

## Management of bio-medical waste generated at Railway Hospitals

### *Audit objective 4*

***Whether the assessment, management and disposal of waste generated at railway hospitals (Bio-Medical Waste) was done as per applicable Laws and Rules.***

The Railway Medical Department has the objective of keeping employees fit and healthy for efficient railway operations by establishing various railway hospitals right from the zonal level to dispensaries at remote field levels. These units produce huge quantum of bio-medical waste. Bio-medical waste implies waste generated during the diagnosis, treatment or immunisation of human beings or research activities pertaining thereto.

Ministry of Environment, Forest and Climate Change issued the Bio-Medical Waste (Management and Handling) Rules (BMW Rules) in 1998, 2016 and 2018 in exercise of the powers conferred under the Environment (Protection) Act, 1986 which provides a regulatory frame work for management of bio-medical waste generated in the country. This included collection, segregation, treatment and disposal of bio-medical wastes in an environment friendly manner thereby reducing the bio- medical waste generation and its impact on the environment. Efficacy and efficiency of the process of collection, segregation and disposal of bio-medical waste was examined in audit in respect of 72 selected railway hospitals. Deficiencies noticed are covered in the succeeding paragraphs.

### **5.1 Authorization for handling of bio-medical waste**

Rule 10 of the BMW Rules stipulated that every occupier<sup>63</sup> shall obtain authorisation from SPCB for handling of bio-medical waste. The occupier is required to fill the details like quantity of waste generated, method of treatment and disposal, mode of transportation of bio-medical waste and details of waste treatment equipment available *etc.* in Form-II prescribed under the Rules. Every occupier is mandatorily required to take all necessary steps to ensure that bio-medical waste is handled in accordance with BMW Rules and without any adverse effect to human health and the environment.

It was observed that the required authorisation was not obtained from the concerned SPCBs in the case of 26 hospitals (*Annexure- 5.1*). This was attributed to: -

- Non-conversant with the prescribed rules and procedures (NFR),
- Non-receipt of instructions from higher authorities (ER),
- Non-filing of application to SPCB (ECR, SR),
- Non-pursuance of application filed with SPCB *etc.* (ECR, SECR, Metro Rail).

<sup>63</sup> *In the context any Railway healthcare facility including dispensary at lowest field level*

Thus, such an important (authorisation from SPCB for handling bio-medical waste) matter of environmental concern for proper management of bio-medical waste remained unaddressed.

MoR in their reply admitted (May 2022) that authorization is yet to be obtained for the hospitals pointed out in the Report, though the process for seeking authorisation under Bio-Medical Waste Rules was stated to be initiated for many hospitals.

## **5.2 Delay/discontinuity in renewal of authorization for handling of bio-medical waste**

Rule 10 read with Form-II of the BMW Rules provides for obtaining fresh authorisation from SPCB before the expiry of previous one by each hospital handling bio-medical waste. For any changes in the activities of the hospital such as increase in the number of beds, change in the handling process of bio-medical waste, a fresh authorisation was mandatory.

The aspect of delay/discontinuity in renewal of authorisation was examined in Audit and it was observed that the authorisation was not got renewed in time in case of 24 railway hospitals (*Annexure- 5.2*). The delay/discontinuity ranged between one to six months in two cases, beyond six to 18 months in three cases, beyond 18 to 30 months in three cases and even extended beyond 30 months in 16 cases. Delays/discontinuity in authorisation was attributed to: -

- Delay in filing application (ER, NEFR, WR, RPU);
- Non-pursuance of application filed with SPCB (WR), absence of instructions from higher authorities (ER); non-payment of additional fee (SCR).
- Renewal refused by SPCB for want of installation of ETP/STP (NR, NWR, SCR, WCR);
- Required documents/ information not submitted to SPCB (WCR) and non-collection and not disinfecting the effluents before disposal into ETP (SR).

It is evident that lack of efficient monitoring regarding renewal of authorisation had resulted in such delays/ discontinuance in authorisation.

MoR in their reply stated (May 2022) that approval for authorisation is under process in many cases and in some cases, response from the concerned SPCBs is also delayed.

## **5.3 Creation of infrastructure in hospitals for handling of bio-medical waste**

Rule 4 of the BMW Rules prescribed for taking all necessary steps to ensure that bio-medical waste is handled without any adverse effects to human health and the environment. These rules also prescribed that a facility for a safe, ventilated and secured location for storage of such waste in coloured bags in containers should be provided within the hospital premises. The bio-medical waste from such locations shall

be directly transported to the common bio-medical waste treatment facility<sup>64</sup> for appropriate treatment and disposal. Rule 4(k) prescribed that hospital authorities should ensure treatment and disposal of liquid waste in accordance with the Water (Prevention and Control of Pollution) Act, 1974, which, *inter-alia*, included provision of effluent treatment plant (ETP)/ sewage treatment plant (STP).

Examination of the related records pertaining to the infrastructure created for handling Bio-Medical waste revealed the following: -

- i. Provision of secured room for storage of bio-medical waste did not exist in 46 hospitals (*Annexure- 5.3*) in 14 zones,
- ii. Provision of ETP/STP was not made for treatment of liquid waste in 54 hospitals (*Annexure- 5.3*),
- iii. No specific reasons for such non-creation of infrastructure could be ascertained.

This clearly indicated the poor level of efficacy in monitoring such important environmental aspects. The resultant ill effects on the health of hospital employees as well as on the patients visiting the hospitals coming in contact of such bio-medical wastes could not be ruled out.

MoR in reply is stated (May 2022) to have provided secured room for storage of Bio-Medical Waste and ETP/STP for treatment of liquid chemical waste but no evidence/document in support of their claim was given.

#### 5.4 Pre-treatment of bio-medical waste before its storage

Rule 4, Schedule-I and Form-II of the BMW Rules prescribed for pre-treatment of bio-medical waste before its storage. Such waste includes laboratory waste, microbiological waste, blood samples, blood bags and other clinical laboratory waste. Schedule-I of the Rules also prescribed the method of treatment for each type of the waste corresponding with the manner as prescribed by the World Health Organisation (WHO) or National AIDS Control Organisation (NACO) guidelines. These types of waste, after pre-treatment, were to be packed and sent to the common bio-medical waste treatment facility for final disposal.

Audit evaluated the status of pre-treatment of different bio-medical waste in the selected railway hospitals and observed the following: -

- i. Pre-treatment of laboratory waste was not carried out in 13 hospitals in five zones.
- ii. Required pre-treatment of micro-biological waste was not done in 13 hospitals in six zones.
- iii. Pre-treatment of blood samples was not carried out in the case of 15 hospitals in seven zones. Similarly, specified pre-treatment of blood bags were not done in 18 hospitals in eight zones.

<sup>64</sup> Any authorized treatment facility by SPCB within a distance of 75 Kilometres.

- iv. Required pre-treatment of other clinical laboratory waste was not carried out in 14 hospitals in seven zones.

(Annexure 5.4).

Thus, the stipulations contained in the BMW Rules for pre-treatment of bio-medical waste were not effectively complied with. The resultant adverse impact of non-compliance of the prescribed procedure on the health of the hospital staff, patients and visitors exposed to such waste cannot be ruled out.

MoR in its reply (May 2022) stated that Railway hospitals are ensuring pre-treatment of Bio-medical waste before storage. Reply is not acceptable as MoR did not furnish any document supporting the veracity of their claim.

### **5.5 Segregation and pre-treatment of liquid chemical waste**

As prescribed in Rule 4 and Schedule-I & III of the BMW Rules, the liquid chemical waste should be segregated at source and its pre-treatment has to be carried out in accordance with the Water Act prior to its mixing with other waste water so that the combined discharge should conform to the prescribed norms. Scrutiny of related record on compliance to this provision revealed the following: -

1. Segregation of liquid chemical waste, as specified in the Rules, was not carried out in 22 hospitals in nine zones.
2. Treatment of liquid waste was not done as prescribed in the Water Act in 29 hospitals in 12 zones (*Annexure-5.5*).

Thus, the statutory provisions for safeguard of health of hospital staff, patients and visitors in particular and public in general were not effectively complied with due to lack of monitoring on the part of hospital authorities.

MoR in its reply (May 2022) stated that Railway hospitals are ensuring segregation and pre-treatment of liquid chemical waste. MoR further added that provision of ETP/STP is being/will be planned.

### **5.6 Proper storage facility for bio-medical waste (BMW)**

As prescribed in Rule 8 of the BMW Rules, the storage of collected bio-medical waste in any hospital should be done in such a way that it is not mixed with any other waste and there should not be any scattering or spillage by animals. Rules also provide that untreated bio-medical waste should not be stored beyond a period of 48 hours. In case it becomes necessary to store such waste beyond the specified period, the prescribed authority (SPCB) be intimated about this along with reasons for doing so. Rule also provide that the containers/ bags in which segregated bio-medical waste is stored, should be labelled as specified in schedule-IV to the BMW Rules. Audit examined the level of compliance of the statutory provisions for proper storage of bio-medical waste and observed the following shortcomings. (Details indicated in *Annexure 5.6*).

1. Places for stacking BMW were not fenced to avoid any contact with humans or scattering/spillage by animals in nine hospitals in six zones.

2. Bio-medical waste was stored for more than the prescribed 48 hours in the case of seven hospitals in three zones. No records were made available to indicate if SPCBs was intimated for storage of bio-medical waste beyond the permissible limit.
3. Further, it was also observed that in six hospitals in five zones, the containers/bags used for storing bio-medical waste were not properly labelled as required under the Rules.



Biomedical waste lying in open at Railway Hospital (old), Perambur at Chennai Central Division in SR

These important regulations/ stipulations of safe storage of bio-medical waste were meant to ensure that the bio-medical waste is handled and stored properly thereby avoiding human contact. Contrary to the stipulations in BMW Rules, safe storage of bio-medical waste avoiding impact on the health of patients, visitors and other public coming in contact with such waste was not adequately ensured. The lack of effective

monitoring by hospital authorities resulted in safety issue remaining unaddressed.

MoR in its reply (May 2022) brought out that Railway hospitals are ensuring proper storage and labelling of Bio-medical waste. Reply is not acceptable as no evidence/documents in support of the claim was furnished with reply.

### 5.7 Compliance of norms prescribed under the BMW Rules for transportation of bio-medical waste

BMW Rules (Rule 8) prescribe various norms for proper disposal of bio-medical waste. As per Schedule-IV of the BMW Rules, vehicle transporting bio-medical waste should be labelled with the bio-hazardous symbol<sup>65</sup>. The containers or bags containing segregated bio-medical waste should be bar coded before sending out of the hospital premises for disposal. Similarly, the vehicles transporting such waste should be connected with global positioning system (GPS). Rules also provide for ensuring timely collection and transportation of the waste to the disposal site. BMW Rules also provided that hospital authorities should be allowed to inspect the treatment and disposal carried out by of the operator of common bio-medical waste treatment facility.

The efficacy of compliance with the above stated rules in the selected 72 railway hospitals was examined by audit and following position emerged: -

- i. Vehicles used for transportation of bio-medical waste were not labelled as prescribed under Rules in six hospitals in four zones.
- ii. Bar coding of containers or bags containing bio-medical waste was not done in 41 hospitals in 14 zones. Further, the vehicles transporting bio-medical waste

<sup>65</sup> Guidelines issued by CPCB in December 2016.

in 35 hospitals in 13 zones were not connected with global positioning system (GPS).

- iii. In seven hospitals in four zones, the hospital authorities did not ensure timely collection and transportation of bio-medical waste.
- iv. Hospital authorities were not allowed to inspect the treatment and disposal by the operators of the common bio-medical waste treatment facility in the case of 15 hospitals in six zones

*(Annexure-5.7)*

Non-adherence to the norms for proper collection, transportation and disposal of bio-medical waste is indicative of lack of effective monitoring by hospital authorities. Further, as a result of deficient system of transportation of bio-medical waste such as vehicle not connected with GPS and absence of bar coding of waste, the risk of disposal of bio-medical waste with other municipal solid waste cannot be ruled out.

MoR in reply (May 2022) admitting deficiency pointed out by audit stated that Railway Hospitals will ensure the norms for labelling, bar-coding, Global positioning system (GPS) provision and timely collection of bio-medical waste.

## **5.8 Disposal of bio-medical waste at hospital level**

Rule 4, 5 and 7 of the BMW Rules prescribe that every occupier (Railway hospital) shall collect segregated bio-medical waste in coloured bags/containers and send it to the common bio-medical waste treatment facility for treatment and final disposal. Rules also prescribe that no occupier shall establish on-site treatment and disposal facility, if a service of common bio-medical waste treatment facility is available at a distance of 75 kilometres. If such service is not available, the occupier shall set up in-house treatment facility like incinerator, autoclave or microwave and shredders as per authorization obtained (from SPCB) for treatment and disposal.

The process of disposal of bio-medical waste in railway hospitals was assessed by audit and it was found that: -

- i. In the case of nine hospitals in six zones, though the facility of common treatment operator was available within 75 kilometres, the management of bio-medical waste was done by these hospitals departmentally, even though in-house treatment equipment (like incinerators, autoclaves or microwave and shredders) were not in existence in these hospitals.
- ii. No such operator was available within 75 kilometres in 15 hospitals in nine zones. These hospitals managed the required treatment/disposal departmentally though the required in-house equipment (incinerator) for treatment and disposal of bio-medical waste was not available with them.

In the absence of common bio-medical waste treatment facility (CBWTF) disposal of such bio-medical waste, some of the hospitals resorted to managing bio-medical waste departmentally endangering the safety of public health and likely impact on

environment. This also reflected ineffective monitoring of such a vital aspect by hospital authorities.

MoR in reply (May 2022) admitting deficiency pointed out by audit stated that Railway Hospitals are now ensuring disposal of bio-medical waste at CBWTF through outsourced agency. Reply is, however, silent on the aspect of Railway hospitals resorting to treatment of bio-medical waste departmentally without ensuring the required facility in this regard.

### **5.9 Non-submission of Annual Reports as required under the BMW Rules**

Rule 13 of the BMW Rules prescribes that every occupier of healthcare facility (railway hospital) shall submit an annual report, in Form-IV prescribed under the Rules, on or before 30<sup>th</sup> June of every year to the prescribed authority (SPCB). This report contained various information which *inter-alia* includes status of statutory authorisation/consent, GPS co-ordinates of hospitals, quantity of waste generated category wise, details of on-site storage and treatment facilities, liquid waste generation and treatment methods, etc. These reports were subsequently compiled, reviewed and analysed by SPCB, thereafter by CPCB and finally reviewed by the Ministry of Environment, Forest and Climate Change.

Status of the submission of the statutory annual reports was reviewed in audit in respect of 72 railway hospitals during the period 2015-16 to 2019-20 and following was observed: -

- i. Only 11 hospitals in eight zones had submitted the report for all the five years.
- ii. Nine other hospitals in seven zones submitted reports for intermittent periods.
- iii. The balance 52 hospitals in 16 zones did not submit annual report in any of the five years (Details are indicated in *Annexure-5.8*).

Thus, the objective of monitoring mechanism established for management of bio-medical waste was not fulfilled due to lack of compliance to BMW Rules by railway hospital authorities.

MoR in reply (May 2022) admitting deficiency pointed out by audit stated that Railway Hospitals will ensure submission of Annual Report under the bio-medical waste Rules.

### **5.10 Health check-up, immunization and training of healthcare workers handling bio-medical waste**

As per Rule 4 of the BMW Rules, it is the duty of every occupier of health care facility (railway hospital) to conduct health check up of staff involved in handling of bio-medical waste at the time of induction and at least once in a year and maintain record for the same. This rule also prescribed immunisation of health workers against diseases that are likely to be transmitted by handling of the bio-medical waste. Rule also provided for proper training to such healthcare workers at time of induction and

thereafter at least once every year and details of such training should be provided in the Annual report.

Compliance to the said rule by hospital selected for audit revealed the following: -

- i. Prescribed health check-up of staff involved in handling of bio-medical waste was not conducted during the review period (2015-16 to 2019-20) in 13 railway hospitals in nine zones. Records for conducting such health check-up were not maintained, in seven hospitals in five zones.
- ii. Healthcare workers were not immunized during the review period in 14 hospitals in eight zones. Further, in 23 hospitals in 11 zones where immunization was done, no records for the same were maintained.
- iii. Training programmes for healthcare workers were not conducted in 15 hospitals in nine zones. In 12 hospitals in six zones though the training programmes were conducted, no record for the same was maintained.
- iv. Clause for engaging only skilled staff handling of bio-medical waste (in case of outsourcing) was not incorporated in the contracts in 46 hospitals in 14 zones. Health check-up of such outsourced staff was not done during the period of 2015-16 to 2019-20 in 14 hospitals in seven zones and immunization of such outsourced staff, as prescribed, was not done in 15 hospitals in eight zones.

It is evident from this position that hospital authorities were not serious in monitoring and ensuring occupational health safety of their workers engaged in handling of bio-medical waste.

MoR in reply (May 2022) stated that many of the Railway hospitals mentioned in audit comment have started ensuring health check-up, immunization & training of health care workers handling bio-medical waste.

### **5.11 Existence of monitoring mechanism for managing bio-medical waste**

Rule 4 of the BMW Rules provides that every occupier of healthcare facility (railway hospital) should establish a system to review and monitor the activities related to bio-medical waste management, either through an existing committee or by forming a new committee. Such committee shall meet once in every six months and the record of the minutes of the meetings shall be submitted along with the annual report to the SPCB.

The effectiveness of the prescribed review and monitoring mechanism was assessed by audit in respect of selected railway hospitals and following was observed: -

- i. Review and monitoring committee was not established in 52 hospitals.
- ii. Six monthly meetings were held only in 11 out of 20 hospitals where such committee was established. (Details indicated in *Annexure 5.9*)

Thus, it is evident that the statutory provisions, for proper monitoring of the process of handling bio-medical waste was not effectively complied with. Resultant adverse



implication on the quality of segregation, collection, treatment, storage and disposal of bio-medical waste can not be ruled out.

MoR in reply (May 2022) admitting deficiency pointed out by audit stated that Railway Hospitals have initiated to establish a system to review and monitor the bio-medical waste management.

## 5.12 Conclusion

Railways have one of the largest medical care facilities across the country that generates large bio medical waste every day. Several deficiencies were noticed in the processes related to collection, segregation, transportation, storage and disposal of bio medical waste.

Requisite authorizations from the SPCBs in compliance to the BMW Rules were not obtained and there were delays/ discontinuance in obtaining mandatory renewal of authorization.

Requisite infrastructure for handling bio medical waste did not exist and there was deficiency in the process of collection of bio medical waste in hospitals test checked in audit. Segregation and pre-treatment of the liquid chemical waste generated was not carried out in compliance to the BMW Rules. Bio medical waste was found to have been stored beyond the prescribed limit of 48 hours.

Audit found significant shortcomings<sup>66</sup> in transportation of bio medical waste. Importantly to ensure requisite monitoring and over sight of the BMW Rules, committees, which were required to be formed, were not in existence in some of the facilities and prescribed annual reports were not submitted to SPCBs in any of the years during 2015 to 2020.

Mandatory health checkup, immunizations and training to the health care workers including out sourcing staff engaged was inadequate.

### Summary of Audit findings

- Railway Hospitals were functioning without requisite authorizations from the SPCBs and delays/ discontinuities in obtaining mandatory renewal of authorization was observed in some other hospitals, which was in violation of BMW Rules.
- Railway Hospitals failed to comply with requisite provisions in BMW Rules for treatment of the bio-medical /liquid chemical waste generated as also for storage and transportation of such waste.
- Committees required to be formed to ensure requisite monitoring under BMW Rules did not exist.

<sup>66</sup> Mandatory labeling, bar coding and provisioning of GPS facilities in vehicles used for transportation

### 5.13 Recommendation

*IR needs to ensure effective compliance with Bio-Medical Waste Management Rules for handling, collection, pre-treatment, segregation, storage and disposal of biomedical waste and strengthen monitoring mechanism.*