STATUS REPORT
ON
BIO-MEDICAL WASTE MANAGEMENT
BY THE
DISTRICT HOSPITALS OF TRIPURA
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Tripura State Pollution Control Board
Parivesh Bhawan, Gorkhabasti,
Pandit Nehru Complex, P.O. Kunjaban,
Agartala, West Tripura, Pin-799006
Status Report of BMW Management in District Hospitals

Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
<td>1-3</td>
</tr>
<tr>
<td>2.</td>
<td>List of Hospitals Visited</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Inspection Reports along with photographs</td>
<td>5-33</td>
</tr>
<tr>
<td>4.</td>
<td>Recommendations</td>
<td>34-35</td>
</tr>
<tr>
<td>5.</td>
<td>Annexures</td>
<td>36-57</td>
</tr>
<tr>
<td></td>
<td>Summary of Findings</td>
<td>58-59</td>
</tr>
</tbody>
</table>

Annexures

1. Bio Medical Wastes (Management & Handling) Rules, 1998 as amended to date
2. Notification of Govt. of Tripura declaring Prescribed Authority & constituting Advisory Committee
4. Memorandum of Govt. of Tripura regarding sale of used hypofixures solutions/ used X-Ray films/ shredded empty saline bottles(plastic)/ empty phenyl (plastic) drums

STUDY TEAMS

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Sri Abhijit Sarkar, Programme Officer, ENVIS
Introduction

Medical care is vital for our life and health, but the waste generated from medical activities represents a real problem of living nature and human world. Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment. Every day, relatively large amount of potentially infectious and hazardous waste are generated in the health care hospitals and facilities around the world. Indiscriminate disposal of BMW or hospital waste and exposure to such waste possess serious threat to environment and to human health that requires specific treatment and management prior to its final disposal. The present review article deals with the basic issues as definition, categories, problems relating to biomedical waste and procedure of handling and disposal method of Biomedical Waste Management. It also intends to create awareness amongst the personnel involved in health care unit.

Biomedical waste, also known as infectious waste or medical waste is defined as waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets. The main sources of biomedical waste are hospitals, medical clinics and laboratories. Because biomedical waste can be detrimental to human health, the law requires such facilities to follow procedures that protect the public from coming into contact with it. Agencies that regulate different aspects of biomedical waste include Occupational Safety and Health Administration (OSHA), Food and Drug Administration (FDA) and Nuclear Regulatory Commission. Hospital is one of the complex institutions, which is frequented by people from every walk of life in the society without any distinction between age, sex, race and religion. This is over and above the normal inhabitants of hospital i.e patients and staff. All of them produce waste, which is increasing in its amount and type due to advances in scientific knowledge and is creating its impact. The hospital waste, in addition to the risk for patients and Personnel who handle these wastes poses a threat to public health and environment. Keeping in view inappropriate biomedical waste management, The Ministry of Environment and Forests notified the “Biomedical Waste (management and handling) Rules, 1998” in July 1998. In accordance with these Rules (Rule4), it is the duty of every “occupier” i.e. a person who has the control over the institution and or its premises, to take all steps to ensure that waste generated is handled without any adverse effect to human health and environment. The hospitals, nursing homes, clinic, dispensary, animal house, pathological lab etc., are therefore required to set in place the biological waste treatment facilities. It is however not incumbent that very institution has to have its own waste treatment facility.
The rules also envisage that common facility or any other facilities can be used for waste treatment. The waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission. The hazardous and toxic parts of waste from healthcare establishments comprising infectious, bio-medical and radioactive material as well as sharps (hypodermic needles, knives, scalpels etc.) constitute a grave risk, if these are not properly treated/disposed or are allowed to be mixed with other municipal waste. Its propensity to encourage growth of various pathogen and vectors and its ability to contaminate other nonhazardous/non-toxic municipal waste jeopardizes the efforts undertaken for overall municipal waste management. The rag pickers and waste workers are often worst affected, because unknowingly or unwittingly, they rummage through all kinds of poisonous material while trying to salvage items, which they can sell for reuse. At the same time, this kind of illegal and unethical reuse can be extremely dangerous and even fatal. Diseases like cholera, plague, tuberculosis, hepatitis (especially HBV), AIDS (HIV), diphtheria etc. in either epidemic or even endemic form, pose grave public health risks. Unfortunately, in the absence of reliable and extensive data, it is difficult to quantify the dimension of the problem or even the extent and variety of the risk involved. With a judicious planning and management, however, the risk can be considerably reduced. Studies have shown that about three fourth of the total waste generated in health care establishments is non-hazardous and non-toxic. Therefore with a rigorous regime of segregation at source, the problem can be reduced proportionately. Similarly, with better planning and management, not the waste generation is reduced, but overall expenditure on waste management can be controlled. Institutional/ Organizational set up, training and motivation are given great importance these days. Proper training of health care establishment personnel at all levels coupled with sustained motivation can improve the situation considerably. Since majority of the health care establishments are located within the municipal area, their waste management naturally has a close linkage with the municipal system. At the same time, the civic authority is responsible for public health in the whole of the municipal area. Therefore, the health care establishments must have a clear understanding with the municipality regarding sharing of responsibilities associated with this issue. Studies have shown that about three fourth of the total hospital waste is not hazardous / infected (provided strict segregation is practiced) and can even be taken care of by the municipal waste management system, e.g., waste generated at the hospital kitchen or garden, the office or packaging material from the store etc. Such practices of strict and careful segregation would reduce the load and the cost of management of the actually hazardous and infected biomedical waste (collection, transportation, treatment and disposal). Each establishment has to chalk-out a programme for qualitative as well as quantitative survey of the waste generated depending on the medical activities and procedures followed by it. The Bio-Medical Wastes (Management & Handling) Rules, provides that the State Pollution Control Board of the State and the Pollution Control Committees in respect of the Union Territories are the prescribed authority for enforcement of the provisions of these rules in respect of all Health Care
Establishments including hospitals, nursing homes, pathological laboratories, blood banks, etc.

In order to assess the present status of the implementation of the Bio-Medical Wastes (Management & Handling) Rules, 1998, as amended to date the officials of Tripura State Pollution Control Board have inspected all the 8 (eight) District Hospitals. It was found that though, in some districts, district hospitals have been constructed recently, the Sub-Divisional Hospitals are virtually functioning as District Hospitals. The officials of the Tripura State Pollution Control Board also meet the authorities of different hospitals and apprised them the different provisions of the rules. They have provided them a Manual for handling bio medical waste in health care establishments prepared by the Tripura State Pollution Control Board and also given them the inputs for effective management of bio-medical wastes. While some efforts were taken by few hospitals lot many things are to be executed for effective management of bio-medical wastes otherwise there will be a catastrophic disaster in the days to come.

The findings of the visit are documented along with photographs and placed seriatim. A summary of the status of bio medical wastes management in the government hospitals of Tripura is also placed in this report.

In the Environment Performance Index (EPI) published by the Planning Commission and placed in the Lok Sabha by the Hon’ble Minister of State for Parliamentary Affairs & Planning, Govt. of India our State ranks 20 (twenty). On a close scrutiny it was found that the State has poor ranking / score in Waste Management. Therefore it is the need of the time to become more proactive by the Hospital Authority to Manage the Bio-Medical Waste as per the provisions of the Bio-Medical Wastes (Management & Handling) Rules, 1998, as amended to date.

Hopefully this report will provide an eye-view of the present status and help to manage the Bio-Medical Waste in much better way.
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of the District</th>
<th>Name of the Hospital</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West Tripura</td>
<td>IGM Hospital</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Sepahijala</td>
<td>Bishalgarh Sub-Divisional Hospital</td>
<td>Presently working as District Hospital</td>
</tr>
<tr>
<td>3</td>
<td>South Tripura</td>
<td>Belonia Sub-Divisional Hospital (First Referral Unit)</td>
<td>Presently working as District Hospital</td>
</tr>
<tr>
<td>4</td>
<td>Gomati</td>
<td>Tripura Sundari Hospital</td>
<td>Presently working as District Hospital. Gomati District Hospital has been constructed. OPD for General Medicine, Dental, Eye, ENT &amp; Psychiatric Department are functional</td>
</tr>
<tr>
<td>5</td>
<td>Khowai</td>
<td>Khowai Sub-Divisional Hospital</td>
<td>Presently working as District Hospital</td>
</tr>
<tr>
<td>6</td>
<td>Dhalai</td>
<td>District Hospital Dhalai, Kulai</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Unakoti</td>
<td>R.G.M. Sub Divisional Hospital, Kailashahar</td>
<td>Presently working as District Hospital. Unakoti District Hospital has been constructed. OPD is functional</td>
</tr>
<tr>
<td>8</td>
<td>North Tripura</td>
<td>Dharmanagar Sub-Divisional Hospital</td>
<td>Presently working as District Hospital</td>
</tr>
</tbody>
</table>
Inspection Reports

Inspection Report on I.G.M. Hospital, Agartala

An inspection of I.G.M. Hospital, Agartala was undertaken by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Ratan Debnath, Sr. Laboratory Assistant.

The inspection was made basically for observing how Bio-Medical Wastes (BMW) are treated and disposed off by the hospital authority. During inspection, almost all the wards have been visited. Moreover, in and outside drainage facilities, onsite BMW management facility, Temporary storage site of BMW etc. were examined carefully.

Two-three containers and few bowls are kept in every ward. Different types of solid BMWs are segregated in most of the wards and kept in respective containers. In some wards, needle crushers were found active. Used saline bottles are shredded and saline sets are cut on spot. No disinfectant is seen in any container.

Ward-sisters and Ward master intimated that they keep wastes category wise in separate containers but the Sulav workers who are engaged to remove the wastes mixed up the wastes together. The mixed wastes are kept in Municipal Bin which is transported by the AMC every day to the incinerator plant at Hapania.

It is relevant to mention here that the hospital authority has not provided any close area for temporary storage of BMW outside the building. A bounded place with concreted platform is necessary for temporary storing of hospital waste.
PHOTOGRAPHS

IGM New Building

Cleaning of Hospital Premises

Waste stored for Disposal inside Hospital Premises

Syringe Cutter Operational

Uncut used Saline Bottle found

Autoclave found and in use
Inspection Report of Bishalgarh Sub-Divisional Hospital, Sipahijala District

An inspection of the Bishalgarh Sub-Divisional Hospital was made by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Abhijit Sarkar, Programme Officer.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection we met Dr. Ratan Chakraborty, Sub-Divisional Medical Officer and intimated him the purpose of the inspection and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

4. The SDMO along with the Ward-Sisters of the Hospital accompanied the Inspection Team.

The Inspection Team had visited almost all the Wards of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

Observations:

i) It is a 75 (seventy five) bedded hospital out of which on an average 45 (forty five) beds remain occupied throughout the year.

ii) The hospital authority provided 3 big size colour coding containers and bowls in every ward. Different types of solid BMWs are kept in those containers. They have also displayed instructions in every ward for proper disposal of different categories of wastes in different containers. Containers were also covered with colored plastic bags.

iii) The hospital is segregating the wastes properly in the wards.

iv) Needle Crushers were found in operation in every ward. Used saline bottles are pierced.

v) There is sufficient number of Autoclaves which are used for primary treatment.
vi) There is no Operation Theatre (OT) in the hospital but there is a Labor Room.

vii) The Hospital Authority got prepared 2 (two) cemented disposal pits, one for placenta and another for other BMWs and general solid wastes. However it was noticed that some hospital wastes were lying here and there outside the pit.

viii) The waste water from all the Wards and labor room directly goes to drain outside drain after preliminary disinfection with bleaching powder.

ix) For effective cleaning & disposal of wastes generated from the hospital, they have engaged 15 Nos. of personnel from LAMPS & PACS.

**PHOTOGRAPHS**

<table>
<thead>
<tr>
<th>Bishalgarh Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual cutting of used saline bottle</td>
</tr>
</tbody>
</table>
Three types of bucket found to segregate the waste

Used syringe found inside one of the three buckets provided by the hospital authorities

Syringe Cutter was found in operation

Buckets found inside labour room
Instructions along with the buckets were provided inside the hospital.

One of the instructions showing different colored bucket along with the types of wastes to be stored.

Autoclave was found operational.

A 2 chamber pit for storing the wastes.
Some wastes were found dumped around the pit

2 chambered pit for dumping the wastes generated from hospital
Inspection Report on Belonia Sub-Divisional Hospital

For observing how Bio-Medical Waste (BMW) are being treated and disposed off by the Hospital Authorities, an inspection of Belonia Sub-Divisional Hospital (First Referral Unit) was undertaken by Sri Manas Mukherjee, Executive Engineer and Sri Ratan Debnath, Sr. Laboratory Assistant.

2. During inspection, the Sub-Divisional Medical Officer (SDMO) was not available as he was on official visit at Santirbazar. Therefore, we met Dr. Samar Das, the Chief Medical Officer (CMO) and intimated him the purpose of the visit and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

3. On the advice of CMO, Sri Dipak Kar, District Programme Manager and Smt. Hasi Dey, Sister-in-charge accompanied the Inspection Team.

The Inspection Team had visited almost all the Wards and Operation Theatre (OT) of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, final disposal site of BMW etc. were examined during inspection.

4. It is a 100 bedded hospital and on an average 80% of the total beds remains occupied throughout the year.

Observations:

i) The hospital provided colour coding containers and bowls in every ward. Different types of solid BMWs are segregated in wards and kept in packets inside the respective containers.

ii) Segregation of wastes is being practiced in wards as well as in OPD Section.

iii) In the wards, needle crushers were found active. Used saline bottles are pierced but saline sets are not cut on spot. Except bleaching powder, no other disinfectants are seen; though as per the BMW Rules, chemical treatment using at least 1% Hypochlorite solution or any other equivalent reagent must be there for ensuring disinfection.

iv) The Hospital Authority has prepared a cemented disposal pit with covering at the back side of the hospital and all the wastes are being dumped inside the pit. But, on spot it was seen that a remarkable quantity of hospital wastes were lying here and there outside the disposal pit.

v) Sister in-charge intimated that they keep the wastes category-wise in separate containers inside their hospital, but there were no separate temporary storage pits outside the hospital.
in which wastes could be disposed separately. So, they disposed all the wastes together in the same disposal pit. She also reported that the wastes are burnt time to time when the disposal pit gets filled.

vi) It is noted that a drain has gone to the adjacent lake which is not being used by people for domestic purpose but is being used for pisciculture. Waste water from basins of different wards of the hospital directly goes to that lake.

vii) It is presumed that during monsoon, the rain water might get mixed with BMWs which were not properly disposed & kept outside the disposal pit and flowed to the said lake.

PHOTOGRAPHS

Belonia Hospital

Permanent disposal pit of Belonia Sub-Division Hospital

OT Waste inside the disposal pit
<table>
<thead>
<tr>
<th>Status Report of BMW Management in District Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMW from General Ward stored outside the disposal bin</td>
</tr>
<tr>
<td>BMW dumped near a drain by the bank of the lake</td>
</tr>
<tr>
<td>A drain is going to nearby lake.</td>
</tr>
</tbody>
</table>
Inspection Report on Gomati District Hospital, Udaipur (formally known as Tripura Sundari District Hospital)

An inspection of Gomati District Hospital (formally known as Tripura Sundari District Hospital) was made by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Ratan Debnath, Sr. Laboratory Assistant.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection, the Medical Superintendent of the hospital was not available in his chamber. Therefore, we met Dr. Bidhu Bhusan Das, the Chief Medical Officer (CMO) and intimated him the purpose of the inspection and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.


The Inspection Team had visited almost all the Wards and Operation Theatre (OT) of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

Observations:

i) According to the Ward Master, though it is a 100 (hundred) bedded hospital but the patient load remains more than the bed capacity throughout the year.

ii) The hospital authority provided 2 big size colour coding containers and bowls in every ward. Different types of solid BMWs are kept in those containers.

iii) Segregation of wastes is not done properly in this hospital.

iv) **No needle crusher is found in any ward.** Used saline bottles are pierced but saline sets are not cut on spot.

v) There is a Micro oven and a shredder machine available in the hospital for treating of BMW but none of them are being used. It is reported by the Ward Master that the machines are not being used due to lack of operator.
vi) The Hospital Authority got prepared 2 (two) cemented disposal pits, one for OT wastes and another for other BMWs. But those were not maintained properly. In both the sites huge quantities of hospital wastes were lying here and there outside the pit.

vii) Ward Master intimated that Nagar Panchayat collects the hospital waste from those sites once a week and disposes at their final disposal site near Banduar.

viii) The waste water from all the Wards and OT directly goes to Nagar Panchayat’s drain without any treatment.

ix) Except bleaching powder, no other disinfectants are seen; though as per the BMW Rules, chemical treatment using at least 1% Hypochlorite solution or any other equivalent reagent must be there for ensuring disinfection.

PHOTOGRAPHS

Udaipur Hospital

- Shredder machine
- Shredded saline bottle inside the shredder
Temporary Storage site is not maintaining properly

Waste dumped outside the temporary storage site

Cemented and cover disposal site of OT waste

OT waste unscientifically dumped nearby permanent disposal pit

Waste unscientifically dumped near the permanent disposal pit of OT waste

New Building of Gomati District Hospital
**Inspection Report of Khowai Sub-Divisional Hospital, Khowai District**

An inspection of Khowai Sub-Divisional Hospital was made by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Abhijit Sarkar, Programme Officer.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection we met Dr. Dhananjoy Reang, Sub-Divisional Medical Officer (SDMO), along with Dr. P.K. Majumder, Chief Medical Officer (CMO) and intimated them the purpose of the inspection and apprised them the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

4. The SDMO along with the Ward-Sister (Smt. Khumtia Debbarma) of the Hospital accompanied the Inspection Team.

The Inspection Team had visited almost all the Wards of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

**Observations:**

   i) It is a 100 (One hundred fifty) bedded hospital out of which almost all beds remain occupied throughout the year.

   ii) The hospital authority provided 3 big size containers and bowls in every ward. Different types of solid BMWs are kept in those containers. They have also displayed instructions in every ward for proper disposal of different categories of wastes in different containers.

   iii) The hospital is segregating the wastes properly in the wards.

   iv) Needle Crushers were found but some were not in use. Used saline bottles were found uncut.

   v) Autoclaves were not in use.

   vi) Placenta and other human organic tissues were kept in a closed tank.
vii) The Hospital Authority got prepared pit for disposal of BMWs and general solid wastes but were completely filled. So, Dr. Arindam Debbarma (in-charge of looking into BMWs and other wastes disposal) informed us that the wastes segregated in the hospitals were dumped together around the pit in open area and are being burnt later.

viii) The waste water from all the Wards and OT directly goes to outside drain.

**PHOTOGRAPHS**

<table>
<thead>
<tr>
<th><strong>Khowai Hospital</strong></th>
</tr>
</thead>
</table>
| ![Khowai Hospital building](image1)
| ![Two buckets were provided for proper segregation of wastes generated](image2) |

| ![CMO showing us in and around the hospital](image3) |
| ![Two buckets were provided for proper segregation of wastes generated](image4) |
Neddle cutter was found and in use

Inspection of Hospital along with hospital authorities

Used saline bottles were found uncut

Three buckets were provided for proper segregation of wastes generated in some Wards

Burning of wastes were taking place due to lack of storage space

Burning of wastes were taking place due to lack of storage space
A 2 chambered pit which is completely filled and wastes are dumped around and burnt later.
Inspection Report of District Hospital Dhalai, Dhalai District

An inspection of District Hospital Dhalai situated at Kulai was undertaken by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Abhijit Sarkar, Programme Officer.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection we met Dr. Jiteswar Ahir, Medical Superintendent (MS) and intimated him the purpose of the inspection and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

4. The Hospital has constituted a Committee for effective management of Bio Medical Wastes in which Dr. Anup Kr. Debnath, Medical Officer (MO), is the in charge and Matron, one Staff Nurse, one Laboratory Technician and one Ward Master are the members.

5. The MS along with Dr. Debnath, MO, Matron and the Ward-Sisters of the Hospital accompanied the Inspection Team. The Inspection Team had visited almost all the Wards of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

Observations:

i) It is a 150 (One hundred fifty) bedded hospital out of which on an average 70 (seventy) beds remain occupied throughout the year.

ii) The hospital authority provided 4 big size colour coded containers and bowls in every ward. Different types of solid BMWs are kept separately in those containers. They have also displayed instructions in every ward for proper disposal of different categories of wastes in different containers but plastic bags used for wrapping the containers were not there.

iii) The hospital is segregating the wastes properly in the wards.

iv) Needle Crushers (12 Nos.) were there for crushing the used syringes. They are cutting the used saline bottles by scissors and were sold to an authorized buyer (Sri Bhudeb Dasgupta)
as per the instruction of Directorate of Health Services vide Memo No. F.5-(3-14)-MS/DHS/2013-14 dated 06-09-2013.

v) Autoclaves (3 Nos.) were seen which are used for primary treatment.

vi) The Hospital Authority has got prepared 4 chambered pit for disposal of BMWs and general solid wastes.

vii) The waste water from all the Wards directly goes to drain outside after preliminary disinfection.

PHOTOGRAPHS

<table>
<thead>
<tr>
<th>Ambassa Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 3 colored dustbins is being provided by the Hospital Authorities for proper disposal and segregation of wastes</td>
</tr>
<tr>
<td>A 3 colored dustbins is being provided by the Hospital Authorities for proper disposal and segregation of wastes</td>
</tr>
<tr>
<td>Used saline bottles were found inside some</td>
</tr>
<tr>
<td>Used saline bottles were found inside some dustbins</td>
</tr>
<tr>
<td>dustbins</td>
</tr>
<tr>
<td>----------------------------------------------</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Bowls been provided in general wards of the hospital</td>
</tr>
</tbody>
</table>
Instructions showing the type of wastes to be kept in the wastebins

Hospitals authorities along with the autoclave which is used during operation

A small autoclave was also seen in use in ward

Dhalai District Hospital building
Inspection Report of R.G.M. Sub Divisional Hospital, Kailashahar, Unakoti District

An inspection of R.G.M. Sub-Divisional Hospital was made by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Abhijit Sarkar, Programme Officer. A Unakoti District Hospital has been constructed recently nearby where only OPD is functional.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection we met Dr. K.Sen Laskar, SDMO of R.G.M. Sub-Divisional Hospital who is also the Medical Superintendent of District Hospital, Unakoti and intimated him the purpose of the inspection and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

4. The MS along with the Ward Sisters accompanied the Inspection Team. The Inspection Team had visited almost all the Wards of the Hospital. Moreover, in and outside drainage facilities, Blood Banks, Pathology Department, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

Observations:

i) It is a 128 (One hundred twenty eight) bedded hospital which completely remains occupied throughout the year. Also, the hospital is having a 10 bedded Ayush along with Panchakarma facility.

ii) The hospital authority provided 2 big size containers and bowls in every ward. Different types of solid BMWs are kept in those containers. They have also displayed instructions in every ward for proper disposal of different categories of wastes in different containers but plastic bags used for wrapping the containers were not present.

iii) Needle Crushers were found and were in operation. They are cutting the used saline bottles by scissors.

iv) Large Autoclaves were present which are used for primary treatment.
v) There is Operation Theatre (OT) and Blood Bank in the hospital. The Blood Banks has a capacity of around 1000 bottles and around 200 bottles were stored on an average throughout the year.

vi) The Hospital Authority got 2 deep burial pit for disposal of BMWs and general solid wastes. But during the inspection it was found that quite a lot of wastes were disposed in open around the pit and they are burning the solid BMWs time to time.

vii) The waste water from all the Wards, Operation Theater and Blood Bank directly goes to drain outside after disinfection with Sodium Hypochloride. The drain is connected to Manu River.

viii) The MS had informed us that they have talked to the Nagar Panchayet for the removal of BMWs and other wastes.

PHOTOGRAPHS

Kailashahar Hospital

R.G.M Sub-Divisional Hospital

Needle crusher in use
### Status Report of BMW Management in District Hospitals

<table>
<thead>
<tr>
<th>Image</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Three different colored buckets were provided for proper segregation of the wastes generated inside hospital" /></td>
<td>Wastes are being dumped behind the hospital without segregation and treatment</td>
</tr>
<tr>
<td><img src="image2.png" alt="Wastes are being dumped behind the hospital without segregation and treatment" /></td>
<td>Inspection of disposal site being done by TSPCB official along with hospital authorities</td>
</tr>
<tr>
<td><img src="image3.png" alt="Filled up waste pit behind the hospital" /></td>
<td>Wastes are being dumped behind the hospital without segregation and treatment</td>
</tr>
<tr>
<td><img src="image4.png" alt="Inspection of disposal site being done by TSPCB official along with hospital authorities" /></td>
<td>Wastes are being dumped behind the hospital without segregation and treatment</td>
</tr>
</tbody>
</table>

*Tripura State Pollution Control Board*
Burning of wastes was found in the dumping site behind the hospital building

Autoclaves were stored inside the Storage Room and was not in use

Bowls were provided under each bed in every ward

Separate containers for wastes generated in Blood Bank
Inspection Report of Dharmanagar Sub-Divisional Hospital, North Tripura District

An inspection of Dharmanagar Sub-Divisional Hospital was made by Sri Manas Mukherjee, Executive Engineer accompanied by Sri Abhijit Sarkar, Programme Officer.

2. The inspection was made for observing how Bio-Medical Wastes (BMW) are being treated and disposed off by the Hospital Authorities.

3. During inspection we met Dr. Amitava Chakraborty, Sub-Divisional Medical Officer and intimated him the purpose of the inspection and apprised him the different provisions of the Bio-Medical Waste (Management & Handling) Rules, 1998 as amended to date.

4. The Ward-Sister and Staff Nurse (Smt. Ratna Chisim and Smt. Deepika Chakraborty respectively) of the Hospital accompanied the Inspection Team. The Inspection Team had visited almost all the Wards of the Hospital. Moreover, in and outside drainage facilities, onsite and off-site BMW Management facilities, temporary disposal site of BMW, final disposal site of BMW etc. were examined during inspection.

Observations:

i) It is a 100 (One hundred) bedded hospital and all the beds remain occupied throughout the year. Sometimes there is shortage of bed due to over count of patients.

ii) The hospital authority provided 1 big size container and bowls in every ward. Different types of solid BMWs are kept in that container.

iii) The hospital has Operation Theater and Blood Bank as well. The capacity of the Blood Bank is around 700 bottles and around 500 bottles are being stored all the time.

iv) No Needle Crushers were found. Used saline bottles were said cut but during the visit some bottles were found uncut and lying behind the hospital building. No shredder machines were found.

v) Autoclaves (4 Nos.) were seen only in the Operation Theater (OT).

vi) The Hospital Authority got 2 (two) pits prepared. One covered pit for disposal of placenta, other human tissues etc and
another one for disposal of all the solid BMWs generated by the hospital. The SDMO has informed that on their request, the Nagar Panchayat is carrying away the wastes and disposed to their dumping site without any treatment.

vii) The effluents from all the Wards, Operation Theater and Blood Bank directly go to outside drain without any treatment.

viii) No disinfectants were found. Even bleaching powders were also not provided in the containers.

ix) The hospital is not following the Bio-Medical Wastes Rules properly. The SDMO has informed that they are facing financial and manpower problem for effective management of BMWs.

**PHOTOGRAPHS**

<table>
<thead>
<tr>
<th>Dharmanagar Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Dharmanagar Hospital" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dharmanagar Sub-Divisional Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2.png" alt="Dharmanagar Sub-Divisional Hospital" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vials are stored and reused for collection of pathological samples</th>
</tr>
</thead>
</table>
A 2 chambered pit for storage of wastes

Wastes are found littering behind the Hospital building

Uncut Saline bottle found behind the Hospital Building in open

Only a single bin has been provided for disposal of wastes from wards.

Bowls were provided under patient’s bed

Vials and other unused medicines found inside one of the bins
Ward Sisters in conversation with TSPCB officials

Wastes being dumped without segregation

Tripura State Pollution Control Board
Recommendaions

There is a big network of Health Care Institutions. The hospital waste like body parts, organs, tissues, blood and body fluids along with soiled linen, cotton, bandage and plaster casts from infected and contaminated areas are very essential to be properly collected, segregated, stored, transported, treated and disposed of in safe manner to prevent nosocomial or hospital acquired infection.

The Process of Bio-Medical Wastes Management includes:-
1. Waste collection
2. Segregation
3. Transportation and storage
4. Treatment & Disposal
5. Transport to final disposal site
6. Final disposal

Recommendations

Health care waste is a heterogeneous mixture, which is very difficult to manage as such. But the problem can be simplified and its dimension reduced considerably if a proper management system is planned. All the Hospitals should manage Bio-Medical Wastes as per the provisions of the Bio-Medical Wastes (Management & Handling) Rules, 1998, as amended to date.

Segregation of BMWs should be done at source. There should be different colour-coded Plastic Containers in every Ward and OTs. There must be Label for BMW Containers/Bags. There should be biomedical waste label on waste carry bags and waste carry trolley and also poster has put on the wall adjacent to the bins (waste) giving details about the type of waste that has to dispose in the baggage as per biomedical waste management rule. Carry bags also have the biohazard symbol on them.

Bio-medical waste should not be mixed with other wastes.

Needle Crushers, Sharps & Autoclaves should be provided in every Ward and OTs.

Separate vehicle/Van may be provided for collection of segregated bio-medical wastes and for transportation to the disposal site.

The liquid waste should be disinfected and treated in the Sewage Treatment Plant (STP) before discharging to the outside drain / river.
Efforts should be taken to construct one Common Bio-Medical Waste Treatment Plant including one incinerator, as per the standard specification, for every two districts of the State.

Sensitization programme for all the concerned hospital staffs including doctors should be taken up periodically.

Bio-medical waste Management Committee can be established in each Hospital. They may sit once in a month and review the Bio-Medical Waste Management of their hospital.

Housekeeping staff wear protective devices such as gloves, face masks, gowned, while handling the waste.

**CONCLUSION**

Medical wastes should be classified according to their source, typology and risk factors associated with their handling, storage and ultimate disposal. The segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives. We need to consider innovative and radical measures to clean up the distressing picture of lack of civic concern on the part of hospitals and slackness in government implementation of bare minimum of rules, as waste generation particularly biomedical waste imposes increasing direct and indirect costs on society. The challenge before us, therefore, is to scientifically manage growing quantities of biomedical waste that go beyond past practices. If we want to protect our environment and health of community we must sensitize ourselves to this important issue not only in the interest of health managers but also in the interest of community.
Chapter 4

Annexures

Annexure-I

BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 1998

( AS AMENDED TO DATE)
BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 1998
MINISTRY OF ENVIRONMENT & FORESTS

NOTIFICATION


S.O.630(E). - Whereas a notification in exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) was published in the Gazette vide S.O. 746(E), dated 16 October, 1997 inviting objections from the public within 60 days from the date of the publication of the said notification on the Bio-Medical Waste (Management and Handling) Rules, 1998 and whereas all objections received were duly considered;

Now, therefore, in exercise of the powers conferred by Section 6, 8 and 25 of the Environment (Protection) Act, 1986 the Central Government hereby notifies the rules for the management and handling of bio-medical waste.

1. SHORT TITLE AND COMMENCEMENT:
(1) These rules may be called the Bio-Medical Waste (Management and Handling) Rules, 1998.
(2) They shall come into force on the date of their publication in the official Gazette.

2. APPLICATION:
These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio-medical waste in any form.

3. DEFINITIONS:
In these rules unless the context otherwise requires:
1. "Act" means the Environment (Protection) Act, 1986 (29 of 1986);
2. "Animal House" means a place where animals are reared/kept for experiments or testing purposes;
3. "Authorization" means permission granted by the prescribed authority for the generation, collection, reception, storage, transportation, treatment, disposal and/or any other form of handling of bio-medical waste in accordance with these rules and any guidelines issued by the Central Government.
4. "Authorized person" means an occupier or operator authorized by the prescribed authority to generate, collect, receive, store, transport, treat, dispose and/or handle bio-medical waste in accordance with these rules and any guidelines issued by the Central Government.
5. "Bio-medical waste" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological, and including categories mentioned in Schedule I;
6. "Biological" means any preparation made from organisms or micro-organisms or product of metabolism and biochemical reactions intended for use in the diagnosis, immunization or the treatment of human beings or animals or in research activities pertaining thereto;

7. "Bio-medical waste treatment facility" means any facility wherein treatment disposal of bio-medical waste or processes incidental to such treatment or disposal is carried out and includes common treatment facilities.

(7a) 'Form' means Form appended to these rules;

8. "Occupier" in relation to any institution generating bio-medical waste, which includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called, means a person who has control over that institution and/or its premises;

9. "Operator of a bio-medical waste facility" means a person who owns or controls or operates a facility for the collection, reception, storage, transport, treatment, disposal or any other form of handling of bio-medical waste;

10. "Schedule" means schedule appended to these rules;

4. DUTY OF OCCUPIER:

It shall be the duty of every occupier of an institution generating bio-medical Waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

5. TREATMENT AND DISPOSAL

(I) Bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V.

(2) Every occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite bio-medical waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.

6. SEGREGATION, PACKAGING, TRANSPORTATION AND STORAGE

(1) Bio-medical waste shall not be mixed with other wastes.

(2) Bio-medical waste shall be segregated into containers/bags at the point of Generation in accordance with Schedule II prior to its storage, Transportation, treatment and disposal. The containers shall be labeled according to Schedule III.

(3) If a container is transported from the premises where bio-medical waste is generated to any waste treatment facility outside the premises, the container shall, apart from the label prescribed in Schedule III, also carry information prescribed in Schedule IV.

(4) Notwithstanding anything contained in the Motor Vehicles Act, 1988, or rules hereunder, untreated bio-medical waste shall be transported only in such vehicle as may be authorized for the purpose by the competent authority as specified by the Government.

(5) No untreated bio-medical waste shall be kept stored beyond a period of 48 hours:
Provided that if for any reason it becomes necessary to store the waste beyond such period, the authorized person must take permission of the prescribed authority and take measures to ensure that the waste does not adversely affect human health and the environment.

(6) The Municipal body of the area shall continue to pick up and transport segregated non bio-medical solid waste generated in hospitals and nursing homes, as well as duly treated bio-medical wastes for disposal at municipal dump site.

7. PRESCRIBED AUTHORITY

(I) Save as otherwise provide, the prescribed authority for enforcement of the provisions of these rules shall be the State Pollution Control Boards in respect of States and the Pollution Control Committees in respect of the Union Territories and all pending cases with a prescribed authority appointed earlier shall stand Transferred to the concerned State Pollution Control Board, or as the case may be, the Pollution Control Committees.

([I[A]]) The prescribed authority for the enforcement of the provisions of these Rules in respect of all Health Care Establishments including Hospitals, Nursing Homes, Clinics, Dispensaries, Veterinary Institutions, Animal Houses, Pathological Laboratories & Blood Bank of the Armed Forces under the Ministry of Defence shall be the Director General, Armed Forces Medical Services.

(2) The prescribed authority for the State or Union Territory shall be appointed within one month of the coming into force of these rules.

(3) The prescribed authority shall function under the supervision and control of the respective Government of the State or Union Territory.

(4) The prescribed authority shall on receipt of Form I make such inquiry as it deems fit and if it is satisfied that the applicant possesses the necessary capacity to handle bio-medical waste in accordance with these rules, grant or renew an authorization as the case may be.

(5) An authorization shall be granted for a period of three years, including an initial trial period of one year from the date of issue. Thereafter, an application shall be made by the occupier/operator for renewal. All such subsequent authorization shall be for a period of three years. A provisional authorization will be granted for the trial period, to enable the occupier/operator to demonstrate the capacity of the facility.

(6) The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew authorization.

(7) Every application for authorization shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application.

(8) The prescribed authority may cancel or suspend an authorization, if for reason~, to be recorded in writing, the occupier/operator has failed to comply ~ with any provision of the Act or these rules:

Provided that no authorization shall be cancelled or suspended without giving a reasonable opportunity to the occupier/operator of being heard.
8. AUTHORISATION
(I) Every occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling bio-medical waste in any other manner, except such occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month, shall make an application in Form I to the prescribed authority for grant of authorization.
(2) Every operator of a bio-medical waste facility shall make an application in Form I to the prescribed authority for grant of authorization.
(3) Every application in Form I for grant of authorization shall be accompanied by a fee as may be prescribed by the Government of the State or Union Territory.
(4) The authorization to operate a facility shall be issued in Form IV, subject to conditions laid therein and such other condition, as the prescribed authority, may consider it necessary.

9. ADVISORY COMMITTEE
The Government of every State/Union Territory shall constitute an advisory committee. The Committee will include experts in the field of medical and health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organization including non-governmental organizations. As and when required, the Committee shall advise the Government of the State/Union Territory and the prescribed authority on matters related to the implementation of these rules.

10. ANNUAL REPORT
Every occupier/operator shall submit an annual report to the prescribed authority in Form II by 31 January every year, to include information about the categories and quantities of bio-medical wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31 March every year.

11. MAINTENANCE OF RECORDS
(1) Every authorized person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with these rules and any guidelines issued.
(2) All records shall be subject to inspection and verification by the prescribed authority at any time.

12. ACCIDENT REPORTING
When any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorized person shall report the accident in Form III to the prescribed authority forthwith.

13. APPEAL
i. Save as otherwise provided in Sub-Rule (2), any person aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal in form V to such authority as the Government of State/Union Territory may think fit to constitute.
Provided that the authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

**14. COMMON DISPOSAL / INCINERATION SITES**

Without prejudice to rule 5 of these rules, the Municipal Corporations, Municipal Boards or Urban Local Bodies, as the case may be, shall be responsible for providing suitable common disposal/incineration sites for the biomedical wastes generated in the area under their jurisdiction and in areas outside the jurisdiction of any municipal body, it shall be the responsibility of the occupier generating bio-medical waste/operator of a bio-medical waste treatment facility to arrange for suitable sites individually or in association, so as to comply with the provisions of these rules.

**SCHEDULE 1**
*(See Rule 5)*

**CATEGORIES OF BIO-MEDICAL WASTE**

<table>
<thead>
<tr>
<th>Waste Category No.</th>
<th>Waste Category Type**</th>
<th>Treatment and Disposal Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category No 1</td>
<td>Human Anatomical Waste(human tissues, organs, body parts)</td>
<td>Incineration @ / deep burial*</td>
</tr>
<tr>
<td>Category No 2</td>
<td>(animal tissues, organs, body parts Carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)</td>
<td>Incineration @/deep burial*</td>
</tr>
<tr>
<td>Category No 3</td>
<td>Microbiology &amp; Biotechnology Wastes (Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)</td>
<td>Local autoclaving/microwaving/incineration @</td>
</tr>
<tr>
<td>Category No 4</td>
<td>Waste sharps (needless, syringes, scalpels, blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps)</td>
<td>Disinfection(chemical treatment@@ /autoclaving/microwaving and multilation/shredding ##</td>
</tr>
</tbody>
</table>

Discarded Medicines and Incineration @
<table>
<thead>
<tr>
<th>Category No</th>
<th>Waste Category</th>
<th>Description</th>
<th>Disposal Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Cytoxic drugs</td>
<td>(wastes comprising of outdated, contaminated and discarded medicines)</td>
<td>destruction and drugs disposal in secured landfills</td>
</tr>
<tr>
<td>6</td>
<td>Soiled Wastes</td>
<td>(Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines, beddings, other material contaminated with blood)</td>
<td>incineration@ autoclaving/microwaving</td>
</tr>
<tr>
<td>7</td>
<td>Solid Waste</td>
<td>(wastes generated from disposable items other than the waste sharps such as tubings, catheters, intravenous sets etc.)</td>
<td>Disinfection by chemical treatment @@ autoclaving / microwaving and mutilation / shredding##</td>
</tr>
<tr>
<td>8</td>
<td>Liquid Waste</td>
<td>(waste generated from laboratory and washing cleaning, housekeeping and disinfecting activities)</td>
<td>Disinfection by chemical treatment @@ and discharge into drains</td>
</tr>
<tr>
<td>9</td>
<td>Incineration Ash</td>
<td>(ash from incineration of any biomedical waste)</td>
<td>Disposal in municipal landfill</td>
</tr>
<tr>
<td>10</td>
<td>Chemical Waste</td>
<td>(chemical used in production of biologicals, chemicals used in disinfection, as insecticides etc)</td>
<td>Chemical treatment @@ and discharge into drains for liquids and secured landfill for solids.</td>
</tr>
</tbody>
</table>

@@ Chemicals treatment using at least 1 % hypo chlorite solution or any other Equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfections.

## Mutilation/shredding must be such so as to prevent unauthorized reuse.

@ There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

*Deep burial shall be an option available only in towns with population less than five lakes and in rural areas.

** Options given above are based on available technologies. Occupier/operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorization]
## SCHEDULE- II
(see Rule 6)

**COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES**

<table>
<thead>
<tr>
<th>Colour Coding</th>
<th>Type of Container</th>
<th>Waste Category</th>
<th>Treatment options as per Schedule I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Plastic bag</td>
<td>Cat.1, Cat.2</td>
<td>Incineration/deep burial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cat.3, Cat. 6</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Disinfected container/plastic bag</td>
<td>Cat.3, Cat. 6</td>
<td>Autoclaving/Microwaving./Chemical Treatment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cat. 7</td>
<td></td>
</tr>
<tr>
<td>Blue/White translucent</td>
<td>Plastic bag/puncture proof container</td>
<td>Cat. 4, Cat. 7</td>
<td>Autoclaving/Microwaving./Chemical Treatment.destruction/shredding</td>
</tr>
<tr>
<td>Black</td>
<td>Plastic bag</td>
<td>Cat.5 and</td>
<td>Disposal in secured landfill</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cat.9 and Cat.10(Solid)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule 1.
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags.
4. Category 3 if disinfected locally need not be put in containers/bags.
SCHEDULE III
(see Rule 6)
LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS..BAGS

Note- Level shall be non-washable and prominently visible.
## SCHEDULE-IV
*(see Rule – 6)*

**LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS / BAGS**

<table>
<thead>
<tr>
<th>Day...</th>
<th>...</th>
<th>Month</th>
<th>Year</th>
<th>Date of generation</th>
</tr>
</thead>
</table>

- Waste category No
- Waste Class
- Waste description

<table>
<thead>
<tr>
<th><strong>Sender's Name &amp; Address</strong></th>
<th><strong>Receiver's Name &amp; Address</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone No</td>
<td>Phone No</td>
</tr>
<tr>
<td>Telex No</td>
<td>Telex No</td>
</tr>
<tr>
<td>Fax No</td>
<td>Fax No</td>
</tr>
<tr>
<td>Contact Person</td>
<td>Contact Person</td>
</tr>
</tbody>
</table>

**In case of emergency please contact**

- Name & Address
- Phone No

- Note- Level shall be non-washable and prominently visible.
SCHEDULE V
(see Rule 5 and Schedule I)
STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL WASTES

STANDARDS FOR INCINERATORS:

All incinerators shall meet the following operating and emission standards:

A. Operating Standards
   1. Combustion efficiency (CE) shall be at least 99.00%.
   2. The Combustion efficiency is computed as follows:
      \[ \text{C.E.} = \frac{\%\text{CO}_2}{\%\text{CO}_2 + \%\text{CO}} \times 100 \]
   3. The temperature of the primary chamber shall be 800± 50ºC.
   4. The secondary chamber gas residence time shall be at least 1(one) second at 1050± 50ºC, with minimum 3% Oxygen in the stack gas.

B. Emission Standards

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Concentration mg/Nm3 at (12% CO2 correction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Particulate matter</td>
<td>150</td>
</tr>
<tr>
<td>(2) Nitrogen Oxides</td>
<td>450</td>
</tr>
<tr>
<td>(3) HCl</td>
<td>50</td>
</tr>
<tr>
<td>(4) Minimum stack height shall be 30 metres above ground.</td>
<td></td>
</tr>
<tr>
<td>(5) Volatile organic compounds in ash shall not be more than 0.01%.</td>
<td></td>
</tr>
</tbody>
</table>

Note:
- Suitably designed pollution control devices should be installed/retrofitted with the incinerator to achieve the above emission limits, if necessary.
- Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Chlorinated plastics shall not be incinerated.
- Toxic metals in incineration ash shall be limited within the regulatory quantities as defined under the Hazardous Waste (Management and Handling) Rules, 1989.
- Only low sulphur fuel like L.D.O./L.S.H.S./Diesel shall be used as fuel in the incinerator.

STANDARDS FOR WASTE AUTOCLAVING:
The autoclave should be dedicated for the purposes of disinfecting and treating bio-medical waste,

(I) When operating a gravity flow autoclave, medical waste shall be subjected to:
(i) a temperature of not less than 121°C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or
(ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or
(iii) a temperature of not less than 149°C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

(II) When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following:

(i) a temperature of not less than 121°C and pressure of 15 psi per an autoclave residence time of not less than 45 minutes; or

(ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes;

(iii) Medical waste shall not be considered properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reasons, time temperature or pressure indicator indicates that the required temperature, pressure or residence time was not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved.

(IV) Recording of operational parameters
Each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle.

(V) Validation test
Spore testing:
The autoclave should completely and consistently kill approved biological indicator at the maximum design capacity of each autoclave unit. Biological indicator for autoclave shall be Bacillus stearothermophilus spores using vials or spore strips, with at least 1 x 10^4 spores per millilitre. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121°C or a pressure less than 15 psi.

(VI) Routine Test
A chemical indicator strip/tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.
STANDARDS FOR LIQUID WASTE:
The effluent generated from the hospital should conform to the following limits:

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>PERMISSIBLE LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6.5-9.0</td>
</tr>
<tr>
<td>Suspended solids</td>
<td>100 mg/l</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>BOD</td>
<td>30 mg/l</td>
</tr>
<tr>
<td>COD</td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Bio-assay test</td>
<td>90% survival of fish after 96 hours in 10Q% effluent</td>
</tr>
</tbody>
</table>

These limits are applicable to those hospitals which are either connected with sewers without terminal sewage treatment plant or not connected to public sewers. For discharge into public sewers with terminal facilities, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.

STANDARDS OF MICROWAVING:
1. Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.
2. The microwave system shall comply with the efficacy test/routine tests and a performance guarantee may be provided by the supplier before operation of the unit.
3. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved biological indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be Bacillus Subtilis spores using vials or spore strips with at least 1X10^4 spores per milliliter.

STANDARDS FOR DEEP BURIAL
1. A pit or trench should be dug about 2 meters deep. It should be half filled with waste, then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.
2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/wire meshes may be used.
3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.
4. Burial must be performed under close and dedicated supervision.
5. The deep burial site should be relatively impermeable and no shallow well should be close to the site.
6. The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or groundwater. The area should not be prone to flooding or erosion.
7. The location of the deep burial site will be authorized by the prescribed authority.
8. The institution shall maintain a record of all pits for deep burial.
### SCHEDULE VII
(See rule 5)

**SCHEDULE FOR WASTE MANAGEMENT FACILITIES LIKE INCINERATOR/AUTOCLAVE / MICROWAVE SYSTEM**

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hospitals and nursing homes in towns with population of 30 lakhs</td>
<td>By 30^{th} June, 2000 or earlier</td>
</tr>
<tr>
<td>B. Hospitals and nursing homes in towns with population of below 30 lakhs</td>
<td></td>
</tr>
<tr>
<td>• with 500 beds and above earlier</td>
<td>By 30^{th} June, 2000 or earlier</td>
</tr>
<tr>
<td>• with 200 beds and above but less than 500 beds</td>
<td>By 31^{st} December, 2000 or earlier</td>
</tr>
<tr>
<td>• with 50 beds and above but less than 200 beds</td>
<td>By 31^{st} December, 2001 or earlier</td>
</tr>
<tr>
<td>• with less than 50 beds</td>
<td>By 31^{st} December, 2002 or earlier</td>
</tr>
<tr>
<td>C. All other institutions generating biomedical waste not included in A and B above</td>
<td>By 31^{st} December, 2002 or earlier</td>
</tr>
</tbody>
</table>
FORM I
(See rule 8)
[APPLICATION FOR AUTHORISATION/RENEWAL OF
AUTHORISATION]
(To be submitted in duplicate)

To,

The Prescribed Authority
(Name of the State Govt. JUT Administration) Address.

1. Particulars of Applicant
   (i) Name of the Applicant
       (in block letters & in full)
   (ii) Name of the Institution:
       Address:
       Tele No., Fax. No., Telex No.,

2. Activity for which authorization is sought:
   (i) Generation
   (ii) Collection
   (iii) Reception
   (iv) Storage
   (v) Transportation
   (vi) Treatment
   (vii) Disposal
   (viii) Any other form of handling

3. Please state whether applying for fresh authorization or for renewal:
   ( in case of renewal previous authorization number and date)

4. (i) Address of the institution handling bio-medical wastes:
   (ii) Address of the place of the treatment facility:
   (iii) Address of the place of disposal of the waste:

5. (i) Mode of transportation (in any) of bio-medical waste:
   (ii) Mode(s) of treatment:

6. Brief description of method of treatment and disposal (attach details):

7. (i) Category (see Schedule I) of waste to be handled
    (ii) Quantity of waste (category-wise) to be handled per month

8. Declaration
   I do hereby declare that the statements made and information given above
   are true to the best of my knowledge and belief and that I have not
   concealed any information.
   I do also hereby undertake to provide any further information sought by the
   prescribed authority in relation to these rules and to fulfill any conditions
   stipulated by the prescribed authority.

Date:                              Signature of the applicant
Place:                             Designation of the applicant
FORM II
(see rule 10)

ANNUAL REPORT
(To be submitted to the prescribed authority by 31 January every year)

1. Particulars of the applicant:
   (i) Name of the authorised person(occupier/operator):

   (ii) Name of the institution:
       Address
       Tel.No.
       Telex No.
       Fax No.
       Email:

2. Categories of waste generated and quantity on a monthly average basis:

3. Brief details of the treatment facility:

   In case of off-site facility:

   (i) Name of the operator

   (ii) Name and address of the facility:
       Tel. No., Telex No., Fax No.

4. Category-wise quantity of waste treated:

5. Mode of treatment with details:

6. Any other information:

7. Certified that the above report is for the period from ..........................
   ...........................................................
   ...........................................................

Date: ...........................................................

Signature: ...........................................................

Place: ...........................................................

Designation: ...........................................................
FORM III
(see Rule 12)

ACCIDENT REPORTING

1. Date and time of accident:

2. Sequence of events leading to accident:

3. The waste involved in accident:

4. Assessment of the effects of the accidents on human health and the environment:

5. Emergency measures taken:

6. Steps taken to alleviate the effects of accidents:

7. Steps taken to prevent the recurrence of such an accident:

Date.....................................  Signature.....................................
Place.....................................  Designation.....................................
FORM IV
[see Rule 8(4)]

(Authorization for operating a facility for collection, reception, treatment, storage, transport and disposal of biomedical wastes.)

1. File number of authorization and date of issue.

2. Authorization is hereby granted to operate a facility for collection, reception, storage, transport and disposal of biomedical waste on the premises situated at.

3. This authorization shall be in force for a period of Years from the date of issue.

4. This authorization is subject to the conditions stated below and to such other conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986.

Date Signature

Designation

Terms and conditions of authorization *

1. The authorization shall comply with the provisions of the Environment (Protection) Act, 1986 and the rules made there under.
2. The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the prescribed authority.
3. The person authorized shall not rent, lend, sell, transfer or otherwise transport the biomedical wastes without obtaining prior permission of the prescribed authority.
4. Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization.
5. It is the duty of the authorized person to take prior permission of the prescribed authority to close down the facility.

*Additional terms and conditions may be stipulated by the prescribed authority
FORM V
(see rule 13)

Application for filing appeal against order passed by the prescribed authority at district level or regional office of the Pollution Control Board acting as prescribed authority or the State/Union Territory level authority.

I. Name and address of the person applying for appeal:

2. Number, date of order and address of the authority which passed the order, against which appeal is being made (certified copy of order to be attached)

3. Ground on which the appeal is being made.

4. List of enclosures other than the order referred in Para 2 against which appeal is being filed.

Signature...........................................

Date:                                               Name & Address..............................

F. No. 23-2/96-HSMD
Dr. V. RAJAGOPALAN, Jt. Secy.

Note: The Principle rules were published in the Gazette of India vide notification number S.O. 630 (E) dated 20.7.98 and subsequently amended vide (1) S.O. 201 (E) dated 6.3.2000; (2) S.O. 545 (E), dated 2.6.2000 and (3) S.O. 1069(E) dated 17-09-2003
Annexure-II

DEPTT. OF SCIENCE, TECHNOLOGY AND ENVIRONMENT.
GOVERNMENT OF TRIPURA

RET. NO.P.8(1)/STE/ENV/2231-42

DATE: 5/17/99

NOTIFICATION

In exercise of the powers conferred on the State Govt. vide section 7 of the Bio-Medical Wastes (Management & Handling) Rules, 1998, the Governor is hereby pleased to declare the Member Secretary, Tripura State Pollution Control Board as the Prescribed Authority for granting authorisation and implementing the said rules in the State of Tripura. It will be the responsibility of the Member Secretary, Tripura State Pollution Control Board to carry out the function which are related to the provisions of the various sections of the Bio-Medical Wastes (Management and Handling) Rules, 1998.

The Governor is also pleased to constitute the Advisory Committee with the following members and under the chairmanship of Principal Secretary/Commissioner, Secretary (Health & Family Welfare) Govt. of Tripura.

i) Principal Secretary(Health & F.W) - Chairman
ii) Secretary,(ST&E) - Member
iii) Secretary, Urban Development - Member
iv) Director, Health Services - Member
v) Chief Engineer, PHE,PWD - Member
vi) Director, Animal Resource - Member
vii) Executive Officer, Agartala Municipal Council, - Member
viii) Superintendent, GB Hospital - Member
ix) Superintendent, IGM Hospital - Member
x) 'One representative from the Nursing Homes - Member
xi) One representative from the NGOs - Member
xii) Member Secretary, TSPCB - Convenor

The committee shall advise the Government and the Prescribed Authority as and when required about matters related to the implementation of these rules.

Copy to:- Secretary to the Govt. of Tripura.

All concerned.

(B. K. SHARMA)

Tripura State Pollution Control Board
GOVERNMENT OF TRIPURA
OFFICE OF THE MEDICAL SUPERINTENDENT;
DHAKLAI DISTRICT HOSPITAL, KULAI,
DHALAI TRIPURA.

Dated, Kulai, the 06/06/2013

A committee with the following members is constituted for Bio-medical waste management of Dhaklai District Hospital.

The committee will be responsible for everything related to Bio-medical waste management.

2. Mithu Bhowmik, Staff Nurse.

For any clarification and advice the committee will consult Dr. Anup Kumar Debnath as and when required. Who will also be the in-charge of the committee.

To
Smti. Manokanya Debbarma, Matron.
Mithu Bhowmik, Staff Nurse.
Shreeshar Bhattacharjee, Lab. Tech.
Dipankar Das, Ward Master.

Yours faithfully,

Medical Superintendent

Dhaklai District Hospital, Kulai,
Dhaklai, Tripura.
MEMO


It is for information that the rate for sale of Used Hypofixure solution/Used X-Ray film/Shredded Empty Saline bottles(Plastic)/Empty Phenyl(Plastic) Drums are hereby accepted for the year 2013-2014 (valid up to 30-06-2014).

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the items with specification</th>
<th>Name of the firms</th>
<th>Approved rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Disposal of used Hypofixure Solution</td>
<td>Bhudeb Dasgupta, Swarupananda Bedding Stores, H.G.B. Road, Agartala</td>
<td>Rs.51.30 per ltr.</td>
</tr>
<tr>
<td>2.</td>
<td>Disposal of used X-Ray Film.</td>
<td>-do-</td>
<td>Rs.170.10 per kg.</td>
</tr>
<tr>
<td>3.</td>
<td>Shredded Empty Saline Bottles (Plastic).</td>
<td>-do-</td>
<td>Rs.7.05 per kg.</td>
</tr>
<tr>
<td>4.</td>
<td>Empty Phenyl Drums (Plastic).</td>
<td>-do-</td>
<td>Rs.12.15 per piece</td>
</tr>
</tbody>
</table>

Above mentioned firm will has to deposit the cost of the aforesaid items by challan to be certified by the respective Head of Institutions under the Head of Account-0210-Medical & Public Health, 01-U.H.S. 800-Other receipt and to submit a receipt copy of challan to the Head of Institution before collection of the same from the following Institutions of Govt. of Tripura.

1. All State Hospital.
2. All District Hospital.
3. All Sub-Divisional Hospital.
4. All CHCs/PHCs.

Above mentioned firm are also allowed to collect the items from all the Medical Institutions of the State.

Director of Health Services,
Government of Tripura, Agartala.

Copy forwarded for Information & necessary action to:
1) The Director of Family Welfare & P.M., Govt. of Tripura, Agartala.
2) The Medical Superintendent, AGMC & GBP/GGM/Cancer Hospital, Agartala.
4) The Chief Medical Officer, West/Sepahijala/Gomati/South/North/Unakutil/Dhalai (Agartala/Bishalgarh/Dharmanagar/Kailashahar/Ambassa), Tripura.
5) The MO/C, Central Medical Stores, Shyamal Bazar, Agartala.
6) The S.D.M.O., ______________West/South/Gomati/North/Unakutil/Dhalai, Tripura.
7) The M.O./C, ______________West/South/Gomati/North/Unakutil/Dhalai, Tripura.
8) Sri Bhudeb Dasgupta, Swarupananda Bedding Stores, Harigaon Basak Road, Agartala. (Mobile: 9862435991).
### Summary

**Summary of the Status of Bio Medical Wastes Management in the Government Hospitals of Tripura**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>District</th>
<th>Name of the Hospital</th>
<th>No. of Beds</th>
<th>OT &amp; Blood Bank</th>
<th>Availability of</th>
<th>Temporary Disposal System</th>
<th>General Cleanliness of the Wards / Water facilities / toilets</th>
<th>Final Disposal System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>West Tripura</td>
<td>IGM Hospital, Agartala</td>
<td>510 + 500</td>
<td>Yes</td>
<td>Yes - in use</td>
<td>Yes - only bleaching powder</td>
<td>Mixed together and disposed in the Municipal WastesBin along with other Municipal Solid Wastes</td>
<td>Preliminary Disinfected before going to municipal drain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(in newly constructed building)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Gomati District</td>
<td>Gomati District Hospital(Tripura Sundari District Hospital), Udaipur</td>
<td>100</td>
<td>Yes</td>
<td>No</td>
<td>Yes - not in use</td>
<td>Yes - not in use</td>
<td>Mixed together and disposed haphazardly in the backside of the hospital</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>South Tripura</td>
<td>Belonia Sub-Divisional Hospital (First Referral Unit), Belonia</td>
<td>100</td>
<td>Yes - in use</td>
<td>Yes - used only during OT but not for BMW</td>
<td>Yes</td>
<td>Yes - mixed together and disposed off in the pit and its surrounding areas</td>
<td>Directly goes to nearby lake</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Sipahijala</td>
<td>Bishalgarh Sub-Divisional Hospital,</td>
<td>NIL</td>
<td>Yes - in use</td>
<td>Yes - in use</td>
<td>Yes</td>
<td>Yes - mixed together and disposed haphazardly</td>
<td>Disinfected before going to drain</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Chapter 5
### Status Report of BMW Management in District Hospitals

<table>
<thead>
<tr>
<th>District</th>
<th>Hospital Name</th>
<th>Population</th>
<th>BMW Present</th>
<th>BMW in Use</th>
<th>Used During OT</th>
<th>BMW Disposed</th>
<th>Disinfection</th>
<th>Sanitation Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bishalgarh</td>
<td>District Hospital Dhalai, Kulai</td>
<td>150</td>
<td>Yes 4</td>
<td>Yes – in use</td>
<td>No</td>
<td>Yes</td>
<td>Disposed properly</td>
<td>Not Disinfected before going to drain</td>
</tr>
<tr>
<td>Dhalai District</td>
<td>Khowai Sub-Divisional Hospital, Khowai</td>
<td>100</td>
<td>Yes 3</td>
<td>Some in use</td>
<td>No</td>
<td>Yes</td>
<td>Mixed together and disposed in the pit and its surrounding and burnt time to time</td>
<td>Not Disinfected before going to drain</td>
</tr>
<tr>
<td>Unakoti District</td>
<td>R.G.M. Sub-Divisional Hospital, Kailashahar</td>
<td>128</td>
<td>Yes 2</td>
<td>Yes – in use</td>
<td>No</td>
<td>Yes</td>
<td>Mixed together and disposed haphazardly and burnt time to time</td>
<td>Disinfected before going to drain</td>
</tr>
<tr>
<td>North Tripura District</td>
<td>Dharmanagar Sub-Divisional Hospital, Dharmanagar</td>
<td>100</td>
<td>Yes 1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Mixed together along with other Municipal Solid Wastes and disposed</td>
<td>Not Disinfected before going to drain</td>
</tr>
</tbody>
</table>
Published by

ENVIS CENTRE
Tripura State Pollution Control Board
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Fax: 0381- 232 5421
email: trippcb@sancharnet.in OR trp@envis.nic.in
Website: www.tspcb.tripura.gov.in OR www.trpensvis.nic.in