

**REPORT ON
STATUS OF SOME COMMON FACILITIES FOR
COLLECTION, TREATMENT AND DISPOSAL OF
BIOMEDICAL WASTE IN MAHARASHTRA**



MAHARASHTRA POLLUTION CONTROL BOARD

Kalpataru Point, Sion Circle,

Sion (East), Mumbai

<http://mpcb.mah.nic.in>

August 2004

MAHARASHTRA POLLUTION CONTROL BOARD

REPORT ON STATUS OF SOME COMMON FACILITIES FOR COLLECTION, TREATMENT AND DISPOSAL OF BIOMEDICAL WASTES IN MAHARASHTRA

CONTENTS

S.No.	Chapter	Page No.
1	Background	1
2	General findings	2
3	Discussions	4
4	Recommendations	6
5	Proposed action points	8
6	Annexure I : Fact sheets of some common facilities for management of biomedical wastes	9
7	Annexure II: Formats for record keeping at common facility for management of biomedical wastes:	15
8	Annexure III: "Bio medical waste management in Mumbai: Policy and Approach. Paper by Dr. D.B. Boralkar, Member Secretary, MPCB, Mumbai, March 2004	20
9	Annexure IV: Draft order and terms of reference proposed by MPCB to MCGB to facilitate development of common facilities for management of BMW in Mumbai	38
10	Annexure V: Copy of the Public Notice dated 30.7.04	49
11	Annexure VI: BMW Management : Facts and Figures	51
12	Annexure VII: Photographs	53

MAHARASHTRA POLLUTION CONTROL BOARD

REPORT ON STATUS OF SOME COMMON FACILITIES FOR COLLECTION, TREATMENT AND DISPOSAL OF BIOMEDICAL WASTES IN MAHARASHTRA

1.0 BACKGROUND

Biomedical Wastes (Management & Handling) Rules, 1998 are notified under the Environment (Protection) Act, 1986. Barring precious efforts made by Tata Memorial Hospital nothing much was done in Mumbai for environmentally sound management of biomedical wastes till with installation of one common bio-medical waste treatment and disposal facility (CBMWTDF) at G.B. Hospital, Sewree. It consists of incinerator, autoclave with attendant units like shredder etc. Municipal Corporation of Greater Mumbai (MCGM) has fixed two separate agencies, one to collect the biomedical waste (BMW) of entire city and another to treat & dispose. The transport agency do not have adequate infrastructure like vehicles, manpower etc. resulting in non-collection of BMW from all generators. Further, the incinerator at the facility started giving blackish toxic fumes due to improper operation. People living in the vicinity complained and started agitation against the facility. This resulted in closing of the facility since November 2003. MCGM then started dumping the BMW in Deonar dumping ground violating the BMW Rules. On November 16, 2003, one truckload of BMW containing body parts was virtually dumped in Mulund dumping ground, which received wide publicity in print and electronic media causing public concern.

Looking at these aspects and in order to assess the overall situation in major towns/cities in Maharashtra, the Member Secretary of MPCB convened a meeting of all concerned. Further, the Secretary (Environment) also held a meeting which was attended by the Additional Commissioner (Project) MCGM, Member Secretary, Regional Officer & Sub Regional Officer of MPCB, Director (Environment) and Department of Urban Development.

As a follow-up, the Member Secretary set up a Group of Senior Officers of the, namely, Shri R.M. Kulkarni, Regional Officer, Mumbai and Dr. Ajay Deshpande, Regional Officer, Thane and directed them to visit common BMW facilities in some major towns/cities and submit the report along with recommendations to improve the overall management of BMW in the State. This report is based on the visit to common BMW treatment and disposal facilities at following cities:

Ahmednagar	Amravati	Aurangabad	Chandrapur	Kalyan
Kolhapur	Miraj	Mumbai	Nagpur	Nasik
Pimpri Chinchwad	Pune	Sangli	Taloja	Thane

2.0 GENERAL FINDINGS

The Group of Officers along with the local Regional and Sub-Regional Officers visited some of the common facilities for management of BMW and prepared fact sheets (placed at Annexure I) and findings/observations are summarised as below:.

2.1 Collection

1. BMW is not segregated at the source properly. Because of lack of training, intention and regulatory control, all waste generated in medical institutes including other solid waste is classified as BMW.
2. The operator of facility charged the generators either on per kilo basis or per bed basis. In case of per bed basis charge, the facility receives all sorts of waste without segregation. In case the facility charges on per kg basis, then the BMW received at facility is considerably low. Hospitals tend to avoid giving wastes to the operator.
3. Most of the hospitals do not have one point of collection from where waste is transported.
4. Hospitals do not generally send the non-incinerable / autoclavable waste to the facility. This waste is directly sold for recycle without any treatment. This is in violation of the rules.
5. Generation of BMW varies widely from place to place. Generally, it is 125 to 250 g per bed per day. There is no consistent ratio of incinerable and non incinerable waste
6. The category wise weight of BMW collected at every collection point is not recorded properly.
7. The hospitals in many cases informed that the operator does not collect their BMW on daily basis. This causes problem for hospitals.

2.2 Transportation

1. For one city, there is one agency for entire BMW management except in Mumbai, where the collection and transportation of the waste is with one party and treatment is with another one.
2. Compared to the number of generators and waste generated, the number of vehicles in most of the cases is inadequate. It hampers proper and timely BMW collection.

3. Some facilities have big vehicles like truck or mini-trucks. Big vehicles are not suitable for densely populated areas in cities. The vehicles do not have proper compartments for different category of wastes.
4. The transporters do not keep the records of the waste collected from individual operators as per category and weight basis.
5. The transporters do not visit and collect the BMW from all hospitals, particularly the small ones.

2.3 Treatment

1. The common facilities need to have complete in-house arrangements for collection, transport, treatment and disposal of all categories BMW. It was observed that some facilities like at Pune, Pimpri Chinchwad Municipal Corporation and Nagpur have only incineration. There is no proper arrangement for ash disposal. These facilities cannot be considered as common facility.
2. Generally the facilities are located away from the habitation, except in Mumbai where it is in the city.
3. It was observed that in most of the cases the required temperature at primary chamber (PC) & secondary chamber (SC) are not achieved. Records of incinerator operation including temperature, waste charging, time of operation and fuel consumption are not maintained. Temperature indicators and recorders were found faulty.
4. Most of the facilities lack technical support to address operational problems.
5. Facilities in smaller towns have to depend on their own D.G. sets, as electricity supply is erratic and irregular.
6. Because of improper segregation, the incinerators tend to emit lot of fumes in spite of provision of scrubbing arrangements.
7. Handling and storage of waste before treatment is inadequate.
8. Records of waste received and treated, temperature, hours of operations are not maintained.
9. Scrubbed water and floor washings are not adequately treated.

3.0 DISCUSSION

The observations made during the visit reveal several non-compliances, in terms of proper segregation, collection, treatment and disposal of BMW.

3.1 Collection and transport

The collection of BMW from the large number of generators and transporting the same to the facility require adequate infrastructure and managerial efforts. There is an urgent need to streamline the collection systems. This should identify the generators, which are either not sending the waste regularly or not segregating the waste properly. It will be possible only if the facility operator approaches the generator on daily basis and keep proper records of category and weight of BMW received. This is relevant as it is observed in case of Mumbai that non-collection of the waste from individual hospitals is causing the problems for smooth operation of the facility.

The proper segregation of BMW at source is also important area where all concerned including local body, medical association and generators have to take initiatives to implement rules. This will also help estimate the BMW generation from different types of medical institutions.

3.2 Treatment

The operation and maintenance of incineration is an important area requiring high degree of attention. The incineration of BMW at temperatures lower than the specified range are likely to emit the toxic/carcinogenic air pollutants like dioxins and furans. Hence, it is felt that the improper BMW incineration at lower temperatures and lower residence time is more dangerous and harmful than not treating the waste. Operating the incineration at desired temperatures, at primary and secondary chambers is a difficult task because of higher temperature ranges. It was observed that in most of the cases, the temperature at PC & SC is not achieved. Records are not maintained of the incinerator operations including temperature, waste charging, time of operation and fuel consumption. It is necessary that all these incinerators shall have continuous temperature recorders.

It is therefore decided to take urgent action against the default and ensure compliance within a stipulated time. Directions are issued by Member Secretary to inspect the facilities at least once in a fortnight by SRO and once in a month by RO.

The incinerator at Pune facility is horizontal with a single burner. The facility operator claims to achieve the required temperature and other specification of the incinerator. However, in the absence of temperature recorder / indicator, this claim could not be ascertained. Further, the occurrence of un-burnt cotton in PC & SC showed improper operation of unit. It is therefore decided that detailed verification shall be done through a reputed expert agency.

3.3 Record keeping

The record keeping is important area where enough attention is not given by CBMWTDF. As per the guidelines for common facilities, the facility shall have a record of daily category wise BMW collection from individual generators and a weekly list needs to be submitted to MPCB for taking action against the generators who are not sending BMW to facility.

The collection of BMW from individual generator is important activity of common facility. It is necessary that the CBMWTDF approach the generator on daily basis to collect the waste. The generators are responsible for proper segregation of waste. The segregated waste needs to be stored properly in colour coded bags which shall be collected by CBMWTDF by actual weighing and recording same in the records of both with transporter and generator. The waste collection bags should also have arrangements to identify the waste source i.e. generator identity. This can be either through bar coding or display of generator code on the bag.

It was further observed that the waste collection records are not kept properly as category of waste, quantity etc. In most of the cases the temperature at PC & SC of incinerator are not achieved. Records are not maintained for incinerator operating parameters such temperature, waste charging, time of operation and fuel consumption. Keeping in view of this requirement MPCB has prepared formats for record keeping (Annexure II). Directions are being issued to CBMWTDF's to maintain the information as per the formats. This includes:

- BMW collection from individual generator
- Incinerator operation
- Autoclave/Shredder operation

3.4 The role of local bodies

As per the BMW rules, the local bodies are required to take a lead in implementing the rules by working as a facilitator. However, in most the cases, the local body is involved in either collection of waste or financial management of the common BMWT facility. It is opined that that the local bodies must work as a facilitator for BMW management rather than getting involved into the day-to-day operation. In a typical case, Nagpur Municipal Corporation has floated a tender for common facility where the

tender evaluation criteria include the royalty to be paid to Nagpur Municipal Corporation. This practice of making revenue out of BMW management is not going well with the spirit of rules. Technical and financial capability of the operator should be the basis for selection.

The hospitals and nursing homes are also required to register with the local bodies under Nursing Homes Regulation. The local body shall verify the compliance by these healthcare establishments while considering their applications for grant of license.

3.5 Capacity utilisation

The installed capacity of incinerator in most of the CBMWTF's is much more than the actual generation of incinerable BMW in the area. Local bodies generally develop these facilities and have stipulated the specifications, including the incinerator capacity. The guidelines published by CPCB for the common BMW facilities stipulate that there should preferably be one incinerator for 10,000 beds and the facility should cater to surrounding area in 150-km radius.

Under these circumstances, it becomes necessary to augment these facilities by allowing them to cater additional areas in the vicinity. This was first tried at Thane facility, where generators from nearby urban areas like Mira Bhayander, Navghar-Manikpur, Vasai have joined Thane facility. This has ensured smooth working of incinerator and has enhanced techno-economic feasibility of the project at Thane. This is subject to compliance verification.

There are several hospitals, which have their own incinerators and their performance, as per the new standards and guidelines have not been evaluated so far. It may be more appropriate to have a common facility, which runs effectively than having several incinerators spread across a city. Evaluation of performance of each of these incinerators is being undertaken by MPCB on priority.

4.0 RECOMMENDATIONS

1. It is noticed that in some cases the local body has entrusted only incineration part to the operator. The non-incinerable waste remains unattended. It is therefore necessary that the common facility should be allowed to operate, only if, they are accepting all the categories of BMW for treatment and disposal. The facility shall also be responsible for total BMW management including collection, transport, storage, treatment and disposal. The role of local body shall be as a facilitator, rather than a business partner.

2. There is large variation in the quantity of BMW generation in each hospital or even in one city. As a result, it is difficult to inventorise the BMW. Variation in quantity of BMW generation is also due to differences in the practices followed for segregation of BMW.
3. The record keeping in most of the cases was not proper. Suggested formats for collection and handling of BMW are as given in Annexure-II.
4. It was observed that all the waste generated do not reach the facility. Operators informed that some waste is sold in the scrap market by generators. This is violation of rules. It was also informed that even Govt. hospitals are not sending all the BMW to facility.
5. The present operational compliance level of all the facilities is not satisfactory. It is therefore proposed to issue appropriate directions for improvement.
6. There should be on-line temperature recorder for PC and SC of the incinerators.
7. All the BMW generators have not obtained authorizations. Legal action is proposed against the defaulters.
8. Region wise task force consisting of a representative from IMA, local body, NGO and State Health Department may be set up for monitoring and advice.
9. RO/SRO shall also visit these facilities once in a fortnight and take suitable action against the generators who are either not sending the waste or not segregating the waste.
10. Training programs are required for the MPCB officers, doctors and workers for proper segregation and handling of BMW.
11. It was observed that at several places the incinerators had some problems and the repairs could not be done in time. BMW must be disposed within 48 hrs. The common facility needs to ensure that all the treatment units have a proper maintenance backup.
12. Management of BMW should also form part of educational curriculum particularly in the medical and nursing courses.

5.0 PROPOSED ACTION POINTS

Proposed action points for BMW management are Maharashtra is presented below:

Sl. No.	Activity	Agency	Time frame
1.	Inventory of bio-medical waste generating units and category wise waste generated.	MPCB	24 months
2.	Computerization at MPCB	MPCB	24 months
3.	Training of MPCB Officers	MPCB	Continuous/regular activity
4.	Awareness programmes	MPCB Medical associations NGO's	Continuous/regular activity
5.	Identification of Appropriate treatment Technology for major cities in state	Donor organization Consultants	Depends on merit of each case.
6.	Infrastructural support for the common facilities in the form of technology, instrumentation and vehicles etc.	Facility operator	- do -
7.	Training to healthcare workers	NGO's	Continuous/regular activity
8.	To ensure that all the BMW generators join the common BMWTDF facility and are given Authorization	MPCB	Continuous/regular activity
9.	To submit half yearly list of BMW generators to MPCB indicating the wastes received at CBMWTDF along with category wise quantity.	CBMWTDF	Continuing activity
10.	Legal action including closure and prosecution against the BMW generators who neither have facilities to treat BMW as per rules nor become member of common facility.	MPCB/ Local body	3 months intensive and then follow up
11.	Inspection, once in a month, of CBMWTDF along with necessary monitoring.	MPCB	Continuing activity
12.	To take legal action against the members of facility who are not sending their waste to facility or not segregating the waste properly.	MPCB	Continuing activity
13.	Issuance of directions to upgrade all units in the facility as per the requirements of guidelines, along with continuous temperature recorder to PCC and SCC of incinerators.	CBMWTDF	3 months
14.	To explore the possibility of accepting the waste from adjoining areas [e.g. Mira-Bhayander, Vasai, Virar, Nalla-Sopara, Navghar-Manikpur, Dahanu] Issue authorization, as the case may be .	CBMWTDF/MPCB/ Local body	4 months
15.	Facilitate development of Common facility for management of BMW as per rules and guidelines in corporation and "A" class municipal towns	Local body	12 months

---oOo---

**FACT SHEETS OF COMMON FACILITIES FOR
MANAGEMENT OF BIOMEDICAL WASTES
AT SEVEN CITIES IN MAHARASHTRA**

1. Amaravati
2. Aurangabad
3. Chandrapur
4. Mumbai Municipal Corporation
5. Nashik
6. Pimpri Chinchwad Municipal Corporation
7. Sangli Miraj Kupwad Municipal Corporation (Facility 1)
8. Sangli Miraj Kupwad Municipal Corporation (Facility 2)
9. Nagpur Municipal Corporation
10. Kolhapur Municipal Corporation

**FACT SHEETS COMMON FACILITIES FOR
MANAGEMENT OF BIOMEDICAL WASTES**

S. No.	Common BMW management facility	Amravati	Aurangabad
1	Name of the Operator/Agency	Global Eco-Save systems	Water Grace Products
2	Location	MIDC area, Badnera	Outside Corporation area
3	Facility provided: Incinerator Autoclave	100 kg/hr. 50 ltr./hr.	300 kg/hr 50-60 kg/hr
4	BMW generated in city	350 kg/day	-
5	BMW received: Incinerable Non-incinerable	276 kg/day 21 kg/day	150kg/day --
6	Record keeping : Daily individual collection Waste received Incinerator operation Autoclave operation	Maintained without wt. Maintained Not maintained Maintained	Not maintained Maintained Not maintained Maintained
7	Observations -		
	(A) Incinerator operation :		
	Temp in PC & SC	PC 760 ^o C SC-140 ^o C	Records not available
	Scrubber	Provided	Provided
	Treat. for scrub. liquid	ETP provided	Provided
	Disposal of Ash	MSW site & deep burial	MSW site
	Temp. recorder	Not provided	Not provided
	(B) Autoclave Operation		
	Records of Operation	in operation	
	(C) Segregation of waste	Not proper	Not proper
	(D) Transportation of BMW		
	Individual Generator	Individual generated	Provided
	Collection Points	-	-
	(E) Vehicles for transport	Provided	Provided
	(F) Housekeeping	Good	OK
	(G) Space available	Adequate	Adequate
8	Recommendations:	(a) The daily category-wise BMW collection on weight basis needs to be recorded. (b) Required temp. at PC & SC must be maintained. (c) Temp. recorder to incinerator shall be provided.	(a) The waste collection is less. This should go up (b) The operational records of incinerator need to be maintained. (c) Required temperature in PC & SC must be maintained. (d) Temperature recorder shall be provided.

**FACT SHEETS COMMON FACILITIES FOR
MANAGEMENT OF BIOMEDICAL WASTES
(continued)**

S. No.	Common BMW management facility	Chandrapur	Mumbai
1	Name of the Operator/Agency	Superb Hygenic Disposal	Bhavani Travels and Transport.
2	Location	MIDC area	GTB Hospital Sewree
3	Facility provided: Incinerator Autoclave	50 kg/hr. 25 ltr./hr.	185 kg/hr 2500 kg/batch
4	BMW generated in city	200 kg/day	8000 kg/day
5	BMW received: Incinerable Non-incinerable	120-150 kg/day 30 kg/ day	2200-2500 kg/day 2800-3000 kg/day
6	Record keeping : Daily individual collection Waste received Incinerator operation Autoclave operation	Not maintained. Maintained Maintained without temp. Maintained	Maintained without wt. Maintained Time, pressure & temp. Maintained
7	Observations -		
	(A) Incinerator operation :		
	Temp in PC & SC	Temp. indicator not working	Incinerator not in operation.
	Scrubber	Provided	---NA---
	Treat. for scrub. liquid	ETP provided	---NA---
	Disposal of Ash	Deep burial	---NA---
	Temp. recorder	Not provided	---NA---
	(B) Autoclave Operation		Yes
	Records of Operation	Maintained	Not maintained
	(C) Segregation of waste	Not proper	Not proper
	(D) Transportation of BMW		
	Individual Generator	Individual generator	Provided
	Collection Points	-	No
	(E) Vehicles for transport	Provided	Inadequate
(F) Housekeeping	Good	Fair	
(G) Space available	Adequate	Adequate	
8	Recommendations:	(a) Provide temp. recorders. (b) Required temp. at PC & SC must be maintained. (c) Temp. indicator shall be provided.	(a) No. of vehicles to be increased. (b) Provide temp. recorder to incinerator. (c) Provide ETP.

**FACT SHEETS COMMON FACILITIES FOR
MANAGEMENT OF BIOMEDICAL WASTES
(continued)**

S. No.	Common BMW management facility	Nagpur	Nashik
1	Name of the Operator/Agency	Nagpur Municipal Corporation	M/s. Water Grace Products
2	Location	Ambazari Crematorium	Near Kannamwar Bridge
3	Facility provided: Incinerator Autoclave	100 kg/hr. Not provided	300 kg/hr 50-60 kg/batch
4	BMW generated in city	--	2500 kg/day
5	BMW received: Incinerable Non-incinerable	200 kg/day Nil	2000 kg/day --
6	Record keeping : Daily individual collection Waste received Incinerator operation Autoclave operation	Not maintained Not maintained Not maintained NA	Not maintained Not maintained Not maintained Not maintained
7	Observations -		
	(A) Incinerator operation :		
	Temp in PC & SC	Not maintained. SC not working	Incinerator not in operation.
	Scrubber	Not in operation	Provided
	Treat. for scrub. liquid	Not provided	Adequate
	Disposal of Ash	Not provided	MSW
	Temp. recorder	Not provided	Not provided
	(B) Autoclave Operation		Yes
	Records of Operation	NA	Not maintained
	(C) Segregation of waste	Not proper	Not proper
	(D) Transportation of BMW		
	Individual Generator	Individual generator	Provided
	Collection Points	-	No
	(E) Vehicles for transport	Provided	Provided
(F) Housekeeping	Generally OK	Average	
(G) Space available	Adequate	Adequate	
8	Recommendations:	(a) SC not operated. Scrubber not in use. Temp. indicator not working. (b) Autoclave & shredders to be provided.	(a) Records of waste handled not maintained. (b) Temp. indicators and recorders not working.

**FACT SHEETS COMMON FACILITIES FOR
MANAGEMENT OF BIOMEDICAL WASTES
(continued)**

S. No.	Common BMW management facility	Pimpri-Chinchwad	Sangli-Miraj-Kupwad (part)
1	Name of the Operator/Agency	PCMC Corporation	M/s.Surya Central Facility
2	Location	Shri Ch. Shivaji Hospital	MIDC area
3	Facility provided: Incinerator Autoclave	60-70 kg/hr. Not provided	50 kg/hr 60 kg/batch
4	BMW generated in city	400 kg/day	300 kg/day
5	BMW received: Incinerable Non-incinerable	No records available No records available	120 kg/day 80-90 kg/day
6	Record keeping : Daily individual collection Waste received Incinerator operation Autoclave operation	Not maintained Not maintained Not maintained Not maintained	Yes without wt. Yes Hours Quantity & time
7	Observations -		
	(A) Incinerator operation :		
	Temp in PC & SC	PC 140 and SC 830 deg. C.	Well maintained
	Scrubber	Not provided	Provided & in operation
	Treat. for scrub. liquid	Not provided	Not provided
	Disposal of Ash	Not proper	Open/ unscientific
	Temp. recorder	Not provided	Not provided
	(B) Autoclave Operation		Yes
	Records of Operation	NA	In operation
	(C) Segregation of waste	Not proper	Not proper
	(D) Transportation of BMW		
	Individual Generator	--	Yes
	Collection Points	26	No
	(E) Vehicles for transport	Provided	Inadequate
(F) Housekeeping	Average	Satisfactory	
(G) Space available	Adequate	Adequate	
8	Recommendations:	(a) Incinerator operated with out scrubber (b) Records not maintained. (c) Temperature at incinerator not achieved.	a) Provide more vehicles, b) Provide ETP c) Provide temp. recorder d) Ash disposal by landfill.

FACT SHEETS COMMON FACILITIES FOR MANAGEMENT OF BIOMEDICAL WASTES

S. No.	Common BMW management facility	Kolhapur	Sangli-Miraj-Kupwad (part)
1	Name of the Operator/Agency	Dass Enterprises	Life Secure Enterprises
2	Location	Kasba Barde, Kolhapur	Badag Road, Miraj
3	Facility provided: Incinerator Autoclave	200 kg/hr. Not provided	50 kg/hr Not provided
4	BMW generated in city	160-200 kg/day	350 kg/day
5	BMW received: Incinerable Non-incinerable	80-90 kg/day 40-50 kg/ day	160-180 kg/day 90-120 kg/day
6	Record keeping : Daily individual collection Waste received Incinerator operation Autoclave operation	Not Maintained Maintained Not Maintained Not Maintained	Not maintained Maintained Not maintained Not Maintained
7	Observations -		
	(A) Incinerator operation :		
	Temp in PC & SC	No records	Records not available
	Scrubber	Provided	Provided
	Treat. for scrub. liquid	No ETP provided	No ETP Provided
	Disposal of Ash	Not proper	Provided
	Temp. recorder	Not provided	Not provided
	(B) Autoclave Operation		
	Records of Operation	Not provided	
	(C) Segregation of waste	Not proper	Not proper
	(D) Transportation of BMW		
	Individual Generator	Individual generated	Provided
	Collection Points	-	-
	(E) Vehicles for transport	Provided	Inadequate
(F) Housekeeping	Poor	Poor	
(G) Space available	Inadequate	Adequate	
8	Recommendations:	(a) The daily category-wise BMW collection on weight basis needs to be recorded. (b) Required temp. at PC & SC must be maintained. (c) Temp. recorder to incinerator shall be provided. (d) Provide ETP and improve housekeeping	(a) Provide autoclave (b) The operational records of incinerator need to be maintained. (c) Required temperature in PC & SC must be maintained. (d) Improve the transport

**FORMATS FOR RECORD KEEPING AT COMMON FACILITY FOR
MANAGEMENT OF BIOMEDICAL WASTES**

DAILY WASTE COLLECTION REPORT

Date:

Name of Driver:

Vehicle No.

S.No.	Name of Hospital	Yellow Bags		Red Bags		Blue Bags		Effluent	Total	Sign of Hospital
		Nos.	Kg.	Nos.	Kg.	Nos.	Kg.	Kg.	Kg.	

DAILY HOSPITALWISE BMW COLLECTION STATEMENT

Name of Hospital:

Membership No.

Month/Year

Date	Yellow Bags		Red Bags		Blue Bags		Effluent	Total	Sign
	Nos.	Kg.	Nos.	Kg.	Nos.	Kg.	Kg.	Kg.	

INCINERATOR LOG SHEET

Date:

Time	Temperature °C				Waste Charge Kg	Fuel Lts PC	Fuel Lts SC	Sign	Remark
	Primary Chamber	Secondary Chamber	Venturi Inlet	Venturi Outlet					

1. Plant started at:
2. SEC Burner started at:
3. Primary Burner started at:
4. Waste feeding started at:
5. Waste feeding stopped at:
6. Burner stopped at:
7. Plant stopped at:
8. Total LDO charged:

DAILY REPORT**Date:****1. TRANSPORT**

Total Quantity of BMW Collected:

Vehicle No.	Incinerable Waste	Plastic	Glass	Other	Total	Remark

Activity Details

Vehicle No.	Departure	Arrival	Km	Hospitals to be visited	Hospitals visited

2. TREATMENT

S. No.	Treatment Given	Kg	Remark
1.	Incineration		
2.	Autoclave		
3.	Shredder		



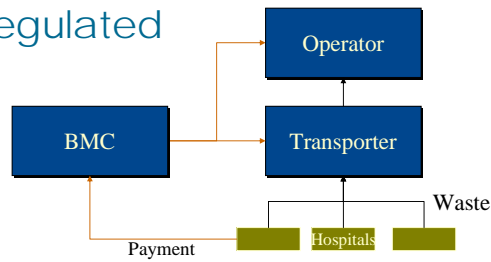
Bio medical waste management in Mumbai

Policy and Approach

**Dr DB Boralkar
Member Secretary
Maharashtra Pollution Control Board**

March 2004

The current structure is unregulated



Key Points:

Waste is collected from hospitals by a Transporter

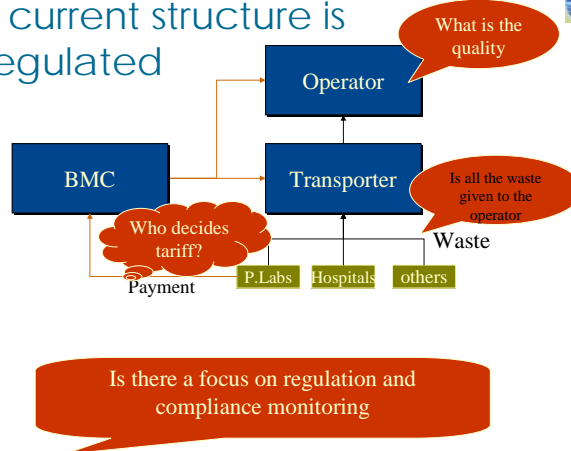
Waste is handed over to the operator

Payment is made by hospitals to BMC

BMC in turn makes payments to the transporter and the operator

2

The current structure is unregulated



3

An integrated approach is required

- Disposal facility is only one of the links in the bio medical waste management chain
- There are other key links that are required
 - ➔ Education and awareness
 - ➔ Compliance monitoring and accountability
 - ➔ Regulatory systems and tools

4



PRESENTATION IS DIVIDED INTO
FIVE COMPONENTS:

- PART I POLICY ISSUES AND OPTIONS
- PART II PREPAREDNESS OF MPCB/BMC
- PART III ELEMENTS OF RFP
- PART IV ISSUANCE OF CLEARANCES
- PART V COMMERCIAL ISSUES IN PROJECT

5



PART I
POLICY ISSUES AND OPTIONS

6



VISION STATEMENT

Principles and practices of environmentally sound management of bio medical waste should be accessible to all generators (particularly, small and medium hospitals) which entail eco-friendly methods of handling and disposal, capacity building and public-private partnership.

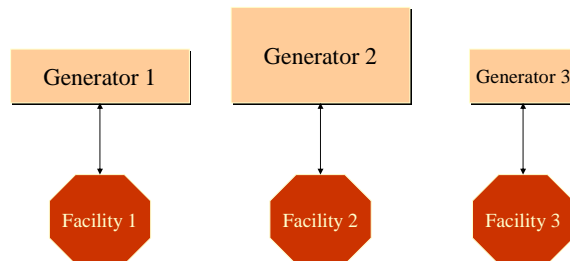
7

Policy Options

- Captive facilities by each generator
- Co-operative model
- Multiple facilities without any planning
- Single facility by State Agency
- Single facility by private sector
- Multiple planned facilities by private sector with infancy protection

8

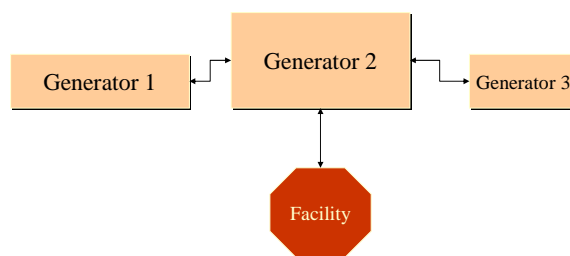
Captive facilities by each user



Key Issues

Small generators cannot afford facility
Even for large generators, cost of treatment will be high
There will be too many facilities which will make regulation difficult

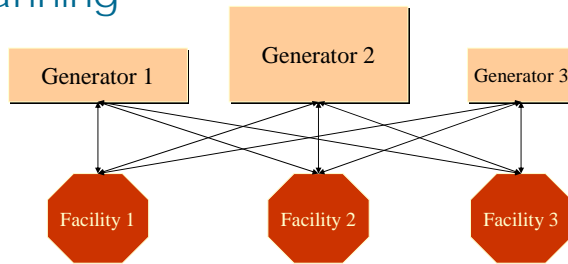
Co operative model



Key Issues

Who will bring the users together?
How will capital cost be shared
How will tariff be decided
Who will operate the facility?
How will treatment quality be monitored?
State support?

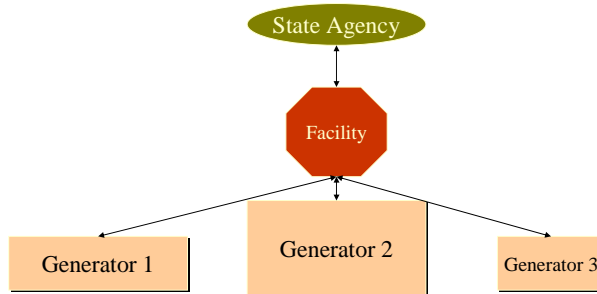
Multiple facilities without planning



Key Issues
 Some facilities will become unviable
 Price undercutting will result in poor treatment quality
 Regulation difficult with multiple facilities and free flow of waste
 Evasion by generators difficult to trace

11

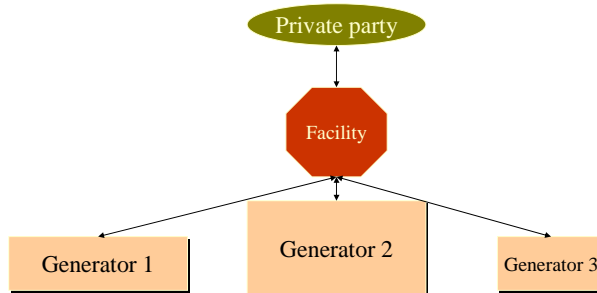
Single facility by State Agency



Key Issues
 Who will bring in capital cost?
 Who will regulate the State Agency?

12

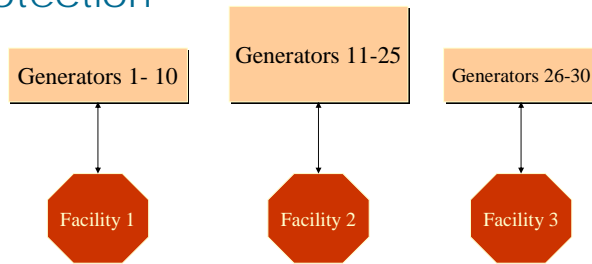
Single facility by private party



Key Issues
 How will tariff be determined?
 How will monopoly be controlled?
 What if the facility fails?

13

Multiple facilities with infancy protection



Key Issues
 No demand risk since each facility will cater to a defined region
 Competition will determine tariff
 If one facility fails, others can step in
 After some years, full competition can be introduced

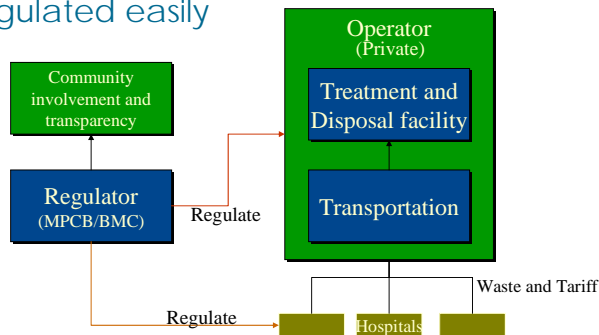
14

Policy Options

- ⊖ Captive facilities by each generator ✗
- ⊖ Co – operative model ✗
- ⊖ Multiple facilities without any planning ✗
- ⊖ Single facility by State Agency ✗
- ⊖ Single facility by private sector ✗
- ⊖ Multiple planned facilities by private sector with infancy protection ✓

15

This is a workable model which can be regulated easily



Key aspects

Single point responsibility for transportation, treatment and disposal.
 Generator sends waste to operator and pays directly to operator.
 Regulator only involved in facilitation, regulation and transparency. 16

MODUS OPERANDI



Elements of common facilities

(A) SEGREGATION/STORAGE (at healthcare establishments)

- Different containers/ bags for different categories (to be Provided by the operator)
- Collection and segregation system within the hospital
- Handover to operator and documentation

(B) TRANSPORT

- Manifest system
- Catalogue for characterisation
- Declaration documentation by the generator
- Acceptance documentation by the SPCB
- Unloading (weight/volume) facilities
- Criteria for disposal of containers
- Washing of container and disposal of effluent

(C) TREATMENT

- Treatment options (as per BMW Rules)
- Treatment programme
- Reporting manifest to SPCB
- Treatment cost and billing to the generator

17

(C) INCINERATOR



- Capacity commensurate with BMW generated in the area
- Residence time and temperature
- Air emission control
- Compliance of standards and monitoring
- Disposal of incineration ash / solid wastes
- Area requirement
- Technical manpower
- Capital, O & M and Treatment costs

(d) AUTOCLAVE//HYDROCLAVE

- Facilities proposed
- Capacity
- Applicable criteria
- Recovery/recycling options
- Disposal of residue
- Area requirement
- Technical/scientific manpower
- Capital and O & M costs
- Treatment costs

18

(E) ENGINEERED LANDFILL (OPTIONAL)



- Proposed life-span and area requirement
- Number of sections
- Lining system.
- Criteria for acceptance
- Leachate collection, treatment, disposal
- Drainage of surface run-off, its collection, treatment (if required based on pre-determined criteria) and disposal
- Infrastructure facilities
- Manifest system
- Capital, O & M and Treatment costs
- Laboratory support

(F) SHREDDER

- Capacity
- Specifications
- Capital and O&M costs

19

(G) OTHER ISSUES

- Equity participation by generators and operator
- Subsidy from State Government/State Pollution Control Board to trigger the process.
- Design parameters and capacity to commensurate with the existing and projected quantities and characterisation of wastes in the operating jurisdiction of Common BMWTDF.
- Waste from outside cannot be allowed for disposal.
- Possibility of progressive reduction in generation of wastes

20

CRITERIA FOR ASSESSMENT OF TECHNOLOGIES

- What is the cost?
- How effective is it?
- Is it readily accessible?
- How is the public perception?
- How many types of wastes it can treat?
- What are the limits with respect to concentration?

21

PROBLEMS REGARDING TREATMENT & DISPOSAL OF BIO MEDICAL WASTES

- Inadequate skilled manpower, technology and capital investment
- Lack of infrastructure and institutional arrangements for implementation
- Difficulties in procurement of land
- Lack of availability of soft loan for development of facilities and expertise in the field

22



REGULATION AND ENFORCEMENT

(A) RESPONSIBILITY OF OCCUPIER

- (i) Handle BMW without any adverse effect to human health and environment.(Rule 4)
- (ii) To set up requisite BMW treatment facility or ensure requisite treatment at common BMW TDF (Rule 5)
- (iii) To segregate BMW and label the containers (Rule 6)
- (iv) To make application for Authorization in Form I (Rule 8)
- (v) To file the annual return (Rule 10)
- (vi) To maintain records of BMW handling and make it available to prescribed Authority
- (vi) To report accidents (Rule 12)

(B) RESPONSIBILITY OF TRANSPORTER

- (i) The container shall, apart from the label prescribed in schedule III, also carry information prescribed in Schedule IV.
- (ii) To transport the untreated BMW only in Authorised vehicle

23



(C) RESPONSIBILITY OF OPERATOR

- (i) Handle BMW without any adverse effect to human health and environment.(Rule 4)
- (ii) To set up requisite BMW treatment facility to ensure requisite treatment at common BMW TDF (Rule 5)
- (iii) To make application for Authorization in Form I (Rule 8)
- (iv) To file the annual return (Rule 10)
- (v) To maintain records of BMW handling and make it available to prescribed Authority
- (vi) To report accidents (Rule 12)

(D) RESPONSIBILITY OF LOCAL BODY

- (i) To continue to pick up and transport segregated non-biomedical solid waste generated and duly treated BMW from hospitals and nursing homes.
- (ii) Provide suitable common disposal/incineration sites.

24



(E) RESPONSIBILITY OF STATE POLLUTION CONTROL BOARD

- (i) To grant or renew authorisation on receipt of Form I and if it is satisfied that applicant possess the necessary capacity to handle the BMW in accordance with the rules **(Rule 7(4))**.
- (ii) To refuse the authorisation for reasons to be recorded in writing **(Rule 7(6))**
- (iii) To suspend or cancel the Authorisation for reasons to be recored in writing. **(Rule 7(8))**

(F) RESPONSIBILITY OF THE STATE GOVERNMENT

- (i) Prescribe fees for authorisation. **(Rule 8)**
- (ii) To constitute an advisory committee. **(Rule 9)**
- (iii) To constitute an Appellate Authority. **(Rule 13)**

25



PART II

PREPAREDNESS OF MPCB/BMC

26



INSTITUTIONAL STRENGTHENING

Re-structuring of organisational setup in the Board

Strengthening of monitoring network:

- Setting up of vigilance squads
- Documentation of data

Improved Efficiency:

- Time bound clearances and longer duration of authorisation validity
- Optimisation of inspection/visits
- Simplification of procedures and decentralisation
- Computerisation
- Faster communication facilities
- Networking of offices

Infrastructure/facilities and capacity building:

27



PART II: PREPAREDNESS OF THE STATE BOARD

- **ADOPTION OF POLICY DECISION**
- **SUPPORT OF THE STATE GOVERNMENT**
- **COMMITMENT OF SUBSIDY, IF ANY**
- **ASSURANCE OF WASTE FLOW**
- **OPERATIONAL/COMMAND AREA OF BMWTF**
- **INVENTORY OF WASTES: CATEGORY-WISE, AREA-WISE, AND QUANTITIES**
- **GUIDELINES OF CPCB FOR COMMON FACILITIES**

28



- SETTING UP OF “EXPERT COMMITTEE”
- APPOINTMENT OF “PROJECT ADVISOR”
- PREPARATION OF “RFP” BY “Project Advisor”
- ISSUANCE OF “RFP”
- SHORTLISTING OF QUALIFIED BIDDERS
- BENCHMARKING OF TECHNOLOGY(s)
- USER CHARGES/TARIFF BASED ON 20% IRR MINIMUM
- USER-OPERATOR INTERFACE MECHANISM

29



PART III

ELEMENTS OF RFP

30



PART III: ELEMENTS OF REQUEST FOR PROPOSAL

1. INTRODUCTION & BACKGROUND

- INTRODUCTION
- OBJECTIVES & TOR OF THE AGREEMENT
- PRINCIPLES UNDERLAYING THE AGREEMENT

31



2. DESCRIPTION OF THE SELECTION PROCESS

- SELECTION PROCESS
- RESPONSIVENESS OF BID
- STEP 1 [COVER 1]: EVALUATION OF FINANCIAL CAPABILITY
- STEP 2 [COVER 2]: EVALUATION OF TECHNO-BUSINESS PROPOSAL
- STEP 3 [COVER 3]: ASSESSMENT OF CONDITIONS
- STEP 4 [COVER 4]: EVALUATION OF COMMERCIAL OFFER
- GENERAL COMPLIANCE CRITERIA
- TIME TABLE AND MILESTONES

32



3. PROCEDURES TO BE FOLLOWED

- INQUIRIES & CLARIFICATIONS
- SUBMISSION OF BID [COVER 1,2,3,4 AND COMMERCIAL OFFER]
- OTHER COMMERCIAL TERMS AND CONDITIONS SUCH AS OPENING OF BIDS, VALIDITY, SECURITY, GUARANTEE ETC.
- PROJECT ADVISORS
- MEMBERS OF THE EXPERT COMMITTEE

33



4. COVER 1 : FINANCIAL CAPABILITY EVALUATION

- OBJECTIVE
- EVALUATION CRITERIA FOR FINANCIAL CAPABILITY
- EVALUATION PROCESS
- FINANCIAL CAPABILITY : INFORMATION FORMATS

34



5. COVER 2 : TECHNO-BUSINESS PROPOSAL EVALUATION

- **MINIMUM COMPLIANCE CRITERIA**
- **TECHNO-BUSINESS PROPOSAL: EVALUATION CRITERIA**
- **EVALUATION PROCESS**
- **TECHNO-BUSINESS PROPOSAL: EVALUATION CRITERIA**

35



6. COVER 4 : COMMERCIAL OFFER EVALUATION

- **OBJECTIVE OF COMMERCIAL OFFER EVALUATION**
- **PAYMENT FORMULA AND PAYMENT MECHANISM**

36



PART IV
ISSUANCE OF CLEARANCES

37

**PART IV:
ISSUANCE OF CLEARANCES**

1. ISSUANCE OF "LOI" BY PROJECT AUTHORITY (BMC)
2. AGREEMENT AND HANDING OVER OF THE SITE TO THE TSDf OPERATOR
3. CONSENT TO ESTABLISH/OPERATE BY MPCB
4. OTHER CLEARANCES, IF ANY, FROM STATE GOVERNMENT DEPARTMENTS

38

Contd...

5. POWER AND WATER SUPPLY (BMC to facilitate)
6. APPROACH ROAD AND BOUNDARY WALL/FENCE (BMC)
7. MONITORING OF PROJECT PROGRESS (BMC/MPCB)
8. RELEASE OF SUBSIDY (BMC/MPCB)

39

PART V
Launching the project

40

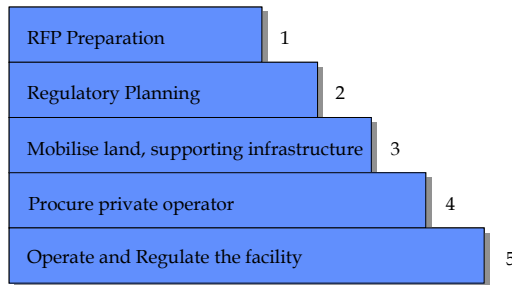
Project design



- Pre qualify all existing operators in Maharashtra
- Divide the city into 4-5 zones so that each facility has 1,000 to 1,500 tonnes of waste per annum
- Launch RFP

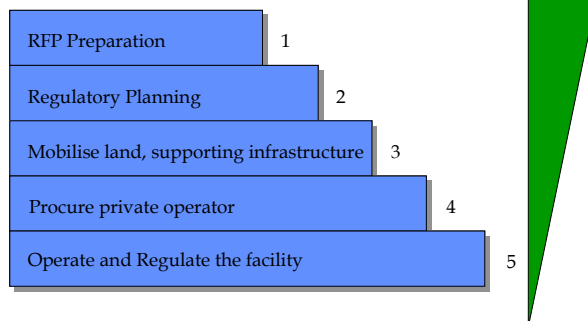
41

What are the various stages



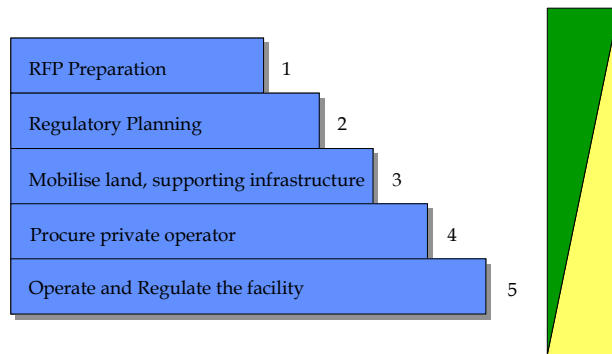
42

Govt/ MPCB involvement is high in the initial stages, and is limited to regulation once the facility is established



43

The private operator's role increases in the later stages of the project



44

RFP Preparation

- ⇒ **Technical**
 - Technical specifications for the disposal facility
 - Specifications for transportation
 - Specifications for storage at generator site
 - Regulatory infrastructure
- ⇒ **Monitoring systems**
 - Regulatory tools
 - Regulatory systems
- ⇒ **Financial**
 - Cost of the total facility
 - Financing terms
 - Broad tariff calculations and payments
- ⇒ **Project structuring**
 - Estimating total number of facilities
 - Drawing up exclusive hinterland for each facility

45

Regulatory Planning

- ⇒ **Building capacity at MPCB**
 - Infrastructure, such as testing facilities, compliance monitoring and tracking software etc
 - Systems
 - Tools and processes
 - Training

46

Mobilising land and infrastructure

- Land from BMC for the facilities
- All connecting infrastructure such as
 - ➔ Power, approach roads, water supply and sewerage
- Key clearances for the facility

47

User mobilisation

- User Mobilisation
 - ➔ Differential tariff for various categories of users such as size of hospitals, maternity homes, labs etc
 - ➔ Membership and membership fees
 - ➔ Planning for storage infrastructure at the user location
 - ➔ Training of staff
 - ➔ Training on compliance reporting procedures

contd

48

Procure private operator

- Conduct investor conference, launch tender process
- Request for proposal
- Pre bid conference and clarifications
- Bidder evaluation and selection
- Contract finalisation and appointment

49

Operation and regulation



⦿ Operation

- Launch phase to smoothen transportation and disposal
- Redrafting procedures as may be required

⦿ Regulation

- Data collection and compilation
- Compliance assurance
- Public dissemination of compliance information
- Third party compliance monitoring if required

50

Summary



- ⦿ Decide policy option – Multiple facilities with private operator and infancy protection
- ⦿ Divide the city into 4-5 zones and initiate membership drive
- ⦿ BMC to provide land
- ⦿ MPCB to gear up capacity to regulate
- ⦿ Project Advisor to prepare Request for Proposal Document (RFP)

51