CHAPTER I – PERFORMANCE REVIEW

PUBLIC HEALTH ENGINEERING DEPARTMENT

1.1 Pollution Control and Waste Management

Highlights

Government of India, under the Environment (Protection) Act, 1986 framed (1998-2000) rules to regulate management of municipal solid wastes and bio-medical wastes to protect and improve the environment. Poor compliance with the rules by implementing agencies, viz. municipal boards and the health care establishments coupled with ineffective monitoring by the Meghalaya State Pollution Control Board (MSPCB) resulted in continued environmental pollution and health hazards leading to increase in the number of patients suffering from air and water borne diseases.

The ambient air quality of the Shillong city in particular and the State in general is far from satisfactory mainly because of emission of air pollutants from automobiles.

(Paragraphs 1.1.11.1 & 1.1.11.2)

The extent of pollution of air caused by 481 polluting industries was not monitored by the MSPCB. Besides, coal mining activities were being carried out in the State without authorisation.

(Paragraphs 1.1.11.3 & 1.1.11.5)

The existence of actual number of water bodies in the State was not determined by the MSPCB or the Water Resources Department. Water of 28 out of 31 water bodies of six districts of the State was not fit for drinking.

(Paragraph 1.1.12.1)

Lack of waste processing facilities in four municipal boards or scientific landfills in all the six municipal boards of the State resulted in open dumping of mixed wastes which could lead to environmental pollution.

(Paragraph 1.1.13.4)

In violation of Bio-Medical Waste (Management and Handling) Rules, 139 (out of 178) health institutions were functioning in the State without authorisation from the MSPCB. The MSPCB also failed to ensure segregation, labelling, colour coding and disposal of bio-medical wastes in accordance with the prescribed rules.

(Paragraphs 1.1.14.1 & 1.1.14.2)

Site for disposal of hazardous wastes generated by industries was not identified. As a result, generators of these wastes were dumping the hazardous wastes at their will, thereby exposing general populace to a greater risk of contracting infections and dangerous diseases.

(Paragraph 1.1.15)

1.1.1 Introduction

Pollution Control is the process of reducing or eliminating the release of pollutants into the environment. It is regulated by various environmental agencies that establish limits for the discharge of pollutants into the air, water and land. Non-compliance with the laid down standards for pollution control poses a risk to human health and the environment.

Waste Management is the collection, transportation, recovery and disposal of waste, including the supervision of such operations and after-care of disposal sites. Waste poses a threat to the environment and human health if not handled or disposed of properly. Surface water contamination takes place when the waste reaches water bodies. Ground water contamination takes place when residues from waste leach into the ground water. Emissions from incinerators or other waste burning devices and from landfills can also cause air contamination. Solid waste includes bio-medical waste generated by hospitals and other health care establishments.

1.1.2 Regulatory Framework

To prevent and control water and air pollution and regulate the management and handling of waste throughout the country, Government of India (GOI) notified the following:

- **Water (Prevention and Control of Pollution) Act, 1974** (Water Act), for prevention and control of water pollution and the maintaining or restoring of wholesomeness of water;
- **Air (Prevention and Control of Pollution) Act, 1981** (Air Act), for prevention, control and abatement of air pollution;
- **Environment (Protection) Act, 1986** (EP Act) was enacted by GOI as an umbrella Act to cover all the specific and general provisions relating to pollution of the environment including the management of hazardous, bio-medical and solid waste. Under this Act, the GOI also notified the Environment (Protection) Rules in 1986;
- **Municipal Solid Waste (Management and Handling) Rules, 2000** (MSW Rules), to regulate the management and handling of municipal solid waste, by every municipality;

- **Bio-Medical Waste (Management and Handling) Rules** (BMW Rules), 1998 with amendments in 2000 and 2003 to ensure proper management of bio-medical waste. Under the Rules, the institutions generating bio-medical waste were responsible for management and handling of bio-medical waste;
- **Hazardous Waste (Management and Handling) Rules,** 1989 (HW Rules, 1989) under the aegis of EP Act. Subsequent amendments to the Rules in 2000 and 2003 defined the roles and responsibilities of the waste generator and waste monitoring agencies. The HW Rules, 1989 were repealed by the GOI and replaced by the **Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008** to regulate hazardous waste; and,
- **Recycled Plastics Manufacture and Usage Rules** (Plastic Rules), 1999 amended in June 2003 and superseded by the **Plastic Waste (Management and Handling) Rules, 2011** to regulate the use of plastics which is regarded as a major source of pollution to the environment.

In exercise of the powers conferred under Section 54 of Air Act and Section 64 of Water Act, Government of Meghalaya (GOM) prescribed the following Rules for prevention and control of air and water pollution:

- Meghalaya Air (Prevention and Control of Pollution) Rules, 1988, which came into force on 06 August 1991; and,
- Meghalaya Water (Prevention and Control of Pollution) Rules (Meghalaya Water Rules) notified in May 1996.

1.1.3 Implementing Agencies

In Meghalaya, while the Meghalaya State Pollution Control Board (MSPCB), constituted in November 1983, is the agency with the primary responsibility of enforcing the Acts and Rules relating to pollution control and waste management, the actual implementation of these Acts and Rules is the responsibility of various departments/organisations as detailed in **Table 1.1** below**.** The Public Health Engineering (PHE) Department of the State acts as the nodal department for the MSPCB and oversees its functioning.

Table 1.1

Designation/Department/ Organisation	Functions/Responsibilities	Reference of Acts/ Rules
MSPCB	Implementation/enforcement of Acts and Rules relating to prevention and control of water and air pollution, management of wastes and monitoring the implementation of rules relating to management of Municipal wastes	Clause 17 of Water and Air Acts, Rule 7 of BMW Rules and Rule 5 of MSW Rules.
Principal Secretary, PHE Department	Policy matters and enforcement of Rules relating to Air and Water Pollution, Municipal Solid Waste, Bio-medical Waste and Plastics	Section 17 of Water Act and Air Act, Rule 6 of MSW Rules, Rule 7 of BMW Rules, Rule 3 and 4 of Plastic Rules 1999 and 2011 respectively and Rules 5 and 6 of HW Rules 1989.

Designation/Department/ Organisation	Functions/Responsibilities	Reference of Acts/ Rules
Principal Secretary, Transport Department	Responsible for checking of vehicular exhaust emissions	State Government's order of February 1992 and Rule 115 of Central Motor Vehicles Rules, 1989.
Principal Secretary, Urban Affairs Department	Enforcement of MSW Rules	MSW Rules.
Deputy Commissioners	Enforcement of MSW Rules in the respective districts	MSW Rules.
Deputy Commissioners of respective districts/ Municipal Boards (MB) from February 2011	Enforcement of the Plastic Rules related to the use, collection, segregation, transportation and disposal of plastics	Rules 3 of Plastic Rules, 1999/ Rule 4 of Plastic Rules, 2011.
Municipal Boards	Implementation of MSW Rules in the jurisdiction of the particular municipalities	Rule 4 of MSW Rules and Rule 14 of BMW Rules.
Government and private hospitals	Implementation of BMW Rules in their hospitals	Rule 7 of BMW Rules.

Thus, there are multifarious authorities entrusted with the air and water pollution and management of wastes in the State.

1.1.4 Scope of Audit

The performance audit covering the period from 2006-07 to 2010-11 was conducted during April-June 2011 through test-check of records of the MSPCB and other implementing agencies[1] in three[2] out of seven districts of the State as indicated in the table below:

Table 1.2

District	Municipal Boards	Hospitals	
		Government	Private
East Khasi Hills	Shillong Municipal Board (MB)	(i) Civil Hospital, Shillong, (ii) Ganesh Das Hospital, Shillong and (iii) R.P. Chest Hospital, Shillong	(i) Nazareth Hospital, Shillong, (ii) Dr. H. Gordon Robert Hospital, Shillong, (iii) Children's Hospital, Pohkseh, Shillong, (iv) Bethany Hospital, Shillong and (v) Woodland Hospital, Shillong
West Garo Hills	Tura MB	Civil Hospital, Tura	(i) Tura Christian Hospital and (ii) Holy Cross Hospital, Tura
Jaintia Hills	Jowai MB	Civil Hospital, Jowai	Dr. Norman Tunnels Hospital, Jowai

Districts were selected considering the population[3] as well as geographical location[4]. All the three Municipal Boards (MB) in these districts (one in each district) were covered under the review. Government and private hospitals were selected on random basis.

[1] Three Municipal Boards out of six, five Government hospitals out of nine and eight private hospitals out of nine
[2] East Khasi Hills district, West Garo Hills district and Jaintia Hills district.
[3] Urban population in three selected districts: 80 *per cent* (3.62 lakh) of the total urban population of the State (4.54 lakh) as per Census, 2001.
[4] One district each from three regions of the State, *viz.* Khasi Hills, Garo Hills and Jaintia Hills.

1.1.5 Audit Objectives

The objectives of performance audit were to assess:

- the level of compliance with the provisions of the various Acts and Rules regulating air and water pollution and management of wastes;
- whether the quantum of waste being generated in the State has been accurately assessed and whether the risks to environment and health posed by wastes have been identified and adequately addressed;
- if the agencies/organisations involved in pollution control and waste management were allocated clear responsibility and accountability; and,
- if monitoring mechanisms were effective.

1.1.6 Audit Criteria

The following audit criteria were adopted:

- Acts and Rules relating to Pollution Control and Waste Management.
- Guidelines/directions principles prescribed by the GOI/Central Pollution Control Board (CPCB) for prevention, control and abatement of air/ water pollution and for waste management.
- Prescribed monitoring mechanisms.

1.1.7 Audit Methodology

The performance audit commenced with an 'entry conference' held on 10 May 2011 with the officers from the MSPCB, Health & Family Welfare (H&FW) Department, Chief Engineer, PHE Department and other officers from Urban Affairs and H&FW Departments in attendance, in which the audit objectives, criteria, audit methodology and the rationale for the selection of districts were explained.

The audit evidence was collected through issue of questionnaires, examination of records, analysis of the data collected, discussion with the concerned authorities at various levels and joint physical verification, wherever required. Audit findings were discussed with the MSPCB and various departments/agencies at an 'exit conference' held on 21 September 2011 and their views incorporated at appropriate places.

1.1.8 Acknowledgement

Audit acknowledges the cooperation extended by the various officials of the MSPCB, MB and other departments at Shillong as well as officials of Tura and Jowai MBs to Audit personnel in carrying out this assignment.

1.1.9 Audit Findings

The points noticed during the course of this review have been grouped as under and discussed in the succeeding paragraphs:

- **Management of Air and Water Pollution**
  - **Air Pollution Management** – *Air quality of the State – Vehicular pollution – Operation of coal mining – Consent to operate industries – Industrial emission – Mobile laboratory van*
  - **Water Pollution Management** – *Water quality of water bodies – Quality of trade effluents*
- **Management of Wastes**
  - **Solid Waste Management–** *Waste processing/disposal facilities set up by MBs without authorisation – Arrangement for management of solid waste – Collection of municipal solid waste – Processing and disposal facilities of municipal solid waste*
  - **Bio-medical Waste Management –** *Functioning of health institutions without authorization – Segregation of bio-medical waste – Bio-medical waste disposal facility – Compliance aspects.*
  - **Hazardous Waste Management**
  - **Plastic Waste Management**
- **Impact of pollution on health profile of the State**
- **Monitoring and Evaluation**
- **Conclusion**
- **Recommendations**

1.1.10 Management of Air and Water Pollution

Air pollution is a major concern as it leads to increased incidence of respiratory illnesses like asthma, bronchitis, emphysema, *etc.* The Air Act is an important legislative measure aimed at the prevention and control of air pollution in India. The Act mandates adherence to emission standards to be set by Pollution Control Boards and provides for sanction in case of violations by industrial units *etc.* While certain areas of Meghalaya[5] were initially declared (February 1988) as air pollution control areas by the Government of Meghalaya (GOM) under the powers conferred under Section 19 of Air Act, in November 1999, the entire State was declared as an "Air Pollution Control Area".

Water pollution affects all sources of water; *viz.* surface water, ground water, onshore and marine water resources. Water-borne diseases such as diarrhoea, typhoid, *etc.* occur because of the presence of bacteria and parasites that are transmitted by polluted water. The Water Act and the Rules made under the Act provide for the prevention and control of water pollution.

[5] Certain areas of East and West Khasi Hills, Jaintia Hills and East and West Garo Hills.

1.1.11 Air Pollution Management

1.1.11.1 Air quality of the State

The MSPCB established five Air Quality Monitoring Stations (AQMS) for monitoring the ambient air quality in the State. The air quality is determined based on four parameters[6]. The locations of the AQMS and the annual average air quality determined by these AQMS during 2006-11 are given below:

Table 1.3

Location of AQMS	Year	Results of Parameters tested (annual average)				
		SPM (up to December 2009)	RSPM[7] (up to December 2009)	PM_{10} (since January 2010)	SO_2	NO_X
		(micro gram per cubic metre or µg/m³)				
Permissible limit of ambient air quality standards	**Industrial area**	**360**	**120**	**60**	**80/50[8]**	**80/40[8]**
	Other than industrial area	**140**	**60**	**60**	**60/50**	**60/40[8]**
Byrnihat, Ri-Bhoi	2008-09	166.90 (19)	128.70 (7)	NA	2.00	13.90
	2009-10	173.70 (24)	136.70 (14)	171.60 (186)	31.97	15.52
	2010-11	NA	NA	181.50 (202)	96.20 (92)	16.10
Lumpyngngad, Shillong	2006-07	63.40	52.10	NA	2.00	4.60
	2007-08	63.00	56.10	NA	2.00	4.60
	2008-09	63.90	57.80	NA	2.00	4.60
	2009-10	65.10	57.30	57.60	2.00	4.70
	2010-11	NA	NA	57.10	2.00	4.80
Police Bazar, Shillong	2006-07	118.80	85.50 (42)	NA	4.20	15.40
	2007-08	103.40	79.40 (32)	NA	3.30	16.50
	2008-09	117.00	90.00 (50)	NA	2.00	15.70
	2009-10	129.60	96.10 (60)	104.60 (74)	2.04	12.69
	2010-11	NA	NA	110.40 (84)	2.20	15.20
Dawki, Jaintia Hills	2009-10	73.00	60.60 (1)	87.80 (46)	3.01	7.24
	2010-11	NA	NA	69.50 (16)	2.00	5.70
Tura, West Garo Hills	2010-11	NA	NA	61.80 (3)	2.00	8.20

(Figures in parentheses indicate percentage of excess over national standards)
NA: Not applicable
Source: Information furnished by the MSPCB.

[6] **Suspended Particulate Matter (SPM):** SPM consists of mist, dust, fumes and smoke and cause respiratory problems and lung damage.

Respirable Suspended Particulate Matter (RSPM)/ Particulate Matter-10 (PM_{10}): One of the major sources of RSPM/PM_{10} is vehicles especially diesel vehicles. RSPM may cause chronic and acute effects on human health, particularly the pulmonary function and respiratory problems. Major concerns for human health from exposure to PM_{10} include effects on breathing and respiratory systems, damage to lung tissue, cancer and premature death.

Sulphur Dioxide (SO_2): SO_2 is a gas, the main source of which in the air is industrial activity that processes material containing sulfur. It is also present in motor vehicle emissions due to fuel combustion. Breathing of SO_2 may causes coughing, wheezing and shortness of breath.

Nitrogen Oxide-X (NO_X): One of the sources of NO_X is conversion of fuel bound nitrogen during combustion. Inhaling of particles present in NO_X may cause or worsen respiratory diseases and may also aggravate existing heart disease.

[7] Monitoring on SPM and RSPM had been dispensed with since introduction of new parameter PM_{10} in January 2010.

[8] Revised in November 2009.

As can be seen from the above table, the annual average concentration of all the parameters tested in the AQMS at Lumpyngngad during 2006-11 was within the prescribed standards. In two AQMSs (Police Bazar and Dawki), while the concentrations of SPM, SO_2 and NO_X were within the prescribed standards, the concentration of RSPM/PM_{10} far surpassed the prescribed standards. Concentrations of RSPM/PM_{10} during 2008-11 and SO_2 during 2010-11 in the air quality at Byrnihat were beyond the prescribed standards. The air quality of Tura was also not satisfactory because of excessive PM_{10} in the air tested during 2010-11.

Analysis of year-wise data further revealed the following:

- **Police Bazar, Shillong**: Concentration of RSPM air quality tested at this station during 2009-10 (up to December 2009) was in excess of 60 *per cent* of prescribed standards against 42 *per cent* during 2006-07. During January-March 2010 and 2010-11, the concentration of PM_{10} was much in excess of prescribed standard (74 *per cent* and 84 *per cent*).
- **Byrnihat**: While RSPM was in excess of 7 *per cent* and 14 *per cent* of prescribed standards during 2008-09 and 2009-10 (up to December 2009), the concentration of PM_{10} exceeded the prescribed standards during 2010-11. Unlike other stations, the concentration of SO_2 in the air quality tested in this centre exceeded the prescribed standard by 92 *per cent* during 2010-11.
- **Dawki**: While there was marginal increase of one *per cent* in the concentration of RSPM during 2009-10 (up to December 2009), the concentration of PM_{10} exceeded the prescribed standards by 46.33 *per cent* during January-March 2010 and 15.83 *per cent* during 2010-11.
- **Tura**: The concentration of PM_{10} in the air quality tested in this station during 2010-11 marginally exceeded the prescribed standard by one *per cent*.

Excessive concentration of RSPM/PM_{10} in ambient air tested in four out of five AQMSs thus, clearly indicated that the air in these four areas (Police Bazar, Shillong, Byrnihat, Dawki and Tura) was polluted thereby exposing the general populace to a greater risk of contracting diseases like breathing and respiratory problems, damage to lung tissue, cancer, *etc.* which are caused due to excessive concentration of RSPM/PM_{10}. The MSPCB stated (July 2011) that though the Commissioner of Transport was requested (January 2011) to control emission of air pollutants from automobiles, no feedback was received from him. As regards air pollution in Byrnihat, the matter was taken up by the MSPCB with the major air polluting units at Byrnihat only in June 2011.

1.1.11.2 Vehicular pollution

As per Section 17 of Air Act, the MSPCB is responsible for enforcing the Air Act. To control air pollution due to emissions from vehicles, the State Government entrusted (February 1992) the responsibility for checking vehicular exhaust emission to the Transport Department.

As per Section 56 of Motor Vehicles Act, 1988 and Rule 62 of Central Motor Vehicles Rules, 1989, it is mandatory for all vehicles to obtain a fitness certificate, which is to be renewed[9] after two years, only after conducting certain tests including exhaust emission tests for pollution control certificate. As of 31 March 2011, 1,47,987 vehicles were registered in the State, of which 1,18,209 vehicles were registered in the three selected districts. Out of 1,18,209 vehicles, 90,915 vehicles were more than two years old. Information regarding number of vehicles for which emission tests were conducted by the Transport Department was however, not furnished, despite a request (August 2011) to the District Transport Officers of the three selected districts. However, the MSPCB had established a station at its office premises at Shillong for monitoring the exhaust emission from vehicles. This station had conducted vehicular emission tests for 7,369 vehicles (petrol driven: 7,195; diesel driven: 175) during 2006-11.

The results of the vehicular emission tests of these vehicles showed that the emission of 4 *per cent* of petrol driven vehicles and 57 *per cent* of diesel driven vehicles were above the permissible limit. Obviously, this was an alarming situation which led the MSPCB to conclude that (January 2011) "*there was an increase in the concentration of SO_2, NO_X and RSPM levels which were mainly due to the emission of pollutants from automobiles*". Thus, although vehicular smoke was a major concern with regard to air pollution in the State, the Transport Department failed to comply with the requirements of the Act and Rules to check the pollution created by vehicular smoke.

Vehicular smoke

To prevent further deterioration of the ambient air quality in the State capital in particular and the State in general, the MSPCB opined that there was an immediate need for strict implementation of the standards for emission of air pollutants from automobiles. The MSPCB, therefore, suggested (January 2011) to the State Government to issue necessary instructions to the concerned authorities in-charge of

[9] Initial certificate of compliance with pollution standards is to be issued by the manufacturer of the vehicle.

registration of motor vehicles under the Motor Vehicles Act, 1988 to ensure that the standards for emission of air pollutants from automobiles are complied with by each and every vehicle registered in the State. Action taken by the State Government on the suggestions of the MSPCB, though called for (October 2011), had not been furnished.

1.1.11.3 Operation of coal mining

As per Section 21(1) of Air Act, no person shall, without previous consent of the MSPCB, establish or operate any industrial plant in an air pollution control area. In Meghalaya, no mining policy was framed.

Coal mining is an activity which discharges pollutants into the atmosphere. The number of coal mines in the State, though called for from the Director of Mineral Resources (DoMR) in May 2011, was not furnished. According to the DoMR, coal mines in the State were being operated without any mining lease granted by the State Government and as such, the number of mines, location, area, *etc.* were not available. However, as of 31 March 2011, the MSPCB had received 11 applications (July 2006 to June 2010) from coal miners for grant of consent to establish coal mining projects in the State. But, consent to operate was not granted by the MSPCB to any of these coal miners due to non-fulfillment of the prescribed compliance criteria.

As per information furnished (June 2011) by the Director of Mineral Resources, GOM, 305.58 lakh MT of coal was extracted in the State during 2006-11 by coal miners. Thus, in the absence of any mining policy as well as approval/consent of the MSPCB as required in even a single case, coal mining was being carried out in the State rampantly in violation of the mandatory provisions of the Act. Consequently, the discharge of pollutants into atmosphere due to unauthorised coal mining in the State remained out of the purview of the MSPCB.

1.1.11.4 Consent to operate industries (other than mining activities)

As per Section 21 of Air Act and Section 25 of Water Act, prior consent of the MSPCB is mandatory for establishing or operating an industrial plant in air pollution control area. Further, as per Rule 28(2) of Meghalaya Water Rules, consent granted to industries for allowing them to function is required to be renewed annually on realisation of the prescribed fee.

As of March 2011, consents were granted by the MSPCB to 886 industrial units in the State of which for 133 units, the consents had expired between March 2007 and February 2011, as detailed below:

Table 1.4

Sl. No.	Number of industrial units	Due date of renewal
1.	02	March 2007
2.	13	Between May 2007 and March 2008
3.	27	Between April 2008 and March 2009
4.	46	Between April 2009 and March 2010
5.	45	Between April 2010 and February 2011
	133	

Source: Information furnished by the MSPCB.

None of the 133 units applied for grant of renewal of consent even after four months to five years of expiry of the validity of consent. The MSPCB also had not initiated any action against the erring units as per Section 39 of the Air Act and Section 45-A of Water Act, which provides for punishment with imprisonment for a term of up to three months or with fine up to ₹ 10,000 or with both in case of failure or contravention of the provisions of this Act. Besides, ₹ 45.98 lakh was due as consent renewal fee from these units.

The MSPCB stated (October-November 2011) that 95 out of 133 industrial units had renewed their consent and for the remaining 38 units, reminders were issued for depositing the required renewal fee.

1.1.11.5 Industrial emission

As per Clause 17 of Air Act, 1981, the MSPCB was to inspect air pollution control areas as it may think necessary, assess the quality of air therein and take steps for the prevention, control or abatement of air pollution in such areas. The frequency of such monitoring with respect to specified highly polluting industries was to be once in two months and for other industries, once in every six months.

Out of 493 units identified by the MSPCB as polluting under the Air and Water Acts, ambient air quality of only 12 (2.43 *per cent*) polluting units situated in Jaintia Hills (seven units), East Khasi Hills (three units) and Ri-Bhoi (two units) Districts were measured by the MSPCB in piecemeal manner ranging from one to three times each during 2006-11. As per the results of parameters measured, two out of five parameters (RSPM and PM_{10}) of ambient air quality in respect of eight out of 12 industrial units exceeded the prescribed standards[10] by 19 *per cent* to 301 *per cent* (PM_{10}) and 2 *per cent* to 21 *per cent* (RSPM). This indicated that the air in these areas was polluted due to industrial emission. The extent of air pollution caused by remaining 481 (93 *per cent*) units was, however, not assessed by the MSPCB.

1.1.11.6 Mobile laboratory van

To monitor air/water quality at remote localities, the MSPCB procured (March 2001) a mobile laboratory van (MLV) at a cost of ₹ 19.27 lakh. The MLV was operationalised in February 2004, after a delay of three years due to delay in procurement of equipment, and used for monitoring the water/air quality at four remote locations[11] for one month only (February 2004). During March 2004 to August 2005, the MLV was under repair. Thereafter, the same was used for monitoring air quality at Police Bazar in the capital city of Shillong during September 2005 to May 2007 as the existing NAMP[12] station at Police Bazar was not functioning. Since June 2007, the MLV remained inoperative due to some mechanical defects. However, no action was initiated to get the van repaired.

[10] PM_{10}: 100 µg/m³; RSPM: 150 µg/m³
[11] Byrnihat, Smit, Pomlum and Pomlakrai
[12] National Air Quality Monitoring Programme

The MSPCB stated (June 2011) that since the body of the MLV was oversized, it could not be used in hilly terrain unless modifications were carried which could not be done due to financial constraints. The reply indicated that the oversized van was procured without properly determining the feasibility of its use in remote localities. The contention of the MSPCB regarding financial constraints was not acceptable because the MSPCB failed to even utilise funds of ₹ 2.33 crore to ₹ 4.17 crore available during 2006-11. The MSPCB further stated (October 2011) that the modification of the MLV was under process.

1.1.12 Water Pollution Management

1.1.12.1 Water quality of water bodies

As per the 'Uniform Protocol on Water Quality Monitoring Order, 2005' notified by the Ministry of Environment & Forest in June 2005, the frequency of sampling of surface water shall be a combination of baseline, trend and flux or impact stations[13]. The baseline stations shall be monitored four times a year for perennial rivers including lakes and three to four times a year for seasonal rivers. Trend stations shall be monitored with an increased frequency of once in a month. Flux or impact stations shall be monitored 12 to 24 times in a year depending upon pollution potential or importance of water use. Similarly, the ground water bodies shall be classified as baseline stations and frequency of monitoring shall not be less than two times in a year.

The actual number of water bodies in the State was not identified by the MSPCB. However, the MSPCB had monitored the water quality of 31 water bodies in six districts during 2006-10. Of these, the water quality of 13 water bodies was monitored as per the prescribed frequency, the results of which are given below:

Table 1.5

Sl. No.	Name of water bodies	District	Classification[14] of water as per results of monitoring during 2006-10
1.	Thadlaskein lake	Jaintia Hills	B
2.	Simsang river	East Garo Hills	B
3.	Ganol river	West Garo Hills	B
4.	Mawpdang spring	East Khasi Hills	B
5.	Police Bazar spring	East Khasi Hills	B
6.	Wah-U-Dkhar spring	East Khasi Hills	B
7.	Umsahep spring	Jaintia Hills	B
8.	Narbong well	Ri-Bhoi	B
9.	Myntdu river	Jaintia Hills	C

[13] **Baseline Stations:** monitoring location where there is no influence of human activities. **Trend Stations:** monitoring location to show how a particular point, on a water course, varies over time normally due to the influence of human activities. **Flux or Impact Stations:** location for measuring the pollutant on main river and extent of pollution due to human interference or geological feature at any point of time.

[14] Class 'A": Drinking water source without conventional treatment but after disinfection; 'B': Outdoor bathing organized 'C': Drinking water source with conventional treatment followed by disinfection; 'D': Propagation of wildlife and fisheries; 'E'; Irrigation and industrial cooling controlled waste disposal; 'U': Unclassified.

Sl. No.	Name of water bodies	District	Classification[14] of water as per results of monitoring during 2006-10
10.	Wards lake	East Khasi Hills	D
11.	Umtrew river	Ri-Bhoi	D
12.	Umiam lake	Ri-Bhoi	D
13.	Kyrhukhla river	Jaintia Hills	U

Source: Water quality monitoring report of the MSPCB.

The results of monitoring of 13 water bodies indicated that water of none of these bodies was fit for drinking. The water of the remaining 18 water bodies, as indicated below, was not monitored regularly:

Table 1.6

District	Sl.No.	Name of Water bodies (Perennial/seasonal rivers)	Result/Class
East Khasi Hills	1	Umkhen River	A
	2	Umsohlang River	D
	3	Umkhrah River	E
	4	Umshyrpi River	E
	5	Lapalang River	B
Jaintia Hills	6	Lukha River	A, D
	7	Umjri River	D
	8	Myntang River	B
	9	Umiurem River	B & un-classed
Ri-Bhoi	10	Umsan River	A,C,D
West Garo Hills	11	Ringrey	B,C
	12	Rongkhon	C
East Garo Hills	13	Manda River	A
	14	Damring River	A
West Khasi Hills	15	Umngi River	B
	16	Rilang River	A,B
	17	Rwiang River	B
	18	Khri River	A,B

Source: Water quality monitoring report of the MSPCB.

Based on monitoring of these water bodies conducted in a piecemeal manner by the MSPCB, it was observed that the water of three bodies was classified under category 'A' and the water of the remaining 15 water bodies was classified under categories 'B' to 'E' and 'U' and thus, not fit for drinking. Despite this, the MSPCB did not carry out regular monitoring of water quality of these 18 water bodies.

The MSPCB admitted the fact and stated (May 2011) that regular monitoring of 18 water bodies could not be carried out due to financial and manpower constraints. The contention of the MSPCB regarding financial constraints was not acceptable because the MSPCB even failed to utilise available funds at its disposal as pointed out in paragraph 1.1.11.6.

1.1.12.2 Quality of trade effluents

Under Rule 29 of Meghalaya Water Rules, the MSPCB was to keep a constant check on the quality of effluents discharged into the natural streams and to monitor samples at fixed or suitable points in the streams.

According to the MSPCB, in Meghalaya, 99 out of 493 polluting industrial units were generating trade effluents. Of these, the MSPCB had carried out sample tests of trade effluents in only five of these industrial units *i.e.* one *per cent,* during 2006-11 to determine the standard of effluents. The results of sample tests are tabulated below:

Table 1.7

Sl. No.	Industrial Unit and date of testing	Parameters tested (Prescribed standards in bracket)				
		Potentio Hydrogenia (PH)	Biochemical oxygen demand	Oil & Grease	Total Suspended Solid	Nitrate-N
		Milligram per litre or mg/1				
1.	Hindustan Coca Cola Limited, Byrnihat Ri-Bhoi District (09 September 2010)	(6.5-8.5) 7.9	(30.0) 7.7	(10.0) 1.0	(100.0) 40.0	(10.0) -
2.	Central Dairy, Mawiong East Khasi Hills District (24 August 2010)	(6.5-8.5) 7.9	(350.0) 308.0	(10.0) 14.5 *(45%)*	(150.0) 20.0	(10.0) 1.1
3.	M/s Rani Motors Services Unit, Sunny Hills, Shillong East Khasi Hills District (5 October 2010)	(5.5 – 9.0) 7.9	-	(10.0) 51.2 *(412%)*	(100.0) 40.0	10.0 2.0
4.	Lake View Inn, Shillong, East Khasi Hills District (09 & 25 November 2010 & 09 February 2011)	(5.5 – 9.0) 7.4 6.5 5.6	(100.0) 182.0 *(82%)* 152.0 *(52%)* 145.0 *(45%)*	(10.0) 58.5 *(485%)* 22.2 *(122%)* 15.0 *(50%)*	(100.0) 45.0 10.0 105.00 *(5%)*	-
5.	Shillong Club & Residential Quarters, East Khasi Hills District (09 November 2010)	(5.5 – 9.0) 4.9	(100.0) 406.0 *(306%)*	(10.0) 881.0 *(8710%)*	(100.0) 570.0 *(470%)*	-

Source: Trade effluents monitoring reports of the MSPCB

The results of sample test indicated that trade effluents discharged by the first unit were within the prescribed standards. The concentration of biochemical oxygen demand, oil and grease and total suspended solid in effluents discharged by the fifth units had surpassed the prescribed standards by 5 to 8,710 *per cent.* In the second and third units, the concentration of oil and grease in effluents had surpassed the prescribed standards by 45 to 412 *per cent.* In respect of the fourth unit, the results of sample test conducted three times during 2010-11 indicated that though there were declining trends in PH, biochemical oxygen demand and oil and grease, these were still above the prescribed standards. The action taken report against these industrial units for failure to maintain the quality of trade effluents as per prescribed standards, though called for (July 2011), had not been received (December 2011).

The above facts not only reflected the negligible and ineffective monitoring of trade effluents by the MSPCB but the extent of pollution caused to streams due to discharge

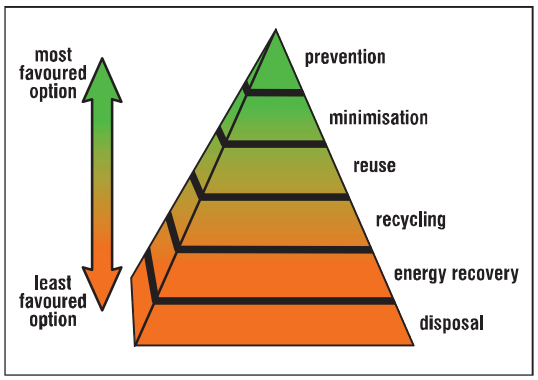
of trade effluents by 99 *per cent* of the remaining polluting industrial units also remained unassessed.

Management of Wastes

1.1.13 Solid Waste Management

Solid waste includes waste generated by households, commercial and business houses, market yards, construction and demolition waste.

MSW Rules prescribe that priority should be given to extract the maximum practical benefits from the waste and prevent and minimise the waste by adopting the strategy of 'Three Rs' (reduce, reuse and recycle) depicted in the waste hierarchy model shown in the pictorial.



1.1.13.1 Waste processing/disposal facilities set up by municipal boards without authorisation from the MSPCB

According to Rule 4(2) of the MSW Rules, every municipal authority or an 'operator of a facility'[15] was to obtain authorisation for setting up waste processing and disposal facility including landfills from the MSPCB. The authorisation should be valid for a given period and fresh authorisation would be required after expiry of the validity period.

Out of six MBs in the State, only two MBs, *viz.* Shillong MB and Williamnagar MB obtained authorisation from the MSPCB for their waste disposal facilities. However, both the MBs failed to renew their authorisations after expiry of the validity period in December 2003 (Shillong) and December 2005 (Williamnagar). The MSPCB on its part, had neither taken any action against these two MBs or against the other four defaulting MBs[16] as per Section 15 of the EP Act[17] which provides for punishment with imprisonment for a term of up to five years or with fine up to ₹ 1 lakh or with both in case of failure or contravention of the provisions of this Act. The MSPCB also did not monitor the system for management of municipal solid waste (MSW)[18] adopted by these MBs, as required under Rule 6(1) of MSW Rules. Since all the six

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[15] **"operator of a facility"** means a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes and also includes any other agency appointed as such by the municipal authority for the management and handling of municipal solid wastes in the respective areas.

[16] (i) Tura Municipal Board, (ii) Jowai Municipal Board, (iii) Resubelpara Municipal Board, (iv) Baghmara Municipal Board.

[17] The BMW Rules, MSW Rules and HW Rules were framed in exercise of the powers conferred under Sections 3, 6 and 25 of the EPA.

[18] The mixture of garbage and rubbish is known as urban refuse or municipal solid waste.

MBs in the State had been functioning without authorisation, standards relating to management of waste being adopted by them remained un-monitored.

The MSPCB stated (October 2011) that invoking harsh penal action under EP Act, 1986 against the defaulting MBs would not be appropriate because Shillong and Williamnagar MBs were submitting annual reports regularly and the remaining MBs had not furnished the project reports for setting up of MSW disposal facilities. The reply is not acceptable because imposition of penal action was mandatory as per the EP Act in the event of failure either to renew or to obtain authorisation.

The Urban Affairs Department (UAD) stated (December 2011) that fresh instructions had been issued to all MBs for obtaining/renewal of authorisation.

1.1.13.2 Arrangement for management of solid waste

Compliance criteria for management of solid waste and the existing arrangements in the three selected MBs are given below:

Table 1.8

Stage	Parameter	Compliance criteria	Present arrangement
Stage 1	Collection	MBs shall adopt house-to-house collection or community bin collection of MSW.	Generally manual collection from community bins. However, door to door collection was being practiced in some wards of Shillong MB and Jowai MB.
Stage 2	Storage	Bins for storage of bio-degradable waste shall be painted in green, those for recyclable waste in white and those for other waste in black.	Permanent open community bins and movable circular bins were installed in some places but the bins were neither as per prescribed design nor in different colours as prescribed in the MSW Rules in all three selected MBs.
Stage 3	Transportation	The vehicles used for transportation shall be covered so that waste is not visible to public and to avoid exposure to open environment.	In all the selected MBs, wastes were transported by uncovered trucks.
Stage 4	Segregation	MBs shall organise awareness programmes to ensure community participation in waste segregation.	Two out of three selected MBs, *viz.* Shillong and Jowai, had organised awareness programmes.
Stage 5	Processing	MBs shall adopt suitable technology or combination of such technologies to make use of waste so as to minimise burden on landfill site.	Except Tura MB, the other two selected MBs did not have functional waste processing plants.
Stage 6	Disposal	Landfill sites used for final disposal shall be restricted to the waste, which is not suitable for recycling or biological processing.	In the three selected MBs, MSW was disposed off in open dumping sites.

1.1.13.3 Collection of municipal solid waste

As per the records in the three selected MBs, the quantum of MSW generated and collected per day during 2006-07 to 2010-11 in the three selected municipalities is given below:

Table 1.9

Sl. No.	Name of Municipal Board	Generation of waste per day in MT	Quantity collected per day in MT (percentage)
1.	Shillong Municipal Board	120.00	100.00 (83)
2.	Tura Municipal Board	65.66	18.35 (28)
3.	Jowai Municipal Board	25.00	20.00 (80)
Total		**210.66**	**138.35 (66)**

Source: Records of Municipal Authorities

As can be seen from the above table, none of the selected municipal authorities collected 100 *per cent* MSW generated during 2006-11. During the period under review, out of 210.66 MT of MSW generated per day in the three municipal areas, 138.35 MT (i.e. 66 *per cent*) were collected and disposed of leaving 72.31 MT (34 *per* cent) uncollected. The situation of Tura MB was the worst as only 28 *per cent* of the total waste generated per day was collected for disposal. In Shillong MB, 83 *per cent* of wastes generated during 2006-11 were cleared.

Dumping of MSW into Rongkhon stream near Tura super market

Open dustbin near MSPCB's office, Shillong

Burning of wastes at Laitumkhrah

1.1.13.4 Processing and disposal facilities of municipal solid waste

As per Schedule-I appended to the MSW Rules, the municipal authorities/State Government were to improve existing landfill sites by 31 December 2001, identify landfill sites for future use and make the sites ready for operation by 31 December 2002 and set up waste processing and disposal facilities by 31 December 2003. However, no landfill sites to dispose MSW in a scientific manner were set up by any of the six municipalities of the State even after a lapse of over nine years (June 2011), reasons for which, though called for (June 2011) from the Urban Affairs Department, had not been furnished (December 2011).

As regards waste processing facilities, only two out of six MBs, *viz.* Shillong and Tura MBs, had so far set up the said facilities[19]. The processing facility, *viz.*, compost plant of Shillong MB at Mawiong, was set up by the Board through two private firms[20] at a cost of ₹ 4.63 crore (including Shillong MB's contribution of ₹ 2.27 crore). The plant was commissioned in December 2002 and was not functioning regularly since April 2004 and became completely non-functional since December 2006 due to break-down of machinery. The plant was not repaired by the firms despite requests (February 2007 and October 2010) by the Shillong MB.

As per agreement executed (November 2000) with the firms, the Shillong MB was to earmark one hectare of land for sanitary landfill for dumping of remnants from the processor. But the landfill site was not provided by the Shillong MB and waste/garbage piled up in the surrounding areas of the plant, trenching ground and approach roads, which resulted in a unhygienic environment, foul smells, multiplication of flies, *etc.* which led to public resentment. To overcome the situation,

[19] Vermi composting plant at Tura MB and Compost Plant at Shillong MB.
[20] M/s Excel Enterprise, Mumbai and M/s Anderson Biotech Private Ltd., Shillong.

the Shillong MB cleared (June 2008 to November 2009) the accumulated garbage from the compost plant site by engaging excavators through private contractors at a cost of ₹ 55.88 lakh. This could have been avoided had the Shillong MB earmarked the land as per agreement and set up a landfill site and stopped waste intake at the compost plant site.

Dumping site at Mawiong, Shillong MB

Thus, failure to set up waste processing facilities by four municipal authorities and non-functioning of compost plant at one MB coupled with non establishment/ identification of landfill sites by any of the MBs resulted in the MSW generated in six of the largest urban agglomerations in the State being disposed off haphazardly at six[21] open dumping sites with serious adverse implications on health and environment.

Open dumping site, Tura MB

[21] (i) Shillong- Riat Khwan, Mawiong, (ii) Tura- Rongkongre, (iii) Jowai- Myngkjai, (iv) Resubelpara- Resu Dekachang, (v) Williamnagar- Ampangdamgre and (vi) Baghmara- Jongkhol

Dumping site (adjacent to Myngkjai river), Jowai MB

The UAD stated (December 2011) that all the six municipal towns have their own designated dumping ground, but due to financial constraints, waste processing facilities could be set up only in Shillong and Tura.

1.1.14 Bio-medical Waste Management

Bio-medical wastes (BMW), such as discarded drugs, waste sharps, microbiology and biotechnology waste, human anatomical waste, *etc.,* are generated by hospitals, nursing homes, clinics, dispensaries, veterinary hospitals, *etc.* The BMW Rules regulate the management of bio-medical wastes. Audit scrutiny revealed the following shortcomings in management of BMW in the State.

1.1.14.1 Functioning of health institutions without authorisation from the MSPCB

Every institution[22] generating, collecting, storing, transporting, treating, disposing and/or handling bio-medical waste[23] has to obtain authorisation from the MSPCB and renew it after every three years. Authorisations specify the compliance criteria and are subject to verification by the MSPCB.

According to information furnished (May 2011) by the MSPCB, there were 701 health institutions in the State as of 31 March 2011. Of these, 178[24] health institutions (Government: 161; Private: 17) were required to obtain authorisation from the MSPCB and the remaining 523 institutions (sub-centres, dispensaries, *etc.*) were exempted from such authorisation. But only 39 out of 178 institutions had obtained authorisation since the promulgation (July 1998) of BMW Rules and 139 institutions (Government: 135; Private: 4) were functioning without authorisation. Out of 39 institutions, nine institutions failed to renew their authorisation after expiry of validity period in December 2002 (one institution), June 2003 (two institutions), December

[22] Any institution generating bio-medical waste, which includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratory and blood bank.

[23] Except those institutions who are treating and rendering service to less than 1,000 patients per month.

[24] Hospitals: 22; Community Health Centres (CHC): 27; Public Health Centres (PHC): 117; Veterinary hospitals: 4; Clinics/dispensary *etc.*: 8

2005 (one institution), December 2008 (four institutions) and December 2009 (one institution) and were thus, functioning without valid authorisations for periods from one to eight years. The H&FW Department had neither taken any initiative to bring 135 Government institutions under the ambit of BMW Rules nor was any penal action initiated by the MSPCB under Section 15 of EP Act against the defaulting Government and private institutions.

Bio medical wastes at the premises of Tura Civil Hospital

Scrutiny of records of 13[25] selected hospitals located in three[26] selected districts further disclosed that no institution had maintained any record relating to the quantity of BMW generated, collected, *etc.* as required under Rule 11 of the BMW Rules. The quantities of BMW generation shown in their annual reports, submitted to the MSPCB were based on approximation.

Thus, failure on the part of both the Government and the MSPCB led to un-authorised functioning of 148 health institutions (Government:142 ; Private:6) in the State and the disposal or treatment of BMW of these institutions was not subject to verification by the MSPCB as prescribed under the BMW Rules.

The MSPCB stated (October 2011) that the matter regarding grant of authorisation to defaulting health institutions was under pursuance with the concerned departments.

1.1.14.2 Segregation of bio-medical waste

According to Rule 6 of BMW Rules, (a) BMW was not to be mixed with other waste and had to be segregated into containers/bags at the point of generation, (b) the containers/bags were to be colour coded and labeled prior to their storage and transportation and treatment and (c) untreated BMW was to be transported only in such vehicle as may be authorised for the purpose.

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[25] (i) Shillong Civil Hospital, (ii) Ganesh Das Hospital, Shillong, (iii) R.P. Chest Hospital, Shillong, (iv) Bethany Hospital, Shillong, (v) Woodland Hospital, Shillong, (vi) Nazareth Hospital, Shillong, (vii) Tura Civil Hospital, (viii) Tura Christian Hospital, (ix) Holy Cross Hospital, Tura, (x) Jowai Civil Hospital, (xi) Dr. Norman Tunnel's Hospital, Jowai, (xii) Dr. H. Gordon Roberts Hospital, Shillong and (xiii) Children's Hospital, Shillong

[26] East Khasi Hills, West Garo Hills and Jaintia Hills Districts

Records of 13 selected hospitals in the three selected districts showed that segregation of BMW was practiced in ten[27] out of 13 hospitals. However, labeling and colour coding of BMW waste was not done in any of the 13 hospitals. Besides, there was no separate vehicle for collection and transportation of BMW in five[28] out of six MBs of the State.

In absence of labeling and colour coding and non availability of separate vehicles for collection and transportation of BMW, the BMW were mixed up with other solid wastes and disposed of in the open dumping sites indiscriminately. The MSPCB also failed to ensure that BMW were segregated, labeled, colour coded, transported and disposed off according to prescribed rules.

Un-segregated solid waste at Mawiong Compost Plant

BMW mixed with MSW at Jowai dumping site

[27] (i) Civil Hospital, Shillong, (ii) Ganesh Das Hospital, Shillong, (iii) Nazareth Hospital, Shillong, (iv) Children's Hospital, Shillong, (v) Dr. H. Gordon Roberts Hospital, Shillong, (vi) Holy Cross Hospital, Tura, (vii) Jowai Civil Hospital, (viii) Dr. Norman Tunnel's Hospital, Jowai, (ix) Bethany Hospital Shillong and (x) Woodland Hospital Shillong.

[28] Except Shillong MB.

The MSPCB stated (June and October 2011) that segregation and labeling/ colour coding of BMW by all the health institutions could not be ensured due to lack of trained manpower and that it was beyond the mandate of the MSPCB to ensure that every institution had trained manpower. The reply was not acceptable as it was the MSPCB's mandate to bring about improvement in compliance of Rules regulating the processing/disposal of BMW generated by health institutions in the State.

1.1.14.3 Bio-medical waste disposal facility

Rule 5(2) of the BMW Rules stipulate that every institution generating biomedical waste shall set up requisite biomedical waste treatment facilities for different categories of BMWs or ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility. Schedule I of BMW Rules *inter alia* prescribes the following treatment and disposal facilities for different kinds of BMW:

Table 1.10

Sl. No.	Category of BMW	Procedure prescribed for treatment and disposal
1.	Human anatomical waste (human tissues, body parts, *etc.*)	Incineration/deep burial
2.	Microbiology and biotechnology waste (wastes from laboratory cultures, dishes and devices used for transfer of cultures, *etc.*)	Local autoclaving/ microwaving/ incineration
3.	Waste sharps (needles, syringes, blades, glass, *etc.*)	Chemical treatment/autoclaving, micro-waving and mutilation/ shredding
4.	Discarded medicines (wastes comprising of outdated, contaminated and discarded medicines)	Incineration/destruction and drugs disposal in secured landfills
5.	Animal wastes (animal tissues, organs, bleeding parts, *etc.*)	Incineration/deep burial
6.	Soiled waste (items contaminated with blood and bloody fluids including cotton, dressings, soiled plaster casts, *etc.*)	Incineration/ autoclaving/microwaving

According to information furnished (May 2011) by the MSPCB, 132 out of 178 institutions were disposing BMWs adopting different methods. As regards remaining 46 institutions, no such information was furnished, though called for in April 2011. The position of disposal of BMW generated by 132 institutions was as under:

Table 1.11

Sl. No.	Categories of institutions	Number of institutions	Category of BMW normally generated	Disposal/treatment facilities of BMW available with the institutions
1.	Hospitals	19	Human anatomical waste, waste sharps, soiled waste, *etc.*, Microbiology and biotechnology waste	Incineration (1), Incineration, sharp pit and chemical disinfection (1), Chemical disinfection (10), Chemical disinfection and deep burial (6), Chemical disinfection and shredder (1) and Chemical disinfection, sewage treatment plant and sharp pit (1)
		1	Waste sharps, soiled waste, *etc.*	Chemical disinfection
		1	-do-	Chemical disinfection and deep burial
2.	CHC/PHC	103	Waste sharps, soiled waste and, discarded medicines	Chemical disinfection and deep burial

Sl. No.	Categories of institutions	Number of institutions	Category of BMW normally generated	Disposal/treatment facilities of BMW available with the institutions
3.	Veterinary hospital	1	Animal waste and soiled waste	Chemical disinfection
		2	-do-	Chemical disinfection and deep burial
4.	Clinics/ dispensaries/ Research Centre	5	Waste sharps and soiled waste	Chemical disinfection
		132		

(Figures in brackets indicate number of hospitals)
Source: Information furnished by the MSPCB.

Analysis of above data revealed that only two out of 132 institutions, *viz*., Civil Hospital, Jowai and North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, were disposing their BMWs as per procedure prescribed under BMW Rules. The disposal/treatment facilities of BMWs available with the remaining 130 institutions were not in conformity with the prescribed procedure. Audit scrutiny revealed the following further irregularities:

➢ Out of 130 institutions, six institutions were provided with six incinerators by the H&FW Department (cost: ₹ 1.09 crore) for disposal of BMWs, as detailed below:

Table 1.12

Sl. No.	Name of hospitals	Date of installation	Present status
1.	Civil Hospital, Nongpoh	December 2008	Not commissioned
2.	Civil Hospital, Williamnagar	January 2009	-do-
3.	Civil Hospital, Tura	January 2009	-do-
4.	Civil Hospital, Shillong	April 2004	Not functioning since November 2006
5.	Ganesh Das Hospital, Shillong	May 2002	Not functioning since May 2006
6.	R.P. Chest Hospital, Shillong	February 2003	Not functioning since September 2004

Source: Information furnished by the Director of Health Services (MI), Meghalaya.

Out of six incinerators, three incinerators placed at Civil Hospitals, Tura, Williamnagar and Nongpoh were not commissioned even after two years of installation due to lack of trained staff, non-availability of electricity and non-completion of electric wiring respectively. The remaining three incinerators at Civil Hospital, Shillong, Ganesh Das Hospital, Shillong and R.P. Chest Hospital, Shillong were not functioning for periods ranging from four to six years due to mechanical defects. According to information furnished (April 2011) by the Director of Health Services (MI), the matter regarding the defects in the incinerators at Ganesh Das Hospital and Civil Hospital, Shillong was taken up with the supplying firm by the hospitals concerned. However, no such action was taken in respect of the incinerator at R.P. Chest Hospital.

➢ Out of the remaining 124 institutions, 75 institutions were located in three selected districts (Hospital: 11; Clinic: 3; Dispensary: 1; Research Centre: 1; CHC: 14; PHC: 42; Veterinary hospital: 3). According to the MBs of the three selected

districts, BMWs generated by the institutions under their jurisdiction were collected by them from the premises of these institutions.

Rule 14 of the BMW Rules (amended in 2000) provides that, without prejudice to Rule 5 *ibid*, the MBs shall be responsible for providing suitable common disposal/incineration sites for the BMWs generated in the area under their jurisdiction.

Out of six MBs, a common bio medical treatment facility was set up in October 2007 only by one MB, *viz.* Shillong MB at Mawiong. The common facility had only one incinerator, which was also non-functional since 2008 due to breakdown of exhaust fan. The Shillong MB had no other facilities such as an autoclave, microwave or a shredder to treat different categories of BMW. The Shillong MB was collecting all categories of BMW generated by 18 institutions (including three institutions having non-functional incinerator) and in the absence of the requisite facilities, was disposing the BMW irregularly in contravention of the BMW Rules. During physical verification of common facility carried out (June 2011) by Audit with the Executive Engineer, Shillong MB, it was observed that the defective incinerator was not yet operational and the BMW collected from various health institutions of Shillong were either dumped in a pit near the site of the incinerator or openly dumped near the pit. The pit was neither secured nor lined with impermeable material to prevent leaching into the ground water table.

Open dumping of bio-medical waste at Mawiong

In the three selected districts there were 59 institutions (CHC: 14; PHC: 42; Veterinary Hospital: 3) operating outside the territorial jurisdiction of the MBs. The manner of disposal of the BMW generated by them, in the absence of proper disposal facilities remained uncertain. Further, despite more than 10 years after the amendment of the BMW Rules in 2000, the other five[29] MBs had failed to set up/provide a common facility for disposal of BMW in their respective jurisdictions (June 2011). The MSPCB also failed to initiate penal action against the erring MBs in accordance with the provisions of the EP Act.

[29] (i) Tura Municipal Board, (ii) Jowai Municipal Board, (iii) Resubelpara Municipal Board, (iv) Williamnagar Municipal Board and (v) Baghmara Municipal Board

Thus, except for two institutions, BMWs generated by the remaining institutions situated in the three selected districts were not being disposed of as per the prescribed procedure, thereby posing a risk to public health and the environment.

The UAD stated (December 2011) that the non-functioning of incinerator in the common facility of Shillong MB since 2008 as indicated above is not correct. The reply was not acceptable because as per inspection of common facility carried out by the MSPCB in June 2010, the incinerator was not functioning since 2008.

1.1.14.4 Compliance aspects

The following requirements of the BMW Rules were not adhered to by the authorities concerned:

- According to Rule 11 of BMW Rules, every health institution was to maintain records relating to generation, collection, transportation, disposal, *etc*. of BMWs. But no such record was maintained by any of the 11 hospitals in three selected districts.
- According to Rule 10 of BMW Rules, every health institution was to submit to the MSPCB by 31 January every year an annual report regarding the categories and quantities of bio-medical wastes handled during the preceding year. The MSPCB was to compile this information in respect of all the institutions in the State and to submit the same to the CPCB by 31 March each year. During 2006-11, the MSPCB had submitted to the CPCB reports compiled in respect of 129 to 662 health institutions out of 701 institutions in the State. However, it was noticed that during 2006-11, annual reports in respect of only eight to 44 institutions were received by the MSPCB. The reports submitted to the CPCB for the years 2006-07 to 2010-11, thus, were not based on facts.
- To advise the Government and the MSPCB on matters relating to the implementation of BMW Rules, the State Government was to constitute an advisory committee by nominating experts from various Government departments including non-government organisations. However, no such committee was constituted even after 12 years of enforcement of BMW Rules (July 1998).

1.1.15 Hazardous Waste Management

Certain industries generate hazardous wastes that are highly toxic in nature and require adequate control and careful handling. Rule 5(2) of HW Rules stipulate that the hazardous wastes shall be collected, treated, stored and disposed of only in such facilities as may be authorised by the State Pollution Control Board for the purpose. As per Rule 18(1) of the HW Rules, the State Government, operator of a facility or any association of occupiers shall individually or jointly or severally be responsible for identification of sites for establishing such facility.

As of April 2007, the MSPCB identified 43 industrial units of the State as hazardous waste generating industries. According to the MSPCB, maximum waste generation was 7,159.37 MTA (MT per annum). Of this, 696.95 MTA was incinerable, 19.28 MTA was landfillable and remaining 6443.14 MTA was recyclable. But the facility for disposal of these wastes have not been established due to non-identification of the sites required for such facilities by the State Government or the industrial units, reasons for which, though called for from the PHE and Urban Affairs Departments in June 2011, had not been furnished. As a result, generators of these wastes were dumping the hazardous waste at their will without any monitoring from the MSPCB, thereby exposing the general populace to risk of contracting infectious and dangerous diseases.

The MSPCB stated (September-October 2011) that in the absence of disposal sites, landfillable and incinerable wastes were stored inside the factory premises of the concerned units.

The UAD stated (December 2011) that provision for hazardous waste had been made in the permanent landfill site at the New Township area for Shillong MB which would be made operational in 2013-14.

1.1.16 Plastic Waste Management

As per Rule 10 of the Plastic Rules (amended in 2003), no person was to manufacture carry bags or containers, with virgin/re-cycled plastics or both irrespective of the size or weight unless the occupier of the unit obtained registration from the MSPCB prior to the commencement of production.

As of June 2011, there were six plastic manufacturing units in the State, of which only three units were granted registration by the MSPCB. The remaining three units had not even applied for registration. The MSPCB also had not initiated any penal action against the defaulting units as required under clause 15 of EP Act.

Further, as per Rule 3 of the Plastic Rules, the Deputy Commissioner of the concerned district (municipal authorities as per Plastic Rules notified in February 2011) was to enforce the provisions of rules relating to the use, collection, segregation, transportation and disposal of plastics. Information regarding enforcement of these provisions by the DCs/municipal authorities, though called for from Government/DCs/MBs in July 2011, had not been furnished.

1.1.17 Impact of pollution on health profile of the State

Scrutiny of statistical data furnished (July 2011) by the Director of Health Services Meghalaya (DHS) for the years from 2006 to 2010 revealed that 2.27 lakh to 3.54 lakh patients treated in the State during the period suffered from diseases like bronchitis, acute upper respiratory infection, pulmonary tuberculosis, whooping cough, *etc.* caused by air pollution.

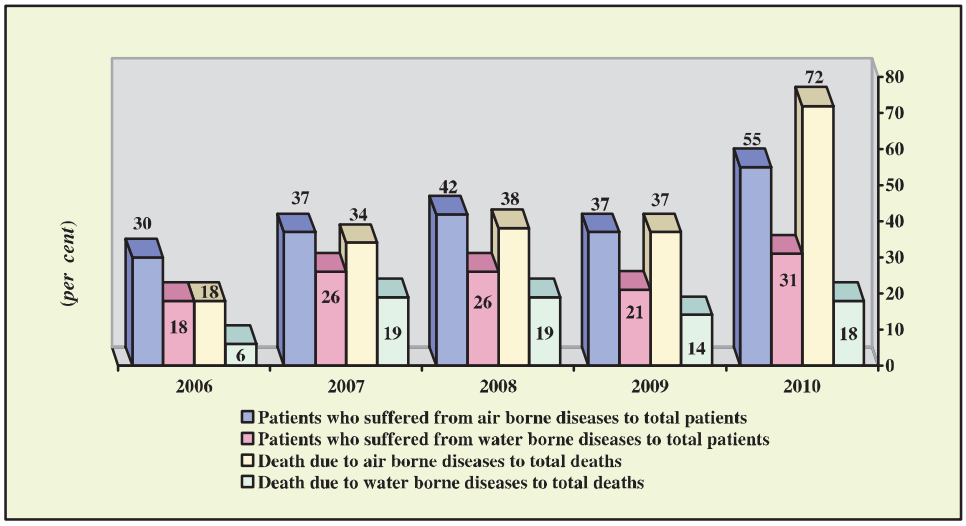
Similarly, the number of patients in the State suffering from water borne diseases like dysentery, cholera, *etc.* during 2006-10 was between 1.42 lakh and 2.03 lakh. Since these diseases are caused by water-borne bacteria, the basic causes of these diseases can be linked to pollution of drinking water by contamination from sewage and surface water polluted with human excreta and other impurities.

The position of patients who suffered from air and water borne diseases, death cases, *etc.* during 2006-10, percentage of patients who suffered from air/water borne diseases to total patients treated in the State during the period and percentage of death cases due to air/water borne diseases to total deaths are given in the table and chart below:

Table 1.13

Sl. No.	Particulars	Year				
		2006	2007	2008	2009	2010
1.	Number of patients of all categories treated in the State	10,43,815	6,19,051	5,46,730	8,83,405	6,45,967
2.	Number of patients suffered from -					
	- Air borne diseases	3,09,977	2,26,931	2,28,990	3,24,605	3,54,932
	- Water borne diseases	1,85,263	1,58,092	1,42,481	1,84,924	2,02,588
3.	Number of patients died due to -					
	- Air borne diseases	102	111	77	64	66
	- Water borne diseases	36	62	39	24	17
4.	Number of death cases from all causes reported in the State	581	327	202	173	92

Source: Information furnished by the DHS.



Analysis of the data given in the above table and chart revealed the following position:

- The number of all categories of patients treated in the State significantly fell by 38 *per cent* from 10.44 lakh in 2006 to 6.46 lakh in 2010. In contrast, the number of patients who suffered from air and water borne diseases during 2010 was an all time high during the period 2006-10.
- The number of patients who suffered from air and water borne disease as a percentage of the total number of patients of all categories treated in the State was 47.45 *per cent* in 2006 which had increased to 86.31 *per cent* in 2010.
- Over the five-year period 2006-10, the percentage of patients who suffered from air and water borne diseases increased by 14.50 and 9.35 *per cent* respectively.
- A mitigating factor was the decline in number of death cases due to air and water borne diseases in absolute terms to 66 and 17 in 2010 compared to 102 and 36 in 2006 respectively. However, when compared to the total number of death cases from all causes, the total number of deaths due to air and water borne diseases during 2010 was 90.21 *per cent* as against 23.75 *per cent* during 2006.

From the above statistics it is evident that air and water pollution in the State had increased significantly, which in turn seriously impacted on the health of the population. This situation was indicative of the failure of the various agencies of the State who were charged with the mandate of monitoring, controlling and management of air, water and waste pollution in Meghalaya.

1.1.18 Monitoring and Evaluation

An integral part of environmental study and pollution control is the continuous monitoring of surface water, air and soil to determine if any undesirable changes are occurring in the atmosphere due to presence of pollutants. Such monitoring would enable the MSPCB to plan control strategies in an effective and efficient manner. The Government or the MSPCB did not evolve any system for regular monitoring of air, water, soil or waste management in the absence of which, comprehensive control strategies for environmental protection remained undetermined. Further, inadequate manpower (54 vacant posts) with the MSPCB hampered the monitoring and enforcement of the provisions of various Acts and Rules relating to pollution control and waste management.

The EP Act has widened the scope of activities of the MSPCB making it the primary authority in the State to regulate the various activities causing air, water and waste pollution and to ensure a pollution free environment. For contravention of the various Acts and Rules made there-under, controlling and regulating pollution, appropriate penalties were to be levied by the MSPCB against the violators. As discussed in the foregoing paragraphs, there were violations by different agencies. In spite of being

armed with sufficient powers, the MSPCB had not initiated any penal action against the violators, except issue of closure notices to 24 industrial units, direction to five industrial units and show cause notices to five industrial units. The legislative Acts and Rules made thereunder have provided for stiff penalties. The legislative intent, however, was not translated into effective implementation.

1.1.19 Conclusion

Compliance of the laws regulating air and water pollution, MSW and BMW by the MSPCB, MBs and health institutions continued to be poor even after 27 years of constitution of the MSPCB. The present waste disposal arrangements do not follow the prescribed procedure for segregation of solid waste into biodegradable and non-bio-degradable waste which require different operations for treatment of the waste. The basic objective of scientific disposal of BMW for preventing environmental pollution remained largely unachieved owing to various operational deficiencies coupled with lax monitoring on the part of MSPCB. Landfills had not been established and all the MBs were dumping the solid waste in the open with consequent adverse results on human health and the environment. MSPCB, the regulatory authority to enforce implementation of these rules, had so far not penalised the defaulting health care establishments and municipal boards though the laws have provided for stiff penalties against the violators. The Acts and Rules for prevention and control of air and water pollution and waste management, thus, remained largely ineffective.

1.1.20 Recommendations

- **To ensure proper implementation of the air and water quality management programme and the process of disposal and treatment of various kinds of wastes, control, monitoring and co-ordination among various concerned state agencies should be strengthened.**
- **All Government health institutions should streamline their bio-medical waste management and disposal systems so as to act as role models for private health institutions.**
- **State Government should make waste segregation mandatory and the municipalities authorised to levy fines if segregated waste is not made available to them for collection.**
- **Landfill sites and waste processing and disposal facilities should be set up on priority basis to avoid open dumping of wastes.**
- **The MSPCB should take punitive action against persons/organisations contravening the provisions of the Acts and Rules.**

The matter was referred to the PHED in August 2011; reply had not been received (December 2011).