

## PREVENTION AND CONTROL OF POLLUTION



[Development and Promotion of Cleaner Technologies, Control of Pollution, Waste Minimisation and Cleaner Production, Taj Protection Mission, Environmental Health, Noise Pollution, Air Pollution, Vehicular Pollution Control, Industrial Pollution Control, Common Effluent Treatment Plants, Assistance for Abatement of Pollution, Zoning Atlas for Siting of Industries, Eco Cities, Urban Environmental Information System Establishment of Environment Protection Authority, Central Pollution Control Board, Hazardous Substances Management]

Most of the developmental activities use natural resources in some or the other form and generate waste leading to pollution in various environmental media like air, water, soil etc. The enhanced pace of such activities and rapid urbanisation have resulted in stress on various eco-systems and quality of life. Realising the deteriorating air and water quality, increasing vehicular emission and higher noise levels. Ministry adopted policy for abatement of pollution which provides multi-pronged strategies in the form of regulations, legislations, agreements, fiscal incentives and other measures to prevent and abate pollution. Over the years the thrust has shifted from curative measures to pollution prevention and control through adoption of clean and low waste technology, re-use and recycling, natural resource accounting, environmental audit and human resource development. To give effect to environmental measures and policies for pollution control, various steps have been initiated which include stringent regulations, development of environmental standards, control of vehicular pollution, spatial environmental planning including Industrial Estates and preparation of Zoning Atlas etc.

Major activities carried out under various programmes and schemes during the year are as follows:

### Development and Promotion of Cleaner Technologies

Integration of environmental considerations into developmental process with optimal utilization of resources has been recognized as a key to sustainable development. It has become progressively more clear that 'end of the pipe' strategies alone cannot resolve complex environmental problems. Adoption of cleaner technologies and cleaner production strategies can ensure resolution of conflicts between growth and environment through economic benefits via increased resource efficiency, innovation and reduced cost for environmental management. The scheme on Development and promotion of Clean Technologies, therefore, aims at promoting such technologies and strategies. Various activities undertaken during the year have been directed towards achieving the said objectives. Significant activities and the progress made during the year in this regard are summarized below :



Fig 49. Plant for manufacturing of brick from marble slurry at Udaipur

## Life Cycle Assessment

Life Cycle Assessment (LCA) is a decision cum management tool which provides information on the environmental effects of various products and processes so as to arrive at necessary corrective measures to make the entire process efficient with optimal utilization of resources and minimal wastes generation. Recognizing the importance of LCA in improving the performance of various manufacturing sectors, it has been identified as one of the thrust area in the 10<sup>th</sup> Five Year Plan. The various sectors in which LCA studies have been initiated so far include; (I) Steel, (ii) Coal / Lignite based Thermal Power, (iii) Pulp and Paper and (iv) Cement. While the studies in steel and thermal power sectors were completed earlier, the final report on steel sectors has been submitted during the year. The study in the pulp and paper sector has been progressing well and is expected to be completed during the year. The study in cement sector has been initiated during this year.

## Field Demonstration and Development of Bamboo Based Composites / Panels

The ongoing project on field demonstration and development of bamboo based composites / panels was continued during the year. Under this project commercial production of horizontal and vertical laminates have been made using *Bambusa bambusa* species. Construction of demonstration houses has been taken up during the current year.

## Recycling of Marble Slurry in Udaipur, Rajasthan

The ongoing project relating to manufacture of bricks and tiles from marble slurry in Udaipur, Rajasthan with the aim of utilizing wastes arising out of marble cutting and processing for the purpose of improving the local environment was continued during the year. Awareness workshops were also organized to make the products, made out of marble slurry popular and to promote its usage.

## Bio-remediation of Railadevi Lake in Thane, Maharashtra

The ongoing project relating to cleaning of Railadevi Lake in Thane District in Maharashtra using bio-remediation technique has been continued during the year. The activities *inter-alia* include dredging and physical cleaning of lake and application of bio-clean product.

## Development of Natural Dyes from Forest Wastes

The ongoing project on identification, development and utilisation of natural dyes from the forest plants of Utranchal by Forest Research Institute, Dehradun was continued during the year and the project is progressing well.

## Technology up-gradation for small and medium enterprise clusters (Utensil Industry) at Jagadhari

The ongoing project for technology up-gradation in small utensil manufacturing units in a representative cluster at Jagadhari was continued. Under this project two units from each of the industry sectors namely : (i) steel utensils, (ii) brass utensils and (iii) aluminium utensils were identified for demonstrating the technology up-gradation options. It is also proposed to organize awareness workshops with the involvement of local

industry associations and State Pollution Control Board to disseminate the information relating to technology up-gradation options among all concerned during the year. A presentation on the progress of work under the project was also arranged.

### **Project on Establishment of an Industrial Waste Exchange Bank by Karnataka Cleaner Production Centre**

The ongoing project for an establishment of an Industrial Waste Exchange Bank by Karnataka Cleaner Production Centre was continued during the year. The Waste Exchange Bank will provide necessary links to create a close cycle of material reuse and recycling among business houses. It will also provide opportunities to identify new market applications and process technology for existing waste material.

### **Project on Development, Demonstration and Dissemination of Bio-degradable Emulsion Technology for increasing the Shelf Life of Fruits and Vegetables**

The above mentioned ongoing project at Indian Institute of Technology (IIT), Delhi was continued during the year. The project has been sponsored jointly with Ministries of (i) Science & Technology, (ii) Rural Development and (iii) Food Processing Industries.

### **Project on Utilization of anode Mud and Chips, the Solid Wastes generated in the Zinc Industry for making value added products**

The project has been sponsored during the year to Regional Research Laboratory (RRL), Bhopal. The project is aimed at developing suitable process for making active chemical manganese dioxide from the wastes generated in the cell house in zinc plant and to separate lead from those wastes. The manganese dioxide so generated will be used in battery manufacture.

### **Development of a domestic unit employing a complexing resin for removing As(v) from water by Central Salt and Marine Chemical Research Institute, Bhavanagar**

The above mentioned project proposal has been approved for financial assistance under the scheme on

Development & Promotion of Clean Technologies in February, 2004 with the objective to exhaustively study the resin and establish the relationship between the resin structure and its coordinating ability for scavenging arsenic from raw as well as chemically treated water. The project envisages development of a portable domestic unit to meet the drinking water needs of a small family of five for a period of one month. It would be tested in a problem village and kept under observation for some time.

## **Control of Pollution**

### **Industrial Pollution Abatement through preventive strategies**

This scheme is an amalgamation of the three ongoing schemes viz. Environmental Audit, Adoption of Clean Technologies in small scale industries and Environmental Statistics and Mapping, which have been continuing since 8<sup>th</sup> Five Year Plan. Due to encouraging results and benefits to various small-scale units, this scheme is being continued during the 10<sup>th</sup> Five Year Plan also.

### **Environmental Statement (As a part of Environmental Audit)**

Environmental audit is a management tool and provides a structured and comprehensive mechanism for ensuring that the activities and products of an enterprise do not cause unacceptable effects on the environment. Submission of an Environmental Statement by polluting units seeking consent either under the Water (Prevention and Control of Pollution) Act, 1974 or the Air (Prevention and Control of Pollution) Act, 1981 or both and the Authorization under the Hazardous Wastes (Management and Handling) Rules, 1989 has been made mandatory through a Gazette Notification of April, 1993 under the Environment (Protection) Act, 1986. The Environmental Statement enables the units to undertake a comprehensive look at their industrial operations and facilities, understanding of material flows and focus on areas where waste reduction and consequently savings in input cost is possible. The primary benefit of environmental audit is that it ensures cost effective compliance of laws, standards, regulations and company policies etc.

A Project was sponsored to the Central Pollution Control Board for evolving model environmental

statement in various sectors. including Sugar, Thermal Power Projects, Cement, Paper and Pulp, Pesticides, Bulk Drugs, Tanneries and Textiles Activities. Further, with a view to disseminate the information on preparation of environmental statements, a proposal to conduct Sector specific awareness programmes on Environmental Statements including Waste Minimisation, Environmental Audit and Management System for the Industries and Regulatory agencies has been sponsored to Central Pollution Control Board. The sector specific awareness programme would cover sectors of Sugar, Pesticide, Thermal Power Stations, Cement, Textile, Iron & Steel, Tanneries, Petrochemicals, Oil Refineries, Pulp & Paper and Bulk Drug Industries and would be beneficial to entrepreneurs, consultants and those involved in assessing the environmental statements.

## **Waste Minimisation/Cleaner Production**

The policy statement for abatement of pollution lays emphasis on preventive aspects of pollution abatement and promotion of technologies to reduce the pollution. Waste minimization is one of the strategies adopted for prevention of industrial pollution. The main objective of the waste minimization is to optimize the consumption of raw material and reduce waste generation by adopting cleaner production techniques in the existing units without necessarily changing the production process or unit operations. This approach to the problem towards utilizing the existing production facility has been specifically introduced for enabling the small and medium enterprises in adoption of cleaner production practices. As a part of the Industrial Pollution Abatement through preventive strategies, financial assistance is being provided for establishment and running of waste minimization circles in clusters of small scale industries, capacity building in areas of cleaner production, establishment of demonstration units in selected industrial sectors etc. The programme is being funded through National Productivity Council who have pioneered in the activity. The implementation of this project has helped in identifying the polluting small and medium industries, evaluating the causes of pollution and facilitating them to adopt cleaner production practices leading to preventive strategies.

During the current year, a Screening Committee has been set up to examine and recommend the proposals from various organizations and institutions. In order to streamline the process, the Committee has evolved a set

of guidelines for submission of the proposal under the scheme. These guidelines provide details on the objectives of the programme, eligibility and also the application format for submission of the proposal along with the documents to be enclosed with the proposal. The comprehensive guidelines is to facilitate both the proponents as well as the Screening Committee to evaluate the proposal. The National Productivity Council in their continued activity have established a total of 118 Waste Minimization Circles (WMCs) in 41 industrial sectors and have trained 168 consultants for replicating the activities and creating awareness amongst the small and medium enterprises. Financial assistance have also been provided for conducting awareness programmes by the Development Commissioner on Small Scale Industries. Initiatives have been taken by the Ministry to facilitate R&D activities under the National Networking programme of CSIR on Waste minimization for the small and medium enterprises.

## **Environmental Statistics and Mapping**

For sound Environmental Management, reliable information base and the mapping of areas needing special attention for pollution prevention and control are a pre-requisite. As a step in this direction, projects and pilot studies have been initiated through various research institutions and organization. Under this programme, following studies have been initiated and are at various stages of completion :

- GIS based Hydrological Modelling for Water Quality and Quantity in Cauvery River Basin by IIT, Delhi.
- Environmental Statistics and Mapping in Delhi - Application of Spatial Technologies by National Institute of Science, Technology and Development Studies (NISTADS), New Delhi;
- Geo-chemical baseline Mapping for Environmental Management by National Geophysical Research Institute, Hyderabad.

## **Charter on Corporate Responsibility for Environmental Protection**

The industrial activities without proper precautionary measures for environmental protection are known to create pollution and associated problems. It is, therefore, just not adequate to comply with regulatory norms for

prevention and control of pollution but go beyond compliance through adoption of clean technologies and improved environmental practices. After a series of industry specific interaction meetings, the Charter on Corporate Responsibility for Environmental Protection (CREP) was released in March, 2003. This charter is a commitment for partnership and participatory action of concerned stake-holders and is a road map for progressive improvement in environmental management system for seventeen categories of polluting industries.

For effective implementation of action points enlisted in the charter, eight task forces have been constituted incorporating experts and members from institutions and industry associations. These task forces are meeting regularly and have also undertaken site inspections for assessing the compliance to stipulate the standards. In addition, a Steering Committee under the chairmanship of Secretary (E&F) has also been constituted to oversee the functioning of these task forces and to take necessary policy decisions.

## Taj Protection Mission

In compliance to Hon'ble Supreme Court's directives, the Planning Commission considered a separate Plan allocation for the environmental protection of the Taj Mahal, which is a world heritage and one of the wonders of the world. In order to implement various schemes for the protection of the monument, the Planning Commission approved Rs. 600 crores on a 50 : 50 cost sharing basis with the State Government of Uttar Pradesh to implement various schemes in the Taj Trapezium Zone (TTZ) in the context of environmental protection of the Taj Mahal.

In the first phase, during the Ninth Five Year Plan, the following ten projects were approved and are being implemented by the State Government of Uttar Pradesh. The projects are :

- Improvement in Electric Supply at Agra
- Improvement in Electric Supply in and around the rural areas of Agra and Fatehpur Sikri
- Water supply (Agra)
- Water Supply (Mathura-Vrindavan)

- Gokul Barrage
- Solid Waste Management
- Storm Water Drainage System (Agra)
- Construction of one part of Agra bye-pass
- Widening of Agra Bye-pass
- Improvement of Master Plan of Roads of Agra City

The Mission Management Board constituted under the Chairmanship of Chief Secretary of Uttar Pradesh, approved seven more projects in its meeting held on 4<sup>th</sup> August, 2002 for implementation during the Tenth Five Year Plan. These are:

- Taj Trapezium Zone Heritage Corridor covering the areas of Taj Mahal, Agra Fort, Ram Bagh, Etmad-Ud-Daula and Chinni-ka-Rauza and River Yamuna.
- TTZ Authority Environmental Centre and Allied Schemes
- Planning of Taj Trapezium Zone and Study of Taj Eco City/Conceptual Plan/Master Plan.
- Automatic Air Monitoring Stations, Display Boards and Networking at Agra-Mathura and Firozabad.
- Hazardous waste secured land-fill site for Agra and Mathura.
- Common Treatment Facility for treatment of the Bio-Medical waste at Agra.
- Public awareness programme in Taj Trapezium.

While these proposals were being examined by the Ministry for a clearance through EFC memo, one of the proposals, went under litigation. Since the matter is under sub-judice, no further assistance under the programme could be released during the financial year 2003-04 by the Ministry.

## Environmental Health

The Ministry has brought out a "Vision Statement on Environment and Human Health" for setting up the priority regarding Environmental Health and for chalking

out Action Plans evolving strategies for protection of public health from natural and man – made environmental pollution and hazards. Environmental Health Cell of the Ministry has commissioned environment health study at Jodhpur, Faridabad and Patna for documenting environmental health profile so that necessary corrective measures could be evolved and addressed for pollution control.

## Noise Pollution

Noticing increasing trend in noise levels from various sources, Ministry has initiated various steps to regulate and control noise pollution and has issued several notifications under the Environment (Protection) Act, 1986. The general standards for industrial, commercial, residential areas and silence zones had been notified as a guideline for the regulatory agencies to divide the human settlements into various zones. These standards have been evolved based upon the guidelines issued by World Health Organisation, separately for day as well as night. A number of source-specific standards also have been notified depending upon the source of noise which include, standards for firecrackers, vehicles, diesel generator sets, etc. Noise standards for firecrackers were notified on 5<sup>th</sup> October, 1999 and Governments of all the States and Union Territories were directed to enforce these standards strictly. The regulatory authorities faced some problems during the compliance of these standards. To overcome their difficulties, Central Pollution Control Board has evolved a testing procedure during the current year and has forwarded to the implementing authorities. National Physical Laboratory, Delhi has been entrusted with the responsibility to check noise from the firecrackers of various categories.

Noise limits for vehicles at manufacturing stage were notified vide GSR 7(E) on 25<sup>th</sup> September, 2000 which would have been effective from 1<sup>st</sup> January, 2003. To make these standards commensurate with the emission standards for vehicles, the notified rules have been revised on 30<sup>th</sup> December, 2002. During 2003, the Automotive Research Association of India (ARAI), Pune has conducted survey to collect data for the stationary noise from various categories of motor vehicles. This data indicates that noise limits for the two-wheelers, three-wheelers and passenger cars are within the prescribed limits, whereas noise from multi-utility vehicles

exceeds the limits and R&D efforts are required in this regard, for which the time is given till April, 2005.

The standards for generator sets of different sizes have been notified from time to time since 1992 under the Environment (Protection) Act, 1986. The limits of noise for diesel generator sets (DG Sets) upto 1000 KVA to be manufactured on or after 1<sup>st</sup> July, 2003 were notified vide GSR 371(E) dated 17<sup>th</sup> May, 2002. These standards have been revised vide GSR 520(E) dated 1<sup>st</sup> July, 2003 and will be applicable from 1.7.2004 subject to certain commitments such as specified emission limit shall be complied with by them as per the extended date of implementation given for that category of engines without seeking further extension of time, bank guarantee(s) and development of either individual or common emission testing facility etc. A compliance procedure has also been evolved for checking the noise limits for diesel generator sets at the manufacturing stage and also of the gensets which are imported into the country by the various suppliers.

The Hon'ble Supreme Court in its order dated 10<sup>th</sup> September, 2003 in the matter of Writ Petition 72 of 1998 regarding noise pollution, had directed the Government of India to monitor the suggestions given by the *amicus curiae* which *inter-alia* include creating awareness through electronic and print media for school children and regulatory agencies, creation of environmental Monitoring Cell, banning of high sounding instruments and loudspeakers etc. and submit a compliance report to the Hon'ble Court. In this regard, Chief Secretaries of all the States/Union Territories had been requested to enforce the orders and submit a compliance report. A perusal of the response received from various States indicate a decreasing trend of noise compared to last year.

## Air Pollution

A Network of 295 Ambient Air Quality Monitoring Stations covering 90 towns/cities all over the country has been set up by Central Pollution Control Board in coordination with the State Pollution Control Boards/ Pollution Control Committees and other Institutions for carrying out regular monitoring. The major objectives of the programme are :

- to ascertain whether the notified ambient air quality standards are maintained;

- to control and regulate pollution from various sources;
- to understand the natural cleansing process undergoing in the environment through pollution dilution, dispersion, wind based movement, dry deposition, precipitation and chemical transformation of pollutants generated; and
- health impacts

Under National Air Quality Monitoring Programme (NAMP), four air pollutants *viz.*, Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen as NO<sub>x</sub>, Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM/PM<sub>10</sub>), have been identified for regular monitoring at all the locations. Besides this, additional parameters such as Respirable Lead and other toxic trace metals and Polycyclic Aromatic Hydrocarbons (PAHs) are also being monitored in seven metro-cities of the country. The monitoring of meteorological parameters such as wind speed and direction, relative humidity and temperature was also integrated with the monitoring of air quality. The monitoring of pollutants is carried out for 24 hours with a frequency of twice a week, to have 104 observations in a year.

The monitored data indicates that sulphur dioxide levels are within the National Ambient Air Quality Standards (NAAQS) at most of the locations. A decreasing trend has been observed in many cities which may be due to reduction of sulphur in diesel and use of cleaner fuels. Nitrogen dioxide levels have also been observed to be below the NAAQS at most of the locations. Levels of Suspended Particulate Matter have been observed to be above the NAAQS, especially in central and northern parts of the country. These high levels are attributed to natural dust and man made activities. Levels of Respirable Suspended Particulate Matter (RSPM) have also been observed to be above the NAAQS in many parts of the country. The main sources of RSPM are natural dust and vehicular emissions.

Further, for real time data collection, automatic monitoring stations at few places have also been established. Under the Male declaration, 11 automatic monitoring stations are also planned at strategic locations to measure the trans-boundary movement of pollutants among the SAARC countries.

To regulate and control air pollution, the source specific standards are notified from time to time. During the year, emission standards for new diesel generator sets upto 800 KW have been notified. These rules shall apply to all new diesel engines for gensets manufactured or imported into India after the effective date. All engines upto 20 KW shall carry ISI mark and meet the relevant BIS specifications. Emission standards for diesel generator sets for more than 800 KW had also been notified on 9<sup>th</sup> July, 2002 vide GSR 489(E). These standards shall be regulated by the State Pollution Control Boards or Pollution Control Committees, as the case may be. It has also been made mandatory for all the diesel generator sets upto 800 KW or more to use the same commercial fuel (High Speed Diesel) as applicable for diesel vehicles in the area.

## Vehicular Pollution Control

As the vehicular emissions is the major cause for deterioration of urban ambient air quality, Ministry is facilitating and coordinating in the field of controlling of vehicular pollution with the concerned Ministries and its associated bodies / organizations including the Ministry of Surface Transport, the Ministry of Petroleum and Natural Gas and the Ministry of Industry in the areas such as up-gradation of automobile technology, improvement in fuel quality, expansion of urban public transport systems and promotion of integrated traffic management etc. The Gross Emission Standards for vehicles have been prescribed from time to time and a road map is prepared to improve the quality of fuel. In consultation with this Ministry, on 10<sup>th</sup> February, 2004, the Ministry of Road Transport and Highways has notified emission norms vide GSR 111(E), under the Central Motor Vehicles Rules (CMVR), 1989 amending Rule 115 of CMVR prescribing future Road Map for Pollution Under Control (PUC) certification procedure. It is proposed that PUC check shall be done every six months instead of earlier prescribed as “six months or any lesser period as may be specified by the State Government from time to time”. The testing procedure has also been changed and specified. For petrol vehicles fitted with three way catalytic convertors operating in a specific city or area, the Government of respective States/Uts, as the case may be, may specify introduction of measurement of LAMBDA (dimensionless value representing burning efficiency of an engine in terms of the air/fuel ratio in

the exhaust gases) and tighter emission norms for in-use vehicles. The Carbon Monoxide (CO) and Hydro Carbon (HC) emission norms for new generation vehicles manufactured on or after the 1<sup>st</sup> October 2004 have also been prescribed in this amendment and shall come into force from 1<sup>st</sup> October, 2004. Mass emission standards for vehicles operating on CNG/converted diesel vehicles and LPG etc. have also been notified.

The Ministry has also been providing inputs for Harmonising the Standards for Vehicles under WP 29 (World Forum for Harmonization of Vehicle Regulations).

The Ministry of Petroleum and Natural Gas had constituted an Expert Committee on Auto Fuel Policy under the Chairmanship of Dr. R.A. Mashelkar, Director General, Council of Scientific and Industrial Research (CSIR) to recommend an Auto Fuel Policy for the country together with a road map for its implementation. The Ministry was represented on this Committee and significant contribution was made in drafting of the Policy. The Committee has submitted its final report to the Government in August 2002 and the recommendations of this Committee has recently been approved by the Cabinet. Some of the highlights of the approved recommendations are as under :

- **Vehicular Emission Norms:** As per the approved Time Frame for Vehicular Emission Norms (passenger cars, light commercial vehicles and heavy-duty diesel vehicles), 11 mega cities namely Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Ahmadabad, Pune, Surat, Kanpur and Agra who have already introduced Bharat Stage - II equivalent to EURO - II norms during April 2000 to 2003 would introduce EURO - III and EURO - IV equivalent norms by April 1, 2005 and April 1, 2010 respectively. EURO - II and EURO - III norms would be introduced in the entire country by April 2005 and April 2010 respectively. It has been further decided that the schedules for implementing these norms would be reviewed in the year 2006, when EURO - II equivalent emission norms would have been implemented in the entire country and EURO - III equivalent implemented in 11 major cities.
- For reduction of pollution from in-use vehicles, some of the recommended measures include; new

improved Pollution Under Control (PUC) checking system, inspection & maintenance (I & M) system, performance checking system of catalytic converter and conversion kits for CNG / LPG and compliance of emission norms by city public service and inter State vehicles.

- For new two and three wheelers, Bharat Stage - II and EURO - III equivalent norms would be introduced in the entire country by April 2005 and April 2008 / 2010.
- **Auto Fuels:** The liquid fuels would be the main auto fuels through out the country and the use of CNG/LPG should be encouraged in the cities affected by high vehicular pollution. To accelerate the development of other alternative fuel vehicles, it has been suggested that a comprehensive programme for policy support, R & D support and other measures for zero emission vehicles should be drawn up.
- The Committee has recommended one time budgetary support to North East refineries, lower customs duty on imported goods and equipment, lower excise duty on indigenously manufactured goods and equipment, 100% depreciation on plant and machinery for upgrading of fuel quality and automobile technology.
- In addition to the above, taking up studies for scientific data collection, identification of critical pollution and emission source apportionment, creation of data base for linking air pollution / vehicular pollution to diseases has been suggested.

Promotion of the Ethanol Blended Petrol and Bio-diesel have also been taken up. A notification has been issued by Ministry of Petroleum and Natural Gas in September, 2002 regarding use of 5% ethanol blended petrol in nine States and four Union Territories. This notification is being implemented from 1<sup>st</sup> January, 2003 in the States of Andhra Pradesh, Goa, Gujarat, Haryana, Karnataka, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh and in UTs namely; Chandigarh, Pondicherry, Daman and Dadra & Nagar Haveli.

As per the directions of the Hon'ble Supreme Court in W.P.No. 13029 of 1985 by M.C. Mehta Vs. Union of India and others, the Ministry coordinated the preparation

of Action Plans for Control of Vehicular Pollution for compulsory switch over to CNG / LPG in the cities of Ahmedabad, Kolkata, Pune and Kanpur which were found to be equally or more polluted than Delhi. The implementation of the plan is being monitored. Besides these four cities, the Ministry also coordinated preparation of Action Plans for **12** more cities namely Faridabad, Lucknow, Agra, Varanasi, Jharia, Patna, Chennai, Hyderabad, Mumbai, Jodhpur, Bangalore and Sholapur which were also identified by the Hon'ble Court in its various orders.

## Industrial Pollution Control

The Central Pollution Control Board (CPCB) identified 1551 medium and large-scale units (which came into operation on or before December 31, 1991) under the Central Action Plan for Pollution Control on 17 categories of highly polluting industries. The inventorisation was continued and 604 large and medium units of 17 categories, which came into operation on or after January 01, 1992, were further identified. Therefore, the total of 2155 industries has been identified under this programme.

Out of these 2155 industries, 1877 have provided the requisite pollution control facilities, 53 are still defaulting and the remaining 225 are closed. The state-wise and category-wise status of 2155 industries as on March 31, 2004 is given in Table-9 and Table-10 respectively.

Legal action has been taken under the Environment (Protection) Act, 1986 in respect of the defaulting units and in many cases, the matter is pending before the various Courts. Almost all the defaulting units are either in the advance stage of installing the pollution control measures or under legal action for default. The Ministry is also pursuing number of court cases on different subjects like stone crushing, brick kilns, Air, Water & Noise Pollution from the industries in High Courts of various states.

## Common Effluent Treatment Plants

The Ministry has undertaken a Centrally Sponsored Scheme for enabling the small scale industries (SSI) to set-up Common Effluent Treatment Plants (CETP) in the country. The SSIs are polluting the environment



**Fig 50.** Oxidation Pond based Treatment Plant at Vrindavan, UP

**Table - 9**

**Statewise Summary Status of the Pollution Control in Pre and Post 1991 Units of 17 Categories of Industries**  
(as per information available with CPCB as on December 31, 2003)

Sl. No.	State/UT	Total No. of units	Status (No. of units)		
			Closed	C#	Defaulters ##
01.	Andhra Pradesh	269	29	240	00
02.	Arunachal Pradesh	00	00	00	00
03.	Assam	16	03	12	01
04.	Bihar	46	19	27	00
05.	Chhattisgarh	25	02	21	02
06.	Goa	08	00	08	00
07.	Gujarat	283	10	272	01
08.	Haryana	107	24	69	14
09.	Himachal Pradesh	11	00	11	00
10.	Jammu & Kashmir	10	03	07	00
11.	Jharkhand	21	03	16	02
12.	Karnataka	116	17	99	00
13.	Kerala	43	06	37	00
14.	Madhya Pradesh	78	15	61	02
15.	Maharashtra	392	26	356	10
16.	Manipur	00	00	00	00
17.	Meghalaya	01	00	01	00
18.	Mizoram	00	00	00	00
19.	Nagaland	00	00	00	00
20.	Orissa	29	03	21	05
21.	Punjab	72	09	60	03
22.	Rajasthan	108	08	96	04
23.	Sikkim	01	00	01	00
24.	Tamil Nadu	156	02	154	00
25.	Tripura	00	00	00	00
26.	UT – Andman & Nicobar	00	00	00	00
27.	UT – Chandigarh	01	00	01	00
28.	UT – Daman & Diu, Dadra & Nagar Haveli	00	00	00	00
29.	UT – Delhi	05	01	04	00
30.	UT – Lakshadweep	00	00	00	00
31.	UT – Pondicherry	08	01	07	00
32.	Uttaranchal	20	00	20	00
33.	Uttar Pradesh	263	27	232	04
34.	West Bengal	66	17	44	05
<b>TOTAL</b>		<b>2155</b>	<b>225</b>	<b>1877</b>	<b>53</b>

# Having adequate facilities to comply with the standards

**Table - 10**  
**Categorywise Summary Status of the Pollution Control**  
**In Pre and Post-91 units of 17 categories of industries**  
(as per information available with CPCB as on position upto 31.3.04)

S.No.	Category	Total No. of Units	Status (No. of Units )		
			Closed	C#	Defaulters
01.	Aluminium	07	01	06	00
02.	Caustic	33	00	33	00
03.	Cement	205	17	182	06
04.	Copper	04	00	04	00
05.	Distillery	209	39	167	03
06.	Dyes & D.I.	102	10	90	02
07.	Fertilizer	124	13	109	02
08.	Iron & Steel	19	01	14	04
09.	Leather	94	15	75	04
10.	Pesticide	111	08	102	01
11.	Petrochem	75	00	74	01
12.	Pharma	401	41	350	10
13.	Pulp & Paper	136	26	108	02
14.	Refinery	16	00	16	00
15.	Sugar	462	50	409	03
16.	TPP	151	03	133	15
17.	Zinc	06	01	05	00
<b>Total</b>		<b>2155</b>	<b>225</b>	<b>1877</b>	<b>53</b>

# Having adequate facilities to comply with the standards

through their effluents but some of them are unable to afford installation of pollution control equipment. In order to encourage use of new technologies for CETPs for existing SSI clusters of units a scheme for financial assistance has been formulated. This promotional scheme is being instituted and will be implemented during the Tenth Five Year Plan.

**The criteria for Consideration for Assistance:**

- CETPs in industrial estates or in a cluster of Small Scale Industrial units are encouraged.
- Central Assistance will be available only for clusters of SSIs.

- Projects for assistance will be prioritised on the basis of :
  - Toxicity of pollutants
  - Pollution load being generated and to be treated; and
  - Number of units covered
- The CETPs are to be set up and managed by the State Industrial Infrastructure Corporation (by whatever name known) or through an appropriate institution including a cooperative body of the concerned units as may be decided by the State Governments/SPCBs concerned.

- The project should be self-supporting for repayment of the loan and meeting operation and maintenance costs.
- The project must formulate adequate institutional arrangements for cost sharing, recovery of dues and management and ensure observance of prescribed standards.
- The scheme must have the technical recommendation of the State Pollution Control Boards.
- The CETP project should have the conveyance system from the individual units to the CETP.
- Sludge characteristics (i.e. hazardous Vs. non-hazardous) from the primary and secondary treatment of the CETP should be estimated. Therefore, the CETP should have a sludge management plan which should be prepared based on the sludge characterisation and be documented in the feasibility report of the CETP project.
- Possibility of recycling/reusing the treated effluent from the CETPs by the member units should be explored and be documented in the feasibility report of the CETP project.
- An environmental management and monitoring plan/ programme to be prepared for the CETP and be documented in the feasibility report of the CETP project.
- A legal agreement between the CETP Co. and its member units to be executed be reflected in the feasibility report of the CETP project.
- The cost recovery formula developed for the CETP project should be ratified by all members and be documented in the feasibility report of the CETP project.
- Necessary clearance be obtained from the concerned State Pollution Control Board for discharging the treated effluent and be reflected in the feasibility report of the CETP project.



**Fig 51.** Leachate collection and ewaporation pond at the common facility for waste management at Hyderabad (A.P.)

- All hazardous waste facilities associated with these CETPs should obtain clearance from the concerned State Pollution Control Board and be documented in the feasibility report of the CETP project.

- Pattern of Financial Assistance:

State subsidy	- 25% of the total project cost;
Central subsidy	- 25% of the total project cost;
Entrepreneurs contribution	- 20% of the total project cost;
Loan from financial institutions	- 30% of the total project cost.

( e.g. IDBI, ICICI or any other nationalised Banks, State Industrial Financial Corporation etc.

- If the CETP Co. does not desire to have loans from financial institutions/Banks they may augment the same out of their own resources/contributions, i.e. the entrepreneurs would then contribute 50% of the project cost.
- Central assistance upto 25% of the total cost of the CETP would be provided as a grant to the Common Effluent Treatment Plant(s) on the condition that a matching grant is sanctioned and released by the State Government. The CETP Company should meet the remaining cost by equity contribution by the industries and loans from financial institutions.
- Central assistance will be provided only for the capital costs. No assistance will be provided for recurring costs. The assistance will be released in four equal installments. The first installment of 25% of the assistance will be released when a body has been identified for the purpose of implementing the project, financial arrangements have been tied up, institutional arrangements have been finalised, consent has been obtained from the State Pollution Control Board and State Government has committed its contribution.
- The second installment of 25 per cent and the third installment of 25 per cent will be released after utilisation of the previous money released and

adequate progress of work subject to release of their proportionate shares by the State Governments.

- The fourth and the last installments will be released only when utilisation certificates for the previous installments have been submitted and duly verified by the State Pollution Control Boards.
- It may be of advantage to combine some components of CETP with the municipal system. On such schemes, the municipalities have to pay their share of the cost.
- An assessment may be made about the present physical & financial status of the CETPs. Funds released for the CETPs should be utilised for the CETP only and not for payment for debts/banks loans etc.
- Large and medium scale industries other than 17 categories of heavily polluted industries may join the CETP after the primary treatment or as considered necessary by the State Pollution Control Board for the purpose of hydraulic load and for techno-economic viability of the CETP. The 17 categories of industries need to provide their own full-fledged effluent treatment facilities to conform to the prescribed standards before the effluent is discharged. However, the large and medium scale industries would not be entitled for any subsidy meant for SSIs.

During the current financial year, financial assistance as per the financial pattern was provided to ongoing CETP plants approved earlier and assistance was also provided to six new plants as approved by the Appraisal Committee.

## Assistance for Abatement of Pollution

Under this scheme, financial assistance is provided to various State Pollution Control Boards/Pollution Control Committees, National Institutions, etc., for specific projects, studies procurement of necessary equipment for strengthening the laboratories, salary support, etc. This is being provided on the basis of the requirements made by these institutions. Before extending financial support, the demands from the concerned organizations institutions are considered by the Ministry in consultation with Central Pollution Control Board wherever required.

During the year, financial support was provided as follows:

- Fifteen States and UTs, including North Eastern States were provided financial support for strengthening their laboratories.
- Salary support for technical staff for Assam State Pollution Control Board was sanctioned till the end of Tenth Five Year Plan.
- Delhi, Tripura, Mizoram and Lakshwadeep which could make recruitment of technical staff sanctioned by the Ministry were released necessary financial support to meet their salary expenditure.

An amount of Rs. 432.0 lakhs allocated in the financial year 2003-04 was fully utilized under this scheme.

### **Spatial Environmental Planning**

Spatial planning is primarily used for land use plans, city planning, and is recently extended to regional planning as well. In the conventional town and country planning, environmental issues were not addressed to the desired level, which has resulted in environmental degradation and deterioration of the urban areas. Monitoring has revealed that levels of air, water and noise pollution are higher in the metro and mega cities compared to other areas. It is, therefore, imperative that the policy planners and enforcement agencies should initiate the remedial measures. Hence, spatial environmental planning has been introduced as a technique for conservation of the environmental resources and for achieving developmental targets in an environmentally sound manner.

In this context, Zoning Atlas for Siting of Industries was initiated at the District level which has covered more than 21 States and Union Territories so far. Thereafter, the programmes for Industrial Estate Planning and Development of Eco Industrial Estates, Environmental Management Plans, Regional Planning Studies and Mapping of Environmentally Sensitive Zones have been taken up. Recently, Urban Environmental Information System has also been evolved for collection of information about the basic demographic profile of the urban area.

**The details of these activities are given below :**

### **Zoning Atlas for Siting of Industries**

The study of Zoning Atlases for Siting of Industries, district-wise/zone, classifies the environment and presents the pollution receiving potential of various sites/zones in the district and identifies the possible alternate sites for industries, through easy-to-read maps (1:250,000 scale). So far, the Atlases have been finalised for 85 districts. The studies have been completed for 39 districts for which draft reports are ready and the studies are in final stages of completion for 16 districts.

### **Industrial Estate Planning & Development of Eco-Industrial Estates**

To identify sites for eco-friendly industrial estates to contain pollution, the programme of Industrial Estate Planning Studies has been taken up. It helps to identify environmentally acceptable sites for the development of future industrial estates and to control the land-use pattern surrounding these industrial estates. So far, the studies have been completed for 12 such sites, out of which draft reports have been prepared for three sites and work is in progress for the other sites. The identified industrial estates are being planned to ensure the pollution abatement infrastructure and for regulating development around these sites in an environment-friendly manner.

### **Mapping of Environmental Sensitive Zones and Industrial Sites – State-wise**

The maps on Environmentally Sensitive Zones and Industrial Sites present the State-wise information on environmentally sensitive zones, viz. National Parks, Reserved Forests, Protected Forests and Industrial Sites. These maps were earlier completed for 18 States and in the current year, work is in progress for Punjab and Rajasthan.

A pilot study has been taken up with the objective to create an inventory of industries in GIS environment for the State of West Bengal to facilitate the decision making on prevention and control of pollution in the industries. Action has been initiated to make use of the results of these studies with the Government of West Bengal.

## **Environmental Management Plans for Urban Areas**

The activity on Environment Management Plans (EMPs) for urban areas is targeted to provide planning solutions for the different kinds of urban areas wherein the environmental degradation has taken place and environmental risks are increasing. In the first phase, the studies for the metro cities of Chennai, Bhubaneswar and Indore have been taken up and EMPs have been evolved for these areas. Action has also been initiated for the enforcement with the help of local Governments.

Similar to the preparation of the Environmental Management Plans, studies have been taken up for the mining, tourism and environmentally fragile areas. Two studies including the Korba Coal Mining area and Satna Limestone Belt have been taken up in Madhya Pradesh as mining areas. Other two studies for tourism sector in Bakelfort (Kerala) and Macleodganj (Himachal Pradesh) are in advanced stage of completion. A study was taken up for Panchmarhi Biosphere Reserve located in Madhya Pradesh which is an environmentally fragile area and has been completed. In its immediate vicinity, another study has been taken up for Amarkantak Biosphere Reserve. Action has also been initiated for using the outcome of these studies with the Government of Madhya Pradesh.

## **Regional/State Planning Studies**

### **Eco-Cities**

The Ecocity Programme was initiated under the Tenth Five Year Plan to bring in visible environmental improvement in the identified small and medium towns. In the first phase, the Programme has been initiated in five towns namely; Ujjain (Madhya Pradesh), Puri (Orissa), Tirupati (Andhra Pradesh), Kottayam (Kerala) and Vrindavan (Uttar Pradesh). The project in Kottayam is aimed at rejuvenating Mundar River and Kacherikadavu Boat Jetty and Canal that have severe siltation and pollution problems. The project in Ujjain is aimed at improvement around Mahakal Temple and cleaning of Rudra Sagar Lake, which is highly silted and polluted with sewage. The project in Vrindavan is aimed at improvement of the historic core of the town located around Rangnath Temple. The project in Tirupati is aimed at improvement around Jagannath Temple, renovation of three of the religious ponds, shifting of

garages and automobile workshops and improvement of existing solid waste disposal facility.

## **Urban Environmental Information System**

To provide information to the public in the form of a local environmental report to be prepared by the Municipalities on the status of socio-economics, development and environment of the towns and cities, preparation of "Urban Environmental Information System" has been taken up in a few volunteering towns including Agartala, Chennai, Guntur, Indore, Kottayam, Agra, Bhubaneswar, Kanpur and Patna. The draft reports are ready for Bhubaneswar and Indore.

## **Industrial Pollution Complaints**

During the year, Ministry received more than 250 complaints from various individuals/organisation/NGOs etc. regarding various pollution problems. These complaints were attended to by calling reports along with the status and comments from the state pollution Control Boards/ Pollution Control Committees. The complaints were mostly related to pollution being caused in environmental media like air, water, land and noise resulting in degradation of the eco-system. Some of the complaints were also related to discharge of untreated or partly treated effluent thereby contaminating water bodies, land and ground water. Air pollution complaints were received for certain cement plants, thermal power projects and brick kilns units and complaints for water pollution were received for sugar mills, distilleries, tanneries, paper and pulp industries. Action as required, based on the reports of the Pollution Control Boards were taken and the industries were directed to provide the necessary pollution control measures. The Ministry also undertook visits to some of the persistently polluting industries and directed the respective boards for necessary actions .

## **Development of Environment Standards**

As a step in the direction of pollution control from various sources, the Ministry notifies general as well as industry specific emission and effluent standards for various categories of industries under the provisions of Environment (Protection) Act, 1986. The standards are reviewed from time to time and new ones are notified. Recently, a meeting of the Expert Committee of the

Ministry was held to consider and review the standards for coke oven plants, emission standards for asbestos fiber and AOX in effluents of pulp and paper mills etc. Emission Standards for Boilers using Agricultural Waste (other than the bagasse) as a Fuel and Pollution Control in Ginning Mills have also been considered for notification. It is also proposed to publish guidelines for disposal of Drill Cutting and Drilling Fuels for Offshore and On-shore Oil Drilling Operations.

## **Establishment of Environment Protection Authorities**

### **National Environment Appellate Authority (NEAA)**

The NEAA was established under the National Environment Appellate Authority Act, 1997 (22 of 1997) to hear appeals in regard to restriction of areas in which any industries, operations, or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards under the Environment (Protection) Act, 1986 and for matters connected therewith or accidental thereto.

The NEAA was established on 9<sup>th</sup> April, 1997 and has the composition as follows:

- A Chairperson (retired Judge of the Supreme Court or Chief Justice of a High Court)
- A Vice-Chairperson
- Members not exceeding three, as the Central Government deem fit

The Authority is located in Jawaharlal Nehru Stadium complex, New Delhi and continued to function during the year.

### **The Loss of Ecology (Prevention and Payments of Compensation) Authority for the State of Tamil Nadu:**

In compliance with the Hon'ble Supreme Court's order dated 28.8.1998 in Writ Petition (Civil) No. 914 of 1991 namely Vellore Citizens' Welfare Forum Versus Union of India and Others, the Ministry constituted the Loss of Ecology (Prevention and Payments of

Compensation) Authority for the State of Tamil Nadu [vide notification S.O. 671(E) dated 30.9.1996] to deal with the situation created by the tanneries and other polluting industries in Tamil Nadu. The Authority consists of a retired judge of the High Court, two members and one Member Secretary.

The tenure of the authority has been extended upto 30<sup>th</sup> September 2004 with the approval of the competent authority.

### **Environmental Pollution (Prevention & Control) Authority for the National Capital Region**

Environment Pollution (Prevention and Control) Authority (EPCA) for the National Capital Region was constituted under sub-section (1) and (3) of the Section 3 of Environment (Protection) Act, 1986 on 29<sup>th</sup> January, 1998 under the chairmanship of Dr. Bhure Lal initially for two years. Subsequently, the composition of the Authority has been enlarged and its tenure extended up to 28<sup>th</sup> January, 2006.

During the year, the Authority has submitted its 16<sup>th</sup> and 17<sup>th</sup> progress report covering the period November, 2002 to June 2003 and June-December, 2003 respectively. A large number of meetings of the Authority were held and various sites/projects were inspected. The issues considered by the Authority during the period include development of new forest area in Delhi, strengthening of CNG refilling infrastructure, RSPM control in various cities, adulteration of fuels and the matters referred by the Hon'ble Supreme Court in its various judgements. The EPCA also reviewed Action Plans for Air Quality Improvements for the cities of Bangalore, Kanpur, Hyderabad, Chennai, Sholapur, Lucknow & Ahmedabad and a report has been submitted to the Hon'ble Supreme Court.

### **Central Pollution Control Board**

The Central Pollution Control Board (CPCB), an autonomous body of the Ministry, was set up in September 1974, under the provisions of the Water (Prevention and Control of Pollution) Act, 1974. It coordinates the activities of the State Pollution control Boards (SPCBs) and Pollution Control committees (PCCs), and also advises the Central Government on all matters concerning the

prevention and control of environmental pollution. CPCB, SPCBs and PCCs are responsible for implementing the legislation, regulations and guidelines relating to prevention and control of pollution; they also develop rules and regulations which prescribe the standards for emissions and effluents of air and water pollutants and noise levels. CPCB also provides technical services to the Ministry for implementing the provisions of the Environment (Protection) Act, 1986.

During the year, special thrust was given to nation-wide pollution prevention plan, particularly with reference to combating vehicular pollution, pollution control in 17 categories of highly polluting industries, implementation of action plans for restoration of environmental quality in critically polluted areas, noise pollution control and proper management of solid waste, hazardous waste and bio-medical waste.

Details of some of the major activities of CPCB during the year are as follows :

### Surface Water Quality

Water quality monitoring is an important exercise, which helps in evaluating the nature and extent of pollution control required, and effectiveness of pollution control in measures already in existence. It also helps in drawing the water quality trends and prioritising pollution control efforts. Keeping this in view, the Central Pollution Control Board in collaboration with State Pollution Control Boards has established the water quality network comprising of 784 stations spread over the country. The monitoring is done on monthly or quarterly basis in surface waters and half yearly in case of groundwater.

The monitoring results obtained during 2002 indicate that organic pollution continues to be the predominant form of pollution at aquatic resources. The organic pollution measured in terms of bio-chemical oxygen demand (BOD) and coliform count gives the indication of extent of water quality degradation. It is observed that nearly 60% of the observations out of 5000 observations, are having BOD recording less than 3 mg/l, 20-25% between 3-6 mg/l & 15% above 6 mg/l. Similarly total & fecal coliform, which indicate presence of pathogens in water, are also of major concern. Nearly half of the observations are having coliform more than 500 Nos./100 ml.

An attempt is made to plot trends of percentage of observations (Fig. 52) obtained during last 10 years in different levels of pollution with respect to BOD & coliform. It is clear from the trend analysis that there is a increasing trend in percentage of observations having BOD below 3 mg/l & coliform below 500 Nos./100 ml. This indicate that there is a gradual improvement in water quality. However the percentage of observations having BOD more than 6 mg/l & coliform more than 5000 Nos./100 ml is also increasing.

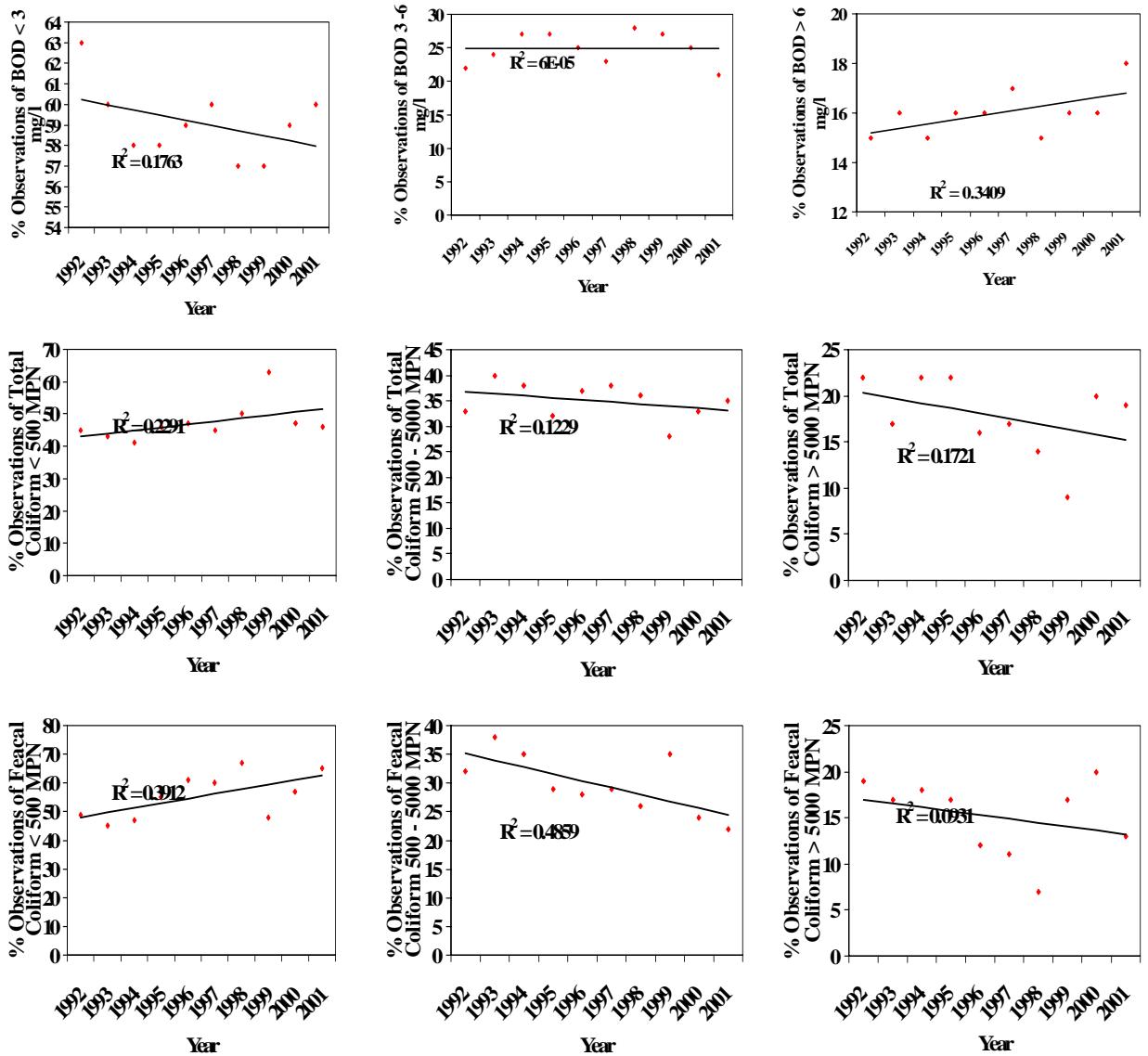
This is due to the shifting of moderately polluted water bodies to higher level of pollution as clear from the decreasing trend in the percentage of observations having BOD between 3-6 mg/l and coliform between 500-5000 Nos./100 ml.

### Polluted River Stretches

The Central Pollution Control Board (CPCB) in collaboration with concerned State Pollution Control Boards is carrying out water quality monitoring at 784 locations. The monitoring data are compiled, analysed and compared with desired water quality in different water bodies. The monitoring programme helps in prioritising pollution control efforts, establishing water quality trends and evaluating effectiveness of pollution control measures already in existence. In order to prioritise the pollution control efforts, CPCB identifies areas of high priority based on the severity of the problem. In 1988-89, CPCB identified 10 problem areas and 10 polluted river stretch to concentrate the pollution control efforts the list of polluted stretches formed the basis for formulation of River Action Plan of the National River Conservation Directorate. The list was further extended based on increasing pollution problem in our country. The water quality data of Year 2000 and 2001 analysed and 86 polluted water bodies are identified. Among these 71 are rivers and 15 lakes and tanks (Table-11). These water bodies do not meet the desired level of water quality for defined uses with respect to Bio-chemical Oxygen Demand. In the present exercise, those water bodies having BOD more than 6 mg/l are identified as polluted water bodies.

### Tank/Lake/Drain/Pond etc.

- Kishtra Reddy Pet Tank, Andhra Pradesh



### Water Quality Trends

Fig 52. Water quality trends with respect to BOD and coliform

- Dharamsagar Tank, Andhra Pradesh
- Hussain Sagar Lake, Andhra Pradesh
- Sarronagar Lake, Andhra Pradesh
- Pulicate Lake, Andhra Pradesh
- Drain No. 8, Haryana
- Renuka Lake, Himachal Pradesh
- Heballa Valley Lake, Karnataka
- Ulsoor Lake, Karnataka
- Lower & Upper Lake, Madhya Pradesh
- Umiam Lake, Meghalaya
- Ward Lake, Meghalaya
- Umtrew Lake, Meghalaya

**Table - 11**

**Statewise Polluted Stretches in Rivers and Lakes**

<b>State</b>	<b>No. of Surface Water Bodies</b>	<b>Rivers</b>	<b>Lakes/Tanks/Reservoirs/Drains</b>
Andhra Pradesh	8	3	5
Assam	2	2	-
Delhi	1	1	-
Jharkhand	1	1	-
Gujarat	10	9	1
Haryana	3	2	1
Himachal Pradesh	2	1	1
Karnataka	6	4	2
Madhya Pradesh	5	4	1
Maharashtra	15	15	-
Meghalaya	5	1	4
Orissa	5	5	-
Punjab	3	3	-
Rajasthan	3	3	-
Tamil Nadu	7	7	-
Sikkim	1	1	-
Uttar Pradesh	8	8	-
West Bengal	1	1	-
<b>TOTAL</b>	<b>86</b>	<b>71</b>	<b>15</b>

<b>River</b>	<b>No. of Polluted Stretch</b>	<b>River</b>	<b>No. of Polluted Stretch</b>	<b>River</b>	<b>No. of Polluted Stretch</b>
Godavari	2	Khan	1	Kuakhai	1
Nagavalli	1	Kshipra	1	Kathjodi	1
Musi	1	Chambal	2	Satluj	1
Kalong	1	Tapi	2	Beas	1
Bharalu	1	Kalu	1	Banas/Berach	1
Yamuna	3	Ulhas	1	Vaigai	1
Subarnarekha	1	Weinganga	1	Palar	1
Sabarmati	1	Panchganga	1	Adyar	1
Amlakhadi	1	Wardha	1	Coovum	1
Shedi	1	Bhima	1	Tambiraparani	1
Damanganga	1	Mula & Mutha	1	Noyyal	1
Ambika	1	Bhatsa	1	Cauvery	1
Bhadar	1	Patalganga	1	Ranichu	1
Khari	1	Kundalika	1	Hindon	1
Kolak	1	Krishna	1	Western Kali	1
Par	1	Girna	1	Buri Yamuna	1
Ghaggar	3	Nira	1	Kali Nadi Eastern	1
Markanda	1	Kharkhala	1	Gomti	1
Bhadra	1	Brahmani	1	Ganga	2
Tunga	1	Ib	1	Damodar	1
Kali	1	Mahanadi	1	<b>TOTAL</b>	<b>71</b>
Tungabhadra	1				

- Thadlaskena, Meghalaya
- Kankoria Lake, Gujarat

The respective State Pollution Control Boards/ Pollution Control Committees were requested to take remedial measures and formulate action plans to restore the water quality of the water bodies.

## Water Quality of Major Rivers

The criteria parameters considered are DO, BOD and Total Coliforms

For the water quality analysis of major rivers pH has not been plotted as it remained within desired levels at almost all monitored locations. The significant observations about the major rivers are presented below:

**River Baitarni:** DO values of this river stretch are meeting the desired class throughout the year. In case of BOD, the entire river stretch under monitoring is not meeting the desired class. Average values in first two locations are within the desired class for both BOD and total Coliform. Thereafter from Jajpur onwards it does not meet the desired class for BOD. In case of Total Coliform, average values are beyond the desired class due to higher concentration up to 11,000 Nos./100ml in the stretch from Anandpur to Chandbali and at Dhamra, it has touched 21,000 Nos./100ml.

**River Brahmani:** DO values of this river stretch are meeting the desired class (3 mg/l) except one value in the month of July at Raurkela D/s. In case of BOD, there is much fluctuation in values. BOD values are observed violating the desired class at all the locations and touched 5 mg/l and 6 mg/l at D/s Pamposh and Kamalanga respectively. Total Coliform values are violating the desired class at D/s Pamposh, Rourkela D/s, Samal, Talcher U/s, Kamalanga, Dhamasala & Pattamundai. At other locations it is well within the limit of desired class

**River Brahmaputra :** DO values of water in this river stretch are meeting the desired class throughout the year. BOD values are meeting the desired class in the entire stretch except at Kherghat in the month of December (3.7 mg/l). Total coliform values were observed violating the desired class at all the locations.

**River Cauvery :** On an average DO & BOD values have been found meeting the desired class. But DO values were not within the desired level at Erode in the months of January (3.8 mg/l) & October (3.5 mg/l), at Mohanur in the month of August (0.5 mg/l), at Tiruchirappalli U/s in the month of May (4.8 mg/l), at Tiruchirappalli D/s in the months of January (3.8 mg/l), September (3.5 mg/l) and October (4.3 mg/l), at Trichy in the month of February (4.7 mg/l), at Pitchavaram all months except February & March and at Near Boarder in the month of March (1 mg/l). It is observed that BOD values was exceeding the desired limit at Erode, Mohanur, Thirumukkudal, Musiri, Tiruchirappalli U/s, Tiruchirappalli D/s, Trichy, Thanjavur, Pitchavaram and Near Boarder. Total Coliforms values were well within the desired class except at Napokulu Bridge. D/s in all months except June, at Kushal nagar U/s in all months, at Sri Rangapattanna all the months except January, Tiruchirappalli U/s in all the months except October, at Tiruchirappalli D/s in all the months except May & June and Trichy, Grand Anaicut in the months of March, April, June, August and September.

Eutrophication symptoms were observed at three locations - Thirumukkudal, Musiri and Tiruchirappalli U/s. It seems that due to eutrophication, the oxygen concentration has risen upto 20 mg/l at Thirumukkudal, 17.9 mg/l at Musiri and 16.5 mg/l at Tiruchirappalli U/s, as the observations were taken during day time, when photosynthetic effects were prominent.

**River Ganga :** DO values have been meeting the desired level except at six locations (at Kanpur D/s, Varanasi U/s, Varanasi D/s, Trighat, Dakhineswar and Uluberia) in the river. In case of BOD, there is much fluctuation in values. Except at five locations (Buxar, Patna U/s, Khurji, Patna D/s, Rajmahal and Behrampur), BOD is exceeding the desired level at all other locations. Total Coliforms values were exceeding the desired level in the entire stretch and it is observed that concentrations were very high in the stretch from Behrampur to Palta (touched 3.5 million MPN/100ml at Behrampur in the month of September).

**River Godavari :** DO values have been observed meeting the desired class in the entire stretch except at Jayawadi dam in the month of June (4.2 mg/l) and at Nasik D/s in the months of January (4.2 mg/l), May (2.9 mg/l), June (4.3 mg/l), July (1.2 mg/l), October (4.9 mg/l)

l) and November (2.1 mg/l). BOD values were violating the desired class at all the locations in the stretch. At Nasik D/s, it touched 66 mg/l in the month of July. Total Coliforms values were violating at all the monitoring stations except the two locations (Dhalegaon and Raheer) in the stretch.

**River Krishna** : DO & Total Coliforms values were meeting the desired class except at Mahabaleswar in the month of July (3.8 mg/l), at Rajapur were in the months of January (4.6 mg/l), April (4.2 mg/l), at Kurundwad in the months of January (3.8 mg/l), April (3.9 mg/l) & Hamsala Deevi in the month of September (2.6 mg/l) and Total Coliforms at Rajapur were in the months of September (550 MPN/100ml), December (550 MPN/100ml) and at Tintini Bdg. in all the months except January, February, March, May touching the maximum value 500 MPN/100ml. BOD values were meeting the desired class after Kurundwad except at Thangadi for all the months having maximum of 3.6 mg/l and Hamsala Deevi in the months from May to September having maximum concentration of 10.5 mg/l. BOD values were not meeting the desired class in the stretch from Mahabaleswar to Kurundwad even in a single month monitored during the year.

**River Mahanadi** : In the entire stretch from Rudri U/s to Paradeep D/s, all DO values were meeting the desired class throughout the year. BOD values were observed violating (during certain months) at five locations at Hirakund Reservoir, Sambalpur U/s, Sambalpur D/s, Sonapur D/s and Cuttack D/s. At other locations it is meeting the desired class. Total Coliform values were not meeting the desired class in the stretch at Hirakund Reservoir, Sambalpur U/s, Sambalpur D/s, Cuttack U/s and Cuttack D/s. Total Coliforms values were meeting the desired class at other locations.

**River Mahi** : During the year, DO, BOD and Total Coliform values have been found meeting the desired class in the entire stretch from Badnawar to Vasad except BOD in the month of August (3.1 mg/l) at Sevalia.

**River Narmada** : DO values are meeting the desired class in the entire stretch except at Amarkantak in the months of February, April, May, June, August with minor deviations. In case of BOD & Total Coliforms, it is meeting the desired class in the stretch from D/s of Omkareshwar till end of the stretch upto Bharuch except

Total Coliforms at Garudeshwar. In addition to this, all the values of Total Coliforms were meeting the desired class at Amarkantak, Mandla, Narsinghpur and Hoshangabad D/s.

**River Penner** : DO values are meeting the desired class at all the locations throughout the year. In case of BOD, minor violations (up to a maximum of 3.6 mg/l) in all the monitored locations were observed.

**River Sabarmati** : DO Values are violating the desired class at Railway Bridge in the months of January (3.0 mg/l), June (0.4 mg/l), July (1.3 mg/l), August (1.2 mg/l), October (1.4 mg/l), November (4.0 mg/l) and December (3.0 mg/l). At the same time maximum values of 19 mg/l in the month of April and 13 mg/l in the month of March were also observed due to eutrophication effect. At other locations, it is well within the limit of desired class. BOD and Total Coliform values were violating the desired class at all the monitored locations. At V.N. Bridge, BOD is violating in all the months touching the level of 517mg/l in the month of March and Total Coliforms value is 4.6 million MPN/100ml in the month of March at Railway Bridge and at Miroli Taluka. The Sabarmati river is probably the heaviest polluted river.

**River Subarnarekha** : DO & BOD values are meeting the desired class except BOD in the months of February (3.2 mg/l), April (4.6 mg/l) and May (3.8 mg/l) at Tata Nagar. Total Coliforms values were not meeting the desired class at all locations except at Chandil Bridge and observed more than 24,000 MPN/100ml at Ranchi, Jamshedpur and Tata Nagar.

**River Tapi** : DO values were found meeting the desired class at all the locations except in the month of April (5.8 mg/l) at Ajnand Village. BOD values were observed violating at all the locations except at Neapanagar. In addition to this, BOD values are always observed violating throughout the year at Ajnand Village, Bhusawal U/s and Uphad Village. Total coliform values were found meeting desired class at two locations i.e. Bhusawal U/s and Uphad Village.

## Monitoring of River Yamuna for Assessment of Water Quality

Central Pollution Control Board is regularly monitoring river Yamuna at 19 locations from its origin at

Yamunotri to its confluence with river Ganga, under National River Conservation Directorate (NRC) sponsored project & under National Water quality Monitoring programme. The frequency of monitoring at each location varies with the significance and approach of respective location. The frequency of monitoring is once in a year at 2 locations viz. Yamunotri and Shyama Chetti, four times a year at three locations viz. Lakhwar Dam, Dak Pathar & Allahabad, while monthly at 14 locations.

Based on the water quality characteristics, 1376 km long Yamuna river stretch can be segregated into five stretches i.e. Himalayan stretch, Upper stretch, Delhi stretch, Mixed stretch and Diluted stretch is at Table-12.

As reflected from the water quality characteristics, the Delhi stretch of river Yamuna is critically polluted

and having septic conditions. The mixed stretch is having both septic & eutrophic conditions. In this stretch the Agra city is the biggest contributor of pollution to the river. The water quality of river Yamuna at Agra is deteriorating because of construction of Gokul Barrage at upstream Agra, where the water is again blocked. During year 2002, the Bio-chemical oxygen demand at Agra downstream ranged between 8-42 mg/l, with annual average of 21 mg/l whereas total coliforms varied from 4,60,000 to 24,30,00,000 Nos./100 ml. The major reason of pollution in river Yamuna is not only discharges from domestic and industrial sources but also over-exploitation of fresh water available in the river, which is essentially required to maintain self purification capacity of the river. In the entire stretch of Yamuna River, the water quality, specially in terms of total coliform is not conforming with respective designated criteria.

**Table - 12**  
**Water Quality Characteristics of Various Stretches of River Yamuna**  
**(January – December, 2002)**

Sl. No.	River Stretch	Stretch details		pH	Dissolved Oxygen mg/l	Biogeo-chemical Oxygen Demand mg/l	Total Coliform Nos./ 100 ml	Coliform Faecal Nos./ 100 ml
1.	Himalayan Stretch	172 km from origin to Tajewala barrage	Min	6.95	7.7	1	150	32
			Max	8.23	10.7	2	1230000	3200
			Av	7.52	8.9	1	131605	653
2.	Upper stretch	224 km from Tajewala barrage to Wazirabad barrage	Min	7.03	6.2	1	630	100
			Max	8.48	9.9	6	3820000	41000
			Av	7.67	7.9	2	256911	2896
3.	Delhi stretch	22 km from Wazirabad barrage to Okhla barrage	Min	6.81	NIL	4	130000	5000
			Max	7.64	4.7	36	26100000	1570000
			Av	7.16	0.8	18	4672084	270042
4.	Mixed stretch	930 km Okhla barrage to river Chambal confluence	Min	6.74	NIL	3	20000	110
			Max	9.39	22.7	42	243000000	1720000
			Av	8.14	7.3	13	4483217	79405
5.	Diluted stretch	628 km River Chambal confluence to river Ganga confluence	Min	7.05	5.5	2	14000	50
			Max	8.88	12.8	9	20300000	17000
			Av	8.04	8.6	4	1790733	2549

## Water Quality Assessment through Bio-monitoring of Major Wetlands in Wildlife Habitats of India

The need and importance of wetlands in water quality management has been greatly realized for improving water quality and wetlands species as bio-indicators. The project studies are undertaken by Central Pollution Control Board at various wetlands in the country with following major objectives: Bio-monitoring of wetlands in wildlife ecosystem will help in prediction and detection of ecological effects to protect rare and endangered biotic species in cost-effective manner; Generate base line data on bio-monitoring of water bodies being used for propagation of wildlife habitats in India; Training / interaction to local authorities, NGO's other institutions such as forest Department State Pollution Control Boards and other concerned organizations.

During the year the bio-monitoring studies have been undertaken in vicinity of wetlands of important wildlife habitats in states of Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Uttar Pradesh, Haryana, Punjab, Rajasthan and Meghalaya.

## Groundwater Survey for the Problem areas

In the 29th Conference of the Chairmen & Member Secretaries of Central Board and State Pollution Control Boards, it was decided that an integrated approach

towards environmental management was necessary for pollution related matters in the problem areas. CPCB had initially identified 22 problem areas and subsequently two more problems areas were identified. CPCB had conducted a major groundwater quality monitoring program at 22 problem areas during year 1994 and the findings were brought out as CPCB publications series GWQS/1 to 4 / 1995-96.

In the current programme, it is proposed to conduct another round of groundwater quality monitoring at all the identified problem areas through Zonal Offices of CPCB. The reports will be brought out in a staggered manner and the first part is under finalisation, wherein the data will be interpreted along with data of surveys already available with the Central Ground Water Board and the agencies for ground water quality assessment is at Table-13.

## Groundwater Monitoring in Major Cities

Groundwater quality of three major cities in Uttar Pradesh (Lucknow, Kanpur and Ghaziabad) and one city in Haryana (Faridabad - Ballabhgarh) is being monitored through a network of 38 representative locations. At each location, monitoring during pre- and post-monsoon phase is to be undertaken. The monitoring of post-monsoon phase at each location has been completed.

The conductivity, fluoride and chloride content at each location was higher. At one location in Ghaziabad, excessive colour has been found. In all the cities, the

**Table - \_\_**  
**Agencies for Groundwater Quality Assessment**

<b>Executing agency</b>	<b>Problem areas (24 areas)</b>
CPCB ZO - Kanpur	Parwanoo , Kala-Amb , Singrauli, Govindgarh <b>(4 areas)</b>
CPCB ZO - Bangalore	Manali, North Arcot, Greater Cochin, Bhadravathi, Vishakapatnam, Bolaram-Patancheru <b>(6 areas)</b>
CPCB ZO - Bhopal	Pali, Jodhpur, Korba, Ratlam-Nagda <b>(4 areas)</b>
CPCB ZO - Vadodara	Vapi, Ankleshwar, Chembur, Tarapur
CPCB HO - Delhi (Laboratory)	Najafgarh Drain Basin area
CPCB ZO - Shillong	Digboi
CPCB ZO - Kolkata	Durgapur, Howrah, Dhanbad <b>(3 areas)</b>
Orissa PCB	Angul, Talcher

total coliform count was high, and at some places faecal coliform was also present.

At all the locations, the iron content was high and chromium content was exceeding at 12 locations. In Kanpur, hexavalent chromium (a more harmful state) was recorded at one location.

## Groundwater Quality in Metropolitan Cities

Assessment of groundwater quality in metropolitan cities of Lucknow, Ludhiana, Agra, Meerut, Faridabad and Jaipur was carried out to know the deterioration and identification of polluting sources.

It is observed that the increased abstraction has lowered the water table and increased the salinity (total dissolved solids), fluoride and lead levels in Agra and Faridabad region, whereas the quality in other cities was found to be satisfactory with respect to major cations and anions.

## Status of arsenic contamination in ground water of West Bengal

A study was undertaken to standardise the methodology for measurement of arsenic in ground water laying emphasis on quality control system to help the local people in analysis of tube well water and also to monitor the status of tube well water in arsenic effected area.

Based on recovery study using Standard Reference Material (SRM) traceable to NIST and inter-laboratory comparison, all the analytical factors were optimised to perform the analysis by hydride generation (VGA) – flame AAS. Facilities were also developed to analyse the sample by Ag-DDS method for cross checking. The laboratory has already established Good Laboratory Practice (GLP), protocols for sample preservation, storage, processing and analysis and quality assurance/quality control (QA/QC) measures.

Field survey was conducted to select arsenic effected area to collect the samples for characterisation of ground water. The results revealed that out of 189 tube well water samples collected randomly from various parts of four district ( 24, paragnas (S&N), Hooghly and

Murshidabad), 43 samples were above the permissible limit. The arsenic content in 60 sample were between 10 and 50 ug/l which were above WHO guidelines. Though number of sample were very limited considering the number of tube wells in effected area but these result revealed that 54 percent tube well are effected at present. Also characterisation of ground water was done with respect to other parameters.

### Status of Arsenic Contamination in Tube Wells

Conc. Range (mg/l)	Frequency	Status
< 10	86	Safe
10 – 50	60	Above WHO Guidelines
> 50	43	Above WHO Guidelines
Total	189	

In 24 Parganas (S) the hardness of the ground water is significantly high and alkalinity is slightly high but dissolved solids were within permissible limit of drinking in most of the cases. The nitrate, phosphate, sulphate and chloride in ground water was within permissible limit.

In the Hugli, except hardness, dissolved solids (few cases) and calcium, almost all other parameters were within permissible limit. In Murshidabad, Ca and Total hardness in almost all the samples were significantly high. In 24 Parganas (N), total hardness and sulphate were significantly high. Detail characterisation was made to evaluate the acceptability of water for domestic uses in terms of arsenic and other parameters and also to have idea to select the technology for arsenic removal.

## Coastal Pollution

### Studies on Pollution Potential from fishing harbours to the coastal waters

The harbour related activities contribute deterioration of coastal water quality and its environment. The Central Pollution Control Board (CPCB) has undertaken a project to assess the pollution load received by the Veraval Fishing Harbour (Gujarat) and the affect on the marine life in harbour area and nearby coastal waters.

The study of verava Fihing Harbour established during 1986 indicates that the problem in this fishing

harbour is severe. The fishing harbour is originally designed for operation of approximately 800 fishing vessels whereas 3537 fishing vessels of different kinds like trawlers (2457), gill netter (93), FRP (681), wooden (306) etc are operated from Veraval Fishing Harbour.

In addition to this, load of pollution generated from the operation of boats and vessels, the domestic wastewater generated from the Veraval town is being discharged into the fishing harbour area without collection/treatment and also the effluent generated from the 42 fish processing industries located in the nearby GIDC also being discharged in to this fishing harbour area. All these sources of pollution from different spheres are contributing to the load of pollution in fishing harbour area and subsequently contaminating the nearby coastal waters.

The industries association of Veraval has commissioned a Common Effluent Treatment Plant with a designed treatment capacity of 5.0 mld to treat the effluent generated from 42 fish processing industries in Veraval, the approximate effluent generation from these industries is 3.5 mld. The project has been entrusted to the Fisheries Research Station, Gujarat Agriculture University, Okha. The detailed study is under progress and it will provide certain remedial measures to keep the fishing harbour and its environment free from pollution threats.

### **Environmental status of coastal aquaculture in India**

The study has been undertaken on the environmental aspects of coastal aquaculture in the western part of India covering states of Gujarat and Maharashtra. The rapidly expanding aquaculture industry have a number of social and environmental side effects, which have been witnessed elsewhere in the world.

The monitoring of aqua farms in both these states indicated that the wastewater generated from aqua farms have been discharged either to the creeks, estuaries or directly into the sea without any treatment, which may result in the contamination of the creeks, estuaries, etc.

The results indicate that the wastewater discharged during exchange, and harvesting periods, carries some quantity of nutrients like Phosphates, Nitrates etc. into the receiving water body. The study is in progress to

assess the wastewater quality generated from brackishwater aquaculture.

### **Assessment of Pollution load from land based Activities influencing the coastal environment**

Considering the importance of the coastal ecosystem, the study has been undertaken to assess the pollution load from land based activities influencing the coastal marine environment of Gujarat and Maharashtra states, collecting dry data on industrial development, population of the cities and towns, water consumption, waste water generation, treatment systems provided etc. from all the littoral states and union territories. The collected data will be used for the assessment of pollution load contributed to the sea.

### **Air Quality Assessment**

The air quality of different cities/towns with respect to three criteria pollutants has been compared with the respective NAAQS and has been categorized into four broad categories based on an Exceedance Factor (the ratio of annual mean concentration of a pollutant with that of a respective standard).

The data for air quality assessment of 183 monitoring locations (in 64 cities/towns), out of which 83 are in residential, 98 in industrial and 2 in sensitive areas have been analysed for air quality assessment. At 17 locations (seven residential and 10 industrial) data were insufficient (< 50 monitoring days in the year) with respect to gaseous pollutants and at 35 locations (18 residential, 16 industrial and one sensitive) with respect to SPM. Such locations have not been considered for air quality assessment.

Central Pollution Control Board is regularly conducting BTX (Benzene, Toluene and Xylene) monitoring using diffusive samplers (passive sampling method) on fortnightly basis at seven locations (Ashok Vihar, I.T.O, J.N.U., Moti Nagar, East Arjun Nagar, Siri Fort, Town Hall) in Delhi. The mean concentration of Benzene ranged between 14  $\mu\text{g}/\text{m}^3$  (J.N.U) and 26  $\mu\text{g}/\text{m}^3$  (I.T.O). The maximum (98  $\mu\text{g}/\text{m}^3$ ) and minimum (23  $\mu\text{g}/\text{m}^3$ ) concentration of Toluene were observed at Moti Nagar and J.N.U. respectively. The mean concentration of Xylene ranged between 8  $\mu\text{g}/\text{m}^3$  (J.N.U) and 31  $\mu\text{g}/\text{m}^3$  (I.T.O). Fig.53 gives the mean concentration of BTX in ambient air of Delhi in 2002.

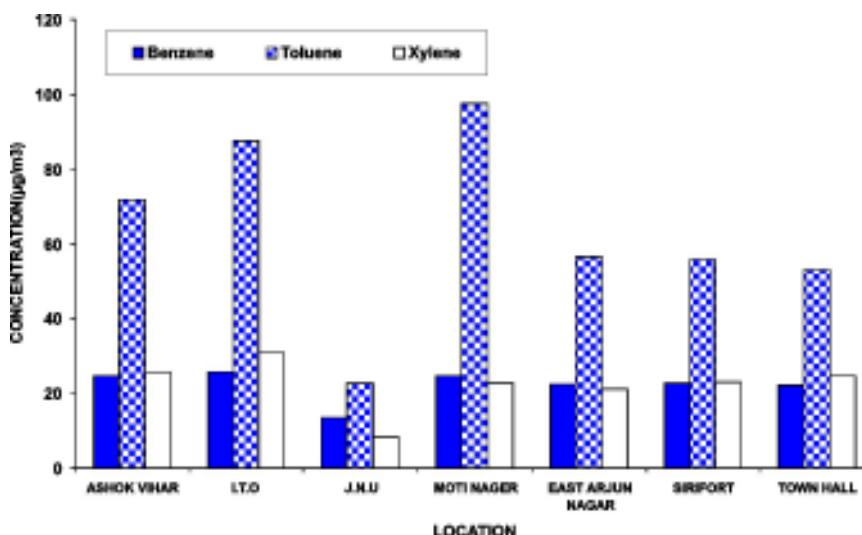


Fig 53. Mean concentration of BTX in the Ambient air of Delhi during the year 2002

### Monitoring of Volatile Organic Compounds (VOC) levels in Vadodara Ambient Air

During winter season few important carcinogenic volatile organic compounds like Benzene, Toluene, Ethyl Benzene and m,p-Xylene were also measured round the clock by using continuous automatic VOC monitor. Results on hourly average basis were compared with their threshold limits to find trend of diurnal variation and identify particular hours when they exceeded their limits. VOCs were measured in the winter season by using automatic VOC analyzer at Subhanpura, a residential area. Results shows -that the measured average Benzene levels varied between 5.93 µg/ m<sup>3</sup> and 20.5 µg/ m<sup>3</sup> and higher values were observed during midday to mid night. The measured average Toluene levels varied between BDL to 33.24 µg/m<sup>3</sup> and average Ethyl Benzene levels varied between 3.35 µg/m<sup>3</sup> and 23.65 µg/m<sup>3</sup>.

### Ambient Air Quality in Delhi during Year 2002

Central Pollution Control Board has been conducting ambient air quality monitoring of criteria pollutants at seven locations in Delhi. The locations have been categorized based on land use i.e., residential, industrial and traffic intersection. The comparison of ambient air quality data during 2002 with previous years indicate that:

- Concentrations of SPM, RSPM and NO<sub>2</sub> have

increased significantly, while Carbon monoxide and SO<sub>2</sub> have decreased.

- Annual average SPM concentration during 2002 registered an increase of approximately 20 percent in both the residential areas (384 µg/m<sup>3</sup>) and industrial areas (451µg/m<sup>3</sup>). Similarly SPM concentration at BSZ traffic intersection (533 µg/ m<sup>3</sup>) registered an increase of 11 percent.
- RSPM recorded 139 µg/m<sup>3</sup> in the residential areas and 167 µg/m<sup>3</sup> in the industrial areas during 2002. These are 14 and 10 percent respectively higher than the values recorded in 2001.
- Increasing trend of SPM and RSPM observed in Delhi may be attributed to a proliferation in construction activity. Inadequate rainfall may also have partly contributed to higher values of SPM and RSPM during 2002 as compared to 2001.
- Nitrogen dioxide has also shown a significant increase in all the areas during 2002. The increase in residential area (33 µg/m<sup>3</sup>) and traffic intersection (75 µg/m<sup>3</sup>) was approximately 11 percent, while in the industrial areas (35 µg/m<sup>3</sup>) it increased by 17 percent. Use of fossil fuels in Delhi is on the increase and the increasing trend of NO<sub>2</sub> may be attributed to the oxidation/conversion of atmospheric nitrogen to oxides of nitrogen during combustion of fossil fuels.

- Increased use of CNG especially by three wheelers has had a marked impact in the concentration of carbon monoxide. CO levels measured at BSZ traffic intersection during 2002 was 3258  $\mu\text{g}/\text{m}^3$  as against 4183  $\mu\text{g}/\text{m}^3$  recorded in 2001, thus indicating a decline of 22 percent.
- Reduction of sulphur content in diesel may have contributed to a declining trend of sulphur dioxide at all the locations in Delhi.  $\text{SO}_2$  in residential areas during 2002 fell to 11  $\mu\text{g}/\text{m}^3$  from a high of 14  $\mu\text{g}/\text{m}^3$  in 2001, similarly at BSZ Marg traffic intersection it was found 10  $\mu\text{g}/\text{m}^3$  as against 15  $\mu\text{g}/\text{m}^3$  recorded in 2001.
- Lead levels have not shown any major changes in 2002 as compared to 2001. The marginally higher values may be attributable to the residual lead present in the soil which had become airborne due to windy environment and movement of vehicles.

### Fine Particulate Matter ( $\text{PM}_{2.5}$ ) Monitoring in the Ambient Air of Delhi

Particulate Matter is the term used for a mixture of solid particles and liquid droplets found in the air. PM

smaller in size. The sources of  $\text{PM}_{2.5}$  include fuel combustion, power plants, wood burning, industrial processes and diesel powered vehicles. These fine particles are also formed in the atmosphere when gases such as sulphur dioxide, nitrogen dioxide and volatile organic compounds are transformed in the air by chemical reactions. Fine particles are of concern because they are risk to both human health and environment. Because these particles are so small they penetrate to the deepest part of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. These fine particles also have a great affinity for water thus contributing to acid rain. Acid rains affects things biological or man made thus affecting the environment.

This problematic cycle is why CPCB has taken initiative to monitor and address fine particles in the atmosphere. Monitoring is being conducted employing portable samplers (Air Metrics) based on the principle of impaction. Preliminary results of monitoring, conducted at BSZ Marg, Delhi indicates alarmingly high concentration of  $\text{PM}_{2.5}$  (Fig 54). Monthly mean between February and July, 2002

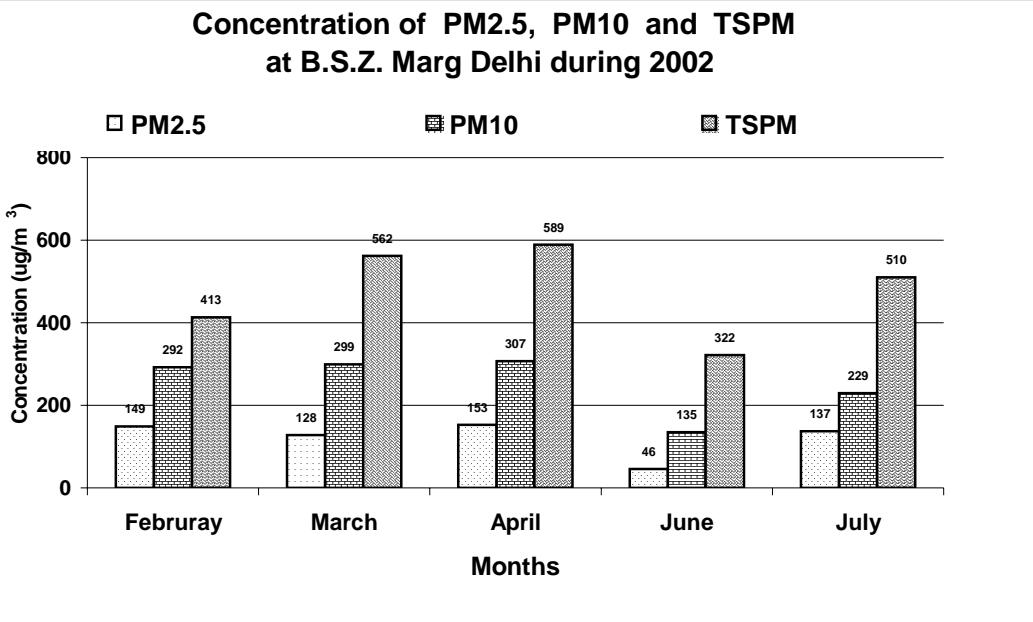


Fig 54. Concentration of PM<sub>2.5</sub>, PM<sub>10</sub> and TSPM at B.S.Z. Marg, Delhi during 2002

ranged between 46 mg/m<sup>3</sup> to 153 mg/m<sup>3</sup>. On an average, PM<sub>2.5</sub> constituted 50% of PM<sub>10</sub> and 25% of TSPM (Total Suspended Particulate Matter). It was observed that the 24 hourly values had exceeded the USEPA limit of 65 mg/m<sup>3</sup> on 95% of days on which monitoring was conducted. Considering the health effects, it is necessary to monitor PM<sub>2.5</sub> at more number of locations in Delhi and other urban centers of the country to assess its levels and for taking mitigative measures.

### Status of Respirable Particulate Matter

RSPM levels were measured in various cities and towns in India. RSPM levels exceeded the NAAQS (annual average) in residential areas of Hyderabad, Visakhapatnam, Delhi, Ahmedabad, Parwanoo, Bangalore, Cochin, Dehradun, Thiruvananthapuram, Mumbai, Nagpur, Pune, Solapur, Angul, Rourkela, Jaipur, Chennai, Kanpur, Lucknow and Kolkata. RSPM levels also exceeded the NAAQS (annual average) in industrial areas of Ahmedabad, Dehradun, Thiruvannathapuram, Solapur, Jaipur, Kanpur and Kolkata.

RSPM levels were within the NAAQS (annual average) in residential areas of Kozhikode and Shillong and industrial areas of Hyderabad, Visakhapatnam, Bangalore, Mysore, Cochin, Kotayam, Kozhokode, Palakkad, Mumbai, Nagpur, Pune, Rourkela and Chennai.

### Non-attainment Areas

Air quality with reference to RSPM is expressed in terms of low, moderate, high and critical. Critical levels of RSPM were observed in residential areas of Hyderabad, Delhi, Ahmedabad, Bangalore, Cochin, Dehradun, Thiruvananthapuram, Mumbai, Nagpur, Pune, Solapur, Rourkela, Jaipur, Kanpur, Lucknow and Kolkata. High levels of RSPM were observed in residential areas of Visakhapatnam, Parwanoo, Angul and Chennai. These results indicate that NAAQS (annual average) of RSPM was exceeded in above cities.

Critical levels of RSPM were observed in industrial areas of Ahmedabad, Thiruvananthapuram, Solapur, Jaipur, Kanpur and Kolkata and high levels of RSPM were observed in industrial areas of Hyderabad and Dehradun during year 2000. These results indicate that NAAQS (annual average) of RSPM was exceeded in above

mentioned cities. Moderate levels were observed in residential areas of Kozhikode & Shillong and industrial areas of Mysore, Cochin, Kottayam, Mumbai, Nagpur, Pune and Rourkela (Fig 55). These results indicate that NAAQS (annual average) was not exceeded in above mentioned cities.

### Air Quality Status in Major Cities

Central Pollution Control Board initiated National Ambient Air Quality Monitoring (NAAQM) programme in the year 1984 with seven stations at Agra and Anpara. Subsequently in 1998-99 the programme was renamed as National Air Monitoring Programme (N.A.M.P.). The number of monitoring stations under N.A.M.P. has increased, steadily, to 295 by 2000-01 covering 90 cities/towns in 29 States and 3 Union Territories of the country. Under N.A.M.P., four air pollutants viz., Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen as NO<sub>2</sub> and Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM/PM<sub>10</sub>), have been identified for regular monitoring at all the locations. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have 104 observations in a year.

### Development of Toxicity based Standards for Industrial Effluents

Realizing the importance of toxicity parameters and for the development of toxicity based Minimum National Standards (MINAS), a collaborative project is being undertaken by Central Pollution Control Board involving five laboratories viz. Gujarat Pollution Control Board, Gandhinagar; National Institute of Occupational Health, Ahmedabad; National Environmental Engineering Research Institute, Nagpur and two laboratories of CPCB located at Kanpur and Delhi.

The analytical results of pulp and paper industries effluent indicate that the toxicity factor (T<sub>F</sub>) in the untreated effluent ranged between 1 to 16 whereas in treated effluent, its value ranged between 1 to 4. The range of percent toxicity reduction after treatment varied from 0 to 100%. In few cases, increase in the level of toxicity after treatment was also observed.

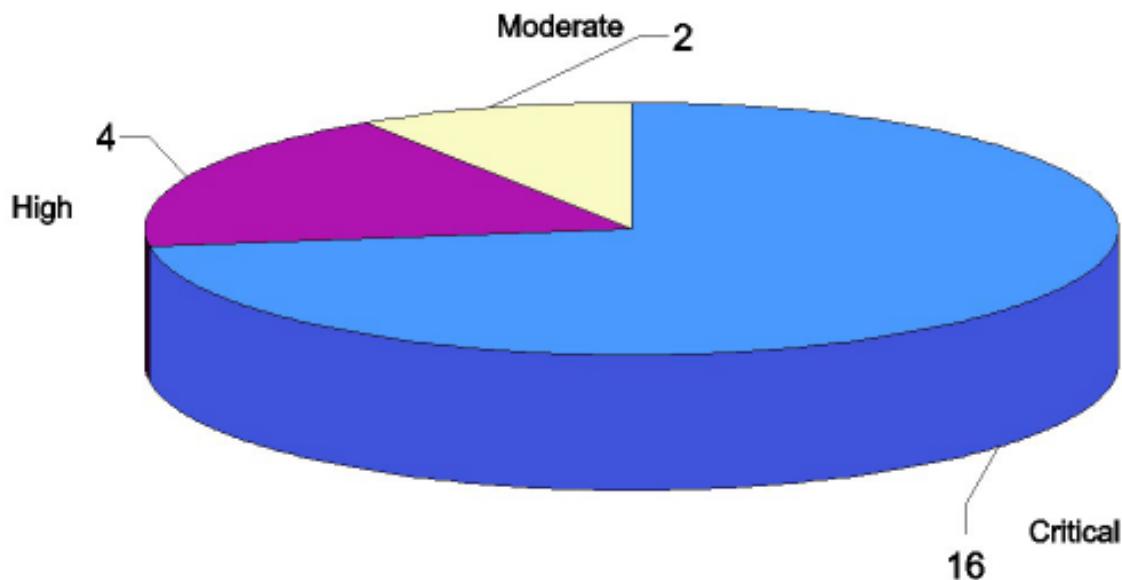


Fig 54. Number of Cities (Res. Areas) with critical, high and moderate RSPM levels

### Standardisation of Methodology for Measurement of Organic Compounds (Polychlorinated Biphenyl)

The PCB's congeners in Aroclor Standard Solutions were at CPCB Laboratories by Gas Chromatograph with Electron Capture Detector (ECD). Peak profiles of six Aroclor mixtures and overlapping peak were observed with GC-ECD. Some least overlapping peaks of Aroclor 1221, 1016, 1254 and 1260 were selected, which were used for calibration of the instrument. Qualitative analysis of Aroclor mixtures was also performed with GC-MS and the observations were compared with the literature. Congener identifications were predicted with the help of mass spectra and findings of other research data. Retention times and mass spectra of 28 individual congeners of toxicological significance were observed. Five levels of calibration (range 10 to 100 pg/ $\mu$ l) were performed using dilutions of mixture containing 28 PCB's congeners.

### Respirable Suspended Particulate Matter (RSPM) Characterization at Agra

Respirable Suspended Particulate Matter (RSPM) characterization study was carried out to ascertain the characterization of RSPM (with size distribution and chemical composition) for the samples collected on May 5/6, 2002. It was found that it had 84-96 % as  $PM_{10}$  fraction, organic fraction was 11.10-14.54% by concentration and inorganic as 85.45-88.90 observed at various selected locations. Further, heavy metals were also observed in higher concentration at Rambagh and Nunhai (mainly Ni and Fe). The basic finding of the study was high inorganic fraction in the samples. Taj Mahal recorded lowest concentrations for all the monitored parameters (Table-14).

**Table - 14**  
**RSPM characterization at Agra**

Sample	Location	RSPM ( $\mu\text{g}/\text{m}^3$ )	PM 10 (Cum %) $\leq 10.62 \mu\text{m}$	Organic fraction (% of RSPM)	Elemental Carbon ( $\mu\text{g}/\text{m}^3$ )	Inorganic fraction (% of RSPM)
A	Nunhai	160	96.68	12.87	0.66	87.13
B	Itmad	124	88.31	11.51	0.35	88.49
C	Taj Mahal	68	84.62	11.10	0.21	88.90
D	Rambagh	153	94.79	14.54	0.68	85.45
E	Keetham	93	94.31	14.32	0.26	85.67

### Colour Problem of River Ganga

River Ganga, the holiest of all rivers and lifeline of North India, has dark coloured water in some stretches. This has not only hurt the sentiments of the millions of people but also has adversely affected the drinking water supply of the towns situated along the river; which included the Metro Towns like Kanpur and Allahabad. The problem has been compounded on account of Magh Mela, which falls during the winter for around a month. On having brought the incidence into notice, CPCB Zonal office, Kanpur carried out detailed investigation and monitoring.

Colour problem of River Ganga may be attributed to discharges of various industries in the river Ganga directly or through its tributaries. Kali and Ramganga were found responsible for carrying the colored waste to river Ganga.

Distilleries and Small Agro based paper mills were among the responsible industries for colour problem located in the region of Meerut, Moradabad and Barilly of Uttar Pradesh and in Kashipur area of Uttranchal State. Detailed survey was conducted to assess the pollution potential of these units. Based on the survey, Uttar Pradesh Pollution Control Board and 18 other industries were issued direction for taking immediate measure to control the colored discharge.

### Reasons for colour development

During non-monsoon season, particularly in winter flow in the river Ganga recedes to bare minimum to

provide sufficient dilution to the effluent discharges. Problem becomes more severe when there is insufficient discharge downstream to Narora Dam at Ganga.

Number of small agro based paper mills without chemical recovery and distilleries are operating in the catchments area of River Ganga that have very high color potential, which are discharging directly or indirectly in river Ganga, upstream of Kanpur.

During winter months industrial discharges were observed to be at its peak due to running of Sugar mills and distilleries at full capacity. Though some industries have made arrangement for storing of its effluent during non-monsoon season but generally it is not adequate.

### Performance Study of Arsenic Removal Plant (ARP) Fitted with Tube Well in West bengal

A study was undertaken to assess the efficiency of Arsenic Removal Plants (ARP) installed at different locations in West Bengal. 30 plants were monitored. In this study some of the ARP installed in south 24 parganas and Murshidabad districts were selected for collecting samples to get them analysed in the Zonal laboratory. The analytical results of As, Fe, Zn & Mn both at inlet and outlet of ARP are presented in Table-15 & 16 indicating percentage of removal of these elements of different districts.

Considering the magnitude of arsenic problems in West Bengal, it is urgently required that with the installation of ARP, proper network for operation and maintenance and monitoring of ARP must be developed to ensure the safe water to people. Also awareness

**Table - 15**  
**Performance of Arsenic Removal Plants (ARP) at District 24 Paragnas ( South)**

Location of ARP	Arsenic (mg/l)			Iron (mg/l)			Zinc (mg/l)			Manganese (mg/l)		
	I	O	%	I	O	%	I	O	%	I	O	%
Ration Shop, Dhaphdhabi	359	19	95	7.92	0.27	97	0.47	1.14	-143	0.13	0.05	66
S.Kumar, Dhaphdhabi	336	20	94	6.22	0.11	98	0.37	0.20	47	0.16	0.03	81
P.Tala, Kumarhat	481	30	94	0.60	NT	99	1.10	NT	99	NT	NT	-
Ashram, Padmajala	288	17	94	4.67	0.21	96	0.08	NT	99	0.02	0.05	-200
K.Haldar, Dhaphdhabi	174	8	95	5.50	0.02	99	0.17	0.08	59	0.11	0.03	73
M. Shekh, Padmajala	397	16	96	3.98	1.00	75	0.10	0.50	-421	0.10	0.12	-26
S.Shekh, Kumarhat	130	11	92	4.55	0.03	99	0.61	0.01	98	0.14	0.06	57
School, Padmajala	204	53	74	5.22	1.02	80	0.72	0.57	22	0.11	0.30	-168
Chh. Molla, Chandkhali	342	118	66	5.00	1.50	70	0.59	0.57	4	0.38	2.19	-484
H. Ali, Chandkhali	100	18	83	4.21	0.24	94	0.38	0.19	50	0.14	0.07	52
S. Laskar, Kumarhat	88	37	58	2.15	0.02	99	0.49	0.33	33	0.04	NT	99
M. Laskar, Alipur	576	20	97	8.78	0.03	99	0.91	0.22	76	0.11	0.09	18
S. Sarkar, Padmajala	371	50	86	7.18	0.13	98	0.82	0.41	50	0.81	NT	99
Naskarpara, Alipur	166	36	79	1.50	NT	99	0.10	NT	99	0.43	0.07	84
School, Chandkhali	171	34	80	6.16	0.58	91	0.75	0.48	36	0.11	0.24	-121

I – Inlet; O = Outlet; % = Percent removed

**Table - 16**  
**Performance of Arsenic Removal Plants (ARP) at District Murshidabad**

Location of ARP	Arsenic (mg/l)			Iron (mg/l)			Zinc (mg/l)			Manganese (mg/l)		
	I	O	%	I	O	%	I	O	%	I	O	%
Kumar Para, Jiagunj	48	5	89	0.38	0.01	97	0.01	0.02	-100	0.37	0.17	54
Kumar Para, Jiagunj	124	4	97	5.38	0.16	97	0.01	0.02	-100	0.70	0.72	-3
Pilkhana, Jiagunj	360	77	79	4.88	0.03	99	NT	NT	-	1.29	1.13	12
Raichandpur, Jiagunj	100	7	93	1.03	0.13	87	0.03	0.03	0	0.65	0.50	23
Thana, Bhagwangola	177	6	97	2.29	0.34	85	0.01	0.06	-500	0.70	0.11	84
Bank, Bhagwangola	112	6	94	1.31	0.06	95	0.03	0.03	0	0.54	0.25	54
Mahisthali, Bhagwangola	100	4	96	2.51	NT	99	0.38	0.02	95	0.71	0.22	69
Akhirgunj, Bhagwangola	62	10	84	0.72	0.81	-13	1.34	0.70	48	0.02	0.03	-50
Talgachi, Jiagunj	101	6	94	3.72	0.10	97	0.11	0.12	-9	1.51	0.10	93
Library, Behrampur	47	5	90	0.74	0.15	80	3.80	0.05	99	0.06	0.16	-167
PHED Off, Behrampur	58	6	89	0.71	0.35	51	6.70	0.18	97	0.06	0.04	33
Juanpur	72	4	94	0.65	0.28	57	1.00	1.04	-4	0.09	0.10	-11
Bapta, Beldanga-1	50	5	91	0.62	0.03	95	1.30	0.08	94	0.09	0.22	-144
Bus Stand, Bapta	50	4	91	0.02	0.12	-500	0.01	0.04	-300	0.87	0.04	95
Allahabad Bank, Jhunka	136	100	26	1.66	1.60	4	0.02	0.01	50	0.34	0.33	3

I – Inlet; O = Outlet; % = Percent removed

campaign must be accelerated to involve the villagers in arsenic mitigation programme.

### **Development of Emission Standards and Stack Height Regulations and Stack Height Regulations for the Vertical Shaft Brick Kiln vis-a-vis Pollution Control Measures**

The Ministry based on recommendations of the Central Pollution Control Board has introduced emission standards for bull trench kiln during 1996. The standards also envisaged phasing out of moving chimney from BTKs. The Central Board took up the work of evolving emission standards stack height regulations vis-a-vis pollution control measures with active support of TERI, New Delhi.

The performance of VSBKs was monitored during the year 2002. The SPM concentration in the stack was measured between 77-372 mg/Nm<sup>3</sup>. Some of the advantages of the VSBK technology include 1) lower energy consumption (30-60% energy saving); 2) low SPM emissions; 3) less floor area requirement for construction of kilns; 4) flexibility in operation; 5) uniform quality of fired bricks; and 6) ability to operate throughout the year, as against BTKs. Keeping these factors in view, VSBK may offer as an alternate viable technology for moving chimney BTKs low capacity and also for clamps.

The energy performance of the VSBKs shows the average specific energy consumption of VSBKs is 0.9 MJ/kg fired bricks lower than the traditional firing technologies used in the country. The VSBK technology has lower emission levels, thus having good potential in the market.

### **Development of Comprehensive Industry Document and Environment Standards**

Broadly, refractory can be categorized based on the installed capacity. On the basis of plant capacity (Thousand Tonnes per Annum, TPA), the refractory plants are categorized as very small scale (up to 5000 TPA), small scale (5001-15000 TPA), medium (15001-50000 TPA) and large capacity (above 50000 TPA) refractory plant.

There are about 6 large, 17 medium scale and 63 refractory plants in the category of small or very small scale sector in the country. Some of the refractory manufacturers are facing tough situation while few are

on the verge of closure or have been closed. The use of high quality refractories has improved the lining life of furnaces and brought down the specific consumption per tonne of liquid steel, resulting in a lower per tonne usage of refractories, which has adverse impact on traditional refractory manufacturing.

The primary pollutant of concern in refractory plant is particulate matter or dust in air emission apart from water pollution, solid wastes and noise pollution. Particulate matter in terms of fugitive dust generation takes place during crushing, grinding and screening operation in plant. The study, aims to present status of pollution in refractory industry and their control, different technologies adopted by Indian refractory industry to combat pollution and finally to develop norms for pollution control. The study has been undertaken in collaboration with National Council for Cement & Building Materials. Ambient air quality, fugitive dust, stack emission, trade effluent, noise pollution & solid waste were monitored during the course of study.

### **Hot Mix Plants**

Central Pollution Control Board has initiated preparation of Comprehensive Industry Document (COINDS) on Hot Mix Plants in an effort to minimize the adverse environmental impacts by regulating emissions. Information on plant, process details, pollution control technology, emissions, plant location, etc. was collected through extensive field visits as well as questionnaire surveys. The COINDS includes development of environmental standards, suitable techno-economic pollution control device and guidelines for its operation and maintenance.

### **Environment Surveillance Activities**

Environment surveillance activities were taken on priority to, (i) keep a watch on the polluting industries to ensure regular operation of their pollution control facilities, and (ii) conduct in-depth monitoring studies to see the improvements in the environmental quality as a result of the implementation of the various Central Action Programmes.

Inspections of industries and areas were conducted and actions taken on the basis of the findings. The actions taken include (i) issuance of directions under Section 18 (1) (b) of the Water Act, 1974 and/or Air Act, 1981 to the SPCBs/PCCs requiring them to ensure implementation

of the findings in respect of the concerned industries/ areas, and (ii) direct action under Section 5 of the Environment (Protection) Act, 1986 against the industries from CPCB itself.

A total of 125 directions were issued to SPCBs/ PCCs under Section 18 (1) (b) of the Water Act, 1974 and/or Air Act, 1981 in the financial year 2002-2003, making the total of such directions issued till March 31, 2003 to 861.

A total of 75 directions were issued to the industries under Section 5 of the E (P) Act, 1986 in the financial year 2001-2002, making the total of such directions issued till March 31, 2003, to 507.

### **Inspection of Industries by CPCB**

A comprehensive programme was initiated for surprise inspection of 150 industries by CPCB. A total of 144 inspections were carried out by CPCB and actions were taken on the basis of the findings of the inspections.

Direct action against eight industries was taken on the basis of the findings of the surprise inspection carried out by CPCB. A total of 10 directions/notices including one confirmed closure have been issued under Section 5 of the E (P) Act, 1986.

Eight directions under section 18 (1) (b) of the Water and Air Act have been issued to the SPCBs/ PCCs requiring them to ensure pollution control in polluting industries/areas. The directions were issued for pollution control by industries in Manali, Chembur, Pondicherry, Bhopal, Vadodara and UT-Dadra and Nagar Haveli areas.

### **Inspection of Industries by SPCBs/PCCs**

Directions under Section 18 (1) (b) of the Water and Air Act were issued to all SPCBs/PCCs in July 2002, for conducting regular inspection of polluting industries and submission of monthly reports including details of inspections and action taken against the defaulters. More than 2750 industries have been inspected by the SPCBs/PCCs.

### **Inventorisation of Post-91 Industries**

The inventorisation of the large and medium industries of 17 categories, which came into operation on or after January 01, 1992, completed. The information

received from SPCBs/PCCs have been collated and compiled, and was sent to SPCBs/PCCs for confirmation of the lists and obtaining the latest status of the action taken against the defaulters. A total of 604 industries have been identified, out of which 527 have provided the requisite pollution control facilities, 46 are closed and 31 are still defaulting.

### **Ensuring Self Monitoring of the Emission/ Discharge in 17 Categories of Industries**

Directions under section 18 (1) (b) of the Water and Air Act issued in July 2002 to all SPCBs/PCCs for providing operational status of pollution control facilities provided by the 17 categories of industries and action taken against the defaulters. The reports were required to be submitted on a six monthly basis with the first report to be submitted by January 10, 2003. Reports have been received from Chhatisgarh and Goa, and reminder has been sent to remaining SPCBs/PCCs for obtaining the reports.

### **Pollution Control in Problem Areas**

#### **Preparation of the Action Plans**

Twenty-four problem areas have been identified in the country for pollution control through concerted efforts involving all the concerned agencies/industries. Action plans have been prepared and being implemented in respect of all these 24 areas.

#### **Environmental Monitoring in the Problem Areas of Najafgarh Drain Basin, Kala-Amb, Parwanoo, Jodhpur, North Arcot, and Govindgarh**

Environmental Monitoring in the Problem Areas of Nagda-Ratlam, Korba, Jodhpur, Najafgarh Drain Basin, Kala-Amb, Parwanoo, North Arcot, and Govindgarh were conducted under the Water Cess Utilisation scheme. Monitoring is completed and draft interim reports received in respect of all the five problem areas of Parwanoo, Kala-Amb, Govindgarh, Najafgarh Drain Basin and North Arcot and the same are being evaluated.

#### **Monitoring and Survey in Problem Areas**

Intensive monitoring survey programme has been initiated in 15 problem areas namely, Ankleshwar, Chembur, Dhanbad, Durgapur, Greater Cochin, Singrauli, Howrah, Jodhpur, Korba, Manali, Nagda-Ratlam, Pattencherru-Bollaram, Tarapur and Vapi. Jodhpur, Pali,

Nagda-Ratlam and Korba have been visited and the monitoring reports are under preparation.

Colour was observed in the Ground Water in the Ratlam area during the monitoring. The source of colour in the ground water was found to be the improper management and handling of the Solid/Hazardous waste generated by a Dyes Intermediate industry.

### **Pollution Control in Problem Area of Chembur and adjoining areas**

Directions under section 18 (1) (b) of the Water/Air Act issued to the Maharashtra SPCB in the matter of industrial pollution control in the Chembur and adjoining areas, in connection with the observations/recommendations of the Lok Sabha's Committee of Petitions.

### **Pollution Control in Problem Area of Manali**

Directions under section 18 (1) (b) of the Water/Air Act issued to the Tamil Nadu SPCB on the basis of the observations made during the visit by CPCB and MoEF team, for pollution control in Manali industrial area.

## **Industrial Pollution Control along the Rivers and Lakes**

### **Industrial Pollution Control along the river Ganga (GAP Phase-I)**

The follow-up programmes in respect of 68 industries identified under Ganga Action Plan (GAP) Phase-I were initiated by CPCB soon after the introduction of GAP in 1985.

The industrial pollution control programme along the river Ganga got further intensified with the launching of the Central Action Plan in August, 1997, for control of industrial discharges along the rivers and lakes in the country. This programme resulted into identification of 119 more industries along the river Ganga that required priority, attention for the control of their effluent discharges.

### **Industrial Pollution Control Along the Rivers and lakes**

851 defaulting Grossly Polluting Industries located along the rivers and lakes in the country have been identified for priority actions under this programme, which

was started in August 1997. The follow-ups for the implementation of the programme, was intensified and at present only five industries are defaulting and the matter is in the Hon'ble Court with respect to three industries and action has been taken against the two remaining defaulters.

### **Operational Status of the ETPs installed by the industries located along the rivers & lakes**

Directions under Section 18 (1) (b) of the Water (Prevention and Control of Pollution) Act, 1974 have also been issued by CPCB to the SPCBs/PCCs to send quarterly reports on the operational status of ETPs of all the grossly polluting industries located along the rivers and lakes. The directions also required the SPCBs/PCC of Uttar Pradesh, West Bengal and Delhi to send separate such reports of all the water polluting industries (irrespective of size and category) existing in Kanpur, Calcutta and Delhi respectively.

The operational status of 790 industries received from 22 SPCBs/UTs. Out of these 790 units, 619 have installed the requisite treatment facilities, 157 are closed, five are in the process of installing the requisite treatment facilities and there is no effluent treatment facility existing in case of the remaining nine industries.

Out of the 619 units which have installed ETPs, 440 are operating satisfactorily and the operation of the treatment facilities is not satisfactory in respect of 179 units. SPCBs/PCCs have been asked to take action against the units where the operation of treatment facilities is not satisfactory and direct the industries for up-gradation of the design/improvement in the operation of the ETP.

### **Industrial Pollution Control along the river Yamuna**

The water quality of river Yamuna got affected due to discharge of effluents by the industries located upstream Delhi along Western Yamuna Canal and complaints were received from the Delhi Jal Board regarding the presence of ammonia in high concentration and subsequent shut down of the Nangloi and Haiderpur water works affecting the supply of drinking water to most parts of Delhi.

The CPCB has directed Haryana SPCB under section 18 (1) (b) of the Water Act, 1974 requiring the State Board to ensure stoppage of any discharge of industrial effluent as well as untreated sewage into the

Western Yamuna Canal. The Chief Engineer, Yamuna Water Services has also been directed not to release water from the Yamuna Nagar Head Works into the abandoned Western Yamuna Canal and to ensure that the flow of any water from this canal does not join the main canal at the Munak regulator.

### **Assessment of Pollution Potential in Zari Industries and probable Techno-Economic Solution for its Treatment & Safe Disposal in Surat**

There are around 2000 to 2500 benches of gilding units in Zari manufacturing industries in Surat City of Gujarat. These industries are located in the heart of the city. The process involves, use and handling of toxic chemicals like acids, Cyanides etc. Due to sheer secrecy and unhealthy competitive practices, Zari industries of Surat could never get the shape, which it could have acquired by way of upgradation in technology, better processes, effective use of resources and of course less water. To explore the present status and probable solutions for associated environmental problems of Zari industries, the CPCB West Zone office has carried out the study in association with M/s Pollucon Laboratories, Surat.

The study revealed that the use of Cyanide in the process is as high as 3 MT/month in Surat City. The average consumption of Cyanide is 30-50 kg/month/unit. The use of concentrated Sulphuric acid in Zari industries of Surat is around 2.5 KL per month. In addition to this there is a significant quantity of Nitric and Hydrochloric acid is also used on the process units. These chemicals as such do not go with the final product i.e. Zari and hence find their way in either water or air environment. These facts reveal the gravity of the situation in Zari industries.

The main pollution is in the form of effluent, which content high amount of Copper, Cyanide and Silver. The wastewater to be drained out from the different stages were characterized and it is found that the concentration of these parameters varies between 4.91 to 7460, 51.5 to 572 & 2.5 to 86 mg/l for Copper, Cyanide and Silver respectively. During the survey it is understood that causality occurs in Zari industries due to inhalation of Cyanide fumes at the time of Silver salt precipitation (Neutralization) from the effluent.

Being in congested area, it is not possible for individual units to provide treatment facility for the

wastewater. The adequate common treatment system supported with appropriate collection mechanism is best suited for the treatment of the effluent generated. Similarly, immediate action is required to provide for proper hood, ducting, scrubbing and exhaust system for venting the toxic fumes/gases.

### **Hazardous Substances Management**

The Hazardous Substances Management Division (HSMD) is the nodal point within the Ministry for planning and overseeing the implementation of policies and programmes on management of chemical emergencies and hazardous substances. The main objective of the Division is to promote safe handling, management and use of hazardous substances including hazardous chemicals and hazardous wastes, in order to avoid damage to health and environment. The activities of the division can be grouped under three main thrust areas, viz., Chemical Safety; Hazardous Wastes Management and Solid Waste Management. The Division is also the nodal point for the following three International Conventions.

- The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal.
- The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals & Pesticides in International Trade.
- The Stockholm Convention on Persistent Organic Pollutants (POPs).

Salient details of the programmes and activities carried out during the year are:

#### **Chemical Safety**

- The Manufacture, Storage and Import of Hazardous Chemical (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 are the main tools for ensuring chemical safety in the country. Implementation of both the Rules by the State/UT Governments is constantly pursued and monitored. As on date, there are 1580 Major Accident Hazard Units (MAH) in 234 Districts of 19 States/ UTs of the country. As per the latest reports, 1107 On-site plans and 136 Off-site plans have been prepared. State Level Crisis Groups have been constituted by all States/UTs except Andman & Nicobar Islands,

- Arunachal Pradesh, & Daman, Diu, Dadra & Nagar Haveli, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Lakshdweep, Manipur, Mizoram, Nagaland and Uttranchal.
- A Sub-Scheme entitled 'Industrial Pocket- wise Hazard Analysis' has been in operation since the Eighth Five Year Plan. Out of 180 hazard prone industrial pockets, Hazard Analysis studies have been initiated for 78 pockets. Out of these 78 studies, 69 studies have been completed. Based on the recommendation of the study reports, off-site plans for Thane, Bharauich and Ratanagiri-Satara have been initiated.
  - During the year, funds were released for establishment of two Emergency Response Centres (ERC) at Mahad (Maharashtra) and Vishakhapatnam (Andhra Pradesh). The ERCs, which serve as a link between the District Crisis Group and the industry, would primarily deal with chemical emergencies in the areas.
  - A study has been initiated on Rapid Ranking of Chemical Industries (Batch type handling) based on Risk Potential through Central Pollution Control Board, Delhi. The manual is customized for situations arising out of chemical accidents or emergency situations, which result in sudden loss of containment, rather than chronic or continuous type of emissions. These accidental releases typically cover losses where the entire hazardous material inventory is released within a very short time. A rapid ranking method has been employed for chemical industries handling hazardous chemicals in terms of (i) Hazard (basically a combination of consequence effect and frequency of occurrence) and (ii) Management Capability for handling the identified hazards.
  - Under the Public Liability Insurance Act, 1991 as amended in 1992, all the MAH units handling chemicals in excess of the threshold quantities referred to in the Schedule, are mandated to take an insurance policy and deposit an equal amount in the Environment Relief Fund (ERF) to ensure immediate payment to the chemical accident victims. It has been decided to entrust the administration of the ERF to the United India Insurance Company. Modalities are being worked out regarding service charges payable to this company. Discussions have also been initiated to streamline the implementation of the Act.
  - During the year, Phase-II of the study entitled "Development and Demonstration of Process Technology for Remediation of Polychlorinated Biphenyls (PCBs) in Oils and Paints by Radiolysis" was initiated. The objective of the project is to develop and optimise a radiolytic process for decomposition of PCBs in oils, capacitor oils and paint scrapings. Pilot study entitled "GIS based emergency Planning and Response System" for four identified industrial States namely - Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh has been completed. The system should be able to help response agencies mainly Central Crisis Group (CCG), District Crisis group (DCG) and Local crisis Group (LCG), during pre-emergency state for planning and rehearsing response to major chemical disasters and also during actual emergency situations so that a well planned response can contain the damage to the minimum.
  - The package can be used along with district off-site emergency plan to improve the emergency management at district level. The training programs are proposed to be conducted during June, 2004 involving the members of the State Crisis Group, District Crisis Group of the districts covered under this project.
  - The project has now been extended to cover Delhi-NCT, Rajasthan, Uttar Pradesh, Haryana, Karnataka, Kerala, West Bengal, Assam, Madhya Pradesh and Punjab.
  - The Central Labour Institute and its regional institutions, National Safety Council, Disaster Management Institute (DMI), Bhopal and other specialized state-run institutions were provided with financial assistance for conducting training programmes on Emergency Preparedness, Accident Prevention and Hazardous Waste Management.
  - Under the on-going Canada-India Environmental Institutional Strengthening Project, a workshop on "Environmental Emergencies (E2) & Chemical Safety and the Preparation of a National Chemicals Management Profile for India" was organised during 20-23, January, 2004 at New Delhi, in cooperation with the Department of Environment, Government

of Canada (EC) and the United Nations Institute for Training and Research (UNITAR).

## Hazardous Waste Management

In the matter of W.P. No 657/95 filed by the Research Foundation for Science Technology and Natural Resource Policy, against Union of India and another, which was being heard in the Supreme Court since 1995, detailed directions on hazardous wastes management have been given by the Hon'ble Court during the year. These directions include many of the major recommendations of the High Powered Committee (HPC) which had earlier been constituted by the Ministry under the Chairmanship of Prof. M.G.K.Menon. With these directions, wide ranging responsibilities have been placed on Ministry, CPCB & SPCBs/PCCs which are required to be fulfilled within specified time frames. Major directions relate to immediate closure of industries operating in violation of Hazardous Waste Rules, preparation of a National Inventory on hazardous wastes by CPCB based on State Inventories to be prepared by all SPCBs, inventorisation of illegal dump sites of hazardous wastes & preparation of rehabilitation plans for the same, disposal of hazardous wastes lying at various Ports / (ICDs) /Docks of the country, amendment of Hazardous Wastes Rules 2003, strengthening of SPCBs, CPCB and HSM Division of the Ministry etc.

- Subsequent to the directives of the Supreme Court, a Monitoring Committee on Hazardous Waste Management has been constituted by the Ministry in November 2003, by addition of two more members & by expanding the Terms of Reference of the existing Standing Committee on Hazardous Wastes under the Chairmanship of Dr. G. Thyagarajan. This Monitoring Committee will oversee the compliance of various directions of the Court and file quarterly Monitoring Reports to the Hon'ble Court. Three meetings of the Committee have been held so far. Based on the discussions of the Committee and inputs provided by the CPCB and other SPCBs/PCCs, the first quarterly Monitoring Report has been filed to the Hon'ble Court in January, 2004.
- As per current assessment, 4.4 million tonnes of hazardous wastes are being generated by 13011 units spread over 373 districts of the country. The states of Maharashtra, Gujarat and Tamil Nadu account for over 63% of the total hazardous wastes

generated in the country. This data, which is based on the waste categories indicated in the Hazardous Wastes (Management and Handling) Rules, 1989, is being revised in the light of the amendments carried out in 2000 & 2003 and also in view of the directions of the Supreme Court.

- The legal instruments for management of hazardous wastes are the Hazardous wastes (Management & Handling ) Rules, 1989, as amended in 2000 and 2003, the Biomedical Wastes (Management & Handling) Rules, 1998/2000/2003 and the Batteries (Management & Handling) Rules, 2001. Major responsibility for implementing these rules is with the Central Pollution Control Board and State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) and also with the State Departments of Environment. The status of implementation of all these rules is regularly monitored by the Ministry.
- The 6<sup>th</sup> Meeting of the Steering Committee for the Management of Bio-Medical Wastes was held during the year to review the implementation of the Bio-Medical Waste (Management & Handling) Rules in the country. On the basis of the recommendations of the Steering Committee, the Bio-Medical Waste (Management & Handling) Rules, 1998 have been amended once again and the draft amendments have been notified on 17.09.2003. As per these amended Rules, inter-alia, the prescribed authority for enforcement of the provisions of these rules in respect of all health care establishments including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories and blood banks of the Armed Forces under the Ministry of Defence shall be the Director General, Armed Forces Medical Services.
- A National Workshop at Delhi and five Regional Workshops at Bhubaneswar, Guwahati, Bangalore, Pune and Lucknow on Bio-Medical Waste Management were conducted by the Centre for Environment Education, Delhi, during the year with financial assistance from the Ministry. Mass Media Campaigns have also been done through All- India Radio, Doordarshan and Newspapers with a view to improving the implementation of the Bio-Medical Waste (Management & Handling) Rules.

- A consultancy project was awarded to the Regional Research Laboratory, Thiruvananthapuram, Kerala for monitoring and analysis of Dioxins/Furans in the air emissions from the Bio-Medical Waste Incinerators installed in the hospitals of Delhi and also in the common treatment and disposal facilities located in Delhi, Ludhiana and Hyderabad.
- The Batteries (Management & Handling) Rules, 2001 were notified in May, 2001 to regulate the collection, channelization and recycling as well as import of used lead acid batteries in the country. These rules inter-alia make it mandatory for consumers to return used batteries. All manufacturers/ assemblers /reconditioners / importers of lead acid batteries are responsible for collecting used batteries against new ones sold as per a schedule defined in the rules. Such used lead acid batteries can be auctioned/sold only to recyclers registered with the Ministry/CPCB on the basis of possessing environmentally sound facilities for recycling/ recovery. Several actions have been taken during the year for effective implementation of these Rules, including provision of support for telecast of video messages on battery management in different channels of the television. The implementation of these Rules is also being examined by the Subordinate Legislation Committee of the Rajya Sabha
- The second meeting of the Standing Committee on Hazardous Wastes was held in June 2003. During this meeting, the idea of setting up a National Mission on Hazardous Wastes on the lines of Leather Technology Mission, Drinking Water Mission etc. was discussed. The idea was further discussed by a Sup-Group under the Chairmanship of Director, Indian Institute of Chemical Technology ( IICT) in July 2003, at Hyderabad. (The Standing Committee has now been re-constituted as the Supreme Court Monitoring Committee)
- The Hazardous Wastes (Management & Handling) Amendment Rules 2003 were notified on 20<sup>th</sup> May 2003. These amendments were finalised on the basis of inputs provided by a Technical Expert Group



**Fig 56.** A view of hazardous waste storage pits

which examined over 250 comments/suggestions received from various stake holders. Copies of these Rules were widely circulated to all concerned. The full text of these Rules is available in the Ministry's web site.

- Hearings in respect of W.P.No.967/89 filed by Indian Council for Enviro Legal Action against UoI and Others on Ground water Pollution and Soil Degradation in Bichhri Village, Udaipur (Rajasthan) due to indiscriminate disposal of Toxic Wastes, are still going on in the Supreme Court.
- As per the Hazardous Wastes (M&H) Rules, all hazardous wastes are required to be treated and disposed off in the manner prescribed. In the absence of adequate number of common disposal facilities in the country, permission has been granted to the hazardous waste generating units in the small scale sector, for storing their wastes temporarily in a secure, lined pit/facility within their premises. During the Tenth Plan Period it has been decided to focus on the setting up of common TSDFs in different part of the country. While support would be provided for setting up two such common facilities in major hazardous waste generating states, one facility would be supported in other states. The Ministry has so far supported the setting up of two common TSDFs at Maharashtra (TTC-Belapur, Talaja ), two in Gujarat (Ankleshear and Surat) and one TSDF in Andhra Pradesh (RR District). The States of Karnataka & T.N. are in the process of setting up such facilities. During the year, the functioning of the TSDFs at Maharashtra and A.P were reviewed.
- Consequent to the Notification of the amended HW Rules in May 2003, the Registration Scheme being implemented by the Ministry for actual users of identified Hazardous Wastes was transferred to CPCB as per the provisions of Rule No.19 of the Hazardous Wastes Rules. This Scheme is therefore being implemented by CPCB now. A total of 277 units reprocessing used oil, used lead acid batteries and other non-ferrous metal waste have been granted Registration so far. The updated list of registered recyclers/reprocessors is now available in CPCB's web site at [www.cpcb.nic.in](http://www.cpcb.nic.in).
- As per Rule 21 of the Hazardous Wastes Rules 2003, the last date for used oil reprocessors to

switch over to any of the Environmentally Sound Technologies specified under the Rules was 22<sup>nd</sup> November 2003. Accordingly all SPCBs have been directed to check the compliance to this Rule by used oil reprocessors.

- Two workshops - one on "E Waste Management" and the other on "Environmentally Sound Technologies for reprocessing of used / waste oil" were organized by the CPCB and the CII respectively to discuss emerging issues relating to management of electric and electronic wastes and used / waste oil reprocessing, in March 2004 at Delhi.

## Solid Waste Management

The Municipal Solid Wastes (Management & Handling) Rules, 2000, the Fly Ash Notification, 1999 and the Recycled Plastics Manufacture & Usage Rules 1999 constitute the regulatory framework for the management of solid wastes in the country.

To further streamline and improve the utilisation of fly ash generated by the thermal power stations, the Notification of 16<sup>th</sup> September, 1999 has been amended and notified on 27<sup>th</sup> August 2003 vide S.O.997 (E). The salient features of the amendment are:-

- The geographical coverage of the Notification has been extended from 50 to 100 kms from Thermal Power Stations.
- Responsibility has been placed on construction agencies to use fly ash based bricks/products in a time bound manner.
- Time limits have been specified for State Pollution Control Boards to take decision on the applications for manufacture of fly ash based bricks/products.
- Fly ash has been included in the guidelines/specifications of road/building construction projects.
- Provision has been made for filling up low-lying areas with pond ash.
- In the year 2002-03, out of about 103 million tonnes of ash generated, 26 million tonnes were utilized. In 2003-04, the ash generated was about 108 million tonnes and utilization was about 31 million tonnes. The major users were cement manufacturers, land

fills, road embankments, back filling of mines and britals.

A Notification amending the Recycled Plastics (Manufacture and Usage) Rules, 1999 was issued on 17<sup>th</sup> June, 2003 vide S.O.698 (E). The salient features of the amendment are as follows:

- Manufacture, sales, distribution and use of virgin and recycled plastic carry bags, which are less than 8 x 20 inches in size, is banned.
- Registration of manufacturers of plastic carry bags with State Pollution Control Boards has been made mandatory.
- Exemption provided to exporters of plastic carry bags.

The status of implementation of the Municipal Solid Waste (Management and Handling) Rules 2000 was reviewed during the year. All the State Pollution Control Board/ Committees have been requested to take up the matter with the relevant local authorities/civic bodies for preparation of time bound action plans for management of Municipal Solid Waste in accordance with the rules. During the year, financial assistance has been provided to Kozhikode city in Kerala for developing and implementing a model system on solid waste management.

## International Conventions/Protocols

### Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal

- India is a signatory to the Basel Convention, which requires countries to ensure that hazardous wastes and hazardous recyclable materials are managed in an environmentally sound manner.
- During the year, Ministry participated in the first and second meeting of the Open Ended Working Group (OEWG) which has been formed by amalgamating the other subsidiary bodies of the

Basel Convention namely, Technical Working Group, Legal Working Group and Working Group on Implementation. The two important issues taken up during these meetings, relate to placement of PVC coated copper cable scrap as a new entry on List B (Annex –IX) of the Basel Convention and the legal aspects of full and partial dismantling of ships. A questionnaire on ship breaking developed during the 2<sup>nd</sup> meeting of the OEWG has been circulated to the Ministries of Shipping and Steel for their inputs to enable the formulation of a National view on the subject.

### Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals & Pesticides in International Trade

- The Ministry participated in the 10<sup>th</sup> Session of the Inter Governmental Negotiating Committee Meeting held in November 2003, for developing an international legally binding instrument for application of PIC procedures.

### Stockholm Convention on Persistent Organic Pollutants (POPs)

- India has signed the Stockholm Convention on POPs in May, 2002. The Convention seeks to eliminate production, use, import and export of 12 POPs wherever techno-economically feasible and in the interim period restrict the production and use of these chemicals. A project titled “Preliminary assessment to identify the requirements for developing a National Implementation Plan in India as a first step to implement the Stockholm Convention on POPs” has been initiated during the year with support from GEF.

## Institutional strengthening

The scheme for strengthening the manpower and infrastructure of the SPCBs/PCCs to ensure effective implementation of various Rules relating to Hazardous Substances Management, was continued during the year.