

## CHAPTER - III

### PERFORMANCE AUDIT

This chapter contains performance audit on Management of Bio-medical Waste in Maharashtra (3.1), MP/MLA/MLC Local Area Development Schemes (3.2), Management of Prisons in Maharashtra (3.3), Information Technology (IT) Audit of Lottery and Flat Allotment System in the Maharashtra Housing and Area Development Authority (3.4).

#### Environment Department

#### 3.1 Management of Bio-medical Waste in Maharashtra

##### Highlights

*Government of India framed the Bio-medical Waste (Management and Handling) Rules, 1998, under the provisions of the Environment (Protection) Act, 1986 which prescribed the procedures for treatment and disposal of bio-medical waste generated by health care establishments (HCEs) such as hospitals, nursing homes, blood banks and veterinary institutions. The enforcement of the Bio-medical Waste (Management and Handling) Rules in the State was found to be inadequate. A large number of HCEs had no facilities for disposal of bio-medical waste; veterinary institutions had not obtained authorisation for treatment of bio-medical waste as required; bio-medical waste was not segregated as per colour codes; plastic wastes of Bio-medical Waste were sold to unauthorised recyclers without disinfection and norms were not prescribed for inspection of health care establishments by the Maharashtra Pollution Control Board (MPCB). The Advisory Committee for advising the Government and the Maharashtra Pollution Control Board on the implementation of the BMW Rules, 1998 met only once during 2003-08.*

**The Maharashtra Pollution Control Board did not conduct any survey of those institutions which did not require authorisations but were required to treat bio-medical waste in the prescribed manner and the mode of treatment of bio-medical waste generated by them.**

*(Paragraph 3.1.6)*

**None of the 4,710 veterinary institutions under the jurisdiction of the Animal Husbandry Department of the State had obtained authorisations under the Bio-medical Waste (Management and Handling) Rules, 1998 from the MPCB.**

*(Paragraph 3.1.6)*

**As of March 2007, 8168 hospitals and nursing homes neither had an individual facility nor joined any common treatment facility for disposal of bio-medical waste.**

*(Paragraph 3.1.7)*

**The MPCB reported incomplete figures of bio-medical waste generated and disposed of to the Central Pollution Control Board (CPCB).**

*(Paragraph 3.1.8)*

**Operators of common treatment facilities in nine districts did not observe the operational parameters of time, temperature and pressure. As such, the proper treatment of bio-medical waste could not be ensured.**

*(Paragraph 3.1.11.2)*

**Deep burial pits were being filled fully instead of half with BMW, without the requisite layers of lime and soil, by 58 health care establishments having a common treatment facility in Kolhapur District and three other hospitals having individual treatment facilities.**

*(Paragraph 3.1.11.3)*

**Thirty one hospitals did not have effluent treatment facilities. The MPCB also did not check the standards of liquid waste before they were discharged into public drains.**

*(Paragraph 3.1.11.4)*

**In Mumbai, 4,575 MT of treated and shredded material, which was required to be disposed in landfills, was dumped along with untreated municipal solid waste.**

*(Paragraph 3.1.11.5)*

**The MPCB did not fix any norms for inspection and verification of HCEs and common treatment facility operators by its officers.**

*(Paragraph 3.1.16)*

**An Advisory Committee constituted in January 2003 met only once in September 2004. The Committee had not given any suggestions to the Government on management of Bio-medical Waste.**

*(Paragraph 3.1.17)*

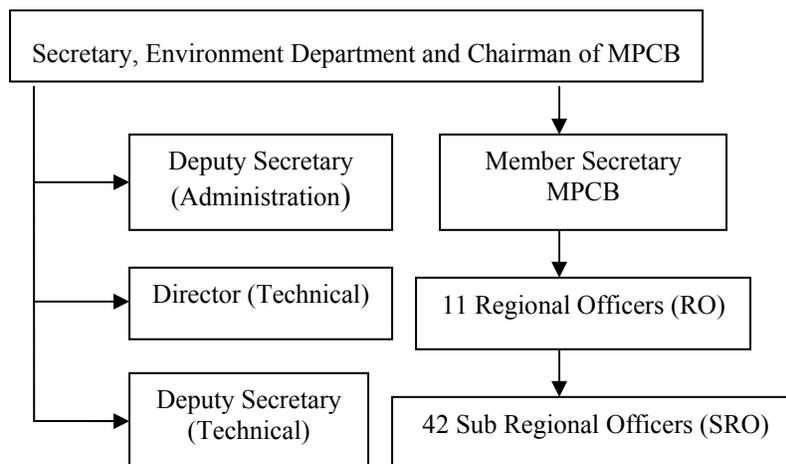
### **3.1.1 Introduction**

Wastes are threat to the environment and human health if not treated properly. Bio-medical Waste (BMW) is generated during diagnosis, treatment, immunisation of human beings and animals, related research activities etc. Health care establishments (HCEs) such as hospitals, nursing homes, pathological laboratories, blood banks etc. are the BMW generating establishments. Government of India framed the Bio-medical Waste (Management and Handling) Rules, 1998 (BMW Rules) under the provisions of the Environment (Protection) Act, 1986, wherein the procedure for treatment and disposal of BMW was prescribed. The Rules require the BMW generating establishments to ensure compliance of the provisions of the Rules

within the prescribed time schedule. As of March 2007, there were 17,720<sup>1</sup> HCEs in Maharashtra.

### 3.1.2 Organisational set-up

The Secretary, Environment Department, who also acts as the Chairman, MPCB is responsible for implementation of the BMW Rules in the State. The structure of the organisation is shown in the flow chart below:



While the Sub Regional Officer (SRO) is responsible for overall implementation of the Rules in each district, he reports the violations and progress to the Regional Officer (RO). The RO is responsible for the implementation of the Rules in the Region and he reports to the Member Secretary (MS), Maharashtra Pollution Control Board (MPCB).

### 3.1.3 Audit scope and methodology

A performance audit on the implementation of the BMW Rules in the State covering period from 2003-04 to 2007-08 was conducted between September 2007 and March 2008 by test-check of records in the Environment Department, the head office of MPCB and ROs and SROs of MPCB in nine<sup>2</sup> out of 35 districts in the State. Three hospitals and common bio-medical waste treatment facilities and individual incinerators in each district were test-checked, along with the representatives of MPCB. Eight out of the 35 districts were selected on the basis of the simple random sampling method. Mumbai District and 14 HCEs in Mumbai were selected based on high risk perceptions. Twelve common treatment facilities (CTFs) and three individual treatment facilities situated in the selected districts were also test-checked. The details of the sample are given in **Appendix 3.1 and 3.2**. The audit plan, the audit objectives and audit criteria were discussed with the Member Secretary, MPCB in an entry conference. The results of the performance audit were discussed with the Member Secretary, Maharashtra Pollution Control Board,

<sup>1</sup> As reported in MPCB's Annual Report submitted to Central Pollution Control Board

<sup>2</sup> Ahmednagar, Aurangabad, Chandrapur, Kolhapur, Mumbai, Nagpur, Nashik, Pune, and Wardha

Mumbai on 6 August 2008. The Government also concurred (August 2008) with the views of the Member Secretary. The views of the Member Secretary/Government have been incorporated at appropriate places.

### **3.1.4 Audit objectives**

The objectives of the performance audit were to examine whether the:

- identification of the BMW generating establishments and assessment of BMW by Government / MPCB was adequate;
- authorisations have been issued by MPCB in all cases, segregation and storage of BMW at source (HCEs), collection and transportation of BMW by operators<sup>3</sup>, were as per the relevant Act, Rules and Orders and were enforced effectively;
- BMW treatment facilities such as incinerators, autoclaves and deep burial pits were adequate and were functioning effectively;
- requirements of maintenance of records by the HCEs, individual facilities and common treatment facilities were complied with; and
- monitoring by MPCB and Government was effective.

### **3.1.5 Audit criteria**

The main criteria used for the performance audit were:

- Bio-medical Waste (Management and Handling) Rules, 1998 issued by Government of India.
- Rules, orders and instructions issued by the State Government as well as the MPCB from time to time.
- Guidelines for common treatment facilities prescribed by the Central Pollution Control Board.

## **Audit findings**

### **3.1.6 Identification of BMW generating establishments/ HCEs**

Health care establishments dealing with less than 1000 patients per month were not required to obtain authorisations, but were required to treat the BMW generated by them. It was, however, found that MPCB did not conduct any survey of such HCEs in the State and ascertain the mode of treatment of BMW generated by them. During the entry conference the MS, MPCB agreed to conduct such a survey.

During the exit conference the Member Secretary, stated (August 2008) that MPCB had obtained some information through Regional Officers and Medical Associations. The details were, however, not furnished.

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<sup>3</sup> Operator means a person who own or control or operates a facility for collection, reception, storage, transportation, treatment and disposal or any other form of handling of BMW

➤ **Position in veterinary institutions**

**None of the 4,710 veterinary institutions obtained authorisations for disposal of BMW**

There were 4,710 Government veterinary institutions in the State as of 31 March 2007, which were required to obtain authorisations from MPCB under the BMW Rules. The Commissioner, Animal Husbandry stated (May 2008) that none of them had obtained authorisation from MPCB under the BMW Rules. Department also did not have any information about the quantity of BMW generated and disposed of by these institutions.

During the exit conference the Member Secretary agreed (August 2008) to take up the matter with the Animal Husbandry Department.

**3.1.7 Authorisation**

According to Rule 8 (1) of the BMW Rules, every occupier<sup>4</sup> of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling BMW in any manner, except such occupier of clinics, dispensaries, pathological laboratories and blood banks providing treatment/services to less than 1000 patients per month, was to make an application in Form 1 of BMW Rules to the MPCB for grant of authorisation. The authorisation granted by MPCB specified the way in which BMW was to be disposed of. Authorisation was also required to be obtained by the operator of a common treatment facility, maintained through private parties. Authorisation fees were also payable by the occupiers and operators as per Rule 8(3).

The revenue realised by MPCB on account of authorisation fees for implementation of BMW Rules including renewal charges during the period covered by Audit was as follows:

(Rupees in lakh)

| Year           | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 |
|----------------|---------|---------|---------|---------|---------|
| <b>Revenue</b> | 51.91   | 73.86   | 43.90   | 69.90   | 119.00  |

During the exit conference the Member Secretary stated (August 2008) that MPCB had incurred expenditure on issuing public notices, awareness cum training, etc. Details of expenditure were, however, not furnished to audit.

➤ **Obtaining of authorisations by HCEs in the State**

**8,168 hospitals and nursing homes had no treatment facilities for BMW**

As on March 2007, out of 17,720 HCEs in the State only 8155 (46 per cent) HCEs had authorisations, 8,520 were attached to common treatment facilities for disposal of BMW, while 1,032 had their own treatment and disposal facilities. Thus, 8,168 hospitals and nursing homes (46 per cent) neither had an individual facility nor joined a common facility for disposal of BMW. Therefore, it could not be ascertained in audit as to how the BMW generated

<sup>4</sup> Occupier in relation to any institution generating BMW includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratories, blood banks by whatever name called, and means a person who has control over that institution/premises

by these hospitals and nursing homes was disposed of and whether it was getting mixed with municipal solid waste (MSW).

➤ Medical colleges and Primary Health Centres (PHCs) had to obtain authorisation for disposal of BMW. It was observed that in Kolhapur District, all nine<sup>5</sup> medical colleges and all 73 PHCs had not applied for authorisation. The RO stated (December 2007) that necessary notices would be issued.

**In Mumbai 901 hospitals and nursing homes did not have authorisation for disposal of BMW**

In Mumbai, there were 2,255<sup>6</sup> hospitals and nursing homes registered with the Municipal Corporation (June 2008). However, only 1,354 hospitals and nursing homes including Government and Municipal hospitals had been given authorisation by MPCB for disposal of BMW as of June 2008. Thus, 901 hospitals and nursing homes did not have authorisation for disposal of BMW. Therefore, it could not be ascertained in audit as to how BMW generated by the remaining 901 HCEs was treated by these HCEs.

The MS, MPCB stated (June 2008) that the small and medium scale HCEs were not economically capable of providing full-fledged treatment and disposal arrangements like incineration and deep burial in-house. He also stated that prosecution methods would be taken against the hospitals which had not applied for authorisation and had not joined CTFs.

During the exit conference, the Member Secretary stated (August 2008) that directives were issued to Public Health Department and Local Bodies to ensure that all HCEs apply for authorisations under BMW Rules.

### **3.1.8 Estimation and generation of bio-medical waste**

BMW Rules stipulated that every occupier, even if he does not require authorisation, was to submit an annual report to the MPCB by 31 January every year regarding the details of BMW generated and disposed of by him. MPCB was to send this information in respect of every occupier to the Central Pollution Control Board (CPCB) by 31 March every year. Information prior to 2004-05 regarding BMW generated and disposed of was not available with the MPCB and similar information for the year 2007-08 has not been prepared by the MPCB (August 2008). As per the information furnished by MPCB to CPCB, the quantities of BMW generated and disposed of during 2004-05 to 2006-07 were as under:

(Quantity in metric tonnes)

| <b>Year</b> | <b>No of HCEs</b> | <b>Quantity generated</b> | <b>Quantity treated</b> | <b>Quantity remained untreated</b> |
|-------------|-------------------|---------------------------|-------------------------|------------------------------------|
| 2004-05     | 11505             | 9245.45                   | 9245.45                 | --                                 |
| 2005-06     | 15223             | 27771.75                  | 27771.75                | --                                 |
| 2006-07     | 17720             | 18969.42                  | 17985.34                | 984.08                             |

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<sup>5</sup> Chatrapati Shahu Medical College, D Y Patil Medical College, Medical Colleges at Kawala Naka, Darara Chowk, Gadinglaj, Jaysingpur, Rankala, Vadgaon Peth and Warna Nagar

<sup>6</sup> As per the details furnished by BMC

**MPCB sent incomplete reports to the CPCB regarding the quantities of BMW generated and treated**

Scrutiny of the returns, however, revealed that category-wise BMW generated and treated was not indicated in the reports. Further, information regarding generation and treatment of BMW in Mumbai city during the above period was not included in the reports sent to CPCB. It was also noticed that the information on quantities of BMW generated and treated were compiled on the basis of the reports furnished by the ROs instead of obtaining the same from the occupiers. The ROs had furnished the quantities of BMW treated only by the CTF operators. Since there were no CTFs in 12 districts in the State, quantities/treatment of BMW was also not reported in respect of those districts. Thus, relying only on data of generation and treatment of BMW in CTFs and non-inclusion of data from 12 districts not having any CTF, resulted in inaccurate reporting of generation and treatment of BMW to CPCB.

The Member Secretary accepted (June 2008) the position and assured that the annual reports (2006-07) would be amended and resubmitted to CPCB. During the exit conference the Member Secretary stated that category-wise information would be submitted from 2007-08 onwards. Efforts would also be made to collect the information from HCEs which did not join the common facilities and did not have individual facilities.

### 3.1.9 Collection and segregation of bio-medical waste

BMW was to be segregated into appropriate colour coded containers/bags at the point of generation in the HCEs, in accordance with a colour code scheme prior to its transportation, treatment, and disposal as shown below:

| Colour code             | Waste category   | Mode of treatment   |
|-------------------------|--|---|
| Yellow                  | human anatomical waste, animal waste, micro- biological and bio-technological waste, solid waste contaminated with blood etc | incineration/ deep burial   |
| Red                     | disinfected containers and solid waste such as dressings soiled plaster casts, beddings etc                                  | autoclaving/ micro- wave/ chemical treatment                          |
| Blue/ White translucent | needles, syringes, scalpels, blades, glass, tubes, catheters etc   | autoclave/ micro- wave/ chemical treatment and destruction/ shredding |
| Black                   | discarded medicines and cytotoxic drugs, incineration ash and chemical waste   | disposal in secured landfill  |

**Eleven out of 38 test-checked HCEs did not segregate BMW as per prescribed colour codes**

The segregated BMW was then sent to common treatment facilities, where treatment was to be given according to the colours of the bags. Joint site visits of 38 test-checked HCEs during September 2007 to June 2008 by Audit with MPCB officials revealed that in 11<sup>7</sup> HCEs, BMW was not being segregated as per colour codes in the wards of the HCEs. The non-segregation of BMW into

<sup>7</sup> Ahmednagar District: Saibaba Hospital; Aurangabad District: Dhoot Hospital and Hegdewar Hospital; Kolhapur District: Adhar Hospital and Chhatrapati Prameela Raje Hospital; Mumbai District: Petit Hospital for Animals, Tata Memorial Centre; Nagpur District: Indira Gandhi Medical College Hospital and Government Medical College; Nashik District: ESIS Hospital; Pune: Sasoon Hospital.

appropriate colour codes would adversely impact the transportation, treatment and disposal. The ROs/SROs had accepted the facts and agreed (September 2007 to June 2008) to issue notices to the HCEs. The Director of Health Services, Mumbai admitted (July 2008) that wrong treatment could also result in emission of toxic gases such as dioxins and furans, which were carcinogenic.

During the exit conference, the Member Secretary stated (August 2008) that the current status of these was being obtained from the ROs concerned.

### **3.1.10 Storage and transportation of bio-medical waste**

According to the provisions contained in Rule 6 (5) of the BMW Rules, untreated BMW was not to be stored beyond a period of 48 hours in the HCEs, provided that if for any reason it became necessary to store the waste beyond such period, an authorised person was to take permission from MPCB and ensure that such storage did not adversely affect human health and the environment.

It was, however, noticed during joint site visits (September 2007 and June 2008) in three hospitals (Sarvodaya Hospital- Yellow category BMW and Bhabha Hospital Mumbai- Red category BMW and Adhar Hospital, Kolhapur -Red category BMW) that untreated BMW was kept for periods ranging from two to 15 days beyond the stipulated period of 48 hours.

Further, the untreated bio-medical waste was to be transported only in such vehicles which were authorised for the purpose by MPCB. It was, however, noticed (December 2007) that in Chandrapur District, the CTF operator was transporting the BMW collected from HCEs during 2003-2008 in a cycle rickshaw, which was not authorised by MPCB.

The Member Secretary stated (June 2008) that the operator had been directed (May 2008) to stop transporting BMW in cycle-rickshaws.

### **3.1.11 Disposal of bio-medical waste**

According to Schedule I of the BMW Rules, human anatomical waste and animal waste, microbiological and biotechnological waste, cytotoxic and discarded drugs generated in towns and cities having populations of five lakh and above were to be disposed of through incineration while in towns with population below five lakh, they were to be disposed of through deep burial. Other types of wastes such as intravenous fluid bottles and sharps were to be disinfected, autoclaved/micro-waved, shredded and disposed of in municipal landfills or recycled. Liquid waste generated from the HCEs was to be disinfected or treated in effluent treatment plants before discharging it into municipal drains. Disposal facilities could be set up in the form of individual or common treatment facilities.

Joint physical verification of sites (September 2007 to July 2008) revealed that in two hospitals (Bhabha Hospital and Sarvodaya Hospital) in Mumbai out of 38 test-checked in the State, bottles, intravenous fluid bottles, needles, syringes etc., were not being disposed of in the prescribed manner. These were

not disinfected with 1 *per cent* hypochlorite solution as prescribed. In fact, on the date of visit ( 4 March 2008), there was no stock of the solution in the Sarvodaya hospital. This not only resulted in violation of the BMW Rules but also exposed the waste handlers to the infected material. MPCB accepted the position and issued show cause notices to these hospitals.



Glass bottles kept without disinfection at Bhabha hospital (4 March 2008)



Used needles/ sharps kept without disinfection at Sarvodaya Hospital (4 March 2008)

### 3.1.11.1 Operational standards for incinerators

According to Schedules V (A) and (B) of the BMW Rules, while operating incinerators, the temperature of the primary chamber was to be maintained at  $800 \pm 50$  °C and the secondary chamber residence time was to be kept at  $1050 \pm 50$  °C for at least one second, with a minimum of 3 *per cent* oxygen in the gases emitted from the chimney so as to minimise the release of suspended particulate matters (SPM) in the atmosphere. If the required temperatures were not maintained during incineration, toxic pollutants like dioxins, furans, heavy metals would be emitted which could be carcinogenic.

During the joint physical verification (September 2007), it was noticed that MPCB had given authorisation to Dr DY Patil Medical College and Hospital, Kolhapur for operation of a single chamber incinerator on 16 May 2002, in spite of the requirement of a double chamber incinerator (primary and secondary). It was also observed that the RO, Kolhapur had not checked the gas emitted from the chimney, to monitor the quality of emissions from the single chamber.

During the exit conference the Member Secretary agreed (August 2008) to identify the incinerators with single chamber.

➤ Joint site visits were conducted on 11 December, 2007 with MPCB team to two out of the 15 incinerator plants test-checked. At Indira Gandhi Medical College, Nagpur and Government Medical College, Nagpur, it was noticed that the temperatures in both the primary and secondary chambers of the incinerators were between 700°C and 800 °C, on the day of visit. The RO, Nagpur agreed (December 2007) to issue notices to the medical college authorities.

During the exit conference, the Member Secretary agreed (August 2008) to obtain the current position for taking necessary action.

**Monitoring of the prescribed parameters of incinerators was not done by the five test-checked Regional Offices**

➤ According to the standards for incinerators prescribed in the BMW Rules, five<sup>8</sup> parameters were required to be monitored by the ROs/SROs so as to ensure that pollution limits were maintained. Scrutiny of monitoring of these parameters involving 15 common and individual facilities done by five<sup>9</sup> ROs of MPCB revealed that all the prescribed parameters were not being monitored. Hence, the actual position of emissions of nitrogen oxide, hydrochloric acid released into air and volatile organic compounds in ash could not be checked by MPCB and verified in Audit.

During the exit conference, the Member Secretary stated (August 2008) that necessary instructions would be issued to all the ROs to monitor all the prescribed parameters.

➤ Scrutiny of the stack monitoring reports of the nine test-checked ROs and SROs further revealed that though the permissible concentrations of SPM and hydro-chloric acid of incinerators were 150 mg/ Nm<sup>3</sup> and 50 mg/m<sup>3</sup> respectively, the actual concentration of SPM ranged from 167 mg/ Nm<sup>3</sup> to 1637 mg/Nm<sup>3</sup> at these places (maximum at CTF at Chandrapur in February 2007). The concentration of hydro-chloric acid ranged from 65 mg/m<sup>3</sup> to 1019 mg/m<sup>3</sup> (maximum at Jawarharlal Medical College, Dhule in January 2007). The MS, MPCB stated (June 2008) that notices would be issued and bank guarantees would be obtained from the operators of common and individual treatment facilities so that they could be invoked in case the limits of pollution were not observed by the operators.

However, it is seen that the BMW (M&H) Rules, 1998 do not provide for any such bank guarantee or monetary penalty to be imposed in such situations. In fact, as per Rules 7(6) and 7(8), the MPCB can only cancel or suspend an authorisation of an occupier/operator for failure to comply with any provisions of these Rules.

Though there was a CTF in Sangli-Miraj Municipal Corporation area, Vasantdada Patil Government Hospital, Sangli, since December 2006 when its incinerator was not in working condition, neither handed over the BMW generated by it to the CTF nor treated the waste as per the provisions of the BMW Rules. The plastic waste of BMW was being sold to the CTF. The SRO noted (9 October 2007) that BMW generated by the hospital was being burnt in an open pit in the hospital premises which resulted in emission of carcinogenic gases into air. An estimated quantity of 40.8 MT<sup>10</sup> was thus burned in an open pit from December 2006 to April 2008 in contravention to the Rules. The SRO agreed (December 2007) to issue a notice to the hospital.

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<sup>8</sup> SPM, NoX, H Cl, Stack (incinerator's chimney) height and Volatile organic compounds in incineration ash

<sup>9</sup> Aurangabd, Kolhapur, Nashik, Nagpur, and Pune

<sup>10</sup> Worked out on the basis of the approximate quantities indicated by the hospital

Six common and individual treatment facilities had not provided ramps for washing the vehicles carrying bio-medical waste

➤ **Providing of vehicle/container washing facilities**

The urban local bodies (ULBs) are providing sites for CTFs and thereafter, the operators create infrastructure with an agreement with the ULBs and then the MPCB issues authorisations to the operators on payment of prescribed fees. Vehicle washing facilities were also required to be provided at the premises of BMW waste treatment facilities by the operators. Every time a vehicle was unloaded of BMW, the vehicle waste containers were required to be washed and disinfected on an impermeable surface and the liquid effluent treated in an effluent treatment plant (ETP). Joint physical verification of sites (September 2007 to February 2008) revealed that in six<sup>11</sup> out of 15 common treatment facilities and individual treatment facilities, ramps (i.e. impermeable surfaces) were not provided. The contaminated effluents can seep into the soil and pollute the ground water.

During the exit conference, the Member Secretary stated (August 2008) that necessary condition regarding providing vehicle washing facility would be incorporated in the authorisation.

**3.1.11.2 Autoclave/microwave and shredding of non-incinerable BMW**

➤ **Installation of autoclaves**

According to Schedule I of the BMW Rules, micro-biological and biotechnology waste, waste sharps, solid waste were required to be treated through autoclave<sup>12</sup>. Further, autoclaved BMW in the form of plastic and waste sharps is required to be shredded and disposed of on the landfills.

➤ Joint physical verification of site (December 2007) revealed that in Chandrapur, autoclave had not been installed resulting in disposal of plastic material including all type of BMW through incineration, without disinfection by autoclaving. The SRO, Chandrapur accepted (December 2007) the facts and agreed to issue a notice to the operator.

➤ Every autoclave was required to have a graphic or computer recording device which would automatically and continuously monitor and record the time, date, load identification number and operating parameters throughout the entire autoclave process. BMW was not to be considered as properly treated unless the required time, temperature and pressure were reached during the autoclave process.

Joint site visits (October 2007 to February 2008) to the common treatment facilities in nine<sup>13</sup> districts, revealed that this recording device was not provided by the common treatment facility operators. In its absence, it could not be ascertained whether the BMW was being properly treated during the

Operational parameters of time, temperature and pressure were not observed in the CTFs in nine districts

<sup>11</sup> Aurangabad, Kolhapur and Pune common treatment facilities and individual treatment facilities at IGMC, GMC and Super Specialties Hospital in Nagpur

<sup>12</sup> Autoclave is an equipment wherein micro-biological and biotechnology waste, waste sharps, solid waste is disinfected by way of maintaining prescribed pressure and temperature

<sup>13</sup> Ahmednagar, Aurangabad, Chandrapur, Ichalkaranji, Kolhapur, Mumbai, Nagpur, Nashik and Pune

autoclave process. This aspect was also not pointed out by the ROs of the MPCB though they made periodic visits to the common facilities. It was noticed that the operator of the common treatment facility at Navi Mumbai was however, following the prescribed procedure for recording of parameters.

During the exit conference, the Member Secretary stated (August 2008) that it was decided to issue instructions to all ROs to review the position and thereafter action would be initiated.

➤ **Procurement of autoclaves and shredders in medical colleges**

**Three medical colleges had not utilised Central funds of Rs 1.39 crore for autoclaves and shredders**

The Ministry of Health and Family Welfare (GOI) released (March 2004) Central assistance of Rs 1.46 crore to three<sup>14</sup> Government medical colleges for purchase of autoclaves and shredders to each of the hospitals as they did not have any such equipment and for imparting training to autoclave operators. It was, however, noticed that the colleges had kept the funds in Personal Ledger Accounts (PLA). These hospitals were among the 19 hospitals, which were selling plastic waste to private persons.

These colleges had spent Rs 12 lakh<sup>15</sup> on training of their staff on management of waste though the release orders of GOI did not stipulate such training. The Director of Medical Education and Research, Mumbai, while accepting the audit observation stated that the machinery (autoclaves and shredders) had not been purchased even as of June 2008, as the Purchase Committee at State Government level did not select the agency for procurement of the machinery.

Non-utilisation of funds (Rs 1.34 crore) resulted in blocking of Government of India funds besides improper disposal of infected BMW plastic material, endangering public health. The GOI also failed in monitoring the utilisation of funds released by them.

➤ **Disposal of plastic waste by hospitals**

Plastic bottles used for intravenous fluid were to be disinfected first through autoclave/microwave. Thereafter, they were to be shredded and only then used for plastic recycling by recyclers, approved by MPCB. It was, however, noticed that 17<sup>16</sup> out of 38 test-checked hospitals disposed of plastic waste to private parties through auction sales, without disinfection for recycling of plastic material. The ROs and SROs (September 2007 to June 2008) promised to issue notices to the concerned hospitals.

During the exit conference, the Member Secretary stated (August 2008) that instructions would be issued to all the ROs to ascertain whether HCEs were

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<sup>14</sup> Beheramji Jijibhai Medical College, Pune, Grant Medical College, Mumbai and Government Medical College, Nagpur

<sup>15</sup> (i) Government Medical College, Nagpur Rs 4.50 lakh, (ii) Beheramji Jijibhai Medical College, Pune, Rs 0.50 lakh and (iii) Grant Medical College, Mumbai Rs 7.00 lakh

<sup>16</sup> Ahmednagar District: Civil Hospital; Aurangabad District: Ghati Hospital, Hegdewar Hospital; Chandrapur District: Civil Hospital; Mumbai District: Bhabha Hospital, KEM Hospital, St. George Hospital, ESIS Hospital, Mahatma Gandhi Memorial Hospital and R N Kuper Hospital; Nagpur District: IGMC, GMC, Super Specialties Hospital; Nashik District: ESIS Hospital; Wardha District: Civil Hospital; Pune district: K E M Hospital and Sasoon Hospital

sending plastic waste to CTFs for treatment and shredded material was sold to authorised plastic recyclers.

### 3.1.11.3 Disposal of bio-medical waste by way of deep burial

As per Schedule I of the BMW Rules, 1998, human anatomical waste and animal waste is to be either incinerated or buried deep in towns with population less than five lakh and in the rural areas. Schedule V of the BMW Rules, lays down the standards for deep burial. A pit or trench of about two meters depth was required to be dug. The deep burial pit was to be impermeable with masonry work, so that fluids do not percolate under ground. It was to be half filled with BMW, and then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil. Scrutiny of deep burials revealed the following:

➤ There was no provision in the Rules as to how many days it was to be kept after the pit was closed and where the decomposed material was to be disposed of. Though the authorisations given by MPCB specified the standards and mode of disposal of BMW in respect of autoclaving and incineration, it did not specify the ways in which the buried material was to be disposed of.

The Director of Health Services, Mumbai, stated that the bio-degraded BMW can be used as manure after two months for the hospital garden and the reopened pits can be reused after one month. However, the Director could not cite any rules or provisions in the Act/Rules for the same.

➤ During joint site visits (September 2007 to December 2007) along with the MPCB team, it was noticed that the deep burial pits were filled fully with BMW without the requisite layers of lime and soil by 58 HCEs which had a common deep burial treatment facility at Gadhinglaj, Kolhapur District and by the Sub District Hospital, Kamptee, District General Hospital, Wardha and the Civil Hospital Chandrapur which had individual treatment facilities. In Mahatma Gandhi Institute of Medical Sciences, Sewagram, Wardha, 60 open *kaccha* pits were dug without any masonry work, of which 30 pits were filled with BMW up to the rim, during the period covered by Audit. As the pits were *kaccha* and lime was not filled in at the half-filled stage, there was danger of pollution to ground water through percolation/run-of of surface water and ground water.

➤ Deep burial facilities were admissible only in towns and cities having population of less than five lakh. It was, however, noticed that the Mahatma Gandhi Memorial Hospital and Medical College, Aurangabad and Chhatrapati Shahu Medical College, Kolhapur were burying human anatomical waste in the college campuses itself, without the authorisation of MPCB. The RO accepted (June 2008) the facts and agreed to issue notices to the hospitals.

Government agreed (August 2008) to obtain present status from the respective ROs.

➤ It was also noticed during joint visits that the hospital authorities of the Civil Hospital, Wardha had reopened a fully filled deep burial pit and shifted the BMW to municipal solid waste (MSW) dumping ground of the Wardha Municipal Council. No replies were received from the MS regarding the above issues.

During the exit conference, the Member Secretary stated (August 2008) that there was no provision in the Rules regarding reclamation and reopening of the deep burial pits filled with BMW. It was also stated that an expert committee would be formed to look into this aspect and send their opinion to Central Pollution Control Board.

#### **3.1.11.4 Treatment of liquid waste**

According to Schedule V of the BMW Rules, the effluents generated from hospitals should conform to the specified standards of pH, suspended solids, oil and grease, Bio Chemical Oxygen Demand, Chemical Oxygen Demand and Bio-assay test. These standards were applicable to those hospitals which were either not connected to public sewers or connected with sewers without terminal sewage treatment plants.

Scrutiny of the records and joint site visits (October 2007 to June 2008) with the field staff of the MPCB revealed that in 31<sup>17</sup> out of the 38 test-checked hospitals, effluent treatment plants (ETPs) had not been installed for treatment of liquid waste and samples of liquid waste were not taken by the officials of the MPCB for test in laboratory and to ensure the prescribed limits.

The Member Secretary stated (August 2008) that initially, in respect of major hospitals, waste sample would be collected.

#### **3.1.11.5 Mixing of BMW with MSW**

According to provisions contained in Rule 6 (1) of the BMW Rules, BMW was not to be mixed with other wastes. Further, according to Schedule I of the BMW Rules, incineration ash and shredded waste were to be disposed of in municipal landfills. Scrutiny of the records of MPCB revealed that as there were delays ranging from 10 to 57 months<sup>18</sup> in setting up of common treatment facilities, BMW of 3388 metric tonnes (**Appendix 3.3**) generated (estimated quantity) during April 2003 to September 2007 was not treated and was mixed with municipal solid waste (MSW) in 22 districts. CTFs had also not been set up in 12<sup>19</sup> other districts. MPCB has no information regarding BMW generated and mixed with MSW in these districts (July 2008).

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<sup>17</sup> Terminal treatment facilities were available only in Nashik (three hospitals) and Yashwantrao Chavan Memorial Hospital, Pimpri-Chinchwad. Individual ETPs were available in three test checked HCEs in Aurangabad.

<sup>18</sup> Calculated from 1 January 2003; as per the Rules all facilities for disposal of BMW were to be constructed by 31 December 2002

<sup>19</sup> Akola, Bhandara, Dhule, Gadchiroli, Hingoli, Nandurbar, Parbhani, Ratnagiri, Sindhdurg, Yavatmal, Wardha and Washim

**Thirty one out of 38 test-checked hospitals had not set up effluent treatment plants and samples of liquid waste were not checked by MPCB**

The Member Secretary stated (August 2008) that the responsibility of providing suitable site for CTFs within their jurisdiction was with the respective ULBs.

➤ Scrutiny of the records showed that out of the three test-checked hospitals in Kolhapur District, Chhatrapati Pramila Raje Hospital, Kolhapur, a 665 bedded hospital, was mixing sharps, needles etc with municipal solid waste (MSW) though a CTF existed at the district headquarters. It was also observed that Kolhapur Municipal Corporation (KMC) had refused (October 2006) to lift the solid waste as it contained untreated BMW. The KMC did not report the same to the MPCB.

The Member Secretary stated (August 2008) that current status of the hospital would be called for.

➤ In Mumbai, shredded plastic BMW weighing 4,575 MT was disposed of in an open dumping ground at Deonar, Mumbai, along with MSW, though required to be disposed of in municipal landfills<sup>20</sup>, during 2003-08. In Mumbai there is no secured landfill authorised by the MPCB.

For want of secured landfills in Mumbai, shredded BMW was disposed of in open ground

During the exit conference, the Member Secretary stated (August 2008) that it was the responsibility of Municipal Corporation of Greater Mumbai to provide suitable site for MSW treatment and landfill.

### 3.1.12 Personal protective gear for waste handlers

As per the CPCB guidelines for CTFs, personal protective gear was necessary to reduce the risks faced by the waste handlers. Appropriate specialised clothing was also required to protect them from blood and potentially infectious material. The Government of India, Ministry of Labour had stipulated (2004) the use of gloves, masks, gum boots and aprons for such waste handlers.

It was, however, noticed during the joint physical verification (September 2007 to June 2008) that the waste handlers were not using gloves in any of the hospitals (except Bombay Hospital, Mumbai). Further, aprons, eye shields and proper footwear were not being used in all the test-checked hospitals (except Bombay Hospital, Mumbai) and in the common treatment facilities. No guidelines had been issued in this regard either by the State Government or by MPCB. The Director of Health Services, Mumbai stated (April 2008) that instructions had been issued in this matter to the hospitals under his control for use of protective gear.

During the exit conference, the Member Secretary agreed (August 2008) to incorporate a condition to this effect in the authorisation.

### 3.1.13 Selection of location for disposal of bio-medical waste

As per CPCB's guidelines, common treatment facilities were required to be located at places which were reasonably far away from residential and

<sup>20</sup> Disposal of residual solid waste on land in a facility designed with protective measures against pollution of ground water, surface water, erosion etc.

sensitive areas so that they had minimal impact on these areas. Site visits with MPCB team revealed that out of the 12 CTFs visited, the CTF at Yeshwantrao Chavan Hospital, Pimpri-Chinchwad, Pune was situated in the hospital premises itself.

During the exit conference, the Member Secretary stated (August 2008) that a suitable site had been provided by the Pimpri-Chinchwad Municipal Corporation.

### **3.1.14 Deep burial facilities in inhabited areas**

According to Schedule V of the BMW Rules, deep burial pits were required to be kept away from human habitation in order to rule out contamination of surface or ground water.

However, the Sub-District Hospital at Kamptee, Nagpur, the District General Hospital, Mahatma Gandhi Institute of Medical Sciences, Wardha and the Civil Hospital, Chandrapur were permitted by the MPCB to dispose of BMW in inhabited areas. Ground water and surface water samples were also not taken by MPCB.

During the exit conference, the Member Secretary stated (August 2008) that the individual deep burial facilities were required to be in the campus of hospital area so as to avoid transportation of BMW for long distance and the standards for deep burial take care of the contamination of ground water.

Reply of the Member Secretary was not tenable as the standards prescribed for deep burial i.e. the pit was to be half filled with BMW etc were not followed by the above four hospitals. Therefore, the possibility of contamination of ground water and surface water could not be ruled out.

### **3.1.15 Monitoring**

According to Rule 11(1) of the BMW Rules, all authorised persons were required to maintain records relating to the generation, collection, reception, storage, transportation, treatment, disposal of BMW in accordance with these Rules. It was, however, noticed that 22<sup>21</sup> out of the 38 test-checked hospitals had not kept records.

➤ As per the guidelines for setting up of common treatment facilities, the operators were to keep records of daily category-wise collection from individual generators and submit a weekly list for taking action against the generators who had not sent the BMW to the facility. Moreover, this would also help the operator to know which HCE was properly segregating the BMW as per Rules.

**Twenty two out of 38 test-checked hospitals did not maintain records of generated and treated BMW**

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<sup>21</sup> Ahmednagar: Saibaba, Aurangabad: Kamalnayan Bajaj, Kolhapur: Adhar, Dr. D Y Patil, Mumbai: J J, Sarvodaya, Jaslok, KEM, Petit, ESIS Hospital, City Hospital, Mahatma Gandhi Memorial Hospital, R N Cooper Hospital, Sabnis Hospital Pune: KEM, Sasoon, Nagpur: IGMC, GMC, Wardha: District General Hospital, Nashik: Civil Hospital, ESIS, HAL

It was, however, noticed that nine<sup>22</sup> out of 15 common and individual treatment facilities test-checked had not kept records showing category-wise quantities of BMW received from each occupier. The registers maintained were showing only the total BMW disposed during the day. Thus, the quantity generated by each HCE and sent for disposal was not available with the CTFs. These incomplete details were subsequently reported by the MPCB to CPCB. The concerned ROs agreed to issue notices to the hospitals and common treatment facility operators.

During the exit conference, the Member Secretary stated (August 2008) that instructions were being issued to the RO/ SRO and current status would be obtained.

### 3.1.16 Inspection by the ROs

According to Rule 11 of the BMW Rules, all records maintained by the HCEs under the Rule were to be subject to inspection and verification by MPCB at any time. The MPCB had however not fixed any norms for conducting inspections of HCEs and common treatment facilities. In the absence of any such norms, shortfall in conducting inspection could not be ascertained in audit. The region-wise position of visits as stated by the ROs was as under:

**Norms for conducting of inspections of health care establishments were not prescribed by MPCB**

| Region     | ROs' remarks   |
|------------|--|
| Aurangabad | RO stated (November 2007) that major hospitals were monitored quarterly and hospitals were visited at the time of renewal of authorisation.  |
| Kolhapur   | RO, stated (October 2007) that due to paucity of staff, hospitals could not be visited.  |
| Mumbai     | RO stated (February 2008) that major hospitals were visited once in a month and other hospitals as per convenience   |
| Nashik     | RO stated (February 2008) that hospitals with more than 100 beds were inspected once in six months and the remaining hospitals were inspected depending upon the availability of manpower. |
| Nagpur     | RO stated (December 2007) that due to paucity of staff, all the major hospitals were inspected more than twice a year and others could not be visited.                                     |
| Pune       | RO stated (October 2007) that inspections could not be carried out due to insufficient staff.  |

Lack of proper inspections resulted in non-observance of the provisions of the Rules by the hospitals and CTFs as brought out in the preceding paragraphs.

The MS stated (June 2008) that the lack of inspections was due to shortage of staff. A proposal for creation of 626 posts (including senior level post) had been approved (April 2008) by MPCB and the same would be sent to the State Government for sanction.

<sup>22</sup> Common treatment facilities: Aurangabad, Chadrapur, Nagpur, Nashik, Mumbai, Individual facilities in Aurangabad District: Ghati Hospital and Nagpur District: IGMC, GMC, Super Specialities

During the exit conference, the Member Secretary stated (August 2008) that in view of inadequate manpower, the issue of uniform frequency of visits to the HCE's would be examined. Proposal for additional manpower was also submitted to the Government.

### **3.1.17 Advisory Committee**

According to Rule 9 of the BMW Rules, the State Government was required to constitute an Advisory Committee to advise the State Government and MPCB on matters relating to the implementation of BMW Rules. As per the Government Resolution (January 2003), the Committee was to meet at least twice a year.

The Committee was to be constituted from experts in various fields. The Committee constituted in January 2003 (after four years of introduction of Rules) met only once in September 2004. The implementation of various suggestions of the Committee like formation of advisory committee at regional level, legal action against defaulting agencies, arranging workshops was not on record. A second committee formed on 30 December 2006 i.e., after almost two years of expiry of the term of first committee (22 January 2005) has also not met as of July 2008. As a result the State was deprived of the advantage of advice on implementation of the Rules from experts in the field.

### **3.1.18 Supervision by the State Government**

According to Rule 7(3) of the BMW Rules, MPCB was to function under the supervision and control of the State Government. Scrutiny of the records of MPCB and the Environment Department, however, revealed that neither MPCB sent any returns regarding generation, storage, transportation, treatment of BMW to the Government nor the Government insisted for the same. MPCB had also not prescribed any periodical returns to be sent by the ROs and SROs regarding achievement of operating standards, emission standards, standards for autoclaving, microwaving and deep burial etc, so as to consolidate and send it to Government. The effective implementation of BMW Rules was thus not ensured by the Government.

Government (August 2008) stated that an Advisory Committee was constituted for this purpose. The manner, by which supervision could be made more effective, would be taken up with the Committee.

### **3.1.19 Conclusion**

Enforcement of the BMW Rules in the State was inadequate. Large numbers of health care establishments had no facilities for disposal of bio-medical waste. Veterinary institutions were disposing of their bio-medical waste without any authorisation from MPCB. MPCB reported inaccurate figures of generation and disposal of BMW in the State to the CPCB. Bio-medical waste was not segregated as per the required colour codes. Plastic waste of BMW was sold to unauthorised recyclers without disinfecting the same. Hospitals at Nagpur, Wardha and Chandrapur were permitted by MPCB to dispose of their BMW through deep burial pits in contravention of the Rules. Waste handlers

**The Advisory Committee to advise on matters relating to implementation of BMW Rules, met only once during 2003-08**

in common and individual facilities were not provided with full personal protective equipments. Incinerators and deep burial pits established for disposal of BMW were not as per required standards. No norms were prescribed for inspection of the health care establishments by the Maharashtra Pollution Control Board. The Advisory Committee set up to advise the Government met only once during 2003-08.

### **3.1.20 Recommendations**

Government should:

- conduct a survey for identification of occupiers of institutions generating bio-medical waste in the State and should ensure that these occupiers follow the prescribed procedure for disposal of the same.
- make a provision in the Conditions/Rules for strict penalty for the failure to obtain authorisation and thereafter also for failure to comply with any provisions of the Act of these Rules.
- ensure that the health care establishments segregate the bio-medical waste as per the prescribed colour codes.
- issue clear directions regarding reopening of pits filled with BMW and their disposal after the pits are filled completely.
- fix norms for inspections of health care establishments and operators of common and individual treatment facilities and ensure their compliance by MPCB.
- ensure that the Advisory Committee meets at proper intervals and its recommendations are implemented.
- ensure close monitoring and inspection for effective implementation of Rules and procedures.

The matter was referred to the Principal Secretary to the Government in July 2008. Reply had not been received (August 2008).