R&D institutes during 2009-10 in various priority areas related to environment. Main target groups for CPCB sponsored training programmes were participants from CPCB, SPCBs / PCCs, laboratories recognized under EPA, Industries, Hospitals, Universities, NGO's, etc. (Annexure -VII-A).
b. CPCB officials were nominated for various training programmes organized by other organizations (Annexure-VII-B).
c. ETU also facilitated participation of officials in various international training programmes / workshop / seminars etc. during 2009-10 sponsored by CPCB /other organizations (Annexure-VII-C).
d. Seven training programmes (of duration 1, 2 and 3 days) on interpersonal skills related to administrative & financial aspects exclusively for CPCB officials were also organized during 2009-10 (Annexure-VII-D).
e. One-day training programme for 30 school teachers was organized by Zonal Office Vadodara on 20.02.2010. Training was imparted on various aspects of environment including need of environmental education, teacher's role, air, water, hazardous waste, bio-medical waste, legislation etc. The issues related with pollution due to festivals like Diwali, Navratri were also discussed in the programme.

8.2 PARTICIPATION OF NATIONAL REFERENCE TRACE ORGANICS LABORATORY IN INTERNATIONAL SYMPOSIUM ON PERSISTENT ORGANIC POLLUTANTS (DIOXIN 2009) HELD AT BEIJING, CHINA AND PUBLICATION OF RESEARCH PAPERS

CPCB's National Reference Trace Organic Laboratory participated in an International Symposium on Persistent Organic Compounds (DIOXIN 2009) held in Beijing, China. The following research papers were presented in the Symposium (DIOXIN 2009) between 23rd to 28th August, 2009. Later, these research papers were published in Journal "Organohalogen Compounds" Volume 71:

i. Kumar Sanjay, Lal R.B., Kumar. B., Sharma C.S., Makhijani S.D., Kamyotra J. S., Gautam S.P. **Identifying the contributing sources of PCDDs/PCDFs by comparison of congener distribution profiles observed in respirable suspended particulate matter sampled from ambient air of Delhi**, *Organohalogen Compounds* Vol. 71, 2009, page 183-186.

ii. Lal R.B., Kumar Sanjay, Kumar B., Sharma C.S., Makhijani S.D., Kamyotra J.S., Gautam S.P. **Air borne particulate bound polychlorinated dibenzodioxins and dibenzofurans (PCDDs/Fs) levels in Delhi, India**, *Organohalogen Compounds* Vol. 71, 2009, page 190-193.

iii. Bhupander Kumar, Sanjay Kumar, Lal R. B., Dev Prakash, Pathak Abhijit, Sharma C. S., Makhijani S. D., Kamyotra J. S. and Gautam S. P., **Emission Levels of polychlorinated dibenzodioxins and dibenzofurans (PCDDs/PCDFs) from waste incinerators in India**, *Organohalogen Compounds* Vol. 71, 2009, page 194-197.

iv. Bhupander Kumar, Dev Prakash, Singh S. K., Meenu Mishra, Lal R. B., Sanjay Kumar, Sharma C. S., Makhijani S. D., Kamyotra J. S. and Gautam S. P., **Distribution of herbicides and pesticides (organochlorine and organophosphate) in agricultural soils from Northern India**, *Organohalogen Compounds* Vol. 71, 2009, page 198-201.

8.3 PARTICIPATION IN 97TH INDIAN SCIENCE CONGRESS

Chairman CPCB was the Chairperson of the Section on 'Environmental Sciences' in the Indian Science Congress held between January 3-10, 2010 at Thiruvananthapuram, Kerala around 50 Technical papers/poster presentation were made by CPCB officials. CPCB also participated in the exbhition at the Congress in a by way. CPCB re-printed the proceedings due to popular demand in which. Over 50 abstracts of papers from CPCB appeared in the above report..

8.4 TRAINING IMPARTED TO NATIONAL ENVIRONMENT COMMISSION (NEC), BHUTAN

As per Memorandum of Understanding (MOU) signed between CPCB and Royal Govt. of Bhutan. Senior Scientist from Head Office, CPCB was to provide technical assistance for developing a strategy and plan for monitoring and management of water quality in Bhutan and to assist in developing the standard for industrial wastewater discharge. The training was imparted by Dr. D. P. Mukhopadhyay, Senior Scientist & Incharge Water Laboratory to officials of NEC, Bhutan

8.5 TRAINING TO JAMMU & KASHMIR STATE POLLUTION CONTROL BOARD'S

CPCB provided training on sampling and analysis of water and wastewater samples to officials of Jammu & Kashmir State Pollution Control Board's between May 31st to June 5th, 2009.

8.6 CENTRALIZED REFRESHER COURSE FOR MALE' COUNTRIES

A centralized training programme on, 'Monitoring Trans-boundary air pollution under Malé Declaration on Control and Prevention of Air Pollution and its likely Trans-boundary Effects' for South Asia is held every year since 2002.

The Seventh Regional Training Programme and Refresher Course was organized at the CPCB, Delhi, India between 16-19 March 2009. The main objectives of the training are: 1) to strengthen the monitoring capacity; 2) to share and discuss the issues encountered in operating the monitoring station in each county; 3) to update the implementation activities under Malé Declaration in each country and 4) to discuss on prioritization of the activities in Phase IV implementation of Malé Declaration.

The training was organized by Central Pollution Control Board (CPCB), New Delhi together with UNEP RRCAP. Thirty two participants (included laboratory technicians and project managers) from member countries supporting the monitoring programme under the Malé Declaration. Resource persons from SEI, IVL, MoC, CPCB, UNEP RRCAP, Bangkok and AIT Bangkok attended the programme.

8.7 ACTIVITIES BY CPCB'S ZONAL OFFICES

- ✓ CPCB jointly with Gujarat Pollution Control Board organized a one day Workshop on "Bio-medical Waste Management in West Zone" on January 30, 2010 at Vadodara for the officials of the State Pollution Control Boards (SPCBs) & Pollution Control Committees (PCCs) as well as for the Health Care Facilities (HCFs) & Common Bio-medical Waste Treatment facilities (CBWTFs), which are instrumental in the implementation of the Bio-medical Waste (M & H) Rules, 1998

- ✓ The West Zone Office organised a training programme-cum-workshop on, "Water Quality Management Plan" at Vadodara between 04th – 06th February, 2010. The target group of the training comprised officials from departments of Hydrology, irrigation, groundwater & SPCBs. The programme was part of activities taken-up by Central Board under World Bank funded Hydrology Project – II.

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CHAPTER IX

ENVIRONMENTAL AWARENESS AND PUBLIC PARTICIPATION

9.1 ACTIVITIES OF NGO CELL

Regional meetings with NGOs located in different States were coordinated and organised through the Zonal Offices/States Board for promotion of the public participation/awareness in the pollution control programmes across the country. A regional meeting was organised by Zonal Office, Bhopal on 12.11.2009 at Bhopal.

Enlistment of the environmental NGOs is done on regular basis, as and when the requests are received 28 NGOs were enlisted during the period April 2009-December 2009.

Token financial assistance to the following provided to four NGOs, was provided for conducting Mass Awareness Programme during the period April 2009 – December 2009:

- M/s. Humanity & Social Service Society, Lucknow, Uttar Pradesh
- M/s. Peace Organisation, Bhopal, Madhya Pradesh
- M/s. Vishwa Manav Kalyan Sansthan, Lucknow, Uttar Pradesh
- M/s. Srijan Society, Kanpur Nagar, Uttar Pradesh
- M/s. Sh. Madhoram Dixit Jan Vikas & Shiksha Samiti, Manipuri, Uttar Pradesh.

9.2 PUBLIC COMPLAINTS RECEIVED & DISPOSED

Total 179 public complaints were received from the public, NGOs, VIPs and VVIPs through MoEF. Most of the complaints received were disposed off and follow up maintained on the pending complaints. Reports received from various Zonal Offices and SPCBs/PCCs on VIP references/complaints were sent to MoEF.

Reports received from various Zonal Offices and SPCBs/PCCs on VIP references/ complaints sent to MoEF.

9.3 RIGHT TO INFORMATION ACT, 2005

A total of 135 RTI applications were received during 01.04.2009 – 31.03.2010 and disposed off in a time bound manner.

9.4 COMPUTERISATION AT CPCB

9.4.1 Environmental Data Bank (EDB)

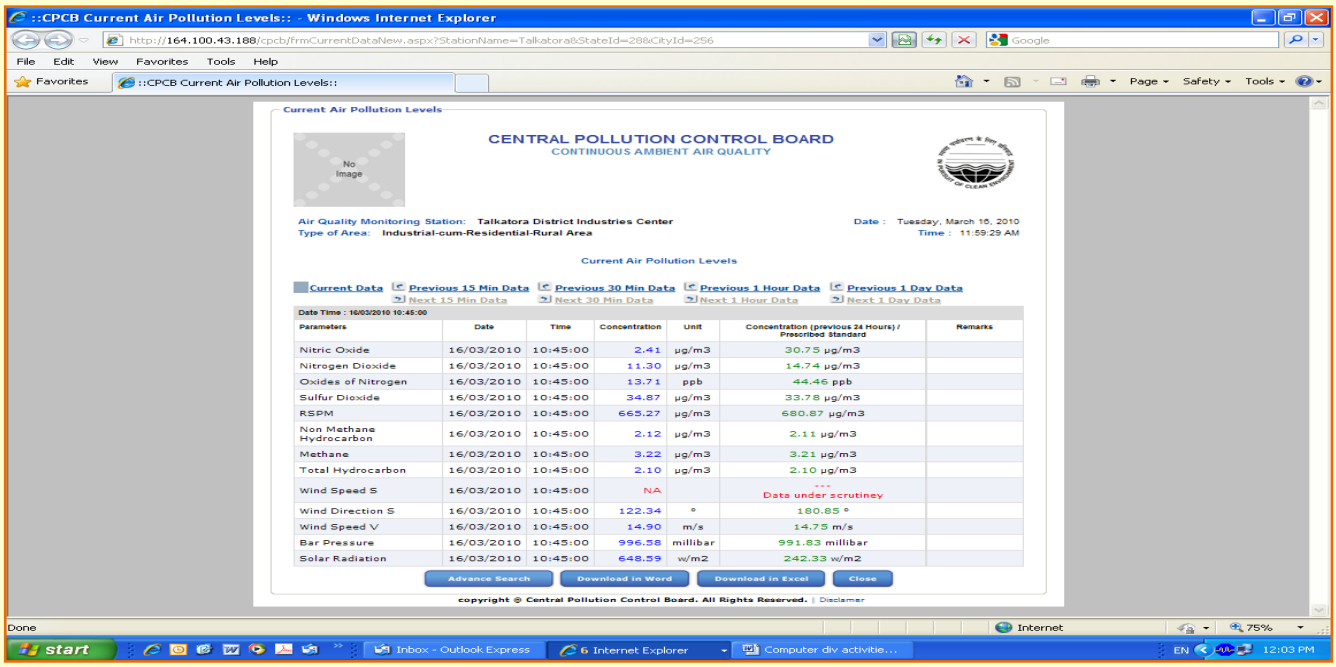
In EDB, on-line entry for data on air quality being monitored under National Air Monitoring Programme and Water Quality monitored under GEMS / MINARS is being done regularly by SPCBs / PCCs. Presently air quality data from 408 stations covering 30 States/ UTs and water quality data from 1022 monitoring stations covering 32 States / UTs is received on-line. To strengthen the EDB with inclusion of data on other environmental parameters, data entry for modules on Municipal Solid Waste (MSW) , industrial pollution and urban pollution is proposed to be taken up.

9.4.2 Streamlining the process for inspection of industries and follow-up actions

In order to eliminate the subjectivity and ad-hoc approach in scheduling industrial inspections, and their follow-up , CPCB has initiated development of computerized system for streamlining the process for inspection of industries. The objective of which was to develop a web-based computerized system for surveillance of industries including random selection of industries to be inspected, scheduling of inspections, database on inspections and follow-up actions. The system requirement have been completed and the work for the development of the software is under progress.

9.4.3 On Line Data Transmission from CAAQMS

CPCB has established four Continuous Ambient Air Quality Monitoring Stations (CAAQMS) network in Delhi (three fixed + one mobile) to monitor primary and secondary air pollutants like SO_2, NO_2, CO, RSPM, $PM_{2.5}$, BTX (benzene, toluene, xylene) , ozone etc. An online system for data transmission and dissemination on real time basis was operational, which was upgraded during the year with improved functionalities and user friendly customized reports and data communication from additional stations located in other cities was also incorporated. Some screenshots of the system are given below:



The concept involves receiving air quality data generated from each station and the page has been designed in user friendly manner so that data in time domain could be seen at a single click.

A glimpse of screen showing current data available in the database is shown below:

9.4.4 Updation of CPCB Website

CPCB's website is being updated regularly. Users response/access to this website has been encouraging. In 2009-10 the number of hits was about 2.23 crores out of which 97% hits were successful. CPCB is displaying all reports for the general public, and presently over 55 reports are displayed.

9.4.5 Computerization and digitization of CPCB Activities

A project has been initiated to develop a work flow based system, which could automate the processes of CPCB to enhance transparency, data availability, efficiency checks, work quality etc. Project is aimed at developing a repository,

9.4.6 Strengthening of LAN and Internet facility

LAN and Internet facility has been strengthened with state of art manageable LAN system setup with 225 nodes. Following systems have been installed to provide uninterrupted LAN facility:

1. 17 layer, 2 switches (manageable)
2. Internet Proxy Server
3. Patch Server
4. Centralized Antivirus Server
5. 2 Nos. 10 KVA Online UPS

9.5 WORLD ENVIRONMENT DAY PROGRAMME

- Zonal Office, Bangalore jointly with Indian Oil Corporation Ltd. (IOC), Bangalore conducted a day long, free emission checking camp on the eve of World Environment day at an IOC petrol pump at Yeswanthpura, Bangalore, to create awareness about the vehicular pollution, its impact and the need for keeping the vehicular pollution within norms.
- The theme for the year was 'Your Planet Needs You- Unite to Combat Climate Change'. To create mass awareness, posters depicting information on environment, ecology, pollution control, global issues etc were displayed for the public. Tree saplings and brochure entitled "*Environmental Mass Awareness "- Do's and Don'ts* were distributed to visitors.

- On World Environmental Day (WED) the Zonal Office Bhopal conducted inter college debate competition in collaboration with Sagar Group of institutions. Other events included film shows, radio talk for Gyan Vani, Bhopal. Distribution of pamphlets on the WED theme.
- Project Office Agra celebrated World Environment Day by distributing leaflets, stickers in Tajganj around Tajmahal, commercial places and markets like Sadar Bazar & Sanjay Place, Agra. Mass awareness programme and demonstration of instrument was also done at District Training Centre, Agra for B. Ed. students.
- The World Environment Day was celebrated by Zonal Office Vadodara in association with Faculty of Science, Maharaja Sayajirao University (MSU) at Baroda. A seminar on current environmental issues along with elocution competition was organized, college students, professionals and academicians attended the programme.

- World Environmental Day was celebrated by North Zonal Office, Lucknow by conducting street play at various places in Lucknow and distributed brochure presenting Environmental Status of Lucknow.

- Zonal Office visited Ahmedabad to participate in the trial run of plasma pyrolysis technology, for the safe disposal of biomedical waste, which was developed by the Indian Plasma Research Institute (IPR), Gandhinagar.

9.6 ACTIVITIES OF THE PUBLIC RELATIONS DIVISION

The highlights of the activities of the Public Relation Division at Delhi are provided below :

✓ Major events : Important Visits by VIPs to Parivesh Bhavan and / major events in 2009-10 calendar

- 24th April 2009 : Visit of Secretary, MOEF
- 04th June, 2009 : Visit of Hon'ble Minister of Environment & Forests Shri Jairam Ramesh to CPCB laboratories, Parivesh Bhawan
- 05th June, 2009 : World Environment Day celebrations at Vigyan Bhawan,Delhi
- 20th October, 2009 : Visit of Dr Kasturirangan, Hon'ble Member of Planning Commission to CPCB.
- 23rd October 2009 : Release of CPCB Publication & workshop on industrial clusters by Hon'ble Minster for Environment & Forests
- 22 -23rd November, 2009: Exhibition on 'Climate Change' at Vigyan Bhawan, Delhi
- 16th December, 2009 : Meeting of Chairman/Member Secretary & SPCBs/PCCs & State Govt. officials on NEPA at Vigyan Bhawan, Delhi
- 22nd December 2009 : Signing MOU with Bhutan
- 3-7 January, 2010 : CPCB's participated in Indian Science Congress at Thiruvananthapuram, Kerala
- 11th January, 2010 : Visit of U.N. Delegation visit from World Bank
- 18-20th January, 2010 : CPCB participated in Northern India Science Fair
- organized by National Science Centre, Delhi
- 04th February, 2010 : Address to newly recruits by Hon'ble Minister of MoEF
- Reports published during 2009-10, at Annexure : VIII

✓ **Some important advertisement released in 2009-10**

- M/s. Newsdeck Communications, London for magazine 'Invest in India '
- Magazine Shilpa Bichitra, Kolkata
- Rain water Harvesting workshop conducted by Indian Institute of Technology, Kanpur
- Workshop on Steel industries by Steel Authority of India Ltd.,

- On the occasion of Diwali - public message in important English & Hindi dailies
- Advertisement regarding Seeking Expression of Interest for the Selection of System Integrator for Development & Deployment of Software System for Computerization & Digitization of CPCB Activities
- Journal of National Environmental Engineering Research Institute (NEERI), Nagpur

✓ **Environmental Information System (ENVIS)**

- Operations of CPCB ENVIS Website: www.cpcbenvis.nic.in
- Visitor count on Website : 23 lacs
- "GREENFLASH" an in-house monthly activity: compilation of environment related issues appearing in 10 English news papers and 6 Hindi news papers. This initiative began w.e.f. October 2009.
- There are several CPCB's reports that are in demand are however out of print.To disseminate information to general public FOUR reports have been scanned for display in CPCB's website www.cpcb.nic.in

i. HAZAMS /17/2000-01: Criteria for Hazardous Waste Landfills
ii. PROBES/ 50/1993-94: Guidelines for Environmental Audit
iii. PROBES /81/2001-02: Guidelines for Management Operation and Maintenance of Common Effluent Treatment Plants
iv. PROBES /51/1993-94: Environmental Auditing in Polluting Industries

9.8 IMPLEMENTATION OF RAJBHASHA

- Shri S K Choubey, Director, Hindi Cell, MoEF, Delhi inspected the Zonal Office Bhopal on 11.06.2009 for implementation of Rajbhasha and appreciated the efforts made in preparation of technical reports in Hindi. Shri Harisingh Chouhan, Research Officer, Regional Office of Rajabhash a Department inspected the ZO Bhopal office to verify the status of implementation of official language Hindi in July 2009 and Nagar Raj Bhasha Samiti Conference at Indira Gandhi Manav Sangrahalay, Bhopal was attended on 18.08.2009. Zonal Office, Bhopal Celebrated 'Hindi Diwas' on September 14, 2009 by conducting various activities and competitions. Sh K L Baheriya MD, MP Housing co-operative Society, was the chief guest for the function.

Hindi Karyashala at ZO, Vadodara

- The Zonal Office, Vadodara organized karyashala on quarterly basis to promote use of Hindi in office. Dr. Manik Mrugesh, Sr. Administrative Officer,

IOCL, Vadodara delivered lecture on development of Hindi and its use as official language.

- Project Office, Agra having achieved 98% target in internal noting, submitted the Annual Report to Nagar Rajbhasa Karynanan Samity of Hindi, and received "Vishesh" Puraskar among 110 Central Govt. offices August-2009 office of project office for use of Hindi during the year 2008-09. Official of paged office Attended Workshop on Rajbhasa Hindi organized by NARAKAS, Agra with representatives of other Govt. Offices on 22.04.09 at Agra.

भारत सरकार

नगर राजभाषा कार्यान्वयन समिति, आगरा

राजभाषा विभाग (गृह-मंत्रालय)

सचिवालय : आयकर आयुक्त का कार्यालय, संजय प्लेस, आगरा - 2

प्रशस्ति–पत्र

प्रमाणित किया जाता है कि वर्ष 2008-09 में आगरा नगर स्थित समस्त केन्द्र सरकार के कार्यालयों/बैंकों/ निगमों/उपक्रमों में [illegible] का कार्य राजभाषा हिंदी के प्रगामी प्रयोग में [illegible] स्थान पर रहा। विभाग इस उपलब्धि पर बधाई का पात्र है। आशा की जाती है कि राजभाषा विकास में आगे भी [illegible] प्रयासरत् रहेगा।

दिनांक : 04.08.2009

आयकर आयुक्त
आगरा
नगर राजभाषा कार्यान्वयन समिति
आगरा

- Hindi Week was celebrated by North Zonal Office Lucknow by showing videos on historical adoption of Hindi as a national official language and contests were such as essay writing, poetry recitals etc were organised.
- **Implementation of Official Language Policy:** CPCB is complying with the directions of the Ministry of Home Affairs, Department of Official Language with regards to the Implementation of Official Language Policy. As far as the compliance of the said policy is concerned we have fully attained the target in terms of Section 3(3) of the Official Language Act, 1963. Whereas, relating to the correspondence originating from CPCB the correspondence in Hindi is 58 percent. To meet the target in this regards CPCB is making regular efforts.

During the year 2009-10 Hindi Division organized two Hindi workshops, one for the Officers and another for the Staffs of CPCB Headquarter to aquaint them with the Official Language Policy of Govt. of India and to inspire them and remove their hesitation to work in Official Language Hindi.

On 14th September,2009 Hindi Diwas was organized in CPCB Headquarters under the chairmanship of Prof. S.P. Gautam. Famous Hasya Kavi Dr. Suneel Jogi and Poetess Dr. Sarita Sharma were special invitees to the function. On this occasion various competitions were organized and cash prizes were awarded to the winners.

Hindi Diwas Celebration in CPCB Head Office, Delhi.

9.9. PARYAVARAN DARSHAN

CPCB shall be venturing for the 1st time engaging TV as a mass media medium for spreading mass awareness on environmental issues. CPCB has signed MoU with Doordarshan for telecasting 45 weekly episodes through its 18 Regional kendras and DD National (total 19 channels).

S.No.	DD Kendra	Language	S.No.	DD Kendra	Language
1.	Ahmedabad (Gujarat)	Gujrati	10.	Lucknow (Uttar Pradesh)	Hindi
2.	Thir'puram(Kerala)	Malyalam	11.	Patna (Bihar)	Hindi
3.	Bhopal (Madhya Pradesh)	Hindi	12.	Mumbai (Maharastra)	Marathi
4.	Shimla (Himachal Pradesh)	Hindi	13.	Bangalore (Karnataka)	Kanada
5.	Guwhati (Assam)	Assamese	14.	Chennnai(Tamilnadu)	Tamil
6.	Srinagar (Jammu & Kashmir)	Kashmiri	15.	Hyderabd (Andhrapradesh)	Telugu
7.	Jaipur (Rajasthan)	Hindi	16.	Jalandhar (Punjab)	Punjabi
8.	Kolkata (West Bengal)	Bengali	17.	Ranchi (Jharkhand)	Hindi
9.	Bhuba'war(Orissa)	Oriya	18.	Raipur (Chatisgarh)	Hindi

The Regional Kendras broadcast shall be in the local language and the environmental region specific issues will be discussed. The project is proposed to be launched on World Environment Day (5th June 2010). The total telecast time shall be for 27 minutes plus 150 seconds free commercial time (FCT). The project is funded from Cess funds. The twelve languages for telecasting shall be Hindi, Gujrati, Malyalam, Assamese, Kashmiri, Bengali, Oriya, Marathi, Kannada, Tamil, Telugu, and Punjabi.

CPCB Co-ordinating Offices	DD's Regional Kendra	State
Z O Vadodara	Mumbai	Maharashtra
	Ahmedabad	Gujarat
Z O Bhopal	Bhopal	Madhya Pradesh
	Raipur	Chattisgarh
	Jaipur	Rajashthan
Z O Lucknow	Shimla	Himanchal Pradesh
	Lucknow	Uttar Pradesh
	Jalandhar	Punjab
	Srinagar	J&K
Z O Kolkata	Kolkata	West Bengal
	Ranchi	Jharkhand
	Patna	Bihar
	Bhubaneshwar	Orissa
Z.O Shillong	Guwahati	Assam
Z O. Bangalore	Bangalore	Karnataka
	Thiruvananthapuram	Kerala
	Chennai	Tamil Nadu
	Hyderabad	Andhra Pradesh
CPCB HQ	DD National	Delhi

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CHAPTER X

ENVIRONMENTAL STANDARDS INCLUDING SCHEDULE FOR THEIR ENFORCEMENT

10.1 DEVELOPMENT OF ENVIRONMENTAL STANDARDS : STUDIES / PROJECTS COMPLETED

10.1.1 Development of Standards and Guidelines for Chemical / Hazardous Waste Incinerators - specific industry sectors

1. Bulk Drug Industry

The Central Pollution Control Board took up the task to collect & collate information related to design and operation of incinerators installed in Bulk Drug industries, and conducted performance study in order to evolve emission standards for three incinerators. The Environmental Standards for incinerator for pharmaceutical industry was notified.

2. Dye & Dye Intermediate Industry

Dye & dye Intermediates manufacturing processes use several raw materials and generate considerable pollution (solid wastes, effluents and air emissions). In general, the wastes and emissions generated depend on the raw material and equipment used, as well as the manufacturing processes employed. The manufacturing processes involved in dye & dye intermediates consist of several steps each, being a batch process. Each step generates products and wastes i.e. unused raw material & process wastes.

The wastewaters have high TDS and COD and are not easily bio-degradable. Similarly the solid wastes are hazardous by nature ranging from process residues, distillation residues, chemical ETP sludge, aqueous waste and filters cakes / residues. As thermal treatment has been recommended for handling & disposal of wastewater and hazardous waste hence incineration of the above is the best solution. Thus many industries have installed incinerators. In view of the above CPCB conducted a study on the above industrial sector. Data was collected, collated on design and operation of incinerators are performance studies conducted in order to evolve emission standards for incinerators. The environmental standard was finalized in the Expert Committee meeting held on January 28, 2010 at MoEF.

3. Organic Chemical Manufacturing Industry

Organic Chemicals manufacturing processes use various raw materials and generate solid wastes, effluent and emissions. The manufacture of basic organic chemicals is

mostly accomplished in multi – steps, with each steps (generally batch process) generating waste that includes raw materials that remain un-reacted. The wastewaters have high TDS and COD which are not easily bio-degradable; similarly the solid wastes are hazardous by nature. As thermal treatment has been recommended for handling & disposal of wastewater and hazardous waste, hence incineration of the above is the best solution. Some of the wastes have high calorific value were developed by CPCB and the Environmental Standard for sector specific incinerator for organic chemical industry finalised in the Expert committee meeting held on January 28, 2010 at MoEF.

10.1.2 Implementation of New Environmental Standards for Petroleum Oil Refineries and Mass Based Standards for Oil Refineries

In 2008, revised effluent and emission standards for oil refineries were notified under the Environment (Protection) Act, 1986. During the year 2009 – 2010, load based standards for Sulphur Recovery Units (SRU) in oil refineries was also notified. All refineries and State Pollution Control Boards have been directed to implement the revised standards.

10.1.3 Effluent Standards of Pharmaceutical Industry

Bulk drug manufacturing processes are known to use several raw material including solvents. The units generate:

- ✓ hazardous solid wastes;
- ✓ effluents with high TDS and COD, which are not easily biodegradable and
- ✓ emissions.

The ETP in most of the pharmaceutical units either compaire of primary treatment or both primary & secondary treatment. In some cases tertiary treatment systems have also been provided. The Central Pollution Control Board developed standards both for formulation as well as bulk drug industry under Schedule- I of the Environment (Protection) Act,1986 Effluent Standards (at serial numbers 39 and 73 were reviewed) and a common standard notified in the Gazzette on July 9, 2009.

10.1.4. Chemical Safety - Inventory Of Hazardous Chemicals Import In India

The Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989 was notified under the Environment (Protection) Act, 1986. According to these rules, any person responsible for importing hazardous chemicals in India shall provide the date of import to the concerned authorities as identified in Column 2 of Schedule 5. CPCB has initiated preparing of an inventory of Hazardous Chemicals being imported by industrial units from May 2003 onwards. The information furnished by many

industries was inadequate as per the MSIHC Rules, information on product specification and Material Safety Data Sheet (MSDS). was lacking.

10.1.5. Development of guidelines and code of practice for control of fugitive emissions from coal and flyash storage and transfer points in Thermal power Plants

Wagon tippler, bottom opening, conveyor belts from mines / ship / port/ primary & secondary crushers, coal transfer points , ash silos and ESP areas are major source of fugitive emissions in coal fired thermal power plants. Studies on the SPM and RSPM emissions in these areas varied from 0.71 to 25 mg/m$^{3.}$ Among these wagon tippler, primary & secondary crushers are major dust prone areas requiring immediate attention for minimizing the fugitive emissions to save workers from exposure to fine dust. Areas like wagon tippler, crushers should have effecient water sprinklers be interlocked with the operations in these areas. Coal conveyors should be covered. New plants should preferably use pipe conveyors, which rule out any fugitive emissions of particulates. All plant should provide ash silos for storage of ash with pneumatic ash loading system. Likewise guidelines have been suggested for each section emitting fugitive dust.

10.1.6 Environmental standards for cashew seed processing industry

The cashew seed processing Industry has been identified as a polluting industry. through the pollution load from individual units is relatively low, however the pollution problem from a cluster of units was found to be high. These units are small belonging to cottage industry category and have no conventional and techno-economically cost effective pollution abatement systems. There are around 1500 cashew seed units mostly located in southern India, with major clusters in Nagercoil district, Tamil Nadu (300 units), Kollam district, Kerala (270 units) and at Palasa-Kasibugga, Andhra Pradesh (about 130 units), and small clusters in Cheerla, Andhra Pradesh, Mangalore, Karnataka and in Goa. The capital investment on these units varies between Rs 6.0 lakhs to Rs 15.0 lakhs.

The environmental standards for Cashew Seed Processing Industry have been notified in the Gazette of India, dated January 1, 2010 besides a report on 'Siting criteria and good practices' was brought out under CPCB's publication series under COINDS.

10.1.7 Revision of Ambient Air Quality Criteria/Standards

After an interval of 15 years, National Ambient Air Quality Standards (NAAQS) were revised by CPCB and notified on November 18, 2009 under Air (Prevention and Control of Pollution) Act, 1981. Revision of the existing National Ambient Air Quality Standards was taken up by Central Pollution Control Board in collaboration with Indian Institute

of Technology, Kanpur (IITK). The standards were prepared based on criteria and standards followed by various countries including WHO guidelines, dose-response relationships of different pollutants, existing criteria and standards, current levels of pollutants in ambient air, studies on health effects of air pollutants, etc were also studied. The standards were discussed with various experts and stakeholders, and notified under the Environment (Protection) Act, 1986 on November 16, 2009 vide notification no. G.S.R. 826(E); and the Air (Prevention and Control of Pollution) Act, 1981 vide notification no. B-29016/20/90/PCI-I on November 18, 2009.

Important features of the new standards are as follow:

1. Existing land use based criteria were omitted and uniform set of standards have been notified except for 'ecologically sensitive areas' (notified by Central Government) for which stringent standards are prescribed in respect of SO_2 and NO_2.
2. SPM has been dropped.
3. Six new parameters: $PM_{2.5}$, Ozone, Benzene, Benzo-a-Pyrene, Arsenic and Nickel have been added.

10.1.8 Climate Change related

a). Assessment of green house gas emission potential of various clean coal technologies (Supercritical, IGCC and CFBC) in comparison to conventional (sub critical) power generation technology in Indian context

The study was conducted in order to assess the potential of green house gas emission from coal based thermal power plants in India. The study suggests that Indian power plants emit about 0.996 tonne CO_2 per MWh of electricity generation based on actual monitoring. However, while using CEA and UNFCC methodologies, CO_2 emission was estimated to be 1.20 tonne/MWh. The findings are indicative only and based on monitoring of six power plants. For definite conclusion, further survey is needed. Based on the findings, it was suggested that CO_2 emissions can be reduced by using washed coal in all power plants and improving the overall efficiency. Future coal based power plants should have Supercritical and fluidized bed converter (CFBC, AFBC & PFBC) technology.

b). Assessment of green house gas emission from cement plants

The cement industry contributes about 5% of total global carbon dioxide emissions. Cement production is highly energy intensive process, the energy consumption is estimated at about 2% of the global primary energy consumption.

A study on the above was done and the following measures for reduction of green house gas emissions were suggested.

- Modernisation and Technology upgradation
- Conversion of Wet / semi dry process to dry process
- Use of blended cements i.e PPC, PSC
- Use of waste derived fuel
- Non conventional energy generation in coastal based cement plants
- Co-generation of power by waste heat utilization

10.1.9 Amendment of noise pollution (Regulation & Control) rules. 2000

Ministry of Environment & Forests constituted a committee headed by the Chairman CPCB to examine the Noise Pollution (Regulation and Control) Rules, 2000 in the context of various court orders and complaints received from the public as well. The committee, after reviewing the noise pollution rules, 2000, recommended few amendments to make the said rules more conductive to human health. Accordingly, Noise Pollution (Regulation and Control) Rules 2000 has been amended vide SO 50 (E) dated 11.01.2010 with the title 'The Noise Pollution (Regulation and Control) (Amendment) Rules, 2010'.

Salient features of the Amendment Rules are: -

(i) Notwithstanding anything contained in sub-rule (2), the State Government may subject to such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address system and the like during night hours (between 10.00 p.m. to 12.00 p.m. midnight) on or during any cultural or religious festive occasion of a limited duration not exceeding fifteen days in all during a calendar year. The concerned State Government shall generally specify in advance, the number and particulars of the days on which such exemption would be operative.

(ii) The noise level at the boundary of the public place, where loudspeaker or public address system or any other noise source is being used shall not exceed 10 dB (A) above the ambient noise standards for the area or 75 dB (A) whichever is lower.

(iii) The peripheral noise level of a privately owned sound system or a sound producing instrument shall not, at the boundary of the private place, exceed by more than 5 dB (A) the ambient noise standards specified for the area in which it is used.

(iv) Sound emitting construction equipments shall not be used or operated during night time in residential areas and silence zones.

10.2 DEVELOPMENT OF ENVIRONMENTAL STANDARDS : PROGRESS OF ON-GOING STUDIES / PROJECTS

10.2.1 Review of effluent standards & development of emission standards for dyes and dye intermediate industry

Central Pollution Control Board (CPCB) evolved standards for discharge of effluent from dyes and dye intermediate industries, which were notified in 1987 under the Environment (Protection) Act, 1986. These standards are under review, besides, standards for emissions are also being developed. National Chemical Laboratory has been engaged for the work. The basic studies have been completed and draft report is under preparation.

10.2.2 Revision of COINDS on Tanneries

Tannery has been identified as one of the 17 categories of highly polluting industries in the country. There are about 1500 leather processing units in the country with more than 80% practicing chrome tanning. In India, about 700,000 – 800, 000 tonnes of hides & skins are processed every year. The tanneries are concentrated mainly in West Bengal, Tamil Nadu, Uttar Pradesh and Punjab. The tanneries are categorized as follows :

❖ Based on processing capacity :

- ✓ small : < 2000 kg/day
- ✓ medium : processing capacity between 2000-5000 kg/day
- ✓ large : > 5000 kg/day.

❖ Based on process :

- ✓ Raw to semi-finish
- ✓ Semi-finish to finished
- ✓ Raw to finish

CPCB undertook a project on "Revision of Comprehensive Industry Document (COINDS) on Tanneries" with the following objectives :

- to upgrade status of Tannery industry in the country;
- to study the associated environmental problems;
- to harmonize develop minimal national standards which could be achieved by the industry techno-economically, and
- to suggest techno-economical pollution control technologies;

The above report shall be presented in the forthcoming Peer & Core Committee meeting in the year 2010-11

The salient findings of the study are as follows :

i. Regarding wastewater , SPCBs have made it mandatory to segregate chrome bearing effluent and recover chrome. Hence all the tannery units have installed chrome recovery units. Almost all the tannery units in India are either connected to CETP or have their own ETP having physico-chemical and single / two stage biological treatment

ii. Tannery units in important leather clusters or have become member of common chrome recovery facilities in Tamil Nadu, West Bengal (Calcutta Leather Complex), Uttar Pradesh (*Banthar*, *Jajmau*, *Unnao) and Punjab (*Jalandhar Leather Complex) are connected to CETPs.

iii. The solid wastes include raw hide / skin trimmings, dusted salt , hair, fleshing and pelt trimmings, sludge from lime pit , chrome shavings/ trimmings, buffing dust and sludge from pre-treatment units, the wastes are either re-used, sold or sent to secured landfill or low lying areas for disposal.

10.2.3 COINDS of Large and Small scale Pulp & Paper Industries

The existing notified effluent and emission standards listed in the (Environment) Protection Act wer reviewed and uniform standards for both Large (wood based) and Small (Agro based) Pulp & Paper industries irrespective of their production capacity, size and raw material proposed by CPCB. The proposed standards for waste paper based industries are under consideration of the Peer & Core Committee.

10.2.4 Performance Evaluation of Air Pollution Control Systems in Pulp & Paper Industry

CPCB has identified ten units to carryout in-depth study w.r.t. the above project. So far five units were visited , the following are the salient observations :

(i) Most mills had Fluidized Bed Combustion (FBC) boiler (either atmospheric FBC or circulatory FBC). The boilers use fuels like coal, wood dust, effluent sludge, bagasse pith, coconut shell, paddy husk, coir pith, etc.

(ii) In case of chemical recovery boiler the steam generation varied between 20-60 tph.

(iii) Large and small paper mills have installed ESPs for control of particulate emissions which in waste paper based mills or small agro based mills multi cyclone was the air pollution control device. Performance of ESPs were found better than multi-cyclones.

Table 10.1: General Performance efficiency

Mill type	Source of Particulate Emission	Capacity	Air pollution control Equipment	Overall performance %
Wood based	Power Boiler Recovery Boiler Lime Kiln	40 tph 350 blds (48tph) 80 tph	ESP ESP ESP	90.00 96.35 99.60
Agro & Wood based	Power Boiler Power Boiler Power Boiler Recovery Boiler Lime Kiln Lime Kiln	60 tph 60 tph 90 tph 1300 blds 65 tph 170 tph 170 tph	ESP ESP ESP ESP1 ESP2 ESP ESP	98.30 96.95 99.79 98.6 99.52 99.56 98.55
Agro based	Multi Fuel Boiler	22 tph	Multi Cyclone	90.06
Waste Paper	Multi Fuel Boiler	15 tph	Multi Cyclone	90.44
Waste Paper based	Multi Fuel Boiler	6 tph 15 tph	Multi Cyclone Multi Cyclone	86.5 93.0

Table 10.2: Operational Costs

Mill	Control Equipment	Operational Cost Rs/day
Wood Based Mill	ESP Power Boiler	2614
	ESP Recovery Boiler	1617
Agro Based Mill	Multi Cyclone Power Boiler	2178
Agro Based Mill	ESP Power Boiler	2400
Agro Based Mill	ESP Power Boiler	7218
	Venturi - Scrubber & grit Cyclone	6321
Wood Based Mill	ESP Recovery Boiler	3860
	ESP lime kiln	2320

10.2.5 Development of COINDS for cement plants

There are about 130 cement plants in the country with the production capacity of 220 MTPA. During cement manufacturing operations, substantial quantity of dust is emitted. Improper air pollution control device may pose serious problem. A study on "Development of COINDS on cement plants" was undertaken in association with National Council for Cement and Building Materials, Ballabhgarh. Based on the study, revision of particulate matter standards can be considered. Development of emission

standards for SO_2 & NOx and load based emission standards for particulate matter from cement plant is also proposed.

The revised report is awaited from National Council for Cement and Building Material, Ballabhgarh.

10.2.6 Clean technology and development of environmental standards for limestone mining

Limestone mining is an important sector as it is being extensively used in various industries including cement. During mining, substantial quantity of dust emissions are generated which pose environmental problem in the region. A study "Description of clean technology and development of environmental standards for limestone mining" has been initiated by CPCB in association with Central Institute of Mining & Fuel Research, Dhanabad. The study will generate the baseline emission data and recommend preventive measures for dust emissions, clean technology and environmental standards for limestone mining. The study is in progress.

10.2.7 Revision of emission limits for new genset engines

a) Revision of emission limits for new Genset engines (upto 800 KW) run on diesel has been proposed in the 11th meeting of the Standing Committee held on November 10, 2009. Draft proposal has been sent to all certification agencies and Indian Diesel Engine Manufacturers' Association (IDEMA) for circulation among stake holders for their views/coments.

Table 10.3: Emission limits for new genset engines

Capacity of diesel engines	Emission Limits (g/kw-hr) for			Smoke Limit (light absorption coefficient, m-1)	Date of implementation
	NOx +HC	CO	PM		
Upto 19 KW	7.5	3.5	0.3	0.7	1.4.2013
> 19 KW upto 75 KW	4.7	3.5	0.3	0.7	
> 75 KW upto 800 KW	4.0	3.5	0.2	0.7	

Note:

i) Smoke shall not exceed the above value throughout the operating load of Genset powered by diesel engine.

ii) Sulphur content in diesel shall be less than 350 ppm

iii) The testing shall be done at D2 cycle of ISO : 8178

b) Revision of emission limits for new generator sets (upto 19 Kw) run on Petrol and / or Kerosene has been proposed in the 11th meeting of the Standing Committee held on November 10, 2009. Draft proposal has been sent to all certification agencies for circulation among stake holders for their views/coments.

10.2.8 State-wise Inventory of Small Scale Industries (SSI)

Major emphasis has been abatement and control of abate pollution from medium and large industries, while small-scale industries remained ignored as they were mostly in the unorganized sector. Though pollution potential from individual units is small however as clusters, these small-scale industries (SSI) generate significant pollution. Inadequate data on environmental issues from them SSI makes policy making difficult. In view of the above CPCB initiated inventorisation of small-scale units in India through the State Pollution Control Boards with the following objectives :

1. Inventorization of the Small Scale Industries (SSIs) in the state;
2. Estimation of pollution load from SSIs;
3. Information on existing abatement and control measures for pollution control in their SSIs;
4. Collection of data useful for improving compliance for pollution control policies in the SSIs.

The project has been awarded on MoU basis to 18 State Boards namely Assam, Bihar, Karnataka, Rajasthan, Jharkhand, Gujarat, West Bengal, Himachal Pradesh, Goa, Kerala, Maharashtra , Orissa, Sikkim, Nagaland, Mizoram, Tamil Nadu, Haryana and Chandigarh Pollution Control Committee.

10.2.9 Development of COINDS for Bee-Hive Coke Oven Plants

Coke is a hard gray, porous solid residue left after bituminous coal is heated to high temperature under anaerobic conditions wherein volatile organics are driven out, the residue is mainly carbon. Coke is an ideal fuel in several industries mainly Steel plants in blast furnaces, metallurgical processes (ferrous & non – ferrous) in foundries and in some lime kilns. The two main types of coke oven plants are :

- ✓ non-recovery coke plants, originally referred to as beehive coke ovens, here the coal is carbonized in large oven chambers; the partially combusted gases exit via a stack
- ✓ in recovery coke pants, the heat of waste gas is utilized in waste heat recovery boilers which convert excess heat into steam for power generation.

As no in depth study has been done for documenting the environmental issues related to the process of beehive coke oven plants, CPCB initiated a study that includes compliance of standards and clean technologies to be adopted.

10.3 DEVELOPMENT OF ENVIRONMENTAL STANDARDS : NEW STUDIES / PROJECTS INITIATED

10.3.1 Performance Evaluation of Lignin Recovery Process (LRP) including the performance of effluent treatment system for discharge standards in Agro-based Pulp & Paper Industry

CPCB has initiated the above study covering ten pulp and paper mills for in-depth study to assess the performance efficiency of LRP and ETP in achieving the prescribed effluent discharge standards as per notification of the Environment (Protection) Rules, 1986 with the following objectives:

i. Evaluate the performance efficiency of LRP and ETP operating in the selected small scale agro based mills for achieving the prescribed effluent discharge standards.
ii. Assessment of lignin removal efficiency and potential use of separated lignin.
iii. Cost analysis of LRP and to identify Best Practicable Technology (BPT) and Best Available Technology (BAT) for LRP and ETP.

10.3.2 Revision of COINDS for Brick Kilns

In view of the improvements and technological advancements in various types of brick kilns in respect of process and fuel used, CPCB has initiated a study to update the past studies and review the notified standards. The study has been awarded to Punjab State Council for Science & Technology, Chandigarh with the following scope of work:

1. Review of relevant National/International experience.
2. Preparation of inventory of brick kilns.
3. In-depth study of predominant type of brick kilns in each of 5 zones i.e. North, South, East, West and Central to monitor emissions/ collect samples and study its effect on ambient air, occupational health, plant & vegetation.
4. Preparation of inventory of identified types and number of emission sources.
5. Development of emission factor for brick industry.
6. Development of standards for source emission, fugitive emission and stack height regulation.
7. Suggest policy and guidelines for siting, better working & housekeeping in brick kilns.

10.3.3 Evaluation and improvement in design of Clamp kilns

Clamp kiln is the most primitive type of brick kiln used for manufacturing bricks in India. Clamp type kilns are popular due to the simplicity in operation and low initial cost though they are energy inefficient. Besides, all smoke / dust emissions remains

remain near ground level due to no provision for dispersion. CPCB has initiated a study in association with The Energy & Resources Institute (TERI), New Delhi in January 2010 with the following scope of work:

1. Review of relevant National/International experience.
2. In-depth study: identification of representative kilns, monitoring of different operating parameters such as fuel consumption, flue gas analysis, operating temperature etc, study of environmental performance in terms of stack monitoring wherever stack exists and ambient air quality monitoring, data analysis.
3. Preparation of inventory of clamp kiln.
4. Developing cost-effective modifications for improving existing clamp kilns.
5. Development and demonstration of improved kiln designs and practices and their performance evaluation.
6. Suggest policies, standard pollution control system/ technology and guidelines for clamp kilns.

The study and is likely to get completed by January 2012.

10.3.4 Demonstration plant for natural gas based brick kiln

Coal is the major fuel used for firing in brick kilns. Apart from coal, agricultural residue, scrap wood; wood by products, trash, etc are also used as fuel due to economic factors. These create environmental issues. CPCB has undertaken a study will support from GTZ under CPCB-GTZ ASEM bilateral cooperation project to study natural gas fired brick kilns technology, used worldwide, and its adoption development by brick kilns in India

10.3.5 Development of COINDS for Steel Re-rolling Mills

The process in re-rolling mills involve heating of steel ingots in oil/ pulverized coal/ or producer gas fired furnace at temperatures between 800-1100 degree centigrade followed by rolling the ingots through set of rollers as per required dimensions . Pollution arise from :

- ✓ wastewater is generated from cooling of hot rolls , the effluent contains oil and grease and mill scale as suspended solids.
- ✓ Air pollution mainly results from furnace emissions
- ✓ Noise pollution from plant operations

Tar generated from producer gas plant is an area of concern.

Central Pollution Control Board initiated a study on the environmental issues releted Steel re-rolling mills. The preliminary results indicate that most of these mills exist in

the small scale sector having production capacity between 3 TPH to 15 TPH. Out of the 1200 steel re-rolling mills in the country , 1100 are in the small scale sector.

10.3.6 Development of COINDS for Pickling Industry

The pickling process involves dipping of stainless steel sheets in a bathing tank containing mixture of sulphuric acid (H_2SO_4) and nitric acid (HNO_3) to remove metal oxides and scales formed during the heating in the furnaces. The metal sheets are first dipped in acid, then washed with water. The process is polluting nature as it generates :

- ✓ effluent highly acidic in nature.
- ✓ harmful acid fumes generated from acid tanks
- ✓ solid waste generated from the acid tank which contains Fe, Ni, & Cr as sludge.
- ✓ Spent acid is discharged, once its strength reduced.

Central Pollution Control Board has initiated a study on environmental issues involved in the pickling process in stainless steel processing units.

10.3.7 Development of COINDS for Activated Carbon Manufacturing Unit

The major raw materials in activated carbon manufacturing are coconut shell and wood charcoal. The process includes carbonization of the raw material in the absence of air. Steam activation is mainly used for activated carbon besides chemical activation is practiced in few units. The process contributes to both air and water pollution. Central Pollution Control Board has initiated a study on environmental issues in an Activated Carbon Manufacturing Unit.

10.3.8 Preparation of COINDS & Status of Large Scale Paint Industries

CPCB has awarded the project on "Preparation of Comprehensive Industrial Document and Status of Paint Industries" to NPC, New Delhi. Eleven (11) paint industries were jointly visited by CPCB and NPC during preliminary study. Based on the preliminary field visit made to 11 paint industries, Interim Report on the above mentioned project was submitted by NPC. All scales of operation, six categories of paint industries have been selected for detailed study are given below:

1. Industrial Automotive paint
2. Decorative water & solvent based paint
3. Decorative water based paint
4. Industrial solvent based paint
5. Decorative water, solvent and emulsion based paint
6. Marine Paints

Parameters for Air, Effluent and Solids have been identified based on various scales of operation for detailed study. CPCB along with NPC is in the process of selecting the laboratory for carrying out the sampling as well as analysis.

10.3.9 Development of COINDS for Small Scale Paint Industry

There are about 2000 small scale paint manufacturing plants in the country. The large paint plants are integrated ones implying they include manufacturing solvent / resins and paint at one place, which the small scale paint manufacturing plants are unorganized and carry out the mixing process of different raw materials to manufacture paint. The source of waste water generation is cleaning of mixing vessel and floor cleaning while air pollution comparises of fugitive emission (volatile organic compounds - VOCs) from mixing vessels. The solid waste contains heavy metals. The above proposed study shall cover all the environmental aspects in selected small scale paint industries - having diversified manufacturing process and products and also develop Minimal National Standards.

10.3.10 Development of COINDS and environmental standards for Plywood industry

There are approximately 2500 plywood industries in India. Plywood is made from thin sheets of wood veneer, called 'plies or veneers'. These are stacked together with the direction of each ply's grain differing from its neighbors by 90^0 (cross banding). The plies are bonded under heat and pressure with strong adhesives, usually phenol formaldehyde resin, making plywood a type of composite material. A common reason for using plywood instead of plain wood is its resistance to cracking, shrinkage, twisting/warping and its high degree of strength. Formaldehyde, a key ingredient in the glue that holds plywood together, has long been linked to health problems including asthma and cancer. Emission of the fine particle from this sector is an environmental problem. CPCB has initiated study on development of COINDS from this sector with the following objectives :

i. to collect and compile information on the status (i.e. number, size and location) of wood seasoning and plywood and plyboard manufacturing units in the country;
ii. to assess stack emissions, ambient air quality, fugitive emissions, effluent quality, noise, solid waste generation and stormwater pollution bywood seasoning and plywood manufacturing units in the country;
iii. to identify appropriate pollution abatement and control systems based on 'best available technology not entailing excessive cost' (BATNEEC) concept and to evolve environmental standards which could be techno-economically feasible;
iv. to evolve suitable environmental (emission & effluent) standards, which could be techno economically feasible for wood seasoning, plywood and plyboard industry

v. to recommend good practices (including solid waste management) and better housekeeping for all operations an siting criteria for new units.

The study has been awarded to National Council for Cement and Building Material, Ballabhgarh.

10.3.11 Utilization of Distillery effluent in agriculture

Central Pollution Control Board has initiated a study on "Utilization of Distillery effluent" as a source of nutrients for crop production in different Agro-climatic regions' having a network of seven centres spread over different climatic zones. The study has been initiated in association with four key Agricultural Universities / Institutes to evaluate effects on soil of the current practices for achieving zero discharge by distilleries through utilization of distillery effluent as a source of nutrients and water, including effects of chloride and fixed dissolved solids in spent wash on salt accumulation in soil and leaching requirements for movements of salts in the soil and possible contamination to ground water. The study is underway.

10.3.12 Compilation on Material Safety Data Sheet (MSDS)

Central Pollution Control Board undertook the task of compiling safety data for the chemicals that are categorized as hazardous, flammable and/or toxic chemicals under:

- ✓ the "Manufacture, Storage and Import of Hazardous Chemical Rules 1989 and was further amended in 2000 and
- ✓ Public Liability & Insurance (PLI) Rules, 1991 and notified by MoEF, New Delhi.

As part of the study, details for 735 chemicals have been compiled and database prepared. The information has been compiled in a format according to the Schedule 9 of the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989. The information is available on the CPCB's website www.cpcb.nic.in which enables easy searching for any chemical, display its safety data, generates reports for display.

10.4 ENFORCEMENT OF ENVIRONMENTAL STANDARDS AND ACTIONS FOR CONTROL OF POLLUTION

10.4.1 Writ petitions against Rice mill related issues

Rice mills are important segment of Indian economy as it provides livelihood to millions of people directly as well as indirectly. Rice processing units includes tiny, small, medium and large processors in organized as well as unorganized sector. The main features of the process are :

(i) Siting of rice shellers/mills;
(ii) handling and storage of rice husk and
(iii) handling, storage and disposal of ash generated in boiler using rice husk as fuel.

Most of the rice mills are situated in the paddy producing regions. The objective of milling is to get whole grain rice and preserve most of the rice kernels in their approximate original shape. When the input to rice mill is paddy, the output is raw/white rice and if input is pretreated paddy, the output is known as parboiled rice.

Table 10.4: Rice processing and associated environmental problems

Pollution	Pollutants
Air/Gaseous	Boilers flue gases, fugitive dust etc.
Liquid	Process wastewater from parboiling
Solid	Inert material, husk, fly ash & bottom ash from Boiler
Noise	Noise from paddy cleaner, rice mill, compressor & DG sets

Pretreated and dried paddy in case of parboiled rice mill and raw paddy in case of white rice mill are subjected to hulling; separation of bran, broken rice etc; husk separation; paddy separation; polishing; whitening; grading; de-stoning; sorting, packaging etc, in a rice mill to obtain finished rice. All these operations are usually undertaken under one roof. The entire enclosure is termed as the mill house. Various machines are involved for undertaking these operations. Fugitive dust emission is the most potential pollution in this mill house, which pollutes the working environment of the mill house. Steam plays a vital role in the production of parboiled rice. Storage and handling of husk at times may cause fugitive emissions of varying magnitude. In India, milling of paddy produces an average of 65% rice, 22% husk, 6% bran, 3% broken rice and balance 4% consists of wastage.

Three writ petitions namely i) WP (C) No. 14933/2007 Gurdeep ii) 15853/2007, Gurmukh Singh and iii) 2452 Puran Singh vs State of Punjab & Ors was received at CPCB. These petitions were filed against the nuisance created by Rice shellers / parboiled mills, operated in various parts of Punjab and Haryana. Hon'ble High Court of Punjab & Haryana added CPCB as a party respondent in the above three cases and after hearing the cases Hon'ble High Court of Punjab & Haryana and directed CPCB to conduct a study on the uses related to handling storage of rice husk disposal of ash generated in boilers using rice husk as fuel. CPCB awarded the project to Federation of Indian Chambers of Commerce & Industry (FICCI).

10.4.2 Pollution Control Status in thermal power plants:

During 2009-10, out of 91 plants, 63 and 72 plants were complying with the emission and effluent standards respectively. Sixteen thermal power plants were inspected under

Environmental Surveillance Programme (ESS). Directions under Section 18 (1) (b) of Air & Water (Prevention & Control of Pollution) Acts were issued to concerned SPCBs for directing the defaulty units to take immediate measures for control of pollution.

10.4.3 Use of Beneficiated Coal

Thirty Four power plants (Table 1) were required to use beneficiated coal as per the notification (GSR 50(E), September 19, 1997). However, 13 more plants (Table 2) are required to use beneficiated coal as per the modified guidelines on critically polluted area based on Comprehensive Environmental Pollution Index (CEPI),. Thus, total 47 plants fall under the purview of the use of beneficiated coal. Out of 47, 29 plants are meeting the requirement of using coal containing not more than 34 % ash content.

Presently, non coking coal washing capacity in India is about 117.6 million tones per annum (MTA) of which Coal India has only 19.7 MTA remaining, 98 MTA is contributed by the private washeries of ACB, Gupta, Hind energy & Maruti Coal & Energy Ltd. To meet the future demand of washed coal, CIL has proposed to install 19 more washeries with total capacity of 100.6 MTA by the year 2015 based on Built Operate and Maintain basis. Tenders have been invited for six washeries with installed capacity of 32.5 MTA. Hind energy & Coal Beneficiation Ltd. has also plan for expanding the existing capacity by adding 8.16 MTA

Table 1: Thermal Power Plants required to Use Beneficiated Coal

S. No.	Name of Thermal Power Station	Capacity (MW)	Category +	Status of Implementation
1.	Badarpur	705	UA	✓
2.	Indraprastha	278	UA	Closed
3.	Rajghat	135	UA	✓
4.	Faridabad	165	UA	Closed
5.	Panipat (Units 1-5)	650	>1000 km	✓
6. a& b	*Bhatinda (Units 1-4)(unit 5-6)*	440	>1000 km	✓
7.	Ropar (Units 1-6)	1260	>1000 km	✓
8.	NCR Dadri	840	>1000 km	✓
9.	Harduaganj	425	>1000 km	X
10.	Panki	274	U.A.	X
11.	Paricha	220	>1000 km	X
12.	Kota (Units 1-5)	850	U.A.	✓
13.	*Sabarmati*	410	U.A.	✓
14a.&b.	*Wanakbori (Units 1-6& 7)*	1260	>1000 km	✓
15a.	*Gandhi Nagar Unit1-6& 7*	660	U.A.	✓
16.	Ukai	850	>1000 km	✓
17.	Sikka (Units 1-2)	240	>1000 km	✓
18.	Bhusawal	478	>1000 km	Information not available

S. No.	Name of Thermal Power Station	Capacity (MW)	Category +	Status of Implementation
19.	Koradi	1080	U.A.	✓
20.	Nasik	910	>1000 km	✓
21.	Trombay	1150	U.A.	✓
22.	Dahanu	500	S.A.	✓
23.	DPL	390	CPA	✓
24.	Muddanur (Rayalaseema)	420	>1000 km	✓
25a&b	North Chennai-I&II	630	U.A.	✓
26.	Ennore	450	>1000 km	X
27a.& b	*Raichur (1-4 & 5-6)*	840	>1000 km	✓
28.	Mettur	840	>1000 km	✓
29.	Tuticorin (1-5)	1050	>1000 km	✓
30.	Bokaro	820	CPA	✓
31.	Durgapur	350	CPA	✓ (partially)
32.	Mangalore	1000	>1000 km	✓
33.	Tranagallu	260	>1000 km	✓
34.	Suratgarh-I	500	>1000 km	✓

✓: Implemented use of beneficiated coal; X : not implemented use beneficiated coal

Table 2: Thermal Power Plants located in critically polluted area (as per CEPI) and require to use beneficiated coal based on CEPI

Sr. No.	Name of Power plant	Category	Capacity	Status of Implementation
1	Chandarpur, MAHAGENCO	CPA-Chandarpur	2100	
2.	Korba (East), ChSEC	CPA-Korba		X
3.	Korba (West), ChESC	CPA-Korba		X
4	Korba, NTPC	CPA-Korba	2000	X
5	Angul, NTPC	CPA-Angul Talcher	440	X
6	Kaniha, NTPC	CPA-Angul Talcher	3000	✓
7.	Singrauli, NTPC	CPA-Singrauli	2000	X
8	Rihand, NTPC	CPA-Singrauli	2000	X
9	Vindhyachal, NTPC	CPA-Singrauli	3250	✓
10	Anpara, UPVUNL	CPA-Singrauli	1600	X
11	Obra, UPVUNL	CPA-Singrauli		X
12	Panki, UPVUNL	CPA-Kanpur	220	X
13	Ib Valley	CPA-Ib Valley		X

✓: Implemented use of beneficiated coal; X : not implemented use beneficiated coal

10.4.4 Utilization of flyash

In order to give more impetus and to make the use of flyash and flyash based products mandatory (by the brick kilns, thermal power stations , CPWD & PWDs) the earlier notification on flyash utilization S.O. 763 (E) dated 14/09/1999 has been amended vide notification no. S.O. 2804(E) dated November 3, 2009 .

(i) No person, located within 100 km radius of any Thermal Power Station, shall manufacture clay bricks, tiles or blocks without mixing at least 50% flyash or pond ash with soil. Minimum percentage of flyash content in the various products has been specified for qualifying as flyash based products.

(ii) Sale of flyash by the thermal power plants is permitted

(iii) Thermal Power Plants shall achieve hundred percent flyash utilization as per following schedule

- New Plants : 4 years from the date of commissioning
- Existing Plants : 5 years from the date of notification

As per the notification, every power plant is required to submit Annual Implementation report by April 30th of the succeeding year. During 2008-09, 344.74 million tonnes of coal and 21.5 million tonnes of lignite were consumed in the power sector. Generating about 137 million tonnes of ash out of which 47 percent was utilised. Yearwise flyash utilization since 1992-93 to 2008-09 is presented in Figure 10.1 and areas wise utilization in Figure 10.2.

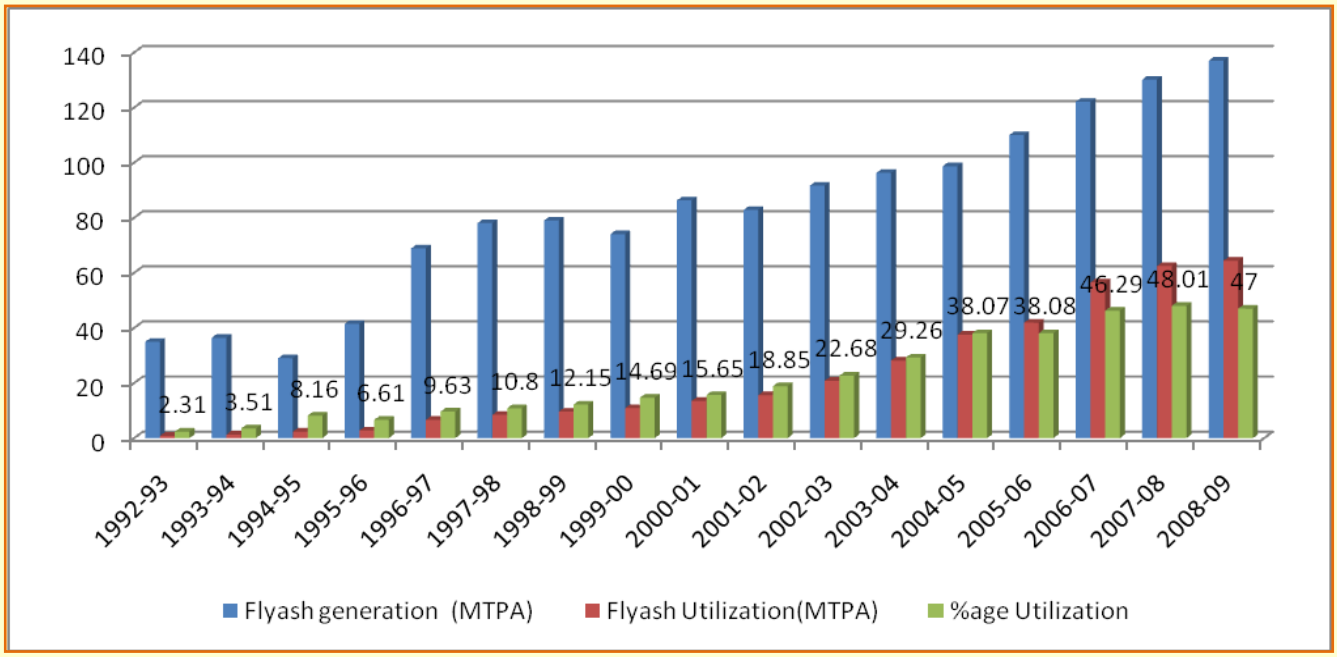

Figure 10.1: Year-wise Flyash statistics

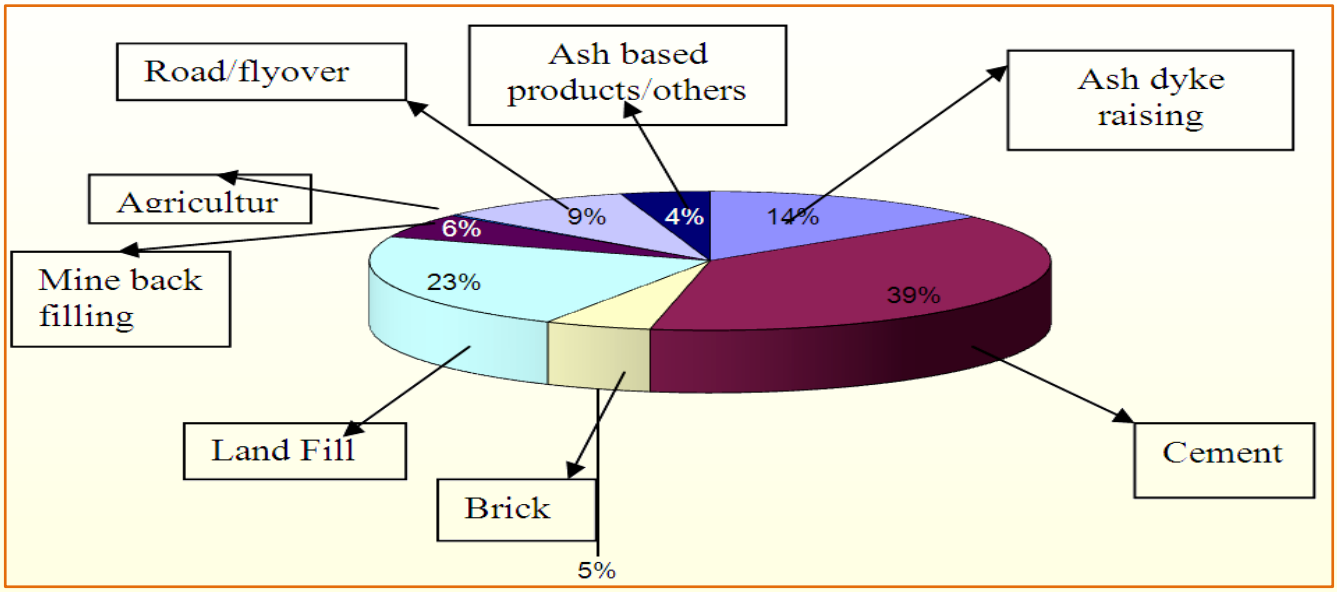

Figure 10.2: Area wise utilisation of Flyash

10.4.5 Co-processing of wastes in cement kiln

CPCB initiated a study on "Co-processing of waste in cement kilns" . Trial runs were conducted for co-processing of different kinds of wastes in cement kiln as fuel supplement / raw material in cement kiln. Parameters in the heavy metals, dioxins and furans, TOC etc were monitored during the trial run including in the kiln stack. In the study, no adverse impact to the environment was observed. The successful trial run of waste co-processing in cement kiln, reveals that waste disposal problem can be solved to a great extent. The co-processing of waste in cement kiln has emerged as the best environment friendly option for its disposal.

Under Rule 11 of the Hazardous Wastes (Management and Handling & Transboundary Movement) Rules, 2008 CPCB has been empowered to issue permissions for utilization of hazardous waste for resource recovery or energy recovery. CPCB received applications under Rule 11 of the Hazardous Wastes (Management and Handling & Transboundary Movement) Rules, 2008 from cement plants for granting permission for co-processing of different kind of wastes in cement kiln. Based on satisfactory performance of trial run, 22 cement manufacturing units in various states have been granted permission for co-processing certain categories of wastes (for which trial run has been conducted). Further, trial runs are underway for various other categories of waste. CPCB has prepared the policy document i.e. "Guidelines on co-processing wastes in cement kiln" and calculated the stakeholders and also placed on our website. For awareness amongst waste generators, cement manufacturers and regulatory authorities.

10.4.6 Corporate Responsibility for Environmental Protection (CREP) in Oil Refinery and Petrochemical Sectors

The National Task Force for CREP for Oil Refineries and Petrochemical Sectors was re-constituted and the first meeting was held on October 09, 2009. It was agreed to incorporate new action points for oil refineries to carry out monitoring and survey to assess hydrocarbon (HC) loss and concentration of VOCs in ambient air / wastewater treatment plant; assess the quantity of gas being flared, provide Cleaner Technology options. Oil refineries were also requested for linking of data from the Continuous Ambient Air Quality Monitoring Stations (CAAQMS) installed to CPCB's server and to provide data from online stack analyzers on the website of refinery.

10.4.7 Task Force for implementation of CREP recommendations on Tanneries

The 6th meeting of the Task Force for implementation of CREP recommendations was held on April 16, 2009 at Zonal Office, CPCB, Kolkata. To assess the status of operation of CETP in Calcutta Leather Complex (CLC), a joint team of officials from CPCB Delhi, Zonal Office & SPCB visited CETP in CLC. The observations are given below :

Calcutta Leather Complex: The State Government allotted 400 acres of land for Development of Calcutta Leather Complex to M/s M. L. Dalmia & Co. Ltd. However the size of the CLC has been reduced to 200 acres, as the remaining 200 acres is under the development of IT Park by M/s M. L. Dalmia & Co. Ltd.

❖ *Status of shifting:*

Total units of tanneries in Kolkata to be shifted	-	457
Total units shifted	-	168
Units obtained NOC & yet to be shifted	-	193
Units to obtain NOC	-	96
Total units to be shifted	-	289

❖ Shifting of remaining units is linked with the construction of 5th & 6th modules of the CETP.

CETP: The CETP has a planned capacity of 30 MLD in 6 modules each of 5 MLD capacity. Presently four modules constructed by the State Govt. are operating while the construction of remaining two modules each of 5 MLD capacity is yet to begin. The operation and maintenance of CETP is done by CLC Tanners Association (CLCTA), however the conveyance system to CETP from individual units was done by developer of the complex.. The conveyance system in some zones of CLC has collapsed causing flooding in the complex due to settlement of solids . The flow reaching the CETP was about 16 MLD, continuous monitoring instruments installed for monitoring the parameters pH and Dissovlved Oxygen were non-functional.

Common chrome recovery plant (CCRP) in two modules each of 120 m^3/ day capacity was lying unutilized in the CETP, because tanners are not sure of the quality of the chrome recovered from CCRP. All the relocated tanneries have installed their individual CRPs. Tanners expect assurance about the quality of the chrome recovered from CCRP. The CCRP is yet to be handed over to CLCTA by CLC Developer.

10.4.8 Task Force for Pollution Control in Electroplating Units

Electroplating units number in thousands are operating in various parts of the country mostly in the small scale sector. Electroplating process involves the usage of toxic chemicals viz., acids, cyanide and toxic metals such as chromium, zinc, copper, nickel, tin etc. To promote pollution control measures in this sector, Central Board constituted a National Task Force to provide guidance in the following matter :

i) Identifying specific problems/ issues of this sector and suitable approach in solving the problem

ii) Identification of cleaner technologies in electroplating sector

iii) Implementation of cleaner technologies / waste minimization measures in electroplating industries

iv) Implementation of environmental discharge standards

v) To develop action plan for phase wise reduction of cyanide and chromium (VI) in electroplating.

vi) Implementation of pollution control measures and compliance to environment standards in unorganized sector

The Task Force visited electropalting cluster in Madurai, Pune and Rajkot to acertain the problems/issues of the sector and they recommendation are under finalization.

10.4.9 Task Force for Pollution Control for Bee-Hive Coke Oven Plants

Central Pollution Control Board has constituted a National Task Force for looking into various environmental issues pertaining to "Bee-Hive Coke Oven Plants". The status of pollution control from Bee Hive Coke Oven Plants is under review. The terms of reference of the Task Force will provide guidance with respect to the following issues.

(i) Implementation of standards.

(ii) To suggest cleaner approach for better working and operating condition in Bee-hive Coke Oven plants.

(iii) Identification of suitable pollution control system so as achieve the standards.

10.4.10 Fugitive Emission of PAHs in Coke Oven Plant

Coke is an important raw material for steel making process and is produced from coking coals. Conventionally coke is produced in coke oven battery where its carbonised at a temperature of around 1000-1100°C to a certain degree of de-volatization to produce metallurgical coke of desired mechanical and thermo-chemical properties.

Coke can be produced both in non-recovery or by-product type coke ovens. The latter process is not of environmental concern as it emits harmful coke-oven gases that contains Hazardous Air Pollutants (HAPs) such as PAH. In integrated Iron & Steel plants, coke is essentially produced from by-product type coke ovens so as to get the benefit of coke-oven gases for use in Blast Furnace and Rolling Mills.

Fugitive emissions are of major concern in by-product type coke ovens as the ovens are required to be operated under positive pressure. The coke oven emissions are a mixture of coal tar, coal tar pitch, volatiles, creosote, polycyclic aromatic hydrocarbons (PAHs) and metals. PAHs are semi-volatile compounds; over 20 different PAHs are found in coke oven emissions, including benzo(a)pyrene, benzanthracene, chrysene, and phenanthrene. Coal tar volatiles include benzene, toluene, and xylenes.
The CPCB's Zonal Office, Kolkata carried out a study for measurement of PAH in fugitive emissions of coke ovens to assess the concentrations (Table 10.5) and to verify the status of compliance with respect to emission of benzo(a)pyrene is given below:

Table 10.5: Fugitive Emission of Polynuclear Aromatic Hydrocarbon in Coke Oven Plants

Industry	Location	Parameter (concentration in µg/m³)					
		Fluoranthane	Pyrene	Chrysene	B(e)P	B(a)P	Dibenz Anthra cene
Plant-1	Batt.# 01 Oven top	4.73	4.2	5.8	8.4	3.7	3.6
	Batt.# 01 Coke side	0.5	0.5	0.55	0.5	0.45	-
	Batt.# 03 Oven top	5.2	6.5	5.9	3.9	0.03	-
	Batt.# 03 Coke side	0.18	0.21	0.13	0.11	0.09	-
Plant-2	Batt.# 08 Oven top	0.06	0.05	-	-	0.06	-
	Batt.# 08 Coke side	0.06	0.07	0.06	-	0.04	-
	Batt.# 09 Oven top	0.47	0.34	1.65	1.4	1.2	0.2
	Batt.# 08	0.006	-	0.001	0.018	0.1	-

Industry	Location	Parameter (concentration in µg/m³)					
		Fluoranthane	Pyrene	Chrysene	B(e)P	B(a)P	Dibenz Anthra cene
	Coke side						
Plant-3	Batt.# 01 Oven top	0.3	0.15	0.9	1.04	0.96	0.2
	Batt.# 01 Coke side	0.06	0.06	0.08	0.09	0.14	-
	Batt.# 06 Oven top	0.48	0.44	0.34	0.19	0.17	-
	Batt.# 06 Coke side	0.05	0.04	0.04	0.05	0.05	-
Plant-4	Oven top	0.09	0.08	0.05	0.05	0.04	0.02

10.4.11 Environmental Status of Jajpur, Orissa

Jajpur in Orissa has an industrial area named Kalinganagar Industrial Complex comprising of mainly sponge iron or steel units . Presently there are 13 of these units and there is a proposal to install an integrated steel plant in a phased manner. Following industries are operational in Kalinganagar Industrial Complex.

1. VISA Steels Ltd.
2. JSL Ltd.
3. Neelachal Ispat Nigam Ltd.
4. Mideast Integrated Steels Ltd.
5. Maithon Steel Ltd.
6. Deenbandhu Ispat Ltd.
7. Rohit Ferro Alloys
8. K. J. Ispat Ltd.

The units serial no. 1 and 2 were surveyed and the key issues are summed below for both the units.

✓ **M/s VISA Steel Ltd.**

- Industry has proposed two types of power plants. One is of WHRB based and another conventional type. At present WHRB has been installed with initial generation capacity of 50 MW (2 x 25 MW). In the next phase the capacity is proposed to be increased to 100 MW. Proposed conventional type boilers are based on CFBC and AFBC technologies. Two of CFBC boilers (2 x 77 MW) and one of type AFBC (1x 77 MW) based power plants will be installed in next phase.
- Industry has one Electric arc Furnace (EAF) with production capacity of 80 ton of steel in each cycle. Dust generated from EAF is sold to briquette manufacturing

units. Industry's other operational plants are submerged arc furnace (SAF) and ferro chrome plant. The unit proposes to install sintering plant and rolling mill.

✓ **M/s JSL Ltd.**

It is an integrated steel plant along with two Ferro Chrome plants, each having capacity of 60 MVA, has installed Captive Power Plant (CPP) and also WHRB of capacity of 13 MW besides has MVA. Fly ash generated from CPP is used in industry for land filling in low lying areas. Industry is intracting with National Highway Authority of India for flyash utilization in road making. Industry has two briquette manufacturing units having capacity of 33 TPH each. The industry has proposed to install the following units in the future expansion phase,:

- power generation will be 1000 MW (8 x 125 MW).
- Sintering Plant
- Blast Furnace
- Electric Arc Furnace
- Rolling Mill

10.4.12 Pollution Control in Iron Ore Mines in Eastern Region

Iron Ore is the most important raw material in steel making process. Madhya Pradesh, Karnataka, Jharkhand, Orissa, Goa, Maharashtra, Andhra Pradesh, Kerala , Rajashthan and Tamil Nadu are the principal producers of iron ore in the country. Total reserve of haematite in Jharkhand region is estimated over 3000 million tonnes. Orissa state itself has about 30% of the country's haematite ore, out of which Keonjhar district alone contributes about 75% reserve of the state followed by Sundargarh district with about 22% reserve of the state. East Singhbhum in Jharkhand and Sundargarh in Orissa hold almost 55% of iron ore reserves in the country. This region produces almost 40% of country's iron ore production.

Keeping into consideration the major social and environmental concern due to iron-ore mining in the eastern region. CPCB initiated an indepth study of some iron ore-mining projects, wherein studies were carried out in Barbil area of Orissa by CPCB Zonal Office Kolkata. The key observations are as follows:

1. Jiling Langalota Iron & Mn Mines - M/s Essel Mining & Industries Ltd. (Production capacity: 4.60 million ton /annum)

The settling pond for the control of surface run off from Jilling overburden dump (OB) and 200 TPD crusher plant is inadequate to control run off during rainy season. Water from the settling pond is used for irrigation purpose. Retaining wall for subgrade ore dumped in Langalota area near railway siding was not completed. This subgrade ore

dumping is not properly managed and stabilized. Run off from this dump flows into the Dalko nala. A proper retaining wall needs to be constructed and the dump systematically stabilized and reclaimed. The TSS in the nala was found to be 102 ppm during inspection.

2. Joda East Iron Ore Mines (M/s Tata Steel Ltd.) (Production: 4.3 million ton/annum during 2008-2009)

Mobile sprinklers are used for dust suppression on haul roads. Ore benefication is practiced and slim is collected in the de-sliming pond inside the lease hold area. Water from this pond is recycled/reused for processing and other work.

3. Jajang Iron Ore Mines (M/s Rungta Mines Ltd., (Production: 5.14 million ton/annum during 2008-2009)

Fixed type sprinklers are provided on permanent haul roads (approx.10.3 km) and it were found operational. Old dumps stabilized with adequate plantation. Retaining wall and garland drains have been provided all along the dump.

4. Thakurani iron Ore Mines, Block-B, Sharda Mines (P) Ltd., (Production: 5.1 million ton/annum during 2008-2009)

Fixed type sprinklers provided along the permanent haul road were found operational during inspection. Mobile sprinklers are also used for dust suppression along haul roads. Slope of the overburden (OB) dumped along the seasonal nala is very high. Some OB dumped materials were also seen in the nala. Plantation along this bund was in good condition.

5. Sirajuddin and Co.

Check dams provided but not maintained properly. Old Overburden dumps are provided with plantation.

10.4.13 Environmental Concerns in Oil & Gas Exploration, Drilling and Production Industry – Case studies in Arunachal, Assam and Tripura

Oil & Gas Exploration and Drilling sector is one of the major industrial sector in the State of Arunachal Pradesh, Assam and Tripura. This industrial sector contributes significantly towards environmental pollution. In North East, Oil and Natural Gas Corporation Limited (ONGCL) and Oil India Limited (M/s OIL) are the major players in the sector. However, in the recent years, private companies, including MNCs like M/s Canoro Resources Limited, M/s Geo-Enpro Petroleum Limited, M/s Hindustan Oil Exploration Company, M/s Jubilant Energy, etc have started Oil & Gas explorations in

the States of Assam, Arunachal Pradesh, Nagaland and Tripura. The CPCB Zonal Office, Shillong surveyed the following exploration sites:

- Kharsang, Arunachal Pradesh (operator: M/s Geo-Enpro Petroleum Limited) ,
- Duliajan, Assam (operator: M/s OIL) and
- Kunabon, Tripura (operator: M/s ONGCL).

Use of natural hill slope as part of Waste Pit - no HDPE liner

The major findings of the study are as follows:

✓ Observation at drilling site : The agencies involved in oil and gas exploration are not following the EPA Notification: GSR 176(E) properly with respect to the guidelines for disposal of solid wastes (disposal of drill cuttings and drilling mud and production stage solid waste disposal). There is no proper design of waste pit. Agencies involved for drilling in below hilly areas were seen using natural hill slope as part of waste pit (photo). HDPE lining is not laid in the pits nor laid over the pit or else impervious lining done complitly, thus purpose of providing waste pit is lost. It is also observed that there are no standard design criteria for construction of waste pit.

Releasing of DG Set emissions

✓ DG Sets/ power generators : at various production installations and drill sites were releasing emissions from the Caterpillar Engines and DG Sets in a horizontal direction at levels / height much below the prescribed norms, and without of acoustic enclosures was also observed.

Recommendations for proper environmental management at Drilling Site

- DG sets and Caterpillar Engines should be operated with proper acoustic enclosures.
- Emissions from DG Sets / Caterpillar Engines should be released in vertical direction only for proper dispersion of the pollutants.
- ETP should be a part of the rig and operated by Oil and Gas Drilling Agency itself.

- Treated water from ETP during drilling should be recycled
- Waste Pit shall be lined with HDPE liners (2.0 mm thickness) and with liners extended up to the top of the embankments
- Waste Pit shall be reclaimed after completion of the drilling as per guidelines

✓ At production installations : it was observed that ground flares have been installed in Oil Collecting Station (OCS) / Group Gathering Stations (GGS) or in the Gas Compressor Stations (GCS). Though there were no agricultural fields around however criterea for plantation within 100 m area from flare site was not being implemented.

Ground flaring in an OCS, by M/s OIL

✓ Violations of the provisions of the Hazardous Wastes (Management & Handling and Transboundary Movement) Rules, 2008 have been observed by way of indiscriminate dumping of Hazardous Waste (oily sludge, tank bottom sludge, etc) by both the public / private sector companies.

✓ Disposal of Formation water without sufficient pre-treatment: Kathalguri and Hapjan Oil Collecting Stations (OCS) were monitored. Formation water separated in these OCS were given preliminary treatment before disposal into Formation Water Disposal Wells at a depth of about 1000 m. Samples of formation water, as disposed of into disposal wells, were collected and analyzed for 'Oil and Grease' and suspended solids content and other parameters. (Table 10.6). Total suspended solids and oil and grease are the limiting parameters as per Environment (P) Act, 1986 for Formation Water Disposal, if disposed through disposal well. M/s Oil India Limited has no effluent treatment plant in the OCS to treat the Formation Water before disposal except feeding of de-oilers (chemicals) to the formation water and subsequent separation of oil & grease by simple siphoning system. The O&G levels observed were as high as 359 mg/l against permissible limit of 10 mg/l.

Dumping of oily sludge in earthen pits

Table 10.6: Analaysing of Formation of Water

Sampling Source (Date of sampling: Sept. 09-12, 2009)	Pollutants		
	pH	TSS (mg/l)	Oil & Grease (mg/l)
Hapjan OCS	7.50	366	359
Kathalguri OCS	7.62	21	39
Drill Cutting Pit of HRU	7.401	19	11

Recommendations for Production Installations (OCS / GCS / GGS)

- Ground flaring be avoided except in case of flares surrounded by agricultural fields in the immediate vicinity. Elevated flares shall be installed at all the installations.
- HDPE lined pit should be constructed as per guidelines for installations like OCS/GCS/GGS and browser unloading stations.
- ETP to be installed at production installations (OCS/GGS) to treat the formation water to meet with the specified standards (O&G -10 mg/l and TSS – 100 mg/l).
- Bio-remediation to be explored and GW quality around bio-remediation site to be be monitored.
- Oil and Gas Drilling Agencies shall have 'Oil spill control emergency response plan' to deal with oil spillages. This will include procurement of proper equipments (booms, skimmers, etc), oil spill dispersants, identifying methodologies to be adopted and enjoying experienced manpower to deal with the oil spills

10.4.14 Slaughter houses in Meghalaya and Nagaland

Unorganized slaughtering of chicken, goats, sheeps, lambs, pigs and other cattles in Meghalaya and Nagaland is an environment issue. Owing to the low temperature, hilly terrain and culture the consumption of meat is high in most north eastern states. The environmental problems from unorganized slaughtering includes burning of hair and feathers, discharge of wastes especially blood and unscientific dumping of other solid wastes contaminate soil.

10.4.15 Review of Environmental Statements (ES) Submitted By Industries – Additional Sectors (Phase – II)

The Ministry of Environment and Forests, Government of India issued notification in April, 1992 and amendment in April, 1993 for submission of '*Environmental Statements*' (ES) by the industries to the respective State Pollution Control Boards (SPCBs). ES is a pro-active tool for self-examination of the industry itself to reduce/minimise pollution by adopting process modifications, recycling and reuse of the resources. The regular submission of ES indicates the systematic improvement in conservation of resources and environmental pollution control being achieved by the industry. The ES can also be used as environmental performance indicator for relative comparison, of implementation and to promote better practices. In order to assess the efficacy of ES, a project was taken-up by the Ministry of Environment & Forests entitled as "Review of Environmental Statements Submitted by the industries" and metting by Central Pollution Control Board (CPCB).

The Central Pollution Control Board has engaged Institutions having expertise in the concerned field to review the ES for the sectors. Chlor-alkali, Dyes & Dye intermediates, Aluminum smelter, Zinc smelter, Copper smelter, and Fertilizer in order to cover major priority industrial sectors under the programme. The outcome of the exercise has been utilised for setting environmental benchmarks for attainment by all the industries.

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CHAPTER - XI

PROSECUTIONS LAUNCHED, CONVICTIONS SECURED AND DIRECTIONS GIVEN FOR CLOSURE OF POLLUTING INDUSTRIES

11.1 CPCB ACTIVITIES UNDER EPCA

"Environment Pollution (Prevention & Control) Authority for the NCR" (EPCA) was constituted by the Central Government vide notification No. SO 93(E) dated 29.01.1998. Central Pollution Control Board has been providing the technical and secretarial support to the EPCA for carrying out its functions. EPCA monitors implementation of action points enlisted in the "White Paper on Pollution with an Action Plan" for Delhi and priority measures for pollution control in Delhi and National Capital Region (NCR).

EPCA has prepared special reports and submitted the same to the Hon'ble Supreme Court from time to time. EPCA also monitors progress of action plans for improving ambient air quality in 8 other not attainment cities namely Ahmedabad, Bangalore, Chennai, Hyderabad, Kanpur, Lucknow, Pune and Sholapur. The EPCA is pursuing various agencies to implement the Action Plan on priority for abatement and control of air pollution and also the air pollution control and various orders of the Hon'ble Supreme Court.

EPCA convened number of meetings with various government agencies during 2009 – 2010 to discuss / review the progress of various issues which included – expansion and improvement in public transport in Delhi, progress of BRT corridors in Delhi, signing of common reciprocal transport agreements among NCR states, issues related to parking in Delhi and neighbouring NCR cities, expansion and improvement in compressed natural gas (CNG) supply in Delhi and NCR cities, issues related to CNG safety and fire incidents in CNG buses, issues related to preparedness for implementation of Euro IV standards from 01.04.2010, public complaints, Outdoor Advertising Policy for Delhi, issues on lifting the cap on TSRs in Delhi, proper treatment of sewage for reuse in parks in Delhi, status of CPCB's air pollution source apportionment study, revision of ambient air quality standards, air pollution control in Delhi and neighbouring NCR cities during winter, revision of air quality monitoring procedure by Delhi Pollution Control Committee (DPCC), and revision of current in-use vehicles emission norms.

In compliance of the Hon'ble Supreme Court order, EPCA submitted the reports on, "Outdoor Advertising Policy for Delhi (2 reports)", "CNG supply in Delhi and NCR" and the report related to lifting the cap on TSRs in Delhi - during the year to the Hon'ble court.

11.2 HEALTH CARE FACILITIES (HCF) / COMMON BIO-MEDICAL WASTE TREATMENT FACILITIES (CBMWTFS) IN NCR REGION

As a follow-up of the minutes of meeting of the Environment Pollution (Prevention and Control) Authority for the National Capital Region' on January 17, 2009, a check list of

compliance parameters in respect of Health Care Facilities (HCFs) and Common Bio-medical Waste Treatment Facilities (CBWTFs) for the purpose of monitoring the HCFs & CBWTFs located in the respective States in NCR Region was prepared and forwarded to the States/UT's in the NCR Region for monitoring compliance. CPCB monitored CBWTFs in NCR region for measurements of dioxins & furans during July –August, 2009. The monitoring results w.r.t the general parameters as well as the dioxins and furans are given below:

Table 11.1: Stack analysis of incinerators at CBWTFs in NCR Region

S. No	CBWTFs	Stack Emission Monitoring Results				Total Dioxins & Furans in ng TEQ/m³
	Parameter	PM	NO_x	HCl	CE (%)	
1.	CPCB Analysis Results (Sample 1) (with 12 % CO_2 Correction)	797.2	38.9	8.4	99.96	0.606
	CPCB Analysis Results (Sample 2) (with 12 % CO_2 Correction)	676.6	47.6	10.4	99.96	0.205
2.	CPCB Analysis Results (Sample 1) (with 12 % CO_2 Correction)	95.42	52.57	BDL	99.46	0.235
	CPCB Analysis Results (Sample 2) (with 12 % CO_2 Correction)	-	-	-	-	3.698
3.	CPCB Analysis Results (Sample 1) (with 12 % CO_2 Correction)	174.52	44.2	08	99.7	1.891
CPCB Analysis Results (Sample 2) (with 12 % CO_2 Correction)		155.40	37.6	116.6	99.9	0.405
Limits prescribed under the BMW Rules		150	450	50	99.00	-

Note: All values expressed in mg/Nm³, except Combustion Efficiency (CE) or otherwise as indicated and 12 % CO_2 correction not applicable for Dioxins and Furans

Further, monitoring of incinerators being operated by (1) AIIMS, New Delhi, (2) Hindu Rao Hospital, Delhi and (3) GTB Hospital, Delhi was conducted in December 2009 as requested by DPCC in compliance to the Delhi High Court's Order dated 28.10.2009. The monitoring results are presented below:

Table 11.2: Stack Monitoring of incinerators operated by HCFs , Delhi

HCFs	Stack Emissions Results (with CO_2 correction factor)								Remarks
	Concentration of Parameters (mg/Nm³)						Combustion Efficiency (%)		
	Particulate Matter		NOx		HCl				
Sample Number	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
HCF (1), New Delhi	315.7 (3454)	716.3 (7814.1)	11.8 (128.7)	9.2 (100.3)	1.0 (10.9)	8.6 (93.8)	73.96	86.4	Non-Complying
HCF (2), New Delhi	610.6 (4070)	1053.7 (6322.2)	23.2 (154.6)	10.5 (63)	1.8 (11.9)	-	88.96	88.35	-Do-
HCF (3), New Delhi	126.6 (1519.2)	101.7 (1356)	11.0 (132)	11.8 (157.3)	1.0 (12)	BDL	81.7	95.31	-Do-

11.3 ENVIRONMENT SURVEILLANCE PROGRAM (ESS)

The Environment Surveillance Program (ESS) has classified zones for surprise inspection, categorized regions under each zone & created database of industrial units under the identified 17 categories of industries for each of the different regions. The regions & units are identified through a computerized system for random number generation on a monthly basis. Inspection of 2-4 units per zone is done every month. The list of units to be visited is communicated to the team leader on the day of inspection after reaching the region (hence it is a surprise inspection). The inspection reports are forwarded to HQ by the Zonal Officers along with their recommendations for each unit. The inspections carried out under ESS in the year 2009-10 and the Directions issued under Section 5 of the Environment (Protection) Act, 1986 & Section 18(1)(b) of Air (Prevention & Control of Pollution) Act, 1981/Water (Prevention & Control of Pollution) Act, 1974 are given below.

Table 11.3: Environment Surveillance Program (ESS) - 2009-10

No. of Industries inspected under ESS in year 2009-10	248
No. of directions issued under Section 5 of Environment (Protection) Act, 1986	19 (out of these 6 are for closure)
No. of directions issued under Section 18(1)(b) of Air/Water Acts	32

11.4 COMPREHENSIVE ENVIRONMENTAL POLLUTION INDEX (CEPI)

The Ministry of Environment & Forests (MoEF) has adopted a Comprehensive Environmental Pollution Index (CEPI) system of environmental assessment of the Industrial Clusters, evolved by the Central Pollution Control Board in collaboration with IIT, Delhi.

For the first time, Comprehensive environmental assessment has been done by CPCB & MoEF for the 88 prominent Industrial clusters of the country on the basis of Comprehensive Environmental Pollution Index (CEPI) number. The present CEPI system is intended to be used as an early warning tool for

categorizing industrial clusters/areas in terms of the severity of the overall pollution levels. The features of CEPI are summed below:

1. CEPI may be used as a tool in synthesizing the available information on environmental status of areas by using quantitative criteria and its ability to reduce complex information into smaller and more easily retained information.
2. CEPI could help in determining the effectiveness and comparing alternate plans and policies and assist decision-makers in initiating appropriate measures in grading polluted / polluting industrial clusters.

An increasing value of CEPI indicates severe adverse effects on environment as well as an indication of a large proportion of population experiencing health hazards. 88 polluted industrial clusters/ problem area were identified by CPCB in consultation with Ministry of Environment & Forests for applying the Comprehensive Environmental Pollution Index (CEPI). A workshop was held on December 24, 2009 on "Comprehensive Environmental Pollution Index (CEPI) for Industrial Clusters" wherein the Hon'ble Minister released the two CPCB reports entitled

- ✓ "Criteria for Comprehensive Environmental Assessment of Industrial Clusters"
- ✓ "Comprehensive Environmental Assessment of Industrial Clusters"

The highlights of the above workshop were :

1. The industrial clusters having CEPI score of 80 and above shall be considered as Very Critically/ Alarmingly Polluted industrial clusters,
2. The industrial clusters with CEPI score of 70 and above but less than 80 shall be considered as Critically Polluted industrial clusters.
3. The industrial clusters with CEPI score of 60 and above but less than 70 shall be considered as Severely Polluted industrial clusters
4. The industrial clusters with CEPI score of 50 and above but less than 60 shall be considered as Warning Zone industrial clusters.
5. Concerned SPCBs/ PCCs to prepare Action Plans for abatement of pollution for 10 Very Critically polluted industrial clusters and 33 critically polluted industrial clusters.

It has been decided that establishment of new industries or further capacity expansion of the existing industries shall not to be permitted in the Very Critically/ Critically polluted industrial clusters and for addressing the problems related to pollution control and infrastructure, matter will be taken up for allocation of separate funds as "Clean Up fund" in the next Budget. The need for regular review of CEPI assessment for the selected industrial clusters, once in two years along with assessment of health impact of pollution on population in vicinity in co-ordination with Public Health Foundation of India (PHFI) was emphasized.

Based on the ranking, Action Plans are under preparation for each industrial cluster having CEPI score more than 70 on priority. Table 11.4 shows the state-wise distribution of critically polluted industrial clusters with CEPI scores more than 70:

Table 11.4: State-wise distribution of critically polluted industrial clusters

S. No	State	No. of Industrial Cluster	Criticall Polluted Industrial Cluster & CEPI
1	Gujarat	6	Ankleshwar (88.50), Vapi (88.09), Ahmedabad (75.28), Vatva (74.77), Bhavnagar (70.99), Junagarh (70.82)
2	Maharashtra	5	Chandrapur (83.88), Dombivalli (78.41), Aurangabad (77.44), Navi Mumbai (73.77), Tarapur (72.01)
3	Uttar Pradesh	6	Ghaziabad (87.37), Singrauli (81.73), Noida (78.90), Kanpur (78.09), Agra (76.48), Varanasi-Mirjapur (73.79)
4	Punjab	2	Ludhiana (81.66), Mandi Gobindgarh (75.08)
5	Haryana	2	Faridabad (77.07), Panipat (71.99)
6	Delhi	1	Najafgarh-Drain basin (79.54) including Anand Parbat, Naraina, Okhla, Wazirpur
7	Chhattisgarh	1	Korba (83.00)
8	Rajasthan	3	Bhiwadi (82.91), Jodhpur (75.19), Pali (73.73)
9	Madhya Pradesh	1	Indore (71.26)
10	Orissa	3	Angul Talcher (82.09), Ib-Valley (74.00) Jharsugula (73.34)
11	West Bengal	3	Haldia (75.43), Howrah (74.84), Asansol (70.20)
12	Jharkhand	1	Dhanbad (78.63)
13	Tamil Nadu	4	Vellore -North Arcot (81.79) , Cuddalore (77.45), Manali (76.32), Coimbatore (72.38)
14	Kerala	1	Greater Kochin (75.08)
15	Karnataka	2	Mangalore (73.68), Bhadravati (72.33)
16	Andhra Pradesh	2	Vishakhapatnam (70.82), Pattencherru-Bollaram (70.07)

It has been recommended that as the next step a comprehensive analysis of spatial and temporal data shall be done for the identified critical polluted industrial clusters/ areas so as to define the spatial boundaries and extent of damage to the eco-geological features. The outcome shall be subjected to structured consultation with the

stakeholders for determining comparative effectiveness of alternative plans and policies for pollution control and remedial measures. The effective implementation of the remedial action plan will help in abatement of pollution and to restore the environmental quality of these industrial clusters.

CPCB commissioned a study in collaboration with NEERI in December 2008 for a study on Wastewater Management from Textile sector in Tirupur. The overall objective of the study was to assess various treatment technologies based on zero effluent discharge and the scope of work included waste water sampling and characterization of selected industries and assessment of pollution load also delineation of proposed treatment schemes for common effluent treatment plants (CETPs) based on assessment studies with action plan w.r.t. time & budget requirement.

11.5 SURVEILLANCE OF T.S.D.F

In order to improve operation of TSDFs in an environmentally safe manner, Central Pollution Control Board issued direction under Section 5 of the E(P) A 1986 to the TSDFs located at following locations:

i. Taloja, Mumbai;
ii. Hyderabad;
iii. Ankaleshwar;
iv. Pithampur (Indore)
v. Nagpur

Time bound action plans was imposed on these facilities to improve storage of waste and operation of incinerator and secured landfill.
Bank guarantee was obtained from three of the above facility operators. Regular visits were conducted at these facilities to assess compliance of the directions. Improvement was observed at these facilities and up-gradation is in various stages of development.

Activities undertaken for effective Hazardous Waste Management:

i. Inspection of five TSDFs & follow up of directions u/s 5 of the EPA;
ii. Compile status of hazardous waste dumpsites
iii. Reconstituted Expert Committee on HW dumpsites & preparation of draft report on HW dumpsites for submission to Supreme Court
iv. Constitution of in house committee for reuse / co processing of HW under the Rule 11 of the HWM Rules. Grant permissions for reuse / co-processing of HW to

all possible applicants as well as exploring opportunities for reuse / co-processing from other industries too.

v. Preparation Road Map for HW management ;

vi. Preparation of two reports pertaining to disposal of Union Carbide India Ltd (UCIL) Waste as per direction of the Supreme Court ;

vii. Compilation of TSDF data

11.6 BIOMEDICAL WASTE MANAGEMENT - DIRECTIONS UNDER SECTION 5 OF THE ENVIRONMENT (PROTECTION) ACT, 1986

Directions under Section 5 of Environment (Protection) Act, 1986 were usual to the defaulter CBWTFS and verification of compliance Act conducted as per following records:

- ✓ M/s. SembRamky Environment Management Pvt. Ltd., Ghaziabad-a joint visit of Central Pollution Control Board (CPCB), & Regional Office, Uttar Pradesh Pollution Control Board (UPPCB), Ghaziabad was done on 10.07.2009, 2108.2009 & 17.11.2009 AND revoking compliance orders issued vide letter dated November 30, 2009.
- ✓ On receipt of a complaint from the public, inspection in the one CBWTF located at Mathura Dt., UP was done & directions under Section 5 of E (P) Act, 1986 was issued vide letter dated February 16, 2010 for violations of the provisions.
- ✓ Follow-up of compliance of directions under Section 5 of E (P) Act in case of M/s Bio-Genetic Laboratory Pvt. Ltd. (earlier known as M/s Global Incineration Services, Dhanbad) was undertaken.
- ✓ Based on the inspection reports received from Zonal Office, Bangalore and Zonal Office, Bhopal, directions under Section 5 of the Environment (Protection) Act, 1986 were issued to

  - M/s. Maridi Eco Industries Pvt. Ltd., Ananthapur, AP
  - M/s. Shree Consultants, Mysore, Karnataka
  - M/s. SembRamky Environmental Management Pvt. Ltd, Bangalore
  - M/s. Hoswin Incinerators, Indore in MP respectively.

As per recommendations of the Rajya Sabha Sub-ordinate Legislation Committee on Bio-medical Waste Management, all the Zonal Offices of CPCB were directed vide letter dated December 01, 2009 to take up assessment of at least three CBWTFs and six HCFs once in quarter for units under their jurisdiction & to submit the reports and follow-up on show-cause / direction issued to the defaulter CBWTFs under Section 5 of

the Environment (Protection) Act, 1986 Summary of actions taken so far is presented in table 11.5.

Table 11.5: Biomedical waste management - Status of Show-Cause / Directions under Section 5 of the Environment (Protection) Act, 1986

S. No.	Name CBWTF	Show-cause Notice/Direction	Date of Issue of Directions/ modified Directions	Implementation Status
1.	M/s. SembRamky Environmental Management (P) Ltd., Ghaziabad.	Revoked Direction on 30.11.2009	25.03.2008	Complied.
2.	M/s Global Incineration Services, Dhanbad, Jharkhand.	Issued Closure Direction	09.04.2008	Compliance to the direction under progress
3.	M/s Shree Consultants, Mysore, Karnataka.	Issued Modified direction	14.05.2010	Compliance to the Direction under progress.
4.	M/s Hoswin Incinerator, Indore	Show-cause Direction u/s 5 of EPA	29.01.2010	Compliance to the directions under progress
5.	M/s SembRamky Environmental Management Pvt. Ltd., Dasbsapet, , Bangalore	Show-cause Direction u/s 5 of EPA	01.12.2009	Compliance to the directions under progress
6.	M/s. Bio-medical Waste Disposal Agency & M/s Private Doctors Association, Aligarh, Vil. Pandava Tehsil. Mat, Distt.-Mathura (U.P.)	Show-cause Direction u/s 5 of EPA	16.02.2010	The unit has been required to submit time-bound action plan

11.7. 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES

A 15-point programme, for priority action was formulated by the Ministry of Environment and Forests (MoEF) for the seventeen categories of highly polluting industries and covered under Central Action Plan. The programme is rigorously

followed by the Central Pollution Control Board. The status of these industries is compiled regularly based on the information obtained from the SPCBs and PCCs.

Table 11.6: Status of 17 categories of industries

S.No.	Type of Industries	Complying	Defaulting	Closed	Total
1	Aluminium	8	__	__	8
2.	Cement				
	✓ Large (> 200T/D)	63	5	8	76
	✓ (< 200 T/D)	112	17	72	201
3	Chlor-Alkali	27	1	4	32
4	Copper	5	__	__	5
5	Distillery	175	29	37	241
6	Dyes & Intermediates	62	3	30	95
7	Fertilizer	79	7	38	124
8.	Iron & Steel				
	✓ Integrated Iron & Steel	10	2	4	16
	✓ Sponge Iron	46	1	6	53
9	Oil Refineries	19	__	3	22
10	Pesticides	61	18	27	106
11	Petrochemicals	44	1	11	56
12	Pharmaceuticals	291	32	76	399
13	Pulp & Paper	104	33	47	184
14	Sugar	377	69	84	530
15	Tannery	103	8	38	149
16	✓ Thermal Power Plant	181	25	20	226
	✓ Captive Thermal Power Plant	18	2	__	20
17	Zinc	6	__	__	6
	Total	**1791**	**253**	**505**	**2549**

Table 11.7: State wise status of 17 categories of industries

S. No.	State/ Union Territory	Complying	Defaulting	Closed	Total
1	Assam	19	2	__	21
2	Andhra Pradesh	305	8	52	365
3	Bihar	17	1	28	46
4	Chhattisgarh	70	5	__	75
5	Goa	9	__	2	11

S. No.	State/ Union Territory	Complying	Defaulting	Closed	Total
6	Gujarat	142	53	60	255
7	Haryana	82	14	34	130
8	Himachal Pradesh	12	2	2	16
9	Jammu & Kashmir	7	__	3	10
10	Jharkhand	22	__	5	27
11	Karnataka	119	9	12	140
12	Kerala	25	9	15	49
13	Madhya Pradesh	42	18	5	65
14	Maharashtra	237	8	69	314
15	Meghalaya	8	4		12
16	Mizoram	1	__	__	1
17	Orissa	38	7	8	53
18	Punjab	54	5	18	77
19	Rajasthan	80	4	75	159
20	Tamil Nadu	191	___	32	223
21	Tripura	8	1	__	9
22	Uttranchal	21	17	2	40
23	Uttar Pradesh	219	71	58	348
24	West Bengal	54	10	21	85
25	Chandigarh	__	__	1	1
26	Daman	2	__	__	2
27	Delhi	2	3	__	5
28	Pondichery	4	2	3	9
	Total	1791	253	505	2549

11.8 GLOSSLY POLLUTING INDUSTRIES ALONG THE RIVERS AND LAKES

A programme was initiated by Central Pollution Control Board in 1993-94 to identify polluting industries discharging effluent into rivers/lakes/waterbodies for priority actions for control of industrial discharges into rivers. While this process of inventorisation continued, the National River Conservation Authority (NRCA) in its meeting held on July 12, 1997 under the Chairmanship of the Hon'ble Prime Minister, decided that the polluting industries which are discharging their effluents into rivers and lakes should be directed to install effluent treatment systems within three months, failing which closure notices should be issued. Accordingly, the Chairman, Central Pollution Control Board at the instance of MoEF issued directions under Section 18(1)(b) of The Water (Prevention & Control of Pollution) Act, 1974, to all the SPCBs / PCCs on July 14, 1997, requiring them to inventorise the list of Grossly Polluting Industries

(industries discharging 100 kg per day or more of BOD load) and take necessary action against the defaulting industries.

The programme is being continued since then, and the monitoring of the progress includes feedback from the SPCBs/PCCs and action is also being taken against the industries by Central Pollution Control Board in cases needing special attention. The status of grossly Polluting Industries in various states and Union Territories are summarized below.

Table 11.8: GROSSLY POLLUTING INDUSTRIES (as of March 31, 2010)

S.No	STATE /UT	Total	Complying	Closed	Defaulting
1.	Andhra Pradesh	17	11	6	-
2.	Assam	9	9	-	-
3.	Bihar	22	16	6	-
4.	Chhattisgarh	1	1	-	-
5.	Gujarat	17	12	4	1
6.	Haryana	76	71	1	4
7.	Jharkhand	38	38	-	-
8.	Karnataka	10	8	1	1
9.	Kerala	36	18	7	11
10.	Madhya Pradesh	1	-	-	1
11.	Maharashtra	214	139	2	73
12.	Orissa	20	12	5	3
13.	Pondicherry	1	-	-	1
14.	Punjab	34	21	4	9
15.	Tamil Nadu	366	248	118	-
16.	Uttar Pradesh	432	294	89	49
17.	Uttarakhand	45	25	4	16
18.	West Bengal	54	25	22	7
19.	DD & DNH	2	2	-	-
TOTAL		1393	948	269	176

11.9 INVENTORIZATION of RED CATEGORIES OF INDUSTRIES

A project was awarded to Environmental Management and Policy Research Institute, Bangalore for Inventorisation of all Red categories of Industries in Karnataka Region. So far data for 2700 for large industries in Bangalore and in other districts of Karnataka have been inventorised. Data on the Corporate Responsibility for Environmental Protection (CREP) was also being collected, so far 132 highly polluting industries have been inventorized.

All state Pollution Control Boards have been directed to update the information of Red category of industries so that a comprehensive document could be compiled.

11.10 MANAGEMENT OF SILT WITH RESPECT TO BSL PROJECT OF BBMB FOR THE YEAR 2004-2008

In compliance to the orders of Hon'ble High Court of Himachal Pradesh, dated June 26, 2006, the Expert Committee continued monitoring of implementation of Action Plan. Accordingly, reports for the monsoon period of 2004 & 2005, 2006, 2007 & 2008 were prepared and submitted in the Hon,ble High Court. Based on the studies of the last five years, the major findings as compiled in 2009-10 are :

1. Sediment load dredged in the Suketi khad by dredging operation from Balancing Reservoir has been carried through Dadour site.
2. The X section of Suketi khad has shown degradation and erosion in the khad bed which was due to heavy floods.
3. The sediment-laden flow of Suketi has not significantly affected the concentration of silt in Beas River at Mandi.

There is no appreciable change in the levels of adjoining agricultural fields on both sides of the Suketi Khad. However, deposition in the adjoining agricultural fields in certain reaches observed was due to the heavy and unprecedented rain/floods in the region

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CHAPTER - XII

FINANCE AND ACCOUNTS

INSERTION OMITTED

CHAPTER - XIII

ANNUAL ACTION PLAN FOR THE YEAR 2010 - 11

13.1 INTRODUCTION

Central Pollution Control Board (CPCB) constituted under the Water (Prevention and Control of Pollution) Acts, 1974 is a 100% Grant-in-aid institution of the Ministry of Environment and Forests (MoEF), Govt. of India. CPCB serves as a technical wing of MoEF and co-ordinates with the State Pollution Control Boards (SPCBs)/ Pollution Control Committees (PCCs) for implementation of action plans and programmes relating to abatement of pollution. Project or / and programmes are executed through in-house efforts and jointly with of Institutes like IITs, Engineering Colleges, Universities and R & D Institutions. In addition to the implementation of the Water and Air Acts, CPCB has planned various programmes relating to implementation of Rules framed under the Environment (Protection) Act, 1986 such as Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, Bio-medical Waste, Municipal Solid Wastes, Plastics Waste, E-waste guidelines etc.

The programmes identified for 2010-11 are formulated based on the thrust areas identified by the Ministry of Environment and Forests under the National Environment Policy (NEP), 2006 and also as per the issues raised by the State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs).

13.2 ACHIEVEMENTS OF 2009-2010

- Water Quality Monitoring is being monitored at 1465 stations.
- Ambient air quality is being monitored at 365 locations.
- Continuous ambient air quality is being monitored at 24 location covering 9 cities.
- Performance monitoring of Sewage Treatment Plants (STPs) have been carried out in selected locations.
- Performance monitoring of few Common Effluent Treatment Plants (CETPs).
- Assessment of Hazardous Air Pollutants (HAPs) in chemical industrial zones.
- Remedial measures have been suggested at some contaminated Transport, Storage and Disposal Facility (TSDF) sites.
- Inventory of Hazardous Waste Industries.
- Monitoring compliance of Common Bio-medical Treatment Facilities.
- Implementation of Municipal Solid Waste (MSW) Rules, 2000 in States and Union Territories.
- Monitoring Programmes of implementation in MSW demonstration projects.
- Preparation of Road Map for MSW Management.

- Implementation of Plastic, Manufacture, Sale and Usage Rules in States and Union Territories.
- Published several documents as listed out in Chapter IX (Annexure -VIII) including the reports on "Ganga Water Quality Trends" and "Criteria for Comprehensive Assessment of Industrial clusters", identified 88 super-critical & critical problem areas of industrial clusters.
- New National Ambient Air Quality Standards (NAAQS) notified.
- Twenty-two (22) Cement Industries have been permitted for co-processing of Hazardous (Waste tyre chips, paint sludge, plastic waste. TDI Tar, Refinery Sludge and ETP Sludge from a particular industry.) & plastic waste.
- Surveys / inspections under Environment Surveillance Squad (ESS) programme, 17 categories of highly polluting industries.

13.3 THRUST AREAS FOR 2010-11

- Strengthening of the Water Quality Monitoring network.
- Strengthening of the Ambient Air Quality Monitoring network.
- Extending the continuous Ambient Air Quality Monitoring network
- Up-gradation of four Zonal Office laboratories at par with Head Office.
- Digitization of pollution related information.
- Development of GIS based information system for Environment Clearance (EC) and Environment Impact Assessment (EIA).
- Assessment of Green House Gase emissions in power plants, vehicles and industries.
- Ensuring compliance in 17 categories of highly polluting industries.
- Major thrust on research & development activities for abatement of pollution.
- Promoting clean technology processes in highly air polluting industries like Coke-Oven Plants, Sponge Iron Plants, and Thermal Power Plants etc.
- Implementation of Municipal Solid Waste (MSW) Rules, 2000 in States and Union Territories.
- Implementation of Plastic, Manufacture, Sale and Usage Rules 1999, as amended in 2003 in States and Union Territories through Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs and demonstration of plastic waste in road construction.
- Monitoring of compliance in CETP, STP, CBMTF, TSDF etc.
- Inventorisation of E-Waste generation in the country.
- Inventorisation of red categories of highly polluting industries will be carried out.
- Preparation of Action Plan for 43 critically polluted areas (CPAs).
- Initiation of studies for Hydro-geological interceptions to recharge ground water to maintain minimum water flow will be carried out.
- Bio-remediation of contaminated TSDF sites will be initiated.
- Bio-mimetic sequestration of CO_2 into Calcium Carbonate using immobilized enzyme and whole cell bio-reactor will be taken-up.

- Pollution control management in distilleries, tanneries, pulp & paper industries
- Implementation of road map for disposal of plastic waste and MSW.
- Inventorisation of Bio-medical Waste, Hazardous Waste, Plastic Waste, Battery Waste generation in major cities in India.
- Co-processing of hazardous and plastic waste in Cement Kilns will be encouraged.

13.4 BUDGET ALLOCATION FOR 2010-11

The allocation made against each major Project Head is summarized as under:

Table 13.1: Budget 2010-11

S.No.	Project Heads	Allocation (Rs. in Lakhs)		
		Head Office	Zonal Offices	Total
I	Pollution Assessment-Survey & Monitoring	820.00	172.50	992.50
II	Lab Management	500.00	219.50	719.50
III	Development of Standards and Guidelines	266.90	Nil	266.90
IV	Training	70.00	21.50	91.50
V A	Information (Database) Management	100.00	27.50	127.50
V B	Library	16.00	4.50	20.50
VI	Pollution Control Enforcement	952.30	539.50	1491.80
VII	Pollution Control Technology	88.80	2.00	90.80
VIII	Mass Awareness, Publications & NGO Activities & Hindi (Raj-bhasha)	73.00	8.50	81.50
IX	Hazardous Waste Management	113.00	4.50	117.50
	TOTAL	3000.00	1000.00	4000.00

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CHAPTER XIV

OTHER IMPORTANT ACTIVITIES BY CPCB

14.1 PERFORMANCE OF SEWAGE TREATMENT PLANTS (STPs)

14.1.1 Performance of STPs in India

The performance evaluation of STPs in India were assessed based on questionnaires circulated to all the agencies responsible for their O&M. The data for 13 States were compiled, the main observations are given below :

- ✓ Delhi with 31 STPs has the hightest capacity for treatment of 3762 MLD of sewage;
- ✓ Different technologies like activated sludge process, trickling filter, oxidation pond & submerged aerobic fixed film (SAFF) are being adopted.
  - 60 STPs have activated sludge process being : Delhi (22), Gujarat (8), Tamil Nadu (8) and Maharashtra (10) .
  - 19 UASB based STPs : Haryana (8) and Uttarakhand (4).
- ✓ State-wise break-up of operational STPs along with their treatment capacities and methods / technologies adopted is provided below :

Table 14.1: State-wise summary of STPs

S. No.	State	STPs Nos.	Treatment Capacity (in MLD)	STP Process/Technology
1	Delhi	31	3762	Activated Sludge Process, Trickling filter, Oxidation pond & SAFF
2	West Bengal	22	296	Activated Sludge Process, Trickling filter, Oxidation pond & Waste Stablization Pond
3	Gujarat	15	1073	Activated Sludge Process, Facultative Lagoon, & Up flow anaerobic sludge blanket
4	Bihar	8	107	Activated Sludge Process, Aerated lagoon & Oxidation pond.
5	Orissa	3	53	Oxidation pond & Waste Stablization Pond.
6	Haryana	13	312	Upflow anaerobic sludge blanket, Oxidation pond
7	Uttar Pradesh	23	1240	Oxidation pond, Upflow anaerobic sludge blanket, Agro-Forestry
8	Uttarakhand	6	18	Activated Sludge Process, Waste

S. No.	State	STPs Nos.	Treatment Capacity (in MLD)	STP Process/Technology
				Stabilization Pond., Anaerobic Filter
9	Maharashtra	15	4225.25	Activated Sludge Process, Aerated lagoon Up flow anaerobic sludge blanket & C-Technology
10	Tamilnadu	13	333.42	Activated Sludge Process, Up flow anaerobic sludge blanket, Waste Stabilization Pond & Oxidation Pond
11	Karnataka	01	12	Aerated Lagoon
12	Andhra Pradesh	13	654	Activated Sludge Process, Up flow anaerobic sludge blanket, Oxidation pond, & Waste Stabilization Pond.
13	Goa	01	9.6	C-Technology

14.1.2 STPs Monitored in Haryana, U.P. And Delhi

Performance evaluation of five STPs in Haryana, U.P. and Delhi under Yamuna Action Plan – NRCD Project was undertaken. Out of the five STPs three STPs are in Haryana, two in Faridabad and on in Gurgaon one STP is in Agra, U. P. and one STP is in Delhi. Out of these four STP's four are based on Upflow Anaerobic Sludge Blanket (UASB) treatment process, while one is based on physico-chemical treatment followed by aerobic treatment system. STPs performance study indicated significant BOD reduction at Sen Nursing Home STP with minimum fluctuation. The three STPs located in Haryana State and one at Agra in UP were found operating below capacity at most of the times.

Table 14.2 : Performance of STPs under Yamuna Action Plan (YAP)

S. No.	STP		Parameters (January, 2009 to December, 2009)						
			BOD mg/l (Avg.)	COD mg/l (Avg.)	Suspended Solid mg/l (Avg.)	Total Coliform Nos./100 ml		Faecal Coliform Nos./100 ml	
						Minimum	Maximum	Minimum	Maximum
HARYANA STATE									
1	Faridabad Zone I STP 2O MLD	Inlet	135	413	367	7,70,00,000	10,10,00,00,000	98,00,000	59,00,00,000
		Outlet	50.0	171	54	89,00,000	50,00,00,000	2,10,000	3,10,00,000
2	Faridabad Zone II STP 45 MLD	Inlet	150	507	427	17,70,00,000	11,50,00,00,000	1,50,00,000	95,00,00,000
		Outlet	81	219	268	63,00,000	5,30,00,00,000	16,30,000	49,00,00,000
3	Gurgaon STP 30 MLD	Inlet	312	876	556	4,40,00,000	18,20,00,00,000	1,26,00,000	1,95,00,00,000
		Outlet	74	245	71	14,00,000	1,29,00,00,000	2,10,000	10,10,00,000
DELHI									
4	Sen Nursing Home STP 10 MLD	Inlet	163	417	347	12,30,00,000	6,10,00,00,000	77,00,000	1,65,00,00,000
		Outlet	7	26	21	23,00,000	23,00,00,000	2,30,000	3,40,00,000
UTTAR PRADESH									
5	Dhandupura STP 78 MLD	Inlet	117	370	218	32,00,00,000	6,80,00,00,000	2,80,00,000	58,00,00,000
		Outlet	53	184	41	25,00,000	17,50,00,000	3,60,000	1,61,00,000

14.1.3 STPs monitored by CPCB Zonal Office , Bhopal

Four STPs were monitored the data & discussions are given below :

✓ Indore (MP) :
- 78 MLD-STP, : period - 2009)
- 12 MLD-STP, : period - 2009)

✓ Jaipur (Rajasthan) :
- 27 MLD STP Jalmahal
- 62.5 MLD STP Delawas

Table 14.3: Analysis Report: 78 MLD-STP, Indore (M.P)

S No	Location	Date	Nature	pH	TS	TDS	COD	BOD	Cl	O&G
01	Inlet of STP	18.11.09	Grab	7.21	1066	938	188	52	155	-
		19.11.09	Grab	7.29	980	928	204	82	162	05
		Composite		7.39	1006	946	177	69	180	-
02	UASB reactor outlet	18.11.09	Grab	7.32	1008	978	96	26	16	-
		19.11.09	Grab	7.32	978	942	104	31	157	-
		Composite		7.22	922	948	92	24	143	-
03	Aeration tank outlet	18.11.09	Grab	7.29	852	802	79	32	140	-
		19.11.09	Grab	7.29	914	892	90	20	138	-
		Composite		7.30	982	888	69	22	172	-
04	Final outlet	18.11.09	Grab	7.33	876	858	69	22	147	-
		19.11.09	Grab	7.31	889	874	89	24	135	BDL
		Composite		7.11	888	868	61	18	151	-
Percentage Removal		Composite		---	12	09	66	74	---	---

All Value except pH are in mg/l

Table 14.4: Analysis Report of 12 MLD-STP, Indore (M.P)

S No	Location	Date	Nature	pH	TS	TDS	COD	BOD	Cl	O&G
01	Inlet of STP	18.11.09	Grab	7.03	1096	982	185	73	158	-
		19.11.09	Grab	7.06	1048	958	190	61	120	BDL
		Composite		7.09	1228	1094	210	82	129	-
02	UASB reactor outlet	18.11.09	Grab	7.22	928	831	85	33	132	-
		19.11.09	Grab	7.11	1024	938	80	26	125	-
		Composite		7.25	1198	1082	93	22	133	-
03	Aeration tank outlet	18.11.09	Grab	7.31	1050	956	58	18	160	-
		19.11.09	Grab	7.17	1064	980	71	19	135	-
		Composite		7.31	1076	974	83	31	140	-
04	Final outlet	18.11.09	Grab	7.22	854	840	63	23	120	-
		19.11.09	Grab	7.23	898	880	76	20	124	BDL
		Composite		7.29	700	688	69	16	112	-
Percentage Removal		Composite		---	43	37	67	80	---	---

All values are in mg/l except pH.

STP Jaipur: RUIDP constructed two conventional STPs at Jalmahal 27 MLD capacity and Delawas 62.5 MLD in Jaipur for treating the sewage from city under ADB funding. The third STP of 50 MLD capacity at Jaisingh-khor for treating the sewage from Bramhapur and the fourth 62.5 MLD STP at Delawas for treating the Jaipur south wastewater including Sanganer industrial wastewater was in commissioning stage. The Jaipur Development Authority has constructed 7.5 MLD capacity Tertiary Treatment Plant (TTP) attached to 27 MLD plant at Jalmahal for feeding into the Jalmahal. The plants are being run by RUIDP.

A. 27 MLD STP at Jalmahal, Jaipur : The CPCB, Zonal Office, Bhopal collected grab and composite samples from 27 MLD STP at Jalmahal on 23.01.2010 for verifying the compliance status, the observations are as follows .

1. The treatment system comprises of course & fine screens, grit chamber, diffused aeration, sludge thickner, centrifuge and secondary clarifier.
2. Hindustan Dorr-Oliver Ltd(HDOL) is operating the 27 MLD STP at Jalmahal and and commissioning the 50 MLD STPs Jaisingh Khor, respectively.
3. The had reddish brown colour due to washing of dyes etc. Flow remained same in the morning and evening. Floating matter was observed in the aeration tank. All the 46 diffused aeration pipes were in operation at the time of monitoring. Thickeners and centrifuge was in operation. No collection and equalization tank have not been provided.
4. During visit the Inlet flow was 2,227m^3/hour.
5. Polyelectrolyte dosing is done in thickeners for increasing the settling rate. The thickened sludge was being pumped into the centrifuges and the decanted sludge cake given to farmers for use as manure.
6. Final outlet discharge pipe diameter is less due to which backflow was occurring in the secondary clarifier, thereby disturbing the settling process.
7. The analysis results indicated that all the measured values were within the norms.

Recommendations:

1. Equalization and holding tank are required to be constructed ;
2. Holding tank for storing the final treated wastewater needs to constructed. The diameter of pipe for discharge of effulent need to be increased to avoid free flow of treated water into the nallah.
3. An in-house laboratory should be developed for analysis of routine parameters.

B. 62.5 MLD of STP Delwas, Jaipur - The STP was commissioned on 15.02.2006 for treating the sewage from southern part of Jaipur city. The STP was constructed by RUIDP and thereafter handed over to JMC (Jaipur Municipal Corporation) for operation. The treatment system has coarse & fine screens, grit separators, primary clarifiers,

diffused aeration, secondary clarifiers, sludge thickener, centrifuge, sludge digesters and gas holders. The construction work for Phase-II (62.5 MLD STP) was under progress in the same premises and the new plant is proposed to be commissioned in March 2010.

i. The STP has two 500 KVA gas generator sets using digester gas as fuel for power generation for running the diffused aeration and other instruments. High noise levels from operation of these generator sets were observed during of inspection.
ii. The consent under Water Act expired on 31.01.2010 and the operator had applied for renewal.
iii. The STP has developed laboratory facilities for analysis of routine parameters and records are satisfactorily maintained. During visit, the inlet flow was noted as 63 MLD. The treated water is discharged into the Amanishah Nallah. It was noted that industrial effluent from Sanganer Industrial Area was also being mixed with the treated sewage. The analysis report indicated compliance for all parameter except for oil & grease (O&G).

14.1.4 STPs on river Ganga monitored by CPCB Zonal Office ,Lucknow

The monitoring was undertaken at five STPs located on River Ganga in the river stretch from Allahabad to Tarighat (Gazipur) under NRCD, MoEF program during April 2009-March 2010.

Table 14.5: STPs on River Ganga between Allahabad to Tarighat (Gazipur)

STP	Place	Type	Capacity (MLD)	Operating Agency	Date of Commissioning
Mirzapur	Mirzapur	UASB	14	U. P. Jal Nigam	31.01.95
Allahabad	Allahabad	ASP	60	U.P. Jal Nigam	June-July 1999
Bhagwanpur BHU)	Varanasi	ASP	8	U.P. Jal Nigam	31.01.90
Dinapur	Varanasi	ASP	80	U.P. Jal Nigam	31.01.95
DLW	Varanasi	ASP	12	DLW	31.01.89
Allahabad	Allahabad	FAB	29	U.P. Jal Nigam	January 2008

1. STP Diesel Locomotive Workshop (DLW), Varanasi

a. One aeration tank and one secondary settling tank have been out of order for over the two years. The plant was operating level below the designed capacity as sewage was being received only for a few hours in the morning and in evening

only. Aerators were not properly maintained, digestors reported to be inefficient, the gas holder being out of order. Power failures resulted in by-pass of untreated sewage regularly.

b. The plant in general lacks proper maintenance.

Table 14.6: Performance of DLW-Varanasi STP

Sr. No.	Period	Hydraulic Load (MLD)	Dissolved Oxygen (mg/l)		AT-1 (mg/l)		Removal Efficiency of STP (%)		
			AT-1	AT- 2	MLSS	MLVSS	SS	BOD	COD
1	Apr-09	6.56	-	-	1660	996	76	66	80
2	May-09	6.12	-	-	530	200	70	95	59
3	June-09	6.9	-	-	1356	1133	64	42	63
4	July-09	6.9	-	-	1850	1200	42	41	42
5	Aug-09	4.73	-	-	829	258	69	69	59
6	Sep-09	11	-	-	1198	550	42	75	59
7	Oct-09	7.44	-	-	2850	1095	53	70	70
8	Nov-09	11	-	-	1426	501	50	39	54
9	Dec-09	9.0	-	-	1633	673	39	62	65
10	Jan-10	-	-	-	-	-	89	76	71
11	Feb-10	6.8	NT	NT	331	209	71	76	69
12	Mar-10		NT	NT	1623	837	88	68	60

2. STP Bhagwanpur, Varanasi

a. STP was operating above installed capacity , it was receiving sewage from BHU Township. During power failure, the STP and pumping stations are not operating, resulting in by-pass of untreated sewage.

b. The plant lacks proper maintenance

Table 14.7: Performance of Bhagwanpur-Varanasi STP

Sr. No.	Period	Hydraulic Load (MLD)	Dissolved Oxygen (mg/l)		AT-1(mg/l)		AT 2 (mg/l)		Removal Efficiency of STP (%)		
			AT-1	AT- 2	MLSS	MLVSS	MLSS	MLVSS	SS	BOD	COD
1	Apr-09	10.59	-	-	566	374	2061	731	86	70	84
2.	May-09	4.68	1.0	-	2169	954	-	-	83	74	79
3.	June-09	9.84	-	-	2167	1800	2740	2270	89	73	78
4.	July-09	11.6	-	-	4261	2700	-	-	84	84	85
5.	Aug-09	5.88	-	-	3229	2526	1108	855	67	82	73
6.	Sep-09	13.4	1.05	-	3563	1136	2117	1417	29	13	23
7.	Oct-09	11.7	1.05	-	4499	2309	4899	2583	78	90	87
8.	Nov-09	11.98	0.5	-	501	246	-	-	88	88	89
9.	Dec-09	11.31	-	0.5	-	-	240	158	75	51	61
10.	Jan-10	-	-	-	-	-	-	-	-	-	
11.	Feb-10	11.17	NT	0.5	2382	1407	3255	1760	93	86	89
12.	Mar-10	2.5	NT	NT	2178	1370	1988	673	78	79	2.5

3. STP Dinapur, Varanasi

a. Most of the treatment units were operating. Digesters were functioning satisfactorily and the gas generated was stored in the two gas holders. The plant has a provision to operate on generator-sets using mixture of gas produced in STP and diesel.

b. However during power failure, the STP and pumping stations failed to operate resulting in by-pass of untreated sewage.

Table 14.8: Performance of Dinapur-Varanasi STP

S. No	Period	Installed Capacity (MLD)	hydraulic Load (MLD)	DO (Mg/l)			Removal Efficiency of STP (%)		
				AT-1	AT-2	AT-3	SS	BOD	COD
1	Apr-09	80 MLD	67.44	-	-	-	80	77	-
2.	May-09	80 MLD	60.24	-	-	-	87	80	77
3.	June-09	80 MLD	77.77	-	-	-	89	78	78
4.	July-09	80 MLD	81.6	-	-	-	88	85	85
5.	Aug-09	80 MLD	81.6	-	-	-	76	84	69
6.	Sep-09	80 MLD	98.6	-	-	-	85	87	80
7.	Oct-09	80 MLD	99.24	-	-	-	88	86	81
8.	Nov-09	80 MLD	99.24	0.1	-	-	86	84	82
9.	Dec-09	80 MLD	99.24	-	-	-	86	79	79
10.	Jan-10	80 MLD	86	0.1	NT	NT	81	84	80
11.	Feb-10	80 MLD	107	0.1	NT	NT	84	73	90
12.	Ma-10	80 MID	71	0.1	NT	Nt	85	81	74

4. STP Mirzapur

a. Bar-screens not properly cleaned / maintained. Maintenance of polishing pond has remained neglected since 2002. Flux of sludge was observed in polishing pond. During power failure, the STP and pumping stations are not operating resulting in by-pass of untreated sewage.

b. The plant lacks proper maintenance

Table 14.9: Performance of Mirzapur STP

S. No.	Period	Installed Capacity (MLD)	Hydraulic Load (MLD)	Removal Efficiency of STP (%)		
				SS	BOD	COD
1	Apr-09	14 MLD	17.34	84	62	57
2.	May-09	14 MLD	17.34	83	62	57
3.	June-09	14 MLD	20.48	77	59	70
4.	July-09	14 MLD	20.81	88	67	73
5.	Aug-09	14 MLD	11.5	82	68	55

S. No.	Period	Installed Capacity (MLD)	Hydraulic Load (MLD)	Removal Efficiency of STP (%)		
6.	Sep-09	14 MLD	20.22	61	66	55
7.	Oct-09	14 MLD	1055	86	67	71
8.	Nov-09	14 MLD	14.6	80	79	62
9.	Dec-09	14 MLD	15.6	84	69	68
10.	Jan-10	14 MLD	5.7	79	81	71
11.	Feb-10	14 MLD	5.7	72	76	88
12.	Mar-10	14 MLD	16.2	88	77	79

5. STP Allahabad

a. Flow measuring device was out of order. About 50 % of the sewage received at STP was being by-passed without any treatment. Secondary settling tanks were found overflowing.

b. The plant lacks proper maintenance. .

Table 14.10: Performance of Naini Allahabad STP

Sr. No.	Period	Hydraulic Load MLD	DO (Mg/l)			Removal Efficiency of STP (%)		
			AT-1	AT-2	AT-3	SS	BOD	COD
1	Apr-09	-	-	-	-	-	-	-
2	May-09	71.1	-	-	-	92	79	87
3	June-09	65	-	-	-	98	98	98
4	July-09	57.35	-	-	-	89	62	77
5	Aug-09	62.3	-	-	-	88.20	85	82
6	Sep-09	70	-	-	-	83	80	80
7	Oct-09	88	--	-	-	94	87	88
8	Nov-09	65	-	-	-	91	87	85
9	Dec-09	65.6	-	-	-	86	71	79
10	Jan-10	68.86	NT	NT	NT	90	88	85
11	Feb-10	85.1	NT	NT	NT	78	87	70
12	Mar-10	108	NT	NT	NT	82	78	70

Other STPs

1. Agra STPs

Agra is a growing city having population about 1.26 million as per 2001 census with an area of 121.57 sq km. It is also a famous tourist place. Currently Agra has 03 sewage treatment plant with total treatment capacity of 90.25 MLD sewage and the excess is discharged to river Yamuna without any treatment. Yamuna Pollution Control Unit, UP Jal Nigam, Agra has installed three STPs at Dhandupura-78 MLD, Pilakhar-10 MLD and Buri ka nagla-2.25 MLD under Yamuna Action Plan, Phase I by tapping the 20 nallas falling directly into river Yamuna. Further two STP's with additional treatment capacity of 54 MLD are under construction under Yamuna Action Plan Phase II.

2. STP Dhandupura

Dhandupura STP is based on UASB treatment technology. After removal of coarse material the domestic wastewater is fed to the bottom of UASB Reactor (6 units.) and degraded by anaerobic microorganism in the granule blanket. Post USAB reactor, the treated wastewater is discharged to river Yamuna after passing through polishing pond (3 units.). The STP was not conforming to the stipulated norms of discharge. as per sample analysis given below.

Table 14.11: Performance of Dhandhupura STP

Sample point	pH	BOD	COD	TSS	Faecal Coli	Total Coli
Inlet of STP	8.2	195	521	268	$4.7x10^6$	$2.2x10^7$
Outlet of screen	8.5	150	509	305	-	-
Outlet of UASB reactor	8.7	94	329	152	-	-
Outlet of Polishing pond -1	8.7	91	263	83	-	-
Outlet of Polishing pond -2	8.2	88	265	81	-	-
Outlet of Polishing pond -3	9.0	100	265	86	-	-
Final outlet of STP	8.1	97	280	70	$2.2x10^5$	$4.9x10^5$
Standards	***5.5-9***	***30***	***250***	***100***		

**All parameters are in mg/l except pH*

3. STP Peelakhar

The sewage treatment plant is based on anaerobic treatment through anaerobic pond followed by facultative ponds. It has capacity to treat 10 MLD sewage from Trans - Yamuna Area. Treated sewage quality was observed meeting the stipulated norms of discharge (Table 14.12).

Table 14.12: Performance of STP Peelakhar

Sample point	pH	BOD	COD	TSS	VSS	Faecal Colliform	Total Coliform
Inlet of STP	7.79	118	334	151	70	$1.7x10^7$	$3.5x10^7$
Outlet of Anaerobic pond-1		64	257	59	34	-	-
Outlet of Anaerobic pond-2	6.08	106	315	86	43	-	-
Outlet of Primary Facultative pond-1	6.08	21.6	142	84	64	-	-

Sample point	pH	BOD	COD	TSS	VSS	Faecal Colliform	Total Coliform
Outlet of Primary Facultative pond-2		52	202	83	69	-	-
Outlet of Secondary Facultative pond-1	6.80	26	105	43	22	-	-
Outlet of Secondary Facultative pond-2		38	173	52	26	-	-
Final outlet of STP	7.77	30	147	33	27	-	-
Final outlet of STP+bypass		138	576	413	216	$2.7x10^5$	$7.9x10^5$
Standards	***5.5-9***	***30***	***250***	***100***	***2100***		

**All parameters are in mg/l except pH*

4. STP Sonepat, Haryana

The 30 MLD STP at Sonepat is operated by Haryana Public Health Engineering Department through M/s Kanwarjeet Enterprises (contractor). The operation of STP is based on UASB technology. The plant was not operated properly and the treated sewage is discharged to Drain No. 6. The result of samples analyzed are given in table 14.13:

Table 14.13: Performance of Sonepat STP

	pH	SS	BOD	COD
Inlet	7.41	246	134	470
Outlet	7.32	130	83	310
Standard	**5.5 - 9**	**100**	**30**	**250**

** All units are in mg/l except pH*

5. STP Yamunagar, Haryana

The 25 MLD STP at Yamunagar is operated by Haryana Public Health Engineering Department through M/s Kadhyana Co-operative Society, Panipat (contractor). The operation of STP is based on UASB technology. During inspection it was reported that about 27 MLD of sewage was being treated. The treated alongwith untreated domestic effluent was being discharged to a drain. Results of analysis of samples collected at inlet and outlet of STP are given in table 14.14:

Table 14.14: Performance of STP Yamunagar, Haryana

	pH	SS	BOD	COD
Inlet	8.46	321	149	486.2
Outlet	8.02	61	34	106.9
Standard	**5.5 - 9**	**100**	**30**	**250**

** All units are in mg/l except pH*

6. STP Jagadhri, Haryana

The STP at Jagadhri (10 MLD) is operated by Haryana Public Health Engineering Department. The operation of STP is based on UASB technology. The STP receives domestic effluent of 10 MLD. Grab sampling was carried out to check for compliance, and the results are presented in table below.

Table 14.15: Performance of Jagadhri STP

	pH	SS	BOD	COD
Inlet	8.88	419	167	639
Outlet	7.82	56	36	155
Standard	**5.5 - 9**	**100**	**30**	**250**

** All units are in mg/l except pH*

7. STP Jallandhar, Punjab

The operation of the 100 STP is based on UASB technology, a gas holder tank has been installed to store the gas produced in the anaerobic reactors. The BOD of treated effluent observed during the study was 48 mg/l against stipulated norms of 30 mg/l. Plant efficiency was observed about 69% in term of BOD reduction and 66 % in term of COD reduction. STP has facility for chlorination of treated effluent for disinfection before discharge but during inspection chlorination was not being done. Digital water meters for measuring the flow are available at the inlet and outlet in STP. The analysis results of the samples collected are given in table 14.16:.

Table 14.16: Performance of Jallandhar STP

S. No.	Sampling location	pH	SS	VSS	Am. Nitrogen	Phosphate	Filtered BOD	BOD	COD
1.	Inlet to STP	7.0	337	113	29	BDL	28	159	392
2.	Outlet of Both Reactor	7.0	149	46	-	-		79	186
3.	Outlet of Pre-Aeration Tank	7.1	185	55	-	-	-	88	239
4.	Final outlet of STP	7.2	74	23	28	BDL	12	48	131
Prescribed Standard		-	100	-	-	-	-	30	-

** All units are in mg/l except pH*

A 25 MLD plant was being commissioned in the same premises by M/s Envirotech Construction Company, which is based on Sequential Batch Reactor Technology.

14.2 INDUSTRIAL POLLUTION CONTROL - COMMON EFFLUENT TREATMENT PLANTS (CETPs)

Union Government has been providing financial support since 1991 to establish common effluent treatment plants (CETPs) for clusters of small-scale industries. 147 CETPs having combined capacity of about 1000 MLD covering more than 10000 polluting industries have been established. Though performance of many of these CETPs are not satisfactory yet the reduction in pollution load due to operation of these common facilities is substantial. This would not have been possible if the concerned small scale industries (SSIs) had been left to set up and operate individual treatment plants, because of the problems involved in establishing and operating as well as monitoring of individual small treatment plants. The Central Pollution Control Board regularly interacts with State Pollution Control Boards in order to improve the performance of CETPs. SPCBs have been issued directions to conduct quality monitoring of CETPs and report the action taken to CPCB. The SPCB/PCC of Gujarat, Maharashtra, Delhi, Rajasthan, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh have established a system of regular monitoring of CETPs. CPCB's Zonal Offices also conducted random surprise inspection of some of the CETPs.

14.2.1 KARNATAKA

Four out of the following seven CETPs in Karnataka were monitored :

(i) M/s. Lidkar Tanners Enviro Centro Systems Ltd., Bangalore,

(ii) M/s.Pai & Pai Chemicals (I) P Ltd., Kumbalgudu, Bangalore,

(iii) M/s. Eco Green Solutions Systems Pvt. Ltd., Doddaballapura, Bangalore,

(iv) M/s.Viwa Eco Club, Veersandra Industrial Estate, Bangalore,

(v) M/s.CETP Apparel Park,Dodaballapura, Bangalore,

(vi) M/s. ECO Engineering Ltd., Mallur (Kolar) and

(vii) CETP, Peenya Industrial Estate, Bangalore.

a. CETP M/s. Eco Green Solution Systems Pvt.

The CETP is located in KIADB Industrial Estate, Doddaballapur with a designed treatment capacity of 50 KLD and has been operating since August 2006. It treats effluent generated from units engaged in electroplating, pickling, anodizing, hard chrome plating, battery washing, galvanizing, PCB washing, degreasing etc. The effluent characteristics indicate pollutants like heavy metals, organic compounds and spent acid, alkaline solutions etc. The member units provide only pre-treatment by neutralization. The observations made during monitoring are given below:

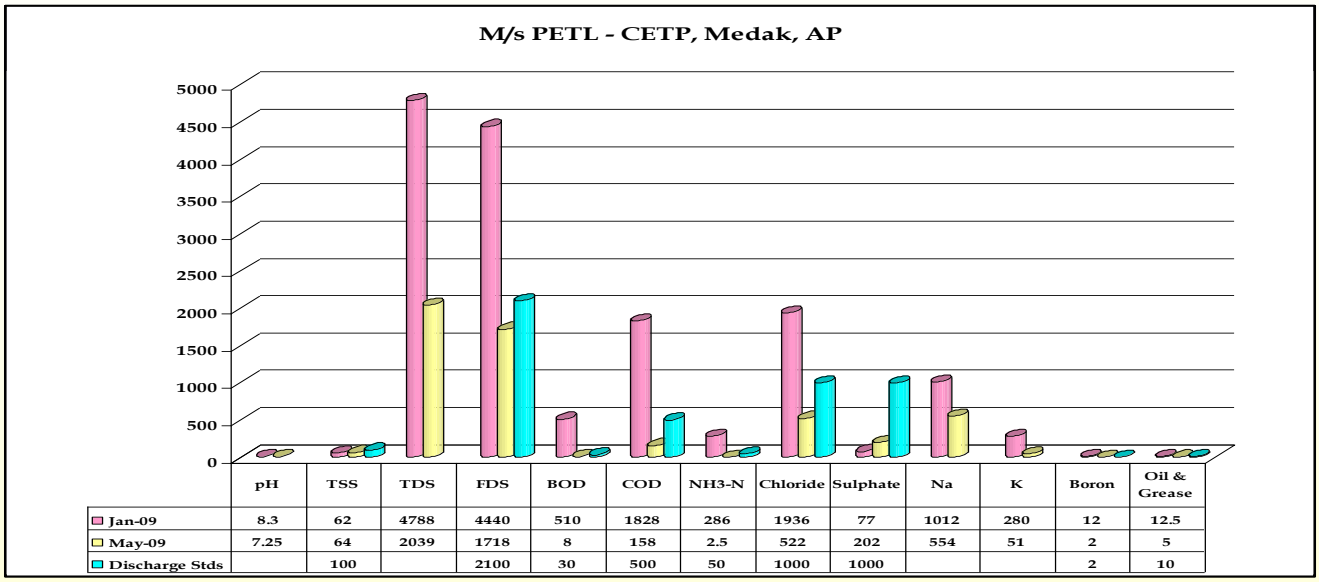
i. Hazardous chemicals like HCl and sludge are not securely stored ;
ii. Workers lack safety equipments while handling HW sludge ;
iii. Analysis results of effluent sample obtained from different units of CETP indicated that COD, TSS, copper, fluoride and phenolic compounds exceeded the standard limits.
iv. Pre-treatment / neutralization process reduces the concentration of total suspended solids (TSS) by about 89% and the concentration of total dissolved solids (TDS) by about 67%. TDS concentration is further reduced by about 7% during flocculation / settling process while, no reduction in the concentration of TSS was observed implying that flocculation and settling units were not working efficiently.
v. The pressure sand filter unit to removes suspended solids by about 11%. COD in ACF outlet was 2.5 times COD of settling tank and the concentration of phenolic compounds in ACF outlet was observed higher than that of settling tank. This indicated that ACF unit is not operating properly.

14.2.2 ANDHRA PRADESH

As a follow up of the Hon'ble Courts direction, an in-depth study of the M/s Pattancheru Enviro Tech Limited (PETL) CETP was done during June 2009 , salient observations are given below:

i. Pre-aeration has been improved by installing three new air blowers in equalisation & buffer tank.
ii. Mixing of sewage received from M/s BHEL and from Iskavagu was noticed at the buffer tank. Due to the dilution concentration of parameters like TDS, FDS, BOD and COD reduced to an extent of 40%-50%.
iii. Proper O & M of aeration tanks resulted in reduction in the concentration of BOD, COD, and NH_3-N. The DO of 1 mg/l to 2 mg/l was being maintained in the aeration tanks.
iv. Online monitoring facilities viz. TOC analyzer, TDS meter and flow meter at the discharge point have been installed.
v. Construction of clari-flocculator, decanter, R & D block and sludge drying beds are under progress. Pilot plant studies of MBR technology are completed & order has been placed for supply.
vi. The CETP was getting trade effluent conforming with the inlet characteristics prescribed by the state board and final effluent was complying with the discharge standards.

Figure 14.1: Status of compliance at the final discharge point during Jan & May 09



	pH	TSS	TDS	FDS	BOD	COD	NH3-N	Chloride	Sulphate	Na	K	Boron	Oil & Grease
Jan-09	8.3	62	4788	4440	510	1828	286	1936	77	1012	280	12	12.5
May-09	7.25	64	2039	1718	8	158	2.5	522	202	554	51	2	5
Discharge Stds		100		2100	30	500	50	1000	1000			2	10

14.2.3 CETPs in Gujarat & Maharashtra

The states of Gujarat and Maharashtra have several industrial estates. There are 25 CETPs in Gujarat and 26 CETPs in Maharashtra located in various industrial estates for treating effluent generated from the small scale industrial sectors. The following CETPs were monitored out the results are given below :

- Gujarat - Vapi, Surat, Panoli, Ankleshwar, Ahmedabad and
- Maharastra- Butibori, Jayasingpur, Taloja, Thane Belapur and Kolhapur.

a. Observations :

i. Most of the monitored CETPs are non-compliant to the prescribed norms.

ii. Most of the CETPs have only primary & secondary treatment, tertiary treatment has been adopted except at Vapi and Ankleshwar in Gujarat.

iii. Inlet effluent characterization indicated significant deviation (upward) from the inlet design norms. In most cases, hydraulic shock load was observed specific during monsoon period due to mixing of storm water with industrial waste water, which resulted in flooding of CETP units.

iv. Characterization of the influent to biological treatment indicated poor amenability to biological treatment due to high BOD / COD ratio and high TDS. Some CETPs have begun accepting domestic sewage to improve amenability to biological treatment.

v. The CETPs have not provided any special treatment to reduce H_3-N concentration.

b. Recommendations:

The CETPs need to upgrade these treatment capabilities considering the complex nature of the effluent to meet the prescribed norms. SPCBs should review the CETPs performance regularly with reference to all parameters. While permitting new units to set up or expansion of existing units the performance of concerned CETP need to be reviewed by the SPCBs. Cases where CETPs are non–complaint NOC for capacity enhancement or establishing new units should not be granted for which, CPCB has already issued directions to all SPCBs.

Table 14.17: Performance of Panoli CETP

Sampling Locations	Date	pH	TSS	TDS	BOD	COD	O&G	NH_3-N	S^{--}	Phenol	CN^{--}
Design/Inlet Norms		**6.5-8.5**	**--**	**10000**	**3000**	**10000**	**--**	**--**	**--**	**--**	**--**
Inlet to CETP	2009 (June 30)	8.29	1179	21760	1564	5426	23	1818	--	5.88	0.29
	2009 (Sept 10)	7.90	831	14854	1682	4325	13.8	1620	--	2.49	--
	2009 (Dec 10)	8.37	1342	17183	983	3350	--	2154	--	2.10	--
Final Outlet of CETP	2009 (June 30)	7.78	241	4822	229	797	8.4	537	--	0.60	0.09
	2009 (Sept 10)	7.14	355	10100	22	353	15.3	19.4	--	0.14	0.16
	2009 (Dec 10)	6.97	545	13420	23	408	2.84	137	--	0.086	--
Outlet Norms (GPCB)		**5.5-8.5**	**100**	**2100**	**30**	**100**	**10**	**50**	**0.5**	**1**	**0.2**

Note:All the parameters, except pH, are expressed in mg/l. (--) Indicates parameter not analysed

Table 14.18: Performance of Ankleshwar CETP

Sampling Locations	Date	pH	TSS	TDS	BOD	COD	O&G	NH_3-N	S^{--}	Phenols	CN^{--}
Design/Inlet Norms		**1.5**	**3770**	**77630**	**3600**	**11000**	**--**	**500**	**--**	**10**	**--**
Inlet to CETP	2009 (June 30)	0.98	393	55575	1129	5618	16	505	--	7.84	0.31
	2009 (Sept 10)	1.92	1807	43153	937	6525	38.9	558	--	7.45	--
	2009 (Dec	2.07	832	49796	828	6528	6.67	858	--	-	--

Sampling Locations	Date	pH	TSS	TDS	BOD	COD	O&G	NH_3-N	S^{--}	Phenols	CN^{--}
	10)										
Final Outlet	2009 (June 30)	7.91	154	16058	88	863	4.8	255	--	0.72	0.17
	2009 (Sept 10)	7.38	295	15288	152	968	8.9	274	--	--	0.14
	2009 (Dec 10)	7.09	608	15018	75	985	4.70	347	--	0.59	--
Outlet Norms (GPCB)		5.5-8.5	100	2100	30	100	10	50	0.5	1	0.2

Note:All the parameters, except pH, are expressed in mg/l. (--) Indicates particular parameter not analysed

Table 14.19: Performance of Vapi CETP

Sampling Location(s)	Dates	pH	TSS	TDS	BOD	COD	O & G	NH_3-N
Inlet/Design Norms		6.5-8.5	300	--	400	1000	--	--
Inlet To CETP	20.05.2009	7.13	272	6011	333	1509	--	117
	02.09.2009	7.60	1215	5924	376	1324	50	63.3
	09.12.2009	6.61	710	9580	444	1517	4.73	64.3
Outlet to CETP	20.05.2009	7.32	460	8177	153	842	14.9	98.8
	02.09.2009	7.32	60	5768	20	481	32	63.4
	09.12.2009	6.90	140	8916	84	432	4.86	68
Outlet norms		5.5-9.0	100	2100	30	250	10	50

Note: All the parameters, except pH, are expressed in mg/l.; (--) Indicates parameter not analysed

Table 14.20: Other CETPs In Gujarat

Date	pH	TSS	TDS	COD	BOD	NH3-N	TKN	O&G	Phenols
Globe Enviro Care Ltd, (GECL), GIDC, Sachin , Surat ; (for Chemical Industries) Design Capacity: 0.5 MLD									
09.09.2009	7.96	73	6550	166	39	29	38	1.8	0.33
Sachin Infrastructure Environment Ltd (SIEL), GIDC, Sachin, Surat ; (for Textile Industries) Design Capacity: 50 MLD									
08.09.2009	7.75	81	8553	592	275	7.9	11	0.98	0.27

OTHER CETPs IN GUJARAT	Date	Point of Sampling	Parameters						
			pH	TSS	TDS	COD	BOD	NH-3-N	Phenol
CETP Nandesari, Vadodara	January 2010	Inlet	8.0	492	21130	1371	242	272	--
		Outlet	6.83	338	42677	465	170	16.58	0.046
CETP Vatva, Ahmedabad	January 2010	Inlet	6.40	550	20739	3696	994	134	6.99
		Outlet	7.48	-	16141	2189	367	190	7.25
CETP Odhav GVMM, Ahmedabad	January 2010	Inlet	6.18	3555	10243	3447	1500	370	4.13
		Outlet	7.27	888	6928	7315	2800	1260	4.63
CETP NEPL, Ahmedabad	January 2010	Inlet	7.27	2133	62350	12778	1856	1042	28.6
		Outlet	7.16	164	11971	2471	584	190	1.62
CETP OEPL, Ahmedabad	January 2010	Inlet	7.08	313	12306	1397	256	51.7	1.79
		Outlet	6.65	96	9391	476	119	22	0.41
CETP Green Environ, Ahmedabad	January 2010	Inlet	6.42	220	3851	1496	648	8.57	0.38
		Outlet	6.43	195	2506	1100	372	6.88	0.35
CETP Narol Dye Stuff, Ahmedabad	January 2010	Inlet	7.0	70	26226	3267	951	77	0.39
		Outlet	8.21	-	5869	579	60	10.3	0.44

Note: All the parameters, except pH, are expressed in mg/l.; (--) Indicates parameter not analysed

Table 14.21: CETPs in Maharashtra

CETP	Date	Point of Sampling	pH	TSS	TDS	COD	BOD	NH-3-N	Phenol
CETP Kagal, Kolhapur	June 2009	Inlet	8.19	40	2405	286	35	59	3.43
		Outlet	8.13	22	2543	108	14	61	2.90
CETP Jaisinghpur		Inlet	10.01	563	3581	2912	1362	12	3.43
		Outlet	9.80	260	3732	1810	1007	14	3.06
CETP Butibori, Nagpur	July 2009	Inlet	8.16	135	2731	890	145	50	----
		Outlet	7.63	127	2193	444	72	81	4.1
CETP Lote Parshuram	Feb. 2010	Inlet	6.92	2222	17188	7433	2053	704	73.12
		Outlet	6.91	4311	40201	16045	7840	1974	89.18
CETP Mahad	Feb. 2010	Inlet	7.81	338	7628	2461	787	226	11.5
		Outlet	8.01	963	13094	2614	323	242	4.18
CETP Roha	Feb. 2010	Inlet	7.65	372	10132	2721	840	555	1.7
		Outlet	7.63	247	9970	2040	455	201	1.18
CETP Patal Ganga	Feb. 2010	Inlet	7.65	579	712	1117	306	35	2.1
		Outlet	7.87	98	3787	454	147	81	1.57
CETP Thane Belapur (12 MLD)	Feb. 2010	Inlet	9.01	311	5531	1836	180	702	3.6
		Outlet	7.27	55	5479	475	71	395	2.29
CETP Thane Belapur (15 MLD)	Feb. 2010	Inlet	9.06	428	6521	2064	698	573	0.46
		Outlet	7.94	30	1956	149	34	90	0.33
CETP Taloja	Feb. 2010	Inlet	7.44	590	2984	1580	810	182	1.51
		Outlet	7.48	143	3762	462	120	2519	1.18

Note:All the values, except pH, are expressed in mg/l.; (--) Indicates parameter not analysed

Table 14.22: Performance of FETP (Final ETP) At Ankleshwar

		pH	TSS	TDS	COD	BOD	NH_3-N	CN^-	Phenol	S^-	O&G
GPCB Outlet Norms		6.5-8.5	100	--	500	100	50	0.2	5	5	20
Inlet Design Norms		5.0-8.5	150	12000	1000	200	-	--	-	-	-
Date of monitoring	Inlet to FETP										
	30.06.2009*	8.00	159	8500	2725	585	532	0.38	8.42	--	19
	10.09.2009	8.04	638	12952	2231	646	1158	0.30	3.86	2.8	61.1
	10.12.2009	6.66	420	7896	2038	683	585	--	8.84	--	--
	Outlet of FETP										
	30.06.2009	7.82	327	9164	1764	556	475	0.19	8.04	--	18
	10.09.2009	7.55	173	8798	702	39	586	0.34	0.82	0.5	13.9
	10.12.2009	7.11	496	11228	1510	294	785	--	4.84	--	--

*Note: All values except pH are expressed in mg/l. ; *- Combined Outlet of pre-primary Clarifiers*

14.2.4 CETP in Uttar Pradesh

1. CETP, Kanpur

The CETP was operating at 65% of hydraulic capacity. The performance was found unsatisfactory as the designed performances were not achieved. The reduction of BOD and COD was reported as 58% and 42%. Precipitation of chromium in the sludge and its judicious disposal continues to remain a critical issue as existing TSDF at Kanpur has achieved the capacity and hence unable to accept any further waste.

2. CETP Unnao

The performance efficiency of the plant indicated 94%, 91% and 99% reduction of BOD, COD and total chromium against the designed reduction of 98%, 94% and 99% respectively. The plant is operating regularly, the inlet norms from member tanneries are being complied. The plant management has provided provision for storage of hazardous waste from CETP.

3. CETP Banthar

The plant is established at a leather complex in Banthar, Unnao with a treatment capacity of 4.5 MLD. The CETP on an average received 1.8 –2.5 MLD of wastewater. The plant achieved 97% and 93 % and 99% reduction of BOD, COD and Total - Cr against the designed reduction of 98% 94% and 96% respectively.

14.2.5 CETP Haryana

1. CETP Barhi

- CETP Barhi is operated by HSIDC. It has designed capacity of 2 MLD which is being augmented to 8 MLD by March 2010. Out of the 479 member units 150-200 units are in operation of which only 40 -45 units are water polluting and aslo have individual ETPs. The CETP receives domestic waste water as well as industrial pre-treated wastewater from industrial units located in Phase –I, Barhi. The sludge removed from the sludge drying bed is used for land filling for which no record was being maintained.
- CETP consists of Screen Chamber, Collection tank, primary settling tank, aeration tank, secondary clarifier, treated water collection sump and sludge dying bed. The treated water is discharged to Drain No. 6.

A view of CETP

- During inspection samples were collected. The analysis results of samples collected indicate that the CETP is not functioning properly.

Table 14.23: Performance of Barhi CETP

	pH	SS	BOD	COD
Inlet	6.23	322	207	593
Outlet	6.87	150	121	393
Standard	5.5 - 9	100	30	250

** All units expect pH are in mg/l*

2. CETP Kundli

- CETP Kundli operated by HSIDC has designed capacity of 4 MLD and receives domestic wastewater and industrial treated water from Kundli industrial area Phase I, II, III & IV. The CETP was under stabilization during the inspection.

- CETP consists of Screen Chamber, Collection tank, primary settling tank, aeration tank, secondary clarifier, treated water collection sump and sludge dying bed. The treated water was being discharged to Drain No. 6. During inspection grab samples were collected. The analysis results showed that the CETP was meeting the prescribed norms. The sludge removed from the sludge drying bed was disposed for land filling and no record was being maintained.

Table 14.24: Performance of Kundli CETP

	pH	SS	BOD	COD
Inlet	7.27	462	142	729
Outlet	7.48	97	16	157
Standard	5.5 - 9	100	30	250

** All units are in mg/l expect pH*

3. CETP Rai

- CETP Rai operated by M/s Enviro Engg. has designed capacity of 0.5 MLD and receives both domestic wastewater & treated industrial waste water of Rai industrial area.

- CETP consists of holding chamber, grit chamber, floculator, primary clarifier, aeration tank, secondary clarifier, treated water collection sump and sludge thickner along with centrifuge. The treated waste water is discharged to Drain No. 6. The analysis results showed that the CETP operation was satisfactory. The sludge removed from the centrifuge is dried and disposed for land filling for which no record are maintained.

Table 14.25: Performance of Rai CETP

	pH	SS	BOD	COD
Inlet	7.38	480	55	406
Outlet	8.02	34	6.7	35
Standard	5.5 - 9	100	30	250

** All units expect pH are in mg/l*

14.2.6 Punjab

1. CETP Jallandhar

- The CETP treats tannery waste from Jallandhar leather complex. The CETP comprises of equalization tank, primary clarifier, aeration tank, secondary clarifier, sand filters, sludge drying beds and has place for storing hazardous waste.
- The designed capacity of the CETP is 1.5 MLD. The total effluent generated from leather complex is about 5 to 6 MLD out of which only 1.3 to 1.9 MLD of effluent

is treated and the balance discharged untreated into the Kalasingha drain. The second module of CETP of 5 MLD capacity is planned to be commissioned by September 2010, which will take care of the entire effluent from the leather complex.

- The treated effluent is discharged to the Kala Singha drain, which ultimately meets River Sutlej.
- Grab samples from different units of CETP were collected,. The analysis results are given in table 14.26.

Table 14.26: Performance of Jallandhar CETP

S. No.	Sampling location	pH	SS	TDS	Sulphide	O&G	BOD	COD	T-Cr^{6+}
1.	Inlet to CETP	10.80	4,525	12,443	Nil	-	2,149	7,425	ND
2.	Outlet of equalization tank	8.48	1538	-	-	-	1,293	3,234	ND
3.	Outlet of primary clarifier	8.33	816		-	-	1275	3,108	
4.	Outlet of Anoxic Tank	7.88	466		-	-	1180	2,365	
5.	Outlet of Secondary clarifier	7.59	296		-	-	81	512	
6.	Aeration Tank of CETP	8.02	2,732		-				
7	Final outlet	7.01	252	10,682		04	37	438	
	Standard	6.5-9.0	100		1.0	10	30	250	02

All values except pH are in mg/l

2. CETP Ludhiana

- The CETP comprises of collection tank, oil skimmer, equalization tank, chemical reaction tank, primary tube settler, storage tank, bio-reactor, primary clarifier, activated filter, ion-exchange, reverse osmosis, sludge drying beds. The designed capacity of the CETP is 0.2 MLD and total 13 tankers are used for collection of waste water from the member units. 500 member units mainly electroplating units are associated with the CETP for treatment of their wastewater in the CETP.
- Flow meter has been installed after activated Sand Filter Unit to know the total quantity of wastewater treated. The CETP has a Anion & Cation Exchange Units (Resin Plant) and degasifier. The CETP also has a Reverse Osmosis Plant which is used by M/s S.K Dyeing Udyog . The R.O permeate water is used to make coolant and battery water.
- Details of samples collected and their characteristics are given in table 14.27.

Table 14.27: Performance of Ludhiana CETP

Sl.	Sampling location	pH	SS	Ammonical Nitrogen	Phosphate	O&G	COD	Cr^{6+}
1.	Inlet to CETP	<2	134	16	-	3.68	216	978
2.	Outlet of Storage tank	7.66	231	-	-	-	-	-
3.	Outlet of clarifier	7.11	65	-	-	-	-	-
4.	Outlet of Resin Plant	7.27	44	-	-	-	-	-
5.	Final outlet of CETP	6.68	24	-	04	1.41	13	ND
	Prescribed norms	**6.0-9.0**	**100**	**50**	**-**	**10**	**-**	**0.1**

All values except pH are in mg/l

14.2.7 CETP in Rajasthan and Madhya Pradesh

1. CETPs Pali

- At Pali, four CETPs - Unit I, II, III & IV having treatment capacities of 5.20 MLD, 8.40 MLD, 9.08 MLD and 4.80 MLD respectively are operational. Common laboratory facility is provided in the premises of Unit No I & II. The excess wastewater from Unit I & II is taken to Unit – IV for treatment through underground pipe.
- The drainage system provided to carry the waste water was not found adequate. As a result large quantity of waste water was overflowing to kutchha pond between Mandia Road Industrial Area and Puinayata Road Industrial Area.
- The sludge is being sent to TSDF Udaipur for disposal.

Unit – I & II : Both the CETP units are not complying the prescribed limits and only 60% removal efficiencies are achieved.

Table 14.28: Performence of CETP Pali (Unit I)

S. No.	Location	Avg Flow	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet (I & II)	4.46 MLD	9.89	11736	1452	10284	2602	867	1780	--
02	Aeration Tank Inlet		9.48	10884	556	10328	2082	737	1690	--
03	Aeration tank outlet		8.19	11956	2560	9396	3810	1239	1540	--
04	Final outlet		8.02	10600	456	10144	893	365	1620	22
Prescribed Standards			5.5-9.0	---	100	---	250	30	1000	10
Percentage Removal			---	09.67	68.60	01.36	65.68	57.90	09.00	---

All values except pH are in mg/l.

Table 14.29: Performence of CETP Pali (Unit II)

S. No	Location	Avg Flow	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet (I & II)	7.27 MLD	9.89	11736	1452	10284	2602	867	1780	--
02	Aeration Tank Inlet		9.65	10696	930	9766	1763	639	1610	--
03	Aeration Tank outlet		7.61	13332	3020	10312	6340	1269	1840	--
04	Final outlet		8.69	10456	408	10048	489	111	1650	18
Prescribed Standards			5.5-9.0	---	100	---	250	30	1000	10
Percentage Removal			---	10.91	71.90	02.30	81.20	87.20	07.30	---

All values except pH are in mg/l.

UNIT – III : The unit was not complying the surface water discharge limits. About 70 % BOD & COD removal efficiency was achieved.

Table 14.30: Performence of Pali (Unit III) CETP

S.No.	Location	Avg Flow	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet	8.96 MLD	6.15	6728	880	5848	2568	896	1210	--
02	Aeration Tank Inlet		8.40	6172	816	5356	2051	660	1150	--
03	Aeration tank outlet		7.95	8332	3068	5264	5820	1908	1380	--
04	Final outlet		8.11	5124	294	4880	722	252	1180	15
Prescribed Standards			5.5-9.0	---	100	---	250	30	1000	10
Percentage Removal			---	23.84	66.59	16.55	71.88	71.88	02.48	---

All values except pH are in mg/l.

Unit IV : Though more than 90 % of BOD & COD removal was achieved by the treatment system the outlet BOD value is higher than the prescribed limit.

Table 14.31: Performence of Pali (Unit IV) CETP

S.No.	Location	Avg Flow	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet	4.80 MLD	10.8	12132	1172	10980	2514	936	1950	--
02	Aeration Tank Inlet		7.12	10948	672	10276	1480	534	1790	--
03	Aeration Tank outlet		7.49	11068	830	9788	1673	605	1620	--
04	Final outlet		7.14	8520	184	8336	232	65	1680	12
Prescribed Standards			5.5-9.0	---	100	---	250	30	1000	**20**
Percentage Removal			---	29.77	84.30	24.08	90.77	93.05	13.85	---

All values except pH are in mg/l.

2. CETP Jodhpur

The flow of RIICO drain carrying mainly textile waste (alkaline effluent) to CETP is approximately 16 MLD. On an average only 8.5 MLD of effluent is taken to CETP in addition to 1.5 MLD acidic effluents which directly reaches the CETP through pipe line.

- CETP does not accept acidic waste coming through RIICO drain. Depending upon pH of effluent coming in RIICO drain CETP staff regulates the gate opening of CETP and RIICO drain. More than 50 percent effluent is not taken into CETP from RIICO drain due to low pH.
- Hazardous waste generated is temporarily stored in a shed for final disposal to TSDF, Udaipur.
- The overall performance of CETP was found to 89 percent. Performance of primary settling in terms of COD, BOD and SS removal was found 68, 32 and 41 percent respectively. Performance of secondary settling in terms of COD, BOD and SS removal was found 50, 62 and 85 percent respectively.

Table 14.32: Performence of Jodhpur CETP

S. No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Acidic effluent	1.19	36740	640	36100	401	61	4200	-
02	Basic effluent	8.16	4840	656	4184	311	82	930	-
03	Primary clarifier outlet (Old)	7.12	5592	412	5180	112	48	1100	-
04	Primary clarifier outlet (New)	7.36	6594	306	6288	98	46	1080	-

S. No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
05	Aeration tank outlet	7.25	5958	460	5498	234	108	970	-
06	Secondary clarifier outlet	7.10	5682	70	5612	106	41	1030	-
07	ACF outlet	7.03	6098	82	6016	88	19	880	Nil
08	Jojri river upstream	8.42	9422	50	9372	180	38	1290	
09	Jojri river down stream(Salawas)	7.71	9230	294	8936	152	26	1120	
10	CETP discharge Nr. Rly. Puliya	7.36	6394	54	6340	97	12	910	

All values except pH are in mg/l.

3. CETP Balotra

- The total effluent discharge from Balotra area was reported as 40 MLD which the capacity of present 2 CETPs is 18 MLD which is less than the total effluent generation.
- Hazardous waste generated is temporarily stored in shed for disposal.
- Finally treated effluent is mixed with untreated effluent. As per the condition in water consent treated effluent is to be used in HRTS but it was not being followed properly.

06 MLD CETP : The overall performance of CETP in terms of COD, BOD and SS removal was 47, 58 and 82 percent respectively.

Table 14.33: Performence of 06 MLD Balotra CETP

S.No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Common inlet	7.15	31938	794	31144	769	269	8320	---
02	Equalization tank	7.21	32094	340	31754	863	276	8610	---
03	Primary clarifier outlet	7.25	31882	208	31674	650	221	8210	---
04	Final outlet	7.22	21592	144	21448	411	112	7830	08
Percentage Removal		---	32.39	48.24	31.13	46.55	25.36	05.89	---

All values except pH are in mg/l.

12 MLD CETP : The overall performance of CETP in terms of COD, BOD and SS removal was 31, 22 and 72 percent respectively.

Table 14.34: Performence of 12 MLD Balotra CETP

S.No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Common inlet	7.15	31938	794	31144	769	269	8320	-
02	Tube settler outlet	7.09	32264	176	32088	398	98	8100	-
03	Final outlet	7.32	32590	220	32370	532	210	7910	05
04	Final outlet + Bypass	7.46	31846	488	31376	905	371	10300	-
05	Luni River D/S	7.69	26308	596	25712	652	345	5920	-
Percentage Removal		---	-02.04	72.29	-03.93	30.81	21.93	04.92	---

All values except pH are in mg/l.

4. CETP Bithuja : Total effluent generation of Bithuja area could not be ascertained as effluent to CETP comes through underground drain. The overall performance of CETP in terms of COD, BOD and SS removal was 54, 54 and 94 percent respectively.

Table 14.35: Performence of Bithuja CETP

S.No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet of CETP	7.70	17034	1248	15750	642	147	6320	-
02	Pri.Clarifier O/L	7.46	16138	242	15896	359	90	613	-
03	Final outlet	7.40	15300	76	15224	292	67	6200	BDL
04	Luni River D/S	7.69	26308	596	25712	652	345	5920	-
Percentage Removal		---	99.55	93.91	03.34	54.51	54.42	01.90	---

All values except pH are in mg/l.

5. CETP Jasol : The total effluent discharge of Jasol area as informed was 9 MLD in addition to the discharge directly into River Luni. Capacity of present CETP is low compared as to total effluent generation. The overall performance of CETP in terms of COD, BOD and SS removal was found on 65, 78 and 83 percent respectively.

Table 14.36: Performence of Jasol CETP

S.No.	Location	pH	TS	TSS	TDS	COD	BOD	Cl	O&G
01	Inlet of CETP	7.88	19548	796	18752	1112	437	7120	-
02	Aeration tank inlet	7.62	25416	838	24578	645	203	9320	-
03	Final outlet	7.50	25324	132	25192	394	94	8100	15
Percentage Removal		---	-29.54	83.41	-34.34	64.56	78.48	-13.76	---

All values except pH are in mg/l.

6. CETP Bhiwadi:

The total effluent generation is about 12 MLD, against the treatment plant capacity of 6 MLD. The overall performance of the plant was not satisfactory.

Table 14.37: Performence of Bhiwadi CETP

S. No	Location	pH	TS	TSS	TDS	COD	BOD	Cl
01	CETP Inlet	7.68	3830	230	3600	350	140	730.8
02	CETP Outlet	7.59	2565	135	2430	210	62	715.9
Percentage Removal			33.02	41.30	32.50	40.00	55.71	02.04

All values except pH are in mg/l.

7. CETP Bhopal: There are around seven to eight industrial units that contribute effluent to the CETP.

Table 14.38: Performence of Bhopal CETP

S.No.	Location	pH	TS	TDS	TSS	COD	BOD	Cl	O&G
01	CETP inlet	6.20	2298	1678	620	1261	529	600	-
02	Equalisation Tank Outlet	5.94	3322	842	2480	4288	1672	800	-
03	Buffer Tank	6.48	4212	2932	1280	2883	1152	850	-
04	UASB Digestor Outlet	7.86	1820	1714	106	832	291	525	-
05	Final Outlet	8.36	990	962	28	74	21	342	05
Percentage Removal		---	56.91	42.66	95.48	94.13	96.03	43.00	---

All values except pH are in mg/l.

14.3 HAZARDOUS WASTE MANAGEMENT

Over 150 HW re-cylers and re-processors across the country have been monitored during year 2009-2010 by CPCB's Zonal Offices located in Bangalore, Kolkata, Bhopal, Vadodara, Lucknow & Shillong.

14.3.1 Status of TSDFs

There are about 36,165 HW generating industries in India producing about 6.23 MT of HW out of which landfillable HW accounts for 44%, incinerable HW accounts for 7 % and recyclable HW about 49 %. In terms of quantum of HW generation state wise, Gujarat leads (about 29%) followed by Maharashtra (about 259%) and Andhra Pradesh (about 9%) these three states along with Chhattisgarh (about 5%), Rajasthan, West Bengal and Tamil Nadu (about 4 % each) account for 80 % of the country's total HW generation. 64 Common Hazardous Waste Transportation, Storage and Disposal Sites (TSDFs) have been identified. 35 sites have been notified out of which 25 TSDFs are

operational and nine TSDFs are under construction. The state-wise details of TSDF are given in Table 14.39.

- ✓ Land disposable HW : As per the National Inventory of Hazardous Waste Generating Industries, the total waste handling capacity (disposal capacity) of these facilities, was 15,00,568 MTA far less than the generation of 27,28,326 MTA for land-disposable HW. The deficit of TSDF capacity estimated was 12, 27,758 MTA, implying an urgent need to develop land disposable facility. The Common TSDF in Andhra Pradesh, Himachal Pradesh, Madhya Pradesh and Uttar Pradesh have surplus capacities to handle the present quantities of land disposable waste being generated in these States.
- ✓ Incinerable HW

The information of the facilities available in the country are as follows:

- Common Incinerators - 13 in six States
- Individual Incinerators - 127 in 12 States
- Total incineration capacity - 3,27,705 MTA
- Present generation of Incinerable Waste in the country - 4,15,794 MTA
- Deficit of Incineration capacities - 88,089 MTA

Table 14.39: State-wise TSDFs in India

S. No.	State/UT	TSDF sites identified	TSDF sites notified	TSDF under construction	TSDFs in operation
1.	AndhraPradesh	02	02	Nil	02
2.	Arunachal Pradesh	Nil	Nil	Nil	Nil
3.	Assam	Nil	Nil	Nil	Nil
4.	Bihar	01	01	Nil	Nil
5.	Chattisgarh	02	Nil	Nil	Nil
6.	Delhi	01	Nil	Nil	Nil
7.	Goa	01	01	01	Nil
8.	Gujarat	08	08	Nil	08 (04 common and 04 SLF)
9.	Haryana	01	01	01	-
10.	Himachal Pradesh	01	01	-	01
11.	Jammu & Kashmir	Nil	Nil	Nil	Nil
12.	Jharkhand	Nil	Nil	Nil	Nil
13.	Karnataka	02	01	-	01
14.	Kerala	01	01	-	01
15.	Madhya Pradesh	08	03	Nil	01 (SLF) at Pithampur
16.	Maharashtra	06	04	02	04

S. No.	State/UT	TSDF sites identified	TSDF sites notified	TSDF under construction	TSDFs in operation
17.	Manipur	Nil	Nil	Nil	Nil
18.	Meghalaya	Nil	Nil	Nil	Nil
19.	Mizoram	Nil	Nil	Nil	Nil
20	Nagaland	Nil	Nil	Nil	Nil
21.	Orissa	01	01	01	-
22.	Punjab	01	01	-	01
23.	Rajasthan	08	02	01	01
24 .	Sikkim	Nil	Nil	Nil	Nil
25.	Tamilnadu	08	03	02	01
26.	Tripura	01	Nil	Nil	Nil
27.	Uttar Pradesh	05	03	-	03 (SLF)
28.	Uttarakhand	03	Nil	Nil	Nil
29.	West Bengal	01	01	Nil	01 (SLF)
30.	Andaman & Nicobar Islands	Nil	Nil	Nil	Nil
31.	Chandigarh	Nil	Nil	Nil	Nil
32.	Daman, Diu, Dadra & Nagar Haveli	01	01	01	Nil
33.	Lakshdweep	Nil	Nil	Nil	Nil
34.	Puducherry	01	Nil	Nil	Nil
	Total	64	35	09	25

Besides above, CPCB has published the following two reports:

- "Guidelines for Storage of Incinerable Hazardous Wastes by the Operators of Common Hazardous Waste Treatment, Storage and Disposal Facilities and Captive HW Incinerators".
- 'Amount needed towards Escrow Account/Corpus Fund/Contingency Fund/Super Fund/Insurance Policies etc Post-Closure Monitoring of the Hazardous Waste Treatment, Storage and Disposal Facility"

14.3.2 Monitoring of TSDFs by CPCB Zonal Offices

TSDF - Pithampur, Madhya Pradesh

1. The MPPCB has issued Consent to Establish under Air & Water Acts on 05.09.2005 to develop the facility for disposal of Hazardous Wastes - 50,000 MT/Year in secured landfill, 20,000 MT/Year in treatment / stabilisation and 20,000 MT/Year in incineration. The consent to operate under Water Act is valid up to 31.10.2010, while the consent under Air Act was not yet issued by the MPPCB.

2. The authorization under Hazardous Wastes (Management & Handling) Rules, 1989 expired on 04.10.2008 and the unit has applied for renewal of authorization during April 2008. The authorisation for trial runs of incinerator was issued on March 18, 2010 with a validity period of 02 years. The permitted capacity was 20,000 MT/Year. The year-wise operations of TSDF with respect to the wastes received at the site and the chemicals used for treatment are:

Table 14.40: TSDF Pithampur (Madhya Pradesh)

Pathway	2009	2010*	Remarks
Direct land fill (MT)	8090.065	1297.597	CPCB Analysis Data: The ground water samples in and around the facility was collected for analysis , no trend has been established for the parameters in the ground water. The presence of heavy metals was not significant.
Landfill after treatment (MT)	2833.124	635.607	
Incinerable waste (MT)	0.000	0.000	
TOTAL (MT) *Waste received till 25.02.2010.	10923.189	1933.204	

Table 14.41: Concentration in ground water in & around TSDF Pithampur (Madhya Pradesh) -Heavy Metals

(Date of sampling: February 25, 2010)

Location	Year	As	Cd	Cr	Cu	Fe	Ni	Pb	Zn
Peizometer No.B-1	2010	*	*	NT	NT	3.750	*	*	*
	2009	NT	NA	0.76	0.07	7.76	NA	NA	0.03
	2008	NT	NT	NT	0.04	12.10	NT	NT	0.09
	2007	NA	NT	NT	0.05	2.52	NT	NT	0.05
Peizometer No.B-2	2010	*	*	NT	NT	NT	*	*	*
	2009	NT	NA	NT	0.02	0.53	NA	NA	0.03
	2008	NT	NT	NT	0.05	5.42	NT	NT	0.06
	2007	NA	NT	NT	NT	0.72	NT	NT	0.07
Peizometer No.B-3	2010	*	*	NT	NT	0.827	*	*	*
	2009	NT	NA	1.17	0.01	0.93	NA	NA	0.01
	2008	NT	NT	NT	0.06	12.90	NT	NT	0.07
	2007	NA	NA	NA	NA	NA	NA	NA	NA
Peizometer No.B-5	2010	*	*	NT	NT	0.955	*	*	*
	2009	NT	NA	0.78	0.02	0.38	NA	NA	0.01
	2008	NT	NT	NT	0.05	14.80	NT	NT	0.13
	2007	NA	NT	NT	0.01	1.55	NT	NT	0.02
Peizometer No.B-6	2010	*	*	NT	NT	NT	*	*	*
	2008	NT	NT	NT	0.09	7.19	NT	0.2	0.24
	2007	NA	NT	NT	NT	1.46	NT	NT	0.09
Peizometer No.B-7	2010	*	*	NT	NT	0.923	*	*	*
	2009	NT	NA	NT	0.02	0.73	NA	NA	0.04

Location	Year	As	Cd	Cr	Cu	Fe	Ni	Pb	Zn
	2008	NT	NT	NT	0.01	0.30	NT	NT	0.11
	2007	NA	NT	NT	NT	2.39	NT	NT	0.09
Open well near temple	2010	*	*	NT	NT	NT	*	*	*
	2009	NT	NA	NT	0.01	0.08	NA	NA	NT
	2008	NT	NT	NT	0.01	1.14	NT	NT	0.14
	2007	NA	NA	NA	NA	NA	NA	NA	NA

All values are in mg/l. NT: No traceable NA: Not analysed

*: No Data available; B-6: No water was present for sampling in the year 2009

TSDF - Gudli, Rajasthan

The hazardous waste authorization issued by RSPCB is valid upto 31.03.2011.

Table 14.42: TSDF Gudli (Rajasthan)

Waste type	Quantity (MT) of waste collected & disposed in SLF during		Total (Till 26.03.2010)
	10.10.2005 to 31.03.2009	1.4.2009 to 26.03.2010	
DLF	3270.98	2155.539	5426.519 MT
LAT	26392.0194	10544.4876	36963.507 MT
INC	1146.874	---	1146.874 MT

DLF=direct landfill; LAT =land application after treatment; INC=incinerable

- The analysis report of the samples collected from the six piezometers is provided in the table below.

Table 14.43: GW Quality - TSDF Gudli (Rajasthan)

S.No.	Site	pH	Cond	TDS	TS	Cl	TA	Na	K	COD	SO_4	BOD
01	Peizometer No1	7.08	659	542	547	59.7	240	15.5	5.3	2.6	38	-
02	Peizometer No2	7.21	736	586	590	59.7	250	15.0	4.4	2.8	60	-
03	Peizometer No3	7.39	773	594	600	57.8	308	9.4	11.2	3.0	68	-
04	Peizometer No4	7.38	732	564	567	82.9	330	17.2	7.7	3.2	68	-
05	Peizometer No5	7.15	1190	829	837	196	388	10.2	8.2	3.0	89	-
06	Ground water U/s of TSDF	6.77	517	372	378	92.6	442	22.10	8.8	3.6	44	-
07	Ground water D/s of TSDF	6.74	508	352	365	88.7	440	22.0	8.2	3.6	51	-
08	Leachate	7.83	14700	11088	11123	3350	-	-	-	729	2699	27

**All values are in mg/L except pH & Cond (µS/cm).*

14.3.4 Status of Hazardous Waste disposal at Himachal Pradesh

TSDF - Majara Nalagarh, H.P. : The Hazardous wastes generated in Himachal Pradesh are disposed in Common Treatment, Storage & Disposal facility (TSDF) at village Majara Nalagarh having landfill areas 191 bigha (144031 sq.m.) with capacity for 20 years operation for disposal of 9 lakh tons of waste. TSDF is operational since June 2008 & has received about 12000 MT of waste. 20 m^3 capacity multiple effect evaporator has been installed, which is used for treatment of waste water generated by washings of container, vehicles & leachates etc. So far 670 units have become members of TSDF. Some of the industries are not sending their hazardous waste regularly to TSDF site.

14.3.5 Issues on Common TSDFs and Illegal Hazardous Waste Dumpsites in Punjab

Punjab has third highest number of captive HW incinerators numbering 17 preceeded by Gujarat (35) and Andhra Pradesh (26). The performance of these 17 captive incinerators needs to be monitored. HW generation in Punjab is provided below :

Landfillable	:	13,601 MTA (11.5%)
Incinerable	:	14,831 MTA (12.6%HW
Recyclable	:	89,481 MTA (75.9%)
Total	:	1, 17,913 MTA

There is one Common TSDF at Nimbua, Derabassi, which is a secured landfill disposal facility having capacity of 13,000 MTA. Some observations are given below :

- The provisions of the CPCB guidelines on storage of incinerable hazardous wastes need to be implemented in all the 17 captive incinerator sites.
- The feedback report as per the CPCB's guidelines on "Protocol for Performance Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities" is pending from the Nimbua TSDF.
- 12 illegal hazardous waste dumpsites were reported by Punjab SPCB. The assessment & rehabilitation plan for these sites and its implementation plan is awaited from the SPCB.

14.3.6 Guidelines for solidification / stabilization of heavy metals in hazardous waste

Disposal of landfillable hazardous waste in secured landfill is carried out either by direct land-filling or after stabilization with chemicals. The practice followed for stabilization of these wastes need to be monitored in order to ensure safe disposal of stabilized hazardous waste without causing adverse affects to environment. CPCB has initiated development of guidelines for stabilization / solidification procedures in collaboration with Indian Institute of Science, Bangalore.

14.3.7 Assessment of technical capabilities, readiness and feasibility of incinerating / disposing of the toxic wastes of UCIL Waste

A committee was constituted with the responsibility of re-assessing the technical capabilities, readiness and feasibility of incinerating/ disposing of the toxic wastes of UCIL. The Task Force comprised of the following members:

1.	Prof.S.P.Gautam, Chairman, CPCB	-	Convener
2.	Shri R.K.Jain, Chairman, MPPCB	-	Member
3.	Dr.Tapan Chakrabarti, Acting Director, NEERI	-	Member
4.	Dr.A.Krishna Reddy, Scientist E.II, IICT	-	Member
5.	Dr.Chhanda Chowdhury, Director, M/o E&F	-	Member
6.	Shri Jasbir Singh, Industrial Advisor, D/o C&PC	-	Member

Five TSDFs in proximity to UCIL, Bhopal were identified and aspected between 12/9/2009 to 12/10/2009 for re-assessment of the facilities for incineration of UCIL wastes. The facilities are located in MP, Gujarat, Maharshtra and Andhra Pradesh. The inspection report including the ranking of the five TSDFs was submitted to the Ministry of Chemical & Fertilizers, Govt. of India.

14.3.8 Contaminated Site Remediation

The Supreme Court Monitoring Committee (SCMC) observed 141 illegal hazardous waste dumpsites in its report submitted to the Hon'ble Supreme Court in November 2006 in the matter of Writ Petition (Civil) No. 657 of 1995 (Research Foundation for Science, Technology and Natural Resource Policy Vs Union of India and Others). Central Pollution Control Board re-constituted the committee, the first meeting of which was held on 11/11/2009. The Committee reviewed the status of dumpsites and suggested a format for reporting by SPCBs/PCC. The committee also recommended co-processing of waste in cement industry and utilization of waste for recovery of metals etc. wherever feasible as a preferred option for disposing HW at the dumpsites or conventional disposal into secured landfill or by incineration.

A three days training programme on "Mass Transport Modeling of Hazardous Waste Dumpsites" was organized by Central Pollution Control Board at National Geophysical Research Institute (NGRI), Hyderabad during April 20-22, 2009, which was attended by, officials of SPCBs/PCC and CPCB.

14.3.9 Project on "Waste Identification, Characterization, Minimization and Management in Hazardous Waste (Schedule IV) recycling units' under Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008

CPCB in collaboration with NPC, Delhi has taken up the study on "Waste Identification, Characterization, Minimization and Management in Hazardous Waste (Schedule IV

items, Used Oil, waste Oil) Recycling units'. The objective of the project to identify measures for waste minimization and waste management in Hazardous Waste recycling units covering the following aspects:

i. Detail process study in representative industries
ii. Identification & Characterization of major waste streams
iii. Generation of baseline data related to raw material input/product output/waste generation for various categories of HW Recycling industries
iv. Identifying ofWaste Minimization measures for various categories of HW recycling industries
v. Feasibility analysis of Waste Minimization Measures
vi. Recommendation of waste minimization and waste management measures for various categories of HW recycling industries

The Hazardous Waste recycling units for the study were divided into eight categories namely copper waste, zinc waste, brass waste, nickel waste, used oil, waste oil, lead bearing waste, paint and ink sludge and miscellaneous waste recycling units. Inventorization of hazardous wastes of the recycling units is proposed, the units shall be classified w.r.t raw material, process, scale of operation etc. Preliminary visit to about 50-70 units, covering all categories have been carried out for dry study. The detail process study shall be carried out in each identified representative units.

14.3.10 Utilization of Hazardous Waste

The Rule 11 of the Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008, stipulates that the utilization of hazardous wastes as a supplementary resource or for energy recovery, or after processing shall be carried out by the units only after obtaining approval from the Central Pollution Control Board. So far 5 units were given approval under Rule 11 for Recycling/Recovery other than Schedule IV items. To make the process for such approval quick and easy and to encourage usage of hazardous waste as a supplementary resource or for energy recovery or after processing, Central Pollution Control Board has constituted an in-house committee for the same and aslo to guide the applicants in this regard. A format has also been prescribed by the committee so as to maintain uniformity in the application process.

CPCB has already taken up trial run for co-processing of few categories of wastes and granted regular permission for the same. Based on satisfactory performance of trial run, 22 cement manufacturing units in various States have already started co-processing of these categories of wastes with the approval of CPCB. Further, trial runs for various other categories of wastes are in progress. Applications for use of hazardous wastes such as incinerator ash, ETP Sludge, spent acid, distillation residue, chromium (3 and

6), spent pot lining etc. as supplementary resource /energy recovery in other applications are also being evaluated.

14.3.11 Road Map for Management of Hazardous Waste

A draft road map for hazardous waste management has been developed by Central Pollution Control Board and the same has been forwarded to MoEF for consideration and publication. The road map emphasizes the 3 R's principle i.e. reduce, reuse and recycling and suggests various actions such as creation of waste exchange bank, proposal for incentives to re-processors with state-of-the-art facilities to meet CPCB guidelines & beyond, performance evaluation of TSDFs, on-line tracking system for movement of hazardous waste etc.

14.3.12 Import – Export of Hazardous Wastes

a. CPCB is an active member of the TRC of MoEF constituted to regulate import and export of hazardous waste in the country by way of carefully implementing the provisions made in the Hazardous Waste (Management, Handling & Transboundary Movement) Rules 2008. The meetings are convened regularly to process the cases. The broad guidelines being followed in granting permission for import and export of hazardous wastes are as follows-

i. Import shall be permitted only for recycling & recovery purposes and in no case for dumping / disposal of the same.
ii. The import of those categories of wastes which are already available in sufficient quantities in the country will not be permitted. The import will be permitted only for those types of wastes for recycle & recovery, which are not available in India in sufficient quantities and permitted in Schedule III (Part A, B & C).
iii. After satisfying the criteria in (i) & (ii) above, import will be permitted for around 30 % of the capacity permitted in 'Registration Certificate' granted by CPCB. Balance capacity to be utilized by the Recycler to reprocess the HW available in the country.
iv. A large number of applications are received by the MoEF for import of the lead scraps for recovery of lead metal. It was recommended by the committee that the industries having 'State of the Art' technologies will be given preference to import. It was also recommended that looking towards the lethal characteristics of the lead, the industries shall be asked to undertake the following monitorings for all the relevant parameters with particular reference to lead on regular basis either at their own or through reputed & recognized Consultant of the field.

- Stack emission monitoring
- Ambient air quality monitoring in the work zone & surroundings of the industry.
- Soil sample analysis in & around the industries.

- Medical examination of the blood samples of the employees / workers of the industry.

v. It was also decided that at the time of renewal of the 'Import Permission', two members of the TRC will visit the industry to verify the pollution control practices and compliance status.

vi. In case of import of plastic waste, it is being ensured by the committee that import of the only those categories of plastic wastes having no chances of their contamination through infectious substances/wastes (Part C – H-6.2 of Schedule III), be permitted.

b. CPCB actively participated in the activities of the 'Coordination Committee' constituted by MoEF to coordinate with other ministries / departments to ensure effective implementation of Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 with particular regard to imports & exports of hazardous wastes for recycling and recovery purposes. In light of the complaints received on import of MSW with other wastes like waste papers and phosphor coated cathode ray tubes, a meeting of the 'Coordination Committee' was convened at 'Jawaharlal Nehru Custom House', Nava Sheva Ports, Mumbai in the month of December and attended by all the concerned departments viz. MoEF, CPCB, Port Trust Authorities, Maharashtra Pollution Control Board, Industrial Associations and NGO. During the visit, a number of containers were inspected at the container yard. During the meeting, all the stakeholders were requested to contribute towards saving the environment by way of effective implementation of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules 2008 and prevention of illegal traffic of hazardous wastes.

14.3.13 Protocol for Performance Evaluation of Common Hazardous Waste (HW) Treatment, Storage & Disposal Facilities including Hazardous Waste incinerators.

The Common Hazardous Waste Treatment Storage and Disposal Facility operators or Common Hazardous Waste Incineration operators are required to strictly follow the guidelines issued by CPCB from time to time for development as well as operation of the Common TSDFs / Common HW Incinerators under the HW Rules, 2008 and amendments made thereof.

To ensure implementation a protocol for performance evaluation of the TSDFs was developed. As per the protocol, basic information needs to be provided by the operator of the facility in the prescribed format at the time of setting up of the facility or prior to the commissioning of the facility by 31 December 2009 by the existing operators besides periodic updation of the information on a quarterly basis. Subsequently, the regulatory authorities are required to carry out physical verification of the information submitted by the facility operator and further action if required to be initiated under the

Environment (Protection) Act, 1986, for violations of the provisions if any by the Common TSDF Operators.

14.3.14 Status of HW Incinerators

a. Status of Common HW Incinerators

Gujarat, Maharashtra and UT of Daman, Diu & Dadra, Nagar Haveli have six 6 common HW TSDF (with landfill, stabilization and incineration facility) for proper disposal of HW generated in the region. The following CHWTFs were monitored by Zonal Office Vadodara :

- ✓ M/s Gujarat Enviro Protection and Infrastructure Ltd (GEPIL), Surat
- ✓ M/s Bharuch Enviro Infrastructure Ltd. (BEIL), and
- ✓ M/s Membar Waste Management, Taloja, Mumbai

Table 14.44: Emission Monitoring Results of HW Incinerators Taloja, Maharashtra:
M/s Mumbai Waste Management Site, Taloja

Date of Monitoring	Location	Stack attached to	SO_2 (mg/Nm³)	NOx (ppm)	HCl mist (mg/Nm³)	H_2S (mg/Nm³)	Cl_2 (mg/Nm³)	HF (mg/Nm³)	NH_3 (mg/Nm³)	PM (mg/Nm³)
24.09.2009	M/s Mumbai Waste Management Site	HW incinerator	8.6	11.2	7.38	16.1	0.081	166	56.64	403
24.09.2009	M/s Mumbai Waste Management Site	HW incinerator	7.14	17.0	4.38	BDL	0.036	215	101.75	158

BDL-Below detectable limit.

Table 14.45: combustion efficiency of H.W. Incinerators Taloja, Maharashtra:
M/s Mumbai Waste Management Site, Taloja

CE	% CO_2	% CO	CO(mg/Nm³)	% O_2
99.9%	4.8	0.0035	40.08	14.5
97.8%	6.8	0.1474	1688	13.3

Note: *All values are corrected to standard 11% O_2 concentration. The values of percent CO_2, CO and O_2 are obtained as observed by M/s Vimta Laboratories, Hyderabad using flue gas analyzer.*

Table 14.46: Emission Monitoring result of H. W. Incinerators Ankleshwar, Gujarat:
M/s BEIL,Ankleshwar

Date of Monitoring	Location *	Stack attached to	SO_2 (mg/Nm³)	NOx (ppm)	HCl mist (mg/Nm³)	HF (mg/Nm³)	PM (mg/Nm³)
12.10.2009	M/s BEIL, TSDF Site Ankleshwar	HW incinerator	6.9	25.73	11.6	6.1	27.28

Table 14.47: Emission Monitoring results of HW Incinerators Surat, Gujarat

M/s GEPIL, TSDF site, Surat (Gujarat)

Date of Monitoring	Location *	Stack attached To	SO_2 (mg/Nm³)	NOx (ppm)	HCl mist (mg/Nm³)	PM (mg/Nm³)
03.12..2009	M/s GEPIL, TSDF site, Surat	H W incinerator	BDL	22.6	7.4	154

* All values are in mg/l and connected to standard *11% O_2 concentration*

The salient features are as follows :

i. A new CHWDF facility has been developed by Industrial Infra-Structure Service (industrial) Ltd. UPSIDC Industrial Area, Banthar . Till date CHWDF has received 1701 MT of HW.

ii. Common Hazardous Waste Treatment, Storage and Disposal facility established by M/s Uttar Pradesh Waste Management Project (A division of RAMKY Enviro Engineers Ltd) is located at Kumbhi, Kanpur Dehat (UP). This facility consists of two cells of capacities 75,000 MT and 70,000 MT respectively.

iii. Another treatment facility operated by M/s Bharat Oil, Kanpur Dehat has holding capacity of 50,000 MT has been established So for, the facility has received 1780 MT of waste, there are 88 member units in this facility.

iv. In Punjab, Common Hazardous Waste Treatment, Storage and Disposal facility was established by Punjab Waste Management Project (A division of RAMKY Enviro Engineers Ltd) located at Nimbua having four cells of capacity 75000 MT.

v. In Haryana, Common Hazardous Waste Treatment, Storage and Disposal facility has been developed at Pali, which is likely to be commissioned before March 2010 having storage capacity for 20 years. It was estimated that the total generation of hazardous waste in the State was 16232 TPA.

vi. The Hazardous wastes generated in Himachal Pradesh are disposed in Common Treatment, Storage & Disposal facility. (TSDF) at village Majara Nalagarh , landfill of area 191 bigha having capacity for 20 years to hold 9 lakh tons of waste. TSDF is in operation since June 2008, has received 7987 MT of waste. 20 m³ capacity multiple effect evaporator has been installed, which is used for treatment of water by washings of container, vehicles & leachates etc. there are 602 member units of this TSDF.

c. Status of Captive HW Secured Landfill Sites

The salient features on SLFs are as follows :

i. Out of 25 captive SLFs 12 are in Rajasthan, 11 in Madhya Pradesh and two in Chhattisgarh states. Captive SLF is only a temporary storage facility until the TSDF is established. However industries are not willing to shift the waste to TSDF because of transportation of waste over large distances to TSDF and reported that charges for treatment and disposal at TSDF was very high.

ii. Eleven captive secured landfill (SLF) sites (closed / operating / under construction) in Madhya Pradesh were monitored.

Table 14.48 : Analysis report of heavy metals of the samples collected from captive SLFs in MP

S. No	Location	Unit	Copper	Zinc	Chromium	Lead	Arsenic (ppb)
M/s Lupin Limited, Mandideep							
01	Piezometer well-I, SLF-I (old)	mg/l	0.012	0.13	BDL	BDL	BDL
02	Well-II SLF-I (old)	mg/l	0.332	0.21	BDL	0.14	BDL
03	Piezometer well-I, SLF-II (new)	mg/l	0.013	0.11	BDL	0.09	BDL
04	Bore well No.2 water	mg/l	0.01	0.01	BDL	BDL	BDL
05	Leachate collection sump for SLF-I (old)	mg/l	0.792	0.74	0.19	8.15	BDL
06	Leachate collection sump for SLF-II,(new)	mg/l	0.053	1.07	BDL	BDL	BDL
07	Incinerator thimble	mg/kg	0.397	BDL	0.23	0.15	ND
08	Ash, SLF-II (new)	mg/kg	251.2	328.0	104.0	371.0	-
09	Sludge, SLF-II (new)	mg/kg	46.5	53.0	16.0	195.0	BDL
M/s Ranbaxy Ltd, Dewas							
01	Leachate	mg/l	0.058	0.26	BDL	BDL	BDL
02	Piezometer S-1 tube well D/s	mg/l	0.032	0.01	BDL	BDL	BDL
03	Piezometer S-2 D/s	mg/l	0.024	BDL	BDL	BDL	BDL
04	Ash (Incinerator Dumpsite SLF)	mg/kg	23.3	34.0	15.0	231.0	BDL
M/s Grasim Ind Ltd.(Chemical division), Nagda							
01	Leachate collection sump	mg/l	0.384	0.13	0.21	0.09	-
02	Piezometer Pardi gate U/s	mg/l	0.363	0.46	BDL	0.30	BDL

S. No	Location	Unit	Copper	Zinc	Chromium	Lead	Arsenic (ppb)
03	Piezometer near Hydrogen bottling plant U/s	mg/l	0.073	0.04	BDL	BDL	BDL
04	Piezometer P-3 U/s (Chlorine Yard)	mg/l	0.013	0.03	BDL	BDL	BDL
05	Piezometer P-4 D/s	mg/l	0.029	0.11	BDL	BDL	BDL
06	Piezometer Sai Khamat Service center, P-5	mg/l	0.013	0.03	BDL	BDL	BDL
07	Piezometer new staff colony P-6	mg/l	0.022	0.04	BDL	BDL	BDL
08	SLF Sludge	mg/kg	29.8	33.0	83.0	123.0	BDL
M/s Century Denim, Khargon							
01	Chemical Sludge	mg/kg	32.2	38.0	124.0	116.0	BDL
M/s Hukumchand Jute Mills, Amlai							
			pH	Mercury			
01	Piezometer No.4		7.04	BDL	-	-	-
02	Piezometer No.6		7.31	BDL	-	-	-
03	Piezometer No.8		7.14	BDL	-	-	-
04	Mercury Sludge at SLF (wet)	mg/kg	9.32	18.88	-	-	-

Note :BDL= Below Detectable Limit., ND = Not Detectable.

14.4 BIO-MEDICAL WASTE MANAGEMENT

14.4.1 Status on Bio-medical Waste Management Scenario in the Country

For effective management of bio-medical waste generated from Health Care Facilities (HCFs), Government of India promulgated Bio-medical Waste (Management & Handling) Rules in July 1998 (hereafter referred as BMW Rules) under the Environment (Protection) Act, 1986. These rules were further amended to fill the gaps experienced while implementing the said Rules. As per Rule 10 of the BMW Rules, every occupier/operator of a common bio-medical waste treatment facility shall submit an annual report to the prescribed authority in Form II by 31 January every year, to provide information about the categories and quantities of bio-medical wastes handled during the preceding year. Subsequently, the prescribed authority shall send this information in a compiled form to the CPCB by 31 March every year. There has been increase in number of CBWTFs over the years presently there are 177 CBWTFs to facilitate proper treatment and disposal of bio-medical waste in the country. Based on the annual report information received from the SPCBs and PCCs (except Lakshadweep Pollution Control Committee as on 31 March 2009), salient features are given as follows:

i. No. of healthcare facilities : 95,273

ii. No. of beds : 1418984

iii. No. of Common Bio-medical Waste Treatment Facilities (CBWTF): 177

iv. No. of healthcare facilities (HCFs) using CBWTFs : 63434

v. No. of healthcare facilities applied for authorization : 61293

vi. No. of healthcare facilities granted authorization : 58845

vii. Quantity of bio-medical waste generated in Tons/day : 409.10 *

viii. Quantity of bio-medical waste treated in Tons /day : 295.30

ix. No. of incinerators (excluding CBWTFs)

- With Air Pollution Control Device : 302
- Without Air Pollution Control Device : 153
  - a. No. of autoclaves : 2008
  - b. No. of microwaves : 265
  - c. No. of Shredders : 2274

Note: ** Above details excludes the bio-medical waste generated from Lakshadweep UT as well as Bio-medical wastes generated (about 4.2 Tons per day) from Armed Forces Health Care Establishments*

14.4.2 Inspection /Evaluation of Health Care Facilities (HCFs) and Common Bio-medical Waste Treatment Facilities (CBMWTFs) and Implementation of Bio-medical (Management & Handling) Rules, 1998

Twelve Military Hospitals located at Lucknow, Bareilly, Pathankot, Tibri, Amritsar and Jalandhar were monitored during April-May, 2009 while three Hospitals of Armed Force Health Care Eastablishments located at Jodhpur, Nasirabad & Jaipur were monitored during July-August, 2009.

Three Armed Forces Health Care Establishments, located in the Maharashtra state were surveyed:

1. Military Hospital, Kirkee, Pune (Maharashtra)
2. Military Hospital (CTC), Golibar maidan, Pune (Maharashtra)
3. Military Hospital, Khadakwasla, Pune (Maharashtra)

The observations and recommendations made by the inspecting team have been sent to the DGAFMS for carrying out improvements in line with the provisions of the BMW Rules.

In addition to the above, CPCB (H.O) also monitored two HCFs viz. Dr. Hedgewar Arogya Sanshthan, Karkardooma, Delhi and Deepak Memorial Hospital & Medical Research Centre, Delhi-92 on 11.09.2009 & two HCFs under Director General, Armed Forces Medical Services, Ministry of Defence in Delhi NCR to assess the performance of the treatment equipment installed. The observations have been communicated to the Delhi Pollution Control Committee and Director General, Armed Forces Medical Services (in case of HCFs falling under Ministry of Defence) to take necessary action at their end.

The following CBWTFs were inspected and monitored for verifying the compliance

1. M/s Bhopal Incinerators, Bhopal
2. M/s Hoswin Incinerators, Indore
3. M/s M/s Hoswin Incinerators, Alwar
4. M/s Rajputana Biotech Incinerator, Sawai Madhopur
5. M/s Instromedix Pvt Ltd, Jaipur
6. M/s Rajputana Biotech incinerator, Jaipur
7. M/s Sales Promotors, Ajmer
8. M/s Elite Engineers, Jabalpur
9. M/s Davis Surgico, Gwalior
10. M/s. Medical Waste Solution, Kurnool, Andhra Pradesh
11. M/s Maridi Eco Industries, Thadipathri, Ananthpur, Andhra Pradesh.
12. M/s SembRamky Environmental Management P Ltd, Bangalore, Karnataka
13. M/s Shree Consultant, Mysore, Karnataka

Observations of some CBWTFs are given below :

a. <u>M/s Elite Engineers, Jabalpur</u>

- The ETP was not operating After chemical dosing & neutralization, the waste water is stored for use in horticulture. Values of COD & BOD of treated water sample collected from storage tank were not conforming to ETP outlet standards. Wastewater from washing of vehicles is not collected. No proper space/ concrete platform designed for washing of vehicles.
- Sampling platform, porthole and staircase for emission monitoring were not provided as per CPCB guidelines. Dumping place for ash within the premises was not as per the guidelines.
- No proper display board provided at the main gate of facility.

b. <u>M/s Davis Surgico, Gwalior</u>

- The ETP was working but not complying with the prescribed limits for BOD & COD.

- Wastewater from washing of vehicles was not collected, no proper space/ concrete platform designed for washing of vehicles.
- Sampling platform, porthole and staircase for emission monitoring were not provided as per CPCB guidelines.

c. CBWTF, Indore:

❖ Source emissions were monitored, however as the concentration of particulate matter in source emission was 192 mg/Nm^3.
❖ The concentrations of the parameters in the ETP outlet water was nearly double the concentration at ETP inlet, implying ETP was not operational .

d. CBWTF, Bhopal:

➢ The waste is collected from 223 Hospitals & Nursing Homes. The facility is serving 5,687 beds in and around Bhopal City.
➢ The capacities:
Incinerator – 100 kg/hr.
Shredder – 25 kg/hr.
Autoclave – 80 kg/hr.

- New incinerator & autoclave installed , shredder requires improvement.
- Poor handling and storage of incinerator ash was observed.
- Plastic contaminated wastes is dumped in open without treatment.

e. CBWTF, Jaipur :

1. It is a 10 years old plant, the incinerator, pipes and ducts are corroded by corrosion resulting in fugitive emissions. During monitoring on 22.01.2010, the primary and secondary chambers temperatures were noted as 790°C & 213°C respectively. ETP was not in operation and the untreated effluent was being discharged outside the premises in the adjacent Nallah.
2. Plastic and waste glasses sold to unauthorized persons after disinfection and shredding. Employees not provided with the safety devices like aprons, mask, gloves etc. Very poor in – house waste management, segregation not proper.
3. Records being maintained properly. RSPCB issued notice and asked bank guarantee of Rs 2.5 lakh for not meeting the norms. The staff are newly recruited and not aware of the guidelines of the incinerator operation etc. Stack, AAQ and waste water quality monitoring not conducted regularly.
4. The Facility did not have valid Consent under the water Act 1974 and Air Act, 1981, no ETP for the treatment of waste water generated from the washing, cleaning of floor etc.
5. There was no segregation of the mixed waste at incineration site and also at point of its generation. The incinerator should be operated properly and the waste

should be incinerated only after maintaining the required temperature in both the chambers.

Table 14.49: Report on the four Units Inspected

S.No.	CBMWT Facility	Action Taken
1	M/s. Medical Waste Solution, Kurnool, Andhra Pradesh	Directed to improve overall performance of the unit. ATR is pending with the unit & present status to be verified.
2	M/s Maridi Eco Industries, Thadipathri, Ananthpur, Andhra Pradesh	Direction issued under Section 5. Undertaking in the form of affidavit is pending with the unit.
3	M/s SembRamky Environmental Management P Ltd, Bangalore, Karnataka	Direction issued under Section 5. Unit has submitted ATR to CPCB. Compliance status verified and monitoring to be carried out.
4	M/s Shree Consultant, Mysore, Karnataka	Direction issued under Section 5. unit had submitted bank guarantee and 50% of amount forfeited. Case is pending with the court.

14.4.4 Evaluation of new proposed State of Art treatment technologies for safe disposal of Bio - medical Waste

Central Board constituted an expert committee under the Chairmanship of Dr. T.K. Joshi, Director, Department for evaluation of the new state of the treatment technologies for disposed of Bio Medical Waste of Occupational Environment & Health, Maulana Azad Medical College, New Delhi. The 9th meeting of the expert committee was held on January 04, 2010, wherein five proposals concerning the state-of-the-art technologies for treatment of bio-medical waste received were considered for approval as required under the Bio-medical Waste (Management & Handling) Rules, 1998 its amendments made thereof.

The Committee in principle, recommended for approval under Schedule I of the BMW Rules the following :

- ✓ 'Plasma Pyrolyis Technology' (PPT) for treatment of bio-medical waste category no. #01 and #02.

- ✓ The equipment namely 'Sharp Blaster' for treatment of only 'waste sharps'

The said Committee suggested CPCB to work on the conditions to be imposed, while granting approval as required under the BMW Rules to the above two technologies as per the BMW Rules notified under the E (P) Act, 1986.

14.4.5 Proposed amendments to the Bio-medical Waste (Management & Handling) Rules, 1998

As per Ministry of Environment & Forests (MoEF) letter No. 3-1/2000-HSMD (Pt.) dated May 21, 2009 CPCB prepared a "draft proposed amendments" on the above subject based on the draw backs observed, inputs received from the various stakeholders namely SPCBs/PCCs/IMA/CBWTF Operators after the interactive meet on BMW management held on August 08, 2008. Various issues considered and the draft proposed amendments to the Biomedical Rules are as follows:

1) Wastes like hazardous waste, radioactive wastes, used lead acid batteries and chemicals to be dealt as per the respective provisions;
2) Suggested duties of the occupier, operator of a common bio-medical waste treatment facility, duties of the identified responsible authorities;
3) Encouraging on-site treatment facilities like autoclaving/microwaving, shredder or any other technology approved by CPCB, by the HCFs and incinerator to be as a part of the CBWTFs;
4) Prohibition of use of chlorinated plastic bags for storage of wastes and its incineration by occupier or operator of a facility;
5) More responsibility to the advisory committee to be constituted by the State/UT Govt. to advise the Govt. for implementation of the Rules;
6) Form for submission of annual report modified with more clarity for submission of the information by the Occupier or Operator of a Facility;
7) Provision of levying fine introduced for violations of the provisions by the HCFs/operator of a treatment facility;
8) More clarity w.r.t the category-wise treatment and disposal option has been provided;
9) Disposal of bio-medical waste by deep burial is proposed to be encouraged only in rural areas with prior approval of prescribed authority;
10) Three Colour coding system (Yellow, Blue, and black) in place of four and multiple colour coding system for storage of wastes has been suggested;
11) Once in three months the incinerator operator has to submit the stack emission analysis results to SPCB/PCC; and
12) Identified various authorities responsible for implementation of rules and entrusted with responsibilities

Presently, the amendments are actively under consideration of MoEF.

14.4.6 Road Map for Management of Bio-medical Waste

Based on the recommendations of the 'Principal Director of Audit, Scientific Department, New Delhi' on the Performance Audit Report on 'Management of Waste in India', Ministry of Environment & Forests (MoEF), constituted a Committee under the Chairmanship of Shri R.H.Khwaja, Additional Secretary, Ministry of Environment &

Forests vide its office order No. 12-19/2008-HSMD dated November 18, 2008 to evolve a 'Road Map' for Management of Wastes including Bio-medical Waste Management in the Country. Accordingly, the draft road map on bio-medical waste management has been prepared emphasizing the following:

i). Amendments required for Bio-medical waste (M & H) Rules, 1998 notified under the Environment (P) Act, 1986;
ii). Identified activities which require attention for effective management of Bio-medical Waste and fixed time frame for compliance of the identified activities, by the concerned regulatory authorities.

The draft road map prepared was communicated to MoEF.

14.4.7 Organization/sponsoring of programmes on Bio-medical Waste Management

CPCB organized two, one day workshops on Bio-medical Waste Management in association with the Tamil Nadu and Gujarat State Pollution Control Boards on December 29th 2009 at Chennai for southern SPCBs/PCCs, HCFs & CBWTFs as well as DGAFMS officials and on 30.01.2010 at, Vadodara for Western SPCBs/PCCs, HCFs & CBWTFs as well as DGAFMS officials.

The Zonal Office made a presentation on "Management of Bio-medical Waste in an Armed Force Hospital" in "97th Indian Science Congress", held during Jan 3-7, 2010, at Thiruvananthapuram.

14.5 BATTERY MANAGEMENT & HANDLING RULES -2001

14.5.1 Status of implementation of the Battery (Management & Handling) Rules-2001

The above rules were notified in May 2001 with the following objectives :

i. To have proper control and record keeping on the manufacturing / import of lead acid batteries and re – call of used lead acid batteries.
ii. To have control on recycling of the lead components of the used battery in a environmentally sound manner to minimize the chances of any sort of pollution / hazard due to lead.
iii. To create public awareness through advertisements, publications, posters or by other means with regard to the hazards of lead and responsibility of consumers to return their used batteries only to the dealers or deliver at designated collection centers.

After notification and with the passage of time the following are the observations :

i. The compliance of the rules at the level of almost all the stake holders was unsatisfactory.
ii. Majority of SPCBs are not filing the annual compliance status reports to CPCB.
iii. The re-call of used lead acid batteries by the unorganized sectors and its recycling in an unscientific manner is still taking place, thereby causing environmental concern.

In order to formulate the 'Code of practice for Environmentally Sound Management of Used Lead Acid Batteries', a committee comprising of the Experts from CII, ILZDA and CPCB was constituted and meeting convened in CPCB on April 02 2009 to finalize the guidelines. For reviewing the pollution potential from lead recycling units, NPC has been engaged by CPCB to prepare the comprehensive industry document (COIND) on 'Secondary Lead and Zinc Smelting Units'.

14.5.2 Amendment in the Battery Rules

Mass awareness programmes were organized at Mumbai, Jaipur and Bangalore during 2008-09 and at Kolkata and Jallandhar in 2009-10 by CPCB jointly with SPCBs. In these programmes all the stakeholders viz. manufacturers, importers, re-conditioners, assemblers, dealers, recyclers, consumer and bulk consumer, SPCBs and CPCB were invited. The major suggestions emerging from the workshops are summarized below:

(i) The need to enhance the frequency of mass awareness programmes and organize the same at district levels jointly with the SPCBs, dealers, manufacturers and importers.
(ii) Re - conditioners are mostly found in roadside shops hence unorganized sector. There number is large and not covered under the consent mechanism. It may be examined whether they can be covered under the municipal laws (through issue of trade license) with technical support from SPCB.
(iii) Establishment of 'Authorized Collection Centers' by Battery Manufacturers needs to be publicized and made more visible & accessible to the public.
(iv) Unauthorized & illegal Recyclers (smelters) are still operating in the country almost everywhere and responsible for violating the provisions of the rule to a great extent. To have proper control on these illegal smelters, there is a need to prevent the supply of raw materials to them. The suppliers of the raw materials are the roadside small shopkeepers which are paying more buy-back amount to the consumers for the used lead acid batteries. They have the advantage of 'no paper work-no scrutiny. ' These road side shopkeepers are in operation in large numbers in all the Indian cities and the quantum of the used lead acid batteries collected by them appears to be much more than the authorized collection

centres & dealers. This loophole needs to be plugged. SPCBs need to initiate strict legal action against the illegal smelters.

(vii) The re-collection of the used batteries by the importers is very poor and no responsibility is fixed.

(viii) There should be some provision for rebate in the Excise Duty and VAT for recovered batteries.

(x) The exact definition of 'Bulk Consumer' in the said rules is not available. This must be elaborated with particular regard to capacity and numbers of the lead acid batteries being used.

(xi) The time target fixed for SPCBs to send the annual compliance report to CPCB is 30th April of every year. On the other hand, they are getting the Returns from the different stakeholders by 30th June. Some of the SPCBs suggested to modify the date of filing of report accordingly.

(xii) Returns are not being filed regularly by the stake holders. Lots of correspondence is to be done by the SPCBs. Some file only numbers and some only weight of batteries collected. SPCBs are finding it difficult to compile & draw conclusion on the data recived once in six months, incorporating penalty clause in the rules be explored.

(xiii) Manufacturers rarely report on violation of the Rule by dealers. Rules should be re-looked regarding the responsibility of dealers. The discount payable by dealers for the used battery buyback should be made public by the manufacturers and dealers.

(xiv) The importers are not filing the returns regularly. Conditions being imposed on them need to be re-looked. IT industries import or purchase UPS batteries for self use, which lasts for about six years.

Based on the suggestions received during the workshops and subsequent meetings at MoEF, the amendments have been proposed..

14.5.3 Environmentally Sound Management of Used Lead Acid Batteries

In order to advise the GoI on the code of practice to be adopted for environmentally sound management of used lead acid batteries, an expert committee was constituted by CPCB comprising representatives from CPCB, Confederation of Indian Industries (CII) and Indian Lead Zinc Development Association (ILZDA). The following measures were suggested by the Committee for environmentally sound management of the waste lead acid batteries-

A. At the level of Dealer :

i. For proper check on the movement & management of waste lead acid batteries, the dealers must submit a copy of the return in Form No. - V to SPCBs /PCCs also in addition to the one filed to the Manufacturers by 31st May and 30th November every year i.e., a statement of return towards sale of new batteries and collection of old batteries for the specified period.

ii. All the dealers must get themselves registered with SPCBs/ PCCs at a nominal cost of Rs. 1000/- or so. This registration shall be valid for a period of 3 years and thereafter renewed depending upon the environmental conditions maintained by them. The SPCBs / PCCs will make necessary arrangement for providing the one page form online. The revenue generated from the collection of Registration Fee shall be utilized for creating mass awareness.

iii. As the dealers are also collecting the used batteries under the buy-back scheme, they must have proper arrangement for storing of the used batteries. The storing hall should have adequate size, proper ventilation and floor & walls with acid proof tiles.

iv. Before auction, the residual acid in the used batteries should be properly drained, collected and stored in the plastic containers. This acid may be reused/recycled or properly neutralized and sludge should be sent to nearby approved TSDF to eliminate the chances of going of lead into the environment.

v. All the measures shall be taken to ensure the auction / supply of used batteries to only the Registered Recyclers.

vi. The transportation of the used batteries to local collection centre / actual user site should be in accordance with the provisions made in Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and the rules made by the Central Government under the Motor Vehicle Act – 1988.

B. At the level of Collection Centers-

i. There should be sufficient number of collection centres to facilitate the public deposit their used batteries without travelling long distances. The information about the location of these collection centres to be kept in public domain by way of advertisement in the local news papers, satellite TV channels and hoardings. The local administration may provide space for establishment of local collection centres.

ii. The collection centres should have proper adequate arrangement for storing of the used batteries. The storing hall should have adequate size, proper ventilation and floor & walls with acid proof tiles.

iii. Before auction, the residual acid in the used batteries should be properly drained, collected and stored in the plastic containers. This acid may be reused / recycled or properly neutralized and sludge should be sent to nearby TSDF to eliminate the chances of going of lead into the environment.

iv. All the measures shall be taken to ensure the auction / supply of used batteries to only the Registered Recyclers.

v. The transportation of the used batteries to actual user site should be in accordance with the provisions made in Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and the rules made by the Central Government under the Motor Vehicle Act – 1988.

C. At the level of Importers

The importers of batteries having the following measures may be given priority / privilege –

- Requisite environmental & personal protection equipments
- Medical examination of the personnel working therein on regular basis with particular regard to lead content in the blood, urine etc.

D. At the level of Recyclers

i. The transportation of the used batteries to actual user site should be in accordance with the provisions made in Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 and the rules made by the Central Government under the Motor Vehicle Act – 1988.

ii. The recycling industry must have proper arrangement for storing of the used batteries. The storing hall should have adequate size, proper ventilation and floor & walls with acid proof tiles. The storage of the waste at the processing site shall be such that the material will not come in contact with water.

iii. Entire operations / process in the industry i.e. storing of used batteries, breaking & separation of different components, melting of lead scraps and installation of air pollution control devices including chimney shall be conducted on impervious floors inside the shed to eliminate the chances of pollution of soil / ground water due to lead.

iv. For breaking of the batteries, automatic machines should be used to avoid the chances of coming in contact with the residual acid, lead plates and other components containing lead compounds. The washings from this hall and other portions of the industry should be properly channelized to ETP for neutralization and settling of the sludge. This sludge shall be sent to nearby approved TSDF.

v. The residual acid in the used batteries should be properly drained, collected and stored in the acid proof tank / plastic containers. This acid may be reused/recycled or properly neutralized and sludge should be sent to nearby TSDF to eliminate the chances of lead going to the environment.

vi. The discharge from ETP shall satisfy the following norms / standards-

Table 14.50: Concentration Based Standards

Parameter	Concentration Based Standards	
	Discharge into Water Body	Discharge into Sewer
pH	5.5 to 9.0	5.5 to 9.0
SS	100 mg/l	600 mg/l
COD	250 mg/l	250 mg/l
BOD	30.0 mg/l	350 mg/l
Lead	0.1 mg/l	1.0 mg/l
Zinc	5.0 mg/l	15 mg/l
Iron	3.0 mg/l	3.0 mg/l
Nickel	3.0 mg/l	3.0 mg/l

vii. The Recycler industry must have proper arrangement for storing the plastic cover and other PVC components of the broken battery.

viii. The lead plates shall be processed for recovery of lead by reduction process in furnace with proper optimization of process. The slag produced after the recovery of lead shall be reprocessed at least twice / thrice so as to extract the lead in the slag to the maximum extent possible, thereafter slag waste has to be disposed to TSDF.

ix. For the transition period, the recycler industry shall have requisite storing arrangement for dried sludge from ETP and slag from the furnaces in the form of a closed, covered and impervious room with restricted entry.

x. The leachate collection system shall be integral part of the TSDF and the leachate shall be further treated so as to meet the tolerance limit of heavy metals as under given in the Schedule VI, under the Environment (Protection) Act,1986

xi. Air pollution control system for reprocessing of lead scraps shall include Furnace, gravity settling chamber, cyclone(s), bag filter(s), agglomerator, ID fan and stack with a minimum of 30 meters height or as stipulated by the SPCB / PCC so as to meet the following emission standard.

Table 14.51: Emission Standard

Pollutant	Concentration Based Standards
Lead as Pb	10 mg/Nm3
Particulate Matter	50 mg/Nm3

xii. Entire air pollution control system including furnaces shall be installed in the shed to avoid the chances of discharge of APCD arresting containing lead into the environment during the rains.

xiii. The industry desirous of recycling or reprocessing the hazardous waste shall first obtain the Registration from CPCB by way of making an application in Form No. 5 accompanied with the copies of the following documents-

- Consent to establish, granted by the SPCB/PCC under the Water (Prevention & Control of Pollution) Act 1974 and Air (Prevention & Control of Pollution) Act 1981.
- Certificate of Registration issued by the District Industries Centre or any other government agency authorized in this regard.
- Proof of installed capacity of the plant by the District Industries Centre or any other government agency authorized in this regard.
- In case of renewal, certificate of compliance of effluent, emission standards and treatment and disposal of hazardous wastes as applicable from the SPCB/ PCC or the concerned Zonal Office of CPCB.

xiv. The recycler / re-processer shall maintain record of hazardous waste purchased and processed and shall file an annual return of its activities of previous year in Form No. 6 to the SPCB/ PCC on or before the 30th June every year as specified in Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008.

14.5.4 Manufacturing Process of Secondary Lead Production

Presently, lead acid battery accounts for about 75% of the lead consumption in India. The overall contribution of the secondary lead industry in the country is same as that of primary producers. The secondary lead plants are in large, medium and small scale sectors. The main source of lead in these plants is scrap lead acid batteries. Traditionally, the processing of lead acid batteries is carried out using pyro-metallurgy. The demand of primary lead can partially be met by encouraging recycling of lead scrap for production of secondary lead. This needs to be ensured through systematic collection of old/used lead-acid batteries and further processing in an environmentally sound manner.

14.5.5 Manufacturing Process of Secondary Lead Production-

i. From the old / scraps of the battery containing lead plates, the lead is separated and melted into ingots. A number of cycles are repeated to recover the lead from the scraps/ slags to the extent possible.

ii. One tonne of black battery contains approximately 750 kg. of lead and the final recovery of the lead is around 550 kg. the remaining lead goes into atmosphere in the form of lead oxides slags (irrecoverable lead).

iii. In case of white batteries, the recovery of final lead is more and up-to 60 % of the weight of battery. From the past experience, it is known that scraps of white batteries (1 tonne) consists of the following-

- Recovery of lead – approximately and up-to 60 %
- Plastics – 100-125 kg

- PVC Separator – 75-100 kg
- Slag – 5-7 kg (approx)
- Rest into environment through un-accountable sources.

Process flow diagram of a typical secondary lead recycling plant is shown below.

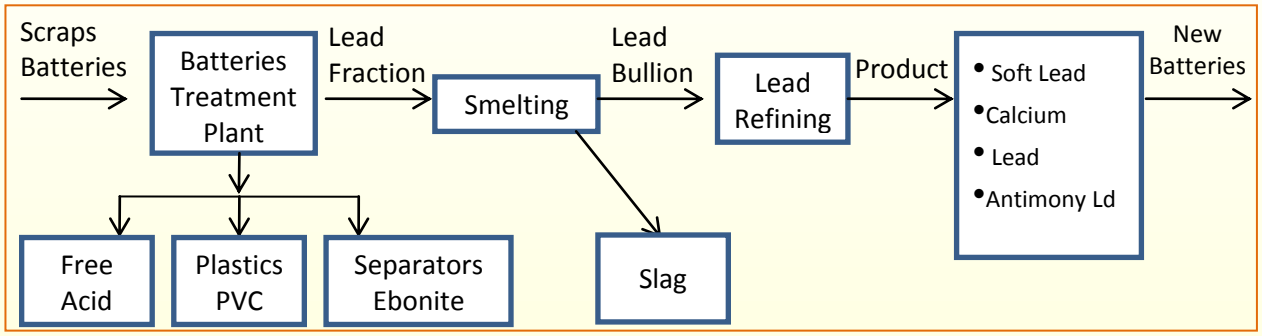


Figure 14.2: Process Flow Chart of Scrap Lead Acid Batteries Recycling Unit for Recovery of Lead

14.6 Municipal Solid Waste (MSW) generated in tons/cities along River Alakananda and River Ganga

The municipal solid waste generated in the towns/cities along the stretch of rivers is reported to about 260.4 tonnes/day (Table 14.52)

Table 14.52 : Status of MSW and Bio Medical Waste(BMW) Generation in Towns/Cities in Uttarakhand along River Alakananda and River Ganga

Town	Population	MSW (T/D)	BMW (Kg/D)
Badrinath	12500	1	-
Joshimath	14402	3	5
Gopeshwar– Chamoli	19775	4	1
Nandprayag	1433	0.5	-
Karanprayag	6976	6	5
Gauchar	7260	0.8	2
Rudraprayag	20200	3	10
Srinagar	19861	12	25
Kirtinagar	1040	0.5	-
Deoprayag	3000	0.6	-
Haridwar-Rishikesh	507854	229	214
Ranipur	59696	-	30
Total	6,73,997	260.4	292

In absence of any secured landfill site in these towns/cities, the entire solid waste is disposed along the slopes of the hills, which ultimately reaches the river.

Recommendations- The UEPPCB and the local bodies need to ensure :

- The facilities for scientific engineered land fill for disposal of municipal waste is non- existent in the entire region in all urban habitants along the River Alaknanda and this issue needs to be addressed urgently for compliance of the MSW Rules, 2000.
- Need for close monitoring and compliance of standards for existing/operating STPs and proper collection and disposal of the MSW management facilities in the region.
- The hotels/Dharamshalas located on the bank of rivers should not be permitted to discharge their untreated sewage to the river directly.

14.7 PLASTIC WASTE MANAGEMENT

14.7.1 Assessment of Plastic Waste and its Management in Railways & Airports

CPCB sponsored a project to M/s RITES Ltd. Gurgaon on 'Assessment of Plastic Waste Generation & its Management in Railways'

a) Railways

Delhi has three major railway stations (H.Nizmuddin, Old Delhi and New Delhi Railway Stations), which cater maximum commuters of National capital. There are 460 dustbins to store the waste at stations. The various segments of study i.e. Platform Vendors, Offices at station, Pantry cars, Waiting / Retiring Rooms, Dustbins, Rag Pickers, and Kabadis are decided depending upon the channel of supply i.e. source, distribution of plastic packaging materials and informal collection system of plastic waste. During the study, was observed that unauthorized waste pickers i.e. rag-pickers play an important role in collection & transportation of plastic waste from railway stations. The rag pickers collect only value added products like drinking water and soft drink bottles from tracks and platform for their daily earnings. There are about 235 to 260 rag pickers actively involved in the collection of value added plastic products. The solid waste generation at Hazarat Nizamuddin station is about 4 tonns, at old Delhi Station about 8 tonns and at New Delh Station about 11.25 tonns respectively. The quantity of plastic waste generation at Hazarat Nizamuddin station is 972 kg, is 1428 kg and at New Delhi station is 4,358 kg. Out of total quantity the value added plastic is 119 kg, 337 kg and 1508 kg respectively. The per capita plastic waste generation at H. Nizamuddin, Old Delhi and New Delhi is 7.8 gm, 9.5 gm and 9.7 gm respectively. There are 460 dustbins to store the waste at stations. But no separate dustbins provided for collecting of biodegradable and recyclable waste.

b) Airports : The domestic airport at New Delhi has three terminals, i.e. Terminal 1A and Terminal 1B and Domestic arrival terminal 1C. Terminal 1A caters to domestic

flights of the Indian Airlines and its subsidiary Airlines while terminal IB and IC caters to other airlines. The International Terminal or Terminal II of Indira Gandhi International Airport (IGIA) New Delhi, from where 35 international airlines fly at regular intervals to the major cities across the world. The study area includes, Terminal Vendors, Restaurants, Dustbins, Air Caterers and Waste collectors. The maximum quantity of plastic waste is being generated by air caterers as compared to other sources. The quantity of solid waste generated per day is about 14 tonns. There are 283 dustbins to store the waste at airport.

The total quantity of plastic waste generated at airport (domestic and International) is 4,130 kg per day. Out of which, 2,666 kg/day is generated at domestic airport and 1,523 kg/day at International airport. The contribution of plastic bottles alone amount to 80% of the total plastic wastes i.e 3,370 kg. The per capita plastic waste generation at Domestic and International airport is 70 gm and 68 gm respectively.

14.8 E-WASTE MANAGEMENT

The E-waste has been included in Schedule IV of Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008. As an outcome of this regulatory intervention, thirteen e-waste recycling facilities have been granted registration by CPCB. The total recycling capacity of these registered recyclers is 60157 MTA (about 15 % of the total e-waste generation in India).

14.8.1 Road Map for Management of E-waste

Based on the recommendations of the 'Principal Director of Audit, Scientific Department, New Delhi' on the Performance Audit Report on 'Management of Waste in India', Ministry of Environment & Forests (MoEF), HSM Division has constituted a committee under the chairmanship of Shri R. H. Khwaja, Additional Secretary, Ministry of Environment & Forests vide its office order No. 12-19/2008-HSMD dated November 18, 2008 so as to evolve 'Road Map' for Management of Wastes including E-waste Management in the Country. Accordingly a draft road map on e-waste management has been prepared emphasizing the following:

i. Strengthening of Legislative Frame Work - a draft rule on the management of e-waste is under preparation at MoEF in which CPCB has contributed significantly.
ii. Developing mechanism to check Illegal import of the E-Waste
iii. Making Legal Provisions for Extended Producer Responsibility (EPR)
iv. Phasing Out hazardous substance in Electrical Electronic Equipments (EEE) to the extent possible
v. Re-visiting import provisions in SEZ Regulation
vi. Regulating Charity Goods
vii. Banning Import of CRT
viii. Regulating Import based on longer usable life time
ix. Development of mechanism for Collection of Waste Electrical, Electronics Equipments (WEEE)

x. Involvement of Voluntary Organisation and Other Stake Holders
xi. Strengthening Infrastructure of Regulating Bodies including human resources
xii. Formation of Core Group at National and State Level
xiii. Surveillance of Goods at High Sea
xiv. Enforcements of RoHS Compliances
xv. Preventing Dumping of used/old equipment.
xvi. Study of International Practices for Management of E-Waste
xvii. Sharing of Information/Technology
xviii. Reduction of Hazardous Substances in EEE
xix. R & D Measures

The draft Road Map prepared was communicated to MoEF

14.8.2 Organisation of workshop for E-waste Management

CPCB Organized two one day workshop on E-waste on 7th July 2009 at Delhi and on 19th February 2010 at Bhopal for all the stakeholders including SPCBs/PCCs, Recyclers, NGOs etc.

14.9 NOISE POLLUTION CONTROL

14.9.1 Ambient Noise Monitoring Network Programme In India

As per section 5.2.8 (IV) of National Environmental Policy (NEP)-2006, CPCB is in the process of developing Noise Monitoring Network in India. It has been decided to include ambient noise as a regular parameter for monitoring in specified urban areas. The data will provide necessary information for decision makers, develop protocols for ambient noise monitoring network.

14.9.2 Protocol for Noise Monitoring:

a) Regulations : Standards have been stipulated for most of the major sources of noise, as well as ambient level of noise in different category areas vide Noise Pollution (Regulation & Control) Rules, 2000 is as follows:

Table 14.53: (Regulation & Control) Rules, 2000

Area Code	Category of Area/Zone	Limit in dB (A) Leq	
		Day	Night
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Day time shall mean from 6 AM to 10 PM

2. *Night time shall mean from 10 PM to 6 AM*
3. *Silence Zone is defined as areas up to 100 meters around such premises as hospitals, educational institutes and courts. The Silence Zones are to be declared by competent authority. Use of vehicular horns, loudspeaker and bursting of crackers shall be banned in these zones.*
4. *Environment (Protection) Third Amendment Rules, 2000 Gazette notification, Govt. of India, date 14.02.2000*

b) Site Selection: The following locations shall be covered :

- ✓ Ambient noise monitoring will cover all urban population initiated in the order of : megapolitan, metropolitan, state capital, class-I cities.
- ✓ Site in a city shall be selected such that each category (Industrial Commercial/ Residential/ Silence zone) of zone are represented.
- ✓ All locations close to the major site activities (construction/vehicular traffics/industrial/trains/crackers) which are likely to have noise impacts.
- ✓ Close to any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law and performing arts center.

c) Installation of Station: At remote (fixed) stations, there will be requirement of 4ft X 4ft RCC block for base foundation for fixing of 4m single mast for mounting Noise Monitoring Terminal (NMT).

d) Monitoring Frequency: Continuously monitoring is proposed for 24 hours. Duration proposed for 24 hours, 16 hours for day time from 06 AM to 10 PM and 8 hours for night time 10 PM to 06 AM with 1 second sampling period.

e) Monitoring parameters: Leq, L10, L90 (with 1 second sampling period)

f) Height of Instruments: 4-10m or as per requirement.

g) Selection of instruments/equipments: For Ambient Noise Monitoring it is proposed to choose remote station and Noise Monitoring Terminal (NMT) is the better option for this purpose as there is large number of stations which can be handled easily using this technology. NMT are optimized for outdoor use with small, custom designed enclosure, the NMTs are designed for use in all climatic environments.

h) Networking of Stations: Installation of Remote Stations, Integration of remote monitoring stations with Central Receiving Station and various components procured for the purpose viz. computers/ Laptops/Scanner/Color Printers/Fax etc. Software should have capability to display the data on CPCBs website.

i) Data Collection: Noise level data generated will automatically be transmitted from remote noise level monitoring stations in to the central receiving stations at CPCB, installation of remote noise level monitoring stations in Delhi.

j) Type of reports to be generated from Central Receiving Station:

i. Peak Value of 24 hour : 6 AM to 10 PM – Daily
ii. Peak Value of Night : 10 PM to 6 AM – Daily
iii. Peak Value of the Day : 6 AM to 10 PM – Daily
iv. Leq (Day time) : 06 AM to 10 PM – Daily
v. Leq (Night Time) : 10 PM to 06AM – Daily
vi. Ln10, Ln90 etc.
vii. List of the values with their location and time which violated the prescribed standard of Noise Pollution (Regulation & Control) Rules, 2000 should be compiled in Tabular form.
viii. Monthly report generation for all the stations.
ix. Yearly report generation for all the stations.

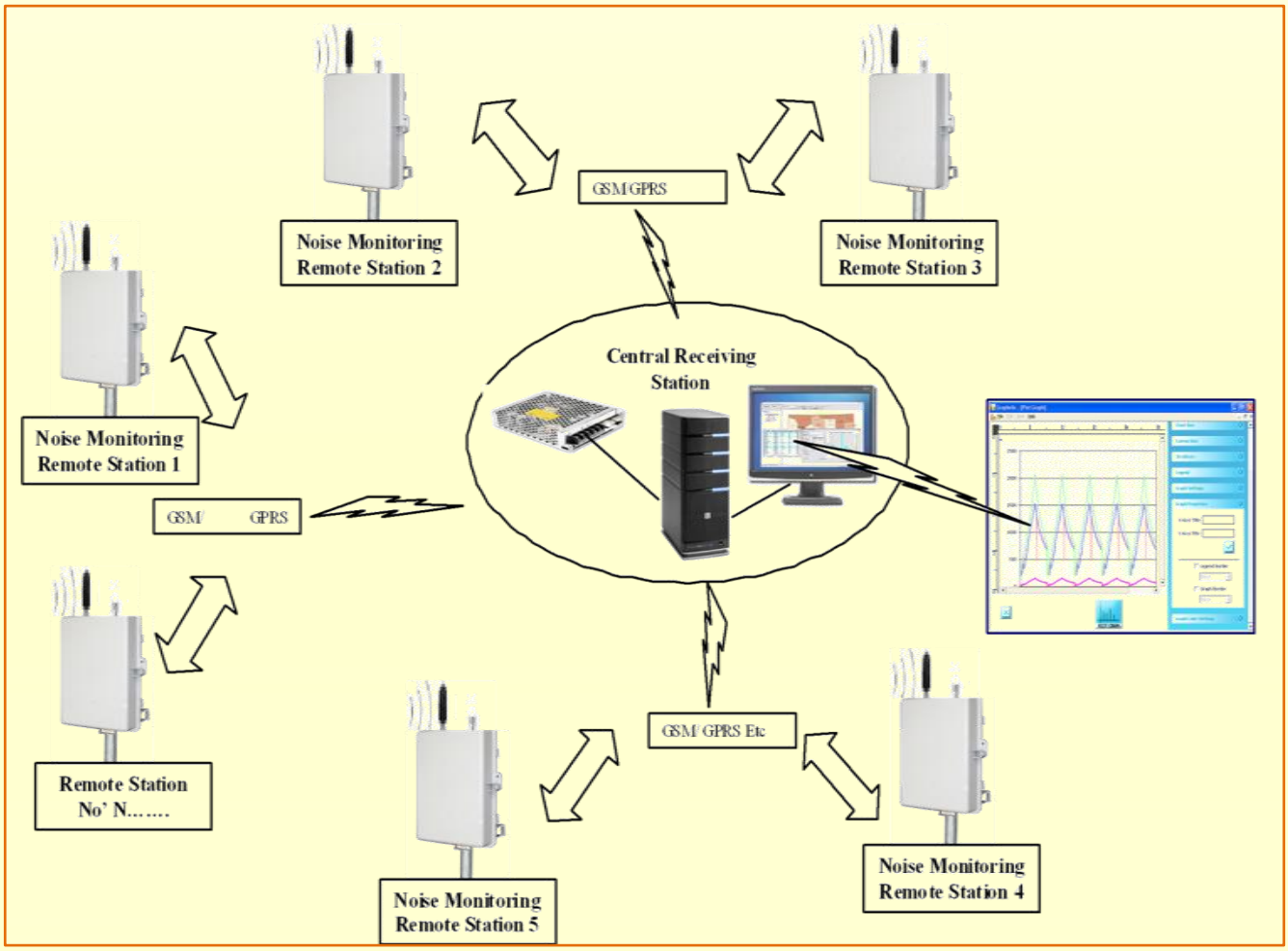


Table 14.54: ROAD MAP FOR DEVELOPMENT OF NOISE MONITORING NETWORK

S.No.	Cities	Network Stations	Initiation Schedule	Installation Schedule
1	Mumbai	10	SEPT. 2010	70 (5 Stations shall be installed at each location during 2010 and another 5 stations shall be installed during 2011)
2	Delhi	10		
3	Kolkata	10		
4	Chennai	10		
5	Bangalore	10		
6	Hyderabad	10		
7	Lucknow	10		
8	Kanpur	5	APRIL.2011	90
9	Pune	5		
10	Surat	5		
11	Ahmedabad	5		
12	Nagpur	5		
13	Jaipur	5		
14	Indore	5		
15	Bhopal	5		
16	Ludhiana	5		
17	Guwahati	5		
18	Dehradun	5		
19	Thiruvananth-Puram	5		
20	Bhubaneshwar	5		
21	Bhopal	5		
22	Gandhinagar	5		
23	Ranchi	5		
24	Amritsar	5		
25	Raipur	5		
TOTAL NO. OF STATIONS				160

NOTE: Monitoring stations shall be located in silence / residential / commercial / industrial areas depending upon the major noise sources.

14.10 VEHICULAR POLLUTION CONTROL

14.10.1 Auditing of Pollution Checking Centres, Delhi.

CPCB conducted auditing of ten Pollution Checking Centres (Petrol & Diesel), authorised by Department of Transport in different zones of Delhi for assessment of adequacy and competence in terms of required infrastructure, instrumentation and

their proper operation & calibration, trained man power etc. The city was divided in 08 Zones and a total of 59 Centres (Petrol & Diesel) have been audited between November 30, 2009 & December 9, 2009 as detailed below.

Table 14.55: Audited Centres

Sr. No.	Date of Inspection	Zone	Nos. of PCCs Inspected
1.	30th November, 2009	East	7
2.	1st December, 2009	North East	7
3.	2nd December, 2009	North	9
4.	3rd December, 2009	North West	7
5.	4th December, 2009	West	6
6.	7th December, 2009	Central	7
7.	8th December, 2009	South	9
8.	09th December, 2009	South West	7

All the Centres in Delhi are fully computerized and continuous connectivity are made with Department of Transport, Delhi through online networking. It was observed during inspection that the Authorised Signatory/Operator deputed at PCC needs regular training to improve their skills in respect of proper methodology for operation, preventive maintenance and calibration. At most of the centres, the operators were not aware about the calibration of the analysers. Though, all the centres are networked with DoT but it was observed that some centres issue manipulated PUC Certificates for diesel vehicles as they are not getting any testing fees in case of failure of vehicles.

It is suggested that the DoT engages a mobile van equipped with well calibrated analysers alongwith calibration facility for spot / onsite checking of the centres. This will help in generating accurate and reliable PUC certificate.

14.10.2 Auditing of Emission Testing Centres (ETC) in Southern States

CPCB, Zonal Office Bangalore carried out the auditing of Emission Testing Centres in Bangalore, Pudducherry and Thiruvananthapuram during the 2009 to assess (i) the readiness of the Centres to monitor and issue certificates as per new guidelines, (ii) the sampling protocol followed by the emission testing centres, (iii) the infrastructure available with Emission Testing Centres, (iv) status of compliance of vehicles with respect to new PUC norms, (v) whether Lambda measurement was being done in case of gasoline vehicles and (vi) any scope for issuing false certificate present in the system.

Table 14.56: Emission Testing Centres - Southern States

City	Total	Audited	Covered in %
Bangalore	279	110	39
Puducherry	07	03	43
Thiruvananthapuram	39	11	28

Observations :

- In all the places, Lambda measurement is yet to start and sampling protocol was not followed.
- In Bangalore, most of the centres complied with authorization from Dept of Transport (DoT), Type Approval Certificate, AMC, Calibration Certificate, Training certificate, 4 gas Analysers and regular submission of data to RTO.
- In Puducherry, out of seven centres sanctioned only one centre runs in full swing, two are having operational problems. The remaining centres are not functioning as PUC is mandatory for transport vehicles only however not compulsory for non-transport vehicles; PUC is being issued with one year validity.
- In Thiruvananthapuram, most of the centres complied with Authorization from DoT and Type Approval Certificate. Condutc of AMC, Calibration Certificate, Training certificate and 4 gas analyzers have not been complied with. Many operators complained about poor service from instrument suppliers.

14.10.3 Studies on Benzene Soluble Organic Fraction (BSOF) in PM_{10} at Bangalore

Samples of PH_{10} collected at 05 locations were analysed to Benzene Soluble Organic Fraction (BSOF) of based on the data collected. An attempt was made to prepare the Air Quality Index and classification of the study area. The results (Table 14.57) revealed that the BSOF values varied from 1.36 to 38.76 $\mu g/m^3$ with an average value of 8.8 $\mu g/m^3$. The data reveals that BSOF constitutes between 1.6 % and 55.4 % of PM_{10} value with an average of 10.7%. The industrial area (Graphite India) showed higher values and the area is unhealthy as per USEPA classification of air quality index.

Table 14.57 : BSOF & PM_{10} data in Bangalore city

Station	Graphite India			KHB Ind. Area			Victoria hospital			Yeshwant-pur			Amco batteries		
Category	Industrial			Industrial			Sensitive			Residential			Residential		
DETAILS	BSOF, µg/m³	PM_{10}, µg/m³	% BSOF	BSOF, µg/m³	PM_{10}, µg/m³	% BSOF	BSOF, µg/m³	PM_{10}, µg/m³	% BSOF	BSOF, µg/m³	PM_{10}, µg/m³	% BSOF	BSOF, µg/m³	PM_{10}, µg/m³	% BSOF
No. of data	79	79	79	80	80	80	80	80	80	80	80	80	82	82	82
Max. Value	24.8	583	10.8	38.8	140	55.4	20.9	255	32.5	20.7	396	24.3	24.9	263	42.4
Min. Value	2.3	30	2.24	1.36	23	2.00	3.42	23	4.78	2.5	28	2.16	3.29	15	1.60
Avg. Value	11.5	224	5.72	5.20	71	8.31	9.59	63	16.4	9.1	141	8.54	8.54	71	14.4
Std. Dev.	5.3	117	2.05	4.16	29.7	6.42	3.87	31.6	6.23	3.3	85.7	4.9	3.84	47	5.99
Co-eff. Of variation	45.9	52.0	35.8	79.9	42.1	77.2	40.3	49.8	38.1	35.7	60.8	56.9	45	66	41.7
Exceedance factor	0.58	3.7	-	0.3	1.2	-	0.5	1.1	-	0.5	2.3	-	0.4	1.2	-
% Violation	8.86	84.8	-	1.3	17.5	-	1.3	7.5	-	1.3	57.5	-	1.2	19.5	-
Coefficient of range	0.83	0.90	-	0.9	0.7	-	0.7	0.8	-	0.8	0.9	-	0.8	0.9	-
Air quality Index	138	135	-	106	59	-	128	55	-	126	94	-	122	59	-
Pollution level	M	C	-	L	H	-	L	H	-	L	C	-	L	H	-
Pollution level - L: Low, M: Moderate, H: High and C: Critical															

14.10.4 Vehicular Emission Load of Shillong in Meghalaya

Shillong city has witnessed an unprecedented increase in vehicular traffic as it is not connected by railroad hence all movement of goods and passengers on the National Highway has to be by road.

As there is no by-pass, all vehicles are forced (including trucks) to pass though the city. This has also led to an increase in the vehicular pollution load in Shillong. Six hot spots identified are listed below.

Table 14.58 : Vehicular Traffic, Meghalaya

Station	Description	Monitoring done
Police Bazar	Commercial Area	Nil
Motphran, Barabazar	Commercial Area	Two
Madanriting	NH with heavy traffic density	Four
Jhalupara	-do-	One
Anjalee Cinema Hall	Commercial area	Two
Don Bosco Square	Educational Hub	Three
Polo Bazar	Medical/ Commercial area	Three

The ambient air quality in Shillong was monitored for Respirable Suspended Particulate Matter (RSPM) and Non-Respirable Suspended Particulate Matter (NRSPM), SO_2 and NO_X. Some salient observations are :

- ✓ vehicular congestion / movement are higher during working days as compared to off days ;
- ✓ petrol driven cars are predominant ;
- ✓ trucks and buses are more frequent on national highways than in other parts of the city.

Table 14.59 : Ambient Air Quality Shillong PM_{10}, SPM

Location Station: MUDA Building, Police Bazar, Shillong	06:00 AM - 2:00 PM	2:00 PM – 10:00 PM	10:00 PM – 06:00AM
PM_{10} (µg/m³)	91	31	194
SPM (µg/m³)	183	198	194

Table 14.60 : Ambient Air Quality SO_2, NO_2

Parameter	06:00 AM - 10:00 AM	10:00 AM – 2:00 PM	02:00 PM – 06:00 PM	06:00 PM – 10:00 PM	10:00 PM – 02:00 AM	02:00 AM – 06:00 AM
SO_2 (µg/m³)	0.99	0.63	1.28	2.27	1.84	1.50
NO_X (µg/m³)	BDL	BDL	BDL	0.095	0.005	BDL

14.11 SOURCE APPORTIONMENT STUDIES

The Source Apportionment Studies taken up for the first time in six cities viz. Bangalore, Chennai, Delhi, Kanpur, Mumbai and Pune, have been completed. The National Summary Report prepared accepted by the Technical Committee meeting held on July 03, 2009. The report comprises Air Quality Monitoring results for three seasons, Chemical Speciation of PM_{10} & $PM_{2.5}$, Source Apportionment through Factor analysis & CMB 8, Emission Inventory with future projections, Analysis of various control scenarios using dispersion modelling; and preparation of action plans. On MoEF's advise the report was peer reviewed by international experts. Based on the comments, the National Summary Report was improved upon and accepted by the Technical Committee in its meeting held on March 22, 2010. The report has been forwarded to MoEF for consideration of Steering Committee.

14.12 AIR QUALITY MANAGEMENT DURING COMMONWEALTH GAMES–2010:

The Ministry of Environment & Forests and Central Pollution Control Board have initiated establishment of a Lidar based air quality forecasting system, during Common wealth Games – 2010 with technical assistance from Government of France. In this

regard, Memorandum of Understanding (MoU) between CPCB and French companies was signed. Work on the study has been initiated.

14.13 NEW CONSTRUCTION OR RENOVATION OF CPCB BUILDINGS

i. **Renovation of Laboratories at 3rd and 4th Floor Head Office :** The drawings and specifications had been approved by the competent authority and the same had been communicated to GTZ. Final drawings are yet to be received from GTZ. Work will be started after receiving final drawings and specifications, by April 2010 tenders are likely to be flooted.

ii. **Renovation of PAMS Hall at 4th Floorand Training Hall at ground Floor at HO has been completed.**

iii. **New Building at CPCB ZO Bhopal :** The Government of Madhya Pradesh has allotted a plot of 10,000 square feet area for construction of Zonal Office cum Laboratory, CPCB, Bhopal at Paryawaran Parisar, E-5, Arera Colony, Bhopal on gratis, on the payment of Rs.25/- only. Shri Jairam Ramesh, Hon'ble Minister for Environment & Forests, Govt. of India laid the foundation stone on 12th September 2009 for the building. CPWD Bhopal has been entrusted the work of preparation of drawings, structural designs and construction of the building. The centrally air-conditioned, environment friendly building with energy saving norms, will house physico-chemical, biological/ micro-biological, instrumentation laboratories with supporting infrastructure.

iv. **New Building at CPCB ZO Vadodara :** Possession of newly constructed office cum laboratory building, Parivesh Bhawan, for Zonal Office, Vadodara was taken and the building occupied in April 2009.

v. **New Building at CPCB ZO Bangalore :** Work on upgradation of office cum laboratory including the civil, electrical and air conditioning work.

14.14 Projects with Environmental Agencies of Different Countries

1. MoU with Bhutan

A Memorandum of Understanding (MoU) was signed between Central Pollution Control Board and National Environment Commission Secretariat (NECS), Royal Government of Bhutan (RGoB) for the period 2009-2012 for the Technical Assistance for developing a strategy and plan for monitoring and management of Air and Water quality in Bhutan in the benign presence of Hon'ble Prime Minister of India and His Excellency King of Bhutan.

2. MALE' Declaration

To cope with the issue of the trans-boundary movement of Air pollution in South Asia, the seventh meeting of the Government Council of South Asia Co-operative Environment Programme (SACEP) was held in Male' in 1998 and adopted a declaration by naming it Male' Declaration on control and prevention of air pollution and its likely transboundary effects on South Asia. Seventh South Asian countries namely, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka apart from Iran are the member States for Male' Declaration.

The Male' Declaration Calls on these member States to assess and analyse the origins and causes of regional air pollution, develop and adopt strategies for minimizing air pollution, cooperate and set up monitoring system and build up standardized methods to monitor air quality and analyze their impact without prejudice to the national activities. The Ministry of Environment & Forests in the National Focal Point (NEP) and the Central Pollution Control Board (CPCB) is the National Implementing Agency (NIA) for India for Male' Declaration.

Air Quality Monitoring Under Male Declaration

Ambient Air Quality Monitoring under Male Declaration at international boundary with Bangladesh is being done at Port Canning, West Bengal under the program "Male Declaration for the study of trans-boundary movement of pollutants". The site is located about 70 km. east of Kolkata city bordering Bangladesh. 24-hour ambient air quality is monitored for at least ten days in a month, for parameters RSPM, NO_2, SO_2 and meteorological data.

3. Participation of CPCB Laboratories in International Proficiency Testing (PT) Programme Conducted by New York State Department of Health, USA

To ensure analytical quality, the CPCB laboratories at Delhi and at its Zonal Offices located at– Kolkata and Lucknow participated in Proficiency Testing Programme organized by New York State Dept. of Health, Wadsworth Centre, Environmental Laboratory Approval Programme (ELAP), Albany New York. Samples related with potable water chemistry and non-potable water chemistry were received and analyzed by CPCB laboratories. The analytical results were sent to the Proficiency Testing provider, New York State Dept. of Health, Albany, New York. The PT results have been satisfactory in most cases, except for some parameters, where improvement in analysis is envisaged.

4. Inter - Laboratory QA / QC Study on Persistent Organic Pollutants (POPs) in Asia Region

National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi was registered as POPs laboratory representing the country having analytical facilities for POPs in India with UNEP Chemicals during January / February,

2009 (Table 7.2). The first worldwide Inter-laboratory study on POPs for Asia-Pacific Region has been organized by UNEP Chemicals during year 2009 under Stockholm Convention, in which 37 laboratories from 13 countries (Asia & OECD Countries) including National Reference Trace Organics Laboratory (NRTOL) of Central Pollution Control Board, Delhi participated.

5. Development of National Implementation Plan (NIP) Under Stockholm Convention - Harmonization of Monitoring Protocols for Dioxin Furan in Environmental Matrices

Ministry of Environment & Forests (MoEF), Govt. of India entrusted CPCB to undertake the inventory of POPs being released from sources in Northern and Eastern regions of the country as part of Development of National Implementation Plan (NIP) under Stockholm Convention, a UNDP Sponsored project.

6. Activities of CPCB in Collaboration with Govt. of Finland

S.No	List of Activities
1.	Three Proposals were presented by CPCB at 5th meeting of India-Finland Joint Working Group on Environment (JWGE) and are as below: - Spontaneous measurement of Stack emissions monitoring in major industrial sector - Advance Odour monitoring and measurement techniques - Cost effective fugitive emissions monitoring systems in organic chemical industry
2.	NOC Letter from MoEF with concurrence by VTT, Finland received.
3.	Visit by Finland Delegates to CPCB - Discussion on Automatic Water Quality Instrumentation - Discussion on Air Quality Monitoring instrumentation (fugitive, stack and odour)

7. Project in collaboration with Sweden EPA

Increased cooperation in the field of environment has been discussed for some time between the Governments of India and Sweden. As a result of a visit by a Swedish delegation under the leadership of the Swedish Minister of Environment it was agreed that Swedish EPA should conduct a feasibility/scoping study in India as a first step towards developing and designing an institutional cooperation programme to be jointly agreed on.

The Swedish Environmental Protection Agency (Swedish EPA) conducted the scoping study during 2008-2009. The study included three missions by Swedish EPA experts to

India. The next step after the Scoping study was a study visit to Sweden in June 2010 by the Indian counterparts in order to get a better understanding of what cooperation could offer and to prepare a draft of a relevant plan of the cooperation. The final plan will be developed in the coming months. Once an agreement is made and the programme is approved by SIDA, the implementation of the cooperation can be initiated.

The field of co-operation would focus on the pulp and paper industry and include exchange of knowledge on Cleaner Production/Best Available Technologies and knowledge and experience exchange on how authorities, within the existing legal framework, can further the development of such technologies though a more holistic approach to environmental permitting and by the use of flexible enforcement measures.

8. Project Activities in collaboration with GTZ - ASEM

It was agreed to undertake the project activities listed below with technical cooperation from GTZ-ASEM. Operational Plans detailing the activities, milestones, time frame and roles and responsibilities of GTZ-ASEM and CPCB will be finalized jointly by CPCB and GTZ-ASEM.

Thrust Area / Project

1. Networking of Continuous Air Quality Monitoring Station (CAAQMS) data
2. Strengthening of expertise at National Reference Trace Organics Laboratory at CPCB and Laboratory Planning
3. Gas Based Brick Kilns – Technology Assessment
4. Green House Gas Accounting in SSI Sector
5. Clean Technologies for Electroplating Industry
6. Option for Total Dissolved Solids Management for Tannery
7. Option for Total Dissolved Solids Management for Textile Industry
8. Technology Evaluation to meet zero discharge from distilleries (Concentration cum Incineration cum Power Generation)

Proposed Project Activities

1. Strengthening of Air Quality data bank in CPCB, Head Quarters, Delhi
2. Odour measurement and options to Control Odour
3. Identification and development of emission factors of HAPs in Pharmaceutical and Pesticide Industry Sectors
4. Control of VOC emission in SSI Sector
5. New Technology for Plastic Waste Management.

6. Risk Assessment for Storage of incinerable Hazardous Waste in TSDF (Treatment Storage Disposal Facility) Site
7. Remediation of Contaminated Hazardous Sites
8. Performance Evaluation of TSDF (Treatment Storage Disposal Facility) in India
9. Eco City Project of Central Pollution Control Board
10. Spatial Environmental Planning Programme (Zoning Atlas)

Ongoing Projects

1. Development/Promotion of Cleaner Process Technologies in Dye & Dye Intermediate Industries - Setting up of pilot project to demonstrate cleaner technology (catalytic hydrogen) for manufacture of H. Acid
2. Air Pollution Source Apportionment
3. Renovation of Air and Water Laboratories at CPCB

9. Project with USEPA

1) Peer Review of Source Apportionment (SA) Study
2) Co-Incineration with High Calorific Value Hazardous Waste in Cement Kilns
3) VOC/Dioxin/Furan Sampling and Analysis for HW Incinerator
4) Assessment of Non-Point Source of Pollution
5) Evaluation of Various Technologies for SO_2/NOx, Control for Power Plants/Refectories, etc.
6) Air Quality Surveillance and auditing of monitoring facilities
7) Air Quality Forecasting & Warning System
8) Fiscal & Non-Technical Policy Options for automobile emission control

10. Canada – India Environment Forum

In the meeting of Canada – India Environment Forum held in June 2009, the following issues pertained to "Pollution Control in Specific Industrial Sectors" were discussed by the Indian Delegates:

(i) Pulp & Paper mills;
(ii) Pharmaceuticals and pesticides;
(iii) Cement industries;
(iv) Iron and steels industries;

The key issues and challenges facing India in each sector are as under:

Pulp and paper : (a) high volumes of wood effluent; (b) high colour in effluent; (c) high energy consumption; and (d) high levels of pollutants (common in all small scale units)

Pharmaceuticals and pesticides: (a) Recovery of solvents used in production processes. (b) Monitoring and reducing the generation of air pollutant emissions, some of which are toxic and even carcinogenic.

Cement industries: (a) potential collaboration includes technologies for fugitive emission control and (b) development of monitoring facilities for dioxin.

Iron and steel: (a) monitoring of fugitive emissions of VOCs and PAHs during coking operations.

E-waste: (a) management practices and (b) monitoring.

On the said aspects and issues, it came to the knowledge of the Indian delegates that Canada has established energy efficient technologies in paper sectors in addition to the reduction of total suspended solids in wastewater and managing the black liquor by means of regulations and thus future collaboration was agreed upon in the said forum. However, other sector specific issues were kept pending.

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Annexure I

DELEGATION OF POWER BY CENTRAL POLLUTION CONTROL BOARD TO POLLUTION CONTROL COMMITTEES

S. No.	Union Territory	Pollution Control Committee	Gazette Notification No. for Power Delegation	Date of Notification
1.	**Andaman & Nicobar Islands**	The Pollution Control Committee Andaman & Nicobar Islands	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No. 33 Dated 16.01.1992 & Legal /156(4) 1990 dated 3.06.2004	16.01.1992
2.	**Chandigarh**	Chandigarh Pollution Control Committee	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No. 199(E) dated 15.03.1991 & S.O. 1131 (E) dated 23.10.2002	15.03.1991
3.	**Daman Diu & Dadra Nagar Haveli**	Pollution Control Committee Daman Diu & Dadra Nagar Haveli	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No. 862 (E) dated 26.11.1992; amended vide notification No. S.O. 384 (E) dated 19.2.1996 and S.O. 698(E) dated 03.07.1998 File No. B-12015/7/04/AS, dated 17.12.2004	26.11.1992
4.	**Delhi**	Delhi Pollution Control Committee	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No. 198 (E) dated 15.03.1991; amended vide Notification No. S.O. 640 (E) dated14.06.2002	15.03.1991
5.	**Lakshadweep**	Lakshadweep Pollution Control Committee	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No 842 (E) dated 31.08.1988 & legal /156(4) 1990 dated 23.03.2006	31.08.1988
6.	**Pudducherry**	Pudducherry Pollution Control Committee	Gazette of India Extraordinary, Part-II, Section-3, Sub-section (ii) S. O. No. 787 (E) dated 10.03.1992; amended vide notification No. S.O. 777(E) dated 19.07.1995	10.03.1992

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Annexure II

LIST OF CPCB BOARD MEMBERS

S.No.	Name	Nominated
1.	Prof. S.P. Gautam Chairman Central Pollution Control Board 'Paryavaran BHavan', East Arjun Nagar, Delhi – 110 032	Chairman
2.	The Adviser (Handling Water Quality -Monitoring Works), Ministry of Environment & Forests 'Paryavaran Bhavan', C.G.O.Complex, Lodi Road, New Delhi – 110 003	Member
3.	Dr. Rajneesh Dube Joint Secretary Ministry of Environment & Forests 'Paryavaran Bhavan', C.G.O.Complex, Lodi Road, New Delhi – 110 003	Member
4.	Smt. Ajita Bajpai Pande Joint Secretary Ministry of Mines, R.No. 325 "A" Wing, Shastri Bhavan, New Delhi – 110 001	Member
5.	Shri Saurabh Chandra Additional Secretary & Financial Adviser Ministry of Environment & Forests 'Paryavaran Bhavan', C.G.O.Complex, Lodi Road, New Delhi – 110 003	Member
6.	Prof. Mihir Deb, Chairman, Tripura State Pollution Control Board, Vigyan Bhawan, Pt. Nehru Complex, Gorkhabasti P.O. Kunjaban, Agartala(W)-799 006 (Tripura)	Member

S.No.	Name	Nominated
7.	The Chairman, Orissa State Pollution Control Board, A-118, Nilakantha Nagar, Unit VIII, Bhubaneswar - 751 012 ORISSA	Member
8.	Ms. B. Karthika Reddy Mayor Municipal Corporation of Hyderabad Hyderabad - 500 038. Andhra Pradesh	Member
9.	Shri S.D. Jeyaprasad, Chairman, Kerala State Pollution Control Board, Plamoodu Jn., Pattom Palace, Trivandrum 695004, Kerala.	Member
10.	Shri Dipesh Sampat Mehta, Advocate & Solicitors (U.K) Dhoop Chhaon, Plot No. 201, Road No. 28 Bandra (West), Mumbai – 400 050	Member
11.	Shri K. Ahmed Khan, No. PH-1, Majestic Garden Apartment, Behind Delhi Public School Kanakpura Road Cross, Bangalore – 560 062 Karnataka	Member
12.	Mrs. Deepa Gupta, Chartered Accountant C-6/77, East of Kailash New Delhi – 110 065	Member
13.	Shri S. Velumani Chairman and Managing Director Ennore Port Limited (A Govt. of India undertaking) P.T. Lee Chengalvarayan Maligai, 23, Rajaji salai, Chennai – 600 001 Tamilnadu	Member
14.	- VACANT -	

S.No.	Name	Nominated
15.	Dr. Kanubhai Mistry Chairman, Gujarat Pollution Control Board, 'Paryavaran Bhavan', Sector – 10 A, Gandhinagar – 382 010 (Gujarat)	Member
16.	Shri L.N. Gupta, Joint Secretary (Refineries) Ministry of Petroleum and Natural Gas, Shastri Bhawan Dr. Rajender Pd. Road, New Delhi - 110 001	Member
17.	Shri J.S. Kamyotra Member Secretary Central Pollution Control Board 'Paryavaran Bhavan', East Arjun Nagar, Delhi – 110 032	Member Secretary

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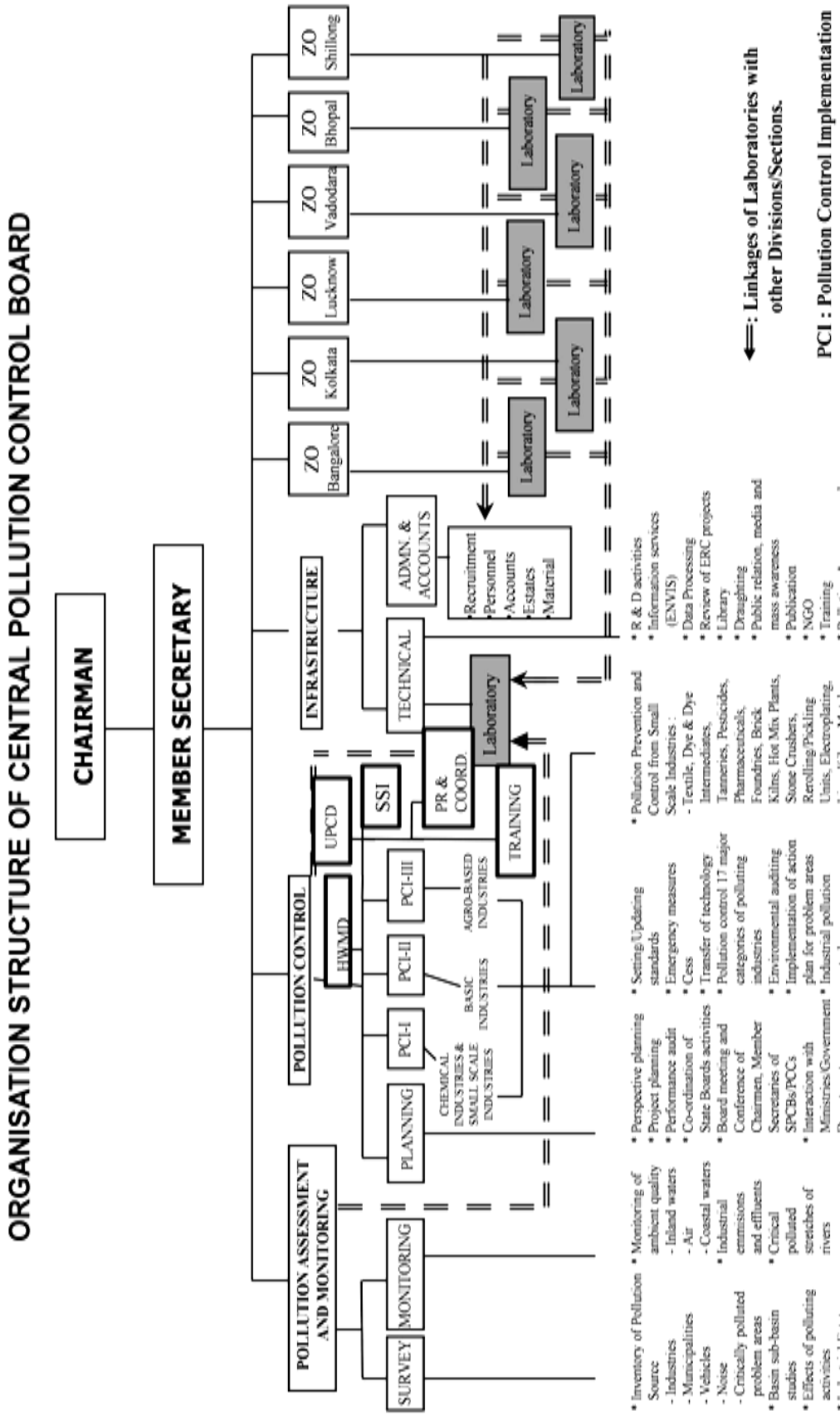
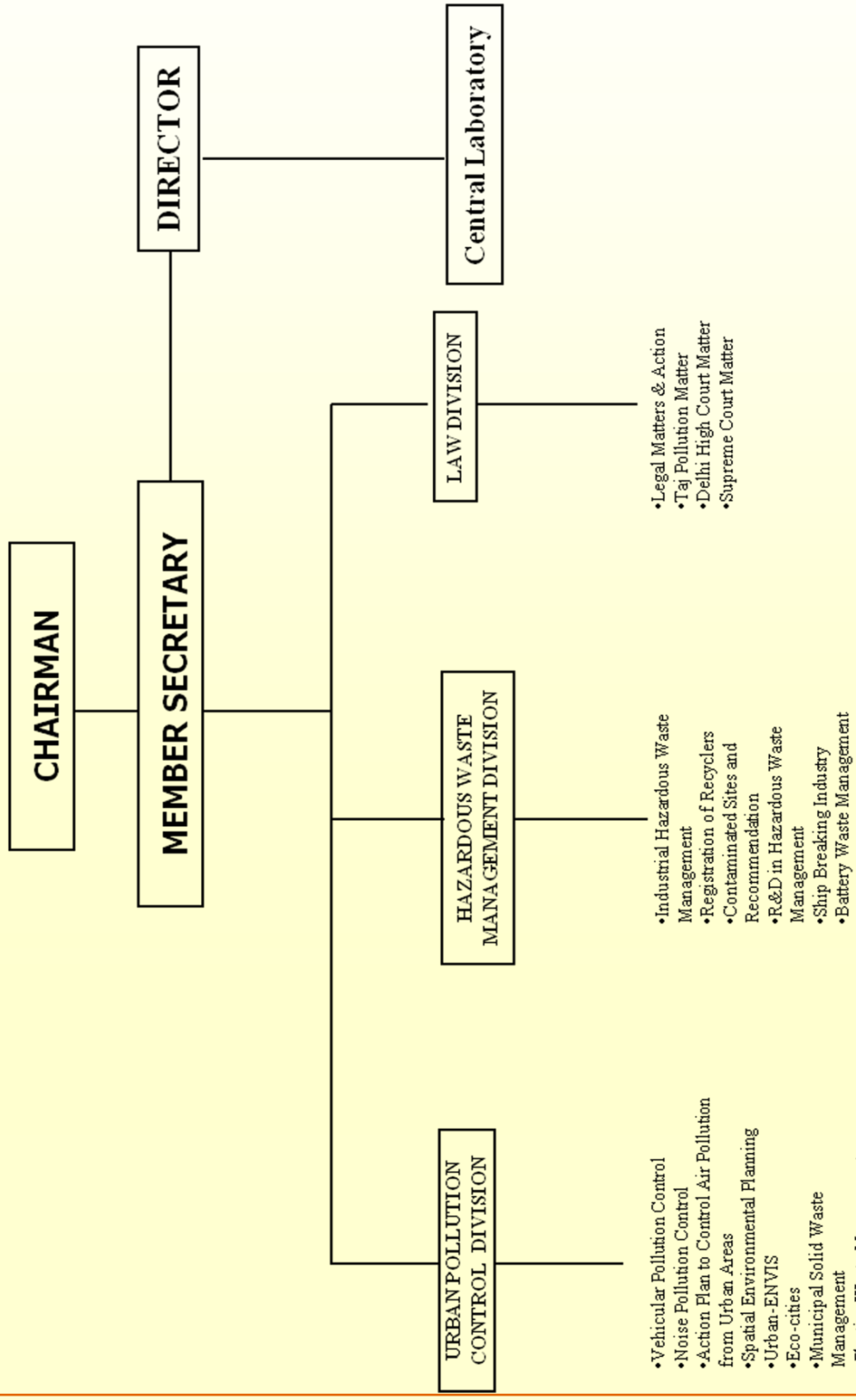
ANNEXURE III

ORGANISATION STRUCTURE OF CENTRAL POLLUTION CONTROL BOARD



ANNEXURE III (Contd.)

ORGANISATION STRUCTURE OF CENTRAL POLLUTION CONTROL BOARD



Annexure IV

SANCTIONED STAFF STRENGTH IN CPCB AND NUMBER OF VACANCIES IN EACH CADRE AS ON 31.03.2010

S. No	Name of the Post	Sanctioned	Filled		Vacant	Deemed abolished/ approval for revival awaited
			Regular/ Dep.	Ad-hoc		
1	Director (Scientist 'F')	2	1	-	1	-
2	Additional Director (Scientist 'E')	8	7	-	1	-
3	Finance & Accounts Officer	1	-	-	1	-
4	Senior Scientist (Scientist 'D')	9	8	-	1	-
5	Sr. Environmental Engineer (Scientist 'D')	13	10	-	3	-
6	Additional Director (Law)	1	1	-	-	-
7	Sr. Administrative Officer	1	-	-	1	-
8	Administrative Officer	7	5	-	2	-
9	Environmental Engineer (Scientist 'C')	38	32	-	6	-
10	Law Officer	2	2	-	-	-
11	Scientist 'C'	22	20	-	2	-
12	Assistant Technical Officer	1	-	-	1	-
13	Assistant Environmental Engineer (Scientist 'B')	45	41	-	3	1
14	Documentation Officer (Scientist 'B')	1	1	-	-	-
15	Scientist 'B'	30	28	-	2	-
16	Assistant Law Officer	2	2	-	-	-
17	Accounts Officer	2	2	-	-	-
18	Assistant Accounts Officer	5	4	-	1	-
19	Hindi Officer	1	1	-	-	-
20	Private Secretary	1	1	-	-	-
21	Senior Technical Supervisor	9	9	-	-	-
22	Section Officer	10	8	-	2	-
23	Draughting Supervisor	1	1	-	-	-
24	Deputy Librarian	1	-	-	-	1
25	Senior Scientific Assistant	35	34	-	-	1
26	Sr. Hindi Translator	1	1	-	-	-
27	Technical Supervisor	10	2	-	8	-
28	Assistant	19	15	4	-	-
29	Data Processing Assistant	4	-	1	3	-
30	Senior Draughtsman	2	2	-	-	-
31	Junior Engineer (E&M)	1	1	-	-	-
32	Junior Engineer (Civil)	1	1	-	-	-

S. No	Name of the Post	Sancti-oned	Filled		Vacant	Deemed abolished/ approval for revival awaited
			Regular/ Dep.	Ad-hoc		
33	Personal Assistant (5)	1	1	-	-	-
34	Accounts Assistant	8	5	-	3	-
35	Jr. Hindi Translator	1	1	-	-	-
36	Junior Scientific Assistant	35	26	1	2	6
37	Publication Assistant	1	1	-	-	-
38	Senior Technician	12	8	3	-	1
39	Driver Special Gd.	1	1	-	-	-
40	Data Entry Operator-Gd.I	2	1	-	1	-
41	Driver Gd-I	7	5	-	2	-
42	Junior Technician	7	5	-	2	-
43	Senior Laboratory Assistant	32	27	-	2	3
44	Cashier	6	-	-	-	6
45	Driver Gd-II	6	3	-	3	-
46	Jr. Draftsman	1	-	-	-	1
47	Stenographer	20	3	-	-	17
48	Upper Division Clerk	24	21	-	3	-
49	Data Entry Operator Gd-II	8	6	-	-	2
50	Driver (Ordinary)	8	6	2	-	-
51	Junior Laboratory Assistant	38	23	-	8	7
52	Lower Division Clerk	35	20	-	-	15
53	Plumber	1	1	-	-	-
54	Pump & Wheel Valve Operator	2	1	-	-	1
55	Senior Attendant	15	12	-	3	-
56	Field Attendant	7	7	-	-	-
57	Attendant	39	25	-	-	14
	Total	**603**	**449**	**11**	**67**	**76**

- 02 posts of Scientist D (one Sr. Env. Engineer and one Sr. Scientist Sl. No. 4 & 5), 02 posts of Scientist B (Sl. No. 15), 02 posts of Senior Scientific Assistanat (Sl. No. 25) and 02 posts of Junior Scientific Assistant (Sl. No. 36) are sanctioned under HWMD for which approval of MoEF for continuation is awaited.
- One post of Senior Administrative Officer (Sl. No. 7), One Post of Assistant Technical Officer (Sl. No.12) & one post of Data Processing Assistant (Sl. No.29) are sanctioned, however approval of MoEF for Recruitment Rules is still awaited.
- Three posts of Accounts Assistant converted into Assistant. (Sl. No. 28 & 34)
- Four post of Personal Assistant have been upgraded to Private Secretary (Sl. No. 33).
- Five post of Sr. Technician are abolished, however, four posts are filled up due to exigency of work. The proposal for revival has been sent to MoEF (Sr. No. 38).
- One post of Pump & Wheel Valve operator is deemed abolished, however filled up on adhoc basis due to exigency of work. The proposal for revival has been sent to MoEF (Sl. No. 54)

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Annexure V

POST CREATED BY THE CENTRAL POLLUTION CONTROL BOARD AFTER THE NOTIFICATION OF CPCB REGULATIONS, 1995 AND FOR WHICH CONCURRENCE OF GOVERNMENT IS AWAITED

S. No.	Name of the post	Approved by the CPCB	Filled		Unfilled
			Regular/Dep.	Ad-hoc	
1	Assistant Law Officer	1	-	-	1
2	Sr. Hindi Officer	1	-	-	1
3	Accounts Assistant	6	-	-	6
4	Private Secretary (19 posts upgraded from Personal Assistant)	19	19	-	-
5	Senior Hindi Translator	1	-	-	1
6	Junior Hindi Translator	7	-	-	7
7	Hindi Typist (LDC)	7	-	-	7
8	Driver Grade II	3	-	-	3
9	Attendant (Safaiwala)	10	-	8	2
10	Field Attendant	11	-	-	11
	Total	66	19	8	39

- 05 sanctioned posts and 14 Board created posts of Personal Assistant upgraded to Private Secretary and filled up on regular basis in view of exigency of work (Sl. 04).

- The CPCB recommended to change only nomenclature without any financial implication in respect of the following posts:-

  (i) Publication Assistant to Assistant Publication Officer (One Post)
  (ii) Junior Engineer (Bldg.) to Assistant Engineer (Bldg.) (One Post)
  (iii) Junior Engineer (E&M) to Assistant Engineer (E&M) (One Post)

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Annexure VI-A

COMPOSITION OF RESEARCH ADVISORY AND MONITORING COMMITTEE (RAMC) DURING 2009-2010

1.	Prof. S. P. Gautam, Chairman, Central Pollution Control Board, Delhi	**Chairman**
2.	Sh. J. S. Kamyotra, Member Secretary, Central Pollution Control Board, Delhi	**Member**
3.	Sh. Paritosh Tyagi, Ex-Chairman, Central Pollution Control Board, Delhi	**Member**
4.	Prof. J. M. Dave, Retd. Prof. School of Environmental Sciences, JNU, New Delhi	**Member**
5.	Prof. Dilip Biswas, Ex-Chairman, Central Pollution Control Board	**Member**
6.	Dr. K. R. Ranganathan, Member Secretary, Loss of Ecology Authority, Chennai, Tamilnadu	**Member**
7.	Sh. N. K. Verma, Ex-Additional Director, Central Pollution Control Board	**Member**
8.	Dr. Tapan Chakrabarti, Director, Environmental Biotechnology Division, NEERI, Nagpur *- Nominee of CSIR Laboratory – NEERI*	**Member**
9.	Dr. R. K. Malhotra, Executive Director, R & D, Indian Oil Corporation (R & D Centre), Faridabad *- Nominee of Indian Oil Corporation (R & D Centre), Faridabad*	**Member**
10.	Dr. Meenakshi Dhote, Head, Dept. of Environmental Planning *- Nominee of School of Planning and Architecture, New Delhi*	**Member**
11.	Dr. Virendra Misra, Scientist `F' and Head, Ecotoxicology Division *- Nominee of CSIR Laboratory – IITR, Lucknow*	**Member**
12.	Dr. S. S. Kohli, Director SERC, Department of Science & Technology, New Delhi *- Nominee of Department of Science & Technology (DST), ND*	**Member**
13.	Sh. Ashok Bhatia, Director (RE Division) *- Nominee of Ministry of Environment & Forests, New Delhi*	**Member**

14.	Sh. J. K. Goel, General Manager (Env.) *- Nominee of Central Mine Planning & Design Institute (CMPDI), Ranchi*	**Member**
15.	Dr. B. K. Tewary, Scientist F and Coordinator/Head, Environment Management Group *- Nominee of , Central Institute of Mining and Fuel Research, Dhanbad*	**Member**
16.	Dr. D. K. Sharma, Medical Superintendent *- Nominee of All India Institute of Medical Sciences (AIIMS), New Delhi*	**Member**
17.	Dr. H. C. Joshi, Professor, Division of Environmental Sciences, IARI *- Nominee of Indian Agricultural Research Institute (IARI), New Delhi*	**Member**
18.	Sh. K. P. Nyati, Principal Advisor, CESD & Head, Environment Policy Division, CII, New Delhi *- Nominee of Industries (CII, New Delhi)*	**Member**
19.	Dr. Suneel Pandey, Fellow, TERI, New Delhi *- Nominee of The Energy and Resources Institute (TERI), New Delhi*	**Member**
20.	Dr. M. S. Qureshi, Scientist, NCL, Pune *- Nominee of National Chemical Laboratory, Pune*	**Member**
21.	Dr. C. S. Sharma - Senior Scientist, CPCB, Delhi (Senior Level Scientist)	**Member**
22.	Dr. (Mrs.) Pratima Akolkar, Scientist `C. CPCB, Delhi (Women Scientist)	**Member**
23.	Dr. R. B. Lal – Scientist `B', CPCB, Delhi (Junior Level Scientist)	**Member**
24.	Dr. S. D. Makhijani, Director (Labs), CPCB, Delhi	**Member Convener**

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Annexure VI-B

CENTRAL POLLUTION CONTROL BOARD
***Parivesh Bhawan*, East Arjun Nagar**

DELHI – 110 032

B-29021/1/91/PCI-I/ April 07, 2008

OFFICE ORDER

Sub: ***Constitution of Peer & Core Expert Committee to evolve standards for effluent & emission, ambient air & water quality – regarding***

The Chairman, Central Pollution Control Board (CPCB) has reconstituted the Core Expert Committee in order to finalise the effluent and emission standards for notification under the Environment (Protection) Act, 1986. The composition of the Committee is as follows:

1.	Chairman, CPCB	Chairman
2.	Shri P. C. Tyagi, Former Chairman, CPCB	Vice Chairman
3.	Dr. J. M. Dave, Retd. Prof. JNU	Member
4.	Dr. R. H. Siddiqi, Retd. Prof. AMU	Member
5.	Dr. B. Sengupta, Member Secretary, CPCB	Member
6.	Director, NCL, Pune or its Representative	Member
7.	Director, NPC, New Delhi or its Representative	Member
8.	Director, ITRC, Lucknow or its Representative	Member
9.	Director, BIS, New Delhi or its Representative	Member
10.	Director, NPL, New Delhi or its Representative	Member
11.	Director, NML, Jamshedpur or its Representative	Member
12.	Director, CFRI, Dhanbad or its Representative	Member
13.	Director, IIP, Dehradun or its Representative	Member
14.	Director, IARI, New Delhi or its Representative	Member
15.	Director, IMD, New Delhi or its Representative	Member
16.	Director, CCMB, Hyderabad or its Representative	Member
17.	Director, NIOH, Roorkee or its Representative	Member
18.	Director, IIT, Kanpur or its Representative	Member
19.	Director, NEERI, Nagpur or its Representative	Member
20.	Representative of MoEF (Sh. R. N. Jindal, AD)	Member
21.	Representative of CII	Member
22.	Representative of FICCI	Member
23.	Member Secretary, U. P. Board	Member
24.	Member Secretary, Karnataka Board	Member
25.	Director, IFD, CPCB	Member

26.	Incharge, PCI-II, CPCB	Member
27.	Incharge, PCI-III, CPCB	Member
28.	Incharge, PCI-SSI, CPCB	Member
29.	Incharge PCI-I, CPCB	Member Convener

2. The above Core Expert Committee will be common for all types of industries.
3. In respect of standards for specific industry, a Peer Committee comprising, a representative of Association of the concerned industry category, a representative of Administrative Ministry of the Government of India dealing the industry sector, an expert to be identified for each industry category and also representatives from State Pollution Control

   Boards of those States where industries of concerned category are in large number will assist the Core Expert Committee to review the draft standards prepared by the Central Board.

4. The terms of reference for the Peer & Core Committee are as follow:

   (i) To identify and suggest new areas for initiating studies for formulation of standards for effluent, emission, water quality and air quality;
   (ii) To guide and suggest line of action to the Group or the consultant constituted / appointed by the Board for formulation of the standards before initiation / and during formulation of standards; and
   (iii) To review and finalise the standards prepared by or on behalf of the Board for sending to MoEF for notification under the Environment (Protection) Act, 1986.

5. Tenure of the Committee

   The tenure of the Committee is upto March 31, 2011, i.e. three years from date of issue of letter.
6. Non officials' members will be paid TA and sitting allowance (Rs. 1,000) for attending meeting, by the Central Board, as per Government of India Rules.

(Dr. B. Sengupta)
Member Secretary

To

All members

Copy to:
1. PS to CCB
2. PS to MS
3. I/c. Accounts

(Dr. B. Sengupta)

Annexure-VII-A

Table VII-A: Planned Training Programmes during 2009-10

S. No.	Programme	Period	Schedule & Place	Conducted by
1.	Training on "Chemical Analysis of Water and Wastewater"	3 day	Dec. 02-04, 2009 Roorkee	IIT-Roorkee
2.	Training on "Determination of Dissolve Oxygen, Biological Oxygen Demand, Chemical Oxygen Demand, Total Organic Carbon, Relationship between BOD, COD, TOC"	3 day	Dec. 06-08, 2009 Roorkee	IIT-Roorkee
3.	Training on "Sampling, Analytical Techniques of Water Samples and Quality Control"	5 day	Dec. 14-18, 2009 Hyderabad	NGRI, Hyderabad
4.	Training "Air Quality Monitoring, Network Design, Air Sampling, Analysis and Quality Assurance"	5 day	Dec. 15-19, 2009 Haridwar	PCRI, Haridwar
5.	Training on "Collection, Storage, Handling and Disposal of Hazardous/Bio-Medical Wastes	5 day	Jan. 04-08, 2010 Chennai	NPC, Chennai
6.	Training on "Environmental Monitoring and Latest Trends and Guidelines for Environmental Impact Assessment Studies"	3 day	Jan. 15-17, 2010 Delhi	IIT-Delhi
7.	Training on "Laboratory Occupational Health & Safety"	5 day	Jan. 16-20, 2010,Patna	CENC, Patna
8.	Training on "Monitoring of Source Emission"	5 day	Feb. 08-12, 2010 Chennai	NPC, Chennai
9.	Training on "Operation and Maintenance of Sophisticated Instruments like GC-MS/GC, HPLC, CHNS, AOX Analyzer	5 day	Feb. 15-19, 2010 Roorkee	IIT-Roorkee
10.	Training on "Cleaning, Preparation of	3 day	Feb. 20-24,	CENC, Patna

S. No.	Programme	Period	Schedule & Place	Conducted by
	Glassware, Sampling, Preservation, Transportation and Storage of Samples, Quality Management Tools, Quality Assurance, Laboratory Audit"		2010 Patna	
11.	Training on "Recent Trends in Environmental Monitoring and Control Strategies in Petroleum and Petrochemical Industry"	3 day	Feb. 22-24, 2010 Roorkee	IIT-Roorkee
12.	Training on "Laboratory Safety and Waste Management"	3 day	Feb., 26-28, 2010 Chennai	IIT-Madras
13.	Training on "Measurement of Uncertainty in Chemical and Biological Testing"	3 day	Mar. 03-05, 2010 Delhi	ISI, Delhi
14.	Training on "Advanced Technologies in Water and Wastewater Treatment"	3 day	Mar. 25-27, 2010 Roorkee	IIT-Roorkee

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Annexure-VII-B

Table VII-b: CPCB Officials attended Miscellaneous Inland Trainings during 2009-10

S. No.	Programme	Duration & Place	Conducted by	Official's Name & Designation
1.	Youth Forum on "Climate Change and Global Warming"	Apr. 21-23, 2009 Delhi	Indian Environmental Society, Delhi	1. Dr. S.K. Nigam, SS, HO-Delhi
2.	Seminar on "Advanced Air Handling System"	Apr. 23-24, 2009 Delhi	FICCI, Delhi	2. Sh. Rakesh Ahuja, ST, HO-Delhi 3. Sh. Ram Sagun Rai, ST, HO-Delhi 4. Sh. V.N. Murthy, ST, HO-Delhi
3.	Training on "Machinery Noise"	Apr. 28-29, 2009 Mumbai	IIT-Bombay	5. Sh. Kedarnath Dash, Sci. 'B', HO-Delhi
4.	Training on "Vigilance"	May 04-08, 2009 Ghaziabad	CBI Academy, Ghaziabad	6. Dr. M.Q. Ansari, SS, HO-Delhi
5.	Training on "Safety and Health in Chemical Laboratories"	May 20-22, 2009 Mumbai	National Safety Council, Mumbai	7. Sh. Bhupander Kumar, Sci. 'B', HO-Delhi 8. Sh. Dev Prakash, SSA, HO-Delhi
6.	Special training on "Inspection Questionnaire of Parliamentary Committee on Official Language"	May 25-26, 2009 Kanyakumari	Centre for Training and Development, Bangalore	9. Sh. Mahendra Kumar, PS, ZO-Bangalore
7.	Training on "Vigilance"	May 25-29, 2009 Ghaziabad	CBI Academy, Ghaziabad	10. Sh. Shital Prasad, SO, HO-Delhi
8.	Training on "High Rise Buildings: Construction and Maintenance including Safety Aspects"	May 26-27, 209 Hyderabad	National Council for Cement and Building Materials, Hyderabad	11. Sh. Rakesh Ahuja, ST, HO-Delhi 12. Sh. V.N. Murthy, ST, HO-Delhi
9.	Seminar-cum-Exhibition for Awanress and	July 02-04, 2009 Delhi	Pixie Consulting Ltd., India in collaboration	13. Smt. Alka Srivastava, HO-Delhi

S. No.	Programme	Duration & Place	Conducted by	Official's Name & Designation
	Capacity Building Among Stakeholders in Poultry, Slaughter Houses & Dairy for "Pollution Abatement by Intr5oduction and Application of Nano Technology"		with N.C.C. Exhibition Organiser, Thailand	
10.	Training on "Laboratory Quality Management System & Internal Audit as per ISO 17025: 2005"	July 28-31, 2009 Jaipur	IIQM, Jaipur	14. Sh. M.N. Mohanan, Scientist 'C', HO-Delhi 15. Sh. A.K. Sen, Scientist 'B', HO-Delhi 16. Sh. S. Jeyapaul, Scientist 'B', HO-Delhi
11.	1st International Conference & Exhibition on "Solid Waste & Environment"	Aug. 12-14, 2009 Coimbatore	Anna University, Coimbatore	17. Sh. M.K. Chaudhury, EE, HO-Delhi 18. Sh. Ubaid A. Ansari, Sci. 'B', HO-Delhi
12.	Training on "Sustainable Solid Waste Management"	Aug. 26-27, 2010 Delhi	NPC, Delhi	19. Sh. M.K. Choudhury, EE, HO-Delhi
13.	Training on "Reservation in Services"	Sep. 03-05, 2009 Delhi	CPCB, Delhi	20. Twenty five participants from Head Office and Zonal Offices
14.	Training on "Wastewater Treatment Technologies"	Sep. 09-12, 2009 Roorkee	IIT-Roorkee	21. Sh. Abhey Singh Soni, SEE, HO-Delhi 22. Sh. A.K. Sinha, Scientist 'C', HO-Delhi 23. Sh. Sandeep Roy, AEE, ZO-Kolkata 24. Sh. G.P. Singh, AEE, ZO-Kolkata
15.	Training for Group 'D' Employees of CPCB	Sep. 22-25, 2009 Delhi	CPCB, Delhi	25. Sixteen participants from Head Office and Zonal Offices
16.	Professional Development Programme on "Environmental Issues in Mining Sector –	Dec. 09-11, 2009 Hyderabad	ESCI, Hyderabad	26. Sh. R.C. Kataria, SEE, HO-Delhi

S. No.	Programme	Duration & Place	Conducted by	Official's Name & Designation
	Legal and Statutory Requirements (As per MoEF Guidelines)"			
17.	International Conference on "Preventing Emerging Occupational and Environmental Risks in South Asia and Beyond"	Dec. 17-19, 2009 Delhi	Maulana Azad Medical College, Delhi	27. Dr. S.K. Tyagi, Sci. 'C', HO-Delhi 28. Dr. Sanjeev Agarwal, Sci. 'C', HO-Delhi 29. Dr. Sanghita Roy Chaudhury, SRF, HO-Delhi
18.	Training on "Microbiological Techniques"	Dec. 14-23, 2009 Bangalore	Dept. of Env. Science, Bangalore University, Bangalore	30. Smt. B.S. Anupama, SSA, HO-Delhi
19.	Training on "Cleaner Production/ Technology Integrated Environment Management"	Jan. 18-22, 2010 Delhi	FICCI, Delhi	31. Sh. R.N. Pankaj, AEE, HO-Delhi 32. Sh. Kamlesh Singh, AEE, HO-Delhi 33. Smt. P.K. Selvi, AEE, HO-Delhi 34. Sh. H.V.C. Chary Guntupalli, AEE, HO-Delhi
20.	Training on "Water Quality Management for Lakes and Reservoir"	Feb. 22-26, 2010 Pune	National Water Academy, Pune	35. Sh. Tarun Darbari, AEE, HO-Delhi

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Annexure-VII-C

Table VII-C : International Trainings /Workshops attended in 2009-10 by CPCB staff

S. No.	Programme	Duration & Place	Conducted by	Official's Name & Designation
1.	Study visit of delegation to Europe (France and Spain)	Sep. 27 – Oct. 03, 2009 Europe	FICCI, Delhi	1. Prof. S.P. Gautam, Chairman, HO-Delhi 2. Dr. Prashant Gargava, EE, HO-Delhi
2.	Regional Workshop on the implementation of Best Available Techniques/Best Environment Practices and Environmentally Sound Management of PCBs and POPs Wastes for Asia	Nov. 16-20, 2009 Beijing, China	UNEP	3. Sh. Keyur Shah, EE, HO-Delhi
3.	Visit for "Establishing Final Water Quality Standard based on Monitoring Results in Bhutan	Dec. 21, 2009 to Jan. 06, 2010 Bhutan	NEC, Bhutan Royal Government	4. Dr. D.P. Mukhopadhyaya, SS, HO-Delhi
4.	Meeting under Male Declaration	Jan. 20-21, 2010 Dhaka, Bangladesh	UNEP	5. Sh. J.S. Kamyotra, MS, CPCB 6. Dr. D. Saha, SS, HO-Delhi

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Annexure-VII-D

Table VII-D: Trainings Programmes for CPCB officials in 2009-10 (Administration & Finance)

S. No.	Programme	Duration	Schedule & Place	Conducted By
	Finance & Administrative Matters			
1.	Training on "Reservation in Services"	3 days	Sep. 03-05, 2009	ITPR, Delhi
2.	Implementation of 6th Pay Commission Report	3 days	Sep.29 - Oct. 01, 2009	CTSR, Delhi
3.	Noting, Drafting, Filing System and Record Management	2 days	Nov.20-21, 2009	ISERA, Delhi
4.	Effective Office Administration & Management	2 days	Jan. 08-09, 2010	ISERA, Delhi
5.	Right to Information Act, 2005	2 days	Jan. 17-18, 2010	ISERA, Delhi
	Interpersonal Skills			
6.	Work Culture in Present Scenario	1 day	Oct. 29, 2009	CBWE, Delhi
7.	Team Work with Motivation	1 day	Nov. 27, 2009	CBWE, Delhi

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Annexure VIII

Publications by CPCB during 2009-10

S.No.	REPORTS
	HINDI REPORTS
1.	Annual Report 2007 - 08
2.	PARIVESH Highlights 2008
3.	Vaigyanik Avam Takniki Lekho ka Sankalan.
	Annual Reports & PR REPORTS
1.	Annual report 2007 - 08
2.	CPCB Calendar 2010
3.	Environment Sections papers – Indian Science Congress -
4.	TEN posters – Indian Science Congress
	Parivesh Newsletter
1.	Hazardous Air Pollutants
2.	Mercury in Environment
3.	Process reqmt. Of compost making
4.	Waste Minimization and Eco Friendly Electroplating Process
	Technical Reports
1	Risk Assessment in Oil Refinery and Petrochemicals Complex
2	Ambient Air Quality Status 2008 (NAAQMS/33)
3	Ganga Water Quality Trend (MINARS/31)
4	Criteria for Comprehensive Assessment of Industrial clusters (EIAS/4)
5	Comprehensive Environmental Assessment of Industrial Clusters (EIAS/05)
6	National Inventory of Hazardous Waste Generating Industries and Hazardous Waste Management in India
7	Environment Management in Hotel Industry
8	Mercury Management Fluorescent Lamp Sector
9	Biodegradable plastics - impact on environment
10	Status of water supply waste water generation and treatment in Class I cities & Class II towns of India)
11	Assessment of plastic waste & its management in Airport & railway stations in Delhi
12	Guidelines and Check-list for evaluation of MSW Landfills Proposals with Information on existing Landfills.
13	Human Health Risk Assessment Studies in Asbestos based Industries in India.
14	Performance Evaluation of Polymer Coated Bitumen Built Roads.

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Annexure - IX

List of Pending Cases in different High Court

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
1.	M/s Modern Lube Industries Vs CPCB & Ors. **W.P.(C) No.4068/2005**	Legal/4(1)/06	Guwahati	This is petition for Registration for used oil under HWMH Rules, 2003	Pending
2.	Qualified Medical Practitioner Asso. Vs UOI & Ors. **W.P.(C) No.29579/2005**	Legall4(2)/05	Ernakullam	This is a petition under Bio-Medical Rules, 1998 seeking claim of PAB (Placenta Anaerobic Rector) as a mode of disposal of bio-medical waste	Pending
3.	All Kerala River Protection Council Vs Collector Kakkanad and Ors. **W.P(C) No.8069/06**	Legal/4(3)/06	-do-	This council has filed the petition for review of brick kiln norms	Pending
4.	Sh. Shdheendra Medical Mission Vs UOI & Ors. **W.P(C) No.21342/2006**	Legal/4(4)/06	-do-	This is a petition submitting under Bio-medical Rules & clamining that PAB reactor is one of the mod for disposable of Bio-Medical Waste	Pending
5.	Sahyog Sansthan Vs State of U.P. & Ors. **W.P.No.3945 (PIL)/05**	Legal/4(5)/05	Lucknow	This is a PIL under Bio-Medical Rules. Challenging the criteria for Common Bio Medical Waste Treatment facility	Pending
6.	Raja Reddy & Ors. Vs MoEF & Ors. **W.P.No.18327/2005**	Legal/4(6)/05	Bangalore	This is PIL field by resident of Hosapalya layout Bangalore against disposable of Municipal Solid Waste	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
7.	North Bihar Lather Industry Association Vs State of Bihar & Ors. **CWJC No.3047/2006**	Legal/4(8)/06	Patna	The association has filed the petition for land allotment. Vide order, dated 20.2.2006 the High Court has directed CPCB to file CA. The CPCB has filled its affidavit.	Pending
8.	HAAT Supreme Wastech (P) Ltd. Vs State of Haryana & Ors. **CWP No.5132/2006**	Legal/4(9)/06	Chandigarh	This is petition under Bio-Medical Waste Rules, and prayed for renewal of aerostation under Rule 8(IV) of Bio-Medical Rules	Pending
9.	Arihant Industries Vs RSPCB & Ors. **SB(CWP) No.8273/2004**	Legal/4(10)/04	Jaipur	The industry is engaged in reprocessing of used oil. Prayed for registration under Rule 19 of the HW Rules.	Pending
10.	Om Prakash Vs PCB & Ors. **W.P.(PIL) No.6505/2003**	Legal/4(11)03	Ranchi	This is PIL against alleged air pollution caused by Bakaro Steel Plant	Pending
11.	Sh. Rajinder Sood Vs Union of India & Ors. **WP No.63/2006**	Legal/4(13)/06	Shimla	This is a PIL against air pollution in the city of Shimla	Pending
12.	Rajesh Sharma Vs Union of India & Ors. **CWP No.(PIL)1010/2006**	Legal/4(14)/06	Gwarlior	This is PIL against the Municipal Authorities and State of MP to control air pollution in the city of Gwalior	Pending
13.	Krishi Rasayan Vs Orissa SPCB & Ors. **Appeal No. 16-A/2006**	Legal/4(15)/06	Appellate Authority, Cuttack	The industry has preferred the appeal against closure order passed by the Orissa SPCB	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
14.	Mahant Krishnanad Vs Ujjain Municipality & Ors. **Suit No.42-A/2005**	Legal/4(16)/05	Civil Judge, Ujjain	This is a suit for grant of stay order preferred by Mahant Krishnand against the Ujjain Municipality which are widening the road site for incoming Kumbh fiar.	Pending
15.	Sandeep Kumar VS Deputy Commissioner, Kurukshetra & Ors. **CWP No.3194/2007**	Legal/4(17)/07	Punjab & Haryana High Court	This writ petition has been preferred against setting up of a rice sheller in the public premises.	Pending
15.	Rameshwar & Ors. Vs State of Haryana & Ors. **CWP No.14904/2006**	Legal/4(18)06	-do-	This is a public interest litigation filed against air pollution caused by thermal power plant, Panipat	Pending
16.	M/s Ballarpur Industries Vs UOI & Ors.	Legal/4(19)/	-do-	This is a writ petition against the directions issued under Section 5 of the EP Act for stopping of effluent discharge in the Western Yamuna Canal.	Pending
17.	M/s Bharat Starch Ltd. Vs UOI & Ors.	Legal/4(20)/	-do-	-do-	Pending
18.	M/s Saraswati Sugar Mills Vs UOI & Ors.	Legal/4(21)/	-do-	-do-	Pending
19.	M/s Haryana Distillery Vs UOI & Ors.	Legal/4(22)/	-do-	-do-	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
20.	Nirbhay Singh Vs State of Punjab & Ors. CWP No.7036/2005	Legal/4(23)/	-do-	This is a PIL filled by Sh. Nirbhay Singh against Muncpilty of Ludhiana	Pending
21.	Bengal Brick Field Owner Association Vs W.B.Pollution Control Board **WP No.5574(W)/07**	Legal/4(24)/07	Kolkata High Court	The brick kiln manufacturing association has preferred this writ petition against the mandatory utilization of flyash	Pending
22.	Delhi Villagers Development Association Vs UOI & Ors. **WP(C) No.17855/05**	Legal/4(25)/05	Delhi High Court	The Delhi villagers Association has preferred this writ petition for restoring the air pollution and in craving a outer ring road for smooth traffic moment.	Pending
23.	Yogesh Chandra Parsuram Bhatt & Ors Vs Ganga Devi Sahakari Khand Udyog Ltd. **SCA No.10817/2006**	Legal/4(26)/06	Ahamdabad	This is a public interest petition initiated against the sugar industry Respondent No.1.	Pending
24.	Shri Oskar Martin Vs Gujarat State Pollution Control Board & Ors. **WP No.376/2006**	Legal/4(27)/06	High Court of Mumbai, Bench at Goa	This is public interest petition filed against illegal mining in the Goa State	Pending
25.	Court on its Motion Vs State Of Maharashtra & Ors. **W P No. 6605/2005**	Legal/4(28)/05	High Court of Mumbai bench at Nagpur	This is suomoto petition entertained by the High Court against the use of plastic bags	Pending
26.	C.M.Prajapati Vs NEPA Ltd. **WP No.15005/2006**	Legal/4(30)/06	High Court of M.P. Jabalpur	This is relating to the utilization of flyash by the brick manufacturer applicant. It is alleged that contrary to the	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
				provision, utilization of flyash free the NEPA Ltd. Is charging cost for the same	
27.	Eashan Group of Industries Vs NEPA Ltd. **WP No.15013/2006**	Legal/4(31)/06	-do-	-do-	Pending
28.	Prithivi Educational Welfare Society Ltd. Vs NEPA Ltd. **WP No.15147/2006**	Legal/4(32)/06	-do-	-do-	Pending
29.	Davinder Kumar Vs UOI & Ors. **CWP No.6868/2007**	Legal/4(33)/07	Chandigarh	This is a PIL filed for effective compliance of MCD Rules in State of Punjab	Pending
30.	Janhit Foundation Vs UOI & Ors. **W.P. No. /2007**	Legal/4(34)/07	Allahabad	It is a PIL filed for alleged pollution of river Hindon	Pending
31.	M/s Rakheja Engineering Works Vs State of Haryana & Ors. **CWP No.8985/07**	Legal/4(35)/07	Chandigarh	Inspection of 13 industries of Faridabad	Pending
32.	Kailash Kumar Shukla Vs State of U.P. & Ors. **WP No.4047(M/B)/2007**	Legal/4(37)/07	Lucknow		Pending
33.	M/s Rana Sugars Ltd. Vs Punjab Pollution Control Board Etc. **CWP No.8056/2007**	Legal/4(38)/	Chandigarh		Pending
34.	Environment (Protection) & Sustainable Development Society Vs	Legal/4(39)/07	Chandigarh		Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
	State of Arunachal Pradesh & Ors. **PIL50/2007**				
35.	M/s Jublient Organics Ltd Vs Union of India & Ors. **CMWP No.62487/2008**	Legal/4(23)/2009/	Allahabad	The Central Board has issued directions u/s 5 of the EP Act against the Petitioner which is a distillery unit. Against the direction of CPCB the petitioner has filed this writ petition for stay which has not been granted so far.	Pending
36.	Bagad Nadi Pradushan Mukti Morcha VS UOI & Ors.	Legal/4(24)/2009	Allahabad	This PIL has been filed by Public Interest Group against the alleged pollution of Bagad nadi which is a small tributary. This Petition has been clubbed with the M/s Jublient Organic Case as Jublient Organics are major pollutant to this river.	Pending
37.	M/s SCI India Ltd. Vs State of Bihar & Ors.		Patna	The Petitioner has filed the writ petition against the State of Bihar and its Departments. The Hon'ble High Court has directed CPCB to inspect the effluent treatment plant and suggests corrective measures for proper treatment of the effluent.	Pending
38.	Drishty Foundation Vs		Patna	The Petitioner a NGO has filed the	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
	State of Bihar & Ors.			writ petition against the instillation of biogasifier in a thickly populated area. The High Court has directed the CPCB to submit status report on the biogasifier which has been filed.	
39.	PML Industries Vs State of Punjab & Ors.		Chandigarh	This is a slaughter house matter in which the industry petitioner has file the case against the State of Punjab. The Hon'ble High Court has directed the CPCB to file the remedial measures for control of pollution. The CPCB has file compliance affidavit.	Pending
40.	Anil Kumar & Ors Vs State of Haryana		Chandigarh	This PIL has been filed by the Petitioner against the alleged pollution caused by M/s F.Falkar a major distiller y unit. The Hon'ble High Court has directed CPCB to investigate the matter.	Pending
41.	Dyeing Effluent Treatment Association VS State of Punjab & Ors.		Chandigarh	These dyeing units has filed the writ petition for grant of stay and defeat the direction issued by the PPCB. They are causing the effluent to the Budhha Nallah, Ludhiana and have not installed CETP. The	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
				CPCB has filed its affidavit.	
42.	Gurdeep Singh Vs State of Punjab & Ors.		High Court of Pujab & Haryana	This is a rice Sheller matter in which the Hon'ble High Court asked to provide guidelines for disposal of the rice, husk ash. The Central Boar has filed its affidavit.	Pending
43.	Gurmukh Singh Vs State of Punjab & Ors.		-do-	This is a rice Sheller matter in which the Hon'ble High Court asked to provide guidelines for disposal of the rice, husk ash. The Central Boar has filed its affidavit.	Pending
44.	Pooran Singh Vs State of Punjab & Ors.		-do-	This is a rice Sheller matter in which the Hon'ble High Court asked to provide guidelines for disposal of the rice, husk ash. The Central Boar has filed its affidavit.	Pending
45.	Jagdish Vs State of Haryana & Ors.		-do-	This is a petition in which control of odour is the subject matter. The Central Board filed its affidavit.	Pending
46.	Sai Educational Trust Vs State of Madhya Pradehs & Ors.		High Court of Jabalpur	In this PIL the Petition has prayed for quashing of the public hearing conducted by MP Pollution Control Board.	Pending

S. No.	Name of case and No.	File No.	Name of High Court	Description	Note
47	A.K.Churi & Ors. Vs State of Maharashtra & Ors.		Mumbai High Court	In this PIL the non-functioning of Tarapur Common Effluent Treatment Plant is under judicial scrutiny	Pending
48.	Ramky Engineers Pvt. Ltd. Vs State of Maharashtra & Ors.		Mumbai High Court	This Petition pertains to dispute between Municipal Corporation, Mumbai regarding disposal facility under Municipal Solid Waste	Pending
49.	Jayanti Das Vs State of Orissa		Cuttack High Court	This PIL is related to the radiation created by mobile towers.	Pending
50.	R.K.Medical Hospital Vs State of Karnataka & Ors.		Bangalore High Court	This is a Petition filed under Bio-Medical Waste Rules.	Pending

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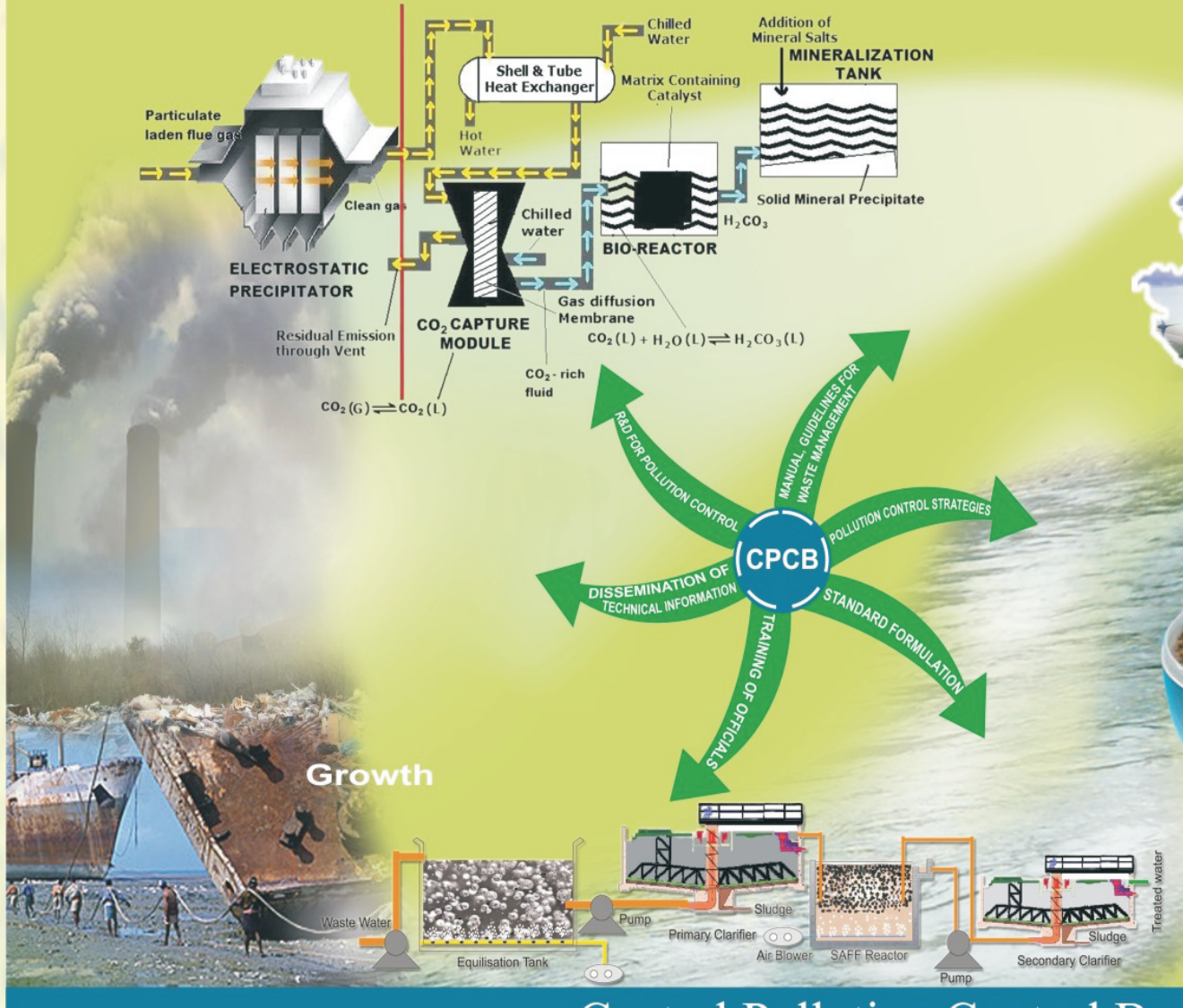
CPCB Serving to Build Sustainably Developing New India



Admire Publicity

Central Pollution Control Board

Ministry of Environment & Forests, Govt. of India

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A Clean PARIVESH for all is our goal