Interim Report of Monitoring Committee on Management of Hazardous Waste

(in the matter of O. A. No. 804/2017 and M. A. No. 1302/2018)

January, 2019

CENTRAL POLLUTION CONTROL BOARD

Ministry of Environment, Forest and Climate Change

Govt. of India

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CHAPTER 1

INTRODUCTION

Hazardous wastes are wastes which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances. And therefore, it is necessary to handle and manage these wastes in an environmentally sound manner failing which they may have adverse effect to human health and environment. Govt of India first promulgated the regulations on Handling and Management of Hazardous Wastes in 1989 under the Environment (Protection) Act, 1986 in which roles of hazardous waste generators and various agencies have been laid down. These rules have been amended/supersessed from time to time, depending upon the various environmental protection requirement mainly in 2003, 2008 and 2016, in which scheme of environmentally sound system for handling and disposal of hazardous waste alongwith roles and responsibilities including the hazardous waste generators and various agencies have been laid down.

1.1 ORDERS OF HON'BLE SUPREME COURT AND NATIONAL GREEN TRIBUNAL

The issues on alleged non-compliances of various aspects and provisions of the hazardous waste management have been raised before the Hon'ble Supreme Court since 1995, which were deliberated and reflected in various orders passed by the Hon'ble Court with major landmark orders dated 14/10/2003 by the Hon'ble Supreme Court in the matter of W.P. (C) No. 657/1995; The Research Foundation for Science, Technology and Natural Resource Policy Applicant(s) Versus Union of India & Ors. The orders were passed addressing then prevailing various important aspects such as import/export of hazardous waste, synchronisation of the Basel Convention and Indian regulation, recycling of hazardous waste, ship breaking, inventory of illegal hazardous waste dump sites & their remediation, inventory of hazardous waste generation, preparation of various guidelines w.r.t management of hazardous waste, etc. A Monitoring Committee was also constituted vide the said orders to monitor compliance of the orders dated 14/10/2003 and subsequently the Monitoring Committee submitted its final report in 2006.

The said Writ Petition was disposed of by the Hon'ble Supreme Court vide orders dated 06/07/2012 reasserting the interim directions given with regard to the handling of hazardous wastes and ship breaking in the various orders passed in the writ petition from time to time and, in particular, the orders dated 13/10/1997 and 14/10/2003.

Subsequently, the issues of hazardous waste management also appeared before the Hon'ble National Green Tribunal, Principal Bench, New Delhi, in the matter of Original Application No. 804/2017: Rajiv Narayan & Anr. Vs Union of India & Ors. The Hon'ble Tribunal, while making observations with regard to enforcement of provisions of the Hazardous and Other Wastes Management (HOWM) Rules, 2016, particularly in Delhi, Haryana, Rajasthan, Uttarakhand and Uttar Pradesh has given following directions vide orders dated 30/07/2018:

> "… 12. We accordingly direct as follows: -

"…(i) All the States, where the hazardous waste is being generated must set up Treatment, Storage and Disposal Facility (TSDF) facility of adequate capacity at appropriate locations within three months from today and forthwith imitate action against erring units.

(ii) Central Government and Central Pollution Control Board must forthwith monitor the compliance of the rules by reviewing the need for action in all the states.

(iii) The Central Pollution Control Board may forthwith constitute a monitoring Committee for the purpose it may appoint a Nodal Officer exclusively to oversee the compliance of the rules. The Member Secretary CPCB may act as a Nodal Officer till a substitute is found. The action taken must be placed on the website of the Central Pollution Control Board within 3 months from today. Compliance report be filed before this Tribunal on or before 30th November, 2018, which will be treated as a separate application.

The application stands disposed of."

A copy of the aforesaid Hon'ble National Green Tribunal orders dated 30/07/2018 is appended as **Annexure I**.

In the mean time, an I.A No 63 of 2012 has been filed in Hon'ble Supreme Court raising specific issues of non-compliance of the orders and directions contained in the judgement dated 06/07/2012 of the Hon'ble Supreme Court in WP 657/1995 and therefore, suitable directions on various issues were sought from the Hon'ble Supreme Court. The counsel for the applicant was asked by the Hon'ble Court to submit the note indicating precisely the live questions/issues that would be required to be considered in the said I.A No 63 of 2012 and counsel for the Applicant submitted/circulated a written note dated 06/07/2018. Having perused the said note and after hearing the counsel and on due consideration of the fact that directions sought for would require a detailed examination of several technical issues which can only be done with the help of experts and, thereafter, such directions that may be issued would require close monitoring to ensure due implementation, the Hon'ble Supreme Court passed orders dated 18/07/2018 stating that the matter should be dealt with by the Hon'ble National Green Tribunal, the expert body, which has been consituted under the National Green Tribunal Act, 2010.

Upon transfer of the above I.A No 63 of 2012, the matter was taken up the Hon'ble National Green Tribunal, Principal Bench, New Delhi, as M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995. The Hon'ble Tribunal passed the orders dated 05/12/2018 in the said matter and the same is reproduced as below:

"…5.The present matter has been received by transfer from the Hon'ble Supreme Court of India, after judgment reported in (2012) 7 SCC 769, directing ban on import of all hazardous/toxic wastes. This was sequel to the earlier judgment in (2005) 10 SCC 510. The applicant sought further direction for implementation of the judgment dated 06.07.2012 which aspect was transferred to this Tribunal.

6. We direct that the issue of implementation of judgement of the Hon'ble Supreme Court dated 06.07.2012, referred to above may also be considered by the Monitoring Committee. It will be open to the applicant to furnish any further documents to the Chairman of the

Monitoring Committee through CPCB. The CPCB will be at liberty to consider involving any other expert on the subject.

Though learned counsel has handed over a list of documents which should be forwarded to the monitoring committee, instead of Tribunal considering the said list, the applicant is at liberty to furnish the same for consideration by the CPCB.

8. The Monitoring Committee will be at liberty to take further time, if necessary for completing its assigned job. Needless to say that the suggestion of remediation of contaminated sites, capacities of the landfill sites, issue of leachate, cleaner technology, sign boards etc. may also be examined by the Committee.

9. The Committee will also be at liberty to give interim report through CPCB to deal with the urgent issues.

10. The CPCB will be at liberty to take appropriate steps with regard to the remediation of contaminated sites or other urgent issues from time to time.

11. List again on 04.04.2019 to consider the report of the Committee."

A copy of the aforesaid Hon'ble National Green Tribunal orders dated 5/12/2018 is given as **Annexure II**.

1.2 CONSTITUTION OF MONITORING COMMITTEE

In compliance to the aforesaid orders dated 30/07/2018 of Hon'ble Tribunal, Central Pollution Control Board (hereafter referred as CPCB) constituted a Monitoring Committee vide office orders No. B-29016/C-08/18/WM-II Div/9791-9794 dated 09/08/2018 as follows:

(i)	Dr. Ajay Deshpande, Former Expert Member, National Green Tribunal	Chairman
(ii)	Dr. A. N. Vaidya, Chief Scientist & Head, Solid and Hazardous Waste Management Division, National Environmental Engineering Research Institute (NEERI), Nagpur	Member
(iii)	Dr. D. C. Sharma, Prof. Department of Civil Engineering, Raja Rajeswari Group of Institutions (Former Additional Director, CPCB) Bangaluru	Member
(iv)	Dr. A. Manoharan, Former Senior Scientist, CPCB, Chennai	Member
(v)	Member Secretary, Gujarat Pollution Control Board	Member
(vi)	Dr. Sonu Singh, Sc D., HSM Division, MoEF&CC	Member
(vii)	Sh. Bharat K Sharma, Scientist 'E', WM-II Division and Nodal Officer, CPCB, Delhi.	Member Convenor

Copy of the said office orders dated 09/08/2018 pertaining to constitution of the Monitoring Committee along with Terms & Reference is attached as **Annexure III**. Sh. Bharat K Sharma, Scientist 'E', WM-II Division, CPCB, Delhi, has been appointed as Nodal Officer by CPCB vide office orders no. B-

29016/C-08/18/WM-II Div/8736-8741 dated 13.08.2018 and copy of the same is given as **Annexure IV**.

The committee was originally expected to complete the assignment by 30.11.2018. A detailed presentation was given to the Hon'ble Tribunal on the work being carried out by the Committee on 31.11.2018 and an additional time upto 31.1.2019 was sought to submit the final report. The Hon'ble Tribunal vide order dated 05/12/2018 granted extension of two months for submission of the report in the aforesaid matter of O.A No 804/2017 on the request of the Monitoring Committee so as to cover all aspects of hazardous waste management. Accordingly, the tenure of the aforesaid Monitoring Committee was extended vide office order no B-29016/C-08/18/WM-II Div/13914-919 dated 14/12/2018 and the Terms & Reference of the Committee has also been revised vide orders dated B-29016/C-08/18/WM-II Div/13920-925 dated 14/12/2018 to cover the other issues raised in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995. Copies of the said office orders are given as **Annexure V and VI** respectively.

1.3 REGULATORY FRAMEWORK

Handling and management of hazardous waste was first regulated with notification of Hazardous Wastes (Management and Handling) Rules, 1989, under the Environment (Protection) Act, 1986, by the Government of India in 1989. Since then, these rules were amended in 1996 and 2003 wherein transboundary movement (export and import) of hazardous waste was covered and regulated in the light of Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal which entered into force in 1992. The said Hazardous Wastes (Management and Handling) Rules, 1989, were superseded with Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008, wherein, besides recycling and disposal, provisions about utilization of hazardous wastes as resource or energy recovery were introduced along with laying down of more specific provisions with regard to handling, management of hazardous wastes. This was in line with the resource conservation principle referred in Narional Environmental policy 2006.

With the experiences gained through enforcement of these Rules and realizing need to harmonise and streamline the handling and management procedures of hazardous wastes with clean technology and reuse and recycle approaches, the Ministry of Environment, Forest and Climate Change, Govt. of India, notified Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, in April 2016 in supersession of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008. Some of the salient features of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 are mentioned in following paras:

i. The ambit of the Rules has been expanded by including 'Other Waste'.
ii. Waste Management hierarchy in the sequence of priority of prevention, minimization, reuse, recycling, recovery, co-processing; and safe disposal has been incorporated.
iii. All the forms under the rules for permission, import/export, filing of annual returns, transportation, etc. have been revised significantly,

indicating the stringent approach for management of such hazardous and other wastes with simultaneous simplification of procedure.

iv. The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating Procedure (SOPs), specific to waste type, which has to be complied by the stakeholders and ensured by SPCB/PCC while granting such authorisation.

v. Procedure has been simplified to merge all the approvals as a single window clearance for setting up of hazardous waste disposal facility and import of other wastes.vi. Co-processing as preferential mechanism over disposal for use of waste as supplementary resource, or for recovery of energy has been provided.

vi. The approval process for co-processing of hazardous waste to recover energy has been streamlined and put on emission norms basis rather than on trial basis.

vii. The process of import/export of waste under the Rules has been streamlined by simplifying the document-based procedure and by revising the list of waste regulated for import/export.

viii. The import of metal scrap, paper waste and various categories of electrical and electronic equipments for re-use purpose has been exempted from the need of obtaining Ministry's permission.

ix. Responsibilities of State Government for environmentally sound management of hazardous and other wastes have been introduced.

1.4 SCOPE OF THE REPORT

This committee was originally constituted to report on the status of enforcement of HW rules on the issues raised in NGT matter Rajiv Narayan 804 of 2017. Subequently, the committee has also been asked to look into the issues raised by the petitioner in Research Foundation matter (WP657/1995). The issue raised in WP 657 of 1995 are on a much wider conspectus and also cover issues raised in Rajiv Narayan. Additionally the issues related to need of amending HW rgualtions, HW contaminated sites, capacity building of SPCBs etc is required to be additionally delat by the committee. As the committee had sought an extended time upto 31.1.2019 for submission of the report in Rajiv Narayan case, well before the subsequent order of additional mandate of reviewing the issues raised in WP 657/1995, the committee after detailed deliberation has decided to submit the interim report mainy covering the Rajiv Narayan case. Both the cases relate to sound environmental management of HW.

This interim report has been prepared by the Monitoring Committee mainly focusing raison d'etre of Committee vide orders dated 30/7/2018 of the Hon'ble Tribunal in the matter of Original Application No. 804/2017: Rajiv Narayan & Anr. Vs Union of India & Ors. The following aspects have been covered in this report:

i. Enforcement of the various provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 by the concerned respective agencies.

ii. Delineation of the shortfalls/non-complinces

iii. Need for action in all the States for effective implementation of the Rules.

iv. Measures required for compliance of the HOWM Rules, 2016 and CPCB guidelines

The report outlines methodology adopted in accomplishing tasks assigned to the Monitoring Committee, current scenario of hazardous waste in the country and status of the compliance of the HOWM Rules, 2016. The observations and recommendations made in this report are based on information gathered through representative field visits and secondary data obtained from various agencies responsible for respective duties assigned under the HOWM Rules, 2016 such as SPCBs/PCCs, CPCB, MoEF&CC, Custom Authority, concerned Departments of State/UT Governments and DGFT and therefore this report is primarily based on desktop approach i.e. based on the information received from the SPCBs/PCCs and though some field visits/meetings which were conducted by the Committee as outlined under Chapter 3 of this report. The committee plans to cover all other aspects including contaminated site, capacity building, issues related to import and export of HW etc in the next report. The committee notes that the additional mandate of WP 657/1995 is a challenging and voluminous task, and will need addional time. Based on earlier SCMC work and present work estimation, committee at this stage is of the view that the NGT may be requested to grant additional time of 6 months to complete the entire assignment.

CHAPTER 2

POLICY AND PRINCIPLES OF HAZARDOUS WASTE MANAGEMENT

The constitutional provisions for the environmental protection form the basis for any Waste management regulation in India. It is therefore pertinent to take a review of Policies and Principles of hazardous waste management based on the constitutional provisions, and to examine its validity in HOWM 2016 rules and its intended compliance. Committee has taken cognizance of all such provisions and after critical review relevant recommendations have been given. This chapter delineates these policies and principles with suitable recommendations for the compliance to HOWM Rules 2016.

The need for protection and conservation of environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India. The Constitution under Part IVA (Art 51A-Fundamental Duties) casts a duty on every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures. Further, the Constitution of India under Part IV (Art 48A-Directive Principles of State Policies) stipulates that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. The Hon'ble Supreme Court of India has already held that a right to clean environment is part of the right to life guaranteed under Article 21 of the Constitution and has explained the precautionary principle and the principle of sustainable development in Vellore Citizens Welfare Forum v. Union of India & Ors. [(1996) 5 SCC 647], Tirupur Dyeing Factory Owners' Association v. Noyyal River Ayacutdars Protection Association [(2009) 9 SCC 737] and M.C. Mehta v. Union of India Ors. [(2009) 6 SCC 142].

The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment. It is an umbrella legislation designed to provide a framework for the coordination of central and state authorities established under the Water Act, 1974 and the Air Act. The term "environment" is understood in a very wide term under section 2(a) of the Environment Act. It includes water, air and land as well as the interrelationship which exists between water, air and land, and human beings, other living creatures, plants, micro-organisms and property. Under the Environment Act, the Central Government is empowered to take measures necessary to protect and improve the quality of environment by setting standards for emissions and discharges of pollution in the atmosphere by any person carrying on an industry or activity; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare. From time to time, the Central Government issues notifications under the Environment Act for the protection of ecologically-sensitive areas or issues guidelines for matters under the Environment Act.

Hazardous wastes belong to the category of special wastes having constituents of chemicals, metals and other compounds which can cause environmental pollution. In order to regulate and ensure environmentally sound management of the hazardous wastes, the Govt. of India notified the Hazardous Wastes (Management & Handling) Rules, 1989 under the

Environment (Protection) Act, 1986. The Government of India has ratified the Basel Convention on the control of transboundary movement of hazardous wastes and their disposal (under the aegis of UNEP). Provisions and certain decisions of the Basel Convention will have to be harmonised within the domestic legislation according to the India's commitment to the Convention. These will have implications on the Indian industry and environment. Disposal of the hazardous waste necessitate proper management and handling in an environmentally sound manner. The Basel Convention on the control of transboundary movements of hazardous wastes and their disposal, adopted by the Conference of Plenipotentiaries in Basel in 1989, was developed under the auspices of the United Nations Environment Programme. This instrument of multilateral environmental agreement represents the intention of the international community to solve the global environmental problem of hazardous waste in a collective manner. The Basel Convention calls for international co-operation between parties in the environmentally sound management of hazardous wastes and the improvement of national capabilities to manage hazardous wastes in an environmentally sound manner. India is also signatory to four International Conventions viz. Basel Convention on Control of transboundary movement of Hazardous waste and their disposal; Rotterdam Convention on Prior Informed Consent Procedure for certain Chemicals and Pesticides in International trade; Stockholm Convention on Persistent Organic Pollutants, the Minamata Convention on Mercury besides Strategic Approach to International Chemicals Management, which are the guiding framework for the Hazardous waste management and legislative framework in India.

Hon'ble Supreme Court of India in M.C. Mehta & Anr. v. Union of India & Ors.: (1987) 1 SCC395 while dealing with the Oleum gas leakage from the factory of Shriram Foods and Fertilizer Industries, which caused harm to certain persons, had held that "an enterprise which is engaged in a hazardous or inherently dangerous industry which poses a potential threat to the health and safety of the persons working in the factory and residing in the surrounding areas owes an absolute and non-delegable duty to the community to ensure that no harm results to anyone on account of hazardous or inherently dangerous nature of the activity which it has undertaken." Subsequently, this principle has held the ground in many cases and has become the basic principle of hazardous waste management in the country.

Gradually, developing countries and countries with economies in transition have become the driving forces behind the global expansion of chemicals production and use. Not only are these countries becoming central sites of chemicals manufacturing, in some cases they also have rapidly expanding domestic consumer markets. These manufacturing and consumption trends also have implications on hazardous waste generation. Waste from products containing chemicals that are hazardous to human and environmental health are an increasing source of concern in many developing countries, where regulatory frameworks for environmentally sound waste management are often weak, non-existent, or poorly enforced (UNEP 2012).

Now, looking at the basic principles of Hazardous waste management, it can be seen that there are several evolving principles and many of them are complimentary to each other. The HOWM Rules, 2016 takes into account many of these principles. The application of these principles depends and vary from case to case, but primarily linked intrinsically with the level of

certainty in the knowledge and understanding of the various stages of HW management. These principles are discussed in order to understand the technical background necessary to monitor and assess the enforcement of HOWM Rules.

a) **The Precautionary Principle**: It states that "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." UN Conference on Environment and Development 1992, Rio Declaration also has stated that-: "The purpose of the Precautionary Principle is to create an impetus to take a decision notwithstanding scientific uncertainty about the nature and extent of the risk, i.e. to avoid 'paralysis by analysis' by removing excuses for inaction on the grounds of scientific uncertainty". The principle involves taking precautions without delay to avoid possible environmental damage or harm to human health in the future. Application of this principle to hazardous waste management has concrete repercussions. For example, in case of wastes which are deemed to be potentially hazardous, such wastes should be classified, managed and disposed as hazardous waste as long as the confirmation of their hazardous or non-hazardous nature is pending or unclear. Regulators have to consider this aspect when developing hazardous waste classification systems.

b) **The 'Duty of Care' Principle**: To comply with the 'Duty of Care' reasonable steps have to be taken: such as

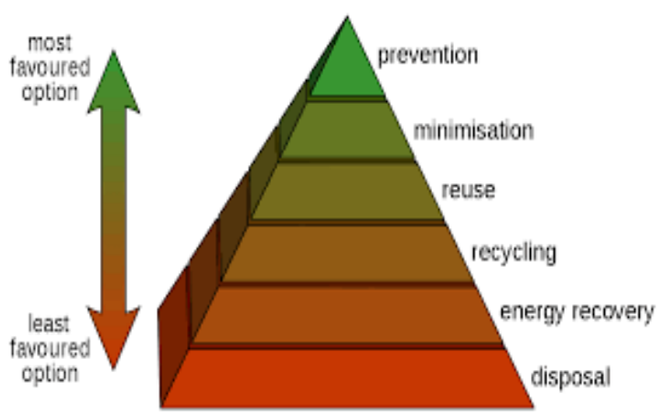
1. To prevent the escape of waste whilst it is in the possession of the holder, and while it is being held by others after being transferred,
2. To provide written information which describes the waste when it is being transferred to another person, sufficiently well to allow them to comply with their duties,
3. To ensure that waste is only transferred to a person authorized to receive it,
4. To prevent waste causing pollution or harm, both when it is under the holder's control and subsequently under the control of those to whom the waste is transferred. The "Duty of Care" principle with respect to waste management is implemented Shriram Case by expanding the responsibility to the absolute liability and also, onus of taking adequate care in hazardous materials. It enhances the scope of the 'Polluter pays' principle by addressing additional stakeholders and by formulating duties specific to waste management.

The "Duty of Care" enshrines in law the requirements for all producers, carriers, importers, exporters, brokers, dealers and processors of hazardous waste to manage the waste correctly by storing it properly, only transferring it to the appropriate people and ensuring that when it is transferred it is sufficiently well described to enable its safe recovery or disposal without harming the environment. The fourth point mentioned above is of particular importance as it reminds waste generators that they remain responsible for wastes generated by them even after transfer to another party.

c) **The 'Polluter Pays' Principle**: The costs of waste management shall be borne by the original waste producer or by the current or previous waste holders. The 'Polluter Pays Principle' is a guiding ethical principle that is enacted in legislations at national level and that applies to all types of pollution. It means that polluters should bear the full costs of the consequences of their actions. With respect to waste management the 'Polluter Pays' principle seeks to shift the responsibility dealing with waste from governments (and thus, taxpayers and society at large) to the entities generating it. In effect, it internalizes the cost of waste disposal into the cost of the product, theoretically meaning that the producers will improve the waste profile of their products, thus decreasing waste and increasing possibilities for reuse and recycling.

d) **The Cooperative Principle**: The Cooperative Principle is intended to integrate all participating actors and stakeholders in the process of environmental decisions. This principle is indispensable for sustainable development, seeing that its holistic approach affects the complexity of production and consumption of goods as well as treatment of wasted materials and products.

e) **The Principle of the 'Waste Management Hierarchy'**: The waste hierarchy is a concept initially developed at European level that provides a preferred order of priorities for selecting and deciding upon waste management options with the aim to conserve resources and to minimize environmental damages. This has now been incorporated in 2016 rules.



Following the waste hierarchy will generally lead to the most resource efficient and environmentally sound choice of waste management. However, in some cases refining decisions within the hierarchy or departing from it can lead to better environmental outcomes. The "best" choice is often influenced by specific local conditions and care needs to be taken not to simply shift environmental problems from one area to another. Decision-makers need to base their choices on firm factual evidence. Life Cycle Thinking and Assessment provides a scientifically sound approach to ensure that the best outcome for the environment can be identified and put in place.

f) **The Principle of 'Waste Management Self-sufficiency'**: Waste management self-sufficiency should be achieved on a regional or national level and in particular, if possible, on the Member State's level of a political or economic union. To this end, Member States will have

to establish, possibly in co-operation with other Member states, an integrated and adequate network of waste utilization and disposal facilities. This principle aims at stopping the misuse of economical gaps between different regions for exporting waste from high income to low- and middle-income countries.

g) **The Principle of 'Best Available Technique' (BAT)**: The principle manifest that the waste generation from installations to the environment should be reduced to the most possible extent and economically in the most efficient manner.

h) **The 'proximity principle'**: It means that waste should be treated and/or disposed of as near as possible to the point where it arises. This principle aims to avoid the adverse environmental impacts of unnecessary waste transport. However, the environmental impacts of transporting wastes very much depend on local conditions and circumstances. The application of the principle will therefore vary according to the type of waste concerned, the quantity, the potential hazard and the potential environmental impact of the method of waste treatment/disposal and the mode of transport. There also has to be a balance between the proximity principle and economy of scale. In certain cases, economy of scale means that some specialist treatment, recovery or disposal operations may be located far from the point where the waste is generated.

The Hazardous waste management also needs to be looked from Sustainable Development Goals (SDG)[1] compliance point of view. The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These 17 Goals build on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

SDGs that have the clearest links to chemicals and waste management are mentioned below with the Target Description of the target.

- **Target 3.9**: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- **Target 6.3**: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- **Target 12.4:** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

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[1] http://www.undp.org/content/undp/en/home/sustainable-development-goals.html

- **Target 12.5**: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- **Target 14.1**: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

In India, a comprehensive legislative framework has been in place for over a decade for addressing various issues related to hazardous waste management. However, on the implementation front, there is a significant backlog. The Hon'ble Supreme court in its landmark order dated 28.10.2003[2], in Research Foundation matter WP(C) 657 of 1995, has taken pioneer initiative to streamline the hazardous waste management in the country. These directions initiated several environmentally sound hazardous waste management initiatives including inventory of HW, manifest system, development common facilities, efforts on restitution of remedial sites, ship braking activities etc. Still however, the level of compliance of Hazardous waste management is not to the desired level. Some of the critical issues in this regard which have been deliberated at various scientific forums are; unreliable and inaccurate Inventorisation of the waste quantities; inadequate infrastructure to deal with hazardous waste; lack of economic solutions; uncertainty in regulator's approach; need of technical and scientific capacity building at SPCBs, capacity lack of proactive action research in the HW management including restoration/restitution and lack of credible data on health impacts of HW disposal.

The Indian Environmental jurisprudence is well established on sustainable development, and the precautionary and polluter pays principles. The three principles underpin India's environmental jurisprudence, yet each recognised principle carries with it the possibility of challenges and differing interpretation. In terms of implementation, the precautionary principle is generally preferred by policy makers, judiciary and regulators over the polluter pays principle. The polluter pays principle is difficult and complex, mainly due to the problem of identification of the polluters and apportioning their responsibilities. Further, the monetary compensation may not fully make up for ecological loss or loss of resources such as ground water, top soil, biodiversity and, therefore, in reality to some degree the polluter never pays the real cost of the pollution, even if some restitution or compensation is possible. The environment is too complex to restitute or restore in its entirety, to the satisfaction of the local community.

Similarly, while applying the precautionary principle, several factors have to be considered like; apprehension and probability of environmental risks; attitude and preparedness to risk management, science and technological interventions to deal with such risks, the role of science and scientists in decision-making processes, openness of decision-making processes, nation's economy and development agenda; and environmental sensitivity of the natural environment, decision on the degree of application of the precautionary principle. This process is many a times random, can have several multisectoral consequential implications, affecting nation's economic and developmental growth. It is therefore always considered to take a prudent approach to develop reliable and well validated scientific tools and

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[2] www.dpcc.delhigovt.nic.in/HWM_SCO.HTM

techniques in environmental risk identification and assessment; and its impact on environment, to a reasonable accuracy so that the uncertainty in environmental impact prediction can be reduced so as to ensure reasonable and consistent application of precautionary principle. All stakeholders would expect a sound and consistent approach of environmental regulators in order to reduce regulatory uncertainty. This would essentially require a sustained and cross sectoral action research initiatives in the field of environmental which would create a sound data base related to environmental risks and its impacts, to reduce uncertainty in environmental matters leading to a more consistent and uniform application of precautionary principle. More discussions on various approaches on precautionary principle while dealing with scientific uncertainties can be found in Gill[3] and Wingspread Statement on precautionary Statement [4].

The Indian hazardous waste regulations have continually been evolving responsive to the knowledge and understanding of the complex interrelationship between hazardous waste and environment. This can be simply illustrated by comparing the definition of hazardous waste as stipulated in rules;

a) 1989: "Hazardous waste' means categories of wastes specified in the schedule

b) 2008: "hazardous waste" means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include the waste specified in Schedule I, II and III in the Rules.

c) 2016: "hazardous waste" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances, and includes the waste generated from the various industrial processes as specified in Schedule I; is equal or more than the concentration limits specified in Schedule II and the wastes specified in Part A and Part C of the Schedule III of the Rules.

Governance Management Strategies: Important stages of environmental governance practices can be listed as (a). Gathering Information; (b). Modelling/Using Decision Support Tools; (c). Prioritizing; (d). Conflict Solving; (e). Deciding Under Uncertainty; (f). Being Adaptive and (g). Flexible. It can easily be appreciated that all these stages would require sound combination of research, technology, economics, and legal principles to have a consistent approach for sustainable solution. And therefore, there is an important need for a more differentiated approach to governance and complex problem solving. The core concern is that one-dimensional approaches in terms of governance and complexity do not sufficiently

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[3] National Green Tribunal, India : Gill : (2017) 29 ELM 1 Environmental Law & Management Published By Lawtext Publishing Limited www.lawtext.com .

[4] http://sehn.org/wingspread-conference-on-the-precautionary-principle/

address the variety of complex environmental problems. A multi-dimensional approach in terms of governance and complexity, including research, technology, finance and stakeholder involvement, could result in a much more nuanced and accurate picture of the relationship between governance and complex problem solving. Besides, it could pave the way for using complexity as a useful 'lens' through which policy problems can be systematically categorized and analysed.

The major problem in hazardous waste management is the absence of credible and relevant information regarding the volume and characterization of the waste produced. There is a need to establish robust reporting mechanisms that will ensure reasonably accurate

(i) estimation of the quantities and characteristics of hazardous wastes produced in the country;

(ii) understanding of treatment and disposal practices; and

(iii) identification of the most important issues requiring urgent attention. This information is generally dynamic as most of the industries continuously upgrade their systems to reduce waste, change the product as per market requirement besides, there are various market forces that influences the product quality requirements. Considering the scarce human and financial resources available to implement a reporting system, the focus should be on use of internet of things (IOT) tools including specially designed software involving HW generators and other stakeholders in the reporting process. Better data availability would not only allow government authorities to concentrate their efforts on critical issues to protect the environment and human health, but also, allow all the stakeholders to adopt a sustainable practice based on scientific data. This aspect is most crucial in HW management and the new rules of 2016 rightly advocates for publishing the HW generation and disposal data on annual basis. **The mute question which the committee is now facing is the reliability and reproducibility of the data so collected.**

From a structural point of view, it would be necessary to follow a functional approach, showing how to identify relevant governance strategies for problem solving, based on the complex nature of the problems. Such an approach is different from causal logics of the factual problem-solving processes, in which governance strategies precede problem solving processes. Technically speaking, the two sections identify specific sub-strategies in governance and complex problem solving, namely management strategies (e.g., information gathering, modelling) and governance strategies (e.g., participation, deliberation). Whereas management strategies refer to actions that directly affect complex problem solving, governance strategies enable or facilitate these management strategies. **The committee has deliberated on this aspect and note that there is need to streamline the efforts of effective environmental governance, as regards Hazardous waste, on sub-themes of;**

a. **Scientific assessments**: Conduct assessments of the environmental fate and exposure pathways of harmful substances, and create awareness of these findings to help governments and others take action.

b. **Legal instruments**: To develop appropriate policy and control systems for harmful substances of concern, even the emerging pollutants
c. **Implementation**: Provide the tools, methodologies and technical assistance to help States design, finance and implement national programmes that improve assessment and management of harmful substances and hazardous waste. Develop enforcement policies to ensure consistent, speedy, proportionate and adequate response to non-compliance while encouraging compliances.
d. **Monitoring and evaluation**: Promote best practice, helping States monitor, evaluate and report on the progress of their national programmes. Prepare annual reports evaluating implementation and also, specific action on the HW management.

The current state of global chemicals and waste governance is characterized first and foremost by fragmentation. Separate instruments have been developed in response to specific challenges as they have emerged. The resulting international governance framework for the protection of the environment and human health from chemical hazards and waste is narrow in its regulatory reach. Within this context, Strategic Approach to International Chemicals Management (SAICM)[5] has been a welcomed broader framework, even though legally non-binding, for global cooperation in the sound management of chemicals and waste (SMCW). Objectives of SAICM are grouped under five themes: risk reduction; knowledge and information; governance; capacity-building and technical cooperation; and illegal international traffic.

It is true that the chemicals used for agricultural, domestic and industrial purposes are often not effectively regulated, safely used, or environmentally disposed of, and therefore, the human population continues to face grave toxic risks through the chemical pollution of air, water, soil, and food. Furthermore, chemical pollution has devastating implications for biodiversity, wildlife, and ecosystem services in all parts of the world. In addition to environmental and health impacts, chemical pollution can have significant negative economic impacts such as losses to agriculture, detrimental effects on the quality of drinking water, public health costs, and negative impacts on revenue derived from recreation and tourism. The SAICM attempts to pragmatically consider the chemical and hazardous waste in an integrated and holistic way which not only will ensure accounting for all the chemicals that are produced and used for various purposes but will also ensure optimum use of them by cross accounting the same with hazardous waste generation. **This practice will remove the potential uncertainties in HW management due to inaccurate inventory, as the same is strictly restricted to the industries only, based on the unreliable data given by industries. Within the present system, this uncertainty can be significantly reduced by conducting environmental audits of some critical industries on the principles of mass balance, though it may takes significant time and expert manpower resources.**

Moreover, as the global waste economy continues its shift from widespread practices of final disposal to a re-use, recycling, and recovery paradigm

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[5] http://www.saicm.org/

(reflected in concepts such as the "circular economy" and "cradle-to-cradle design"), there is an urgent need to eliminate human health and environmental problems caused by hazardous chemicals and waste emitted through unsound recycling industries. Fostering sustainable and inclusive recycling networks can contribute significantly to resolving public health and environmental pollution issues linked to hazardous waste management.

The existing regulatory system does reasonably well when it comes to managing certain toxic wastes from industrial facilities. Through enforcement of state and federal laws, hazardous waste from industrial sources is tracked, reported, and managed according to requirements and standards that are vastly improved from thirty years ago. **Still, many toxic chemicals are released into the environment through Permitted discharges, Exclusions to regulations, Non-point source pollution, and Problems associated with hazardous waste management. Though 2016 notification incorporate the house hold generation of HW, there is a need to include other sources to estimate the reliable and realistic assessment of HW generation and its impacts on environment.**

In view of the above, devising the enforcement strategy for hazardous waste as a part of overall environmental governance needs to be combination of scientific and management strategies, for consistent and objective application of Precautionary principle as well as Polluter Pays Principle, in order to ensure Sustainable Development. The committee therefore recommends to promote the substantial focussed research on scientific, technical, economic and management aspects of the overall HW management in the country. There is an urgent need to enable a paradigm shift in approach to adopt science-based enforcement of regulations (rather than routine policing), that is possible only with a sound, consistent, multi-sectoral action research initiatives in hazardous waste management. There are explicit and enabling provisions regarding need of such research in the EP Act, 1986 (section 3 (2) (iii, iv, ix) as well as Water and Air Acts (section 16 and 17). The broader contours of such research needs are presented at the end of the report which the committee feels should be taken at priority along with capacity building of the CPCB/SPCB. This will not only help the active sensitisation of all stake holders but also can trigger into efficient and economic solutions, which can help to achieve efficient hazardous waste management in country in most economic and environmentally sound manner.

"It is not possible to repeat too often that waste is not something which comes after the fact…picking up and reclaiming scrap left over after production is a public service, but planning so that there will be no scrap is a higher public service."

----------Henry Ford, 1924

CHAPTER 3

APPROACH/METHODOLOGY ADOPTED BY THE MONITORING COMMITTEE

The monitoring Committee, in its first meeting, discussed in details the mandate given by the Hon'ble NGT and agreed upon following methodology to comply with the directions of Hon'ble NGT.

- Obtaining information through questionnaires from the concerned governmental agencies and stakeholders
- Assesing the the need for action by concerned agencies in all the States
- Interactions/ meetings with the stakeholders such as SPCB/PCC, Customs department, DGFT, Labour department and so on
- Collection of the relevant information though representative field visits by the committee members. These field visits were planned in order to assess the status of key components of the HOWM 2016 rules such as TSDF, Recycling units, Recovery units, Ports, and small and large scale industries generating hazardous wastes.
- Review of the secondary data and information in the context of HOWM rules 2016 as also constitutional policies and principles.
- Identification of shortfalls in compliances and delineation of suitable recommendations.

The committee was originally mandated to review the compliance of HOWM Rules 2016. Subsequently, the committee was also mandated to look into compliance of Hon'ble Supreme court judgemtn in WP 657/1995 dated 06.7.2012. The committee whicle appreciating the large scope of such mandate of monitoring of compliance of rules and SC judgment, decided to formulate a strategy to expedite the reporting. The committee mainly relied on secondary data received from SPCBs and other staekholders on a specially designed questionnalire followed by personal interactions with concerned agencies, and also, some validation filed visits. The committee propose to continue this methodology with more extensive visit schedule to cover the remaining aspects related to contaminated sites, CETP sludge issue, Solvent handling and also, resource utilisation aspects in the coming months. The methodology adopted by committee is described below;

3.1 MEETING/DISCUSSIONS WITH STAKEHOLDERS

So far the Committee has convened five meetings during August 24, 2018; September 24-25, 2018; October 25-26, 2018; December 11, 2018 and January 07-09, 2019 wherein thorough interactions were held with representatives of different stakeholders such as Custom Authority, DGFT, common Treatment Storage and Disposal Facility (TSDF) operators, Cement plant operators co-processing hazardous wastes, hazardous waste pre-processing facility operators and few of the SPCBs/PCCS.

The committee also interacted with applicant of the Application Number 804/2017 i.e. Sh. Rajiv Narayan on October 26, 2018 and Sh. Sanjay Parikh, Learned Counsel in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995 on January 08, 2019, respectively, so as to take cognizance of their concerns in implementation of the HOWM Rules, 2016 and other issues raised in the aforesaid matter.

Figure 1: Interaction with officials of SPCBs on October 26, 2018

Figure 2: Interaction with Sh. Rajiv Narayan, applicant in the matter of O. A. No. 804/2017 on October 26, 2018

Figure 3: Interaction with Sh. Sanjay Parikh, Learned Counsel in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995 on January 08, 2019

Figure 4: Interaction with Sh. Sanjay Parikh, Learned Counsel in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995 on January 08, 2019

3.2 QUESTIONNAIRE/SURVEY

The committee, after substantial deliberations on the data/information neededfor assessing the compliance to HOWM rules 2016, prepared a questionnaire/s which are attached as **Annexure VII**. The questionnaire also implicitly addressed the issues such as enforcement of provisions of HOWM Rules, 2016, and duties performed by the concerned agencies who have been assigned with respective responsibilities under the Rules. These agencies were identified as SPCBs/PCCs, CPCB, MoEF&CC, Custom Authority, DGFT and Department of Environment, Department of Industries and Department of Labour all the State/UT Govts. These questionnaires were sent to the respective agencies.

The response to the questionnaire received from the various stakeholders are given below in the **Table 1**:

Table 1: Response to the questionnaire received from the various stakeholders

S. No.	Name of the State	Information received from SPCB	Information received from Department of Environment	Information received from Department of Labour	Information received from Department of Industry
1	Andaman and Nicobar Islands	×	×	√	×
2	Andhra Pradesh	×	√	×	×
3	Arunachal Pradesh	√	×	√	×
4	Assam	√	×	×	√
5	Bihar	√	×	√	√
6	Chhattisgarh	√	×	×	√
7	Delhi	√	×	√	×
8	Gujarat	√	×	×	×
9	Goa	√	×	√	√
10	Haryana	√	√	×	×
11	H.P.	√	×	√	×
12	J.& K.	√	×	×	×

S. No.	Name of the State	Information received from SPCB	Information received from Department of Environment	Information received from Department of Labour	Information received from Department of Industry
13	Jharkhand	√	×	×	×
14	Karnataka	√	×	×	×
15	Kerala	√	×	×	×
16	Lakshadweep	×	√	×	×
17	Madhya Pradesh	√	×	×	×
18	Maharashtra	√	×	×	×
19	Manipur	√	×	×	√
20	Meghalaya	√	×	×	√
21	Mizoram	√	×	×	√
22	Nagaland	√	×	×	×
23	Odisha	√	×	×	×
24	Punjab	√	×	×	×
25	Rajasthan	√	×	×	×
26	Sikkim	×	×	×	√
27	Tripura	√	×	×	×
28	Tamil Nadu	√	×	×	×
29	Telangana	√	√	×	×
30	Uttar Pradesh	√	×	×	×
31	Uttarakhand	√	√	√	×
32	West Bengal	√	√	×	√
33	D&D and D&NH	×	×	×	√
34	Puducherry	√	×	×	√
35	Chandigarh	√	×	√	×
	Total	**29**	**06**	**08**	**11**

a) 29 of 35 SPCBs/PCCs (viz. Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, J&K, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Odisha, Tamil Nadu, Telangana, Tripura, Rajasthan, Punjab, Puducherry, Uttar Pradesh and West Bengal);
b) Department of Environment of only 06 States/Ut (namely Haryana, West Bengal, Andhra Pradesh, Telangana, Kerala and Uttarakhand);
c) Department of Industries of only 11 States/UT (namely Bihar, Chhattisgarh, West Bengal, Goa, Mizoram, Sikkim, Assam, Meghalaya, Manipur, Daman & Diu, Puducherry)
d) Department of Labour of 08 States/UTs (namely Andaman & Nicobar, Arunachal Pradesh, Bihar, Chandigarh, Delhi, Goa, HP and Uttarakhand);

MoEF&CC; CPCB; Customs Authority and DGFT.The response to the questionnaire was not received from following stakeholders despite reminders and video conferences arranged for the purpose:

a. 06 SPCBs/PCCs namely (Andhra Pradesh, Sikkim, Uttarkhand, Andaman & Nicobar, Lakshadweep and Daman, Diu & Dadra & Nagar Haveli) .
b. Department of Environment of 29 States/UTs (namely Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Chandigarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jharkhand, J&K, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Odisha, Tamil Nadu, Tripura, Rajasthan, Sikkim, Punjab, Puducherry, Uttar Pradesh, Andaman & Nicobar, Lakshadweep and Daman, Diu & Dadra & Nagar Haveli.);
c. Department of labour of 27 States/UTs (namely Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Haryana, Jharkhand, J&K, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Odisha, Tamil Nadu, Telangana, Tripura, Rajasthan, Sikkim, Punjab, Puducherry, Uttar Pradesh, West Bengal, Lakshadweep and Daman, Diu & Dadra & Nagar Haveli) and
d. Department of Industries of 24 States/UTs (namely Andaman & Nicobar, Andhra Pradesh, Arunachal Pradesh, Chandigarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, J&K, Kerala, Karnataka, Lakshadweep, Madhya Pradesh, Maharashtra, Nagaland, Odisha, Telangana, Tamil Nadu, Tripura, Rajasthan, Punjab, Uttar Pradesh and Uttarakhand).

It was further observed that

- The SPCBs/PCCs probably did not realize the importance of the requested data
- The information provided was not properly compiled and was tentative in nature
- There were many anomalies and descrepancies in the provided information leading to no conclusions
- The questionnaire survey and interaction with the SPCBs/PCCs on Video Conference indicated lack of proper understanding and purpose of the HOWM 2016 Rules
- Even the the awareness about the involvement of other Governmental agencies was missing in many instances.

The responses to the questionnaires are appended as **Annexure VIII**.

3.3 FIELD VISITS

The Committee also conducted field visits in Mumbai, Kanpur, Hyderabad, Aurangabad, Bhiwadi and Vadodara during September 05-06, 2018; September 11-12, 2018; September 17-18; December 06-07, 2018; December 17, 2018 and December 24, 2018 respectively, to monitor and assess status field enforcement of the HOWM Rules, 2016. These field visits were representative and included key stakeholders in HOWM Rules, 2016 such as few Common TSDFs; hazardous waste generating/recycling/utilisation units; Common Effluent Treatment Plant (CETP) and contaminated sites. The visit reports of the same are given as **Annexure IX, X, XI, XII, XIII and XIV** respectively.

Further, in order to monitor import/export of hazardous and other wastes and methodologies being followed and facilities available for executing the duties assigned to the Custom Authority under the Rules, the Committee visited and interacted with Customs officials at Jawaharlal Nehru Port

Trust, Mumbai, on October 15, 2018. Minutes of the said visit is given at **Annexure XV.**

Information submitted by SPCBs/PCCs, Custom Authority and DGFT were examined and gaps/anomalies were identified and communicated to the respective agencies for submission of revised information. A video conference with all SPCBs/PCCs was also held during the third meeting on October 25, 2018.

The data/ information compiled thorugh these surveys , interactions, and field visits form the basis of the overall assessment of the compliance to the HOWM rules 2016, identifications of shortfalls and key areas of concerns, and recommendations given.

CHAPTER 4

STATUS OF COMPLIANCE OF HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES, 2016 AND ISSUES

4.1 HAZARDOUS WASTES IDENTIFICATION, GENERATION AND THEIR TRACKING

4.1.1 Hazardous Waste identification and generation

Identification of different types of hazardous wastes generated from an industrial or processing activity is fundamental scientific exercise and the basic step of efficient management of hazardous wastes. Once identified, next step is to quantify these hazardous wastes in terms of production i.e. kg of each of the hazardous wastes generation per ton of products. Such identification and quantification of HW require to be stipulated in the authorization granted by SPCB/PCC under Rule 6 of the HOWM Rules, 2016, which constitute basic regulatory document from where tracking of such hazardous wastes begin till is managed (i.e. recycled, utilized or disposed). Escape of any category of hazardous waste (being generated in an industrial activity) from ambit of the said authorization leaves scope of unaccounted generation of hazardous wastes and their illegal disposal or use thereby causing impact on human health and environment.

In order to identify different types of hazardous waste generation and their quantification, it is required to assess all raw materials being used and hazardous wastes/by-products/products produced across various steps of production. Such assessment also requires to derive quantity of each of the hazardous waste generation per ton of production of by-products/products by reconciliation of mass balance of the production processes. For instance, in industrial activity having paint shop, paint sludge gets commonly stipulated as hazardous waste in the authorization granted by SPCB/PCC but other associated hazardous waste being generated in such activity viz. spent/waste solvent, empty drums/containers containing paint/solvent, paint contaminated cotton rags/cardboards, etc. often gets escaped and may find its way into fuel/solvent adulteration, usage as illegal fuel or informal washing of drums/containers leading to effluent/air emissions and impact on workers' health.

Most of the SPCBs/PCCs have reported that authorisations are granted based on declaration made by the applicants while making application for grant of authorisation and not by assessing the production process/raw materials/mass balance though SPCB/PCC of Chandigarh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Puducherry, Odisha, Tamil Nadu Telangana and Uttar Pradesh have claimed that they do assess the process/mass balance while granting authorisation, but no such documentary evidence has been placed before the committee. The same is depicted in the **Figure 5.**

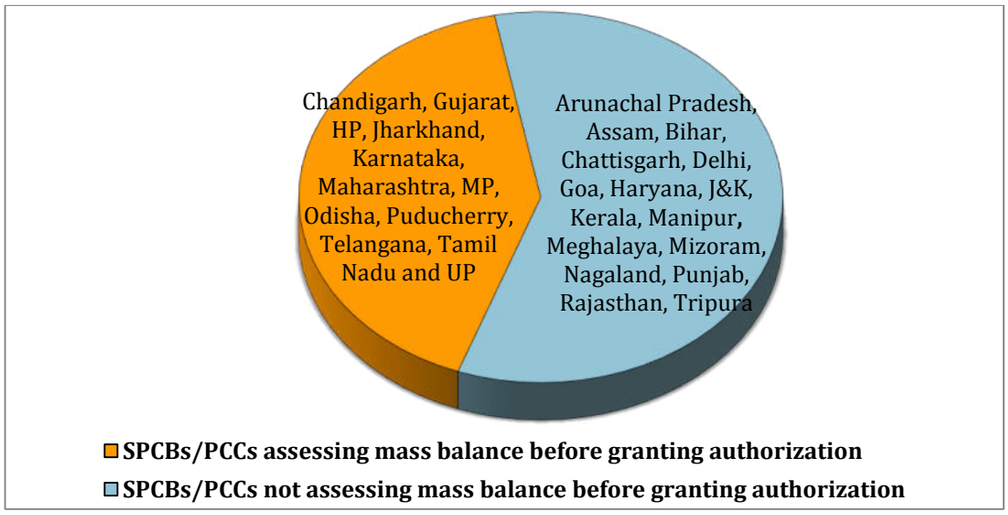

Figure 5: Status of authorization granted by SPCBs/PCCs after assessing mass balance of the production process and hazardous waste generation

Audit (mass balance studies) is also not conducted by SPCBs/PCCs to assess and verify information given by hazardous waste generating units except Telangana, Puducherry, Tamil Nadu, Karnataka and Gujarat while Chhattisgarh informed that they are under process of implementing such audit. **Figure 6** below shows the status on the audit conducted by the SPCBs/PCCs.

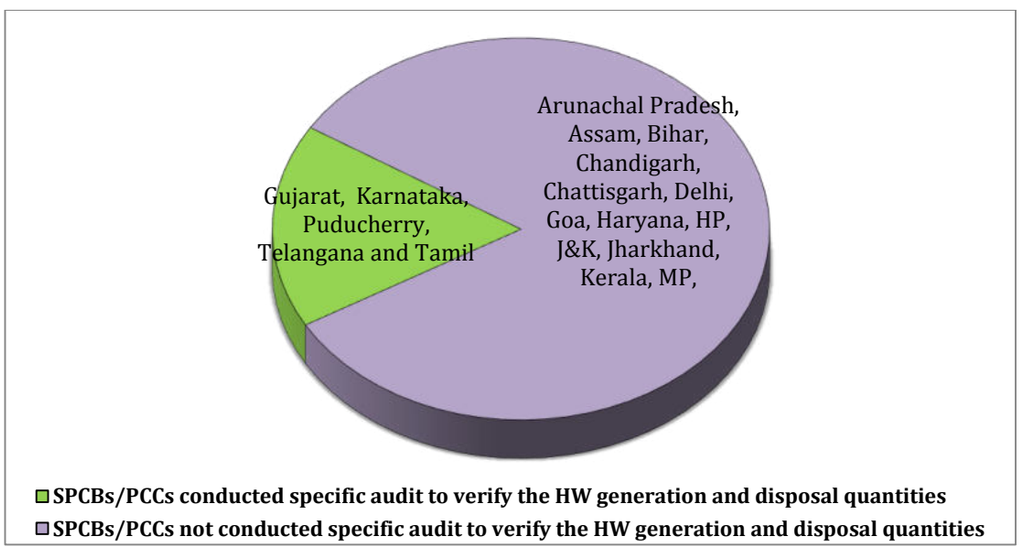

Figure 6: Status on audit to verify the HW generation and disposal quantities, including the mass balance by SPCBs/PCCs

It may, therefore, be observed that categories of hazardous waste generated in industrial activity and its quantities are generally laid down in the authorization, solely, based on declaration by applicant while making application for authorization in most of the SPCBs/PCCs. However, according to rules, any application for authorisation requires to be scientifically & technically reviewed and appraised by SPCBs/PCCs taking into account type and quantities of raw materials, production process and material mass balance of the reactions/processes so as to identify and include all relevant categories and quantities of hazardous wastes generated in the industrial activity within the ambit of the authorization. This would ensure proper tracking of HW generation, transportation and management and hence could be a reliable base document for effective enforcement of various provisions of the HOWM Rules, 2016.

4.1.2 Grant of Authorization by SPCBs/PCCs

a. Authorisation Grant Process: Rule 6(2) of the HOWM Rules, 2016, stipulates that the State Pollution Control Board may, after such inquiry as it considers necessary, and on being `satisfied' that the applicant possesses `appropriate' facilities for collection, storage, packaging, transportation, treatment, processing, use, destruction, recycling, recovery, pre-processing, co-processing, utilisation, offering for sale, transfer or disposal of the hazardous and other waste, as the case may be, and `after ensuring' technical capabilities and equipment complying with the standard operating procedure or other guidelines specified by the Central Pollution Control Board from time to time and `through site inspection', grant within a period of one hundred and twenty days. In the case of an application for renewal of authorisation, the State Pollution Control Board may, before granting such authorisation, satisfy itself that there has been `no violation of the conditions' specified in the authorisation earlier granted by it and same shall be recorded in the inspection report. Rule 6(3) of the said Rule stipulates that the authorisation granted by the State Pollution Control Board shall be accompanied by a copy of the `field inspection report' signed by that Board indicating the adequacy of facilities for collection, storage, packaging, transportation, treatment, processing, use, destruction, recycling, recovery, pre-processing, co-processing, utilisation, offering for sale, transfer or disposal of the hazardous and other wastes and compliance to the guidelines or standard operating procedures specified by the Central Pollution Control Board from time to time.

The provisions of the rules stipulating such elaborate and stringent provisions for grant of Authorization indicates the importance given by the Rule makers for a through due diligence of the entire gamut of HW management by the occupier. Further, provision of inspection and enclosure of such field inspection report at the time of granting authorization ensures accountability and transparency in availability of adequate requisite facilities for handling and management of hazardous wastes that the applicant possesses at his/her premises which are required to be verified by the inspecting official. However, it was observed by the committee that most of the SPCBs/PCCs are not enclosing the said field inspection report along with authorization, as stipulated under the aforesaid provisions of the HOWM Rules, except Bihar, Odisha, Uttar Pradesh, Karnataka, Chhattisgarh and Maharashtra. However, this submission is not verified by the committee independently and generally, it was observed that such inspections are general inspections and do not especially cover all aspects of HW management and particularly verification of adequacy of HW facilities and also, no violation by the occupier. Suffice to say that the visits are general vigilance inspections and not the compliance verification process as envisaged in the rules.

Though Gujarat and Madhya Pradesh have reported that the said inspection report is available on XGN portal but the same is attached with the authorisation document being issued to the applicant and such inspection report is not accessible for public information as it is not part of authorisation, though envisaged in Rules. However, in cases where inspection report is attached with the authorisation document, copies of such inspection report reveal that adequacy of the

facilities on various aspects such as storage, transportation, treatment, recycling, utilization, disposal, etc. and compliance with relevant CPCB guidelines are not being covered in the said inspection report. Further, there is no uniformity in the information covered during the inspection.

Besides coverage of the aforesaid mandatory aspects in the inspection report, the committee also feels that such inspection report may also incorporate assessment and verification of generation of HW based on raw materials being used and their quantification (based on mass balance approach). Realising the requirement of maintaining uniformity in such inspection report across all SPCBs/PCCs while granting/renewing authorisation, the committee feels that there is need to have a standard format with checklist for carrying out inspection by officials of SCBs/PCCs to meet obligations stipulated under the Rule 6(2) and (3) of the HOWM Rules, 2018, as a starting point.

b. Time for processing the Authorisation: Delay in disposing few of the authorization applications (beyond the stipulated period of 120 days) has been observed in most of the States except Assam, Chhattisgarh, J&K, Odisha, Nagaland, Manipur, Kerala, Telangana and Uttar Pradesh and the same is illustrated in **Figure 7 and 8** below:

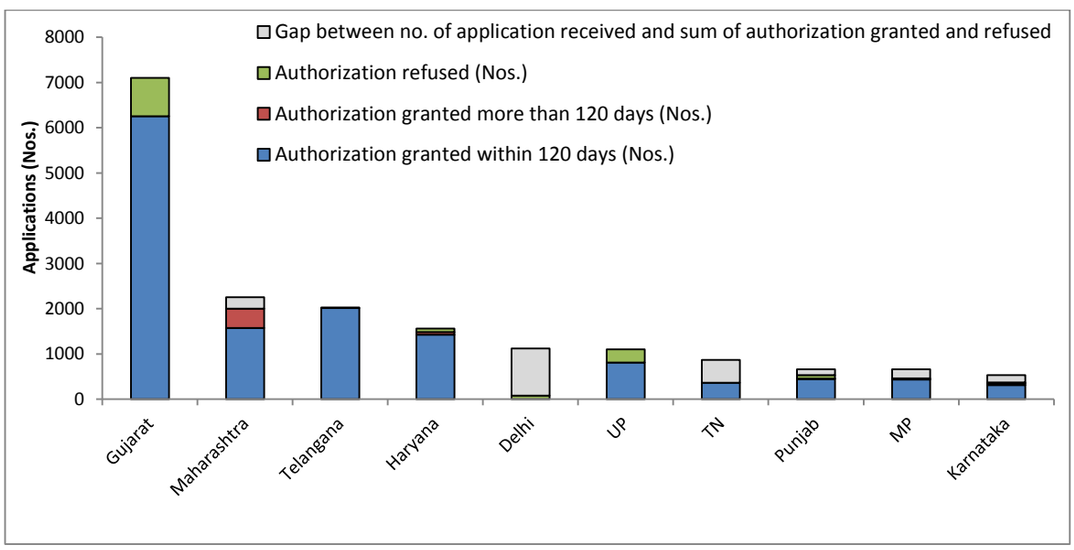

Figure 7: Status on authorization granted (within and more than 120 days) and refused by SPCBs/PCCs (more than 500 application)

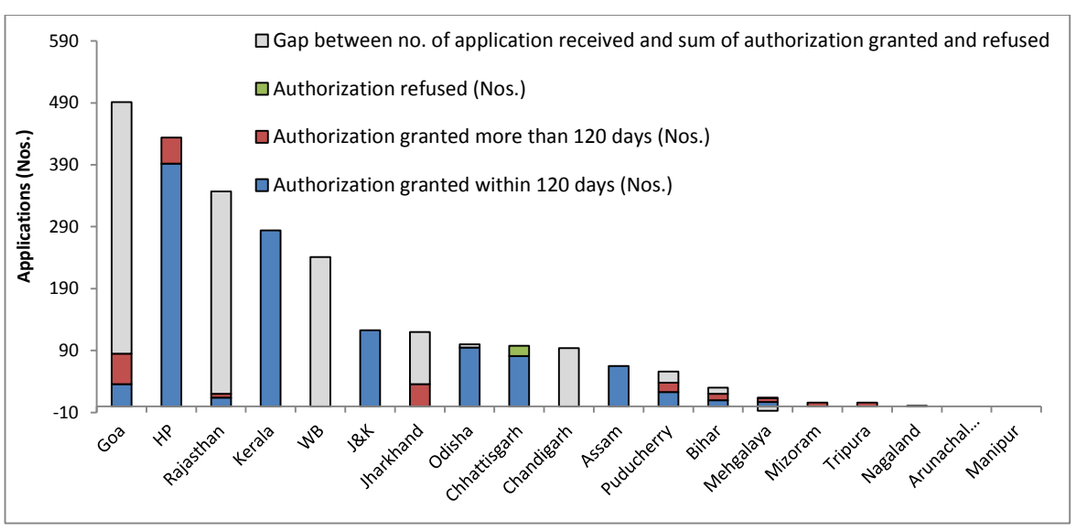

Figure 8: Status on authorization granted (within and more than 120 days) and refused by SPCBs/PCCs (less than 500 application)

c. With regard to provisions under Rule 6(6) of the HOWM Rules about maintaining a register by SPCBs/PCCs containing particulars of the conditions imposed under these rules for management of hazardous and other wastes which shall be open for inspection during office hours to any interested or affected person, it was observed that most of the SPCBs/PCCs are maintaining the register as stipulated under the HOWM Rules except Bihar, J&K, Rajasthan, Uttar Pradesh, Telangana (through online system), Delhi, Haryana, Maharashtra, Meghalaya, Nagaland, Assam, Chhattisgarh, Puducherry, Jharkhand and West Bengal. However, details on conditions imposed under HOWM Rules for management of hazardous and other wastes have been reported to be maintained only by Tamil Nadu and Mizoram.

4.1.3 Tracking of Movement of Hazardous Waste

Tracking hazardous waste from "cradle to grave" is universally accepted principle and the same has been espoused in HW regulations vide Rule 19, Rule 20(1) and Rule 20(2) of the HOWM Rules, 2016. The Rule 20(1) stipulates that the occupier handling hazardous or other wastes and operator of disposal facility shall maintain records of such operations in Form 3. The Form 3 lays down format wherein date wise records require to be maintained about handling and management of hazardous wastes by the authorized occupier. The Rule 19 lays down provisions of Manifest System (Movement Document) in various colour-coded manifest prescribed as Form 10 which travels with hazardous waste from the point of generation, through transportation, to the final recycling, utilization or disposal facility, as the case may be, as well as intimation of the same to the sender, transporter, receiver and the concerned SPCB/PCC at various stages such as at the time of handing over the waste to transporter and transporter to the receiver.

“Cradle to grave” principle is effective only if the aforesaid date and quantity wise records about handling and management of hazardous wastes are maintained by the occupier. Such date wise records would concise hazardous waste generated, treated or transported for recycling/utilization/disposal and net waste stored at any given day. Unless such date wise records are maintained and monitored, tracking of hazardous waste may not be effective.

In most of the States/UTs, the occupiers are not maintaining date-wise records about handling and management of hazardous wastes which is required under the aforesaid Rule 20(1) of the HOWM Rules, 2016. Though SPCB/PCC of Puducherry, Madhya Pradesh, Punjab, Odisha, Jammu & Kashmir and Delhi have reported that such date-wise record maintenance is being monitored by them. Among these, Delhi PCC has reported that among 1123 units who submitted annual returns 396 units have been noticed to be not maintaining the said date-wise records. Similarly, MP PCB has noticed such non-maintenance in 36 of the 1206 units who submitted annual returns. Rest others (Puducherry, Punjab, Odisha and Jammu & Kashmir) have noticed only about 1-8 such non-maintenance cases. The status of monitoring of daily records by SPCBs/PCCs is given at **Figure 9** below:

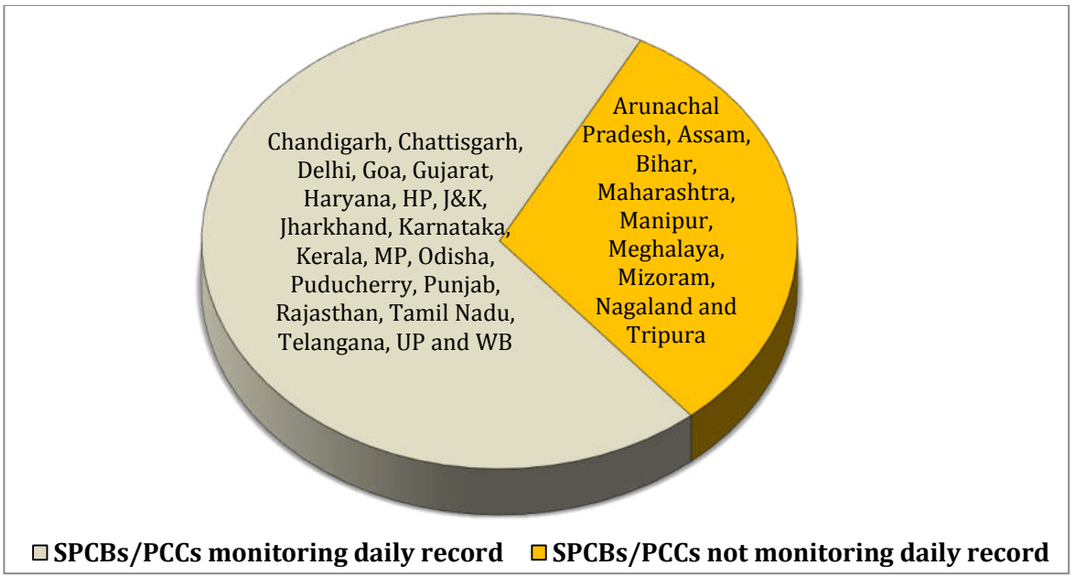

Figure 9: Status of monitoring of daily records (in Form 3) by SPCBs/PCCs

Flow of manifest document in Form 10 (which contains details of waste description & quantity, senders, transporters, receivers, acknowledgements by transporters and senders, etc.) as prescribed under the Rule 19 are as below:

Copy number with colour code	**Purpose**
(1)	**(2)**
Copy 1 (White)	To be forwarded by the sender to the State Pollution Control Board after signing all the seven copies.
Copy 2 (Yellow)	To be retained by the sender after taking signature on it from the transporter and the rest of the five signed copies to be carried by the transporter.
Copy 3 (Pink)	To be retained by the receiver (actual user or treatment storage and disposal facility operator) after receiving the waste and the remaining four copies are to be duly signed by the receiver.
Copy 4 (Orange)	To be handed over to the transporter by the receiver after accepting waste.
Copy 5 (Green)	To be sent by the receiver to the State Pollution Control Board.
Copy 6 (Blue)	To be sent by the receiver to the sender.
Copy 7 (Grey)	To be sent by the receiver to the State Pollution Control Board of the sender in case the sender is in another State.

With regard to compliance of the aforesaid manifest document during transportation of hazardous wastes, most of the SPCBs/PCCs are receiving copy 1 (white) of manifest from the sender (except Tripura, Mizoram, Karnataka, Manipur, Delhi and Nagaland) and copy 5 (green) of manifest from the receiver (except Meghalaya, Tripura, Assam, Jharkhand, Mizoram, Karnataka, Manipur, Jammu & Kashmir, Delhi and Nagaland). In case of interstate movement of hazardous waste most of the SPCBs/PCCs are not receiving the copy 7 (grey) from the receiver in other state except Puducherry, Rajasthan, Chandigarh, Gujarat, Punjab, Himachal Pradesh, Odisha, Uttar Pradesh, Telangana and Haryana. However, there is no mechanism or system of reconciliation of the manifest documents and thus closure of the loop (i.e. from generation to receiver) remains unaccounted and tracking of illegal transportation or disposal of hazardous wastes

becomes difficult. Few SPCBs have software system for the same but limited to wastes being transported to common TSDF within the State. Non-availability of mechanism for closure of the loop or reconciliation of manifest documents leaves scope of untracked illegal transportation or disposal of hazardous wastes.

CPCB has reported that they have initiated process for development of a centralized software system called "National Hazardous Waste Tracking System" for tracking generation, transportation, storage and recycling/ utilization/disposal of hazardous wastes for each of the occupiers handling hazardous wastes beginning from date wise generation to annual status of the same. The conceptual framework of the said software system was briefed to the monitoring committee and work of awarding the software development to competent software developer is under progress. However, committee recommends that the proposed system shall ensure validity, reliability and credibility of all the data entered in the system while ensuring immediate regulatory response in case of non-compliance. Moreover, such system would essentially require huge capacity building of all the stakeholders which would be a challenging task. Upon development, validation of the same and its field implementation require to be done.

4.1.4 Observations and Recommendations

(i) All SPCBs/PCCs (except Andaman & Nicobar, Nagaland, Lakshadweep not having major hazardous waste generating units in their State/UT) shall set up a mechanism to evaluate each application of authorisation scientifically and technically taking into account of all raw materials being used, various steps of production process and applying mass balance approach thereof so as to identify & quantify and regulate entire types of waste generation into ambit of authorisation document which is basic document and foundation of implementation of the HOWM Rules, 2016. This will effectively replace the present practice of relying on types and respective quantities of hazardous waste generation as declared by applicant while making application for grant of fresh/renewal of authorisation under Rule 6 of the HOWM Rules.

(ii) For effective working of the above mechanism, SPCBs/PCCs (except Andaman & Nicobar, Nagaland, Lakshadweep not having major hazardous waste generating units in their State/UT) may set up expert committee for the said technical evaluation having experts in the field of process engineering, chemical engineering, hazardous waste management, laboratory analysis, etc. Such technical evaluation may be carried out by SPCB/PCC for each industrial processes applying for Consent to Operate or fresh/renewal of Authorisation and for subsequent similar processes (having similar raw materials, products and production process), SPCBs/PCCs may proceed based on identification and quantification of hazardous wastes carried out in previous for such processes.

(iii) Recognising the requirement of verification of adequacy of all required facilities in inspection report while granting/renewing authorisation as also stipulated under the Rule 6(2) and (3) of the HOWM Rules, 2016, and to have uniformity in such inspection reports across all SPCBs/PCCs, a Format for carrying out inspection by officials of SCB/PCC and checklist is recommended and the same is given at **Annexure XVI**. The aforesaid committee of SPCB/PCC may suggest specific verifications/observations to be made of the said Format and checklist and may further add or remove scope of verification of various

facilities, generation of various categories of HW and their quantities, etc. on case to case basis by the inspecting officials. Thereafter, inspections shall be carried out by SPCB/PCC official incorporating such scope and be reported in the inspection report accordingly.

(iv) All SPCBs/PCCs shall clearly and distinctly stipulate all categories of HW generated from industrial activity (for which authorisation is granted), their respective quantity, mode of disposal/recycling/utilization (as derived through aforesaid process of scientific & technical evaluation and field verification) in the authorisation being granted by them. Further, such authorisation shall be accompanied with the aforesaid copy of the field inspection report signed by that Board in compliance with Rule 6(2) and (3) of the HOWM Rules, 2016.

(v) In order to comply with provisions of Rule 6(4) of the HOWM Rules, 2016, with regard to maintaining a register by SPCBs/PCCs containing particulars of the conditions imposed under the authorization for management of hazardous wastes and that it shall be open for inspection during office hours to any interested or affected person, every SPCB/PCC shall create a separate section in its website in this regard where copy of all authorizations issued by the SPCB/PCC shall be uploaded along with the aforesaid inspection report.

4.2 INVENTORY ON HAZARDOUS WASTE GENERATION AND ITS MANAGEMENT

Hazardous waste Inventories can be excellent tools to aid in planning and designing the waste management programs and policies. They are also useful in deciding the priorities and strategies for regulatory intervention, including the enforcement actions. The reliability and accuracy of such inventory could be greatly improved if more focus were put on how to practically obtain the information on hazardous waste management which is most achievable and useful. Large amounts of information on hazardous wastes are often not readily available or easily obtainable, which may be a reason many industries as well as SPCBs/PCCs have difficulty in reporting. Thus, emphasis in this inventory document should be given to identifying priority waste streams and to identifying basic, low-cost methods that can be used to estimate the amount of waste that is generated and transported, and disposed.

Preparation of HW inventories necessarily involves interplay with prevailing policies, regulations, monitoring and enforcement of compliance, realigning the efforts of enforcement on the waste management hierarchy adopted and with the planning and implementation of HW disposal capacity to fulfill the principles of environmentally sound waste management. Furthermore, the national level inventory can provide exchange of information among the stakeholders in order to promote the exchange of good practices and also, set specific the benchmarking of specific generation, reutilization of HW of prioritized sectors between all Parties.

4.2.1 Status of Hazardous Waste Generation and its Management (2008 onwards) including Records and Returns

a. The Hon'ble Supreme Court of India vide its order dated 14.10.2003 in the Writ Petition No. 657 /1995 has issued various directions for management and handling of the hazardous waste including preparation of an inventory of hazardous waste by every State Pollution Control Board/Pollution Control Committee. Accordingly, CPCB based on the information submitted by 30 SPCBs/PCCs

prepared and published a report on "National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India"[6] in the year 2009. The information reported in the above report is related to the year 2007-08 and thus corresponds to the wastes listed under the Hazardous Wastes (Management & Handling) Rules notified in 2003. The information submitted by the SPCBs / PCCs were also verified through random checks / inspection by the teams of CPCB / SPCBs/PCCs officials.

As per the above inventory report of 2009, there were 36,165 nos. of hazardous waste generating industries, generating 62,32,507 Metric Tonnes per Annum (MTA) of hazardous wastes, of which 27,28,326 MTA was Landfillable hazardous waste; 4,15,794 MTA was Incinerable hazardous waste and 30,88,387 MTA was Recyclable hazardous waste.

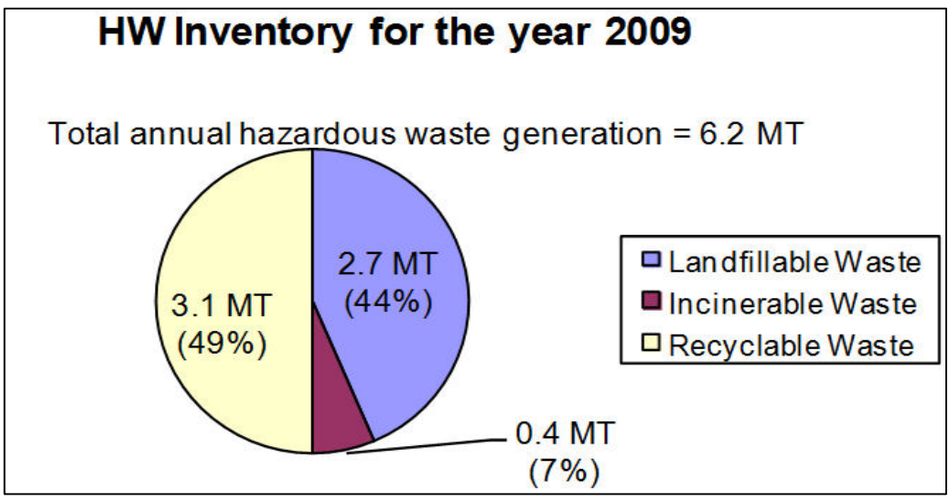

Figure 10: Pie chart showing hazardous waste generated in the year 2007-2008

Further, Gujarat (28.76%); Maharashtra (25.16 %); Andhra Pradesh (8.93 %); Chhattisgarh (4.74 %); Rajasthan (4.38 %); West Bengal (4.17 %) and Tamil Nadu (4.15 %) were reported among the top seven hazardous waste generating States which together contributed about 80 % of the country's total hazardous waste generated.

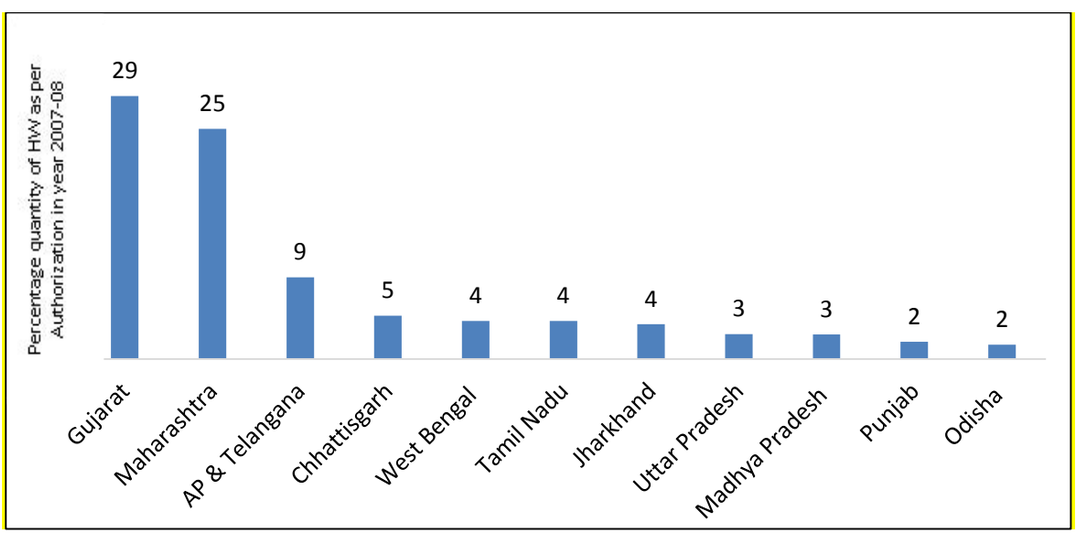

Figure 11: Top 11 hazardous waste generating States in the year 2007-2008

[6] http://cpcb.nic.in/cpcbold/upload/NewItems/NewItem_145_hw_inventory_final_report_2009.pdf

b. The 2016 Rules have recognised the importance of the updated inventory of HW and also, accordingly, the provisions for submission of the annual inventory by SPCBs/PCCs with regard to waste generated, recycled, recovered, utilized including co-processed, re-exported and disposed to CPCB have been introduced in the HOWM Rules, 2016 under Rule 20 (3) of the said Rules. As per provisions under the said Rules, based on annual returns (Form 4) submitted by occupiers of hazardous and other wastes to the concerned SPCB/PCC, the SPCBs/PCCs are required to send annual inventory of respective State/UT to CPCB who is required to prepare the consolidated review report on management of hazardous and other wastes as stipulated under Rule 20(4) of the said Rules and forward it to the Ministry of Environment, Forest and Climate Change, along with its recommendations before the 30th day of December once in every year. In compliance with the said provisions of the Rules, CPCB developed formats for submissions of annual inventory by SPCBs/PCCs and undertaken various follow ups/reviews. Country's annual inventory has accordingly been compiled by CPCB for 2016-2017[7]. The inventory for 2017-18 is reported to be under preparation. Moreover, the SPCB/PCC are also required to prepare the inventory of hazardous waste generators, actual users, and common and captive disposal facilities and shall submit the information to CPCB every two years.

c. The committee noted that in order to prepare consolidated review report on management of hazardous wastes in accordance with the said provisions of the Rules, CPCB prepared formats to obtain information from SPCBs/PCCs and circulated to all SPCBs/PCCs in July 2016. However, annual inventories were submitted in time hardly by a few SPCBs/PCCs within the stipulated period of 30th September, despite several follow ups with SPCBs/PCCs by CPCB in terms of reminder letters, development of web portal (viz. SPCB Sanyojan) for submission of annual inventory by SPCBs/PCCs, taking up issues during review meetings with SPCBs/PCCs, workshops, show-cause notices and directions to SPCBs/PCCs under section 5 of the Environment (Protection) Act, 1986.

d. CPCB only, could compile country's 2016-17 inventory in July/August 2018 which were required to be completed by 31st December 2017 due to late submissions of State/UT's annual inventory by SPCBs/PCCs, the said country's 2016-17 inventory is mere compilation of reported data from SPCBs/PCCs which may not be comprehensive and the same have been pointed out by CPCB in the said report also. The committee observes that failure in timely sending of annual report by SPCBs/PCCs with comprehensive data to CPCB may be attributed to:

(i) poor categorisation and quantification of hazardous waste generation by SPCBs/PCCs;
(ii) poor enforcement of date-wise records maintenance about handling and management of hazardous wastes among occupiers;
(iii) non-availability of information from all authorised occupiers;

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[7] http://cpcb.nic.in/inventory/

(iv) non-reconciliation of manifest document pertaining to within and outside State/UT, and;

(v) poor enforcement of annual returns submission by occupiers to the SPCB/PCC within the stipulated time frame of 30th June of every year, etc.

e. HW inventory as complied for the country by CPCB for the year 2016-17 is compilation of the HW information received from SPCBs/PCCs. In turn, SPCBs/PCCs compile the data received from the industries which have HW authorization. The committee has observed that even there is no mechanism to ensure that all the industries who have authorization would submit the mandatory information on annual basis. The entire process of HW Inventorisation as on today is nothing but compilation of information. There is no check or verification or validation of the data, not there are any scientific assessment of HW information related to particular sectors or evaluation of HW information on the principles of environmental benchmarking. This is very relevant as it is an increasing trend to declare certain types of potential HW as by-products, in order to get out of the vigor's of stringent HW rules enforcement, particularly the manifest system. Though there are some yardsticks developed by CPCB for estimating the HW generation from some specific industries, the range of variation is reported to be too broad as in case of pesticide industries, and even then, there is no analysis or any efforts to benchmark the industries, either at National level or at state level. For example, one review of some consents related to tyre pyrolysis oil manufacturing in Maharashtra[8], it was noted that even the categories of the HW generated is varying besides the ratio of HW generation related to production levels.

f. It may be noted that the above inventory is based on the annual reports provided by SPCBs/PCCs and does not include the following:

- Hazardous Waste and Other wastes covered under Schedule III of the HOWM Rules, 2016 for import and export;
- Domestic hazardous waste such as discarded paint drums, pesticides cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles, etc. categorised under Solid Waste Management Rules, 2016;
- Information of SPCBs/PCC of Arunachal Pradesh, Daman, Diu & Dadra Nagar Haveli since they did not provide the annual inventory information. Further, Delhi PCC also did not provide their annual inventory information based on annual returns provided by hazardous waste occupiers and as per the said format. However, the limited information provided by Delhi PCC has been incorporated in this report.
- State/UT wise inter-movement of hazardous waste for recycling/utilization/disposal.

g. Further, States like Puducherry, Manipur and Mizoram have not submitted the hazardous waste generation as per the annual return, however, information on management of hazardous waste have been provided based on the authorized quantity of generation. States like

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[8] Consent to establish issued dt 10/8/2017 to Gajanan enterprises Palghar showing HW nil. Consent to operate given to Eco-green industry Wada, on 20/10/2016 shows HW, besides varying by-products.

Goa, Gujarat, West Bengal, Puducherry, Manipur and Mizoram have reported that annual return have not been submitted by all the occupiers. UTs like Andaman & Nicobar and Lakshadweep have reported generation of hazardous waste as nil, as there are no hazardous waste generating industries. However, it is expected that hazardous wastes such as used/waste oil, used lead acid batteries, etc. are generated from automobiles workshops/service stations/etc.

h. Ipso facto, all these limitations makes the inventory much incomplete and non-comprehensive. In the absence of any verification or validation and, also enforcement actions for non-submission of information, industries and HW generator have conatus for submission of unverified HW information. Unless such HW generation data is scientifically classified and validated, it would not be technically possible to track the labyrinth of HW disposal methods in presently in vogue.

i. 2016-17 Inventory: As per the said inventory, about 7.17 Million Metric Tonne of hazardous waste have been reported to be generated in the country from 56,350 numbers of hazardous waste generating industries during 2016-17. Details of the quantity of hazardous waste generated and its management are given at **Table 2 and Figure 12** below:

Table 2: Hazardous Waste Generation and their recycling/ utilization/disposal in the country

1.	**Quantity of HW disposed**		**2.84 Million MT (38.30%)**
	(i) Common SLF	:	1.68 Million MT
	(ii) Captive SLF	:	0.89 Million MT
	(iii) Common Incinerator	:	0.23 Million MT
	(iv) Captive Incinerator	:	0.05 Million MT
2.	**Quantity of HW Recycled/Utilized**		**3.68 Million MT (49.46%)**
	(i) Recycling of commonly recyclable hazardous wastes (Schedule IV listed wastes under the HOWM Rules, 2016)	:	1.00 Million MT
	(ii) Co-processing in Cement Kilns	:	0.55 Million MT
	(iii) Captive utilization		1.66 Million MT
	(iv) Non-captive utilization (other than (ii) above) under Rule 9 of the HOWM Rules, 2016	:	0.47 Million MT

About 0.90 Million MT of hazardous wastes have been reported to be stored at the occupier's premises at the end of financial year i.e. March, 2018.

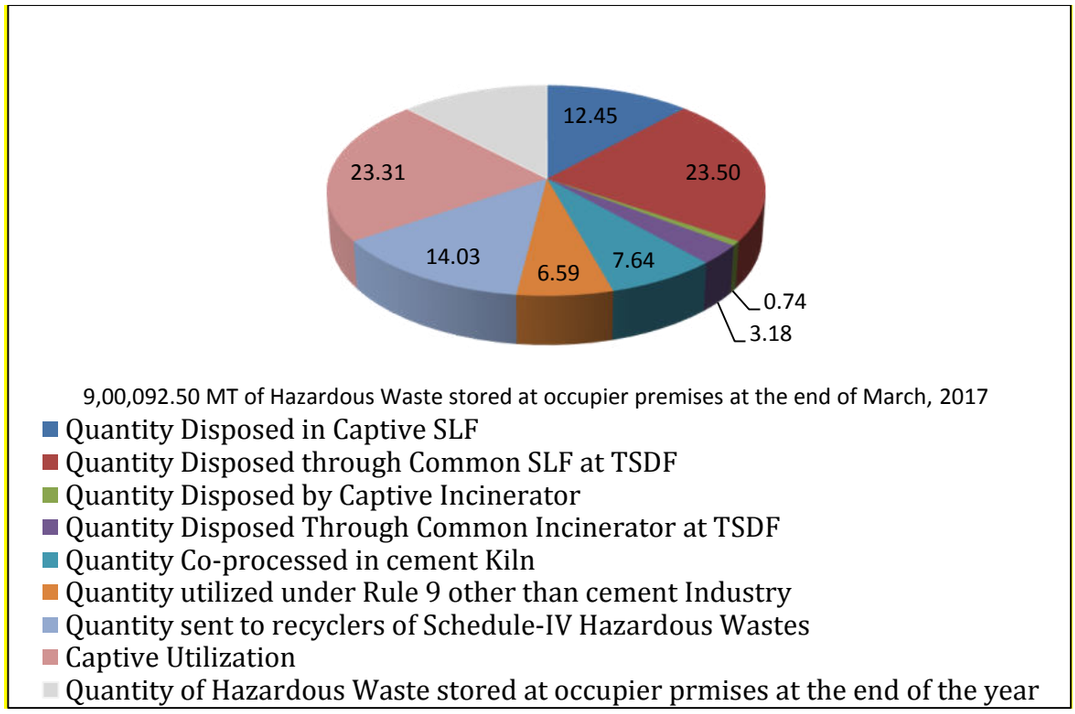


Figure 12: Pie chart showing hazardous waste management (during 2016-17)

Gujarat (39.20%), Rajasthan (10.10%), Odisha (8.30%), Jharkhand (8.07%), Tamil Nadu (5.34%), Maharashtra (5.32%), Karnataka (4.70%), Andhra Pradesh (3.94%), Telangana (3.86%) and Uttar Pradesh (2.60%) are the top 10 hazardous wastes generating states, which together contribute about 91% of total hazardous waste generated in the country. PCC of Andaman & Nicobar and Lakshadweep have informed that there are no hazardous waste generating industries in their Union Territory. Details of State/UT wise hazardous waste generating units, hazardous waste generated/ recycled/ utilized/ disposed and lying stored at the occupier's premises are given it **Table 3**.

Table 3: State-wise Hazardous Waste Generation & its Management (2016-17)

S. No.	State/UT	No. of Hazardous Waste Generating Industry	Quantity of Hazardous Waste as per Authorization (MTA)	Quantity of Hazardous Waste as per Annual Return (MTA)	Quantity Disposed in Captive SLF (MT)	Quantity Disposed through Common SLF at TSDF (MT)	Quantity Disposed by Captive Incinerator (MT)	Quantity Disposed Through Common Incinerator at TSDF (MT)	Quantity Co-processed in cement Kiln (MT)	Quantity utilized under Rule 9 (MT)	Quantity sent to recyclers of Schedule-IV Hazardous Wastes (MT)	Captive Utilization (MT)	Quantity of Hazardous Waste stored at occupier premises at the end of the year (MT)
1	Andaman & Nicobar	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Andhra Pradesh	2298	976781.2	282266.4	8399.136	140977.4	306.19	3094.476	24775.21	7651.84	51494.899	21555	30282.338
3	Arunachal Pradesh	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP
4	Assam	55	INP	29434.64	10075.13	0.00	0.00	0.00	0.00	27178.38	4983.51	310.82	4764.856
5	Bihar	121	1253.16	7629	0.00	30	0.00	48.35	4386	0.00	93.09	2262.2	9381.429
6	Chandigarh	1167	9733.387	2846.89	0.00	69.294	0.00	11.25	0.00	0.00	2766.35	0.00	0.00
7	Chhattisgarh	264	306430.8	65186.14	1882.9	0.00	0.00	0.00	0.00	20618.2	16141.11	14713.5	11830.651
8	Daman & Diu	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP
9	Delhi#	1136	INP	4197.36	INP	INP	INP	INP	INP	INP	INP	INP	21,006
10	Goa	1409	82730.7	24796	3499	0.00	14357.3	2695	469.9	8.335	912.5	0.00	1320.35
11	Gujarat	11200	14490351.1	2811925.3	243493.7	708270.5	22339.6	84940.593	289276.1	140467.3	425746.65	468222.3	429149.944
12	Haryana	3941	64896.63	58829.43	687.71	8308.1	4135.4	20459.66	5089.1	3566.246	7458.8725	0.00	9124.1825
13	Himachal Pradesh	3108	506523.1	29029.38	0.00	17804	0.00	0.00	1249.88	10754.38	321.616	0.00	10.67
14	Jammu & Kashmir	213	1043.21	1043.21	0.00	0.00	12.3	0.00	0.00	0.00	4.26	0.00	1026.65
15	Jharkhand	562	772180.6	578788.6	3059.01	0.00	1554.3	0.00	4341.1	0.00	12464.64	550819.3	6550.21
16	Karnataka	3264	1337666.8	336791.6	0	33548.1	20.21	29015.9	57796.38	98321.97	64957.51	0.00	54552.68

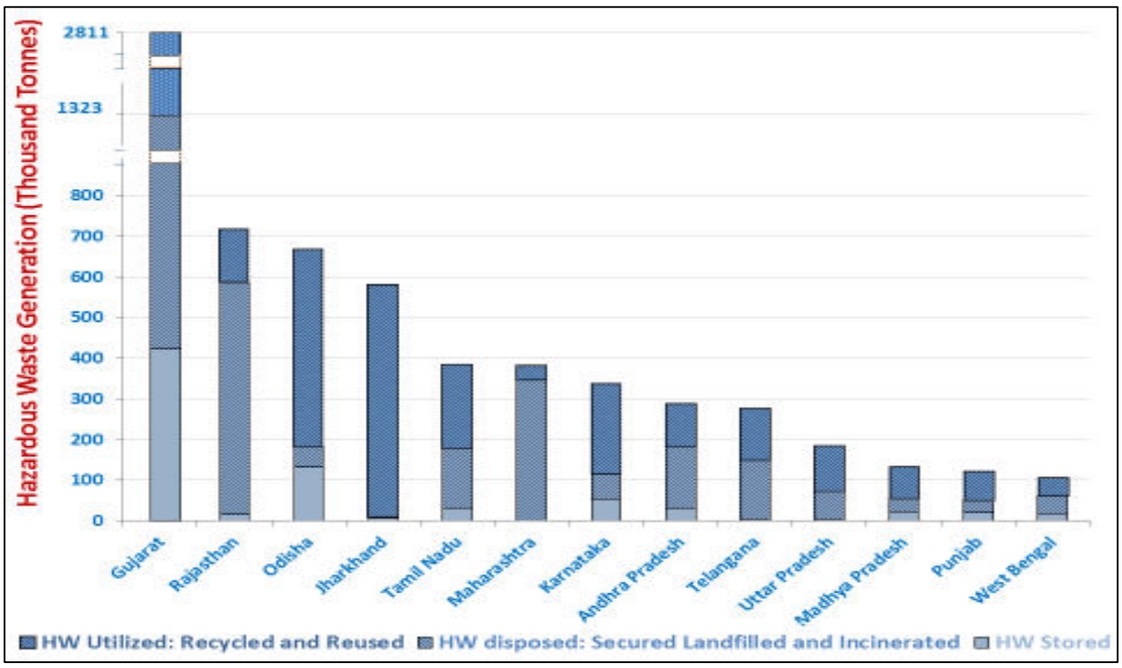
17	Kerala	927	40766.69	38466.20	18805	15694.2	0.00	0.00	0.00	0.00	3711.04	0.00	253.02
18	Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Madhya Pradesh	2222	553028.4	125880.7	3613	24879.	2926.0	1400.202	23788.19	1118.624	17452.422	36770.3	22501.81
20	Maharashtra	6160	2359606	381686.2	0.00	296293.1	0	49211.6	0.00	6066.465	30105.94	0.00	0.00
21	Manipur*	255	336.8	INP	INP	INP	INP	INP	INP	INP	INP	INP	INP
22	Meghalaya	11	513.83	75.8	0.00	0.00	0.00	0.00	0.00	0.00	37.25	0.00	309.004
23	Mizoram	28	14.761	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.761
24	Nagaland	2	10	10	0.00	0.00	0.00	0.00	0	0.00	10	0.00	0.00
25	Odisha	184	788974.2	595697.8	2883.786	48692.9	83.368	0.00	31.42	73370.15	5514.889	402729.1	131784.73
26	Puducherry*	127	93575.68	INP	3	0.00	54.8	714	1055.69	14846	10183.19	0.00	71488.7
27	Punjab	3294	221393.3	115490.1	5814.4	20817.4	2246.5	1734.3	418.814	42846.3	27567.01	1150	20586.03
28	Rajasthan*	1046	1140453.8	724663.2	505952.3	58373.5	87.85	4116.854	33655.51	2655.76	30868.322	63089.6	16040.69
29	Sikkim	23	785.472	785.472	0.00	785.47	0.00	785.472	0.00	0.00	0.00	0.00	0.00
30	Tamil Nadu	3615	702861.2	383189.2	77004	62850.2	2419.9	4848.24	55829.8	1907.47	118975.86	30117.5	31052.87
31	Telangana	2510	525468.9	277078.5	0.00	138791.6	0.00	5391.3	35769.8	1156	90567.102	32.51	5371.11
32	Tripura	167	270.19	270.19	4.5	0.00	4	0.00	0.00	2.46	238.63	0.00	20.6
33	Uttarakhand	3671	111809.1	24264.09	102.44	3860.3	162.9	3600.6	922.06	342.66	9860.87	4584.8	828.28
34	Uttar Pradesh	2334	229322.6	186591.5	2221.6	53417	1556.8	11734.157	1000	1109.132	46399.417	64588.9	4564.118
35	West Bengal	1036	145322.9	85848.74	0	42303.6	206.36	3227.479	5249.65	16204.52	21698.68	1222.8	17856.2
Total		56,350	25464105	71,72,762	8,87,501	16,75,766	52,473	2,27,029	5,45,102	4,70,192	10,00,535	16,62,168	9,01,671.9

*****Data not validated by respective SPCB/PCC and represent as provided by them

Information not provided as per prescribed format 2016-17. Data shown are not as per annual return by the occupier.

N/A: Not applicable, INP: Information not provide

State/UT wise hazardous waste generation, recycling, utilization, disposal and lying stored at the occupier's premises are also depicted in **Figure 13**.



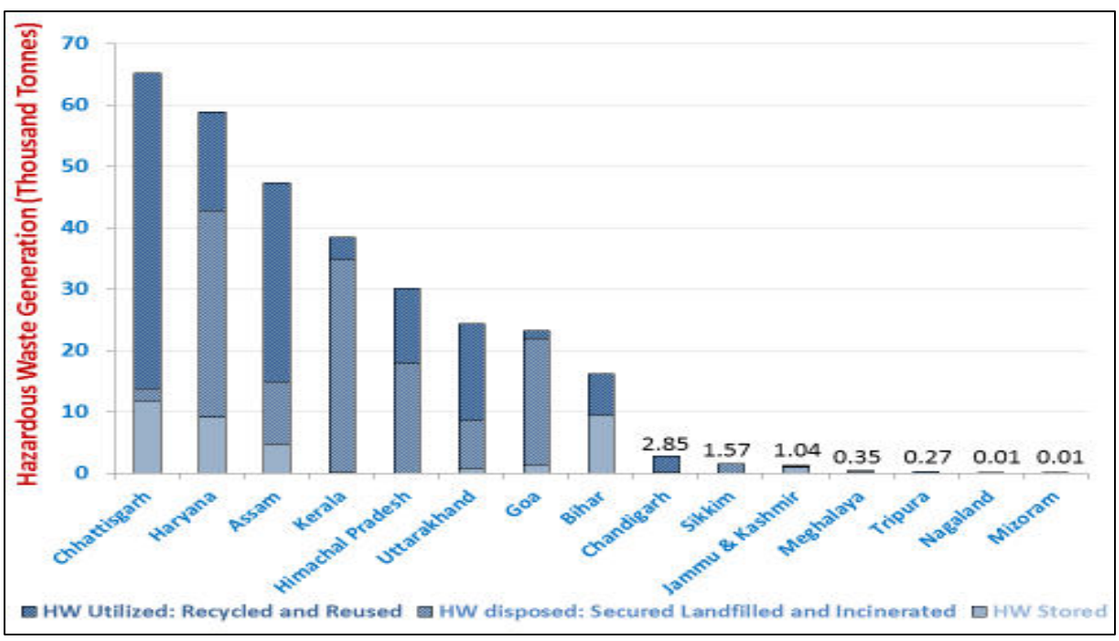


Figure 13: Hazardous waste generation and its management during 2016-17

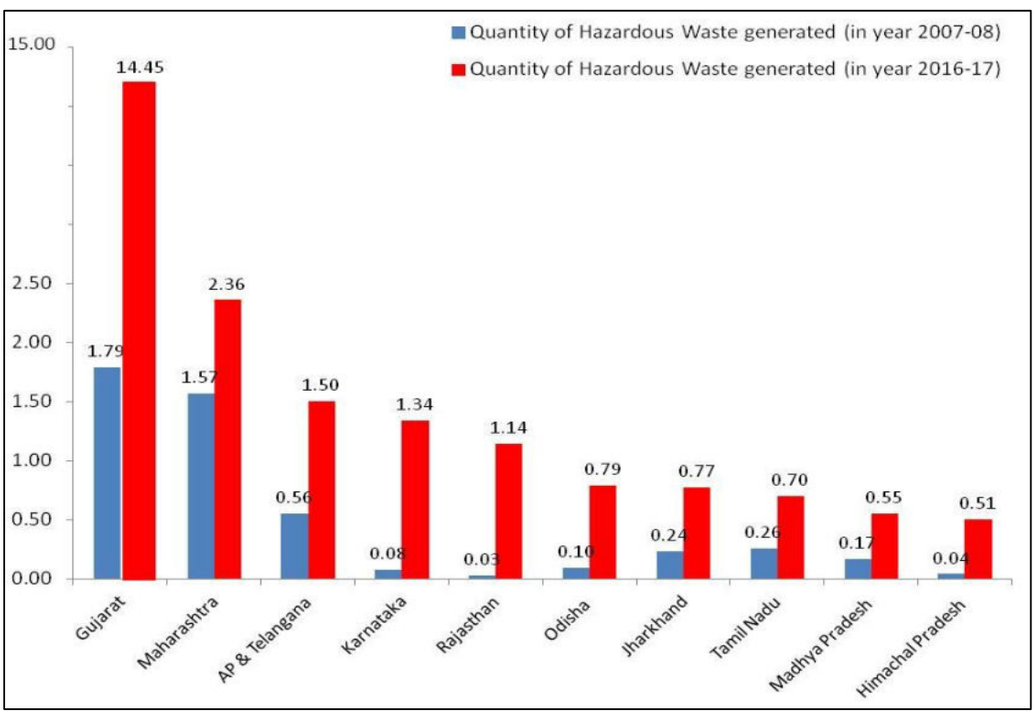
The data shows that there are 1,733 authorized recyclers for recycling of commonly recyclable hazardous wastes (used oil/waste oil/non-ferrous scraps/etc.) listed under Schedule-IV of HOWM, Rules, 2016, having authorized capacity of 6.99 Million MT. About 1.00 Million MT of hazardous waste has been recycled during 2016-17, of which 75% has been recycled in Gujarat, Tamil Nadu, Telangana, Karnataka and Andhra Pradesh.

The further reveal that there are 65 Cement Plants that are utilizing hazardous waste in the country by co-processing the same having authorized capacity of 7.22 Million MT. Gujarat, Karnataka, Tamil Nadu, Telangana and Rajasthan together constitutes more than 86% of total hazardous waste co-processed in cement plant in the country and Gujarat leads with about 53%. Apart from utilization of hazardous wastes in cement plants, there are 224 facilities for utilization of various categories of hazardous waste as a resource/energy recovery, having

authorized capacity of 2.32 Million MT. Gujarat, Jharkhand and Odisha together constitutes more than 75% of total hazardous waste utilization (other than Co-processing in cement plant) in the country and Gujarat leads with about 28% followed by Jharkhand with about 25 %.

j. It may be seen that with the evolution of the Rules, there is change in the trend of generation and management of hazardous waste over the past few years which is also depicted in the inventory report of 2008 and 2016. The major changes observed as summarised as below:

k. There is significant increase in the authorised quantity of hazardous waste generation since year 2008 which may be attributed due to increase in numbers of hazardous waste generating units (36165 units in 2008 to 56,350 units in 2016) Further, the quantity of hazardous waste generation has been reduced only in case of West Bengal which may be due to exclusion of high volume low effect waste from the category of the hazardous waste in the HWM Rules, 2008. Committee notes that the 2016 inventory is a step ahead as it attempts to report actual generation and management of hazardous waste as reported vide annual returns by the occupiers.



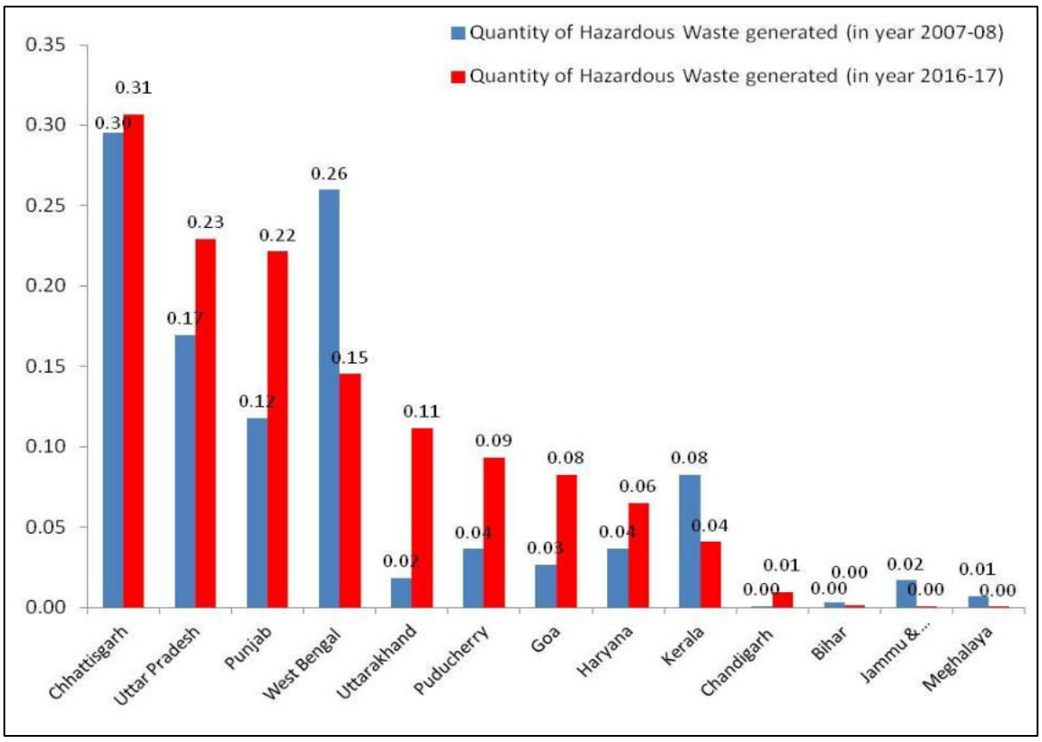


Figure 14: Trend of hazardous waste generation during 2008 and 2016

i. The top 10 hazardous waste generating States have also been transformed as given in **Table 4** below:

Table 4: Top 10 Hazardous Waste Generating States of 2008 & 2016

Sl. No.	HW generated in year 2007-08	HW generated in year 2016-17	
	As per Authorization	As per Annual return	As per Authorization
1	Gujarat	Gujarat	Gujarat
2	Maharashtra	Rajasthan	Maharashtra
3	AP & Telangana (Combined)	Odisha	Karnataka
4	Chhattisgarh	Jharkhand	Rajasthan
5	West Bengal	Tamil Nadu	Andhra Pradesh
6	Tamil Nadu	Maharashtra	Odisha
7	Jharkhand	Karnataka	Jharkhand
8	Uttar Pradesh	Andhra Pradesh	Tamil Nadu
9	Madhya Pradesh	Telangana	Madhya Pradesh
10	Punjab	Uttar Pradesh	Telangana

ii. There is shift in hazardous waste management trend as only 49.55% of the hazardous waste generated were recyclables in 2008 whereas 53% of the hazardous waste generated has been reported to be recycled/utilised in 2016.

iii. Only 10 States were having common TSDFs in 2008 whereas 18 States/UT have common TSDFs in 2016.

1. Inventory 2017-18: The committee has been informed by CPCB now that realising incomplete and unverified data being sent by SPCBs/PCCs while preparing State/UT's annual inventory, CPCB has revised format

for submitting State/UT's inventory for 2017-18 onwards. However, till January, 2019 only 26 SPCBs/PCCs have submitted their 2018-19 annual inventories despite regular follow up by CPCB. The status of annual inventory for the year 2017-18 received from 35 SPCBs/PCCS is given at **Table 5** below. The received inventories are under examination by CPCB and according to CPCB, there are apparent mismatch and gaps in terms of quantity of hazardous waste generated and recycled/utilized/co-processed/disposed/stored; reporting of interstate movement of hazardous waste; details on captive SLF/Incinerator; etc. CPCB further informed that it would be able possible to complete country's inventory only upon receipt of State/UT inventories from the respective SPCBs/PCCs.

Table 5: Status of Inventory Report received for the year 2017-18

S. No.	Name of SPCB/PCC	Annual Inventory (2017-18)
1	Andaman and Nicobar Islands	Not Received
2	Andhra Pradesh	Yes
3	Arunachal Pradesh	Not Received
4	Assam	Yes (not as per prescribed format)
5	Bihar	Yes
6	Chhattisgarh	Yes
7	Delhi	Interim information (Not as per prescribed format)
8	Gujarat	Interim information (Not as per prescribed format)
9	Goa	Yes
10	Haryana	Not Received
11	H.P.	Yes
12	J.& K.	Yes
13	Jharkhand	Yes
14	Karnataka	Not received
15	Kerala	Yes
16	Lakshadweep	Not Received
17	Madhya Pradesh	Yes
18	Maharashtra	Yes
19	Manipur	Not Received
20	Meghalaya	Yes (not as per prescribed format)
21	Mizoram	Yes
22	Nagaland	Yes
23	Odisha	Yes
24	Punjab	Yes
25	Rajasthan	Not Received
26	Sikkim	Yes
27	Tripura	Yes
28	Tamil Nadu	Yes
29	Telangana	Yes
30	Uttar Pradesh	Yes
31	Uttarakhand	Not Received
32	West Bengal	Yes
33	Dadra & NH, Daman& Diu	Not Received
34	Puducherry	Yes
35	Chandigarh	Yes

4.2.2 Issues and Challenges

a) The committee, therefore, observes that there is lack of scientific and administrative preparedness in SPCBs/PCCs in preparing comprehensive and timely State/UT inventory which are mandatory deliverables by them every year. The said comprehensive inventories are very important as country's inventory is derived from them and is a very important report which would be instrumental in analysing gaps in hazardous waste management in the country and taking various policy level decisions by various Govt. agencies as well as other stakeholders.

b) Some literature is available related to estimation of hazardous waste gene`ration from Solvent handling or on-site recycling by Kansas Department of Health and Environment[9], Bureau of Waste Management 'Determining the Hazardous Waste Generation Rate for On-Site Solvent Recycling Technical Guidance Document HW-2011-G3'. Basel Convention has draft document of Methodological guide for the development of inventories of hazardous wastes and others wastes under the Basel Convention (Preliminary draft, February 2013 prepared by UNEP) available on its website[10].

c) The UNEP document strongly recommends that the development of the inventory be undertaken by an interagency task force bringing together representatives of key stakeholders. In addition, survey teams will need to be established for the purpose of organizing the collection of primary data from generators. These teams should have a good level of understanding of Basel Convention waste classification system and, if one is place, of its relationship with the national waste classification system. UNEP document distinguishes the inventory preparation in two types of generation; a. In the early stages of development, HW inventories are often created using basic calculations of HW generation and a review of management practices aiming at identifying priority waste streams and sources, main risks, main players, service and investment needs etc. Such inventories are named *first generation* inventories and b. In a more advanced stage when detailed HW legislation, licensing and enforcement is in place it is the self-monitoring and compliance monitoring system could be created that produces data for annual HW inventories. These *second-generation* inventories could be updated annually or compiled to answer specific questions. The basis for annually updated inventories could be the monitoring obligation of the nationally regulated stakeholders. UNEP report further refers to a case study in Greater Cairo and emphasizes the linkage between HW generation and integrated pollution control. If toxic emissions into the sewer, surface water or soil are not controlled, only little hazardous waste is accumulated at the site and consequently, no or little generation of HW services is documented. Ideally, HW inventories should be part of an integrated approach of

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[9] http://www.kdheks.gov/waste/techguide/hw-2011-G3.pdf

[10] http://www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-SUBM-COMP-GUID-USA-DevelopmentOfInventories-20130809.English.doc

tracking the distribution of hazardous material flows between air, water, land, waste and on-site disposal. Such an approach is promoted by the Pollution Release and Transfer Register (PRTR) scheme that is facilitated by the Organization for Economic Co-operation and Development (OECD). The PRTR databases from industrialized countries can be used to identify industrial sectors that use and release selected hazardous chemicals or substances. The document not only emphasis the industry and process wise waste generation calculations but also refers to collection and verification of field level data through expert or specially trained qualified staff.

d) Another important aspect of HW Inventorisation is its interlinkage with other regulations including Hazardous Chemicals Rules, Biomedical Waste Rules, Municipal Solid Waste Rules, E-waste Rules etc. All these rules have provision to finally disposed hazardous waste as resulting from enforcement of these rules, with the common hazardous waste treatment, storage and disposal facility (CHWTSDF) as hazardous waste. For example, e-wastes rules encourage the recovery of precious metals and also mercury from various types of e-waste, still however, if such recovery is not taking place, then the entire waste is expected to reach common facilities. It would be therefore, suffice to mention that even, inventorisation of potential waste under these rules, is also critical to improve the accuracy of HW inventory. All the factors in the HW inventory can result into a huge and unexplained gap in HW generation vis a vis HW generation as per annual reported data given by industry thereby leading to uncertainty while dealing with HW in holistic manner.

4.2.3 Observations and Recommendations:

Observations:

In summary, the committee would like to record its observations as under;

a) The HW inventory compiled by CPCB for year 2016-17 is nothing but compilation of data received from individual SPCBs which in turn is the data submitted by industries generating HW and having authorisations. There is no verification or validation of the inventory data either by SPCB or CPCB or any expert agency. The material balance techniques for prima facie verification of data has even not done on random or specimen basis. Similarly, there is no verification of the 'by-products' which could have been logically classified as HW streams besides benchmarking similar industries for sectoral process based HW generation. The committee observed that only Gujarat PCB is making some attempt to regulate by-product claims of some of the industries by categorizing the same as hazardous wastes through scientific scrutiny.

b) Not all the industries having authorisation have submitted the data. It is not known how many industries have not submitted the data and as per available information, no action as per Rules has been taken against such industries.

c) The inventory has no consideration of HW waste arising out from enforcement of other rules particularly, MSW, E-waste, BMW, Battery rules etc. which involves hazardous materials like mercury, lead etc. However, committee notes that the current provisions of rules do not expressly cover these aspects.

d) Most of the data on interstate transport is not verified and reconciled.

e) Similarly, there is no verification of any data related to waste reuse, reutilisation etc. In fact, the rules prescribe manifest system for various stages of HW management, still however, there is no mechanism or required sufficient manpower available with the Boards to verify and reconcile such information with quantities of HW and its disposal routes prescribed in the authorisation.

The Committee has therefore observed that the inventory as prepared so far is not very comprehensive and cannot be taken as holistic representative of the actual scenario of HW management. The format of HW inventory seems reasonable and can be further evolved with better data collection. Presently such inaccuracies and inadequacies can be reflected in non-uniform trends of HW generation and disposal patterns for different states which cannot be justified with filed observations. The HW inventory is an important tool of effective and efficient HW enforcement, can help not only SPCBs/CPCB to streamline their enforcement efforts but also, industries to upgrade their operations based on realistic HW data and benchmarking with competing industries. The committee therefore feels it necessary for CPCB and SPCB to urgently develop capacity in HW inventory preparation including standard protocols for verification and validation, sectoral process based reasonable HW generation range, HW disposal and reutilisation techniques, besides capacity building of its officials. The committee recognises that the preparation of HW inventory requires highly specialised capacity within SPCB/CPCB and also, significant documentation in terms verification of manifest and reconciliation of data. The committee therefore recognise the need of involving scientific and academic institutes in verification and validation of sectoral HW generation and reuse/utilisation besides having a national level software to capture all such data including interstate transport of HW and reconciliation of data, besides, creating alarms for non-closure of any manifest loop.

Recommendations

The committee recommends that there is an urgent need to strengthen the mechanism to develop annual inventory of HW which is credible, reliable and robust in terms of its content and scope. The committee recognise that the standard approach of any database development like data generation, verification, validation and ownership need to followed for such inventory preparation. The committee recognise that this is not a very easy job and will need an integrated and holistic approach from SPCBs and CPCB. It would be necessary to involve scientific and academic institutions besides professional bodies like industry association on board for such an elaborate exercise. In addition to the recommendations made in Section 4.1, the committee recommends the following;

i. Development of web portal - "National Hazardous Waste Tracking System" to track daily generation, handling, transportation and recycling/utilization/disposal of hazardous waste by occupier in the country, being proposed and initiated by CPCB is need of the hour. Such portal would be very helpful in enforcing date wise record maintenance by occupiers, auto-reconciliation of manifest document including interstate movement, checking unauthorized receiver or transportation, auto-generation of district and State/UT wise comprehensive inventory of hazardous waste, etc. However, it may take about a year for development and validation of the said software and its field implementation would depend upon enforcement by SPCBs/PCCs.

ii. Till the above software is developed and effectively implemented, all SPCBs/PCCs shall enforce date wise record maintenance by occupiers, manifest document for movement of hazardous wastes, reconciliation of manifest documents including interstate movement and timely annual return submissions by each and every occupiers of hazardous waste as stipulated under the Rules. Such enforcement would also check illegal sale/recycling/utilization/disposal of hazardous waste.

iii. As degree of qualitative and comprehensive State/UT's inventorisation would depend on success of the above enforcement, the committee strongly recommends that there is need to set up a dedicated system within SPCBs/PCCs for such enforcement and compilation/reconciliation of data which would ensure comprehensive State/UT's annual report preparation and timely submission to CPCB and in turn would enable CPCB in delivering country's quality inventory on hazardous waste management meeting truly with objectives laid down under Rules 20 of the HOWM Rules, 2016.

4.3 RECYCLING AND UTILISATION OF HAZARDOUS WASTE

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, ensures resource recovery and disposal of hazardous waste in environmentally sound manner. For the first time, Rules have been made to distinguish between Hazardous Waste and Other Wastes. Other wastes include: waste tyre, paper waste, metal scrap, used electronic items, etc. and are recognized as a resource for recycling and reuse. These resources supplement the industrial processes and reduce the load on the virgin resource of the country.

The Rules have defined the Hazardous Waste Management hierarchy in the sequence of priority of prevention, minimization, reuse, recycling, recovery, co-processing; and safe disposal has been incorporated in the rules. This is in alignment with the National Environmental Policy and committee feels that this is welcome step where the policy priorities are translated into the Rules for effective enforcement. To strengthen the provision of recycle/utilisation, the waste generator is required to follow Waste Management Hierarchy and shall take all steps to ensure that the wastes listed in schedules-I, II, III and IV of the HOWM Rules, are properly handled and disposed in environmentally sound manner in accordance of the provisions laid down under Rules without any adverse effect on the environment.

4.3.1 Recycling of Hazardous Waste

The Rules have provisions for recycling of commonly recyclable hazardous wastes (such as used/waste oil, zinc dross, copper dross, used lead acid battery, etc. listed under Schedule-IV of the Rules). Further, CPCB has published guidelines for environmentally sound recycling of the same and also available at CPCB website i.e http://cpcb.nic.in/uploads/hwmd/GuidelinesforEnviron_soundRecyclingHW2010.PDF

There are 1,733 authorized recyclers for recycling of commonly recyclable hazardous wastes (used oil/waste oil/non-ferrous scraps/etc.) listed under Schedule-IV of HOWM, Rules, 2016, having authorized capacity of 6.99 Million MT. About 1.00 Million MT of hazardous waste has been recycled during 2016-17, of which 75% has been recycled in Gujarat, Tamil Nadu, Telangana,

Karnataka and Andhra Pradesh. The top 10 States contributed in recycling of hazardous waste is given below at **Figure 15**.

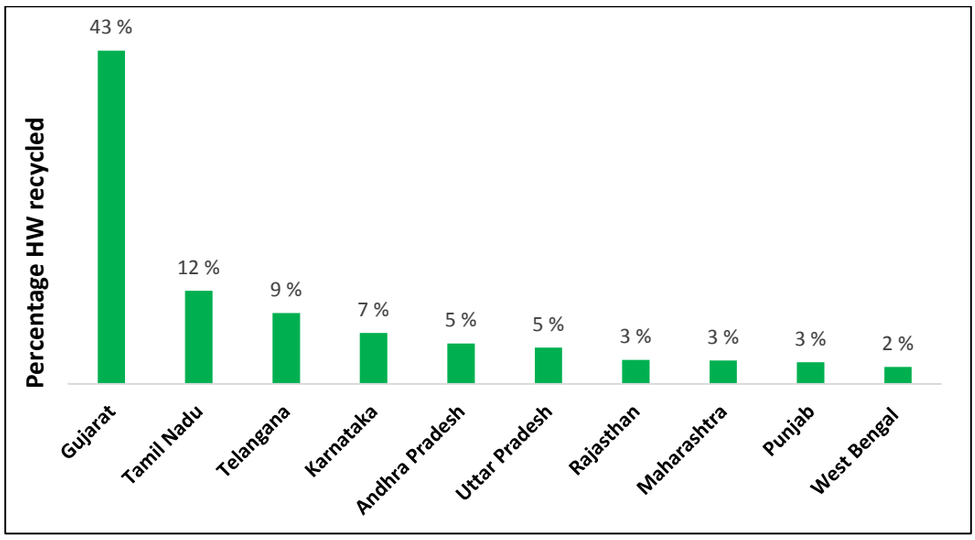


Figure 15: Recycling of hazardous waste by top 10 States during 2016-17

The best practices in recycling of some wide sectors are narrated below:

- **Best practices or minimum facilities required for recovery of Used oil/Waste oil**
  1. Dedicated storage tanks for storage of Used oil/Waste Oil
  2. For settlement of suspended or fibrous materials screener, gravity settler and any other pre-treatment facilities
  3. For defueling & dehydration
  4. Condenser or water vapor system
  5. Distillation Column/Vacuum distillation unit
  6. For colour stability clay treatment shall be provided.
  7. For base stock separation filter press shall be provided.
  8. For waste oil recovery centrifuge and dehydration vessel shall be provided

- **Best practices or minimum facilities required for Lead Recycling:**
  1. Automatic battery breaking machine
  2. The suction hood connected to air pollution devices.
  3. The washing facilities for plastic components and neutralization facilities
  4. Mandir bhattis or rotary furnaces are installed for melting lead scrap.
  5. The pollution control system installed for both type of furnace including Cooing Chambers, cyclone separator, bag filter alkali scrubber followed by exhaust blower and chimney.
  6. Sweat furnace for lead coated power, communications cable, lead sheet & pipe and other lead containing products.
  7. Third party monitoring for lead standards.
  8. Covered shed with concrete floor for storage and handling of all the raw materials, intermediates, and products.

4.3.2 Utilization of Hazardous Waste

As per Rule 9, for utilization of hazardous and other waste as a resource or after pre-processing either for co-processing or for any other use including within the premises of the generator, authorization from SPCB is required.

SPCBs are delegated powers to grant authorization for utilization of Hazardous and Other Wastes under Rule 9 on the basis of Standard Operating Procedures (SOP) or guidelines developed by CPCB.

In case, Standard operating procedures or guidelines are not available for specific utilization; the approval has to be sought from Central Pollution Control Board. Hence, such application shall be sent to CPCB through SPCBs/PCCs for preparation of SOPs/Guidelines.

CPCB has prepared 48 Standard Operating Procedures (SOPs) for utilization of 37 different types of hazardous wastes after conducting trial runs on such utilization. The list of such SoPs is given at **Annexure-XVII.** The same have also been circulated to all SPCBs/PCCs and are also available at CPCB website[11].

The SOPs includes standard utilization procedures, fixed ratio/quantity of waste utilization based on trial run and material- mass balance, work zone/emission/effluent standards, record and returns and minimum requisite facilities required to ensure environmentally sound utilization of hazardous waste. It is understood, based on the data submitted by SPCBs that due to SOPs/guidelines the above sectors have been more organized.

There are 224 facilities for utilization of various categories of hazardous waste as a resource/energy recovery, having authorized capacity of 2.32 Million MT.

Gujarat, Jharkhand and Odisha together contributes more than 75% of total hazardous waste for utilization (other than Co-processing in cement plant) in the country and Gujarat leads with about 28% followed by Jharkhand with about 25 %. The same is depicted in **Figure 16**.

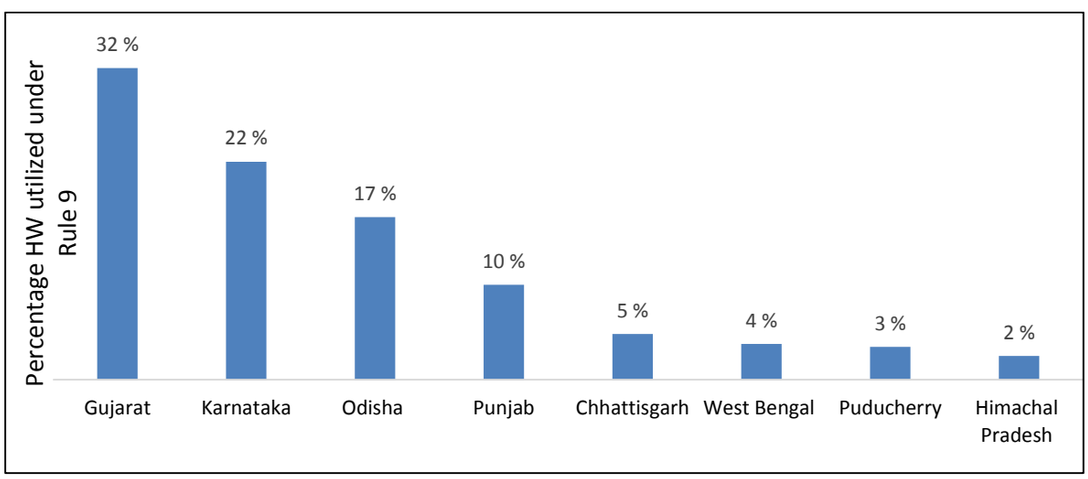


Figure 16: Utilization (other than Co-processing in cement plant) by top 10 States during 2016-17

It may be seen that during 2016-17, about 1.66 Million MT of the hazardous waste generated has been utilised as captive utilisation which includes utilisation of hazardous wastes (such as pyrometallurgical slags, ETP Sludge, Used Anode Butt, etc.) generated during the manufacturing process by the occupiers within their own premises. Jharkhand leads on the top with 33% followed by Gujarat and Odisha at 28% and 24% respectively. Below **Figure 17** shows the trends of captive utilisation by the major States.

[11] http://cpcb.nic.in/sop-for-hw-specific/

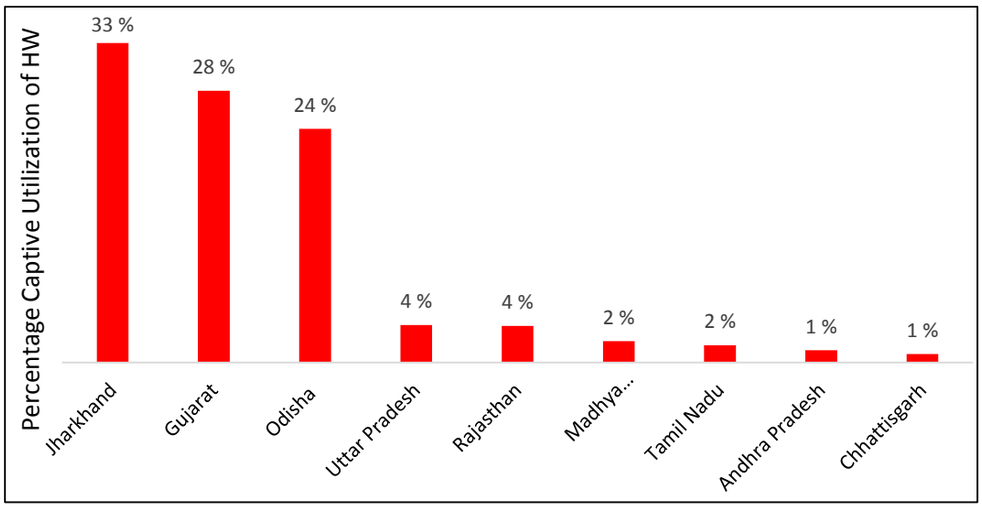
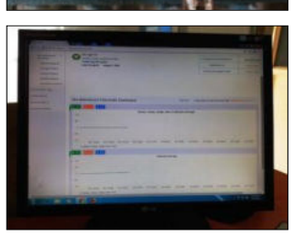


Figure 17: Captive Utilization of hazardous waste during 2016-17

Best practices or minimum facilities required for distillation of Spent Solvent:

1. Dedicated storage tanks for storage of spent solvent and recovered solvent.
2. Solvent transfer pump (s) for transferring Spent Solvent from storage tank to distillation column.
3. Vent of all the storage tanks (i.e. Spent solvent & recovered solvent) connected to condenser.
4. Vehicles shall be fitted with the spark arrestor.
5. Thermic fluid heater/ electric heating system.
6. Distillation column.
7. Water as cooling medium for condenser for recovery of spent solvent with boiling point of 100°C and above.
8. Cooling Tower.
9. Secondary condenser with chilled water/brine as cooling medium for solvent with low boiling point (i.e. <100°C).
10. VOC absorption media connected to vent of condenser.
11. Packaging & storage of residue generated from distillation column in dedicated storage area.
12. Fire safety arrangements.
13. Installation of Online analyzer for VOC at the vent outlet- in time bound manner.
14. Tankers/HDPE drums shall be used for receiving spent solvents and connection of vent of the tanker with spent solvent storage tanks during loading.

Photographs of VOC Meter



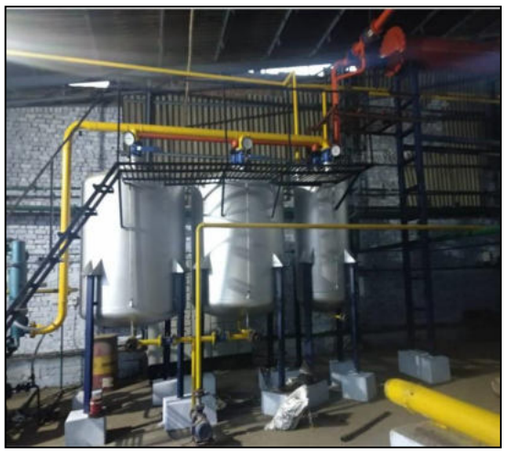


Figure 18: Photographs of the facilities

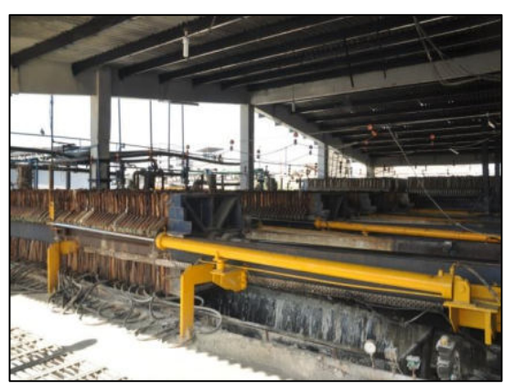
4.3.3 Successful Case Studies of Utilisation of Hazardous Waste

1. Spent Acid Management Facility

Gujarat is having Novel Spent Acid Management facility for management of spent acid generated from various dyes and dye intermediates and other chemicals (Cat: 26.3 of Sch-I & B-15 of Sch-II). The concentration of sulphuric acid in the spent acid is normally in the range of 20-30% and Chemical Gypsum (80% Purity) is generated which is sent to Cement manufacturing units (resource recovery).

This facility is commissioned in December 2009 with a total project cost of Rs 30 Crore. Board has issued permission for utilization of spent acid 2, 70, 000 MTPA for manufacturing of chemical gypsum 1, 47, 600 MTPA. At present about 700 MT/Day of spent acid is received and neutralized with lime stone powder and Hydrated Lime and generated wastewater is treated in in-house ETP which is further sent to CETP for ultimate treatment. Facility is also having 50,000 MT of gypsum storage area (approximately 3 months storage area for monsoon period). Facility is having 207 member units. Since December-2009 to till date @ 4.45 Lakh MT of chemical gypsum sent to Cement Plants.

Calcium carbonate silo for neutralization



Automatic filtration unit

Gypsum storage area – 50,000 MT @ 3 months for monsoon

Secondary biological treatment plant

Bird view of secondary treatment plant

Figure 19: Spent Acid Management Facility

2. Spent Solvent Recovery Units

In June 2016, CPCB published various Standard Operating Procedures (SOP) and Checklist for the minimal requisite facilities for utilization of hazardous waste including utilization (recovery) of spent solvents as per Hazardous & Other (M&TM) Rules 2016.

Gujarat Pollution Control Board (GPCB) also issued "Guidelines for the Management of Spent Solvents" with an aim to enforce environmentally sound management of spent solvents and to control Volatile Organic Compounds (VOCs) concentration in ambient air and also to put check on unauthorized disposal of spent solvents and residues/ wastes generated from the distillation process.

Since, Gujarat houses bulk drug and pesticides manufacturing units in large numbers, generation of spent solvents in the State is very high. This resulted into inflow of large numbers of applications seeking permission either for new units or for expansion of solvent recovery units. Though the guidelines published by the CPCB and the GPCB are very exhaustive, but there is ample scope for further detailing on certain aspects like control over storage capacities, area requirements, residue generation, design aspects of activated carbon tower, distillation columns, etc.

To overcome the difficulties faced during the scrutiny of applications (for the new units / capacity enhancement by the existing units) under the Rule-9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules-2016 as well as in view of the fire/explosion incidences that took place in solvent recovery units during

last two years, GPCB decided to undertake a detailed study of solvent recovery facilities. Accordingly, a sub-group for conducting a study of solvent recovery units was framed. Based on field visits, interaction with recovery units and association, academic experts etc. detailed study report was prepared and checklist is revised accordingly including thumb rule for permitting storage quantity of spent solvent and recovered solvent in drums and storage tanks depending on the storage area, temperature sensors and other aspects.

Though association in Ankleshwar region, the distillation residue of small solver recovery units is collectively diverted into cement industries instead of incineration.

4.3.1 Pre-Processing & Co-Processing of Hazardous Wastes

1. Pre-Processing of Hazardous Waste

Pre-processing is the process of pre-treatment of waste streams coming from different sectors and industries to make it suitable/homogenised for feeding into the kiln system to avoid process fluctuations. Pre-processing involves only physical transformations like size reduction (by shredding and cutting), separation of foreign/undesirable materials (magnetic materials separation by Magnetic separator, use of metal detectors to remove metallic particles), impregnation (introducing and proper mixing of biomass/saw dust in semi solid streams to soak extra flowing liquids & maintaining good flow ability) and desired size selection (size selection by screening operation, manual size selection by handpicking of large material size on very low speed Belt conveyors).

Due to the heterogeneity of wastes, pre-processing is required to produce a relatively uniform waste stream for co-processing in cement kilns. This waste stream should comply with the technical and administrative requirements of cement manufacture and guarantee that emission standards and product quality are met. Waste mix having uniform characteristics needs to be prepared from different waste streams for trouble free co-processing in a cement kiln.

The characteristics of the waste mix that need to be uniform in terms of particle size, chemical composition and heat content. For optimum operation, kilns require very uniform waste mix flows in terms of quality and quantity. Uniform quality of waste mix can be achieved by pre-processing different types of wastes in a pre-processing facility.

The pre-processing facility must have appropriate infrastructure to ensure that the waste homogenization operation is carried out in an environmentally sound manner and has equipment & facilities that are required to handle the required hazardous wastes.

The pre-processing area must have impervious concrete floor and should be adequately covered to avoid exposure of rain to the material being stored and handled while pre-processing or co-processing.

Equipment's required In Pre-Processing

Various types of equipment are required during pre-processing operations like Shredder, Grinder, Cutter, Hammer, Jaw Crusher, Chipper and Hydro pulper, Machines for size reduction. Mixers for homogenizing the waste mix into large vessels/pits. Moving machinery like Trucks, Bob cat, Forklifts, Loaders, Dumpers, Arm handlers, Wheel loaders, Crawler loaders, Telescopic handlers etc for material movement

from one to another place and loading-unloading of the material. Metal detectors, Electro-Magnetic separators, metal sorting equipments are utilized to remove small metallic traces which may be present into the incoming hazardous and other wastes from various sources. Different type of screens like Disc screen, Rotary screen, Trommel screen, Oscillating/ vibrating screens are used to separate the differently sized portions of the processed waste and choosing the right fraction for feeding into the system.

Various types of Belt conveyors like flat belt conveyors, Inclined Belt conveyors, Cleated belt conveyors, chain conveyors, bucket conveyors, closed conveyors, pipe conveyors etc are utilised to transport the material from one to another place, usually pre-processed waste from the processing area to feeding area.

Requirement for Pre-processing of wastes

a) Pre-processing facility must have appropriate laboratory facility for characterizing solid, liquid and sludge wastes with qualified analysts to ensure that proper waste acceptance process is practiced. This laboratory shall be equipped with facilities to test Moisture, Calorific value, Ash, Chorine, Fluorine, Carbon, Hydrogen, Sulphur, Nitrogen, Phosphorous, alkali and heavy metals, flash point, mixing compatibility, reactive sulphide, reactive Cyanide or halides etc.

b) Fume extraction systems with vacuum ducts and fume hoods should be installed at receiving pits/tanks, mixing units, blending units, shredders, transfer points, dryers, impregnation units, granulators, pelletizers, crushers, grinders, blenders etc. where there is source of such emissions. Such fume extraction systems should be connected to scrubbers / bag filters / VOC emission control through carbon adsorption, thermal or biological treatment etc. depending on type of emissions. The cleaned gases should be vented through ID fan and stack.

c) A fire protection system of approved design should be in place in the storage and pre-processing area.

d) The storage, handling and pre-processing facility should have appropriate spillage / leachate collection and storage system with impervious liners to avoid contamination of the ground water and soil.

e) The storm water and spillage / leachate drainage systems should be so designed that there should be no contamination of the storm water with the spillage or leachate from the storage, handling and pre-processing area.

f) The electrical and instrumentation fitting should be conforming to the standards.

g) The facility must have appropriate odour control facility to deal with the odour nuisance.

h) Emergency showers and eye wash stations should be provided within the storage, handling and pre-processing work area for immediate emergency use following exposure to the wastes.

i) Abatement techniques should be in place for control of noise to required levels.

Reject Disposal of Pre-processed wastes

The rejects produced from the pre-processing facility, if any, may be sent to the TSDF, the authorisation for which may be obtained from concerned SPCB.

2. Co-processing of wastes in Cement kiln

Co-processing is defined as the use of waste as raw material, or as a source of energy, or both to replace natural mineral resources (material recycling) and fossil fuels such as coal, petroleum and gas (energy recovery) in industrial processes, mainly in energy intensive industries (EII) like cement production.

In Co-processing, the combustible waste is utilized as fuel (Alternative Fuels) into the kiln system for maintaining the high temperature during clinker production. Some of the waste streams like biomass, small quantity waste streams, etc which have suitable quality parameters may be directly fed into the kiln system. However, majorly waste streams, especially when volumes are more, are fed after pre-processing which make it homogenized to reduce the process fluctuations.

Equipment's required In Co-Processing

Various equipments are required for feeding the pre-processed AFR into kiln system. Automated mechanical extraction machines such as walking Floor and various belt conveyors as mentioned above are utilized for transporting material from processing area to feeding point. Different kinds of volumetric and gravimetric dosing machinery are utilized for feeding the AFR material into the kiln in a controlled manner. Various safety equipments like Rotary Air Lock, Safety shut off valves & gates & Double slide gates are utilized into the feeding mechanism to avoid any back fire due to pressure build-up inside the kiln. Bag filters are utilised at transfer points to avoid any dust emission into the atmosphere in case of feeding fine AFRs.

Appropriate feed points have to be selected according to the physical, chemical and toxicological characteristics of the waste materials. Wastes of high calorific value have to be always fed into the high temperature combustion zones of the kiln system. Wastes containing stable toxic components and also wastes containing more than 1.5% chlorine should be fed to the main burner to ensure complete combustion in the high temperature and long retention time.

Alternative raw materials containing constituents that can be volatilized at operating temperatures in the pre-heater system have to be fed into the high temperature zones of the kiln system.

Suitability of Substances for co-processing

The decision on what type of substances can be used is based on the clinker production processes, the raw material and fuel compositions, the feeding points, the air pollution control devices and the given waste management problems. The Accept - Refuse Chart as prescribed in CPCB Guidelines for Pre-Processing and Co-Processing of Hazardous and Other

Wastes in Cement Plant[12] as per HOWM Rules, 2016, could be used by plant operators to help them in considering, which type of substance is suitable for co-processing.

As a basic rule, waste accepted for co-processing must be safe enough to handle in the given facility and shall contribute to recovery of material or energy value present in it or provide its safe disposal. Sometimes, some waste streams are not suitable in large volumes but can be co-processed in small volumes with controlled feed rate into the system. The cement kilns undertaking co-processing of the different wastes as above must comply with the following notified emission standards.

Regulatory requirements for Co-Processing

Continuous Emission Monitoring System (CEMS) should be installed & functioning for the parameters PM, SO2 and NOx in the first phase and the data should be uplinked to CPCB and SPCB servers. Additional emission parameters for CEMS may be added in future as per the directions of CPCB or SPCBs from time to time. Other parameters shall be monitored manually once in a year and data should be submitted to SPCBs/CPCB.

SPCB / PCC shall monitor the emission from the cement plant to verify the compliance of notified emission standards. In case, SPCB/PCC does not have the emission monitoring facilities, they can engage any EPA recognized /NABL accredited laboratory for the purpose.

For co-processing of hazardous and other wastes, cement plants shall obtain Consent to Establish (CTE) and Consent to Operate (CTO) prior to obtaining authorisation under HOWM Rules, 2016.The cement plants /standalone pre-processing facilities / TSDFs shall have valid authorisation for receiving, transporting, handling, storing, pre-processing or co-processing of hazardous and other wastes, for which they shall apply for authorisation as per Form 1 of HOWM Rules, 2016. Before undertaking pre-processing or co-processing of a waste stream which were introduced for co-processing or pre-processing, the facility operator shall give intimation to SPCB / PCC as per the format given at Annexure – 5 of Guidelines for Pre-Processing and Co-Processing of Hazardous and Other Wastes in Cement Plant as per HOWM Rules, 2016.

There are 65 Cement Plants having authorized capacity of 7.22 Million MT are utilizing hazardous waste in the country by co-processing. Gujarat, Karnataka, Tamil Nadu, Telangana and Rajasthan together contributes more than 86% of total hazardous waste co-processed in cement plant in the country and Gujarat leads with about 53%. Surprisingly, the major state of Maharashtra is not allowing the co-processing so far for reasons best known to them. The **Figure-20** illustrating States involved in co-processing of hazardous waste is given as below:

[12] http://cpcb.nic.in/uploads/hwmd/GUIDELINES-ON_CO-ProcessinginCement.pdf

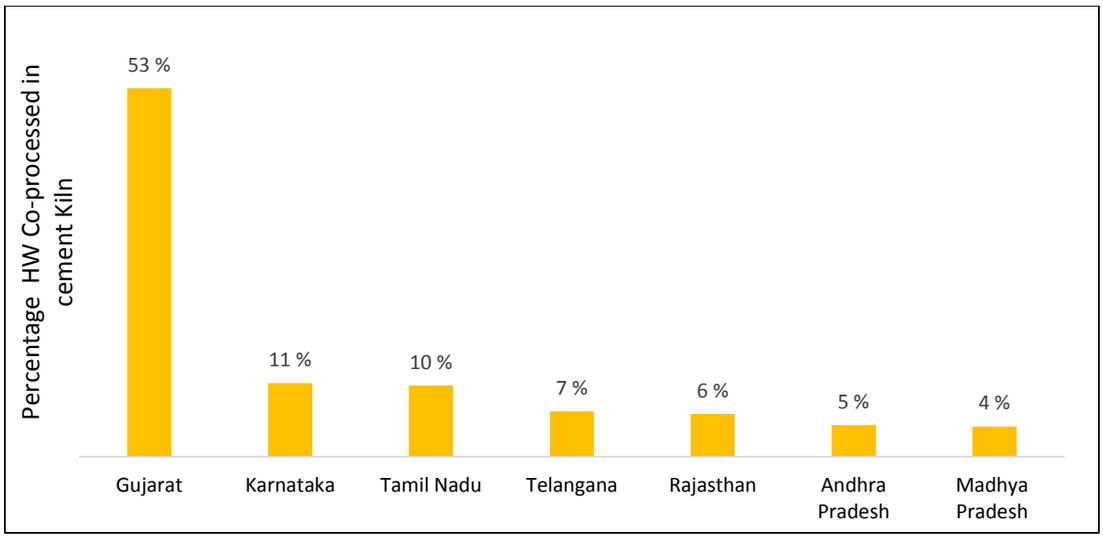


Figure 20: Co-processing of hazardous waste in cement plant (during 2016-17)

4.3.4 Observations and Recommendations

a) Considering the inventory received from various States, it is observed that in States like Gujarat and Maharashtra the quantum of hazardous waste reuse/recycle seems very less. There is a lot of scope for improvement in the figures of hazardous waste Reuse/Recycle.

b) To achieve this, there needs to be capacity building of various stake holders including SPCBs/PCCs & Industries.

c) There needs to be prepare generic SOP by CPCB so as to cover large numbers of units under ambit of single SOP instead of making SOP individual case bases.

d) There needs to be introduction of concept EPR-Extended Producer Responsibility in this sector in which generator of the waste is required to be made responsible throughout the life cycle of waste till it disposed. Some good practices have been observed in State like Gujarat wherein attempt has been made to formulate concept through making agreement between generator & re-processor.

e) There needs to have some amendment in Rules to give identity to waste exchange bank centres & ascertain its roles & responsibility in Rules itself like TSDF operator. SOPs/ Protocol for waste exchange centresshall be finalized.

f) A successful model like Novel spent Acid Management, Ahmadabad for hazardous waste management shall be replicated in other areas.

g) Co-processing of wastes has several benefits. Pre-processing helps in getting the wastes to be met in required form needed for co-processing. The Committee is of view to include the following aspects:
    i. Periodic reporting of trial run studies self-conducted to ensure compliance of notified standards for various types of waste co-processed from time to time to SPCBs/PCCs.
    ii. Common pre-processing facilities to be treated as common TSDF and fulfil all requirements of HW Rule 2016.
    iii. Pre-processor to provide detailed characteristics of each supply to SPCB/PCC.
    iv. Sole transporters should not be issued authorization. Only dedicated vehicles of common TSDF, Common pre-processor or industrial units having authorization should be permitted.

v. SPCBs/PCCs to grant authorization to waste generators to send waste for pre-processing and co-processing.
vi. SPCBs/PCCs to grant authorization to cement plants to undertake co-processing of all wastes approved in the guidelines.
vii. SPCBs/PCCs to allow interstate movement of wastes for co-processing.
viii. TSDFs may also be allowed to pre-process and send wastes for co-processing.

h) The pre-processing and recycling/utilisation facilities need to be treated as critical environmental infrastructure facilities for sound environmental management of hazardous waste so as to ensure enhanced level and frequency of enforcement and environmental monitoring. Elaborate protocols are needed to be developed.

4.4 BY-PRODUCTS AND SPENT SOLVENT MANAGEMENT

4.4.1 Definition of By-products

The distinction between when a material obtained after a production process should be considered as a by-product and when it should be considered as `waste' is difficult to make on objective and consistent criteria. HW rules 2016 defines "by-products" as "a material that is not intended to be produced but gets produced in the production process of intended product and is used as such" and "waste" has been defined as "materials that are not products or by-products, for which the generator has no further use for the purposes of production, transformation or consumption". Waste includes the materials that may be generated during, the extraction of raw materials, the processing of raw materials into intermediates and final products, the consumption of final products, and through other human activities and excludes residuals recycled or reused at the place of generation. Earlier, the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 did not make such distinction and only hazardous waste was defined. According to Rule (9) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (HOWM Rules, 2016) the utilization of hazardous and other waste as a resource or after pre-processing either for co-processing or for any other use can be carried out only after obtaining authorization from SPCB/PCC in respect of waste on the basis of Standard Operating Procedures (SOPs) or guidelines issued by CPCB. As of December 2018, 48 SOPs have been developed by CPCB for utilization of various categories of hazardous wastes.

Various inorganic salts, acids, bases, etc. are commonly sold as by-products and used directly without any further processing in various ancillary industries. However, such acids, salts, etc. need to be examined with respect to contaminations, if any, which may have impact on human health and environment and depending upon level of presence or absence of such contaminations, such acids, salts, etc. are required to be categorized as by-product or waste. For instance, generator of spent sulphuric acid from dye & dye intermediates or other chemical manufacturing processes may claim the same as `by-product' arguing that it contains 30-70% sulphuric acid and can be used in Single Super Phosphate (SSP) production but such usage may have adverse impact on soil, water bodies or plant since the spent acid may contain harmful organic compounds, metals, halogen, etc. (depending upon process of spent acid generation) which could be embedded in SSP though in trace level but continuous use of such SSP in agriculture over the years may result in adverse impact on soil, flora, fauna, etc. Hence, such spent acid cannot be

declared as by-product and need to be regulated as waste and its utilization as resource recovery, if any, also requires to be regulated by way of preparing SOP/guidelines under Rule 9 of the HOWM Rules, 2016. SPCBs/PCCs are required to discern whether a given material is a waste or by-product. Without this clarity, there is a possibility that the provision of "by-product" in the hazardous waste rules may be misused by hazardous waste generators to escape from the stringent provisions of the rules. This could be a cause for serious environmental concern, especially if it is disposed of inappropriately.

One of the issues which will significantly influence the effective enforcement of HW regulation is clear and consistent distinction between waste and non-waste by-products. One of scientific challenge in effective enforcement would be to make distinction between materials that are not the main objectives of the production process but can be considered as non-waste by-products, and those that should be treated as wastes. Still however, there are no clear guidelines or criteria which can help the field level staff of the SPCBs/PCCs to enforce the rules effectively. In absence of such guidelines, it could be possible that the provisions of `by-product' is used by HW generators to avoid the stringent provisions of the rules and thereby endangering the environment. It is to be noted that both products and wastes can contain toxic materials and be a risk to human health and the environment if badly handled or controlled. Additionally, industrial and extraction wastes often have characteristics that may pose particular risks for the environment, when compared with products. These are linked to the fact that whereas the content of products is generally specifically designed and controlled, the composition of wastes may be less clear.

With more focus on stringent enforcement of hazardous waste and also, remediation of contaminated sites, there is need to improve the scientific and legal certainty of waste legislation, and to make the definition of waste easy, consistent and objective, to understand and apply, in order to guide competent authorities in making case by case judgments on whether a given material is a waste or not, and to give economic operators information on how these decisions are being be taken. This is relevant as wider interpretation of waste would impose huge costs on business concerned and narrow definition would pose a risk to environment.

By-products in the form of inorganic salts, acids and bases are used in ancillary industries and are commonly sold and used directly without any further processing. However, State Pollution Control Boards/Pollution Control Committees are required to be able to discern whether a given material needs to be considered as waste or by-product. Without this clarity, there is a possibility that the provision of "by-product" in the hazardous waste rules is likely to be misused by hazardous waste generators to avoid the stringent provisions of the rules, particularly for safe and environmentally sound reuse/recycle of the HW. This could be a cause for serious environmental concern, especially if it is disposed of inappropriately. At the same time, the authorities need not take an intransigent view but should deal with each case on scientific criteria in transparent manner.

4.4.2 Procedure for classification and de-classification of By-products

MoEF&CC has set up a mechanism in the form of Technical Review Committee, as per the foot note of Schedule I of the Rules, for considering the applications for identification of by-products on case to case basis on the request from the

industries. It is necessary to note the foot note which reads as under; '*The inclusion of wastes contained in this Schedule does not preclude the use of Schedule II to demonstrate that the waste is not hazardous. In case of dispute, the matter would be referred to the Technical Review Committee constituted by Ministry of Environment, Forest and Climate Change.*"

There have been a number of applications submitted before the Technical Review Committee to make this distinction. In one such case, the Indian Drug Manufacturers' Association requested for re-classification of spent solvents from hazardous wastes to by-products. They stated that in many cases, pharmaceutical operations require the use of fresh solvents as per GMP guidelines and the spent solvents generated from these processes, while cannot be utilized by the pharmaceutical industry again, are perfectly well-suited for utilization by other industries such as textiles/dyes and intermediates/construction etc. For several decades, these downstream industries have been acquiring spent solvents from pharmaceutical companies and using them for their applications and to generate new products. However, SPCBs/PCCs are considering the spent solvent has hazardous waste as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016, forcing pharma companies to manage the spent solvents as hazardous waste. This was not a sustainable option for the industries as it hampered re-use/recycling. The association, therefore requested MoEF&CC to revise the hazardous waste rules to remove spent solvents from being classified as hazardous waste and allow free trading without any regulation in terms of quality/purity, registration of manufacturer/end-user, etc, particularly in cases where there is a well-established system of downstream users who purchase the spent solvents. The case was deliberated in the 57th meeting of the TRC and the Committee in its recommendation stated that the spent solvents have to go through a process of purification normally, distillation and then only can be used as solvents. The Committee had observed that the units carrying out such processing do not use adequate systems for recovery of solvents from spent solvent and create environmental problems. Therefore, it was necessary that such processes were regulated to ensure that appropriate treatment systems are provided before the spent solvent is taken for recycling. It is for this reason that spent solvents is categorized as hazardous waste and needs approval of CPCB for recovery of solvent in accordance with Rule 9 of HOWM Rules, 2016.

The Technical Review Committee in Ministry concluded that so far as the distinction between hazardous waste and by-product is concerned, the definition of by-product made it clear that by-product although not intended to be produced gets produced in the process and "is used as such". In case of waste, it needs further processing before it can be used and it has to be ensured that the processing is done in an environmentally sound manner. However, utilization alone cannot be the only criteria for it to be declared as a by-product. For example, in another case put up before the TRC in 58th meeting, the applicant submitted that they had a synthetic detergent and single super phosphate (SSP) manufacturing facility. During the production process, sulphuric acid (80%) was generated from the unit as a raw material for manufacturing SSP. As per Schedule II of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, waste which contain inorganic acids shall be considered as hazardous, provided they exhibit the characteristics listed in Class-C of the same schedule. Therefore, utilization of such waste is possible only after SoP, for the utilization of spent acid,

prepared CPCB in accordance to Rule (9) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The applicant stated that as per the definition of waste in the rules, waste are materials that are not products or by-products, for which the generator has no further use for the purposes of production, transformation or consumption.
This clause is further explained as:

(i) waste includes the materials that may be generated during, the extraction of raw materials, the processing of raw materials into intermediates and final products, the consumption of final products, and through other human activities and excludes residuals recycled or reused at the place of generation; and
(ii) by-product means a material that is not intended to be produced but gets produced in the production process of intended product and is used as such;

From the definition provided in the Rule, the applicant had inferred that if any material has no further use to the generator for the purpose to the generator for the purpose of production, transformation or consumption, than only it can be considered as waste material. Accordingly, applicant asked that sulphuric acid generated in their unit be considered as 'by-product' under the hazardous waste rules. The TRC deliberated on the issue and decided that the demand for spent sulphuric acid depends on the proximity to the location of generation. In some cases, where there is no demand it is neutralized by lime to produce gypsum which again is considered as a waste. The gypsum however, may be used in cement plant if the logistics favours. Thus, utilization of a material alone cannot qualify the item to be declared as by-product. In its conclusion, the TRC suggested that the applicant may take permission under Rule (9) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

4.4.3 Current Practices:

The differentiation between non-waste by-product and hazardous waste has been discussed in detail by EU in the Communication from the Commission to the Council and the European Parliament on the Interpretative Communication on waste and by-products [COM(2007) 59 final][13]. The communication states that there is no black and white distinction, but rather a wide variety of technical situations with widely differing environmental risks and impacts and a number of grey zones. However, for the purposes of applying environmental legislation, it is necessary to draw a clear line between the two legal situations on a case by case basis. It is interesting to note that as per the European Union waste laws the term "by-product" does not have legal meaning – materials are simply waste or non-waste. However, for the purposes of the communication, the following terms have been used in the document:

- **Product** – all material that is deliberately created in a production process. In many cases it is possible to identify one (or more) "primary" products, which is the principal material produced.
- **Production residue** – a material that is not deliberately produced in a production process but may or may not be a waste.
- **By-product** - a production residue that is not a waste.

[13] (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52007DC0059&from=EN)

The interpretative communication was prepared based on the jurisprudence of the European Court of Justice and addresses the issues of by-products in relevant industry sectors, on when by-products should or should not be considered as waste in order to clarify the legal situation for economic operators and competent authorities. In a number of cases the court has stated that whether a material is a waste or not depends on the specific factual circumstances, and therefore, the decision must be taken on a case by case basis. However, for the purposes of applying environmental legislation, it is necessary to draw a clear line between the two legal situations on a case by case basis – waste or not waste. It is this distinction that has on occasions proved difficult to apply. The Communication identifies a three-part test, the result of decisions by the European Court of Justice (ECJ) and extensive case law on the subject, that relevant authorities should use case-by-case in determinations regarding industrial by-products for purposes of distinguishing them from waste. If there is a possibility that the material is not useable, does not meet the technical specifications that would make it usable (unless necessary actions to meet specifications are an integral part of the continuing process of production), or there is no market for the material, then it should be considered a waste. A change in these circumstances may enable authorities to determine that some or all of the material is a by-product.

ECJ decisions identify a number of other factors that may or may not be appropriate for use in distinguishing between wastes and by-products:

a. if no use other than disposal can be envisioned, the use has a significant adverse environmental impact relative to alternatives, or the use requires special protection measures, the material appropriately may be considered a waste
b. the treatment method used for the material in question cannot provide a definitive answer with respect to whether it is a waste
c. the perception that a material is a waste may be a factor in determining whether it should be regulated as a waste
d. if the undertaking for which a material is to be used seeks to limit the quantity of this material that is produced (for example because the material has no reuse value), this fact may indicate the material is a waste. The Communication acknowledges that rigid application of this last factor could discourage pollution prevention in some circumstances.

The committee notes that the distinction between when a material obtained after a production process could be considered as a useful by-product and when it could be considered as waste is not well delineated based on objective and consistent criteria so far. The HOWM Rules, 2016 for the first time clearly defines the by-products as produced in the production process with an objective of promoting re-use/recycling of materials. Though the TRC, as stated above, takes a decision on case to case basis, it would be necessary to consider streamlining and incorporating the entire mechanism or process in the rules rather than acting solely on the exception proviso referred in the foot note of the Schedule. It would also be necessary to update the Schedule I and II accordingly on the decisions taken by the TRC in case of generic waste streams, rather than a case to case basis approach.

As per the provisions of the Rules, SPCBs/PCCs are mandated to grant authorization, which inter alia includes categorization of hazardous waste. The rules also provide provision for appeal against the grant or refusal of authorization. Hence, it would be necessary to discuss with

SPCBs/PCCS as to how they interpret the term by-product while granting authorization and also, involve them in any decision-making process dealing with definition of by-products. This is also relevant as the proviso refers to `dispute' and hence participation of concerned SPCB/PCC is necessary in decision making. And it is also necessary to understand how the SPCBs/PCCs to ensure that the by-products which are toxic or have potential to cause environmental damage are effectively handled and sold/handed over to some agency, which actually use them and what is the life cycle of such by-products sold to third party. It would be necessary that CPCB/SPCB conduct some specific research on this aspect through reputed research institutes, more particularly for some of most commonly known polluting chemical processes.

Based on the interpretative communication referred above, the committee suggests that the following points need to be taken into consideration while distinguishing between by-product and waste. Points II (a), (b), (c), and (d) below must be met for a material to be declared as a by-product.

I. Intention of generator
   a) Did the generator deliberately choose to produce the material in question?
      i. If the manufacturer could have produced the primary product without producing the material concerned but chose to do so, then this is evidence that the material concerned is not a waste.
      ii. Other evidence that the production of the material concerned was a technical choice could include a modification of the production process in order to give the material concerned specific technical characteristics.

II. Certainty of further use of material
   a) Is the further use of the material a certainty not a mere possibility?
      i. When the further use of the material was not a mere possibility but a certainty, without any further processing prior to reuse and as part of a continuing process of production, then material should not be considered waste.
      ii. If there is a possibility that the material is in fact not useable, does not meet the technical specifications that would be required for it to be useable, or there is no market for that material, then it should continue to be considered as a waste.
      iii. The use for which the by-product is destined must also be lawful - in other words that the by-product is not something that the manufacturer is obliged to discard or for which the intended use is forbidden under the rules.
      iv. A case by case judgement is required for instances where there may be potential for a certain proportion of the material to be used, while the rest could be disposed of. In such cases, the existence of long-term contracts between the material holder and its subsequent users can be an indication that the material covered by the contract will be used and therefore that certainty of use is present.
      v. Similarly, if the material is going to be stored for an indefinite amount of time, prior to a potential but not certain re-use, then it should be considered as a waste while it is being stored.

b) Will further use bring financial advantage to the waste holder?

(i) Where a manufacturer can sell the material concerned for a profit, this can indicate that it is more likely that such a material will certainly be used, however this alone is not definitive.

(ii) The costs of treatment of waste needs to be considered, as there is a risk that a token price could be offered to have the material classified as non-waste, and therefore allow it to be treated outside of proper waste treatment facilities. However, a high price, in line with or above current market prices for the material, may indicate that the material is not waste.

c) Can the material be used again without any further processing?

Often, in the value chain of a by-product there is a chain of tasks that must be undertaken as part of the further use of the material. The material is produced, it may then be washed, dried, refined or homogenised, characteristics or other materials that are necessary for its further use may be added, its quality will be controlled and so on. Some tasks will be carried out on the production site of the manufacturer, some on the site of the next user, and some by intermediaries. To the extent that these tasks are an integral part of the production process, they do not prevent the material from being considered as a by-product. The Court has found that if an additional recovery process is required before further use, even if such subsequent use is certain, this is evidence that the material is a waste until the process has been completed.

d) Is it part of the continuing process of production?

If the material is made ready for a further use as an integral part of the continuing process of production, and is then effectively sent for such a further use, then it is a by-product. In this situation, the competent authority will need to decide whether the tasks described in the section above are an integral part of the continuing process of production. In doing so the degree of readiness of the material for further use, the nature and extent of the tasks needed to prepare the material before further use, the integration of these tasks into the main production process and whether the tasks are being carried out by someone other than the manufacturer, could all be relevant. If the material leaves the site or factory where it has been produced in order to undergo further processing then this may be evidence that such tasks are no longer a part of the same production process. However, with the increasing specialization of industrial processes, this cannot be taken as definitive evidence. If the material is needed as part of the primary activity of the manufacturer then this is evidence that the material concerned is not a waste.

III. Other factors for consideration for a material to be considered waste

a) No other use than disposal can be envisaged, or the use has a high environmental impact or requires special protection measures

b) If the undertaking for which a material is to be used seeks to limit the quantity of this material that is produced (for example

because the material has no reuse value), this fact may indicate the material is a waste. However, a rigid application of this factor could discourage pollution prevention in some circumstances.

The committee while recognizing the broader objective to promote resource conservation and recovery as manifest in waste management hierarchy referred in the Rules, emphasize that the entire process of identification of by-product needs to be driven by an objective technical review criterion. The committee also recognize the dynamic aspect involved due to continuous promotion of clean technology and also, improvements in product development processes and the need of research in this sector and also, involvement of SPCBs and research/academic institutes in the entire process of by-product identification and decision making. This is necessary to ensure sustainable development thought effective enforcement of the HW rules.

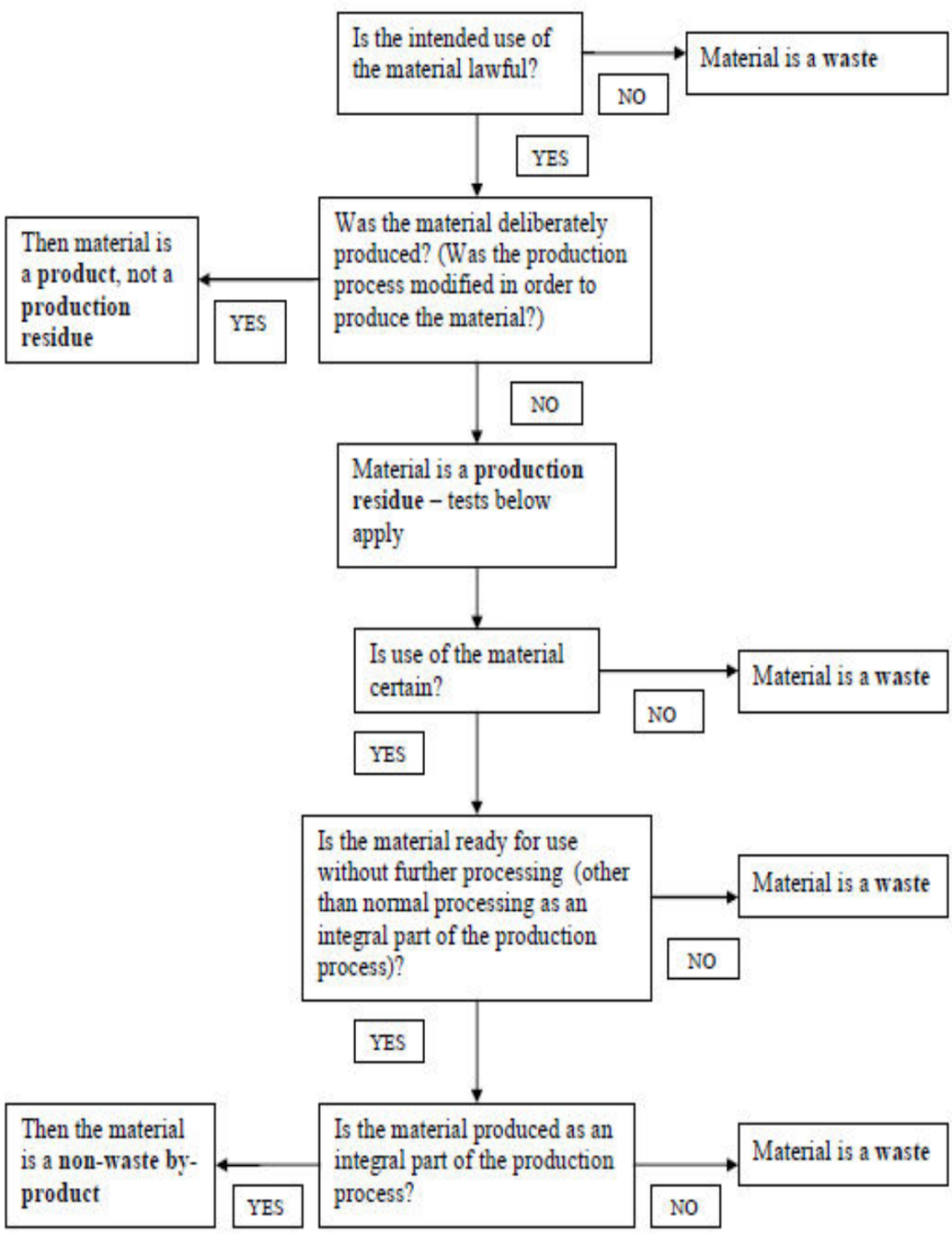


Figure 21: Suggested Decision tree for waste versus by-product decision

4.4.4 Spent Solvent management

The term 'solvent' is applied to a large number of chemical substances which are used to dissolve or dilute other substances or materials. They are usually organic liquids. Many solvents are also used as chemical intermediates, fuels, and as components of a wide range of products. Solvents are used in a variety of applications across many industries. Common examples of solvents are acetone, petroleum spirits, dichloromethane, 1.1.1-trichloroethane, hexane, toluene, methanol, trichloroethylene, methyl ethyl ketone, xylene, perchloroethylene, white spirit etc. Generally, a solvent is a liquid that is either a single chemical or a mixture of chemicals used to dissolve a substance or material. This property allows solvents to be used as cleaning agents, or in chemical manufacturing, or as ingredients in other products. Common uses of solvents include: Industrial cleaning and degreasing; Dry cleaning; Paint thinning and coating; Fabric scouring; Auto and airplane manufacturing and maintenance; and many other uses.

The spent solvent has been categorised as hazardous waste as per the HOWM Rules, 2016. It was also considered as hazardous waste as per 1989 rules and also, 2008 rules. It is therefore evident that the regulations consistently view the solvents as Hazardous waste and it is mandatory to ensure environmentally sound management of the spent solvents. The solvent generation has consistently been a matter of concern and all the regulatory agencies generally are well aware of the need of regulating the spent solvent management.

HOWM Rules 2016: Schedule-I, at S. No. 20

20.	Production and/or industrial use of solvent	20.1	Contaminated aromatic, aliphatic or naphthenic solvents may or may not be fit for reuse
		20.2	Spent solvents
		20.3	Distillation residues
		20.4	Process Sludge

The solvents are used in several types of industries, but more predominantly in pharma, bulk drug, pesticide, and chemical organic. The pharmaceutical manufacturing industry and organic chemical industry are significant part of country's economy, with the chemical synthesis segment of this sector being a major user of organic solvent and subsequently a large producer of waste solvent for recovery or disposal. These sectors do undertake considerable recovery for reuse, but experiences barriers to the reuse of this solvent including: product quality requirements are very high, demanding validated high purity from any recovered solvent, processes require a large number of solvents leading to a wide range of solvent mixtures, the separation of which can be expensive and complicated. The continuous enhancement of quality standards under Good Manufacturing Practice requirements has also resulted in increased quantities of spent solvents from pharma and bulk drug industries. Solvent recovery is not the primary business focus of these production facilities.

The committee has reviewed the spent solvent management through the documentation available like inventory of waste, data on spent solvent recovery units and also, through field visits. Committee has been benefitted by SOP

under Rule 9 published by CPCB in March 2018 and also 'Guidelines for Spent solvents' prepared by GPCB14. The committee notes that the solvent management has been an issue of concern for the SPCBs/PCCs and CPCB and they have appropriately considered high weightage for VOCs in the CEPI reports. In fact, CPCB has considered several types of VOCs as potential carcinogens (listed in Group B and C of Annexures) in CEPI index calculations15 for all three attributes of air, water and soil environment, that includes a large variety of solvents used for industrial operations. This concern has also led CPCB to ensure that the sound solvent management is an integral and critical component of the CEPI action plans prepared by SPCBs and approved & vetted by CPCB. The CEPI related monitoring reports available on CPCB/SPCB website show high concentrations of VOCs in air and effluent in many of the industrial areas.

The committee has reviewed all these aspects of solvent use in industrial sector carefully and noticed that enforcement of the HOWM Rules and SOPs formulated by CPCB as regards the spent solvent generated in industrial operations, is required to be made more scientific, focussed and effective so as to ensure compliance of the HOWM Rules, SOPs and the authorisation granted thereunder. On review of solvent management through HW inventory and CETP data received from SPCB/PCC, the committee noted that there is credible evidence that the spent solvent from some of the industries is unauthorizedly discharged in CETP inlet stream, directly and indirectly, leading to high CETP influent standards. This fact can be corroborated though the data on CETP inlet vis a vis CETP inlet criteria. Such unauthorised discharge not only result in violation of HOWM Rules, but also results in increased pollution load on CETP resulting in its inefficient functioning besides air pollution from release of VOCs. The committee is of the opinion that such unauthorised discharge of spent solvent into the water environment, including the ETP inlet, is a violation of HOWM Rules and needs to be dealt accordingly.

Solvents and the emissions of VOCs from unscientific handling and disposal of solvents have significant climate change potential. These VOCs have the climate change consequences and it will be necessary to quantify the carbon dioxide equivalent emissions through the use of the Global Warming Potential concept for considering the direct global warming effect of haydrocarbons due to their long atmospheric lifetime and infra-red absorption properties and the indirect global warming effect of hydrocarbons due to their atmospheric degradation and perturbation on the distribution of other greenhouse gases (GHG) such as methane and ozone. Considering India's commitment for GHG reduction in a time bound manner, this sector needs more research and attention for effective enforcement of HOWM Rules.

And therefore, the committee has dealt the spent solvent management in three different segments;

a) Spent solvent management within the industry
b) Spent solvent recovery plants

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[14] Available at https://gpcb.gujarat.gov.in/uploads/126_1_GPCB_Guideline-for-the-spent-solvent-management.pdf

[15] CPCB Criteria For Comprehensive Environmental Assessment of Industrial Clusters, http://cpcb.nic.in/displaypdf.php?id=Q1BBL05ld0l0ZW1fMTUxX0ZpbmFsX0Jvb2sxLnBkZg==

c) Unauthorised spent solvent discharges resulting in inefficient functioning of the CETP.

1. **Spent solvent management within the industry**

Rule 4 of the HOWM Rules, 2016, elaborately describes the responsibility of the occupier which not only requires occupier to ensure sound management of HW but also safety of the workers. The occupier is also required to ensure proper storage and record keeping including inventory of HW generated, stored and disposed. Some of the large-scale industries are also engaged in recycling and utilising the solvent in their manufacturing process. Still however, the committee noted the need of proactive efforts by the industries through identification and characterisation of various HWs including solvents.

The committee observed a major challenge in implementation of these rules as regards the record keeping of the generation of spent solvents and their storage and disposal. Whilst it is true that small industries may not be able to update the HW records on daily basis, but major industries and industries generating significant quantities of HW are required to maintain the HW records strictly as per rules. The committee also observed that there is a need to sensitize the industries on the health impacts of inhalation of volatile fumes of solvents on the health of their workers. Though the health inspection of workers is routine activity, such examination needs to be more focused on potential adverse health impacts of solvents. Internationally, the concept of Green Chemistry is strongly advocated through;

- Green concepts integrated in drug development through more sustainable manufacturing platform
- Limited number of 'universal' green solvents utilized
    - Properties allow for easy recovery
    - Used with other campaigns
- Integrated solvent recovery systems
- Continuous processing simplifies recovery design strategies

The committee therefore recommends that;

a. MoEF&CC shall undertake major awareness program for use of environmentally friendly solvent use and handling systems including the green chemistry.
b. The major spent solvent generating industries shall be directed to maintain the records of HW generation, storage and disposal strictly as per rules.
c. The State government through its labour department shall immediately integrate the potential health effects of solvents in the mandatory health check-ups as required by HOWM Rules.

2. **Spent solvent recycling industries**

The spent solvent industries are critical component of the solvent management system. These industries use distillation process to recover the solvent and then recycle them. Conventionally, these plants work either on labour contract basis, where they take the spent solvent form an industry and after distillation return the recovered solvent back to the industry, or on purchase-sale model where they purchase the spent solvent or mix of solvents, process the same and sale the recovered solvents in commercial market. With the GMP being made more stringent, the sale and purchase model is gaining ground in commercial market.

The committee had an occasion to visit 2 plants in Kurkumbh MIDC Maharashtra namely; M/s Ramkamal Chemicals Pvt ltd, A-77 and M/s Shiv Shakti Oxalate Pvt Ltd. A-94/1, Kurkumbh MIDC; and found that the industries were not aware of the SOPs published by CPCB. Not only that they were found to be unaware of authorisation under Rule 9 with SPCB/PCC and the overall storage of solvent was not appropriate. The SOPs were not being complied. The more serious thing was the spent solvent were purchased from industries outside state and there was no manifest system being followed by both seller and purchaser industries and the concerned SPCBs were not informed. The pungent smell of solvents indicated large scale fugitive emissions of VOCs resulting in air pollution. The committee also found the need of capacity building and sensitisation of the SPCB filed level officials regarding application of Rule 9 in general and implementation of Sops of CPCB in specific. There is absolutely no compliance of SOPs in terms of record keeping, authorisation, storage of spent solvent, storage of recovered solvents, packing and sale of spent solvents etc. The requisite updated information of authorisation under Rule 9 was not available with Maharashtra SPCB also. The photographs taken during the visit (as given below in **Figure 22**) itself would indicate the urgent need of compliance of HOWM Rules and SOPs published under the same.

Figure 22: Spent solvent recovery plant at Kurkumbh, MIDC

The committee would therefore recommend the following;

a. The SPCBs/PCCs shall publish all the requisite information of all the spent solvent recycling industries in the State/UT on respective website immediately within 1 month, and send a copy to CPCB. CPCB shall ensure that this compiled information is available on CPCB website in next 2 months. This information needs to be updated every six months as prescribed in SOP.
b. SPCBs/PCCs shall immediately conduct the audit and inspection of all such industries in next 3 months and ensure that the HOWM Rules and SOP prepared by CPCB are strictly complied with. CPCB shall also carry out random inspections of such units for exemplary actions. Stringent action shall be taken for the non-compliance of rules in terms of HOWM Rules and Environment (Protection) Act 1986.
c. SPCB/PCC shall ensure that the industries sending their spent solvents to such spent solvent recycling industries are adequately informed about the requirement of authorisation under Rule 9, through publishing the newspaper advt. and/or respective industry associations. In case of non-compliance, SPCBs/PCCs shall take necessary stringent legal action against defaulting industries.

3. Common Effluent Treatment Plants (CETP)

The MoEF&CC has promoted the CETPs in many industrial areas across the country to facilitate the techno-economic effluent treatment option for the small and medium industries and also, to ensure that the final discharge from the industrial area is well regulated at the final disposal point. According to Central Pollution Control Board, 193 Common Effluent Treatment Plants (CETPs) are installed in the country with combined capacity of 1474 Million Litres per Day (MLD). Though, the CETPs have been operational at many places, it is a well-documented fact that most of these CETPs are not able to regularly achieve the stipulated discharge standards. Among the several reasons for such non-compliance, the main reason for such non-performance is higher concentration (pollution load) of the CETP inlet effluents, the prescribed standards as well the design criteria for CETPs. Moreover, at many places, the hydraulic load at these CETPs is also exceeding the designed capacity. Such CETPs have already identified by CPCB/SPCB since a very long period and many regulatory actions have also been taken against such CETPs as well as the defaulting industries discharging high concentration effluents to the CETPs. NGT, of recent, has also taken a consistent and tough actions against the erring CETPs in order to streamline their operations like Taloja, Vapi, Dombivali etc to name a few.

The main reason for non-performance of these CETPs is high concentration effluent reaching to ETP as inlet, which has exceeding parameters over and above the design inlet criteria. On a critical examination of such CETP operations, such high concentration of inlet effluent is most likely to be the result of

- discharge of high concentration COD streams,
- discharge of spent solvents having very high COD
- discharge of effluent having very high TDS or other inhibitory compounds

It is interesting to refer to some of the studies carried out by MPCB for VOCs concentration in CETP effluents. The MPCB report of 2010[16] also analyses the presence of VOCs at various locations in CEPI industrial areas and has identified large VOCs concentrations in CETP inlet as well as outlet. CPCB report on VOCs monitoring at Lote industrial area[17] as well as Patalganga area[18] reported large concentrations of VOCs in the CETP inlet as well as outlet. Both these reports summaries the findings on VOCs in waste waters, broadly as under;

- There are high concentrations of various toxic and carcinogenic solvents in the CETP inlets.
- The presence of solvents (VOCs) in the wastewater samples occur mainly due to improper separation of intermediates/ products/

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[16] MPCB report on `Environmental Sampling and Analysis of Volatile Organic Compounds, Lote Industrial Estate, Maharashtra' available at http://mpcb.gov.in/ereports/pdf/MPCB_VOC_Report_ver5.pdf

[17] CPCB report on`Environmental Sampling and Analysis of Volatile Organic Compounds, Lote Industrial Estate, Maharashtra' available at http://mpcb.gov.in/ereports/pdf/CPCB_VOC_Report_lote_2010.pdf

[18] CPCB report on VOCs at patalganga area http://mpcb.gov.in/ereports/pdf/CPCB_VOC_Report_patalganga_2014.pdf

solvents at different unit process operations, which result in to high organic load in wastewater and difficulty in treatment.

- Normally the wastewater generated by the industries contains high VOCs and the industries are doing only primary treatment. During these processes some percentage of VOCs are dispersed into the atmosphere. After primary treatment the industries are pumping their effluent to CETP for further treatments. In CETP, during aeration process, most of the VOCs are vaporized and dispersed into the atmosphere. These VOCs are directly impacting the ambient VOCs concentration.
- Presence of VOCs in wastewater affects the ambient air quality, efficiency of the effluent treatment system and the quality of the final receiving body. VOCs (Solvents) are emitted into the environment during various treatment unit operations particularly during aeration in equalization tanks and aeration tanks.

These reports show a general trend adopted by some errant intransigent industries to discharge their non-reusable spent solvents into the effluent sent to CETP. This spent solvent is a `hazardous waste' as defined in the HOWM Rules and needs to be disposed of following due procedure. However, it is observed that the errant industries are adopting this practice of CETP discharge in order to reduce the cost of HW disposal through either re-processing or incineration. Such unauthorised disposal not only cause disturbance to CETP operations but also ambient air pollution besides, environmental damage in the receiving water bodies.

Now considering the provisions of HOWM Rules, the Schedule-I, entry 20, clearly classify all such spent solvents as Hazardous waste. This category of waste generated in the industry is not expected to be reaching the effluent stream for further treatment and disposal to CETP. This waste needs to be collected and disposed strictly as per said rules.

Considering the above facts, it is manifest that the discharge of spent solvent or any other category of HW through effluent stream for treatment and disposal to CETP, does not attract the exclusions provided under Rule 2 of the HOWM Rules, 2016 and such unauthorised discharge of VOC and other HW in effluent streams needs to be dealt for violation of HOWM Rules, 2016 by the concerned SPCBs/PCCs. This approach was also adopted by the Supreme Court Monitoring Committee (SCMC) formed in the matter of Research Foundation matter. This is extremely relevant as the CEPI and VOC study reports referred above indicates presence of variety of solvents and many of them are toxic and also carcinogenic. The proper collection and disposal of such spent solvents will not only ensure the efficient operations of CETP but also resultant reduced discharge of such volatile pollutants in the ambient air and in receiving water bodies.

In view of above finding, the committee though it necessary to collect information on CETPs from all SPCBs/PCCs as regards to their performance, VOC concentrations, legal action taken etc. Another aspect, critical for the effective enforcement is the disposal of sludge from these CETPs which is HW as per the HOWM Rules, 2016. The committee has noted that the CEPI report correctly identify the improper and inadequate disposal of sludge from CETP reactors as one of the critical actions for improving the CETPs. The committee has observed that there is significant variation in the HW generation reported by CETPs, as per authorisation granted to them by SPCBs and the HW generation rate varies from 0.5 to 2 MT/MLD of CETP installed capacity per

day. The improper and inadequate disposal of hazardous sludge from CETPs is not only resulting in poor functioning of CETPs but also resulting in discharge of sludge into the water body through the effluent, damaging the environment. This unauthorised disposal of hazardous sludge is therefore violation of HOWM Rules and needs to be viewed serious. Committee has therefore called for such relevant information from SPCBs.

Unfortunately, only 09 states have responded to the Questionnaire sent by the Committee through CPCB namely; Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, Punjab, Tamil Nadu, Kerala, and Himachal Pradesh. Other states have not responded to the communication in spite of regular follow up from CPCB. Status on the same is given below in the **Table 6**.

Table 6: Status of the information w.r.t. Common Effluent Treatment Plant (CETP) provided by SPCBs/PCC

Sl. No.	State	Status of information provided
1	Andhra Pradesh	X
2	Delhi	X
3	Gujarat	✓
4	Haryana	X
5	Himachal Pradesh	✓
6	Jammu & Kashmir	X
7	Jharkhand	X
8	Karnataka	✓
9	Kerala	✓
10	Madhya Pradesh	✓
11	Maharashtra	X
12	Punjab	✓
13	Rajasthan	X
14	Tamil Nadu	✓
15	Telangana	X
16	Uttarakhand	✓
17	Uttar Pradesh	X
18	West Bengal	✓

It is to be noted that the detailed information as submitted by SPCBs is available with the CPCB and though, it is expected, it not known whether this information has been validated at SPCB level. There are several issues with the data in terms of, assessment of generation of the HW from CETPs, storage of HW at site, timely disposal considering time of storage stipulated in notification, and manifest system. Be that as it may be, the representative data from some of the CETPs is illustrated below in **Table 7** to understand the correlation of CETP HW disposal compliance and CETP functioning.

Table 7: Information w.r.t. HW generated from some of Common Effluent Treatment Plant (CETP)

Name of CETP	Installed Capacity MLD	Operating capacity MLD	Complying/ Non-complying (COD mg/L)	Autho. HW generation MTPA	HW disposal MTPA
Narmada Cleantech, Ankaleshar, Gujarat	60	40	NC (606)	36500	2016-17: 11449 2017-18: 13911
Palsan Infra Surat, Gujarat	100	95	NC (259)	42480	2016-17: 228 2017-18: 451.1
CETP Pharmacity, Parwada, AP	5	5	C (240)	22 TPD 8030 MTPA	2016-17: 21845 2017-18: 21029
Angeripalayam CETP, Tiruppur, TN	10	3.8	ZLD	62	2016-17: 389 2017-18: 753 2018-19: 13616 Storage 1.4.2017: 16689 31.3.2018: 14568 30.9.2018: 853
CLC Tanners CETP, Calcutta, WB	20	15.5	C (143)	15 TPD 5475 MTPA	2016-17: 992 2017-18: 1421
CETP Jalandhar Punjab	5	3.5	NC (1210)	12 TPD 4380 MTPA	2016-17: 5830 2017-18: 4846
CETP Dodaballpur, Karnataka	5	1	C (59)	800	2016-17: - 2017-18: 350

None the less, the committee has taken note of the data on CETP performance as available on SPCB website. It is observed that in State of Maharashtra where there are already case in NGT regarding CETP operations, the CETPs of Taloja and Tarapur are not performing and the inlet and outlet effluent qualities are much higher than the prescribed standards, thereby indicating that the spent solvents are getting ingress in the effluent collection system.

It is manifest from the above table that there is significant variation in rate of generation of HW from the CETP operations. It is true that such quantity will have significant dependence on the type of member industries, level of primary treatment by the industries and also, enforcement levels. Still however, significant variation is observed in cluster of CETPs like tannery, chemical etc. It is also observed that the data on HW generation do not match with disposal in most cases and it can be reasonably apprehended that the significant quantity of effluent is discharged through CETPs without adequate treatment. It is also observed that the entire HW is also not being disposed to the CHWTSDF in timely manner. The committee would therefore infer that the

many of the CETPs could be discharging the effluent containing some portion of solvents and also, the hazardous sludge into the environment. It is therefore necessary to cover such non-compliance under the HOWM Rules and suitable action needs to be initiated. NGT in its judgment in OA 37 (WZ) of 2013 dated 2nd July 2015, has imposed penalty on the erring CETPs based on the excessive COD load of the effluent, considering such excess concentration effluent as hazardous. The committee also would like to concur with such a view and would like to request NGT to give suitable directions in this regard. In view of above committee would like to recommend following;

a. The names of SPCBs who have not submitted information in this regard shall be submitted to NGT for suitable action.
b. SPCBs shall undertake a research or consultancy project for assessment of hazardous sludge from the CETPs in their state to assess the most reliable quantity and quality of hazardous sludge from the CETPs immediately.
c. SPCBs shall conduct VOC monitoring in and around industrial areas where CETPs are operational to assess the VOC concentration in air, effluent and ground water in the area.
d. The SPCBs shall conduct monthly verification of CETP performance including the HW generation and disposal, and the data should be available in public domain.
e. The CETPs which are discharging non-conforming treated effluent in the environment and also, not disposing the HW scientifically shall be liable to legal action as per Rule 23 (1) of HW Rules, subject to in principle approval by NGT.

4.5 CAPTIVE AND COMMON DISPOSAL FACILITY FOR HAZARDOUS WASTE

4.5.1 Background

The hazardous waste may be disposed at captive treatment facility installed by the individual waste generators or at Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs). Common TSDFs are facilities used by various units/industries for treatment, storage and disposal of their hazardous wastes on commercial basis. These are useful for small and medium scale hazardous waste generating industries who cannot set up their own TSDFs.

TSDFs (Treatment, Storage and disposal Facilities) are facilities for treatment, storage and disposal of hazardous wastes in an environmentally sound and techno-economical viable manner. The common TSDFs are generally expected to have facilities such as authorized vehicles for transportation of hazardous wastes from industries/units, weighing machine, laboratory facilities (to determine characteristics of hazardous wastes to decide their storage and disposal pathway), hazardous waste storage facilities, waste treatment/stabilization facilities, etc. The common TSDFs may have only secured land fill facilities or both secure land facilities and incineration facilities. The latter are called “Integrated common TSDFs.”

The generators have the option of recycling/reprocessing/co-processing/utilization of hazardous prior to ultimate option of disposal at secure land fill facility (SLF) or through destruction in incinerator. Such disposal can be carried at either at captive or common disposal facilities. Disposal at TSDFs is advantageous as compared to the captive facility because of the reasons such as reduced capital investment, reduced cost of treatment,

checks mushrooming of treatment equipment in an area, easy implementation by the regulatory bodies etc.

In the light of regulatory ease and to have better focus on the hazardous waste disposal areas, it was emphasized that it would be more appropriate to have one or more large common TSDF facilities than having sporadic facilities by individual industries as captive facility. The rules were enacted and the state authorities were asked to plan and construct common hazardous waste treatment and disposal facilities in these states and CPCB was entrusted the task to coordinate with the state authorities for identification of land and develop the common facility termed as TSDF.

Figure 23: Stabilization of hazardous waste

Figure 24: Common hazardous waste Incinerator

4.5.2 Status of Disposal facilities- in 2008

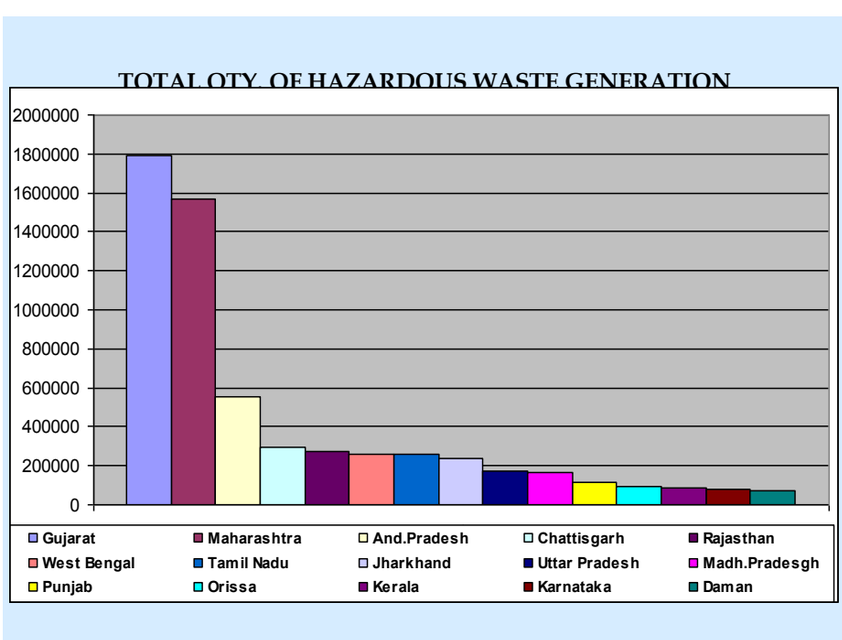
As per the inventory compiled by CPCB in the year 2008, the status of TSDF in various states is highlighted in **Table 8**. 11states had developed a total of 26 facilities in their respective states whereas the States/UTs namely Andaman & Nicobar, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Chandigarh, Delhi, DDDNH, Goa, Haryana, J&K, Jharkhand, Kerala, Lakshadweep, Manipur,

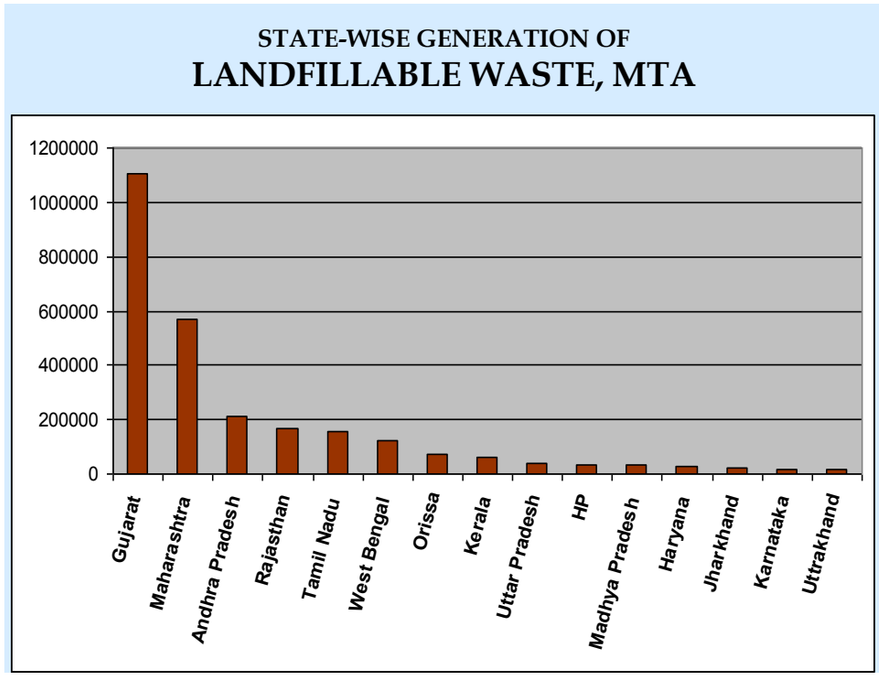
Mizoram, Meghalaya, Nagaland, Odisha, Puducherry, Sikkim, Tripura and Uttarakhand could not construct and commission such facilities.

The states namely Gujarat, Maharashtra, Andhra Pradesh, Rajasthan, Tamil Nadu and West Bengal, which generate almost 75% of the total Hazardous waste in the country, were also leading in terms of taking a lead and installed TSDF facilities in their respective state. It can also be seen that although, the state of Gujarat topped the list of Hazardous waste generation, also topped in the number of TSDF facilities when compared with the other states. Following Gujarat the other states that exhibited significant Hazardous waste generation are Maharashtra, Andhra Pradesh, Uttar Pradesh, Karnataka and Tamil Nadu in that order.

Table 8: Status of TSDF (reported in 2008 inventory)

S. No.	Name of the State	Integrated TSDFs (with both SLF and Incinerator)	TSDFs with only Common Secured Landfills	TSDFs with Only Common Incinerators
1.	Andhra Pradesh	2	0	0
2.	Gujarat	4	3	0
3.	Himachal Pradesh	0	1	0
4.	Karnataka	0	0	3
5.	Madhya Pradesh	1	0	0
6.	Maharashtra	3	1	0
7.	Punjab	0	1	0
8.	Rajasthan	0	1	0
9.	Tamilnadu	0	1	0
10.	Uttar Pradesh	0	3	1
11.	West Bengal	1	0	0
Total		**11**	**11**	**04**





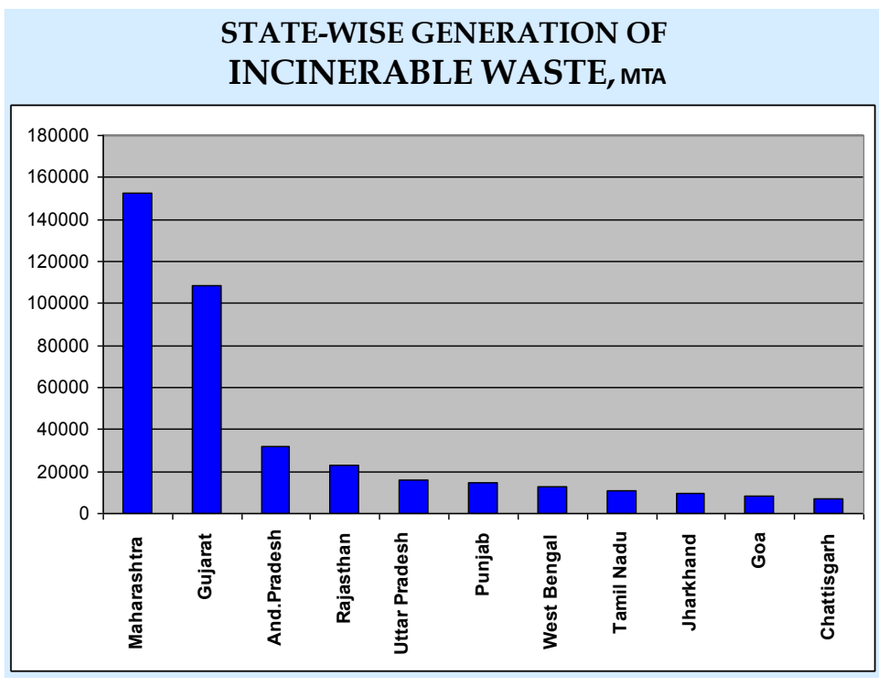


Figure 25: State- Wise generation of Hazardous Waste

4.5.3 Status of Disposal facilities -as on 2016

The Hazardous Waste Inventory of 2016-17 reveals that the number of states/UTs that constructed and commissioned TSDF facilities increased to 18 with total 42 facilities (comparison graph given below in **Figure 26**), of which 18 facilities are integrated TSDFs having both Secured Landfills and Incinerators; 10 have only common incinerators, and; 14 have only Secured Landfills. State/UT wise availability of the same is given below in **Table 9**. Altogether 17 states namely Andaman & Nicobar, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Chandigarh, Delhi, Goa, J&K, Lakshadweep, Manipur, Mizoram, Meghalaya, Nagaland, Puducherry, Sikkim and Tripura still not developed common facilities. As per the information submitted by the state of Goa, the state is in the process of awarding the work for TSDF, whereas the incinerable waste is transported to MWML in the state of Maharashtra. Similarly, other states such as Chandigarh and Sikkim etc also indicated that working arrangements have been made with the neighbouring states. The

details of the TSDF facilities with and without incineration facilities has been presented in Table **9** that is self-explanatory.

Table 9: Availability of Common Integrated Treatment, Storage & Disposal Facilities (TSDFs) with Common Incinerators & Secured Landfills

S. No.	Name of the State/UT	Integrated TSDFs (with both SLF and Incinerator)	TSDFs with Only Common Incinerators	TSDFs with only Common Secured Landfills
1.	Andhra Pradesh	1	-	-
2.	Gujarat	4	2	3
3.	Haryana	1	-	-
4.	Himachal Pradesh	-	-	1
5.	Jharkhand	1*	-	-
6.	Karnataka	-	6	2
7.	Kerala	-	-	1
8.	Madhya Pradesh	1	-	-
9.	Maharashtra	3	-	1
10	Odisha	-	-	1
11	Punjab	-	-	1
12	Rajasthan	-	1	2
13	Tamilnadu	1	-	1
14	Telangana	1	-	-
15	UP	2	1	1
16	Uttarakhand	1	-	-
17	West Bengal	1	-	-
18	Daman, Diu, Dadra & Nagar Haveli	1	-	-
	TOTAL	**18**	**10**	**14**

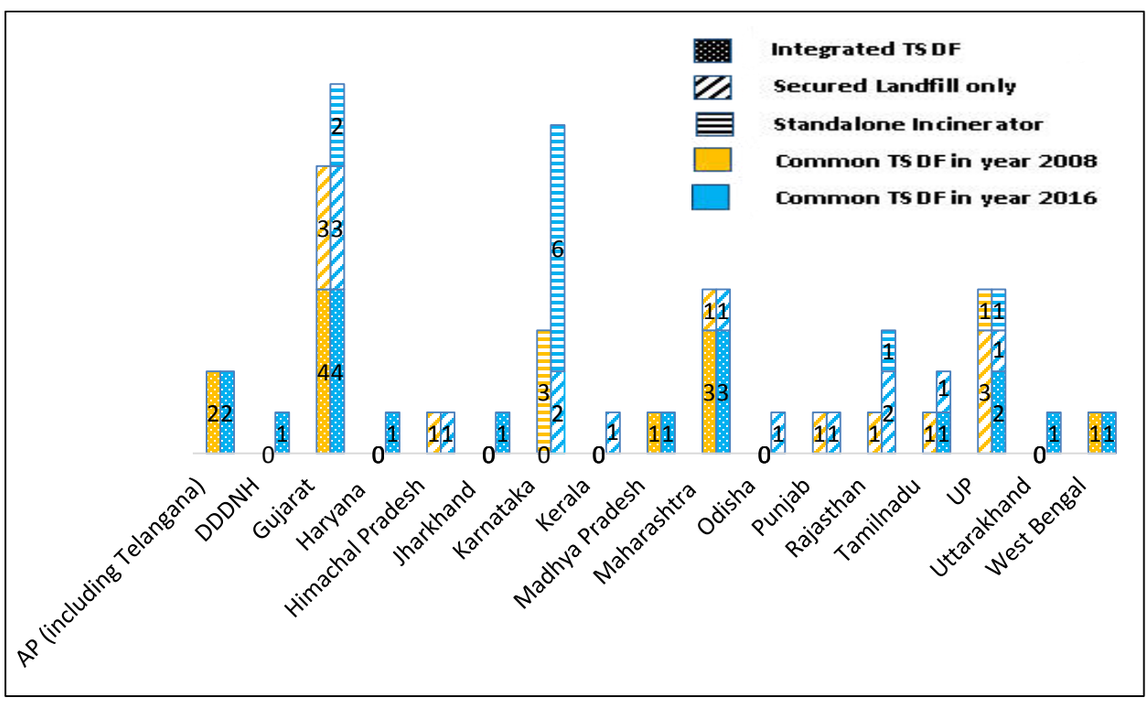


Figure 26: Comparison of common TSDFs in year 2008 and 2016

4.5.4 Related Guidelines for Design and upkeep of TSDF

CPCB has published guidelines for the design, operation and upkeep, best practices and operations of incinerators etc. in order ensure environmentally safe operation and upkeep of these facilities. The guide lines specify double liner HDPE membrane systems to rule out the potential infiltration of leachate into the ground. Collection and treatment of leachate was also addressed in these guide lines. List of such guidelines are as given below:

1. Criteria for Hazardous Waste Landfills
2. Manual for Design, Construction and Quality Control of Liners and Covers for Hazardous Waste Landfills
3. Development of Site Selection Methodology for Landfilling - A Case Study for Bangalore
4. Guidelines for Conducting Environmental Impact Assessment : Site Selection for Common Hazardous Waste Management Facility
5. Guidelines For Common Hazardous Waste Incineration
6. Management of Hazardous Waste - Guidelines For Proper Functioning And Upkeep Of Disposal Sites
7. Management Of Hazardous Waste- Guidelines For Transportation Of Hazardous Wastes
8. Protocol for Performance Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities including Common Hazardous Waste Incinerators
9. Guidelines for Storage of Incinerable Hazardous Wastes by the Operators of Common Hazardous Waste Treatment, Storage and Disposal Facilities and Captive HW Incinerators
10. Guidelines For Common Hazardous Waste Incineration

4.5.5 *Observations:*

1. **<u>Setting up of TSDF</u>**

The number of TSDFs in the country has increased gradually from 04 facilities in the year 2003 (i.e since SCMC judgement) to 42 TSDFs in 18 States/UTs. The remaining 17 states namely Andaman & Nicobar, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Chandigarh, Delhi, Goa, J&K, Lakshadweep, Manipur, Mizoram, Meghalaya, Nagaland, Puducherry, Sikkim and Tripura does not have such Common TSDF for treatment and disposal of hazardous waste.

The Hon'ble NGT vide order dated 30/07/2018, in the matter of O.A No 804/2017, has directed that all the states, where the hazardous waste is being generated must set up Treatment, Storage and Disposal Facility of adequate capacity at appropriate locations within three months from today and forthwith imitate action against erring units.

In compliance with aforesaid order CPCB issued letter to State Environment Department and SPCBs/PCCs, not having common TSDF, for compliance of the above directions. The status on the compliance and issues related to setting up of TSDF has already been dealt separately under Chapter 6 of this Report.

2. **<u>Operation and Monitoring of TSDF</u>**

   i. CPCB issued direction to SPCBs/PCCs vide directions dated 05/02/2014 and 02/03/2015 under section 18(1) (B) of the

Water (Prevention & Control of Pollution) Act, 1974 and the Air (Prevention & Control of Pollution) Act, 1981, to install online continuous stack emission monitoring system in common hazardous waste incinerators and to connect & upload the online emission data at SPCB/PCC and CPCB server.

CPCB follow up with SPCB/PCC and operators of the common facility for the installation of continuous emission monitoring system and connectivity of the same with CPCB server. At present, all the 26 common facility operator having incinerator have installed online continuous monitoring system and connected with CPCB server.

ii. In order to resolve the issues pertaining to environmentally sound management of leachate generated from secured landfill and fugitive emissions during stabilization of hazardous waste, CPCB informed that following decisions were taken after convening a meeting with the operators of common facility:

a. For Stabilization of hazardous waste for secured landfilling-

(i) Installation of mechanized cover system having arrangement of waste conveyor system, mixing unit with mechanized mixing arrangement, suction duct/hood, scrubber system and stack., Or

(ii) Stabilization in pit by mixing with excavator/backhoe loader having hood over the pit with adequate suction arrangement (to arrest dust/fumes) followed by scrubber and stack.

b. For management of leachate generated from secured landfill;

(i) Solar Evaporation pond: May be used provided suitable sized pond be installed considering Evaporation loss Vs. Leachate generation. Further, such pond shall have double liner system with leachate pumping system arrangement and adequate sized standby pond /tank in case of failure of the liner system, if any; or

(ii) Multiple Effect Evaporator (MEE): May be used for treatment of leachate. The condensate water to be managed as per the conditions stipulated in the Consent to Operate issued by the concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974. The residue of MEE may be disposed into secured landfill after proper encapsulation; or

(iii) Spray Dryer of common hazardous waste incinerator: May be used in quenching of flue gases from secondary chamber of the incinerator as leachate has high TDS which will be helpful in exchanging heat. However, leachate shall be treated prior to its use to achieve concentration of COD < 250 mg/I; or

(iv) Effluent treatment plant (ETP): May be treated in ETP having advance oxidation technology or adopting other suitable technology (since leachate has high COD and TDS) so as to manage as per the conditions stipulated in the Consent to Operate issued by the concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974.

CPCB has communicated these decisions to operators of common facility in the form of directions for taking necessary actions and upgrading the facilities with regard to stabilization of hazardous waste and management of leachate by 15/10/2018 failing which environmental

compensation will be levied on the operator for each day of violations based on pollution index.

The committee propose to collect information on compliance of the aforesaid directions in the next phase.

3. **Escrow Account**

The secured landfill facility upon closure of the facility needs to be monitored at least for a period of 30 years so as to ensure that there is no adverse impact on the environment as well as health of the public living in the vicinity of the facility. In this regard, various activities as part of the post-closure monitoring requirement are essential like groundwater monitoring around TSDF, leachate collection, analysis and its treatment, gaseous emissions monitoring from the vents of secured landfills for VOC and H2S, Ambient Air quality monitoring around the disposal facility, greenery maintenance etc. and contingency like insurance, remedial measures in case of adverse impact on the environment are required to be performed by the operator of the facility. For undertaking such activities during the post-closure period, adequate amount of funds would be required which needs to be deposited in a common account called "Escrow Account".

In this regard, MoEF&CC vide letter no. 23-1/2008-HSMD dated 16.04.2009 has asked SPCBs/PCCs to create Escrow Account recommending to deposit 5 % of the annual turnover of landfillable waste towards the Escrow Account.

As per the information provided by SPCBs/PCCs out of 18 SPCBs/PCCs only 12 states (i.e Andhra Pradesh, DDDNH, Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Karnataka, Telangana and Uttar Pradesh) have made escrow account arrangement for post closure monitoring of secured landfill. Remaining 06 States/UT (namely Gujarat, Jharkhand, Kerala, West Bengal, Tamilnadu and Uttarakhand) need to create the said escrow account which were supposed to be implemented w.e.f April 16, 2009. However, the committee would like to emphasize that the required amount needs to be deposited at required intervals in such escrow accounts and the said information needs to be collected by SPCB/CPCB on regular basis, to say the least on annual basis.

4.5.5 Issues with common facilities

a) There have been instances when fire accidents were reported from the TSDF located in Ankaleshwar and Hyderabad. These fires indicated the need for the adequate storage of incinerable hazardous wastes and safe homogenization/blending techniques practiced in these facilities. CPCB has also published guide lines for the safe storage of incinerable hazardous wastes, sensors and alarm systems and also the firefighting systems. Similarly, the accident breaching the side walls of land fill and slurry Hazardous waste flowing into nearby areas in Vapi Gujarat also hints towards the need of stringent monitoring and supervision during construction of such facilities as well as routine operations at these facilities.

b) Similarly, there were apprehensions about incinerable waste being land filled rather than ending in incinerator. This becomes more prominent in

the light of sizable quantum of high calorific waste being diverted for the co processing and only the left over relatively lower calorific waste with presence of higher concentrations of halogens coming to the TSDF for incineration.

c) The secured landfills that were designed and operated without double liner HDPE impervious base are likely to have allowed the leachate to infiltrate into the ground below the SLF. Such cases are more likely to occur in captive landfills although common TSDF's failure cannot be ruled out.

d) SPCBs find it difficult to monitor and exercise the periodic checks on the quality parameters of the best civil engineering practices during the construction of the TSDF. , thereby necessitating need of engaging expert agencies for the purpose.

e) In standalone SLF the leachate generation has to be minimised specifically by covering the SLF during monsoon months and preventing rain water to enter into the landfill adding to the volumes of the leachate generated.

f) Leakage of leachate from the SLF also forms an area of concern and prompts towards periodic monitoring of ground water in the vadose zone extending from 2 to 6 m below the SLF base.

g) Few SLF namely at Roorkee, Kanpur and Tumakuru, do not seem to have designed on the lines of CPCB guidelines and as such warrants thorough audit and cross verifying the layout and design parameters. The TSDFs that are not strictly as per CPCB guide lines shall be either upgraded or shall not be allowed to operate just for business.

h) Regarding Treat and landfill category of waste, as such the SPCBs have no tool to monitor the activity and as such has no other option but to accept the figures provided by the TSDF operator.

i) The escrow account along with tri-partie agreement among TSDF operator, Bank and SPCB have not been opened by few of the TSDF operators (as mentioned above). Where ever the accounts have been opened, the amount (5% of total revenue) has not been transferred into these accounts.

j) Where ever the vadose zone beneath the SLF is found to be contaminated, TSDF operator shall formulate the extent of contamination and initiate remediation of the ground water, so that the contamination not spread further into other areas.

k) There are serious concerns about the housing permissions given by the local authorities within 500 m (buffer zone) from the TSDF boundaries, which shall create a rift between the TSDF facilities with the neighbours in long run. For instance, at Balotra, Rajasthan, huge solar evaporation ponds have been constructed by CETP for the evaporation of RO rejects just adjoining the TSDF, making it vulnerable to environmental risks.

4.5.6 Recommendations

The committee has visited few TSDF sites and also, interacted with SPCB officials. The recommendations mentioned below are essentially of operational nature and committee would like to work on the possible ways, means and techniques to implement the recommendations in holistic manner in the next phase.

1. The layout and design of TSDF need to be standardized strictly on CPCB guide lines with the state of art provisions such as leachate minimisation, gravity flow of leachate from landfill and collection of leachate and rain water in separate ponds. Also various sheds provision for treatment and storage during monsoon months.
2. The possible leachate infiltration from the landfills that were designed prior to year 2000 specifically, need to be studied at shallow monitoring wells up to 20m to established the safe working of the SLF. The examination of ground water from the monitoring wells located around the SLF also needed to be examined to rule out the slow leakage of the leachate into the vadose zone. Where ever the vadose zone beneath the SLF is found to be contaminated, TSDF operator shall have to formulate the extent of contamination and initiate remediation of the ground water, so that the contamination does not spread further into other areas.
3. The treatment of Hazardous waste is still practiced mechanically by employing earth movers for mixing of waste and additives. This needs to be mechanized so that exposure of gases during reaction to workers could be eliminated and improved stabilization attained.
4. In order to eliminate the chances of incinerable Hazardous waste entry into the SLF, mechanism shall be evolved to either test the leachate or the volatile concentrations in the landfill.
5. The air emissions through the stacks of the incinerators though hooked to online monitoring systems, yet there is a need to cross check these levels after periodic calibration of the sensors and using other manual methods to rule out manipulation of results, if any. Majority of SPCBs are not equipped to conduct monthly air quality monitoring of incinerator stacks and analysis of off gases for the parameters like Dioxins and Furan.
6. Similarly a third party audit is required to cross verify the TSDF operations and establish the compliance of HWM rules and the consented stipulations. Such audits shall study the total consumption of additives namely fly ash, lime, activated carbon, cement and other chemicals used for various purposes in routine operations of the TSDF.
7. The minimisation of leachate volumes and treatment of leachate is still a major issue that almost every TSDF facility has to look into, specifically during monsoon months. The daily leachate generation, its quality characteristics etc. shall be monitored regularly by SPCBs and based on these results routine feedback must be passed on to operators.
8. It is observed that some HW consignments have been refused by TSDFs. TSDF needs to follow the CPCB guidelines for acceptance of the waste strictly. It is necessary to verify whether the TSDF are accepting the non-hazardous waste for the business profitability as these TSDF facilities have been developed for a purpose and have been partially funded by public money.
9. Where ever new SLFs are under construction, SPCB shall either depute a representative permanently at the site or appoint an expert third party agency to monitor the implementation of standards and specifications as laid by CPCB.

10. A SLF designed for a particular quantum of waste for land filling up to a fixed height, shall not be allowed to exceed the height as the excess filling may have deleterious impacts on the liner system specifically on the welded joints and enhanced failure potential.
11. It is strongly recommended that the escrow accounts must be immediately opened and the amount (5% of total revenue from day one) must be transferred into these accounts within a fort night.
12. It is strongly recommended to prevent local authorities from granting permissions to construct houses in the buffer zones from the immediate effect. The houses already constructed in the buffer zone shall need to be either demolished or the land has to be acquired by the government. In worst case each house hold must submit an affidavit that they are aware about the potential risks around the TSDF and own the responsibility.
13. In the era of fast dwindling landfill sites and in the light of NIMBY syndrome, it has become inevitable to conduct research to utilise the land filled hazardous waste that have been land filled for more than 10 years in to the SLFs. These materials shall be well researched for their leaching potential and transformation into useful building materials. This shall help in recreation of the landfills and conserve the need for new lands in future.
14. The MOEF&CC/CPCB/SPCB/PCC and Operators shall earmark funds for such environmental research and outsource the research work to the academic institutions and/or research agencies.
15. There is need for expediting setting up of TSDFs in the States generating moderately high quantity of hazardous waste but not having TSDFs; such States are Chhattisgarh, J&K, Goa, Assam, Bihar and Puducherry.

4.6 IMPORT-EXPORT OF HAZARDOUS WASTE

4.6.1 Background

The Ministry of Environment, Forest and Climate Change is the nodal Ministry to deal with the transboundary movement of the hazardous and other wastes in accordance to the provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The Ministry accepts applications for import/export on a case by case basis and examines them through the Expert Committee (EC). After assessment of the application the Ministry provides permission to the importer/exporter on the basis of which the Customs Authority authorize the shipment. In case of disputes on technical matters such as determination of whether the waste is hazardous or not; or if a material is a by-product or waste; etc., the applications are placed before the technical Review Committee constituted by the Ministry.

4.6.2 Procedure for Import-Export of Hazardous Waste

The procedure for import/export of hazardous wastes incorporates the Prior Informed Consent (PIC) procedure of the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal. India is a party to the Convention since 1992. As per the PIC procedure, before an export of hazardous or other wastes may take place, the authorities of the State of export must notify the authorities of the States of import and transit and

provide them with detailed information regarding the intended transportation. The detailed information includes type of waste, its physical description, reason for waste export, quantities, etc. The transportation is allowed only when all States have given their written consent.

In accordance to this procedure, the hazardous wastes that require PIC procedure have been listed out in Schedule III - Part A. All the wastes listed out in the rules have been assigned Basel numbers as per the Annexes VIII and IX to the Convention.

A number of issues need to be resolved to make the process more stringent and to prevent misuse of the provisions of the rules. There needs to be more stringent checks to strengthen the enforcement of the rules. It has been observed that during import of hazardous wastes, information regarding the materials are usually falsified by importers. For example, on paper the importer declares as paper waste, however, what is actually being imported is municipal solid waste. Customs authorities do not have designated funds to enable the environmentally sound disposal/destruction of hazardous and other wastes that are seized or unclaimed due to fraudulent declarations. There is lack of coordination between customs and the ministry in terms of reporting illegal activities. According to Schedule VII of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 it is the duty of Ports and Customs Authorities to inform MoEF&CC regarding illegal traffic of hazardous and other wastes. However, since the notification of the rules not a single case has been reported to the Ministry by the Ports or Customs Authorities.

Between April 2016 and March 2018, Ministry has granted permission for import of 3, 15, 500 tonnes of lead scrap, 12, 88,160 tonnes of used rubber tyres/tubes scrap. Further, 1, 20, 600 tonnes of non-activated glass cullets were imported between April, 2016 to April, 2018. With respect to electrical and electronic waste, a total of 1, 55, 727 numbers were imported into the country.

4.6.3 Recommendations

1. Harmonization of Basel codes with ITC (HS codes): The Ministry provides permission on the basis of Basel codes while DGFT uses HS codes. There is a need to synchronize the two codes to avoid confusion.
2. Risk management assessment: The customs authorities use the risk management system (RMS) to enable low risk consignments to be cleared based on the acceptance of the importer's self-assessment and without examination. Roughly 30 percent of containers covered under risk management out of which 10 percent are physically verified. There are different types of waste streams which have not been integrated in the RMS. There is a need to review the import/export data of various waste streams and include them in RMS. Further, waste streams in Schedule III – Parts A, B and D and Schedule VI that are often mis-declared by importers need to be identified and added to the RMS.
3. Collaboration between regulating authorities: Regular interaction between the Ministry of Environment, Forest and Climate Change, CPCB, SPCBs, customs and ports authorities should take place with frequent consultative meetings and trainings in order to avoid working in silos.
4. Separate budget for destruction of seized materials: The Customs authorities need to be provided with funds to enable the environmentally sound management of seized hazardous and other wastes.

4.7 CONTAMINATED SITES

4.7.1 Background

Rapid urbanization and industrialization has led to generation of large quantities of solid waste involving industrial hazardous wastes in many cities in the country, beyond the handling capacity of civic bodies, responsible for collection and disposal of the wastes. There are several contaminated dumpsites in various parts of India where hazardous and other wastes were dumped historically, which resulted in contamination of soil, groundwater and surface water thereby posing health and environmental risks. Most of the contaminated sites were created when industrial hazardous wastes were disposed by occupiers in unscientific manner or in violation of the rules prescribed. Some of the sites were developed historically when there was no regulation on management of hazardous wastes. In some instances, polluters responsibility for contamination have been either closed down their operations or the cost of remediation is beyond their capacity, thus the sites remain a threat to the environment. These contaminated sites need to be remediated on priority to levels that are acceptable considering the human health risks and by adopting appropriate remediation technologies.

Remediation of contaminated sites involves cleaning of contaminated media i.e. soils, groundwater, surface water and sediments by adopting various in-situ or ex-situ clean-up technologies, up to a predefined remediation target levels for each identified constituent. These site specific remediation target levels (SSTLs) are decided for each site, separately adopting either the risk based assessment approach or standard based approach. SSTLs for remediation of contaminated sites are calculated based on quantitative human health risk caused by constituents of concern on a particular contaminated site. SSTL for a site is decided after considering various factors such as; cost of remediation, type of intended future land use, feasibility of a remediation technology, etc.

The committee in this interim report is not coming out with observations and recommendations as far as contaminated sites are concerned. This critical aspect of HW management has been specifically covered in Research Foundation matter which has been recently mandated to this committee. I this report, committee intends to document the submissions mainly made by CPCB and record only prima facie observations. In coming days, committee would be visiting some of these sites and have a first-hand knowledge and information on the issue.

4.7.2 Initiatives on inventory and assessment of probable contaminated sites

1. Inventory of contaminated sites:

An inventory of contaminated sites in the country was initiated in the year 2003 as per the directives of Supreme Court's Monitoring Committee (SCMC) constituted by Hon'ble Supreme Court of India in the matter of W. P. (C) 657 of 1995. As per initial inventory in the year 2005, State Pollution Control Boards/Pollution Control Committees (SPCBs/PCCs) have reported 141 contaminated sites. The list was revised since then from time to time to the present 69 sites in 10 States in 2011. However, this list was in-complete since a systematic inventory was not carried out. As per the recent study on "Inventory & mapping of probable contaminated sites", carried out by Ministry of Environment, Forest & Climate Change (MoEF&CC) under Capacity Building for Industrial Pollution Management Project (CBIPMP), during 2012-16 and

published the report in 2017, in which 320 probable contaminated sites were identified. Subsequently, CPCB received additional information of 09 sites from SPCBs during 2016-17 and the list has been revised to 329.

2. List of contaminated sites:

A list of 329 probable contaminated sites have been reviewed/verified by SPCBs/PCCs based on following criteria:

A. Sites where there are traces of dumping of Hazardous waste / accumulation of Effluent or its sediment or sludge / Spillage of Chemicals / leakage of underground pipelines / contamination of groundwater - which requires further assessment.

   The possible contamination can be classified into following types:

   - S1: Land bound solid phase contamination
   - S2: Water bound sediments solid phase contamination
   - L: Land bound liquid phase contamination
   - P1: NAPL contaminants in soil (Non-Aqueous Phase Liquids)
   - P2: Groundwater contaminations

B. There are no traces of dumping of Hazardous waste / no accumulation of Effluent sludge / no Spillage of Chemicals / no leakage of underground pipelines / no contamination of groundwater; which does not require any further assessment.

C. Sites that are already investigated / inspected and found to be contaminated. Type of Contamination (Type: S1 / S2 / L / P1 / P2)

D. Sites that are already investigated / inspected and found not contaminated.

Based on above criteria, as on August 2018, twenty-two SPCBs/PCC have been reported 145 contaminated sites, including the sites where detailed site investigation carried out/ Detailed Project Reports (DPRs) prepared for remediation and remediation works initiated. Apart from 145 sites, 48 sites yet to be investigated and whereas 136 sites have been reported as no contamination. The details are given below:

No. of contaminated sites (18 States/UT) - No. of sites where detailed site investigations completed/or DPRs prepared (9 States) – 24 sites - No. of sites where remediation works initiated (6 States) – 7 sites (included in above 24 sites)	145
No. of sites yet to investigate (6 States)	48
No. of sites, out of 329 probable contaminated sites, reported as having no contamination (19 States)	136

Most of the contaminated sites in the country are not remediated since many years, these sites continue to contaminate soil and groundwater, posing severe health risk to human population in receptor areas. Some of the contaminated sites are orphan sites, where the polluter(s) were not identified or the polluter(s) identified is not in a position to carry out remediation. Thus, it becomes the responsibility of the State in larger public interest to safeguard the receptor population.

As per the existing regulatory framework under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, SPCBs/PCCs are given mandate to take steps for remediation of contaminated sites arising due

to improper handling of hazardous wastes. According to CPCB, however, in case of historical dumpsites/contaminated sites where no polluters are identified, there are no specific regulatory provisions with mandate to identify, inventorize and execute the remediation, SPCBs/PCCs have not progressed in implementing the remediation works.

The committee does not necessarily agree with this contention of CPCB as the rules, in letter and spirit, contemplates safe and secure hazardous waste management in the country. Moreover, as per the provisions of the EP Act, Section 9 and also, Rule 23 of HW rules, the authorities are expected to ensure that such contaminated sites, in first go, do not appear and in case of such finding, take necessary action for remediation and restoration, on the principles of Polluter pays. Mere submission that no polluter is found, such dumps can not be allowed to persist and continue to pollute the environment. There are enough scientific and legal tools available with the regulatory authorities to handle such critical issue upfront in most scientific and legal manner to set an example of credible and deterrent action.

The committee is also concerned with the variation in data on such contaminated sites, which the committee *prima facie* finds mainly due non-availability of objective criteria, lack of verification and validation exercise, absence of annual reporting on the issue and also, capacity at state levels to deal with such critical and scientific issue.

4.7.3 Implementation of Assessment and Remediation works

There is limited experience in the country on remediation of contaminated sites. Further, the existing institutional and legal framework in the country does support implementation of liabilities on responsible parties, recovery of costs and execution of remediation works. The projects initiated by MoEF&CC under Capacity Building for Industrial Pollution Management Project (CBIPMP) and National Clean Energy Fund (NCEF) are providing to understand the gaps in existing institutional & legal framework and also for deriving an implementation framework by undertaking actual remediation projects as pilot cases. This would also help in developing a National Program for Rehabilitation of Polluted Sites (NPRPS) for implementing a comprehensive regulation for remediation of contaminated sites in the country. The key issues, such as fixing liabilities and recovery of costs are not addressed effectively in existing environmental or civil regulatory framework.

4.7.3.1 Capacity Building for Industrial Pollution Management Project (CBIPMP)

MoEF&CC Government of India has initiated the CBIPM Project to build capacity at the state & central levels and develop a framework to address the issues in a comprehensive & systemic manner under an area-wide management approach. CBIPM Project was aligned with the endeavour to establish a National Programme for Rehabilitation of Polluted Sites (NPRPS) as a framework for scaling up the clean-up and rehabilitation of polluted sites as a pilot project and facilitate the reduction of environmental and health risks associated with legacy polluted sites.

Objectives of the project

i) To build tangible human & technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites; and

Status of 04 pilot projects;

a) Closure and containment of MSW dump sites at in Kadapa, Andhra Pradesh: The site assessment, extent of site contamination and closure & containment plan including remedial design are completed. The actual closure & containment works are under progress.

b) Closure and containment of MSW dump sites at Dhapa adjacent to East Kolkata Wetlands, West Bengal: The site assessment, extent of site contamination and closure & containment plan including remedial design are completed. The actual closure & containment works are under progress.

c) Remediation of Noor Mohammad Kunta (NMK), Katedan Industrial Area (KIE) in Ranga Reddy District, (now in Telangana): The site assessment, extent of site contamination and remedial plan are completed. However, the remediation works could not be taken-up due to the status quo orders issued by the Hon'ble High Court of Telangana & AP in W.P. No. 39864 of 2014.

d) Remediation of contaminated sites in the District of Hooghly, West Bengal (Hooghly Sites): The site assessment, extent of site contamination and remedial plan is finalized. However, the remediation works could not be taken-up due to technical issues. However, WBPCB submitted that remediation is not required because groundwater was not contaminated, the environmental and social risks were not significant and highway expansion work was started.

ii) To support the development of a policy, institutional and methodological framework for the establishment of a NPRPS. Under NPRPS, MoEF&CC had also undertaken the following three separate assignments;

a) National Inventory and mapping of polluted sites;
Outcomes: 320 probable contaminated sites were identified

b) Development of methodologies for assessment and remediation of polluted sites; Outcomes:
- Guidance document prepared for assessment and remediation of contaminated sites in India.
- "Development of Soil Quality Standards" under progress for assessment and remediation of contaminated sites in India

c) Development of institutional and legal framework for implementation of NPRPS.
Outcomes: "Remediation of Contaminated Sites Rules, 20XX" is under progress.

4.7.3.2 Project on Remediation of contaminated areas (containing multiple sites) under National Clean Energy Fund (NCEF) scheme

In continuation to CBIPM Project, MoEF&CC has initiated a Central government project under National Clean Energy Fund (NCEF) for remediation of 12 priority contaminated areas (containing multiple sites) located in 8 States in the country. CPCB was identified as an agency to implement project in two phases that is preparation of Detailed Project Reports (DPRs) in 1st Phase and executing remediation works in 2nd Phase. CPCB has initiated this project in 6 States for 8 contaminated areas by CPCB. The status of DPRs for following eight contaminated areas under NCEF project are given below;

S. No.	Name of the contaminated area & State	Status
1.	Mercury contaminated area, Ganjam, Odisha	DPR prepared
2.	Chromium contaminated area, Orichem, Talcher, Odisha	DPR prepared
3.	Chromium contaminated area, Nibra Village, Howrah, West Bengal	DPR prepared
4.	Pesticides & heavy metals contaminated land & creeks, Eloor-Edayar, Kerala	DPR prepared
5.	Chromium contaminated area, Rania, Kanpur Dehat, UP	DPR prepared
6.	Chromium contaminated area, Ranipet, Tamil Nadu	Draft DPR received
7.	Pesticide contaminated area, Deva Road & IPL, Lucknow,	Draft DPR received
8.	H-Acid contaminated area, Ratlam, MP	DPR expected by January, 2019

Central funding to NCEF project has been discontinued in June, 2017, however, MoEF&CC has assured financial assistance for completion of DPRs.

4.7.3.3 Projects initiated for detailed site investigation and remediation of contaminated sites by responsible parties on directions of SPCBs and Hon'ble Courts

As per the directions of Hon'ble Court/SPCBs, some industrial units have initiated detailed site assessment followed by remediation activities in & around their premises. In this regard, CPCB has also regularly monitoring and evaluating the performance of the assessments and remediation works jointly with concerned SPCBs.

S. No.	Details of the contaminated site	Regulatory Body/Hon'ble Court	Responsible Party
1.	BPCL-Oil contaminated site near Tondiarpet, Chennai, Tamil Nadu	TNPCB and Hon'ble NGT, Chennai Bench	M/s Bharat Petroleum Corporation Limited (BPCL)
2.	Mercury contaminated soil at Kodaikanal, Tamil Nadu	TNPCB and Hon'ble NGT, Chennai Bench	M/s Hindustan Unilever Limited (HUL), Kodaikanal
3.	Groundwater (colour, chlorides, etc.) contamination around M/s Godavari Bio-Refineries, Ahmed Nagar, Maharashtra	Hon'ble NGT, Pune Bench	M/s Godavari Bio-Refineries, Ahmed Nagar District, Maharashtra
4.	Groundwater contamination along the ECP Channel in Vadodara	Gujarat PCB	Dye-intermediates and Pharmaceutical industries
5.	Groundwater contamination at Lohia Nagar, Ghaziabad	UPPCB	M/s Shriram Pistons & Rings Ltd along with other three chrome using industries (i) Mascot Tools & Forgings Pvt Ltd, (ii) Kathuria Brothers (iii) Marshal Cycles

4.7.3.4 Benefits

Remediation of contaminated dumpsites will minimize environmental and health risks by containing the migration of the toxic chemical constituents or their treatment/removal from contaminated soil and groundwater to acceptable and safe levels. Although in some cases, remediation of contaminated sites may not necessarily bring direct economic benefits; it will generate long-term environmental and social benefits. The over-all benefits are summarised below:

- Improved quality of ground/ surface water, air and soil;
- Improved productivity and better land use;
- Improved human health, other flora / fauna;
- Improved learning to support future projects;
- Improved awareness of industries/ local communities;
- Enhanced capacity of environmental regulatory agencies.

4.7.3.5 Issues and Challenges for Execution of Remediation Projects

Need for remediating the contaminated sites was also emphasized in the recommendations of Supreme Court Monitoring Committee (SCMC) constituted by the Hon'ble Supreme Court of India in the year 2003. It has been observed that the SPCBs/PCCs have not taken adequate steps for remediation of identified contaminated sites.

With regards to hazardous waste management, illegal dumping of industrial waste is a common practice in industrial States. While a large number of hazardous waste contaminated sites exist in the country, the regulating authorities face number of challenges before formulating a national level strategy. These challenges include;

- Lack of sufficient information/data on the quality and risks of legacy pollution and accumulated waste,
- Lack of capability in identification and assessment of contaminated sites including sampling and its analysis,
- Sources of funding for execution of remediation projects,
- Mode of Execution,
- Approach for deciding remediation target levels including risk based approach for deriving site specific remediation target levels including setting of remediation objectives/goals,
- Absence of effective tracking system for monitoring the process and enforcement of regulations to prevent secondary contamination,
- Underdeveloped common infrastructure for safe containment or disposal of hazardous waste,
- Capacity Building within the SPCBs/PCCs.

4.7.3.6 Way forward for execution of Remediation Projects

CPCB has recommended that;

- Concerned SPCBs/PCCs shall carry out preliminary assessment of all the identified contaminated sites in the State and also identify the responsible person/industry. Thereafter, if required the responsible persons/industry be directed to conduct detailed site assessments followed by remediation.
- In case where polluter is identified, SPCBs/PCCs shall initiate action as per the guidelines issued by CPCB for 'Implementing Liabilities for Environmental Damages & Disposal of Hazardous Waste and Penalty'.

- In case of the contaminated sites where the polluter is not found, the State Government would be required to finance remediation of such sites to safeguard the people living in contaminated areas from adverse health effects, in line with Article 47 and 48A of Indian Constitution, which stipulate that it shall be the endeavor of the State to protect and improve the environment.
- Initiate immediate intervention measures for containing immediate threats from existing contaminated sites (in both active and inactive sites).
- If any new site(s) identified, enlist along with the existing list of contaminated sites.
- Scope of implementing cost effective remediation techniques.
- Capacity building SPCBs/PCCs for rapid preliminary assessment of contaminated sites, which may include practical training on use of tools for soil and groundwater screening such as hand-held XRF instruments, Colorimeter, PID for VOCs/ SVOCs, hand operated augers, groundwater pumps, level meters, etc.

A. Time frame for implementation of projects on assessment and remediation of contaminated sites

S. No.	Activity	Time lines
1.	Constitution of State Level Technical Review Committee (TRC)	1 year
2.	New site(s), if any, enlist along with the existing list of contaminated sites.	0.5 year
3.	Training on Capacity building for officials of SPCBs/PCCs for rapid preliminary assessment of contaminated sites	1-1.5 years
4.	Preliminary assessment followed by detailed site assessment study of identified contaminated sites	1-2 years
5.	Execution of actual remediation works	1-3 years

B. Constitution of Committees at State Level

a) Project Oversight Committee (POC):

Department of Environment/Industries or SPCB/PCC of the concerned State Government/UT shall constitute a Project Oversight Committee (TRC) to oversee the progress of remediation projects to be executed at State Level and comprising the following members:

S. No.	Designation	Chairperson/Member
1.	Chief Secretary or concerned Department of Principal Secretary, State Govt.	Chairperson
2.	Chairman, SPCB/PCC	Member
3.	Representative of Industries Department	Member
4.	Representative of Finance Department	Member
5.	Respective Member Secretary, SPCB/PCC	Member
6.	Representative of CPCB	Member
7.	In-charge of concerned Department/Division	Member Convener

b) Technical Review Committee (TRC):

Department of Environment/Industries or SPCB/PCC of the concerned State Government/UT shall constitute a Technical

Review Committee (TRC) to monitor the progress of remediation projects to be executed at State Level and comprising the following members:

S. No.	Designation	Chairperson/Member
1.	Chairman, SPCB/PCC	Chairperson
2.	Respective Member Secretary, SPCB/PCC	Member
3.	Representative of CPCB	Member
4.	Representative of IITs	Member
5.	Representative of NEERI	Member
6.	In-charge of concerned Department/Division	Member Convener

The committee intends to deal with this issue in a more critical manner in the next phase to come out with its own observations and findings.

4.8 LABORATORY FACILITIES

The environmental laboratory plays a very important role in assessing the status of environment comprising both abiotic (soil, water and air) and biotic (flora, fauna and human being) components. The laboratories are the essential corner stones of any effective pollution control programme.

The analytical laboratories provide qualitative as well as quantitative data for good interpretation and decision-making purpose. For generating this valuable data with a desired accuracy and to quantify concentration of the constituents present in the samples, the laboratory should have the desired facilities and capabilities to achieve the above goal.

As per the provisions of The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, all concerned organizations like SPCBs/PCCs/ TSDF operators/ Pre-processors/ customs etc. have to carry out Sampling, Analysis and implementation of The Hazardous Wastes Management Rules 2016. As part of this task, concerned organizations have to be equipped for analysis of various physico- chemical and biological Toxicity parameters. To cater these needs, an advanced Hazardous waste analytical laboratory with all sophisticated Instruments/ Equipment is required for various stake holders.

Figure 27: Laboratory with Instruments/ Equipment

The list of parameters to be analyzed for various laboratories is given below in **Table 10**

Table 10: List of parameters to be analysed

S.NO	PARAMETERS
1	Anions like CO3, HCO3, Cl, SO4, Cyanide etc
2	Ash Content (%)
3	BOD
4	Calorific Value
5	Cations like Na, K, Ca, Mg etc
6	COD
7	Compressor Strength of Stabilised Waste
8	Corrosivity
9	Density
10	EC
11	Flash point/Ignitibility
12	Leachate Release Test (LRT)
13	Loss on drying (%)
14	Loss on Ignition) (%)
15	Metals
16	Organic Compounds (Volatile & Semi Volatile)
17	Paint Filter Liquid Test (PFLT)
18	pH
19	Phenols

20	Reactivity
21	TCLP extract/Water Extract
22	TDS
23	Total Chloride (%)
24	Total Organic Carbon (TOC)
25	Total Sulphur (%)
26	Toxicity (Bioassay)
27	TSS
28	Any other instruments if required

Note: *In addition to above mentioned parameters, other parameters as listed in Schedule II to VI of HOWM Rules 2016, shall also be considered for analysis*

List of Main Instruments and Equipment Required

The list of Instruments/ Equipment required for setting/ upgradation is given below in **Table 11**

Table 11: List of the requirement of main instruments and equipment for hazardous waste samples

S. No	INSTRUMENT & EQUIPMENTS	Analytical Parameters
1.	Analytical Balance 0.00001 g	Weighment
2.	Air Toxic field Analyzers	Various toxic Gases in source & ambient
3.	Atomic Absorption Spectrophotometer with Graphite Furnace & Hydride Generator	Metals
4.	Bio Assay set up	Toxicity test
5.	Bomb Calorimeter with digital display	Calorific value
6.	CHNS (Carbon, Hydrogen, Nitrogen, Sulphur) Analyzer	Analysis of Carbon, Hydrogen, Nitrogen and Sulphur in the sample
7.	Compressor test Apparatus	Compressing Strength of solid waste
8.	Conductivity Meter	Conductivity
9.	EDXRF portable Field Analyzer	Metal analysis
10.	Extractors (TCLP) for semi-Volatile compounds	Extraction purpose
11.	Extractors (TCLP) for Volatile compounds	Extraction purpose
12.	Filtration assembly with suction pump	Filtration of Extracts
13.	Flash Point Apparatus	Determination of Flash point temp.
14.	Gas analyzers portable	VOC, Total HC and other gases
15.	Gas Chromatography coupled with Mass Spectrophotometer GC- MS-MS	Identification and analysis of various organic constituents
16.	Grinding machine- Dry heavy duty	For grinding samples
17.	High Pressure Liquid Chromatography	Analysis of organic compounds
18.	Inductively Coupled Plasma (ICP-AES)	Metals
19.	Ion Chromatograph	Cations, anions, cyanide etc.
20.	Karl Fisher Titration unit	Moisture in viscous sample
21.	Liquid chromatography–Mass spectrometry (LC-MS)	Organic compounds

22.	Leachate Release Test Apparatus	Estimation of leachate release
23.	Mercury Analyzer	Analysis of Mercury
24.	pH Meter	pH measurement
25.	Rotary Agitator	Extraction of Non-volatile substances
26.	Sampling Devices set	Sampling of hazardous and solid wastes in field
27.	TOC Analyzer	Organic Carbon content
28.	UV - Visible Spectrophotometer	Estimation of various analytes based on colorimetric principles
30	Water Purification System	High purity water generation

MAN POWER REQUIREMENT

The manpower requirement exclusively for hazardous waste analysis at Head Quarter laboratory and regional levels laboratories is required to be provided. Such staff needs to be qualified and well trained to deal with HW samples, many a times very complex and unknown samples of HW. The exact number of staff can be decided based on total sample load and work load criteria of the individual institute.

Table 12: Man power requirement for hazardous waste analytical laboratory (HEAD LABORATORY)

Laboratories of SPCBs / PPCs/ Customs/ TSDF Operators

Sl. No.	Post	Qualification	Subject	Experience
1	Chief Analyst	M.SC. Ph. D	Chemistry	Atleast 10 years
2	Asst. Chemist	M.Sc.	Chemistry	Atleast 5 years
3	Sr. Lab Assistant	M.Sc.	Chemistry	Atleast 2 years
4	Jr. Lab Assistant	B.Sc.	Chemistry	Atleast 2 years
5	Lab Attendant	12th	With science subject	Atleast 1 year lab

Table 13: Man power requirement for hazardous waste analytical laboratory (Each Regional laboratory)

Laboratories of SPCBs

S.NO.	POST	QUALIFICATION	Subject	EXPERIENCE
1	Lab In charge	M.SC. / Ph. D	Chemistry	Atleast 5 years
2	Asst. Chemist	M.Sc.	Chemistry	Atleast 3 years
3	Sr. Lab Assistant	M.Sc.	Chemistry	Atleast 2 years
4	Jr. Lab Assistant	B.Sc.	Chemistry	Atleast 2 years
5	Lab Attendant	12th	With science subject	Atleast 1 year lab

Recommendations:

1. Each laboratory has to create a separate sub section of laboratory as Hazardous Waste Laboratory
2. All the Head Quarter laboratories of SPCBs/PCCs, TSDF sites, Pre-processing units and regional laboratories of SPCBs have to equip with required instruments/ equipment as listed in **Tables 10 & 11**.
3. Necessary manpower for Head Quarter laboratories of SPCBs/PCCs, TSDF sites, Pre-processing units and regional laboratories of SPCBs shall be recruited / allocated as specified in **Tables 12 & 13.**
4. All the concerned analysts are to be trained on Sampling & Analysis of various parameters from reputed institutes
5. All the laboratories should obtain laboratory Accreditation as per ISO 17025: 2017 (NABL) or Laboratory Recognition under The Environment (Protection) Act 1986 or both covering all the relevant parameters under scope of accreditation / recognition.
6. The laboratories may explore the possibility of mobilizing /getting financial resources for setup/upgradation of Hazardous waste analysis Laboratory.

CHAPTER 5

ENFORCEMENT OF DUTIES ASSIGNED UNDER HOWM RULES, 2016

The committee has reviewed the enforcement actions of SPCBs/PCCs and State/UT Govt. as per duties assigned under Schedule VII and other provisions of the HOWM Rules, 2016.

5.1 DUTIES PERFORMED BY SPCBS/PCCS VIS-À-VIS PRESCRIBED UNDER SCHEDULE VII AND OTHER PROVISIONS OF THE HOWM RULES, 2016

The committee has sought the information through questionnaire (given at Annexure VII) from SPCBs/PCCs and information was received from only 29 SPCBs/PCCs viz. Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Chandigarh, Delhi, Gujarat, Goa, Haryana, Himachal Pradesh, Jharkhand, J&K, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Odisha, Tamil Nadu, Telangana, Tripura, Rajasthan, Punjab, Puducherry, Uttar Pradesh and West Bengal.

However, 06 SPCBs/PCCs (namely Andaman and Nicobar Islands, Andhra Pradesh, Lakshadweep, Sikkim, Uttarakhand and Daman & Diu and Dadar & Nagar Haveli) have not submitted the information inspite of the repeated follow up by CPCB.

The committee has reviewed this information and the observations of the committee strictly on the information provided in the questionnaire are submitted below with respect of various duties assigned under HOWM Rules, 2016. The committee plan to verify the submissions of the SPCBs/PCCs in the next phase on a representative sample basis.

A. Observation w.r.t. Issuance of Authorization

(i) SPCBs of Bihar, Odisha, Karnataka, Chhattisgarh and Maharashtra enclose the field inspection report along with authorization, as stipulated under the HOWM Rules. Though Gujarat and Madhya Pradesh have reported that the said inspection report is available on XGN portal.

(ii) Assam, Chhattisgarh, J&K, Odisha, Manipur, Kerala, Telangana and Uttar Pradesh are granting authorization within the stipulated period of 120 days. While others SPCBs/PCCs are granting the authorization beyond the stipulated period of 120 days.

(iii) Nos. of authorization granted for the utilization of hazardous and other wastes have been provided by most of SPCBs/PCC. However, details on the category, type, source of generation, for the utilization of hazardous and other wastes and product manufactured have not been provided by J & K, HP, Punjab, MP and WB.

(iv) Except Himachal Pradesh, Karnataka, Maharashtra and Tamil Nadu, others SPCBs/PCCs do not assess financial capabilities of occupier to deal with emergency response/accidental release at the time of giving authorization.

(v) Authorization fee is being collected by SPCBs/PCC of Odisha, Kerala, Puducherry, Jharkhand, WB and MP. However, only MP & Odisha has informed about utilization of the collected fee (in inspection, application processing and random monitoring).

B. Observation w.r.t. Inspection of HW Units

(i) Policy for frequency of inspecting each of the hazardous waste handling unit is not notified except in Uttar Pradesh, J& K, Telangana, Bihar, Haryana, Rajasthan, Chhattisgarh, Tamil Nadu, Karnataka and Gujarat. However, the information on required frequency and actual number of hazardous waste handling units inspected during 2017-18, have not been consistently reported.

C. Observation w.r.t. Show-cause/court cases

(i) Only 15 SPCBs/PCC (J&K, Telangana, Haryana, Goa, Odisha, Himachal Pradesh, Maharashtra, Rajasthan, Puducherry, Chhattisgarh, West Bengal, Madhya Pradesh, Punjab, Gujarat and Karnataka) have reported violations/issuance of show-cause notices/closure directions. However, only Maharashtra reported filing of FIR. The details of violations/ issuance of show-cause notices/closure directions is given in **Appendix**.

Reporting on violating units is not adequate, in terms of violations regarding provisions of daily records, annual returns, manifest document, storage beyond stipulated timeframe, etc. It, therefore, implies that SPCBs/PCCs are not taking action in this regard.

D. Observation w.r.t. Financial Penalty & Liability Rule 23

(i) Except Uttar Pradesh, J&K, Tripura, Rajasthan, Chhattisgarh, Puducherry, Jharkhand, Mizoram, Chandigarh and West Bengal, others SPCBs/PCCs have constituted in-house "Hazardous Waste Response Team' in accordance with the CPCB guidelines on "Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Waste and Penalty" for assessment and imposing the liability & financial penalty.

However, Kerala, Maharashtra, Meghalaya, Gujarat and Punjab have not informed details of constitution of such team to CPCB.

(ii) Except Odisha, no actions under Rule 23 of the HOWM Rules, 2016, with regard to liability for damaging environment and levying financial penalty for violation of the Rules is reported by SPCBs/PCCs.

E. Observation w.r.t. Monitoring

(i) Except Uttar Pradesh, Telangana, Odisha, Rajasthan, Puducherry and Tamil Nadu, others SPCBs/PCCs are not monitoring the compliance of various provisions and conditions of permission including conditions of permission issued by MoEF&CC for export and import, however, Rajasthan and Puducherry have not provided nos. of units monitored during 2017-18.

F. Observation w.r.t. Verification of annual returns

(i) Except Bihar, Haryana, Odisha, UP, Telangana, Gujarat, Rajasthan, Jharkhand and Manipur, other SPCBs/PCCS have provided nos. of occupiers possessing authorization and number of occupiers submitted the annual returns during 2017-18. Further, SPCBs of Maharashtra, Rajasthan, Telangana and WB have reported verification of annual return of all the units. Haryana is not verifying any annual returns filed by occupiers.

(ii) Except Chhattisgarh, Haryana, Telangana and UP, other SPCBs/PCCs are not receiving the annual returns from the hazardous waste generating units (10-65%).

G. Observation w.r.t. Maintenance of register

(i) Except Bihar, Goa, J& K, Uttar Pradesh, Telangana (online system) Maharashtra, Meghalaya, Assam, Chhattisgarh, Puducherry, Jharkhand and West Bengal, other SPCBs/PCCs are maintaining the register as stipulated under the HOWM Rules. However, details on conditions imposed under HOWM Rules for management of hazardous and other wastes is only being maintained only by SPCB of Tamil Nadu and Mizoram.

H. Observation w.r.t. Manifest Document

(i) With regard to manifest copy 1 & 5 from the sender and receiver, states of Jharkhand, Assam, Tripura and Meghalaya are not receiving the copies. Bihar and Goa are receiving copy 1 and copy 5 partially while J&K is receiving only copy 1.

(ii) PCBs/PCCs have not developed mechanism or system to monitor and reconcile the manifest document information. SPCBs/PCC of Haryana, Telangana and Punjab have software system for the same but limited to common TSDF movement only.

(iii) Except Assam, Punjab, Tamilnadu, Manipur, Meghalaya, Mizoram, other SPCBs/PCCs are monitoring the hazardous waste generating units for not sending their hazardous waste within the stipulated time i.e. > 90 days/>180 days, as applicable. Further, except MP, Telangana and Odisha, other SPCBs, who reported monitoring of the same, have not reported such violation.

(iv) In case of interstate movement of hazardous waste, except Chandigarh, Himachal Pradesh, Goa (receiving partially) and Rajasthan, others SPCBs/PCCs are not receiving the copy 7 (grey) from the receiver in other state.

I. Observation w.r.t. Policy for recycling/co-processing

(i) Except Haryana, West Bengal, Mizoram, Kerala, Jharkhand, Chhattisgarh, Assam, and Mizoram, others SPCBs/PCCs have policy for encouraging reuse/recycle and co-processing over disposal in TSDF. However, details of such policies have not been informed.

J. Observation w.r.t. Disposal facility

(i) Though most of SPCBs have informed that design and layout of captive or secured landfill have been approved by them but the same requires review by them in terms of compliance with provisions stipulated under the CPCB guidelines;

(ii) Most of the SPCBs/PCCs are assessing the performance of the captive/common incinerators. However, in case of Maharashtra, the same is being assessed through online continuous emission monitoring system only. Odisha is not assessing the performance of the captive/common incinerators.

(iii) Except Madhya Pradesh, all the SPCBs/PCCs are periodically monitoring the wells located within and outside TSDF/captive secured landfill facilities. Further, the quantity of leachate generated in the TSDF is also being assessed by all the SPCBs/PCCs.

States/UTs like Tripura, Assam, Puducherry and Jharkhand, despite of reporting captive SLF in 2016-17 inventory, have reported non-existence of such facilities.

K. Observation w.r.t. Public Compliant

(i) Except Telangana, Odisha, Uttar Pradesh, Maharashtra, Puducherry, Karnataka and Gujarat, others SPCBs/PCCs have not reported receipt of complaints from the neighboring agricultural farms/residents surrounding the TSDF/industry. However, action taken against such complaints have not been reported.

L. Observation w.r.t. Laboratory and HW Cell

(i) Most of the SPCBs/PCCs do not have adequate laboratory facilities for sampling & analysis of hazardous waste as stipulated under HOWM Rules, 2016. Such facility is critical component for enforcement of HOWM Rules, 2016.

(ii) Dedicated hazardous waste cell is not available in States having large number of hazardous waste generating units such as Chhattisgarh, Jharkhand, Tamil Nadu, West Bengal and Madhya Pradesh.

M. Observation w.r.t. Training

(i) SPCBs/PCC of Himachal Pradesh, Haryana, Rajasthan, Odisha, Karnataka, Puducherry, West Bengal, Kerala, and Gujarat have organized trainings programmes for their officials.

Recommendations:

The committee has observed that there is an urgent need to strengthen the enforcement actions by SPCBs/PCCs through scientific interventions and also deterrent legal actions incase of non-compliance. The committee has noted the need of capacity building with regards to manpower, infrastructure including the laboratory besides specific training and documentation, use of IT based tools, etc.

5.2 DUTIES PERFORMED BY STATE/UT GOVT. VIS-À-VIS PRESCRIBED UNDER SCHEDULE VII OF THE HOWM RULES, 2016

(i) <u>Duties stipulated with regard to allocation/earmarking of industrial space</u>

Rule 5(1) of the HOWM Rules, 2016, stipulates that "*Department of Industry in the State or any other government agency authorised in this regard by the State Government, to ensure earmarking or allocation of industrial space or shed for recycling, pre-processing and other utilization of hazardous or other waste in the existing and upcoming industrial park, estate and industrial clusters.*"

Information was sought from Department of Industries of all State/UT Govts. vide letter dated 31/8/2018 as per questionnaire prepared by the Monitoring Committee on compliance of the above provisions. Following are responses received:

(a) Department of Industries of only 03 States (namely Bihar, Chhattisgarh and Goa) have reported that the department/agency has been authorised by the respective State/UT Government. However, no action has been taken with regard to stipulated duties of allocation or earmarking of the industrial space or shed for recycling, pre-processing and other utilization of hazardous or other waste in the existing and upcoming industrial park, estate and industrial clusters as per the Rules.

(b) Department of Industries of 07 other States/UTs (namely Manipur, Mizoram, Meghalaya, Sikkim, Daman & Diu, Puducherry and Assam)

have reported that the department/agency has not been authorised in this regard by the State/UT Govt.

Directorate of Industries, Lakshadweep, has forwarded the questionnaire to Department of Science & Technology for providing the information.

(c) Department of Industry, Commerce & Enterprises, Government of West Bengal, has informed that the department has allotted 70 acres of land to West Bengal Electronic Industry Development Corporation Limited, Department of Information Technology and Electronics for setting up of E-Waste recycler or dismantler at Rishi Bankim, Shilpaudyan, Naihati, West Bengal.

Rest other States/UTs did not respond to the questionnaire of this monitoring committee.

(ii) <u>Duties stipulated with regard to recognition/ registration/ health & safety/skill development etc. of workers</u>

Rule 5(2) of the HOWM Rules, 2016, stipulates that *"Department of Labour in the State or any other Government agency authorized in this regard by the State/UT Government shall ensure recognition and registration of workers involved in recycling, pre-processing and other utilization activities; assisting formation of groups of such workers to facilitate setting up such facilities; undertaking industrial skill development activities for the workers involved in recycling, pre-processing and other utilizations, and; undertaking annual monitoring for safety and health of workers involved in recycling, pre-processing and other utilisation."*

Information was sought from Department of Labour of all State/UT Govts. vide letter dated 31/8/2018 as per questionnaire prepared by the Monitoring Committee on compliance of the above provisions. Following are responses received:

(a) Department of Labour of 09 States/UTs (namely Chattisgarh, Himachal Pradesh, Delhi, Andaman & Nicobar, Goa, Chandigarh, Bihar, Arunachal Pradesh and Uttarakhand) have reported that they have not been authorized by the respective State/UT Govt. with regard to the aforesaid provisions of the Rules. Further, no action has been reported with regard to the said provisions of recognition/ registration/ health & safety/skill development etc. of workers.

Directorate of Industrial Safety & Health, Labour Department, Government of NCT of Delhi has informed that, there is no provision for ensuring recognition and registration of workers involved in recycling, pre-processing, and other utilization activities under any of the present law which are enforced by this Directorate (i.e The Factories Act, 1948 and rules framed there under). The Directorate has also informed that they have not been entrusted with enforcement of any of the provision of HOWM Rules, 2016 and neither the Directorate has infrastructure/facility to give industrial skill development for such workers engaged in hazardous waste management activities.

Rest other States/UTs did not respond to the questionnaire of this monitoring committee.

(iii) Duties stipulated with regard to submission of annual report to MoEF&CC

Rule 5(3) of the HOWM Rules, 2016, stipulates that "*every State Government may prepare integrated plan for effective implementation of these provisions and to submit annual report to the Ministry of Environment, Forest and Climate Change, in the Central Government.*"

MoEF&CC vide D.O. 23/21/2018-HSM dated 18.04.2018, referring provisions of Rule 5(1), 5(2) and 5(3), has requested the chief secretaries/Advisor to Administrator of 35 States/UTs to submit the annual reports with regard to action taken on the said provisions of Rules.

However, no response has been received from any of the State/UT Govt. in this regard.

(iv) Duties stipulated with regard to identification/notification/inventory of disposal sites

The State Govt. has also been entrusted with the following duties stipulated under Schedule VII read with Rule 21 of the HOWM Rules, 2016, with regard to disposal sites:

(a) Identification of site (s) for common Hazardous and Other Waste Treatment Storage and Disposal Facility (TSDF)
(b) Asses Environment Impact Assessment (EIA) reports and convey the decision of approval of site or otherwise Acquire the site or inform operator of facility or occupier or association of occupiers to acquire the site
(c) Notification of sites
(d) Publish periodically an inventory of all potential or existing disposal sites in the State or Union Territory

Information was sought from Department of Environment of all State/UT Govts. vide letter dated 31/8/2018 as per questionnaire prepared by the Monitoring Committee on compliance of the above provisions. Following are responses received:

(a) Environment Dept./SPCBs of only 07 States (namely Haryana, Punjab, Uttarakhand, Kerala, Telangana, Andhra Pradesh, West Bengal) reported that they have identified and notified sites for common TSDF, that are operational too. Kerala, Punjab and West Bengal claim publishing the inventory.
(b) SPCB of Chhattisgarh and Jammu and Kashmir have informed that a site has been identified by the concerned department/agency. Sikkim PCB has also informed that identification of suitable site is under process.
(c) SPCBs of Meghalaya and Mizoram have informed that they have not identified/notified sites for common TSDF.

Rest other States/UTs did not respond to the questionnaire of this monitoring committee. However, as per information provided with respect to other references, Delhi, Chhattisgarh, Goa and Assam have also identified site for common TSDF.

Observations:

It has been observed that actions have not been taken on the above duties by the State/UT Govts. as prescribed under the HOWM Rules, 2016, by the

State/UT Govt. (except identification of common TSDFs in 13 States and notification of the same in 07 States) and there is lack of awareness among them in this regard.

Recommendations:

There is need to sensitize State/UT Govts. about duties required to be performed by the concerned department/agency as stipulated under Rule 5(1), 5(2), 5(3) and Schedule VII of the HOWM Rules, 2016. Hon'ble NGT may issue appropriate directions in this regard.

Appendix

Status on violations reported and action taken by SPCBs/PCCs

S. No.	State	Number of FIR lodged	Number of show-cause notices issued	Number of closure directions issued	Number of revocation of show-cause notices/closure directions
1.	Gujarat	Nil	63	50	Not provided
2.	Rajasthan	Nil	210	26	06
3.	Telangana	09	19	06	06
4.	Himachal Pradesh	Nil	14	04	04
5.	Maharashtra	03	03	03	04
6.	Uttar Pradesh	Nil	Nil	03	Nil
7.	Karnataka	Information not provided	57	02	Information not provided
8.	Jammu & Kashmir	0	08	02	01
9.	Madhya Pradesh	Nil	02	01	Nil
10.	Punjab	0	64	01	19
11.	Puducherry	Nil	06	01	Nil
12.	Chhattisgarh	Information not provided	04	Information not provided	Information not provided
13.	Odisha	Nil	10	0	0
14.	West Bengal	518			
15.	Meghalaya	Nil	Nil	Nil	Nil
16.	Tripura	Nil	Nil	Nil	Nil
17.	Assam	Nil	Nil	Nil	Nil
18.	Jharkhand	Nil	Nil	Nil	Nil
19.	Tamilnadu	Nil	Nil	Nil	Nil
20.	Mizoram	Nil	Nil	Nil	Nil
21.	Chandigarh	Nil	Nil	Nil	Nil
22.	Manipur	Nil	Nil	Nil	Nil
23.	Bihar	Nil	Nil	Nil	Nil
24.	Kerala	Nil	Nil	Nil	Nil
25.	Delhi	Nil	Nil	Nil	Nil
26.	Haryana	Nil	74	0	74
27.	Nagaland	Nil	Nil	Nil	Nil
28.	Goa	Nil	171	Information not provided	171
29.	Arunachal Pradesh	Nil	Nil	Nil	Nil

Details of Court Cases reported by SPCBs/PCCs (during 2017-18)

S. No.	State	Number of Court cases reported
1.	Gujarat	Information not provided
2.	Rajasthan	Nil
3.	Telangana	Information not provided
4.	Himachal Pradesh	Nil
5.	Maharashtra	Nil
6.	Uttar Pradesh	Nil
7.	Karnataka	Information not provided
8.	Jammu & Kashmir	Information not provided
9.	Madhya Pradesh	12
10.	Punjab	Nil
11.	Puducherry	Nil
12.	Chhattisgarh	Nil
13.	Odisha	Nil
14.	West Bengal	Nil
15.	Meghalaya	Nil
16.	Tripura	Nil
17.	Assam	Nil
18.	Jharkhand	Nil
19.	Tamilnadu	Nil
20.	Mizoram	Nil
21.	Chandigarh	Nil
22.	Manipur	Nil
23.	Bihar	Nil
24.	Kerala	Nil
25.	Delhi	Nil
26.	Haryana	Nil
27.	Nagaland	Nil
28.	Goa	Information not provided
29.	Arunachal Pradesh	Nil

CHAPTER 6

STATUS OF COMPLIANCE OF ORDERS DATED 30/7/2018 OF THE HON'BLE NGT (W.R.T SETTING UP OF TSDF AND TAKING IMITATE ACTIONS AGAINST THE ERRING UNITS

The Hon'ble NGT vide its order dated 30th July, 2018 in the matter of Original Application No. 804/2017 (M.A No. 651/2018; earlier OA No. 36/2012); Rajiv Naryana & Anr. Vs Union of India & Ors., has directed that '*All the states, where the hazardous waste is being generated must set up Treatment, Storage and Disposal Facility (TSDF) of adequate capacity at appropriate locations within three months from today and forthwith imitate action against erring units.'* Status on compliance of the same, observations and recommendations of the Monitoring Committee are given in subsequent chapters.

6.1 STATUS OF AVAILABILITY OF COMMON HAZARDOUS WASTE TSDFS

Rule 16(1) of the HOWM Rules, 2016, stipulates that the State Government, occupier, operator of a facility or any association of occupiers shall individually or jointly or severally be responsible for identification of sites for establishing the facility for treatment, storage and disposal of the hazardous and other waste in the State. Further, identification of site (s) for common TSDF; assessing Environment Impact Assessment (EIA) reports and conveying the decision of approval of site or otherwise acquiring the site or informing operator of facility or occupier or association of occupiers to acquire the site; notification of sites, and; publishing periodically an inventory of all potential or existing disposal sites in the State or Union Territory are duties of State Government/Union Territory Government/Administration prescribed under Rule 21 read with Schedule VII of the said Rules.

Status of availability of common TSDF in various States/UTs is given in **Table 14** below:

Table 14: Availability of common TSDF in various States/UTs

Sl. No.	State/UT	Common HW TSDF	
		Common Secured Landfill	Common Incinerator
States/UT having both common Secured landfill and common incinerator			
1.	Andhra Pradesh	√	√
2.	Gujarat	√	√
3.	Haryana	√	√
4.	Jharkhand	√	√
5.	Karnataka	√	√
6.	Madhya Pradesh	√	√
7.	Maharashtra	√	√
8.	Rajasthan	√	√
9.	Tamilnadu	√	√
10.	Telangana	√	√
11.	Uttar Pradesh	√	√

12.	Uttarakhand	√	√
13.	West Bengal	√	√
14.	Daman, Diu, Dadra & Nagar Haveli	√	√
States/UT having only common Secured landfill and no common incinerator			
15.	Himachal Pradesh	√	×
16.	Kerala	√	×
17.	Odisha	√	×
18.	Punjab	√	×
States/UT not having both common Secured landfill and common incinerator			
19.	Andaman & Nicobar	×	×
20.	Arunachal Pradesh	×	×
21.	Bihar	×	×
22.	Chandigarh	×	×
23.	Delhi	×	×
24.	Assam	×	×
25.	Sikkim	×	×
26.	Meghalaya	×	×
27.	Manipur	×	×
28.	Mizoram	×	×
29	Nagaland	×	×
30.	Tripura	×	×
31.	Jammu & Kashmir	×	×
32.	Lakshadweep	×	×
33.	Chhattisgarh	×	×
34.	Goa	×	×
35.	Puducherry	×	×

It may be seen from Table 14 above that common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) are available in 14 States/UT namely, Andhra Pradesh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal and Daman, Diu, Dadra and Nagar Haveli.

Further, 04 States namely Himachal Pradesh, Kerala, Odisha and Punjab have only common secured landfill and there is no common incinerator facility for disposal of HW.

The remaining 17 States/UTs (namely Andaman & Nicobar, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Puducherry, Sikkim, Tripura and Lakshadweep) do not have common TSDF.

6.2 FOLLOW UPS WITH CONCERNED DEPARTMENTS AND SPCBS/PCCS OF STATES/UTS NOT HAVING COMMON TSDF

Department of Environment and SPCB/PCC of all the aforesaid 17 States/UTs, not having common TSDFs, and the other 04 States having only common SLF and no common incinerator, were informed about the aforesaid orders of the Hon'ble Tribunal by CPCB vide letter dated 17.08.2018 and to take necessary action. Reminder letters dated 17.10.2018 were also issued to the above 21 Departments of Environment with copy to respective SPCB/PCC and Department of Industries of the said States/UTs, requesting to send action taken on compliance of the aforesaid orders.

With regard to setting up of TSDFs in three months, as ordered by the Hon'ble Tribunal, responses have been received only from 05 Department of Environment/Industries of States/UTs (namely Assam, Delhi, Lakshadweep, Sikkim and Jammu & Kashmir) and 06 SPCBs/PCCs (namely Delhi, Chhattisgarh, Goa, Jammu & Kashmir, Mizoram and Nagaland). Odisha SPCB also responded about setting up of common incinerator.

With regard to action taken on erring units, as ordered by the Hon'ble Tribunal, none of the 21 SPCBs/PCCs have responded on compliance of the same except Odisha SPCB.

Directions issued by CPCB prior to orders dated 30/7/2018 of the Hon'ble Tribunal

It is noted that CPCB had inspected 25 units in 05 States/UT namely, Assam, Chhattisgarh, Jammu & Kashmir, Goa and Puducherry among the States/UTs not having common TSDF. Various violations of HOWM Rules, 2016, were reported during the said inspections. Referring such violations, CPCB issued directions dated 12/06/2018 under section 5 of the Environment (Protection) Act, 1986, to the Department of Environment of 14 of the above 17 States/UTs, not having common HW TSDF (except[1] Andaman & Nicobar, Lakshadweep and Delhi):

(a) to submit time bound action plan for setting up common TSDF for disposal of non-recyclable/non-utilizable hazardous waste generated within the state/UT or making sharing arrangement with authorized common facility of other State/UT, and;

(b) in case the said action plan is not submitted by 15/07/2018 or the same is not found appropriate, CPCB would be constrained to direct SPCBs/PCCs to stop issuing authorization or renewal of authorization under the HOWM Rules, with immediate effect.

With regard to setting up of common TSDFs, 04 Departments of Environment of States namely Goa, Jammu & Kashmir, Mizoram and Puducherry and 09 SPCBs/PCCs of States namely Goa, Manipur, Chandigarh, Sikkim, Mizoram, Assam, Jammu & Kashmir, Puducherry and Tripura have responded to the directions issued under section 5 of Environment (Protection) Act, 1986. Besides, DPCC also responded about status of setting up of common TSDF.

Referring the said violations of HOWM Rules, 2016 observed during the inspections conducted by CPCB, the SPCB/PCC of the above 14 States/UTs, were also issued directions under section 5 of the Environment (Protection) Act, 1986, to close violating units reported in the aforesaid inspection reports and all other defaulting units by verifying hazardous waste storage vis-à-vis their generation as per raw material consumption/production data, levy penalty, bring entire categories of hazardous wastes being generated under the ambit of authorization, maintain daily records of HW generation and storage, maintain manifest document for movement of HW, display board outside the factory gate, etc.

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[1] *Directions to the remaining 03 States/UTs such as Andaman & Nicobar, Delhi and Lakshadweep were not issued by CPCB since Andaman & Nicobar and Lakshadweep had reported that there is no hazardous waste generating industry, and; Delhi Pollution Control Committee was already directed earlier with regard to non-grant of authorization and monitoring to setting up of common TSDF in Delhi by following up with DSIIDC.*

With regard to action taken on the defaulting units, 08 SPCBs/PCCs namely, Assam, Tripura, Puducherry, Manipur, Goa, Mizoram, Chhattisgarh and Chandigarh have informed about the status of action taken on defaulting units for non-compliances observed during the said inspections.

Compiled status of responses received from Departments of Environment and SPCBs/PCCs of respective State/UT with respect to the aforesaid orders of the Hon'ble Tribunal and directions issued by CPCB is given at Table 15 below;

Table 15: Status of responses received from Departments of Environment and SPCBs/PCCs on compliance of orders dated 30/7/2018 of the Hon'ble Tribunal

S.No	**States/UTs**	**Response received with regard to setting up of common TSDF**				**Response received from SPCB/PCC with regard to action taken on erring units**	
		W.r.t the Hon'ble NGT orders dated 30/07/2018		**w.r.t. to Directions dated 12/06/2018 issued by CPCB u/s 5 of E(P) Act, 1986**		**w.r.t the Hon'ble NGT orders dated 30/07/2018**	**w.r.t. to Directions dated 12/06/2018 issued by CPCB u/s 5 of E(P) Act, 1986**
		Dept of Envn	***SPCB/PCC***	***Dept of Envn***	***SPCB/PCC***	***SPCB/PCC***	
A.	**States/UTs not having common TSDFs**						
1.	Andaman & Nicobar	×	×	NA	NA	×	NA
2.	Arunachal Pradesh	×	×	×	×	×	×
3.	Bihar	×	×	×	×	×	×
4.	Chandigarh	×	×	×	√	×	√
5.	Delhi	√	√	NA	NA	×	NA
6.	Assam	√	×	×	√	×	√

7.	Sikkim	√	×	×	√	×	×
8.	Meghalaya	×	×	×	×	×	×
9.	Manipur	×	×	×	√	×	√
10.	Mizoram	×	√	√	√	×	√
11.	Nagaland	×	√	×	×	×	×
12.	Tripura	×	×	×	√	×	√
13.	Jammu & Kashmir	√	√	√	√	×	×
14.	Lakshadweep	√	×	NA	NA	×	NA
15.	Chhattisgarh	×	√	×	×	×	√
16.	Goa	×	√	√	√	×	√
17.	Puducherry	×	×	√	√	×	√
B.	**States having common secured landfill and no common incinerator**						
18.	Odisha	×	√	NA	NA	√	NA
19.	Himachal Pradesh	×	×	NA	NA	×	NA
20.	Kerala	×	×	NA	NA	×	NA
21.	Punjab	×	×	NA	NA	×	NA
√ - responded; × - Not responded; NA – Not Applicable as directions were not issued by CPCB							

6.3 STATUS OF SETTING UP OF TSDFS IN STATES NOT HAVING THE COMMON TSDFS

Status of setting up of common TSDFs based on the various information/responses received from SPCBs/PCCs and Governments of State/UT are as below:

(a) Only two SPCBs viz. Goa and Odisha have sent action plan for setting up of common TSDF specifying time period till its full operation.

Goa SPCB has informed that as on 16/8/2018, agency for setting up common TSDF (having both common Secured landfill and common incinerator) has been identified, Environmental Clearance has been obtained and CTE has been granted. Agreement or deed of lease is pending for approval with GIDC and Goa SPCB has informed that period of 18 months would be required for full operation of common TSDF from the date of signing of the said agreement or Deed of lease.

Odisha SPCB has informed that, as on 08/01/2019, project report for setting up of common incinerator has been prepared and applied for EC to MoEF&CC. TOR has been issued, public hearing was conducted on 06/11/2018 and proceedings of the same have been communicated to MoEF & CC. Odisha SPCB has informed that grant of EC is expected within 03 months and operation of the common HW incinerator is expected to start by end of September, 2019.

(b) Chandigarh PCC and Sikkim SPCB have informed that they are sharing common incinerator facility of UP and West Bengal

respectively. They also share common secured landfilling facility of Punjab and West Bengal respectively.

Puducherry has informed that landfillable and incinerable HW are disposed through the TSDFs in Karnataka as well as incinerator/co-processing facilities available in Karnataka and Tamilnadu.

(c) Assam PCB, Department of Environment of Govt. of Jammu & Kashmir and Chhattisgarh Environment Conservation Board have informed about the identification of the site but no action plan with time target has been submitted for commissioning of common TSDF at such sites. Chhattisgarh has informed that expression of interest has been floated for selecting the facility operator.

(d) Government of Delhi has informed that a site at Bawana, Delhi has been allotted to Delhi State Industrial and Infrastructure Development Corporation (DSIIDC). DSIIDC is in the process of finalizing bid for award of project at Bawana site.

(e) SPCBs of Manipur, Mizoram, Tripura and Nagaland have informed about communications being made with the respective State Governments. However, no action plan with time frame have been informed.

(f) Andaman & Nicobar and Lakshadweep have informed that there are no hazardous waste generating industries. However, it is expected that hazardous wastes such as hazardous chemicals or wastes contaminated cotton rags/containers, used lead acid batteries, used oil, ETP sludge, etc. may be generated from small scale units such as automobiles workshops/garages/etc. which require proper management.

Status of setting up of common TSDF in States/UTs not having common TSDF as compiled from information received from Departments of Environment and SPCB/PCCs of respective State/UT is given at Table 15 above.

Details of the above information, as received from the respective SPCB/PCC or State/UT Govt., are also given at **Annexure XVIII.**

6.4 STATUS OF ACTION TAKEN AGAINST ERRING UNITS BY SPCBS/PCCS

Status of action taken on erring units based on the various information/responses received from SPCBs/PCCs is as given below;

(a) Puducherry PCC has informed that two units reported violating during inspection by CPCB have been closed under Section 5 of Environment (Protection) Act, 1986.

(b) Chhattisgarh Environment Conservation Board, Goa SPCB and Assam PCB have informed that show cause notices were issued to the defaulting units. Further, Chhattisgarh ECB forwarded proposal of imposing financial penalty for the violation of provisions of HOWM Rules, 2016, as directed by CPCB, in case of 04 units inspected by CPCB and requisite approval has been granted by CPCB in this regard.

(c) Odisha SPCB has reported actions such as show-cause notices, suspension/refusal of authorization, imposition of financial penalty, bank guarantee etc. Details are given at **Annexure XIX**.

(d) Mizoram SPCB has informed that there is no HW generating industry in the state and most of the HW generators are small scale automobile repair industries.

(e) Chandigarh PCC has informed that verification of the defaulting units are under process. Tripura SPCB sought time to complete the exercise of verification of such defaulting units due to lack of technical manpower.

(f) Manipur PCB has informed that the hazardous waste generating units are mainly automobile workshops, garages generating used oils and lubricants and closed all the HW units operating without authorization.

6.5 OBSERVATIONS AND RECOMMENDATIONS WITH REGARD TO SETTING UP OF COMMON TSDFS

Observations

The Committee has reviewed information received from the various State Governments and SPCBs/PCCs vis-à-vis compliance of the Hon'ble NGT orders dated 30/07/2018 for setting up of common TSDFs within three months from date of the said orders and note that;

a) 17 States/UTs do not have common TSDF (common SLF or common incinerator) and 04 States do not have common incinerators. Of the said 21 States/UTs, Department of Environment or Department of Industries or SPCB/PCC of the following 11 States/UTs did not respond on action taken on compliance of the aforesaid orders of the Hon'ble Tribunal:

States/UTs who responded on orders of the Hon'ble Tribunal (1)	*States/UTs who did not respond on orders of the Hon'ble Tribunal (2)*
(i) Assam	*(i) Andaman & Nicobar*
(ii) Delhi	*(ii) Arunachal Pradesh*
(iii) Mizoram	*(iii) Bihar*
(iv) Nagaland	*(iv) Chandigarh*
(v) Jammu & Kashmir	*(v) Meghalaya*
(vi) Lakshadweep	*(vi) Manipur*
(vii) Chhattisgarh	*(vii) Tripura*
(viii) Goa	*(viii) Puducherry*
(ix) Odisha	*(ix) Himachal Pradesh*
(x) Sikkim	*(x) Kerala*
	(xi) Punjab

(b) Based on responses received from the above 10 States/UT listed in column (1) and responses received from 04 States/UTs of the 11 States/UTs listed in column (2) above as follow up of CPCB directions dated 12/6/2018 issued prior to the Hon'ble Tribunal orders dated 30/7/2018 and other communications, status of

setting up/sharing of common TSDF of 16 of the 21 States/UTs not having common SLF and common incinerator is as below:

(i) Only State of Goa and Odisha have sent action plan for setting up of common TSDF specifying time period till its full operation. However, the same is not as per the orders of the Hon'ble NGT i.e. setting up of TSDF within three months.

(ii) Chandigarh PCC and Sikkim SPCB have informed that they are sharing common incinerator facility of UP and West Bengal respectively. They also share common secured landfilling facility of Punjab and West Bengal respectively.

(iii) Puducherry has made sharing arrangement with Karnataka and Tamilnadu.

(iv) Bihar has a sharing arrangement only for incinerable hazardous waste in UP.

(v) Assam PCB, Department of Environment of Govt. of Jammu & Kashmir and Chhattisgarh Environment Conservation Board have informed about the identification of the site but no action plan with time target has been submitted for commissioning of common TSDF at such sites. Chhattisgarh has informed that expression of interest has been floated for selecting the facility operator.

(vi) SPCBs of Manipur, Mizoram, Tripura and Nagaland have informed about communications being made with the respective State Governments.

(vii) Andaman & Nicobar and Lakshadweep have informed that there are no hazardous waste generating industries.

(viii) Delhi has identified land for setting up of common TSDF at Bawana site and has also invited Expression of Interest for selecting the facility operator.

It is noted that common TSDF has not yet been commissioned in Delhi despite deadline of two years set up by the Hon'ble NGT vide orders dated 23/07/2015 in the matter of Balam Singh Rawat vs Govt. of NCT of Delhi & Ors.

Recommendations

(a) The committee, therefore, recommend that the above status of compliance of the Hon'ble Tribunal orders dated 30/7/2018 may be brought to the notice of the Hon'ble Tribunal for suitable directions in this regard.

(b) Of 21 States under the review, only states of Goa and Odisha have submitted time bound action plan, though it does not conform to to NGT directed 03 months timeframe. All other states have not submitted any time bound action plan for setting up common TSDF.

(c) Alternate to setting up of own common TSDFs in each State/UT, sharing arrangement with State/UT having common TSDF may also be considered or co-processing in cement. However,

allowing sharing of common TSDF to other States/UTs will depend upon decisions of the States/UTs having common TSDFs.

(d) *In view of the smaller quantities of Hazardous Wastes expected in the North-Eastern States along with the topographical factors the Committee is of the opinion that, in case of North Eastern States, Chief Secretaries of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Tripura and Nagaland, with intervention of the Ministry of Development of North Eastern Region, may co-ordinate with Govt. of Assam for sharing proposed common TSDF of Assam, while Sikkim may share common TSDF of West Bengal. They may also explore (co-processing of HW) with cement plant operators in Meghalaya.*

(e) *The States/UTs viz. Andaman & Nicobar, and Lakshadweep not having hazardous waste generating industrial unit, shall prepare inventory of various hazardous waste generation (hazardous chemicals or waste contaminated cotton rags/liners/containers, ETP sludge, Used oil/Waste oils etc.) from automobile service centres/workshops/garages etc. in the State/UT and develop an action plan for managing the same. The State can seek suitable technical assistance from CPCB if required. This work need to be completed on priority within two months.*

6.6 OBSERVATIONS AND RECOMMENDATIONS WITH REGARD TO IMITATING ACTION TAKEN AGAINST ERRING UNITS:

Observations

The Committee has also reviewed submissions and the information received from the various SPCBs/PCCs on compliance of the Hon'ble NGT orders dated 30/07/2018 with regard to taking imitating action against the erring units and note that;

a) *Of the 21 States/UTs not having common TSDF (common SLF or common incinerator) and common incinerators, only Odisha SPCB has responded on imitating action taken against erring units in compliance to the aforesaid orders of the Hon'ble Tribunal, as detailed below.*

(b) *Directions dated 12/06/2018 were also issued by CPCB under section 5 of the Environment (Protection) Act, 1986, to SPCBs/PCCs with regard to closure of violating units, levying of penalty, maintenance of records and returns, etc., as has been mentioned in section 2 of this report, prior to orders dated 30/7/2018 of the Hon'ble Tribunal. Based on responses received from the Odisha SPCB and the other 08 States/UTs (namely Goa, Assam, Jammu & Kashmir, Delhi, Nagaland, Lakshadweep, Chandigarh, Chhattisgarh) who responded to the said directions dated 12/06/2018 issued by CPCB, status of action taken on erring units by 09 SPCBs/PCC is as below:*

(i) *Only Odisha SPCB has taken actions on defaulting units such as show-cause notices, suspension/refusal of authorization, imposition of financial penalty, bank guarantee, etc. (details given at* **Annexure XIX***).*

(ii) Only few SPCBs/PCC namely Assam PCB, Chhattisgarh Environment Conservation Board, Goa SPCB and Puducherry PCC have taken action on the erring units limited to such units where violations were reported by CPCB.

(iii) Chandigarh PCC has informed that verification of the defaulting units is under process.

(iv) Tripura SPCB sought time to complete the exercise of verification of such defaulting units due to lack of technical manpower.

(v) Manipur and Mizoram SPCB have informed that there are no HW generating industries in the state and most of the HW generators are small scale automobile repair industries. Further Manipur has informed that all the HW units operating without authorization were closed.

Recommendations

The Committee, therefore, recommends that the above status may be brought to the notice of the Hon'ble Tribunal for suitable directions in this regard except Odisha SPCB with regard to taking imitating actions against erring units.

CHAPTER 7

SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

The committee has reviewed various aspects of enforcement of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, for its effective compliance and enforcement. Though, this report is primarily an interim report, the committee thought it necessary to summarise its observations on the issues dealt so far and also, suggest necessary corrective actions for the consideration of the Hon'ble Tribunal to issue suitable directions, if necessary.

Sr No.	Observations	Proposed Actions (Responsible Agency and timeline of action)
1.	**Hazardous waste identification: - Uniformity in assessment, By-products and solvents (Details in Chapter 4 – Section 4.1.1)** a. The Rules define by-products very categorically linking it to its intended use. Presently, there is no verification or appraisal of such continuous intended use before classifying certain waste as a by-product. There is a need for SOP/guidelines for identification of by-products based on the manufacturing process as well as intended use. b. Applicability of various clauses of the HW Rules to the 'other waste' also needs to be defined clearly in the Rules itself. c. Presently, there is hardly any scientific examination or scrutiny for identification and quantification of HW prior to grant of authorisation. d. The HW Rules basically focuses on a close loop approach for the HW Management which is reflected in the adoption of manifest system in order to ensure that the HW movement is continuously tracked till its final disposal (Cradle to Grave approach). e. However, in case of spent solvent sent for solvent recovery, such manifest system seems to be ending at the door step of the spent solvent recycler. It would be advisable to continue this manifest system right upto the actual user of such recovered solvent from solvent recovery plant to ensure appropriate regulation of spent solvent plant performance and appropriate accounting and use of recovered solvent. The similar approach is also	1. There is a need to urgently prepare a guidelines or protocol on how to decide the by-product on specific criteria. This can be done based on chemical process involved in order to bring consistency in approach. *(MoEF&CC and CPCB: 06 months)* 2. Other waste is presently missing from all the regulatory actions, including inventory. It is necessary to bring such waste in regulatory domain, as envisaged in the rules. *(SPCBs/PCCs: inventory of 2018-19 onwards)* 3. SPCBs/PCCs need to take steps to ensure closing of the manifests received and reconcile the HW handling data. This work is humungous and need support in terms of software and online submissions. *(SPCBs/PCCs)* 4. Pan India IT based solution is suggested for tracking HW. Such integrated data handling and management solution is under implementation by CPCB which the committee would like to review in next phase. 5. The pre-processing and recycling/utilisation facilities need to be treated as critical environmental infrastructure facilities for sound environmental management of hazardous waste so as to ensure enhanced level and frequency of enforcement and environmental monitoring. Elaborate protocols are needed to be developed. *(SPCBs/PCCs: continuous activity).* 6. According to Rules, the identification and quantification of the hazardous waste generation is to be done at the authorisation stage itself and therefore, it is necessary that SPCBs shall adopt the scientific principles as enumerated for such identification and quantification of HW.

	required to be adopted in all cases of recycling/recovery/ utilisation such as used oil, waste oil, lead scrap, spent acid, spent catalyst, etc.	(SPCB/PCCs: Immediate)
2.	**Grant of Authorisation by SPCBs/PCCs (Details in Chapter 4 – Section 4.1.2)** a. The Rules stipulates requirement of enclosing field inspection report while granting authorisation b. The committee observed that only in few cases the SPCBs are enclosing the said field inspection report alongwith authorisation granted. c. Further, such filed inspection report lacks details w.r.t to adequacy of the facilities on storage, transportation, treatment, recycling/utilisation, disposal, etc.	1. Uniform format for visits and inspections of HW handling facilities is necessary to ensure comprehensive inspections as per the provisions of the Rules. A format is proposed by the Committee which is given at **Annexure XV.** 2. The authorisation document should clearly stipulate respective mode of management (such as common or captive incineration/secured landfilling or pre-processing or recycling or utilization or export or captive storage, as applicable) for each category of HW being generated. *(SPCB/PCCs: immediate)*
3.	**Inventory (Details in Chapter 4 – Section 4.2)** a. Inventories are based on reporting by the generators/occupiers through annual report as well as authorisation. b. The inventory data do not cover all the industries who have been granted authorisation. It also does not cover the hazardous waste from domestic sources, interstate movement, import/export of hazardous waste, and other waste. c. The inventories are not verified and validated based on the scientific principles by the State Pollution Control Boards/Pollution Control Committees (SPCBs/PCCs). d. There is a substantial variation in the quantity declared in the authorisation and actual quantity of hazardous waste generation declared in the annual report. e. Quantities reported in the captive utilisation of hazardous waste appear to be on higher side and are not verified. f. There are no standard protocol/guidelines for preparation of HW inventory based on sound scientific principles and approach which is a basic necessity to ensure uniform and consistent preparation of HW inventory by different SPCBs/PCCs.	1. Standard guidelines and protocol based on scientific fundamentals for preparation of inventory should be prepared by CPCB and strictly followed by the SPCBs/PCCs to ensure reliable and credible inventory. *(SPCBs/PCCs and CPCB/: inventory of 2018-19 onwards)* 2. SPCBs/PCCs shall verify and scientifically validate the HW data and facilities before grant or renewal of authorisation. *(SPCBs/PCCs: inventory of 2018-19 onwards)* 3. There is an emergent need to develop sectoral process based reasonable HW generation range to have uniformity in assessing the HW generation from industries and benchmarking the same with its peers, rather than solely depending on industry data. *(SPCBs/PCCs: continuous activity)* 4. All occupiers who have authorisations shall submit the Annual report and in case of non-compliance, action needs to be taken by SPCB/PCC. *(SPCBs/PCCs: inventory of 2018-19 onwards)* 5. The timelines for inventory preparation as envisaged in Rules be strictly complied with by SPCBs/PCCs. Preparation of country's inventory by CPCB is dependent on such timely submission by SPCBs/PCCS. *(SPCBs/PCCs and CPCB)*
4.	**Enforcement actions. (Details in Chapter 5)** a. Though there have been several	1. SPCBs/PCCs shall invoke the powers conferred under clause 23 (1) and (2) of the Rules, related to all damages caused to the environment or third

	incidents on record of non-compliance of HW Regulations resulting in discharge of HW in environment, the powers vested with the CPCB/SPCBs/PCCs for recovering environmental damages under Rules 23(1) has not been invoked. b. Only three States namely Maharashtra, Telangana and Madhya Pradesh have reported prosecution actions under Section 15 of EP Act, 1986. c. There are hardly few cases where the SPCBs/PCCs have invoked provisions related to revocation and/or refusal of authorisation in view of the observed non-compliances. d. Inspection report, mostly is not attached along with the authorisation granted. Wherever inspection reports have been attached such reports lack in required information for appraisal.	party due to improper handling and management of the hazardous and other wastes, and non-compliance respectively. CPCB has already issued guidelines for Liability assessment, for invoking clause 23(1) and (2) of HW Rules. CPCB shall also take consequential actions under clause 23 (1) as per the said guidelines wherever directions under section 5 of the E(P) Act have been issued by CPCB, noticing environmental damages. *(SPCBs/PCCs and CPCB: Immediate).* 2. The habitual and serious defaulters shall be prosecuted under provisions of the Environment (Protection) Act, 1986. Other alternative regulatory actions including refusal and revocation of Authorisation can also be explored following the due process. *(SPCBs/PCCs: Immediate)* 3. Non-compliance to be documented while processing authorisation for renewal or inspections in order to invoke powers of refusal or revocation of Authorisation as per Rules. *(SPCBs/PCCs: Immediate)* 4. Urgent updation of concerned websites of SPCBs/PCCs/CPCB with respect to all enforcement actions along with details of industries and action taken. *(SPCBs/PCCs/ CPCB: Immediate)* 5. There is need to have an enforcement framework for effective enforcement of Rules based on principle of proportionality and also, precautionary principle. Such framework will remove ambiguity in regulatory actions and bring transparency, predictability and consistency in enforcement for actions. *(SPCBs/PCCs/CPCB: within 06 months)*
5.	**Hazardous waste utilisation and recycle. Issues and need of improvements (Details in Chapter 4 – Section 4.3)** a. The inventory data shows skewed variation in utilisation of HW pattern among different States. For example in Gujarat about 36 % of the HW generated is either recycled or utilised, whereas in Maharashtra 0.98 % HW generated is recycled and utilised. b. Maharashtra is not authorising and promoting the co-processing which is one of the major option of utilisation of HW, although the HW Rules provided hierarchy of waste management promoting recycle and utilisation of the HW. There is a need to have a consistent and scientific approach to promote the HW recycle and reuse in consonance of the objective of the	1. The inventory data needs to be verified and validated before accepting the same. The states shall adopt the proposed guidelines immediately while preparation of HW inventory. *(SPCBs/PCCs: Immediate)* 2. There is emergent need of consistent approach in recycle and utilisation of HW in terms waste management hierarchy mandated in the rules across all the States in order to ensure the level playing field for the industry. This can be achieved by advocacy programme such as concept of waste exchange banks, know your waste programme, circular economy, documentation of the success stories along with regulatory interventions wherever required. (SPCBs/PCCs) 3. It is also necessary to develop certain benchmarks/guidelines for the possibilities of HW recycle/utilisation

	HW Rules expressed in terms of hierarchy, throughout the country. c. There are certain environmental risks associated with the recycle and utilisation of the HW in case of non-compliance. It is therefore necessary that such recycle and utilisation of HW is strictly regulated in terms of the performance of such recycle and utilisation. d. There is need to immediately prepare guidelines for high volume low impact waste like slags from pyrometallurgical operations, fly ash, red mud, Jarosite, mine tailings and ore beneficiation rejects. e. More clarity is required on the application of Rule 9 particularly in case of captive utilisation. Presently, it is very difficult for SPCB/PCC field staff to investigate and analyse such claims of industry. Therefore, presently, the data given by industry is relied upon in totality. f. The pre-processing facilities collect the HW from different industries and carry out the homogenization/blending activities to achieve the required calorific value and other desired specification for co-processing. As this industry sector indulge in handling the wide range of wastes from different industries, it would be prudent to have improved enforcement regime in terms of number of inspections, detailing of inspection, environmental monitoring and reporting of waste receive/disposed etc. on the lines of common facilities.	on case to case basis. For example, for co-processing at Cement plants the Thermal Substitution Ratio (TSR) can be an objective criterion to decide the potential to use HW for utilisation purpose. The range of TSR at different cement plants can be collated to develop a database for sound co-processing practices. *(SPCBs/PCCs)* 4. The concept of environmental benchmarking among the similar industries generating HW can be useful to ensure consistency and uniformity. The emerging trend of circular economy would be a key intervention for rationalising the HW generation and reuse/utilisation (*SPCBs/PCCs: continuous activity)*
6.	**Common Treatment, Storage and Disposal facilities: reporting. (Details in Chapter 4 – Section 4.5)** a. The Committee has observed that in some cases the TSDF rejects the consignment received from the waste generator for non-compliance of acceptance criteria. This consignment is returned back to the waste generator. b. The site selection criteria, design and layout are the critical parameters for establishment of the TSDF. In addition, waste storage, stabilisation, landfilling, incineration and leachate management are critical operations. The committee has observed non-compliance of these guidelines For example TSDF at Balotra, Roorkee, Kanpur, etc.	1. The practice of returning the HW consignment needs to be immediately stopped and the consignment needs to be stored within the TSDF with information to the waste generator and also the concerned SPCB. The TSDF shall take appropriate measures to dispose this waste at the risk and cost of the waste generator under due information to the SPCB immediately on priority. Though the present guidelines prescribed that the waste shall be sent back to the waste generators, this practice needs to be immediately discontinued in view of non-accounting of the waste once it is out of manifest protocol and the associated environmental risks. (*SPCBs/PCCs/TSDFs: immediate)* 2. SPCBs/PCCs shall conduct environmental audit including the site selection criteria, design and layout for

	c. Of 18 SPCBs/PCCs having common secured landfills, 06 SPCBs have still not opened Escrow Account provision for post-closure monitoring of common SLF. d. Compliance of the Hon'ble NGT orders dated 30/07/2018 with regard to setting of TSDFs and taking imitating actions against erring units- Only Goa and Odisha have submitted action plan with timeframe for setting of Common SLF + Incinerator and Common Incinerator respectively. Only Odisha has taken action against erring units.	the TSDFs in next one year. They can engage expert institutes for the purpose and seek CPCB's technical advice on the ToR of the study, if required. *(SPCBs/PCCs: 01 year)* 3. All the Common SLF shall disclose the mandatory amount deposited in Escrow Account annually to SPCB/PCC, CPCB and display on their website. SPCB/PCC to take action in case of non-compliance. *(SPCBs/PCCs: immediate)* 4. It is necessary that the Hon'ble NGT orders dated 30/07/2018 with regard to setting up of TSDF and taking imitate actions against erring units be strictly complied with by the concerned State/UT Government and SPCBs/PCCs. *(State/UT Governments and SPCBs/PCCs: immediate)*
7.	**Contaminated sites: Status, identification, need of urgent action, investment, capacity building, guidelines. (Details in Chapter 4 – Section 4.7)** The Committee has initiated work on monitoring of direction of the Hon'ble Supreme Court with regard to contaminated site WP 657/1995 and has discussed the matter with SPCBs/PCCs/CPCB and the petitioner Shri Sanjay Parikh, Adv. The Committee recognised the monitoring of this aspect has a large scope and the committee intends to focus on this specific issue in coming days. In the mean-time committee has made following preliminary observations and record the need of immediate interventions. a. MoEF&CC/CPCB have identified total 329 potentially hazardous waste contaminated sites and subjected them for screening based on verification by the SPCBs. After the verification by SPCBs, the total 144 sites have been identified as contaminated sites and 57 sites are still under evaluation. The Committee is of the opinion that the identification of the contaminated sites is an elaborate process involving objective criteria and standard protocols. It is expected that SPCBs and CPCB shall follow such objective criteria and standard protocol to identify the contaminated sites and also to assess their scope and extent of	1. It is necessary that such contaminated site database is developed after due verification by SPCBs/PCCs and validation by CPCB or some expert third party, so as to ensure the reliability of such data base. The entire process of screening, verification and validation needs to be as per standard protocol and the data needs to be owned by both SPCB/PCC and CPCB, not leaving the things at state level alone. *(SPCBs/PCCs/CPCB: continuous activity)* 2. CPCB should update national priority list of such confirmed contaminated sites. *(CPCB: continuous activity)* 3. Concerned SPCBs/PCCs shall identify the responsible person/industry, for each of these contaminated sites for suitable application for polluter pays principle for the remediation programme in line with the CPCB guidelines 'Implementing Liabilities for Environmental Damages & Disposal of Hazardous Waste and Penalty'. *(SPCBs/PCCs: Immediate and continuous activity)* 4. Both SPCBs and CPCB shall continue the process of identification of probable contaminated sites and subject them to identification criteria and decide their status as well as scope and extent of such contamination. This process is a dynamic and need to be a regular feature of enforcement. *(SPCBs/PCCs and CPCB: continuous activity)* 5. In case of the contaminated sites

	contamination. b. Out of 144 identified contaminated sites, CPCB has prioritised 8 sites for which DPR for assessment and remediation has been prepared. However, there is an urgent need to execute this remediation plan on top priority. The Committee has been informed that the required financial resources for such remediation have not been mobilised so far. c. There is a change in number of such identified sites over the period which could be due to listing/ delisting of probable contaminated sites as a result of increased enforcement and monitoring activities, and variations in criteria.	where the polluter is not identified, the State/UT Government would be required to finance remediation of such sites to safeguard the people living in contaminated areas from adverse health effects, in terms of their constitutional responsibility to protect and improve the environment. *(States/UTs Government and SPCBs/PCCs)* 6. SPCBs/PCCs need to initiate immediate intervention measures for containing immediate threats from existing contaminated sites (in both active and inactive sites) and also further ingress of HW. *(SPCBs/PCCs: immediate)*
8.	**Impact of other regulations (Details in Chapter 4 – Section 4.2)** The committee notes that HW resulting from enforcement of other regulations like E-waste, SW rules etc are presently not accounted in the HW management plans under HW rules. Committee finds a need to consider impact of other regulations while planning HW management including preparation of inventory and assessing the impacts. a. As per E-waste regulation, in case of fluorescent and other mercury containing lamp where recyclers are not available, such waste is channelized to common TSDF for disposal after pre-treatment/immobilization of mercury. Such waste should also be accounted into HW inventorisation. b. In case of solid waste rules, there is a separate category of domestic HW which is expected to be disposed in the Common Hazardous facility, however, there is no data or information available on the quantity and quality of such domestic HW available so far.	SPCBs/PCCs and CPCB need to take cognizance of these aspects while enforcing the relevant rules and also, preparation of HW inventory and other interventions. *(SPCBs/PCCs and CPCB)*
9.	**Import and export. (Details in Chapter 4 – Section 4.6)** a. Harmonization of Basel codes with ITC (HS codes): The Ministry (MOEF) provides permission on the basis of Basel codes while DGFT uses HS codes. There is a need to synchronize the two codes to avoid confusion. b. Risk management assessment: The customs authorities use the risk	Committee would deliberate on this issue further for making detailed recommendations. Still however, following recommendations on co-ordination and data management are made; 1. There is need to synchronise Basel code and HS codes to cover all scheduled items as per HW rules in customs verification and control more effectively. *(MoEF&CC, Custom and Port*

	management system (RMS) to enable low risk consignments to be cleared based on the acceptance of the importer's self-assessment and without examination. Roughly 30 percent of containers covered under risk management out of which 10 percent are physically verified. There are different types of waste streams which have not been integrated in the RMS. There is a need to review the import/export data of various waste streams and include them in RMS. Further, waste streams in Schedule III – Parts A, B and D and Schedule VI that are often mis-declared by importers need to be identified and added to the RMS. c. Collaboration between regulating authorities: Regular interaction between the Ministry of Environment, Forest and Climate Change, CPCB, SPCBs/PCCs, customs and ports authorities should take place with frequent consultative meetings and trainings in order to avoid working in silos.	*Authorities)* 2. CAG has come out with details of illegal HW import and its storage in ports and ICDs. This needs to be verified on priority and action be taken for disposal of the same in terms of earlier orders of Hon'ble Supreme Court. *(Custom and Port Authorities)* *3.* Improve traceability of importers: The Customs authorities could make the registration process of importers more stringent as there have been cases where importers have never been able to be traced when their illegal imports were intercepted *(MoEF&CC, DGFT, Custom and Port authorities)*
10.	**Capacity building in CPCB and SPCBs/PCCs and other agencies (trained adequate manpower, laboratory, budget) (Details in Chapter 4 – Section 4.7 and 4.8)**	1. Each of the SPCBs/PCCs/Custom/TSDF, as listed in report, need to have at least one laboratory where all HW parameters as required under the Rules can be analysed. *(SPCBs/PCCs/Custom/TSDF: 06 months)* 2. Capacity building in SPCBs/PCCs for rapid preliminary assessment of contaminated sites, which may include practical training on use of tools for soil and groundwater screening such as hand-held XRF instruments, Colorimeter, PID for VOCs/ SVOCs, hand operated augers, groundwater pumps, level meters, etc. *(CPCB: 06 months)* 3. SPCBs/PCCs and CPCB needs capacity building in terms of qualified and experienced manpower and also, tools and techniques for effective governance. Committee is informed about steps being taken by SPCBs and would review the same in detail. *(MoEF&CC, State/UT Government, CPCB and SPCBs / PCCs: Immediate)*
11.	**Duties performed by State/UT Govt. as stipulated under the HOWM Rules, 2016** **(Details in Chapter 5)** The State Govts. have been entrusted with duties of authorising Dept. of Industry/other Govt. agency and	1. There is need to sensitize State/UT Govts. about duties required to be performed by the concerned department/agency as stipulated under Rule 5(1), 5(2), 5(3) and Schedule VII of the HOWM Rules, 2016. Hon'ble NGT may issue appropriate directions in this regard.

	Dept. of Labour/other Govt. agency with regard to allocation/earmarking of industrial space, recognition/ registration/ health & safety/etc. of workers involved in recycling/ pre-processing/ other utilization activities of HW and submission of integrated plan under Rule 5(1), (2) and (3) respectively: The State Govt. has also been entrusted with duties of identification and notification of sites for common TSDF and publishing periodically inventory of disposal sites as stipulated under Schedule VII of the HOWM Rules, 2016. It has been observed that actions have not been taken on the above (except identification and notification for common TSDFs in few States) by the State/UT Govt. and there is lack of awareness among them in this regard.	*(All State/ UT Govts.: Immediate)*

BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI

ANNEXURE-I

Original Application No. 804/2017
(M.A. No. 651/2018)
(Earlier OA No. 36/2012)

IN THE MATTER OF:

Rajiv Naryana & Anr. Vs. Union of India & Ors.

CORAM : HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE DR. JUSTICE JAWAD RAHIM, JUDICIAL MEMBER
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Present:

Applicant

Mr. Raj Panjwani, Sr. Adv., Mr. Rahul Choudhary and Ms. Meera Gopal, Advs.

Respondents:

Mr. B.V. Niren and Mr. Kshitij Mudgal, Advs. for CGWA
Mr. Raj Kumar, Adv. for CPCB
Mr. Vikas Malhotra, Adv. for Ministry of Environment, Forest and Climate Change
Mr. Amit Tiwari, Adv.
Mr. Mukesh Verma, Adv. for UPPCB
Mr. Tarunvir Singh Khehar, Ms. Guneet Khehar and Mr. Sandeep Mishra, Advs. for GNCTD
Mr. Rahul Verma and Mr. Ankit Verma, AAG for State of Uttarakhand
Mr. Sandeep Mishra, Adv. and Mr. Dinesh Jindal, LO, Delhi Pollution Control Committee
Mr. Shiv Mnagal Sharma, Mr. Saurabh Rajpal, Mr. Adhiraj Singh and Mr. Vikramjeet Singh, Advs. for State of Rajasthan/RSPCB
Mr. Anil Grover, AAG & Mr. Rahul Khurana and Mr. Mishal Vij, Advs. for State of Haryana & HSPCB
Mr. Naveen Kumar and Mr. Prabhat Kumar, Advs. for M/s. Rathi Steel & Power Ltd.
Mr. Manish Kumar, Adv. for State of HP
Mr. Balendu Shekhar, Mr. Sriansh Prakash and Mr. Rajkumar Maurya, Advs.
Mr. Pradeep Misra and Mr. Daleep Dhyani, Advs.
Mr. Amit Tiwari, Adv for State of Uttar Pradesh
Mr. Dinesh Jindal, LO, DPCC

	Date and Remarks	Orders of the Tribunal
	Item No. 07 **July 30, 2018** **ss**	1. The Original Application No. 36 of 2012 was filed seeking action for non-compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The said application was disposed of on 25th October, 2017, with a direction that an independent application may be filed in relation to management of bio-medical hazardous wastes. The States may file their status reports, if not already filed. The status report was to be filed with respect to the directions already issued on dated 29th August, 2017, with respect to following: *"1. As to what is the total generation of hazardous waste in their respective States.* *2. Which agencies have been authorized in terms*

	Item No. 07 **July 30, 2018** **ss**	*of rules to collect, transport, disposed of and the process of the hazardous wastes.* *3. What is the capacity of the plants which have been given due authorization for that purpose.* *4. What happens and how the remnant hazardous waste is being dealt with.* *5. The members who have been allotted any of the authorized plants and are not sending hazardous waste to those plants. What action the concerned authorities i.e. the State Government and the respective States and State Pollution Control Boards have taken so far, against such members.* *These details should be filed within one week from today."* 2. The matter was thereafter registered as Original Application No. 804 of 2017. On 15th January, 2018, this Tribunal considered the report of the joint inspection team dated 12th December, 2017. The Tribunal noted that M/s. Rathi Steel was abstracting water through borewell without authorisation. The Rathi Steel was required to respond and the Central Ground Water Authority was directed to dispose of the pending application of M/s. Rathi Steel. 3. Thereafter, the States of Uttar Pradesh, Rajasthan, Haryana, Delhi and Uttarakhand have filed their respective status reports which have been subject matter of consideration before this Tribunal on several earlier hearings. Today, we propose to dispose of the matter of consideration of the said reports. 4. First of all we have taken up for consideration the latest status report filed by the State of Haryana on 07th September, 2017. The report states that there is only one Common Treatment, Storage and Disposal Facility (CTSDF) in district Faridabad. The CTSDF has been authorized to process 50000 MTA Hazardous Waste for

	Item No. 07 **July 30, 2018** **ss**	Processing as fuel in Cement Industries. Apart from the said facility, 108 units have been authorised to process recyclable hazardous waste. The capacity of secured landfill for hazardous waste is 32 years and incineration capacity is 7040 MTA. Learned counsel for the State of Haryana states that the units which were found to be non-compliant have been closed. 5. The stand of the State of Uttar Pradesh is that 1835 units are operating as on 13th September, 2017, and all the said units are complying with the rules. 6. The stand of the State of Rajasthan is that 35 units are violating the rules for which Show Cause Notice had been issued, but no action has been taken as on 21st September, 2017. 7. The stand of the NCT Delhi is that 1100 units are operating as on 23rd March, 2018. All the 1100 units are operating without complying with the rules. 8. The stand of the State of Uttarakhand is in the status report filed on 06th March, 2018 is that directions have been issued for closure of 5 units and the other units were found to be compliant with the rules. 9. The stand of Central Pollution Control Board is that it has no role to play as action under the rules is to be taken by the State Boards. 10. The question which arises for consideration is whether the Central Pollution Control Board and the State Pollution Control Boards have performed their duties. Rules 20 of the rules requires returns to be filed by the occupiers handing hazardous and other wastes. The State

	Item No. 07 **July 30, 2018** **ss**	Pollution Control Boards have to submit report by 30th September every year to the Central Pollution Control Board. The Central Pollution Control Board has to prepare a consolidated review report every year. There is nothing to indicate that Central Pollution Control Board has prepared such reports, as no affidavit have been filed by the Central Pollution Control Board though the Central Pollution Control Board is party to the proceedings. 11. From the information furnished by the Delhi Pollution Control Committee, it is patent that there is flagrant violation of the rules and hazardous waste is being generated for which no action is being taken. Rule 7 permits suspension and cancellation of authorization and if there is no authorization the same is certainly in violation of Environment (Protection) Act, 1986 for which action can be taken apart from action for violation of Rule 8 and 9. The Central Government as well as the Central Pollution Control Board under section 18 of the Water (Prevention and Control of Pollution) Act can direct the State Boards to take action and in default can take over the State Board. Action can also be taken under rule 23 for recovering the financial penalty for violation of the rules. Needless to say that those units which are found to be non-compliant must be forthwith closed, apart from action taken and not allowed to operate till they become compliant. 12. We accordingly direct as follows:- (i) All the States, where the hazardous waste is being generated must set up Treatment, Storage and Disposal Facility (TSDF) facility of adequate

	Item No. 07 **July 30, 2018** **ss**	capacity at appropriate locations within three months from today and forthwith imitate action against erring units. (ii) Central Government and Central Pollution Control Board must forthwith monitor the compliance of the rules by reviewing the need for action in all the states. (iii) The Central Pollution Control Board may forthwith constitute a monitoring Committee for the purpose it may appoint a Nodal Officer exclusively to oversee the compliance of the rules. The Member Secretary CPCB may act as a Nodal Officer till a substitute is found. The action taken must be placed on the website of the Central Pollution Control Board within 3 months from today. Compliance report be filed before this Tribunal on or before 30th November, 2018, which will be treated as a separate application. The application stands disposed of. ....., CP (Adarsh Kumar Goel) ....., JM (Dr. Jawad Rahim) .....,JM (S.P. Wangdi) .....,EM (Dr. Nagin Nanda) 30.07.2018

ANNEXURE-II

Item No. 08 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

M.A. No. 1302/2018
IN
Interlocutory Application No. 63
in W.P. (C) No. 657/1995

The Research Foundation for Science, Technology and Natural Resource Policy — Applicant(s)

Versus

Union of India & Ors. — Respondent(s)

Date of hearing: 05.12.2018

CORAM: **HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON**
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Applicant(s): Mr. Sanjay Parikh, Mr. Ritwik Parikh and Ms. Sanjana Srikumar, Advocates

For Respondents (s): Mr. Pradeep Misra, Advocate for UPPCB
Mr. Mukesh Verma, Advocate for MPCB and UEPPCB

ORDER

1. Vide the order dated 30.07.2018 in *Original Application No. 804/2017, Rajiv Naryana & Anr. Vs. Union of India & Ors.*, this Tribunal directed Central Pollution Control Board (CPCB) to constitute a Monitoring Committee with a view to ensure compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

2. Accordingly, the CPCB constituted a Monitoring Committee vide order dated 09.08.2018 headed by Dr. Ajay A. Deshpande, former Expert Member, National Green Tribunal and comprising six other experts on the subject viz.

   i. Dr. A. N. Vaidya, Chief Scientist & Head, Solid and Hazardous Waste Management Division, National

Environmental Engineering Research Institute (NEERI), Nagpur – Member

ii. Dr. D. C. Sharma, Prof. Department of Civil Engineering, Raja Rajeswari Group of Institutions (Former Additional Director, CPCB) Bangaluru – Member

iii. Dr. A. Manoharan, Former Senior Scientist, CPCB, Chennai – Member

iv. Member Secretary, Gujarat Pollution Control Board – Member

v. Dr. Sonu Singh, Sc D., HSM Division, MoEF&CC – Member

vi. Sh. Bharat K Sharma, Scientist 'E', WM-II Division and Nodal Officer, CPCB, Delhi – Member Convenor.

3. The Committee has held several meetings, conduced field visits, interacted with all the State Pollution Control Boards and Committees and interacted with the TSDF operators.

4. The Committee has sought time and has been granted further time to complete its work.

5. The present matter has been received by transfer from the Hon'ble Supreme Court of India, after judgment reported in *(2012) 7 SCC 769*, directing ban on import of all hazardous/toxic wastes. This was sequel to the earlier judgment in *(2005) 10 SCC 510*. The applicant sought further direction for implementation of the judgment dated 06.07.2012 which aspect was transferred to this Tribunal.

6. We direct that the issue of implementation of judgement of the Hon'ble Supreme Court dated 06.07.2012, referred to above may also be considered by the Monitoring Committee. It will be open to the applicant to furnish any further documents to the Chairman of the Monitoring Committee through CPCB. The CPCB will be at liberty to consider involving any other expert on the subject.

7. Though learned counsel has handed over a list of documents which should be forwarded to the monitoring committee, instead of Tribunal considering the said list, the applicant is at liberty to furnish the same for consideration by the CPCB.

8. The Monitoring Committee will be at liberty to take further time, if necessary for completing its assigned job. Needless to say that the suggestion of remediation of contaminated sites, capacities of the landfill sites, issue of leachate, cleaner technology, sign boards etc. may also be examined by the Committee.

9. The Committee will also be at liberty to give interim report through CPCB to deal with the urgent issues.

10. The CPCB will be at liberty to take appropriate steps with regard to the remediation of contaminated sites or other urgent issues from time to time.

11. List again on 04.04.2019 to consider the report of the Committee.

Adarsh Kumar Goel, CP

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

December 05, 2018
M.A. No. 1302/2018
IN Interlocutory Application No. 63
in W.P. (C) No. 657/1995
R

ANNEXURE – III

OFFICE ORDER

F No.B-29016/C-08/18/WM-II Div./ 9791-9794 August 09, 2018

Sub.: Constitution of Monitoring Committee to monitor the compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and need for action in all the States."

The Hon'ble National Green Tribunal, Principal Bench, New Delhi in the matter of OA No. 804/2017: Rajiv Narayana & Anr. Vs Union of India & Ors. has passed the following orders on 30/07/2018:

"...(i) All the States, where the hazardous waste is being generated must set up Treatment, Storage and Disposal Facility (TSDF) facility of adequate capacity at appropriate locations within three months from today and forthwith imitate action against erring units.

(ii) Central Government and Central Pollution Control Board must forthwith monitor the compliance of the rules by reviewing the need for action in all the states.

(iii) The Central Pollution Control Board may forthwith constitute a monitoring Committee for the purpose it may appoint a Nodal Officer exclusively to oversee the compliance of the rules. The Member Secretary CPCB may act as a Nodal Officer till a substitute is found. The action taken must be placed on the website of the Central Pollution Control Board within 3 months from today. Compliance report be filed before this Tribunal on or before 30th November, 2018, which will be treated as a separate application ..."

In compliance to the aforesaid order of Hon'ble NGT, Principal Bench, New Delhi, a Monitoring Committee is being constituted herewith comprising the following:

1.	Dr. Ajay A. Deshpande, Former Expert Member, National Green Tribunal, Govt. of India, Flat A-101, Pristine Privilege, Opposite Prism, Near Rohan Nilay, Behind Spicer College, Audh, Pune- 411067 (Maharashtra)	Chairman
2.	Representative from Ministry of Environment, Forest & Climate Change, Govt. of India	Member
3..	Dr D. C Sharma, Prof. Department of Civil Engineering, Raja Rajeswari Group of Institutions, Bangalore (Former Additional Director, CPCB)	Member
4..	Dr A. N Vaidya, Chief Scientist & Head, Solid and Hazardous Waste Management Division, National Environmental Engineering Research Institute (NEERI), Nagpur	Member
5..	Member Secretary, Gujarat Pollution Control Board	Member
6..	Dr A. Manoharan, Former Senior Scientist, CPCB, # 24, HIG Flats, 475, Anna salai, Nandanam, Chennai- 600 035	Member
7.	Shr. Bharat K Sharma, AD & Head, WM-II Div., CPCB, and nodal officer appointed by CPCB in compliance with the Hon'ble NGT orders dated 30/07/2018	Member Convenor

Contd/-2

Terms of reference (ToR) of Monitoring Committee (TEC)

i. To monitor the compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

ii. To review the need for action in all the States for effective implementation of the Rules.

iii. To recommend measures for compliance of the HOWM Rules, 2016 and CPCB guidelines

iv. The Committee, if required will make site visits for assessment of the issues pertaining to management of hazardous and other wastes.

v. The Committee may invite other experts as "Invitee Member" for the purpose of executing its work.

vi. The Committee shall meet as and when necessary.

Tenure of Technical Expert Committee:

The tenure of the said Committee is till 30/11/2018 which may further be extended by CPCB, if required.

Reimbursement of TA/DA and Sitting fee:

(a) The following fee, in accordance with the orders dated 20/04/2017 of the Hon'ble NGT, Principal Bench, New Delhi in the matter of O.A No. 24 of 2011, would be paid:

1. The Chairmen/Expert Members, whether in service or retired or are operating as consultant independently: -
   (i) Chairman of the Committees would be paid a sum of Rs. 5,500/- per meeting.
   (ii) Non-official Members of the Committees would be paid a sum of Rs. 5,000/- per meeting.
2. Members who are retired and are not presently working in any Government organization or institute, would be termed as non-official members.
3. Members of the Committee who are in service either in the Government or institute, bodies, instrumentalities of the State would be paid a sum of Rs. 2,500/- per meeting.
4. Members who are in service will not be provided any TA/DA once the payment is made in terms of this order.
5. All the members would be provided with car facility for travel. If there are outstation members, they would be paid first class rail fare or economy air fare for coming to Delhi or the place where the meetings are fixed.
6. All the secretarial services would be provided to them and if they are required to incur expenses for the secretarial services, the same shall be reimbursed to them.

(b) The expenditure in this regard will be met from the budget head " NGT 25 %" at CPCB.

(Dr. Prashant Gargava)
Member Secretary

Copy to:

1) PS to CCB : for kind information of CCB, please.
2) I/c F&A
3) All Members of the Committee (list enclosed)

(Dr. Prashant Gargava)

13/8/12

List of Members

1. Dr. Ajay A. Deshpande
   Former Expert Member, National Green Tribunal, Govt. of India,
   Flat A-101, Pristine Privilege, Opposite Prism, Near Rohan Nilay,
   Behind Spicer College, Audh. Pune- 411067

2. Dr. D. C Sharma
   Prof. Department of Civil Engineering,
   Raja Rajeswari Group of Institutions,
   # 202, Kambipura, Mysore Road
   Bangalore-560074

3. The Joint Secretary (HSMD)
   Ministry of Environment, Forests & Climate Change
   2nd Floor, Jal Wing, Indira Paryavaran Bhawan,
   Aliganj, Jor Bagh Road, New Delhi-110003

4. The Member Secretary,
   Gujarat Pollution Control Board
   Paryavaran Bhawan, Sector 10-A,
   Gandhi Nagar – 382 010

5. Dr A. Manoharan,
   Former Senior Scientist, CPCB,
   # 24, HIG Flats, 475, Anna salai,
   Nandanam, Chennai- 600 035

6. Dr. A. N Vaidya
   Chief Scientist & Head, Solid and Hazardous Waste Management Division,
   National Environmental Engineering Research Institute (NERRI)
   Nehru Marg, Nagpur, 440020, In

ANNEXUR-IV

CENTRAL POLLUTION CONTROL BOARD
(Parivesh Bhawan, East Arjun Nagar)
DELHI – 110032

F.No.B-29016(SC)/1()/18/WM-II Div./ 8736-8741 August 13, 2018

OFFICE ORDER

In compliance to the Hon'ble National Green Tribunal, Principal Bench, New Delhi orders dated 30/07/2018 in the matter of Original Application No. 804/2017: Rajiv Naryana & Anr. Vs Union of India & Ors., Sh. Bharat Kumar Sharma, Additional Director and Divisional Head, Waste Management- II Division is appointed herewith as "Nodal Officer" to oversee the compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

(Prashant Gargava)
Member Secretary

To,

Sh. Bharat K Sharma
Additional Director & Head
Waste Management-II Division
CPCB, Delhi

ANNEXURE - V

OFFICE ORDER

F.No.B-29016/C-08/18/WM-II Div./

December 14, 2018

Sub.: Monitoring Committee to monitor the compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and need for action in all the States."

Reference to orders dated 05/12/2018 of the Hon'ble National Green Tribunal, Principal Bench, New Delhi, in the matter of M.A. No. 1696/2018 (OA No. 804/2017: Rajiv Narayana & Anr. Vs Union of India &Ors), tenure of the Monitoring Committee constituted by CPCB vide Office Order No. B-29016/C-08/18/WM-II Div./9791-9794 dated 09/08/2018 is, hereby, extended till 31/01/2019.

(Prashant Gargava)
Member Secretary

To,

1. Dr. Ajay A. Deshpande
   Former Expert Member, National Green Tribunal, Govt. of India,
   Flat A-101, Pristine Privilege, Opposite Prism, Near Rohan Nilay,
   Behind Spicer College, Audh. Pune- 411067
2. Dr. D. C Sharma
   Prof. Department of Civil Engineering,
   Raja Rajeswari Group of Institutions,
   # 202, Kambipura, Mysore Road
   Bangalore-560074
3. Dr. Sonu Singh
   Joint Director (HSMD)
   Ministry of Environment, Forests & Climate Change
   Indira Paryavaran Bhawan, Aliganj, Jor Bagh Road,
   New Delhi-110003
4. The Member Secretary,
   Gujarat Pollution Control Board
   Paryavaran Bhawan, Sector 10-A,
   Gandhi Nagar – 382 010
5. Dr A. Manoharan,
   Former Senior Scientist, CPCB,
   # 24, HIG Flats, 475, Anna salai,
   Nandanam, Chennai- 600035
6. Dr. A. N Vaidya
   Chief Scientist & Head, Solid and Hazardous Waste Management Division,
   National Environmental Engineering Research Institute (NEERI)
   Nehru Marg, Nagpur-440020

ANNEXURE - VI

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVT. OF INDIA

OFFICE ORDER

F.No.B-29016/C-08/18/WM-II Div./ December 14, 2018

Sub.: Monitoring Committee to monitor the compliance of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and need for action in all the States."

The Hon'ble National Green Tribunal, Principal Bench, New Delhi, has passed the following orders dated 05/12/2018, in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 sin W.P. (C) No. 657/1995; The Research Foundation for Science,Technology and Natural Resource Policy Vs. Union of India &Ors.:

"... 5.The present matter has been received by transfer from theHon'ble Supreme Court of India, after judgment reported in (2012) 7 SCC 769, directing ban on import of all hazardous/toxic wastes. This was sequel to the earlier judgment in (2005) 10 SCC 510. The applicant sought further direction for implementation of the judgment dated 06.07.2012 which aspect was transferred to this Tribunal.

6. We direct that the issue of implementation of judgement of the Hon'ble Supreme Court dated 06.07.2012, referred to above may also be considered by the Monitoring Committee. It will be open to the applicant to furnish any further documents to the Chairman of the Monitoring Committee through CPCB. The CPCB will be at liberty to consider involving any other expert on the subject.

7. Though learned counsel has handed over a list of documents which should be forwarded to the monitoring committee, instead of Tribunal considering the said list, the applicant is at liberty to furnish the same for consideration by the CPCB.

8. The Monitoring Committee will be at liberty to take further time, if necessary for completing its assigned job. Needless to say that the suggestion of remediation of contaminated sites, capacities of the landfill sites, issue of leachate, cleaner technology, sign boards etc. may also be examined by the Committee.

9. The Committee will also be at liberty to give interim report through CPCB to deal with the urgent issues.

10. The CPCB will be at liberty to take appropriate steps with regard to the remediation of contaminated sites or other urgent issues from time to time.

11. List again on 04.04.2019 to consider the report of the Committee."

In compliance with above orders of the Hon'ble Tribunal, Terms of Reference (ToR) of the Monitoring Committee (constituted by CPCB vide office order no. B-29016/C-08/18/WM-II Div./9791-9794 dated 09/08/2018 in compliance with orders dated 30/07/2018 of the Hon'ble NGT, Principal Bench, New Delhi in the matter of 804/2017) is extended herewith to review various issues as outlined in aforesaid orders dated 05/12/2018 of the Hon'ble NGT in the matter of M.A. No. 1302/2018 in Interlocutory Application No. 63 in W.P. (C) No. 657/1995.

Further, the committee shall submit its report at the earliest for which timeframe may be indicated by the Committee.

(Prashant Gargava)
Member Secretary

To,

1. Dr. Ajay A. Deshpande
   Former Expert Member, National Green Tribunal, Govt. of India,
   Flat A-101, Pristine Privilege, Opposite Prism, Near Rohan Nilay,
   Behind Spicer College, Audh. Pune- 411067

2. Dr. D. C Sharma
   Prof. Department of Civil Engineering,
   Raja Rajeswari Group of Institutions,
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3. Dr. Sonu Singh
   Joint Director (HSMD)
   Ministry of Environment, Forests & Climate Change
   Indira Paryavaran Bhawan, Aliganj, Jor Bagh Road,
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4. The Member Secretary,
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   Gandhi Nagar – 382 010

5. Dr A. Manoharan,
   Former Senior Scientist, CPCB,
   # 24, HIG Flats, 475, Anna salai,
   Nandanam, Chennai- 600035

6. Dr. A. N Vaidya
   Chief Scientist & Head, Solid and Hazardous Waste Management Division,
   National Environmental Engineering Research Institute (NEERI)
   Nehru Marg, Nagpur-440020

PART- A

Questionnaire for seeking information from SPCBs/PCCs in the matter of O.A No. 804 of 2017

Rule Provisions	Information required	
Rule 6(1)	1. Number of the applications received under Rule 6 of the HOWM Rules, 2016 (during 2017-18) a) Fresh b) Renewal 2. Number of authorization(fresh/renewal) granted (during 2017-18) a) Within 120 days of the receipt of complete application b) More than 120 days of the receipt of complete application. 3. Number of the authorization refused (during 2017-18) a) Fresh b) Renewal	Nos.
Rule 6 (3)	4. Whether all the authorization granted post HOWM Rules, 2016 notification are accompanied by a copy of field inspection report & signed by the Board in accordance with the Rule 6 (3) of the Rules. If yes, provide any copy of the same.	Yes/No
Rule 6(4)	5. In case of refusal of authorization, whether SPCB/PCC a) Gives opportunities of hearing to the applicant b) Records reason in writing for such refusal Please enclose copy of one such refusal for reference.	Yes/No
Rule 6 (6)	6 a) Whether SPCB has maintained a register containing particulars of the conditions imposed under HOWM Rules for the management of hazardous and other wastes.	Yes/No
	b) Please enclose copy of one page of such register.	
	c) Whether the same has been made available online. If yes, provide website details.	Yes/No
Rule 6 (7)	7. a) Whether SPCB issues passbook alongwith the authorisation to actual user of hazardous and other wastes for maintaining records of hazardous and other wastes purchased.	Yes/No
	b) Please provide a copy of such passbook.	-
	(c) Whether SPCB/PCC monitor entry in the passbook	Yes/No
Rule 7	8. Upon suspension or cancellation of authorization, a) Whether directions are issued for the safe storage and management of the hazardous and other wastes in such cases.	Yes/No
	b) Numbers of such directions issued	Nos.

Rule Provisions	Information required	
Rule 9 (1) & (2)	9. Number of authorization granted for utilization of hazardous waste under Rule 9 of the HOWM Rules, 2016. (Pl. specify the details on category, type, source of generation, product manufactured) 10. Number of authorization granted for utilization of other waste under Rule 9 of the HOWM Rules, 2016. (Pl. specify the details on category, type, source of generation, product manufactured)	Nos.
Rule 9 (3)	11. Type and categories of hazardous and other wastes permitted for co-processing including cement plants (during 2017-18)). If no co-processing is allowed or permitted, please mention reasons thereof, including the Board guidelines/policy, if any	
Rule 13 (2) (c)	12. Numbers of one-time authorization granted to traders for import of waste on behalf of actual user.(during 2017-18).	Nos.
Rule 15	13. Numbers of cases received regarding illegal import of hazardous and other wastes (during 2017-18) 14. Numbers of cases received regarding illegal export of hazardous and other wastes (during 2017-18). 15. How many of these illegal traffic cases are: a) Re-exported b) Sent for disposal c) Sold to authorized recycler	Nos.
Rule 16	16. Whether design of such common TSDF is approved by SPCB.	Yes/No
	17. Whether design of such captive TSDF is approved by SPCB.	Yes/No
	18. Whether layout of such common TSDF is approved by SPCB.	Yes/No
	19. Whether layout of such captive TSDF is approved by SPCB.	Yes/No
	20. Whether the common and captive secured landfills are meeting the location criteria as specified in the CPCB guidelines on "Criteria for hazardous waste landfills". If no, whether any appropriate design measures have been taken? Please give details separately.	Yes/No
	21. Whether the common secured landfills are maintaining Escrow Account in tripartite agreement as per the MoEF&CC Office Memorandum no. 23-1/2008-HSMD dated 16/04/2009	Yes/No
Rule 18 and 19	22. Whether there is any system adopted for indicating in the manifest about the responsibility of safe transport as per Rule 18(6) of the Rules. If yes, please provide any copy of such manifest system	Yes/No
	23. (a) Whether the SPCB are receiving copy 1 (white) of manifest from the sender	Yes/No
	(b) Number of cases noticed by SPCB/PCC where the copy 1 is not being sent to SPCB/PCC?	Nos.
	24. (a) Whether the SPCB are receiving copy 5 (green) of manifest from the receiver? If yes, is there any mechanism to reconcile the waste movement? Please give details.	Yes/No

Rule Provisions	Information required	
	(b) Number of cases noticed by SPCB/PCC where the copy 5 is not being sent to SPCB/PCC?	Nos.
	25. (a) In case of interstate movement of hazardous waste whether the SPCB is receiving the copy 7 (grey) from the receiver in other state? Is there any co-ordination with the other SPCB/PCC for verification or reconciliation of the waste movement? If yes, please give details for such verification and reconciliation.	Yes/No
	(b) Number of cases noticed by SPCB where the copy 7 is not being sent to SPCB/PCC.	Nos.
	26. Whether the SPCB is being informed about the transit of hazardous and other wastes?	Yes/No
	27. Whether there is any mechanism adopted by SPCB/PCC for implementation and monitoring of movement of the hazardous and other waste If yes, please provide details of the same	Yes/No
Rule 20	28. Number of occupiers possessing authorization	Nos.
	29. Number of occupiers submitted the annual returns (during 2017-18)	Nos.
	30. Numbers of common and captive secured landfills in the State/UT	Nos.
	31. Numbers of Common and captive incinerator in the State/UT	Nos.
	32. Numbers of common Integrated TSDF (i.e both secured landfill and incinerator) in the State/UT	Nos.
	33. Numbers of occupiers randomly verified by SPCB/PCC w.r.t. annual returns filled by them.	Nos.
	34. (a) Whether maintenance of the daily records in Form 3 of the HOWM Rules, 2016, maintained by the occupiers are monitored by SPCB/PCC	Yes/No
	(b) Number of occupiers not maintaining daily records been noticed by SPCB/PCC.	Nos.
Rule 22	35. (a) Is any officer appointed in SPCB/PCC for dealing the matter related to reporting of accident. If yes, provide details of the officer w.r.t. name, designation, telephone & e-mail id.	Yes/No
	(b) Numbers of the accident reported during 2017-18	Nos.
	(c) Whether any action taken by SPCB on accidents reported under Rule 23(1) and 23(2). If yes, provide details of action taken.	Yes/No
Rule 23	36. Number of cases noticed by SPCB/PCC on environmental damages (during 2017-18)	Nos.
	37. Whether liability has been fixed by SPCBs in such cases?	Yes/No
	38. Whether any methodology developed for assessment of damages and assessment of liabilities?	Yes/No
	39. Details of penalties imposed for violations of Rules(during 2017-18): a) Number of cases where penalty imposed. b) Total amount of penalty imposed. c) Total amount of penalty collected.	Nos.
	40. Whether prior approval of CPCB approval has been taken before imposing such financial penalty	Yes/No

Rule Provisions	Information required	
Schedule II of HOWM Rules, 2016	41. Whether SPCB has lab facility and developed protocol for analysis of the constituent listed under schedule II. If yes, a) How many labs of the SPCB have such capability? Please specify separately for Head Office and Regional Offices b) Please specify parameters that can be monitored. c) Whether such laboratory is accredited by NABL or recognized by MoEF&CC or both? Pl provide details	Yes/No
Schedule VII of HOWM Rules, 2016	42. Whether the SPCB monitors the compliance of various provisions and conditions of permission including conditions of permission for issued by MoEF&CC for export and import? If yes, please specify the duration/frequency of the same and numbers of units monitored during 2017-18	Yes/No
	43. Whether the SPCB is examining the applications for imports submitted by the importers and forwarding the same to MoEF&CC.	Yes/No
	If yes, please provide for 2017-18. a) Numbers of such application received b) Numbers of such application forwarded to MoEF&CC c) Methodologies for examination	Nos.
	44. Whether SPCB organized any programme to prevent or reuse or reduce or minimize the generation of hazardous and other wastes? If yes, please provide numbers (during 2017-18) and details of the same. Please also give details of successful case studies of hazardous waste reuse, reduce or minimization etc.	Yes/No
	45. Details of violations addressed/reported (during 2017-18) against the Rules and action taken thereof. a) Nos. of violations addressed/reported b) Nos. of cases in which court cases in which have been filed c) Nos. of cases in which FIR has been lodged d) Nos. of cases in which show-cause notices issued e) Nos. of cases in which closure directions issued f) Nos. of revocation of show-cause notices/closure directions	Nos.

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PART-B

S.No	Information required	
1.	Whether hazardous wastes sent to other states for disposal in common secured landfill. If yes, (a) please provide details of TSDF and quantity disposed during 2017-18. (b) Please provide details on the mechanism adopted by SPCB/PCC for implementation and monitoring of inter-state movement of the hazardous waste	Yes/No
2.	Whether the performance of the common and captive incinerator is assessed by SPCB/PCC.	Yes/No
	If yes, (a) please provide the frequency (during 2017-18) of such monitoring in i. Captive incinerator ii. Common incinerator	Nos.
	(b) Numbers of violations observed in the above monitoring (during 2017-18) and action taken thereof	Nos.
	(c) Please provide copy of the latest stack emission analysis reports.	
3.	Are the monitoring wells within and outside TSDF/captive secured landfill facilities, periodically monitored by SPCB/PCC.	Yes/No
	(b) If yes, has the SPCB/PCC examined the same w.r.t impacts on groundwater?	Yes/No
	(c) Please provide report in this regard	-
4.	Number of trainings organized by SPCB/PCC during 2017-18. Please provide topics of the said training.	Nos.
	Number of trainings attended by officials of SPCB/PCC during 2017-18. Please provide the details w.r.t. organized by and topics.	Nos.
5.	Please provide the details of captive utilization of hazardous and other wastes during latest year for which information is available Year | Category of hazardous /other waste | Quantity utilized [ ] | [ ] | [ ]	-
6.	Whether an in-house "Hazardous Waste Response Team' has been constituted by SPCB/PCC in accordance with the CPCB guidelines on "Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Waste and Penalty", for assessment and imposing the liability & financial penalty.	Yes/No
7.	Whether there is any policy for frequency of inspecting each of the hazardous waste handling unit.	Yes/No
	If so, actual frequency and numbers of each hazardous waste handling units (during the year 2017-18)	Nos.
	Number of cases observed where hazardous waste generation data does not matches with the production Please provide the list o such cases	Nos.
8.	Whether financial capabilities of occupier of hazardous waste is assessed to deal with emergency response/accidental release of hazardous waste while granting auhtorisation	Yes/No

	Is yes, please provide number of cases refused for grant of authorization based on the above	Nos.
9.	Whether authorization is granted after assessing the mass balance of the production process and hazardous waste generation thereof	Yes/ No
	If yes, (a) Whether the above is done by SPCB/PCC or through third party	Yes/No
	(b) Please provide name of the third party	
10	Whether SPCB/PCC has conducted any specific audit to verify the HW generation and disposal quantities, including the mass balance, from specific industries?	Yes/No
10.	Whether the SPCB/PCC has any online software system for submission and processing of authorization application, accounting of hazardous waste generation and its management and submission of annual returns by the occupier of hazardous waste If yes, please provide the link of the said online software system If no, what is the mechanism with the SPCB/PPC to reconcile the data submitted by the industries and also, to identify the industries who have not submitted the data?	Yes/No
11.	Whether, the SPCB/PCC has prescribed fees for processing the authorization application	Yes/No
	If so, details of such authorization fees w.r.t amount and how the same is collected and utilized	
12.	Please provide details of any successful case study/ initiative taken by SPCB/PCC for effective management (utilisation/recycling) of the hazardous or other waste, if any. (Please attach separate sheets)	
13.	What is the policy of SPCB to reduce the waste reaching TSDF by encouraging the reuse/recycle and co-processing?	
14	Whether TSDF in the state has any time returned/refused any HW load to the generator. If yes details and reason thereof	Yes/No
15.	Whether the quantity of leachate generated in the TSDF is periodically assessed If yes, the annual quantity and mode of disposal of the same.	Yes/No
16	Whether any complaints received from the neighboring agricultural farms/residents surrounding the TSDF/industry. If yes, please brief nature of such complaints and details of action taken thereof.	Yes/No
17.	Whether SPCB/PCC has identified contaminated sites/underground/surface water pollution and illegal dumps in the state. If yes, pl attach details and action taken reports.	Yes/No
18.	Does the SPCB/PCC periodically check hazardous waste generating units not sending hazardous waste for > 90 days/>180 days, as available	Yes/No
	If yes (a) How many units violated the said period alongwith their list (b) Action taken by SPCB/PCC	Nos.
19.	Is there any separate hazardous waste management cell for enforcement of HOWM Rules 2016	Yes/No
	If yes, (a) Please provide numbers of the technical and non-technical personnel in the SPCB/PCC for enforcement of HOWM Rules, 2016	

Head Office		Regional Office	
Technical	Non-Technical	Technical	Non-Technical

	(b) Suggest measures required for appointment of additional manpower in SPCB/PCC	

	(c) Whether SPCB's have requested for any additional manpower? If yes give details thereof.	
20.	Please give details of the successful case studies for reduction, recycle and reuse of HW waste practiced by Industries and others.	`

*****

Questionnaire for seeking information from State Government in the matter of O.A No. 804 of 2017

Rule Provisions	Information required	
Schedule VII of HOWM Rules, 2016	1. Total number of sites identified and notified for common TSDF by the State Government?	Nos.
	2. Whether State Government periodically published an inventory of all potential or existing disposal sites in the State or union territory? a) If yes, please provide the details. b) Whether the same is available in public domain? Please provide the link of the same	Yes/No

*****

Questionnaire for seeking information from Department of Industry in the matter of O.A No. 804 of 2017

Rule Provisions	Information required	
Rule 5	Whether the State Government has authorized Department of Industry or other Government Agency for allocation or earmarking the industrial space or shed for recycling, pre-processing and other utilization of hazardous or other waste in the existing and upcoming industrial park, estate and industrial clusters? If yes, please provide name of the Govt. agency and details of the allocation/earmarking of the above w.r.t number, areas and activities.	Yes/No

*****

Questionnaire for seeking information from Department of Labour in the matter of O.A No. 804 of 2017

Rule Provisions	Information required	
Rule 5	1. Whether State Government has authorized Department of Labour or any other Government agency for: a) recognition and registration of workers involved in recycling, pre-processing and other utilization activities b) undertaken any industrial skill development activities for such workers and c) undertaken annual monitoring for safety and health of such workers. If yes, please provide name of the Govt. agency and details of recognition/registration/activities undertaken, as above.	Yes/No
	2. Whether State Government has prepared integrated plan for effective implementation of these provisions and submitted the annual report to MoEF&CC. If yes, year wise details of the above.	Yes/No

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Questionnaire for seeking information from MoEF&CC in the matter of

O.A No. 804 of 2017

Rule Provisions	Information required	
Rule 5	1. Whether State Government has submitted the annual report to MoEF&CC in accordance with Rule 5 (3) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. If yes, year wise details of the above.	Yes/No
Rule 10	2. Numbers of guidelines or standard operating procedures for environmentally sound management of hazardous and other wastes issued by MoEF&CC. (Please provide details of the same) during 2017-18	Nos.
	3. Action taken for promoting environmental sound management of Hazardous and Other Wastes	
Rule 13 (2) (c)	4. Details of permission granted to importers/exporters of hazardous and other wastes. (during 2017-18) a) Numbers of application received for import b) Numbers of application received for export c) Numbers of application granted permission for import d) Numbers of application granted permission for export e) Number of application rejected for import f) Number of application rejected for export	Nos.
Rule 15	5. Numbers of cases received regarding illegal import of hazardous and other wastes (during 2017-18) 6. Numbers of cases received regarding illegal export of hazardous and other wastes (during 2017-18).25. 7. How many of these illegal traffic cases are: (a) Re-exported (b) Sent for disposal (c) Sold to authorized recycler	Nos.
Schedule VII of HOWM Rules, 2016	8. Whether Ministry of Environment, Forest & Climate Change identified any hazardous and other wastes for inclusion/exclusion into schedule I (since April, 2016)? If yes, details of type and category of such hazardous and other waste	Yes/No
	9. Numbers of training and awareness programme sponsored by MoEF&CC related to Hazardous and Other Wastes Management (during 2017-18) and details thereof.	Nos.

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Questionnaire for seeking information from DGFT in the matter of O.A No. 804 of 2017

Rule Provisions	Information required
Schedule VII of HOWM Rules, 2016	Details of licenses granted/refused for import/export of hazardous waste and other waste (during 2017-18) a) Total nos. of applications received for import b) Total nos. of applications received for export c) Total nos. of licenses granted for import d) Total nos. of licenses granted for export e) Total nos. of licenses refused for import f) Total nos. of licenses refused for export

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Questionnaire for seeking information Port Authority/ Custom Authority from in the matter of O.A No. 804 of 2017

Rule Provisions	Information required	
Rule 13 (10)	1. a) Whether the Custom authority verify the movement document and test report in accordance with the Rule 13 (10) of the HOWM Rules, 2016 b) In case of doubt, whether customs authority verify the analysis report If yes, does the Customs Authority has such lab facilities at all places or whether the same is carried out by third party	Yes/No
Rule 15	2. Numbers of cases received regarding illegal import of hazardous and other wastes (during 2017-18) 3. Numbers of cases received regarding illegal export of hazardous and other wastes (during 2017-18).25. 4. How many of these illegal traffic cases are: (a) Re-exported (b) Sent for disposal (c) Sold to authorized recycler	Nos.
Schedule VII of HOWM Rules, 2016	5. Whether Port Authority/ Custom Authority are verifying the documents? If yes, mechanism adopted for verification of the same	Yes/No
	6. Whether Port Authority/Custom Authority informed MoEF&CC of any illegal traffic?	Yes/No
	If yes, please provide the numbers of such illegal traffic reported (during 2017-18) .	Nos.
	7. Whether training has been imparted to the officials on the provisions of these rules and in the analysis of hazardous and other wastes.	Yes/No
	If yes, numbers of the training imparted (during 2017-18) and earlier.	Nos.
	8. Whether any violation against the exporter or importer under the Indian Port Act, 1908 or Customs Act, 1962 has been reported.	Yes/No
	If yes, please provide numbers of violations and details of action taken.	Nos.

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Annexure VIII

Visit report to Mumbai by Monitoring Committee constituted by CPCB in compliance with orders dated 30/07/2018 of the Hon'ble National Green Tribunal, Principal Bench, New Delhi

During first meeting of the above mentioned Monitoring Committee held on 24/08/2018, it was decided that in order to monitor field enforcement of the HOWM Rules, 2016, few hazardous waste handling facilities in Hyderabad, Mumbai and Kanpur be visited by making three groups of the Monitoring Committee. Accordingly, Dr. A. N. Vaidya, Member of the Monitoring Committee and Dr. D. C. Sharma, Member of the Monitoring Committee visited Common Hazardous Waste Treatment Storage and Disposal Facility (TSDF) and hazardous waste recycling units in Mumbai on September 06-07, 2018. The purpose of the visit was to observe the compliance of the HOWM Rules 2016 by these units. TSDF as well as hazardous waste recycling units form the essential components of Hazardous waste management and are dictated by separate clauses and schedules in the rules. This report briefs the findings of these visits.

1. Common TSDF facility at Taloja:

This facility has large area of Jurisdiction and operates secured landfill as well as Incinerator. The general awareness about the rules was ok. Infrastructure was also reasonably well. Incinerator was recently updated and had two chambers. Secondary chamber had residence time of 2 second as stipulated. Waste stabilization facility was also available in case any specific waste needed stabilization prior to landfilling. The salient observations were as follows.

- The record keeping was ok. Manifest system was adequately followed.
- Stabilization parameters were not explained clearly and there was confusion about moisture content allowed in landfilling.
- Manifest of wastes received from other states was not clear
- Incinerator was equipped with online monitoring system
- Escrow account was opened.
- Storage needed updation.

2. Waste Oil Recycling Unit:

Waste oil recycling unit in Vasai, Mumbai was visited. The unit processes waste oil as well as used oil on job basis as well as for free sale. The unit had storage facility for waste oil and products. The major oil reclamation was done by primary distillation method, for which, three distillation columns were provided. The salient observations are as follows.

- The lay out was very congested and safety was concern. Crude refining methods were used and residue and other hazardous wastes were sent to TSDF at Taloja. The records are well maintained.
- Manifest system was not very clear.
- Process was not explained properly.
- The information about the market for the recovered oil was haphazard.
- Overall housekeeping and safety was concern.

3. Lead Battery Recycling Unit:

Lead battery recycling unit in Vasai, Mumbai was also visited. The unit processes spent lead batteries for the recovery of lead. Waste batteries are received on tonnage basis an d process involves dismantling, separation of plastic and metals followed by melting in furnace wherein molten lead is recovered. The residue is sent to TSDF as hazardous waste.

The salient observations are as follows.

- The lay out was very congested and safety was concern.
- Crude recovery methods were used and residue and other hazardous wastes were sent to TSDF at Taloja. The records are well maintained.

- Furnace was very old type and there was no proper control over emissions especially dioxin, furan, and VOCs.
- Manifest system was not very clear.
- Process was not explained properly.
- Material balance was not very clear
- The information about the market for the recovered lead was haphazard.
- Overall housekeeping and safety was concern.

Broad conclusion: The said visit revealed that the recycle, recovery, and utilization of hazardous waste is an area of environmental concern as well as for compliance to the rules.

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Annexure IX

Report on
Existing Facilities & Management practices of
Uttar Pradesh Waste Management Project Ltd.
(Operated by Ramky Enviro Engineers Ltd.)
Tehsil Akbarpur, Kanpur Dt. UP

Inspected as per the direction of NGT by a team comprising
A. Manoharan, Former Sr. Scientist, CPCB
&
D.M. Thaker, Chief Engineer, GPCB
along with officials of CPCB Regional Directorate & UPPCB,

Date of visit : 11th September , 2018

INSPECTION REPORT

1.	**Name of the Operator**	Uttar Pradesh Waste Management Project Ltd. (operated by Ramky Enviro Engineers Ltd.) Tehsil Akbarpur, Kanpur Dt. UP
2.	**Location and address**	Uttar Pradesh Waste Management Project Ltd, Village Kumbhi,__Tehsil Akbarpur, District Kanpur-Dehat, UP
3.	**Contact Person (provide Tel. no. / fax / e mail mobile)**	Shri Chinna Reddy Manidi, Project Head Mobile: 933574566 E mail chinnareddy.m@ramky.com
	Total Area	31.5 Ha
4	**Secured Landfill (Direct)**	
	(i) Date of commissioning	The Project was awarded on 21st April 2005 by UPPCB. Established in 2006 with CFE F01124 C-2/M.O.C/3337/06 dated 08th May.
	(ii) Number of cells	4 Nos Total Cell no. 1,2 & 3 are capped 4th one is running with cap of 1.5 lakh tones
	(iii) Total Capacity (MT)	SLF 2.5 lakh tonnes
	(iv) operational MT	SLF 12,459 TPA ; Incinerator 2903 TPA
	(v) Compliance of CPCB guidelines regarding design, construction & operation of SLF as on date	Complied with *CPCB guidelines regarding design, construction & operation of SLF*
	Hazardous Waste Storage Area	Hazardous Waste Storage Area available
	Transportation	Own trucks with GPS system is in Place
5.	**HW treatment facility**	
	(i) Solidification / stabilisation	Yes Available
	(ii) Physical / Chemical treatment	Yes Available
9	**Incinerator Capacity**	Cap. 2 tonnes/hr
10	**Environmental compliance**	
	(iii) Consent / NOC validity	Valid Consents are available Checked in file O.K

	(iv) Authorization validity	*Authorization* Valid Checked in file O.K
	Whether Environmental Clearance obtained or not	*Environmental Clearance is under process for integrated waste management*
	Leachate Collection & management	Leachate is collected and treated in spray drier
	APC measure and Compliance of emission standards given by CPCB	**Quenching - Spray Evaporative cooler** ***Bag Filter*** ***Packed bed scrubber*** **ID Fan** **Automation - PLC** **Two** Stage scrubbing system : Venturi scrubber with fixed / adjustable throat. Scrubbing medium - Caustic solution with Activated Carbon. Packed bed scrubber with ceramic rings. Real-time sensors for CO, SOx, Nox, O2, HCL, T, Particulates etc. Continuous testing of air emissions in the chimney. Ambient air quality monitoring is being done on twice a week basis and the reports are submitted to RO - Rania of UPPCB along with UPPCB Lucknow. Dioxin & Furan Monitoring is not carried so far.
	Ground Water Quality Monitoring Data	Ground Water Quality Monitoring is carried out regularly at 8 location (4 Upstream + 4 Downstream) . Water quality reports are being submitted to PCB on monthly basis.
	Laboratory facilities	Laboratory is available with all the required facilities The laboratory has obtained NABL accreditation system in 2017

Other Observations

1. In general, the overall housekeeping is O K
2. Display of general information is displayed through Electronic digital display board
3. The laboratory condition is O K.
4. Fire Safety and other safety measures are found in Order.
5. Green belt of 45 % area is available
6. Health camp check up is being carried out regularly
7. CSR activities are being carried out

RECOMMENDATIONS

The unit Uttar Pradesh Waste Management Project Ltd, a TSDF unit operated by Ramky shall improve the facilities & management system in the following lines:

1. In general the housekeeping is O.K. However in certain areas such as Waste stabilization , incinerator area needs some improvement
2. *Environmental Clearance is under process for integrated waste management. The unit has to obtain EC*

Figure 1: Chemical Storage & Stabilization Pit

Figure 2: Stabilization of Hazardous Waste

3. GPS system is in place for tracking waste movements and needs improvement
4. Dioxin & Furan Monitoring is not carried so far. As per CPCB norms Dioxin & Furan Monitoring in Incinerator Stack is to be monitored once in 3 months frequency.
5. Ground water quality monitoring is carried out regularly Water quality reports are being submitted to PCB on monthly basis. There is a need to find out trend analysis of GW quality since startup of the unit
6. The unit has obtained **NABL Laboratory accreditation** as per ISO 17025. Laboratory is available with all the required facilities
7. At present there is no pre processing facility to utilise as Alternative Fuel for coprocessing in Cement kiln, The unit may explore the possibility of coprocessing in cement plants

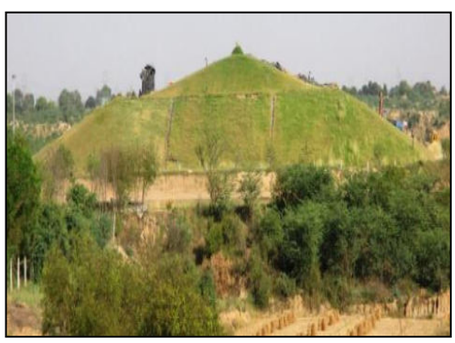

Figure 3: Capped Secured Landfill

Figure 4: HW Incinerator

8. There is **a sufficient green belt area** in the premise with 45 % area
9. It is informed that the wastes are not received from all registered members. There is a gap between generation and various disposal options It is to be monitored through efficient Tracking system for effective disposal/ utilization of wastes

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Annexure X

Visit report to Hyderabad by Monitoring Committee constituted by CPCB in compliance with orders dated 30/07/2018 of the Hon'ble National Green Tribunal, Principal Bench, New Delhi

During first meeting of the above mentioned Monitoring Committee held on 24/08/2018, it was decided that in order to monitor field enforcement of the HOWM Rules, 2016, few hazardous waste handling facilities in Hyderabad, Mumbai and Kanpur be visited by making three groups of the Monitoring Committee. Accordingly, visit to the following units in Hyderabad was carried out during September 18-19, 2018, by Dr. Ajay Deshpande, Chairman of the Monitoring Committee and Sh. Bharat K Sharma, Nodal Officer and Member Convener of the Monitoring Committee & Scientist E, WM-II Div., CPCB, Delhi:

(i) Common Hazardous Waste Treatment, Storage and Disposal Facility (TSDF) i.e. M/s Hyderabad Waste Management Project at Sy. No. 684/1, Dundigal (V), Quthubullapur (M), Rangareddy District (Telangana);

(ii) Hazardous waste generating unit i.e. M/s Mylan laboratories Ltd., (Unit-II) at Sy. No. 10 & 42, Gaddapotharam Village, Jinnaram Mandal, Sangareddy District – 502 319, and;

(iii) Pre-processing facility (for co-processing of hazardous waste in Cement plant) at plot no. 28, 29 & 30, Sy No.5/1, Industrial Park, Rakamcharla (V), Pudur (M) Rangareddy District, operated by M/s GEPIL Infrastructure Pvt. Ltd.

Selection of hazardous waste generating unit i.e. M/s Mylan laboratories Ltd., (Unit-II) to be visited was identified by Telangana State Pollution Control Board (SPCB).

Shri D. Narendra, Environmental Engineer, UH-II, from Telangana SPCB also participated in both days of the visits and Shri P. Vishwantham, Chief Environmental Engineer, Telangana SPCB, participated in the visit on 17/8/2018.

The aforesaid visits were followed by interaction with officials of Telangana SPCB at their Head Office in Hyderabad.

Observations made at Common TSDF i.e. M/s Hyderabad Waste Management Project (HWMP), Dundigal (V), Quthubullapur (M), Rangareddy District (Telangana)

The common TSDF has been set up in 200 acres and is operational since 2001. Two cells of the secured landfill (SLF) have been capped permanently with vegetative cover and the third cell is capped temporarily with HDPE liners and due for permanent capping. Areas of the said Cells are 5.5 acres, 10.5 acres and 13.25 acres respectively and quantity of hazardous wastes disposed are about 0.252, 0.573 and 0.817 Million Tonnes respectively. Fourth cell (divided into three sub-cell) of 16.32 acres is partly is partly temporarily capped, under operation and construction. About 0.116 Million Tonnes of hazardous waste has been disposed in temporarily capped and operational cell. 03 nos. of temporary storage sheds have been installed (where treatment facility to stabilize the hazardous waste also exists) in which it is claimed to store about 5000 tonnes of landfillable hazardous waste. 04 nos. of solar evaporation ponds have been installed with HDPE liner for leachate management and leachate is also used in spray dryer of the incinerator.

An incinerator of authorized capacity of 1.5 to tonnes/hour has been installed with rotary kiln, secondary chamber, spray dryer, multicyclones, lime & activated carbon dosing unit, bag filter house, scrubber and stack of 30 meters height. It has 04 nos. of storage sheds of 5500 sq. meters which is claimed to store about 8500 tonnes of incinerable hazardous waste. Smoke detection systems, fire alarms, fire hydrant, etc. are installed in the sheds.

An Alternate Fuel Raw Material Facility (AFRF) has also been installed with consented capacity of 70 Tonnes/day. It has a shredder and mixing chamber (Blendor) with belt conveying system to load the wastes and transfer the shredded/blended wastes. A pit is also installed where wastes are manually homogenized. The shredder, Blendor and pit have hoods over them to arrest fugitive emissions and channelized through ducting to cyclone and bag filter house. The pre-processed waste from AFRF is sent to cement plants in Telangana and Hyderbad for co-processing.

The site has been published as waste disposal site for the purpose of treatment, storage and disposal of hazardous waste by the Revenue Department vide G.O.Ms No. 44 dated 10/7/2004. Copies of Consent to Operate and Authorisation granted by Telangana SPCB are given at Annexure I. It has NABL accredited laboratory and also having approved under the Environment (Protection) Act, 1986. A spray dryer for leachate management and mechanized stabilization system were under installation. 1295 hazardous waste generating units of Telangana are enrolled for membership with the TSDF.

Figure 1: Google map showing Common TSDF of M/s HWMP

Following are observations made during the visit:

(i) Though a pond was shown informing that the same is used to store run off water of the facility but the same needs to assessed w.r.t. its capacity to store the same, availability of run-off water channel network, etc.

(ii) Design and layout of the site has been approved by SPCB. However, requisite facilities such as location of surface water drainage facilities including settling pond (storm water basin), equipment shelter, emergency exit, etc., as stipulated in CPCB guidelines, have not been provided in the said approved layout. Currently it has about 50% of its premises developed into green belt.

(iii) The Cell I is about 15 meters from west boundary of its the premises. Telangana PCB has requested Hyderabad Metropolitan Development Authority to maintain 500 m buffer zone citing that some developmental activities are being taken along the south side of the TSDF boundary.

Figure 2: Hood at conveying system and blendor

(iv) Hoods installed over the pit, shredder, blendor and conveyor belt are not efficient to arrest fugitive emission. The outlet from bag filter house of AFRF unit is dispersed above the ground;

Figure 3: Cyclone and Bag house of AFRF. Outlet from Bag filter house is dispersed above the ground

(v) Though the workers engaged in manual waste mixing pit at AFRF shed was wearing protective gears but the same may not be a safe practice. The mixing may be done using screw conveyor system, pug mill, etc. to avoid exposure of workers to hazardous wastes;

Figure 4: Workers engaged in opening of waste at AFRF facility. Hoods are shown over shedders and manual waste mixing pit

(vi) Of 1295 members of the common TSDF, 530 members are actively sending their hazardous waste to the common TSDF. Rest 765 members not sending hazardous waste. Some of them may have been sending their wastes to the pre-processing facility for co-processing in Cement plant but the same needs to be examined.

Figure 5: Waste in pit for manual mixing to prepare pre-processed waste for Co-processing in Cement plant

(vii) Telangana PCB may examine if M/s HWMP has been authorized for E-waste collection also and take action as annual return of M/s Mylan Laboratories Ltd., (Unit–II), Sangareddy District, shows that 0.31 tons of E-waste has been sent to M/s HWMP during 2017-18.

Observations made at M/s Mylan Laboratories Ltd., (Unit–II), Sangareddy District

The unit manufactures various pharmaceutical products and during the course of its manufacturing various categories of hazardous wastes are generated. Copy of Consent to Operate and Authorisation granted by Telangana SPCB is given at Annexure II wherein various products & their capacity, categories of hazardous waste generation & their quantity have been stipulated. Copy of the Annual Report for 2017-18 submitted to Telangana SPCB is also given in the said Annexure II.

Spent Solvent Distillation Plant, Solvent/Spent Solvent Storage Tanks, Stripper along with distillation unit at ETP Plant, Drum/Barrel washing facility, Hazardous waste storage shed, etc. were found in the unit. Following are the observations made during the visit:

(i) Nevirapine has been produced more than the consented capacity of 66.67 Kgs/day. Total production of the same is 26132 Kg;

(ii) Reported hazardous waste generation is very less than the respective authorized quantity;

(iii) Generation of some of the authorized hazardous waste such as Spent Solvent, Hazardous waste/chemical contaminated HDPE containers, Liners & bags, Lead Acid Batteries, etc. have not been reported in the Annual Return;

(iv) There are variations in month wise data of productions and respective data on hazardous waste generation;

(v) Date wise record of hazardous waste generation and their management, as required under Rule 20(1) of the HOWM Rules, 2016, are not maintained;

(vi) Facility for detoxification of hazardous waste/chemical contaminated Liners & Bags (Waste category No. 33.1) was not observed. Further, SOP or guidelines for the same has not been prepared by CPCB and the unit has not approached CPCB also in this regard, as required under Rule 9 of the HOWM Rules, 2016;

(vii) Inspection report indicating the adequacy of facilities for collection, storage, packaging, utilization, etc. (based on which the authorization dated 06/2/2018 has been granted by Telangana SPCB) has not been attached with the authorization document whereas Form 2 and Rule 6(3) of the HOWM Rules, 2016, stipulates requirement of the same;

(viii) CPCB has prepared SOP for utilization of Drums/Barrels contaminated with Hazardous Waste/Chemicals (Waste category No. 33.1) by cleaning/detoxification for limited category of hazardous chemicals contaminated Drums/Barrels and the said chemicals have been listed in the SoP. However, while granting authorization, types of contaminated chemicals authorized for detoxification as per the said SOP would have been mentioned in the said authorization. For cleaning/detoxification of Bags/Liners and Drums/barrels contaminated with chemicals other than those listed in SoP, if any, CPCB would have been approached for preparation of SOP for the same and accordingly authorization would have been granted;

Observations made at the pre-processing facility i.e. M/s GEPIL Infrastructure Pvt. Ltd., Rakamcharla (V), Pudur (M) Rangareddy District

The pre-processing facility has facility for storage, transportation, crushing, mixing/blending, etc. and laboratory facility (list of equipment given at Annexure III A) for analysis of hazardous wastes. The pre-processed wastes, conforming to prescribed parameters laid down by the co-processing cement plant, are transported to the co-processing cement plant in Andhra Pradesh, Karnataka, Chhatisgarh and Madhya Pradesh. Copy of Consent to Operate and Authorisation

granted by Telangana SPCB and Annual Return for 2017-2018 are given at Annexure III B. Following are the observations made during the visit:

(i) The hazardous wastes stored in drums were not found labeled whereas the same is required Rule 17 of the HOWM Rules, 2016. In absence of such labeling, there is risk of accident while mixing/blending the wastes;

Figure 6: Unlabeled drums containing hazardous waste, stored in the shed

Figure 7: Fumes coming out of drums, containing hazardous waste

(ii) In a few of the drums, fumes were observed coming out indicating that packaging was improper and that wastes may be reactive or liable to spontaneous combustion, etc. Though, smoke detectors, firefighting etc. were installed in the shed;

(iii) The hood installed over crushing machine and liquid blending tank were not found effective in sucking fumes and channelizing the same to air pollution control devices;

(iv) Mixing of solid waste in dispersible form was found to be carried out in platform under the shed using JCB. The same may be done in closed system using screw conveying system, pug mil, etc. so as to contain fugitive emission. Further, leachate/liquid hazardous waste was observed on the floor;

(v) The storage, mixing, shredding, etc. are carried out in one shed and it was informed that construction of another shed is planned. Capacity of the facility to handle authorized quantity of 1,75,000 metric tonnes in the existing shed needs to be assessed;

(vi) Inspection report indicating the adequacy of facilities for collection, storage, packaging, utilization, etc. (based on which the authorization dated 06/2/2018 has been granted by Telangana SPCB) has not been attached with the authorization document whereas Form 2 and Rule 6(3) of the HOWM Rules, 2016, stipulates requirement of the same;

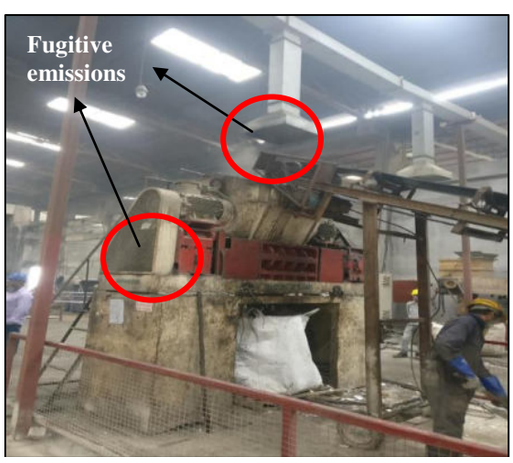

Figure 8: Fugitive emission coming out of shedder and hood not effective arrest the same

Figure 9: Leachate/liquid hazardous waste on platform where mixing of hazardous waste is done

(vii) The authorization allows the pre-processing facility operator to procure organic incinerable and non-organic hazardous wastes. However, it doesn't stipulate categories/qualities of hazardous wastes which are restricted for pre-processing.

Discussions at Telangana SPCB

Officials of Telangana SPCB informed about information of hazardous waste generation and their management in the State for 2016-17. However, information (on duties of SPCB as stipulated under the HOWM Rules, 2016) in the format as sought by the Monitoring Committee was under preparation and it was requested to send the same at the earliest.

It was learnt that Telangana SPCB has developed a portal for movement of hazardous wastes and liquid effluent which is a good initiative. The same was demonstrated. However, the same is limited to wastes and liquid effluent going to common TSDF and CETP only and feature of date wise records of waste generation and storage have not been incorporated.

Annexure X A

List of Lab Equipment at M/s GEPIL Infrastructure Pvt. Ltd., Rakamcharla (V), Pudur (M) Rangareddy District

Sl.No	Name of Equipment
1	Digital Bomb Calorimeter
2	PH Meter
3	Analytical Balance
4	Flashpoint Appartus
5	Hot Air Oven
6	Muffle Furnace
7	Hot Plate
8	Visco Meter
9	Karl Fischer (Automatic Digital)
10	Flow Cup Viscometer Digital
11	TDS Meter (Pen Type)
12	Respirable Dust Sampler
13	Hygrometer Digital
14	Anemometer Digital
15	Sound Level Meter Digital
16	Rain Gauge Measure Copper
17	Spectrophotometer
18	Vaccm Pump
19	Pilot Sigma Mixer
20	LOD Balance

List of Gas detection sensors

Sl.No	Name of Equipment
1	Aniline
2	NH_3
3	NO & NO_2
4	CO & CO_2
5	HF
6	Cl
7	Br_2
8	CH_4S
9	H_2O_2
10	H_2S
11	VOC
12	SO_2
13	Phosgene

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Annexure XI

Visit report to Aurangabad by Monitoring Committee constituted by CPCB in compliance with orders dated 30/07/2018 of the Hon'ble National Green Tribunal, Principal Bench, New Delhi

Dr. Ajay Deshpande, Chairman of the Monitoring Committee and Dr. A. N. Vaidya, Member of the Monitoring Committee visited the spent solvent recovery units in Aurangabad during December 06-07, 2018 to assess issues on by-products/hazardous waste and hazardous waste management.

The spent solvent is one of the major hazardous waste generated in industrial processes, and its proper handling and disposal is a challenging aspect of chemical handling in the industries. The HW rules requires proper invetorisation and handing of spent solvent before it is given either for recycle or recovery to the third party solvent recovery units. With the strong base of chemical industries in the country where use of solvents is imperative, the solvent recovery units are located in most of the states in large numbers.

As per the HW rules for these solvent recovery units are 'actual user' and as such, all relevant provisions of HW rules are applicable to these units. During the surprise visit to two such solvent recovery units namely; Ramkamal Chemicals Pvt ltd, A-77 and Shiv Shakti Oxalate pvt ltd. A-94/1, Kurkumbh MIDC area along with official of SPCB in Maharashtra, the committee observed that;

1. Both these units could not produce 'actual user authorisation' which is mandatory from SPCB, though they have renewed their consent to operate with specific condition of obtaining AUA. These units could not show the passbook as prescribed under the rules.
2. The industry plant managers were not aware of the SOP for Solvent recovery units prepared by CPCB.
3. The storage and handling of spent solvent received from different parties was not scientific, more so at Ms. Ramkamal Chemicals. There was no labeling on drums; some of the drums were not in good conditions, no concrete flooring for storage of drums, no details of drum disposal etc.
4. There were heavy VOC emissions within the industry premises, more so at Ms Ramkamal Chemicals.
5. Some of the raw material i.e. spent solvents was received from outside the state, and there was no manifest system followed.

All these observations indicate that the enforcement of HW rules at such solvent recovery units needs immediate attention. In order to ensure compliance, it is necessary that the CPCB be requested to issue directions to all SPCBs for following;

1. To ensure that all the solvent recovery industries in the state have mandatory 'actual user Authorisation' and they comply with the SOP issued by CPCB for solvent recovery units, within one month.

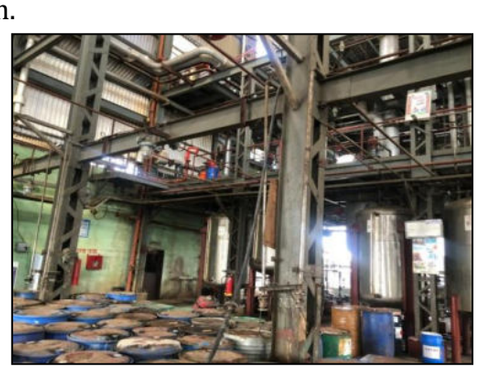

Figure 1: Storage and processing area of spent solvent recovery unit

2. To ensure that these solvent recovery industries shall immediately ensure safe and scientific spent solvent handling and storage.
3. To ensure that such solvent recovery units shall comply with the provisions of HW rules in terms of interstate transport of Hazardous waste with immediate effect.
4. SPCBs shall conduct industry interaction programs to create awareness and sensitization on HW rules with all the stakeholder industries.
5. SPCBs shall immediately prepare an inventory of such solvent recovery units and publish the same on their website for information of all stakeholders with copy to CPCB within one month.

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Annexure XII

Visit report of the Recycling/Processing Units/CETP in Bhiwadi, Rajasthan

As per decision of the Monitoring Committee constituted by CPCB vide order dated 09/08/2018 of the Hon'ble NGT (in the matter of O.A. No. 804/2017: Rajiv Narayan & Anr. Vs. Union of India & Ors.), Sh. Bharat K Sharma, Sc. E, CPCB, Delhi & Member convener of monitoring committee and Dr Sonu Singh, Joint Director, HSMD, MoEF&CC & member of the monitoring committee, visited the following units on 17/12/2018:

i) M/s. Arya Alloys Pvt. Ltd., Survey No. B-824, RIA, Bhiwadi, Tehsil: Tijara, District: Alwara, Rajasthan
ii) M/s Bhiwadi Jal Pradushan Nivaran Trust, opposite new Bus stand, Tijara road, Bhiwadi, District: Alwar, Rajasthan

It was decided to visit M/s India Ecoventure Tyre Recycling Pvt. Ltd., E-801, RIICO Industrial area, Bhiwadi, Tehsil Tijara, District Alwar who was granted permission by MoEF&CC for import of rubber scrap. However, RO Biwadi informed that said unit is closed, therefore, instead of visiting aforesaid unit, M/s Eco Rubber venture, G-1/189, RIICO Industrial Area, Khushkhera, Alwar, Khushkhera, Tehsil Tijara, District Alwar.

Sh. K C Gupta, Regional officer RO Bhiwadi, RSPCB and Sh. Varun Vinod Prabhu, JRF, CPCB also accompanied in the said visits. Inspection reports of the above visits are given at Annexure A, B and C.

Annexure A

Inspection Report of M/s. Arya Alloys Pvt. Ltd., Survey No. B-824, RIA, Bhiwadi, Tehsil: Tijara, District: Alwara, Rajasthan

1.0 About the industry

The unit is engaged in the production of Lead alloy/ refined lead and Lead sub Oxide. Refined lead manufacturing process involves manual breaking of used batteries and separating lead scrap and waste plastic. Waste plastic is being sent to recycling process and lead scrap is mixed with lime and charcoal as per the requirement and this mixture is heated in the temple furnace/rotary furnace to recover the melted lead. Remaining lead ash (accumulate in furnace, cyclone and bag filter) still contain considerable amount of lead metal, hence it is reheated repetitively in the temple furnace or rotary furnace till the maximum lead metals are recovered. After final heating received lead ash have very less quantity of lead metal which is disposed to the common TSDF.

Unit was having 4 temple furnaces (capacity of each 4 MT/day) and 2 rotary furnaces (capacity of each 12 MT/day). All furnaces are connected to air pollution control system include cyclone separator, bag filter, alkali scrubber followed by stack of height about 30 m.

The unit possesses Consent to Operate issued by Rajasthan State Pollution Control Board under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981. As per the Consent to Operate the unit has Lead alloy/ refined lead manufacturing capacity as 17,700 MT/Annum and Lead sub Oxide manufacturing capacity as 1,500 MT/Annum and consent to operate was valid till 31/05/2018. The unit also possesses the Authorization (under the Hazardous and Other Wastes Management Rules, 2016) for Collection, Disposal, Generation, Reception, Recycling, Storage and Transport of Hazardous waste on the premises valid till 30/09/2021. The unit has been granted authorization for ETP sludge (0.75 tons/annum), Lead slag/lead bearing residue (79.25 tons/annum), Lead ash/particulate from flue gas (400 tons/annum).

2.0 Observations:

(i) The unit has sent about 4 MT of hazardous waste (i.e. lead slag/lead bearing residue) to the authorized TSDF in year 2017-18, however; record or manifest could not be shown by the unit.

(ii) At the time of visit about 284 MT of lead ash generated from first stage of heating process was stored in the open area (collected from last 18 months), however; unit informed that their rotary furnace is under maintenance and as the rotary furnace will start the same will be utilized in the further stages to recover the residual lead.

(iii) During visit about 27 MT of lead ingots was stored in the premises under a shed. However, lead ingots was not properly covered or stored in the dedicated storage room.

Figure 1: Stored lead scrap

Figure 2: Stored lead ingots

(iv) The unit is not maintaining daily records of the hazardous waste generated and disposed as per the Form 3 prescribed under Rule 20(1) of the HOWM Rules, 2016. Further unit has not provided the process flow chart as well as

material balance for production of lead, hence, the relationship between lead slag produced and lead scrap utilized cannot be establish.

(v) There was no labeling on bags stored with hazardous wastes as per the Rule 17(1) of the HOWM Rules, whereas, the unit is required to label the bags with requisite details in the prescribed format (Form 8);

(vi) The unit has submitted the annual return of year 2017-18 w.r.t. generation and management of hazardous waste to Rajasthan Pollution Control Board, as required under Rule 20(2) of the HOWM Rules, 2016.

Figure 3: Air Pollution Control Device i.e. cyclone, bag filter and alkali scrubber connected to furnaces

Figure 4: Effluent Treatment Plant of capacity 15 KLD

(vii) All furnaces are connected to air pollution control system include cyclone separator, bag filter, alkali scrubber followed by stack of height about 30 m. However it is observed that alkali scrubber was not functional.

(viii) Unit has installed Effluent Treatment plant of capacity of 15 KLD, however it is not in operation.

3.0 Recommendations:

(i) The unit shall:

(a) maintain records and manifest document as required under Rule 19 of the HOWM Rules, 2016;

(b) maintain daily records on generation, storage, management of hazardous wastes in compliance with Rule 20(1) of the HOWM Rules, 2016;

(c) store all the raw materials, intermediates and products in the covered area/shed having concrete floor and mechanized equipment system for handling these materials;

(d) package and label the hazardous waste stored in accordance with provisions stipulated under 17 of the HOWM Rules, 2016;

(e) operate air pollution control system properly to reduce the particulate matter/gases emission;

(f) sprinkle the water in the loading are to reduce the chances of lead particulates/dust getting airborne;

(g) collect all water used for washing, rain water etc. through separate pit (to delink this from regular drain) to remove metallic lead etc. and the pit should have fine screen for passage of clear water; and

(h) ensure that trucks/vehicles involved in the material handling/ transportation process shall leave the premises only after washing their tyres.

Annexure B

Inspection Report of M/s Bhiwadi Jal Pradushan Nivaran Trust, opposite new Bus stand, Tijara road, Bhiwadi, District: Alwar, Rajasthan.

1.0 About the industry

The unit is engaged in the treatment of industrial and domestic wastewater (generated from 4-5 villages and units located in the RIICO industrial area) in a common effluent treatment plant (CETP). Industrial and domestic wastewater is channelized to CETP through open drain. In CETP conventional Activated Sludge Process (ASP) is provided to treat wastewater where wastewater goes through three stages of treatment viz. primary treatment (i.e. bar screening, grit chamber, Oil & Grease trap, equalization, neutralization, coagulation, flocculation, primary clarification), secondary treatment (i.e. organic matter biodegradation, secondary clarification) and tertiary treatment (i.e. pressure sand filter, activated sand filter and treated water collection). Final treated effluent is disposed in a lake. Water from the lake is partly used in road washing, gardening and farming process.

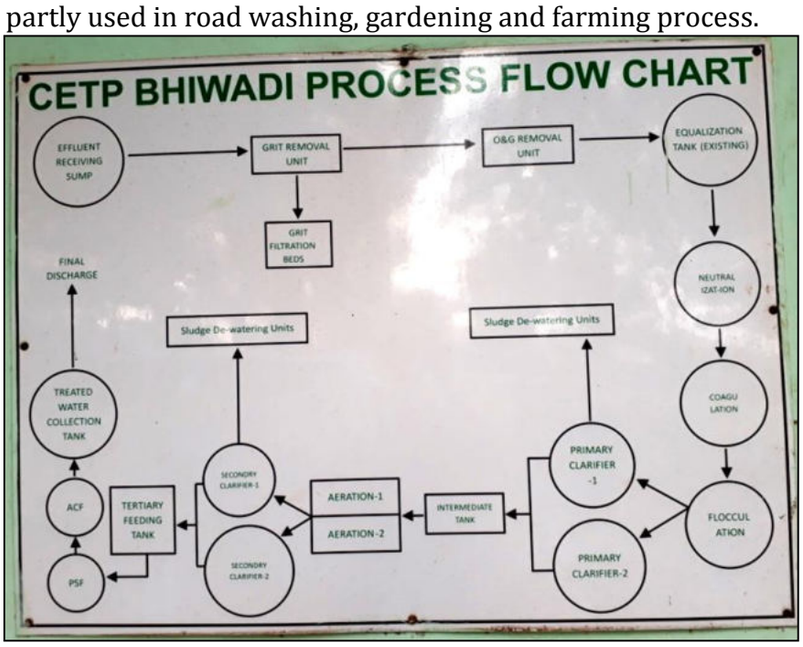

Figure 1: CETP Bhiwadi Flow Chart

In equalization tank surface mixers are provided to equalize the influent wastewater which is fed to the neutralization tank where, lime solution is added to neutralize the acidic wastewater. Neutralized wastewater is channelized to coagulation tank where alum solution is added to create aluminium hydroxide floc and suspended solids present in wastewater adhered to these flocs. To enhance the settleability of the flocs' polymer dosing is done in the flocculation tank. Flocs are separate out from water in the primary clarifier and overflow of primary clarifier is fed to aeration tank where, organic matter in the wastewater is degraded by micro-organisms with help of dissolved oxygen. In the aeration tank diffused aeration system is provided for proper mixing and increasing the dissolved oxygen in the wastewater. Wastewater from aeration tank enters in the secondary clarifier where biomass is separated out from water and supernatant of secondary clarifier goes to tertiary treatment.

The unit possesses Consent to Operate issued by Rajasthan State Pollution Control Board under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981. As per the Consent to Operate capacity of CETP is 9 MLD and Consent to Operate was vilid till 30/09/2014, however, unit has applied for the renewal of the same. The unit also possesses the Authorization (under the Hazardous and Other Wastes Management Rules, 2016) for generation and disposal of hazardous waste, valid till 30/09/2022. The unit has been granted authorization only for ETP sludge (2,500 MT/annum).

2.0 Observations:

(i) It was informed that concentration of COD and BOD (average of last 6 months) in the CETP influent wastewater is about 1,050 mg/L and 175 mg/L respectively. Using the same calculated BOD/COD ratio of CETP influent is about 0.16. However, as per the standard wastewater engineering practices as described in *Wastewater Engineering: Treatment and reuse by Metcalf and Eddy,* BOD/COD ratio for biological treatment should be more than 0.5, which shows that influent wastewater is not suitable to treat with biological treatment, still the outlet COD and BOD (average of last 6 months) are reported as about 210 mg/L (80% reduction) and 30 mg/L (82% reduction) respectively. Hence the results reported by the RD Bhiwadi need to be re-verified.

Further, unit informed that about 50% COD reduction is achieved in the primary stage of treatment only; however, the justification/basis for the same is not given.

(ii) There was no change in the quality of wastewater before and after tertiary treatment w.r.t. colour and odor which implies that the activated carbon filter was not functional.

(iii) Lots of foam was observed in the aeration tank (i.e. about 0.25 to 0.35 m thick), and the possible reasons for the same are slowly biodegrable surfactants present in the influent, proliferation of filamentous organisms in the aeration tank etc. which affects the efficiency of the aeration tank.

(iv) As per Consent to Operate issued by Rajasthan State Pollution Control Board, the capacity of CETP is 9 MLD. However, as per reports provided by unit, they are receiving the influent wastewater up to 11.7 MLD which is 30 % higher than permitted inflow.

(v) Unit has installed online wastewater analyzer at inlet (for pH, flow) and at outlet (for pH, TSS, BOD, COD) for monitoring the flow and characteristics of influent and effluent wastewater.

Figure 2: Foam in the aeration tank

Figure 3: Monitoring screen of online wastewater analyzer

(vi) The concentration of Mixed Liquor Suspended Solids (MLSS) in the aeration tank is about 6,300 mg/L. However, as per the standard wastewater engineering practices as described in *Wastewater Engineering: Treatment and reuse by Metcalf and Eddy*, for conventional ASP, MLSS should be in the range of 1500-4000 mg/L. Excess biomass in the aeration tank requires more dissolved oxygen and it also reduces effective volume of the aeration tank.

During visit it is observed that colour of biomass was light black indicating the unhealthy growth of the microorganisms, which may be due to lack of dissolved oxygen in the aeration tank, low BOD to COD ratio, higher organic loading rate, improper working of diffused aerators etc. which may affect the organic matter removal efficiency of the aeration tank.

Figure 4: Filling of dewatered ETP sludge into vehicle for co-processing

Figure 5: Stored ETP sludge under dedicated storage shed

(vii) ETP sludge was generated from primary and secondary clarifier. At the time of visit, about 200 MT of primary ETP sludge was stored in the form of heap under covered dedicated storage shed. However, no slope was provided to floor for collecting the leachate from the sludge and garland drain around the storage area for recirculating the leachate for treatment.

Further, no storage of secondary sludge was observed during the visit and unit informed that they are sending secondary sludge to gardening directly from the filterpress. However, detail analysis report of secondary sludge was not provided by the unit.

(viii) The unit has sent primary ETP sludge to coprocessors for which the unit has maintained Manifest document (as required under Rule 19 of the HOWM Rules, 2016). However, the unit has provided the following data of year 2016-17 and 2017-18:

Hazardous waste	**Quantity of sludge disosed (MT)**		**Disposal**
	2016-17	2017-18	
ETP sludge (primary sludge + sludge generated during neutralization of spent acid)	11,986.465	13,497.951	Co-processing at Shree Cement Ltd., Ultratech cement Ltd. and RWMP, Udaipur

From above data it is observed that the ETP sludge generated by unit is about 450% more than the authorized quantity.

(ix) Apart from the above hazardous waste, oil and grease skimming (generated from oil and grease trap) and spent carbon (generated from activated carbon filter) are also generated in the unit which are not covered in the authorization issued by the Rajasthan SPCB.

(x) Unit claimed that oil and grease skimming sent to common TSDF and spent activated carbon to co-processing, however; record or manifest document in this regard could not be shown by the unit.

(xi) Quantity primary sludge generation informed by unit is about 15 MT/day, however, as per the calculation by using following formula the same is estimated to be about 7 MT/day.

$$\mathbf{P_{TSS} = \frac{((TSS_o - TSS) \times Q + (Lime + Alum + Polymer)) \times M_c}{1000}}$$

- P_{TSS} = Quantity of primary sludge production (kg/day)
- TSS_o = Influent total suspended solids = 0.377 kg/m^3
- TSS = Effluent total suspended solids = 0.051 kg/m^3
- Q = Flow = 9500 m^3/day

- Lime, Alum and Polymer = Quantity of respective chemicals = 2400, 400 and 5 kg/day resp.
- M_c = Factor for moisture containt in final sludge = 1.3 (Assuming 30% moisture in the final sludge)

(xii) Quantity of secondary sludge generation informed by unit is about 6 MT/month, however, as per the calculation by using folllowing formula the same is estimated to be about 12.1 MT/month.

$$P_{xv} = \frac{Y \times Q \times (S_o - S) \times M_c}{1 + (k_d \times \Theta_c)}$$

- P_{xv} = Quantity of microbial mass produced per day (Kg/day)
- Y= Biomass yield (gm is Volatile Suspended Solids / COD (gm)) = 0.4
- Q = Flow = 9500 m^3/day
- S_o = Influent COD = 0.605 kg/m^3
- S= Effluent COD = 0.209 kg/m^3
- k_d = biomass decay coefficient (gm VSS/ gm VSS /day) = 0.06 day^{-1}
- Θ_c = Sludge retention time = 45 days
- M_c= factor for moisture containt in final sludge = 1.4 (Assuming 40% moisture in the final sludge)

(xiii) The unit is maintaining daily records of the ETP sludge generation and sending for co-processing and gardening. However, such daily record is not as per the Form 3 prescribed under Rule 20(1) of the HOWM Rules, 2016.

(xiv) The unit has submitted the Annual return w.r.t. generation and management of hazardous waste (i.e. ETP sludge) to Rajasthan Pollution Control Board, as required under Rule 20(2) of the HOWM Rules, 2016.

3.0 Recommendations:

The unit shall:

(a) Maintain the organic loading rate in the design range and required dissolved oxygen concentration in the aeration tank;
(b) Operate the activated carbon filter properly to achieve desirable quality of outlet wastewater w.r.t. colour and odor;
(c) Add antifoaming agent in the reactor to reduce the foam;
(d) Operate CETP on designed flow rate (i.e. 9 MLD);
(e) Maintain MLSS in the aeration tank within range of 1500-4000 mg/L;
(f) Maintain manifest for sending hazardous waste (i.e. spent carbon and oil and grease skimming) for disposal or co-processing;
(g) Obtain Hazardous waste authorization for generation and disposal of oil and skimming and spent carbon;
(h) Maintain daily records on generation, storage and management of hazardous wastes in compliance with Rule 20(1) of the HOWM Rules, 2016;
(i) Store ETP sludge in a lined floor/pit having proper slope. Storage area should have garland drain around the sludge storage area to collect the leachate generated from sludge. Make an arrangement for collection and conveyance of the leachate to treat in the CETP. Further, separate storage area to be provided for primary and secondary sludge storage;
(j) Submit the Annual return w.r.t. generation and management of hazardous waste (i.e. spent carbon and oil and grease skimming) to State Pollution Control Board, as required under Rule 20(2) of the HOWM Rules, 2016.

Annexure C

Inspection Report of M/s India Ecoventure Tyre Recycling Pvt. Ltd., E-801, RIICO Industrial area, Bhiwadi, Tehsil: Tijara, District: Alwar, Rajasthan

1.0 About the industry:

The unit is engaged in the production of rubber crumb/granules. The manufacturing process involves separation of a steel ring from waste tyre in the De-beading machine followed by cutting of tyre using strip cutter in to rubber strips. These rubber strips are again cut into small (about 2.5cm x 2.5cm) chips in chips making machine and further fed to shredder to crush the rubber chips in to fine rubber granules. At the tail end of the shredder magnetic strip is provided where steel wires are separated out from rubber granules. The rubber granules are passed through vibrating screens to obtain the rubber granules of required size.

Figure 1: Collection of fine rubber granule

Figure 2: Strip cutter

The unit possesses Consent to Establish and Consent to Operate issued by Rajasthan State Pollution Control Board under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 for manufacturing of rubber granule having manufacturing capacity of 60 MT/day. Consent to Establish was valid till 30/04/2023 and consent to Operate was valid till 31/10/2028. The unit also possesses the Authorization (under the Hazardous and Other Wastes Management Rules, 2016) for Collection, Generation, Incineration and Storage of Hazardous waste on the premises valid till 30/11/2023. The unit has been granted authorization for shredded tyre scrap (85 MT/day).

2.0 Observations:

(i) During visit it was observed that M/s Eco Rubber venture was operating their plant on trial basis only and have not started production of rubber granule.

(ii) With regard to proposed visit of M/s India Ecoventure Tyre Recycling Pvt. Ltd., E-801, RIICO Industrial area, Bhiwadi, Tehsil Tijara, District Alwar, RO Bhiwadi informed that this unit is closed. However, refereeing letter dated 15/12/2017 of owner of the said plot i.e. M/s Matod Industries (P) Ltd. who has informed that, about 2-3 years back plot no. E-801, Industrial area Bhiwadi was rented to the said M/s India Ecoventure Tyre Recycling Pvt. Ltd. and now the same is not in existence at said plot. The said plot was purchased by M/s Matod Industries (P) Ltd. from M/s Meca Quilts Ltd. vide registered lease deed dated 19/05/2017.

Further, it was observed that, MoEF&CC has issued permission for import of used rubber scrap vide letter dated 06/04/2018 to M/s India Ecoventure Tyre Recycling Pvt. Ltd. The said permission was granted based on Consent to Operate by Rajasthan SPCB under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 vide letter dated 20/03/2018.

3.0 Recommendations:

(i) MoEF&CC may examine and take necessary action with regard to issuance of import permission to the M/s India Ecoventure Tyre Recycling Pvt. Ltd., E-801, RIICO Industrial area, Bhiwadi, Tehsil Tijara, District Alwar, RO Bhiwadi, as this unit was not in existence at the said premises during the grant of permission by MoEF&CC.

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Annexure XIII

Visit Report to remediation of contaminated sites along ECP channel in Baroda, Gujarat

1.0 Background:

The state of Gujarat ever since the beginning of industrial revolution in India, evolved as a hub of manufacturing industries specifically in the areas of chemicals, petrochemicals, pesticides and other miscellaneous sectors. Way back in the year 1977, Vadodara city became one such industrial hub housing the industrial complex of Central and State Government industries namely Indian Oil Corporation Ltd. (IOCL), Indian Petrochemical Ltd (IPCL; now Reliance Industries Ltd), Gujarat State Fertilizer Corporation (GSFC), Gujarat Alkali and Chemicals Ltd (GACL) and GIPCL. The area was also housing small and medium scale industries in Nandesari, Padra as well as surroundings to GIDC area.

As the area was land locked, in order to safely dispose the treated waste waters into the marine environment, an effluent channel project (ECP) was conceived and commissioned in the year 1983. The canal was designed to carry 130 MLD of treated effluents over a distance of 55 km into the Gulf of Khambat. The entire channel is covered with RCC slabs from the takeoff point at Dhanora, where the large industries are located and Nandesari CETP is also located nearby. As on November 2014, ECPL enrolled a total of 35 members, 2 CETPs namely Nandesari and EICL of Umraya. Nandesari CETP has 171 members, whereas EICL as many as 61 members. The detailed layout of this canal and surroundings has been highlighted in Figure 1.

Since the channel was constructed in brick masonry and farmers also used the treated effluents for irrigation purpose, there were complaints about ground water contamination in few patches along the canal. It was therefore, decided that the Vadodara Effluent Channel Ltd (VECL, the new name of ECPL) to collect the ground water samples along the channel and in the year 2016 M/S ERM was entrusted the task to assess the extent of contamination and accordingly the DPRs were prepared assessing the extent of contaminationfor the decontamination of sites where ever the pollution had entered into the ground and contaminated the ground water. The industries responsible for such contamination were also identified and GSPCB issued directions to such industries to take up the remediation work to remediate the contaminated ground waters.

2.0 The site visit by Monitoring Committee members:

Two such industries that were identified to remediate the contamination are M/S Huntsman International Pvt Ltd located at Ekalbara and M/s Mayur Dye chem Intermediates Ltd located at Karkhadi . Both these units were visited by Monitoring committee members namely Dr. D C Sharma and Dr. A Manoharan on 24th December 2018. Visit was also planned to the VECL office as they are the custodian of the ECP canal system and responsible for day today operation of the same. GSPCB officials namely Mr Thakar, Mr. SP Gupta, Mr. Neeraj, also accompanied the team members.

The visit commenced from M/s Huntsman where the industry's consultant M/S ERM made a detailed presentation on the ongoing activities for the remediation of the ground water that was contaminated due to unscientific storage of the hazardous wastes within the premises for a considerable time. This was followed by visit to the capped landfill, abstraction and monitoring wells nearby, treatment plant for the purification of pumped out water and also the bore wells on the other extreme boundary. Spot Samples from bore well no 1 were also collected for analysis by Industry, GSPCB and regional office of CPCB.

Figure 1: ECP canal Project- Effluent Carriage System

Similar presentations were made by the consultant M/S Kadam on behalf of M/s Mayur Dye chem followed by the site visit to pumping, storage and blending area and the prototype for the proposed treatment of pumped out water through Fenton system clubbed with Reverse Osmosis.

Finally a visit was made to VECL Office and the discussions were held with Mr. Satish Panchal, MD on the status of the directions issued by GSPCB. It is to be noted that recently GPCB issued a closer notice to M/s VECL for non compliance on various counts.

The salient features of these visits are outlined in the following paragraphs:

3.0 Remediation works at M/S Huntsman International Pvt Ltd:

3.1 Background:

it was learnt that earlier an industry in the name of M/s Textiles was operating in the premises engaged into manufacture of H-acid and other dyes for the textile sector. In the absence of proper scientific norms, the gypsum sludge and other hazardous solid wastes were stored unscientifically within the premises which subsequently lead to the ground water contamination. Although, a secured landfill was constructed in the year 1993, but the bottom and sides of the SLF were not provided with HDPE impermeable membranes (only a bituminous coated bottom layer) which easily gave way to the leachate to infiltrate into the ground waters.

Based on the directions issued by GSPCB, an assessment report was prepared by M/S ERM and the same is under implementation. Some of the actions taken are exhibited as below:

3.2 Secured Landfill Area:

i) The secured landfill was provided a sealed capping using the HDPE liner as per CPCB guidelines and a green grass cover was maintained since then.

ii) This action shall prevent the rain waters to further infiltrate into the Hazardous waste and finally into the already contaminated ground waters.

Figure 2: Capped secured landfill site

Figure 3: Gypsum sludge storage area

iii) The gypsum sludge that was stored in open area was also lifted and at this location a concrete bed was constructed above ground to store the gypsum sludge in safe manner.

iv) As of now the industry discontinued manufacturing H-acid, hence the gypsum sludge is not produced for storage. As such the storage area for gypsum was found to be empty.

3.3 The monitoring cum abstraction well:

i) Close to the SLF, and gypsum sludge storage area, the shallow well (30 m depth) exhibited the symptoms of ground water contamination in the form of dark brown coloured water. A total of three samples were collected from this bore well for analysis by industry, GSPCB and CPCB.

ii) This was done to cross verify the quality of data generated by M/s ERM (through SGS laboratory) and the GSPCB, as significant variations were noted in the results.

iii) The pumped water from this well is mixed with water having lesser colour from the other wells, treated in the treatment units and utilised in the day-today operations of the industry.

iv) The waste waters arising out of industrial processes is further treated in the effluent treatment plant and finally discharged into ECP channel for it disposal.

v) The analysis reports by these agencies referred as above are highlighted which clearly indicates the presence of colour in the ground water.

Figure 4: collection of ground water to verify colour of water

vi) In order to contain the contamination from further spreading, it is suggested to draw more water from this well and if possible treat separately without blending with other streams.

3.4 The Containment well:

This well is towards the downstream side (of the ground water flow) on North-West side of the industry and pumping from the depth of approx 80 m.

At this depth, the colour presence in water is also to a lesser extent. The pumped water is utilised after mixing with other waters prior to its treatment and reuse within the industrial processes.

3.5 Recommendations:

i) The rain water harvesting and injection of fresh water into the ground could hasten the process of remediation as the reducing yield from this well indicates that water levels are receding at shallow depths.

ii) Reuse of the treated effluent in the processes so that dependence of fresh water abstraction could be minimised. Therefore, more water abstraction from the contaminated shallow well could be targeted.

iii) Few additional abstraction wells could also be drilled near the SLF to expedite the remediation process as the process has taken almost 5 years and still the colour is persisting.

iv) Vertical RCC walls around the capped SLF could be considered to isolate the rain waters diffusing into the landfill contents.

v) Few samples outside the industry premises in the direction of flow could be collected and assessed for the extent of remediation.

4.0 M/s Mayur Dye Chem Pvt Ltd:

4.1 Background:

The industry is located in Ekalabara area and engaged in the manufacture of H-acid Since the gypsum and other sludge must have been stored in an unscientific manner in the past, lead to the contamination of ground water within and around the industrial premises. The preliminary assessment on the extent of contamination of ground waters was carried out by M/s ERM whereas on the directions issued by GSPCB the industry has engaged M/S Kadam to implement the scheme, who in turn has been working on the treatability and feasibility studies of the coloured ground waters through Fanton oxidation and in combination with Reverse Osmosis.

4.2 Status of Decontamination:

4.2.1 Pump and Treat System:

1. Depending upon the extent of treatment abstraction wells have been dug at depths 20, 50 and 80 m respectively, the ground waters are being pumped out at different depths and stored in separate HDPE tanks. One tank has been provided to blend all the waters and used for the industrial purposes.
2. A series of rotameters are also installed to measure the quantum of flow pumped out at different depths. Generally higher flow rates are maintained at shallow depth where the extent of contamination appears to be quite significant.
3. The consultant after conducting the lab scale treatability studies have concluded that Fenton oxidation system using H_2O_2 is one of the viable way of removing colour and COD from the waters pumped out. The pilot scale plant is also installed and the unit has to commence the pilot scale studies on the Fenton Oxidation.
4. Plans are also ready to further treat the oxidized waste waters trough RO system so as to utilise the permeate however, industry is yet to come out of the solution towards safe disposal of the reject stream which may contain high to very high TDS in the concentrated effluent.
5. It was also noticed that industry has now constructed and commissioned a concrete lined covered shed to store the gypsum sludge, which is being handed to the cement mills for co-processing. This action at least would arrest further contamination of the ground waters.
6. It could also be seen from the records that industry may not be operating in an honest manner resulting VECL suspending the membership at some point of time.

4.2.2 Recommendations:

The following could be recommended to enhance the process of decontamination.

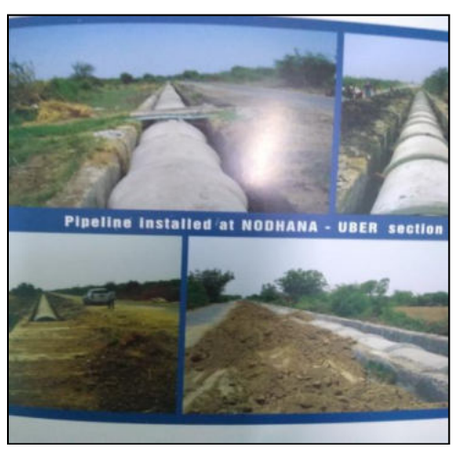
1. The Fenton Oxidation system shall be commissioned latest by 31st January 2019 and the quantum of ground water pumping shall be further increased for speedy decontamination of ground waters.
2. The safe disposal of the RO reject streams shall be worked out at the earliest, else the same shall be either disposed into VECL canal system or into the ground waters once again defeating the very purpose of decontamination.
3. There is a need to intensively monitor the discharge from the industry into the canal system. Although, a cc camera has been installed by VECL at the disposal point into the canal, yet in the light of previous history and in the light of RO rejects generation, the industry may attempt to discharge non complying effluents into the canal system.
4. It is also essential that the claims made by industry that untreated, blended ground waters are utilised for washing etc in the manufacturing process, shall be thoroughly cross verified in the light of fresh water requirement for

other industrial purposes. The industry is expected to used only pumped waters for the industrial purposes and as such no other source of fresh water shall be used as per GSPCB directions in this regard.

5. In long run, the industry may be directed to install a state of art RO system, as of now some second hand RO membrane has been installed without any prefiltration systems, although, at the rotameters choking was observed indicating the ground waters containing suspend material in it.
6. If need be, few other shallow bore wells may be dug in other parts of the industry for additional pumping and efforts shall be made to recharge these wells with rain water for dilution and maintaining the yield from the bore well.

5.0 The Discussions at VECL:

The owner of the canal system is VECL and visit to this office revealed the following.

1. In the light of complaints about the diffusion of contaminants from the canal waters due to either overflowing of channel in rainy season, mere brick lined canal that too decades ago, It has been decided to convey the effluents through the piping system.
2. It was given to understand that annually VECL undertakes the maintenance works of the canal and as such significant quantities of settled sludge (Hazardous wastes) is removed. This indicates that few companies are still illegally discharging the Hazardous waste into the conveyance system
3. RCC pipe line has been provided from the tail end and in stretches where industries are discharging effluents into the canal system.
4. Till now a total of 5 Km stretch has been laid with the pipe line inside the existing channel.
5. VECL has been collecting samples from the industries out lets from time to time, but VECL has no regulatory powers other than merely suspending the membership that too temporarily.
6. GSPCB appears to have directed VECL to install FETP (Final Polishing treatment plant) at the tail end so as to take care of any non complying effluents in the canal system. As a regulatory tool recently GPCB has issued closer notice under section 33 of the water act.
7. It is understood that the canal system was designed to carry a flow of 130 MLD, however, a maximum of 60 MLD discharge is conveyed through this canal. Now since pipe line is also designed to carry maximum flow up to 60 MLD, it would be essential to ensure that total discharge into the pipe line shall not exceed the maximum designed capacity.
8. 

9. **Figure 5:** The RCC pipe line laid within the canal
10. In order to reduce the total discharge into the pipe system, member industries shall have to resort to attain zero discharge system by recycling the treated effluents with in premises and minimizing the demand for the fresh waters. An action plan shall have to be prepared in this regard.

11. The decision of carrying corrosive effluents through cement pipe line does not seem to be appropriate as the joints may be corroded and may start leaking once again, defeating the very purpose of huge investment. Generally for industrial effluents, HDPE pipes are recommended as against the cement/RCC pipes.

6.0 Final Recommendations:

The recommendations could be generalized in the following paragraphs.

1. There is every possibility that prior to the concept of HDPE double liner system as introduced by CPCB, large number of industries must have been either storing hazardous wastes in the open grounds without any protective cover from the rain water and this must have lead to the contamination of soil and the leachate infiltration into the ground waters in the vicinity. Hence all such units shall be thoroughly investigated by the third parties to rule out the contamination within those premises and outside.
2. Specifically in poorly maintained industries, the contaminants may infiltrate into the ground, if the floorings are either not appropriate or corroded over a period of time. Such units may also need to be investigated for possible contamination. The industries that handle concentrated acids, pickling, electroplating, with leaking underground tanks etc. are likely to contaminate the soils and the ground waters.
3. Those industries having captive landfills but not laid with double HDPE geo membranes are likely to contaminate the strata below the landfills. It is seen that the SLF designed prior to year 2000 by NPC were equipped merely with bituminous coated bases which exhibit significant potential to leaching into the ground. All such captive SLFs need to be investigated for possible leaching of contaminants into the ground as the leaching is a slow preprocess and the results may be visible after considerable time is elapsed.
4. Similarly the TSDFs designed by NPC prior to year 2000 may also need thorough investigation to rule out the possible contamination in the vicinity.
5. Few TSDFs (for example at Roorkee and Kanpur by Bharat Trans Oil and in Tumakuru in Karnataka) that have been designed and operated not strictly as per CPCB guide lines, also need to be investigated for possible contamination.
6. As a matter of fact all those TSDFs that have experienced 5years of operation or more, should be studied for the quality of ground waters at shallow depths ranging from 20m to up to 80 m depth.
7. Special attention is required in the states that have not yet come up with TSDF and the industries are directed to store the hazardous wastes within their premises. There is every possibility that industries in such states may possibly be dumping the hazardous wastes illegally within or outside the state boundaries. This needs be thoroughly studied for the possible contaminated sites in those areas.
8. All such investigations shall be carried out by professional companies appointed by MOEF/CPCB under the guidance and supervision of Monitoring Committees specifically constituted for the purpose.
9. The expenditure for such task can be met from the funds that have been collected as penalty by NGT and/or the industries that are investigated by the third parties. The respective state PCBs shall be responsible to prepare a preliminary list of all such units.
10. The list shall also include underground storage tanks of oil companies, age old municipal solid waste dumps, abandoned industries and all such areas where possibly the Hazardous waste could have been buried.

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Annexure XIV

Minutes of the meeting held with officials of Jawaharlal Nehru Custom House, Mumbai

1. The Monitoring Committee during its second meeting held during September 25-26, 2018, decided to visit Jawaharlal Nehru Port Trust, Mumbai, to monitor import/export of hazardous and other wastes and methodologies being followed and facilities available for executing the duties assigned to the Custom Authority under Rule 13, 14 and 15 and Schedule VII of the HOWM, Rules, 2016. Accordingly, Jawaharlal Nehru Custom House, Mumbai was visited on October 15, 2018, by following members of the Monitoring Committee:

   a) Dr. Ajay Deshpande, Chairman of the Monitoring Committee
   b) Sh. Bharat K Sharma, Nodal Officer and Member Convener of the Monitoring Committee & Scientist E, WM-II Div., CPCB, Delhi
   c) Dr. Sonu Singh, Joint Director, Ministry of Environment, Forest & Climate Change & Member of the Monitoring Committee
   d) Dr. A. Manoharan, Member of the Monitoring Committee

2. Sh. Yudhast Kumar, DC, Disposal, welcome members of Monitoring Committee and made a brief presentation on the duties assigned under HOWM Rules, 2016, procedures and methodologies adopted by Custom Authority for import and export of hazardous waste. He informed that for import of various categories of wastes, document verification is being [practiced by them such as the following:

   I. Tyre/Rubber Scrap
      - Form6/Form 9: Movement Document
      - The Import License from DGFT
      - Memorandum from MoEF&CC
      - Pre-shipment Inspection Certificate (PSIC)
      - Authorization from concerned SPCB

   II. For Metal Scrap
      - Form6/Form 9: Movement Document
      - The Import License from DGFT
      - Pre-shipment Inspection Certificate (PSIC)
      - Authorization from SPCB

3. Further, he also highlighted the green initiatives taken by JNCH like Bio Degradation of food articles, destruction by incineration (eg. Gutkha, Fire Crackers etc.). He further added that JNCH has also enhanced focus on "Green Customs".

4. A case study of illegal traffic was demonstrated during the presentation wherein the possible action w.r.t. illegal traffic of hazardous and other wastes practiced by them was also shared with the Members of the Committee.

5. He also briefed about the issues/problems faced by the Custom Authority such as no proper feedback mechanism, lack of training and infrastructure, technical language and its interpretation, balancing of trade facilitation and policy compliance, lack of facility and resource for destruction, etc.
6. Thereafter, members of the Monitoring Committee visited the Jawaharlal Nehru Custom House Laboratory Facility set-up for testing of hazardous waste and also interacted with officials, who were dealing with hazardous waste cargo. List of testing facility available in the said laboratory is enclosed at Annexure-I.

7. After visit and detailed discussions with officials of JNPT, following recommendations were made :
   a) Need for harmonization of Basel codes with ITC (HS codes)
   b) Risk management assessment: The customs authorities use the risk management system (RMS) to enable low risk consignments to be cleared based on the acceptance of the importer's self-assessment and without examination. Roughly 30 percent of containers covered under risk management out of which 10 percent are physically verified. There are different types of waste streams which have not been integrated in the RMS. There is a need to review the import/export data of various waste streams and include them in RMS. Further, waste streams in Schedule III – Parts A, B and D and Schedule VI that are often mis-declared by importers need to be identified and added to the RMS.
   c) Requirement of collaboration between regulating authorities: Regular interaction between the Ministry of Environment, Forest and Climate Change, CPCB, SPCBs, customs and ports authorities should take place with frequent consultative meetings and trainings in order to avoid working in silos.
   d) Separate budget for destruction of seized materials: The Customs authorities need to be provided with funds to enable the environmentally sound management of seized hazardous and other wastes.

Annexure-A

1. Conventional Analysis
2. Instrumental Analysis
   i. Gas chromatography
   ii. HPLC
   iii. AAS
   iv. Metal Analyzer
   v. UV-Vis Spectrophotometer
   vi. Flame Photometer
   vii. FTIR
   viii. GCV
   ix. Auto Titration
   x. Oil content in wax
   xi. Melting/Boiling/Aniline/Flash/Drop Point

Type of samples received at laboratory:

Metals, Mineral Oil (base oil, rubber process oil, furnace oil, lube oil, white spirit, low aromatic oil, wax), Plastics & Rubber, Textiles & textile chemicals, Dyes/Dye intermediates, Pharmaceuticals, Organic and Inorganic chemicals, Ore & Minerals, Animal feed supplementary, Paper & paper products, Coal.

***

Annexure XV

FORMAT FOR INSPECTION OF INDUSTRIES WITH REGARD TO GENERATION AND MANAGMENT OF HAZARDOUS WASTES

S.No	Particulars	Status / details
1.	Name of Industry	
2.	complete postal address of the industry	
3.	Website	
4.	Tel and Fax Number	**Telephone No.1:** 0 **Telephone No.2:** 0 **Fax:** 0
5.	longitude and latitude	
6.	E-mail	
7.	Date of Visit	D D M M Y Y Y Y
8.	Contact Person Name, Designation and Contact No	**Name** **Designation** **Contact No.**
9.	Name and Designation of the Officials visiting the Unit	
10	Process description in brief for each Product. Also attach Process Flow Diagram indicating raw materials and sources of hazardous waste generation	

Sr. No	Name of Person	Designation
1		
2		
3		
4		

<table>
<tr><th>S.No</th><th>Particulars</th><th>Status / details</th></tr>
<tr><td></td><td>along with mass balance.</td><td></td></tr>
<tr><td>11</td><td>Year of commissioning</td><td>
<table>
<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>12</td><td>Production (in MT or KL / day)

of each product</td><td>
<table>
<tr><th>Sr. No</th><th>Product</th><th>MT/day or Month or Annum</th><th>Operational status</th></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>13</td><td>Status of consent under the Water Act, 1974</td><td>
Date of issue
<table>
<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Validity
<table>
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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>14</td><td>Status of consent under the Air Act, 1981</td><td>
Date of issue
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<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Validity
<table>
<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>15</td><td>Status of Authorization under the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 (HWM Rules, 2008) / Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016 (HOWM Rules 2016) and details of Hazardous Waste (HW) authorized

(please also attach copy of authorization)</td><td>
Date of issue
<table>
<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Validity
<table>
<tr><td>D</td><td>D</td><td>M</td><td>M</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><th>S.No</th><th>Name of HW</th><th>Category</th><th>Quantity</th><th>Mode of Treatment & Disposal/Recycling/Reuse/etc.</th></tr>
<tr><td>1.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>..</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
</table>

S.No	Particulars	Status / details
16	Name and Categories of HW generated and their respective quantity (Please specify all types of HW generated from the unit along with category as per Schedule I or II of the HOWM Rules 2016)	The details of various categories of hazardous wastes generation and their quantity, as verified by the inspecting team during the inspection are as below in Table 1:

Sl. No. (1)	Various Production Plant/ Process at the facility (2)	Name of HW (with category) generated in Tonne and their quantity per tonne of inputs* (3)	HW generation (in Tonne) per tonne of the consented product (4)	HW generation as per the consented capacity of the product (Tonne per day or month or annum) (5)	Actual quantity of products produced or inputs used				Actual Quantity of HW generated	
					During current financial year (as on date of inspection) (6)		During previous financial year (7)		During current financial year (as on date of inspection) (8)	During previous financial year (9)
					Product	Input	Product	Input		
1.										
2.										
3.										
4.	ETP (KLD)									
5	Utilities									
6	Other									

*Please give name and quantity of each of the inputs for each rows of the above table. In case of recycling/utilization/pre-processing/co-processing units, the inputs would also include HW being procured and used in deriving products

Note: *Column (3) and (4) are to be derived as per mass balance and verified during the inspection. Column (6) and (7) are to be derived from Column (3) or (4), as applicable*

17	Captive Recycling/ Utilization/ Incineration/ Secured Landfilling facility details	If yes, please specify details of such facilities including compliance details as per the Rules and CPCB guidelines (please refer checklist):
18	Details of HW storage, Quantity of HW Stored and period of storage	1. Storage facility details and capacity: (i) Lined /Unlined : (ii) Open/Covered and safe from rain water intrusion : (iii) Capacity : Size L x W x H and quantity in Tonne it can store (iv) In case of incinerable hazardous waste storage, comment on compliance of CPCB guidelines (refer checklist): 2. Details of HW Stored:

Table2: Details of HW Stored

Sl. No. (10)	Name & Category of HW (as per column (3) of Table 1) (11)	Actual HW generated in Tonne (sum of column (8) and (9) of Table 1) (12)	Previous Stock (in Tonne) stored in Storage shed (at the beginning of previous financial year) (13)	Actual quantity (in Tonne) found stored on the day of inspection (14)	Balance (in Tonne) (Column 13 + Column-Column14) (15)	Latest date of transfer of HW to authorised Recycler/ Co-processor/ TSDF/etc. (16)
1						
2						
3						

3. Comments on whether HW is being sent to authorized Recycler/ Co-processor/ TSDF/etc. timely in compliance with Rule 9 of the HOWM Rules :

<table>
<tr><th>S.No</th><th>Particulars</th><th>Status / details</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>19</td><td>Categories and quantity of HW sent to authorized actual user/Common TSDF</td><td>1. Details of the authorized actual user* /Common TSDF, as applicable, whom HW are sent:

<u>Table 3A: Details of authorized actual user and TSDF</u>
<table>
<tr><th>Sr. No.
(17)</th><th>Name & address of the authorized common TSDF/Actual User*
(18)</th><th>Name of SPCB/PCC who granted authorization to the authorized TSDF/Actual User* and authorization no. with its validity
(19)</th><th>Activities for which authorisation granted to the authorized TSDF/Actual User* (Specify among Transportation/ Recycling/ Utilization/ Pre-processing/ Co-processing/ Incineration/Secured landfilling)
(20)</th><th>Name & categories of HW for which authorization granted to the authorized TSDF/Actual User*
(21)</th></tr>
<tr><td>1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td><td></td></tr>
</table>
*Actual user includes occupier who procures and processes HW for reuse, recycling, recovery, pre-processing, utilisation including co-processing.

2. Details of HW sent to the authorized actual user and TSDF, as applicable, since previous financial year (as per daily /annual record and manifest document Form 10): Please fill applicable data in Table 3B as attached with this format separately.</td></tr>
<tr><td>20</td><td>Compliance w.r.t. labeling, manifest system, records, annual returns, etc.</td><td>Please make observations on the below:
1. Adequate packaging of HW
2. Labeling of HW containers in Form 18
3. Compliance of all Manifest Documents and sending/receiving of the same to the concerned when HW are being sent (refer Rule 19 of the HOWM Rules, 2016)
4. Transportation of HW only by authorized sender or receiver
5. NOC from the concerned SPCB/PCC if HW are sent for disposal to other State/UT
6. Intimation to both the SPCBs/PCCS before handing over the waste to the transporter incase HW is sent for recycling or utilisation including coprocessing
7. Prior intimation to SPCBs/PCCs of the States/UTs of transit incase of interstate transportation
8. Transportation of HW and compliance with Rules under Motor Vehicles Act, 1988
9. Daily records maintenance in Form 3
10. Timely submission of annual returns in Form 4 to the SPCB/PCC</td></tr>
<tr><td>21</td><td>Safety facilities provided at storage facility</td><td>
<table>
<tr><th>Sr. No</th><th>Safety Facility</th></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>5</td><td></td></tr>
<tr><td>6</td><td></td></tr>
<tr><td>7</td><td></td></tr>
</table></td></tr>
<tr><td>22</td><td>Environmental Monitoring</td><td>Please comment on results of ground water sampling; soil sampling; stack emission monitoring conducted by SPCB/PCC or EPA notified lab in presence of SPCB/PCC officials</td></tr>
<tr><td>23</td><td>Details of HW contaminated sites, if any, within and outside the industry premise</td><td></td></tr>
<tr><td>24</td><td>Remarks</td><td>Please write down non-compliances, significant observations and recommendations</td></tr>
</table>

Place : Signature

Date: (Name and designation of inspecting official)

Table 3B: Details of HW sent to authorized actual user and TSDF listed in Table 3A since previous financial year till date of inspection

S. No.	**Name of HW & Category** (as per column 2 of the Table 2)	**Quantity recycled/ Utilized/ Disposed in captive facility (in Tonne)**			**HW sent for Recycling/ Utilization/ Pre-processing/ Co-Processing/ Incineration/ Secured Landfilling in Tonnes and to whom**							**Total HW recycled/Utilized in captive facility and sent to other authorized facility** (Sum of column 24 to 33)	**Quantity of hazardous waste store within the premises** (as per column 15 of the Table 2)
		Incinerated	Secured Landfilled	Recycled/ Utilized	Recycling	Utilization	Pre-processing	Co-Processing	Incineration	Secured Landfilling	Sent to whom (please specify Sl. No. of Table 3A)		
(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)
1.													
2.													

*Comments on difference between (Column 15 of Table 2/Colum 35- Column 34)

Checklist for inspecting officials

- ☐ Assess various categories of hazardous and other waste generation (as per industrial process and Schedule I, II, III and IV of the HOWM Rules, 2016)
- ☐ Assess and verify quantity of each categories of hazardous and other waste generation
- ☐ Verify authorization conditions
- ☐ Verify packaging and labeling as per Form 8
- ☐ Hazardous and other waste storage area with adequate size/capacity
- ☐ Compliance of provisions of CPCB guidelines for “Storage of Incenerable Hazardous Wastes by the Operators of Common Hazardous Waste Treatment, Storage and Disposal Facilities and Captive HW Incinerators”, if applicable
- ☐ Common TSDF membership
- ☐ Manifest documents as per Form 10
- ☐ Sending/Receiving of various signed Manifest Document (Form 10) as per Rule 19
- ☐ All categories of generated hazardous and other waste included in the authorization along with quantity and mode of disposal/utilization/recycling/etc.
- ☐ Hazardous and other waste disposed/handed over timely to authorized facility (Refer Rule 8)
- ☐ Verify provisions and checklist of relevant SoP/Guidelines developed by CPCB in case of Recycling/Utilization of hazardous waste

- ☐ Verify enforcement of passbook in case of actual user
- ☐ Daily records as per Form 3
- ☐ Annual record submission in Form 4

- Captive Secured Landfilling, if any: – Compliance with CPCB guidelines such as
  - ☐ SLF Location criteria* (relevant provisions of guidelines enclosed)
  - ☐ Stabilization facility, if applicable
  - ☐ Liner system* (relevant provisions of guidelines enclosed)
  - ☐ Leachate drainage, collection and removal* (relevant provisions of guidelines enclosed)
  - ☐ Leachate treatment/Disposal (ETP/MEE/Spray Dryer/solar evaporation pond/CETP)
  - ☐ Monitoring of wells* (relevant provisions of guidelines enclosed)
  - ☐ Log book

- Captive incinerator facility, if any: –
  - ☐ Type of incinerator (Single Chamber/ Twin chamber)
  - ☐ Log Book
  - ☐ Energy Meter
  - ☐ Online monitoring system reading and calibration details
  - ☐ Maintenance of prescribed temperature in combustion chamber(s)
    A) Dye & Dye Intermediates Industry
    - In case of Twin Chamber---
      - Primary chamber: minimum 850 ± 25^{0}C
      - Secondary chamber: minimum 950 ^{0}C
    - In case of Single Chamber#---
      - Chamber: minimum 950 ^{0}C

B) Pesticides Industry

- In case of Twin Chamber---
  - Primary chamber: minimum 850 ± 25^{0}C
  - Secondary chamber: minimum 1100 ^{0}C
- In case of Single Chamber#---
  - Chamber: minimum 950 ^{0}C

C) Pharmaceutical Industry

- In case of Twin Chamber---
  - Primary chamber: minimum 850 ± 25^{0}C
  - Secondary chamber: minimum 950 ^{0}C
- In case of Single Chamber#---
  - Chamber: minimum 950 ^{0}C

D) Organic Chemicals Manufacturing Industry

- In case of Twin Chamber---
  - Primary chamber: minimum 850 ± 25^{0}C
  - Secondary chamber: minimum 950 ^{0}C
- In case of Single Chamber#---
  - Chamber: minimum 950 ^{0}C

☐ Air pollution control device

☐ Compliance with the emission standards (Please refer the enclosed parameters and standards notified under EPA for Dye & Dye Intermediate industry, Pesticides, Pharmaceuticals and Organic Chemicals Manufacturing Industries are enclosed)

☐ Disposal of APCD Devices (Solid waste, Scrubber water)

☐ Quality and Quantity of Ash generated

☐ Training and Equipment to workers working in the site

☐ Emergency Response Plan

☐ Infrastructural and Financial Capabilities of the unit to (a) handle volume of hazardous wastes for which authorization is being granted, and (b) undertake remedial measures in case of accidental spill/fire/release of contaminants into water bodies

☐ Any contaminated/probable contaminated/illegal disposal site within and outside the industry premise

- ☐ ETP Details along with Process Flow Diagram

- ☐ Assessment of ETP sludge generated based on inlet and outlet parameters

- ☐ Violations of HOWM Rules 2016, if any, and imposition of financial penalty and environmental liability as per Rule 23 and CPCB guidelines on “Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Waste and Penalty”

Note :

**For details may refer CPCB guidelines on “Criteria for Hazardous Waste Landfills” and Guidelines for “Proper Functioning And Upkeep Of Disposal Sites”.*

 # As per the respective notified standards (copies enclosed), single chamber is permitted only incase of halogenated organic waste less than 1% by weight in input waste.

Leachate Drainage, Collection and Removal

A leachate collection system shall be designed at the base of all landfills. It shall comprise of a drainage layer, a perforated pipe collection system. sump collection area, and a removal system.

The leachate collection layer (drainage layer) will usually be a 30 cm thick sand-gravel layer with a slope of 2% or higher and a permeability of greater than 10^{-2} cm/sec (10^{-4} m/sec). A system of perforated pipes and sumps is provided within the drainage layer. The pipe spacing will be governed by the requirement that the leachate head shall not be greater than the drainage layer thickness. Fig. 6 shows a typical layout of pipes and sumps.

Leachate will be removed from the landfill (Fig. 7) by (a) pumping in vertical wells or chimneys (b) pumping in side slope risers, or (c) by gravity drains through the base of a landfill in above-ground and sloped landfills. Side slope risers may be preferred to vertical wells to avoid any down drag problems. Submersible pumps have been used for pumping for several years; educator pumps are also being increasingly used. The leachate may be stored in a holding tank (for a few days) before being sent for treatment.

The design of following components should be undertaken :

(a) leachate pipe and leachate trench network

(b) leachate sumps and pumps

(c) leachate wells/side slope riser

(d) leachate holding tank

(e) backwashing/backflushing arrangement to prevent clogging/ choking/headloss.

The material used for pipes etc., should be such that it is not affected by the leachate quality.

Minimum Specifications

The liner system shall be designed specifically for each site to meet the criteria stated in Section 7.1.

The liner system must include the following components. However, depending on the design requirements, the number of components as well as the specifications of the components can exceed the minimum specifications listed below. The components listed below are waste downwards (Fig. 12).

(a) A leachate collection layer of thickness 30 cm or more and coefficient of permeability in excess of 10^{-2} cm/sec (10^{-4} m/sec.).

(b) A single composite liner comprising of

  (i) A HDPE geomembrane of thickness 1.5 mm or more (see specification* below) and
  (ii) A compacted clay (or compacted amended soil) layer of thickness 150 cm or more having a coefficient of permeability of 10^{-7} cm/sec (10^{-9} m/sec) or less. At locations where availability of clay is limited, amended soil will be constituted by mixing bentonite or any other suitable clay to locally available soil to achieve the desired permability.

In regions where rainfall is high and/or subsoil is highly permeable (e.g. gravel, sand, silty sand) and/or the water table is within 2.0 m to 6.0 m beneath the base of the landfill, the liner system shall be a double composite liner and shall include the following components, waste downwards (Fig. 13) :

(a) A primary leachate collection layer of thickness 30 cm or more and coefficient of permeability in excess of 10^{-2} cm/sec (10^{-4} m/sec).

(b) A primary composite liner comprising of

  (i) A HDPE geomembrane of thickness 1.5 mm or more (see specification* below) and
  (ii) A compacted clay (or compacted amended soil) layer of thickness 45 cm or more having a coefficient of permeability of 10^{-7} cm/sec (10^{-9} m/sec) or less.

(c) A secondary leachate collection layer (also called leak detection layer) of thickness 30 cm or more and coefficient of permeability in excess of 10^{-3} cm/sec (10^{-5} m/sec).

(d) A secondary composite liner comprising of

(i) A HDPE geomembrane of thickness 1.5 mm or more (see specification* below) and
(ii) A compacted clay (or compacted amended soil) layer of thickness 45 cm or more having a coefficient of permeability of 10^{-7} cm/sec (10^{-9} m/sec) or less.

***Specification** : [The geomembrane must have (a) Tensile Strength at yield > 18 kN/m, (b) Tensile Strength at break > 30 kN/m, (c) Tear Resistance > 150 N and (d) Puncture Resistance > 250 N].*

The liner materials listed above can be substituted by equivalent materials only if the following is satisfied :

(a) the liner system components continue to function as 'composite' liners; and
(b) the use of such components has been demonstrated over a 10 year period in different HW landfill and approved by a regulatory agency
(c) the design, construction and quality control specifications of such materials have been approved by a regulatory agency and are available for implementation.

For extremely hazardous waste, the number of composite liner layers shall, if necessary, exceed two and these will be finalised by the design engineer in consultation with SPCB/PCC as per site specific conditions.

(c) A secondary leachate collection layer (also called leak detection layer) of thickness 30 cm or more and coefficient of permeability in excess of 10^{-3} cm/sec (10^{-5} m/sec).

(d) A secondary composite liner comprising of

(i) A HDPE geomembrane of thickness 1.5 mm or more (see specification* below) and

(ii) A compacted clay (or compacted amended soil) layer of thickness 45 cm or more having a coefficient of permeability of 10^{-7} cm/sec (10^{-9} m/sec) or less.

***Specification** : [The geomembrane must have (a) Tensile Strength at yield > 18 kN/m, (b) Tensile Strength at break > 30 kN/m, (c) Tear Resistance > 150 N and (d) Puncture Resistance > 250 N].*

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For extremely hazardous waste, the number of composite liner layers shall, if necessary, exceed two and these will be finalised by the design engineer in consultation with SPCB/PCC as per site specific conditions.

Environmental Monitoring System

Monitoring at a landfill site (Fig. 10) shall be carried out in four zones (a) on and within the landfill; (b) in the unsaturated subsurface zone (vadose zone) beneath and around the landfill; (c) in the groundwater (saturated) zone beneath and around the landfill and (d) in the atmosphere/local air above and around the landfill.

The parameters to be monitored regularly are :

(a) long-term movements of the landfill cover;
(b) leachate head within the landfill;
(c) leachate quality within the landfill;
(d) gas quality (optional) within the landfill;
(e) quality of pore fluid in the vadose zone;
(f) quality of pore gas (optional) in the vadose zone;
(g) quality of groundwater in the saturated zones and
(h) air quality above the landfill, at the gas control facilities, at buildings on or near the landfill and along any preferential migration paths.

The indicators of leachate quality and landfill gas quality must be decided after conducting a study relating to the type of the waste, the probable composition of leachate and gas likely to be generated and the geotechnical as well as hydro-geological features of the area.

A monitoring programme must specify (i) a properly selected offsite testing laboratory capable of measuring the constituents at current detection levels (ii) a methodology for acquiring and storing data; and (iii) a statistical procedure for analyses of the data.

The following instruments/equipment shall be used for monitoring :

(a) Groundwater samplers for groundwater monitoring wells.
(b) Leachate samplers for leachate monitoring within the landfill and at the leachate tank.

(c) Vacuum lysimeters, filter tip samplers, free drainage samplers for leakage detection beneath landfill liners.

(d) Surface water samplers for collection of sample from sedimentation basin.

(e) Downhole water quality sensors for measuring conductivity, pH, DO, temperature in leachate wells, groundwater wells and sedimentation basins.

(f) Landfill gas monitors (portable) for onsite monitoring of landfill gases.

(g) Active and passive air samplers for monitoring ambient air quality.

It is recomemended that the location of each type of instrument/equipment be finaised in conjunction with an expert on the basis of the topography of the area and the layout of the landfill. A minimum of 4 sets of ground water monitoring wells (one up-gradient and three down gradient) for sampling in each acquifer are considered desirable at each landfill site (Fig.11).

Annexure-XVI

List of SOPs prepared by CPCB for utilisation of hazardous waste as per Rule 9 of HOWM Rules, 2016

S. No	Name of HW	Source of generation	Type of utilization/Intended use
1	Spent Solvent (containing Toluene, Xylene, Cyclohexane, Acetone, Methyl isobutyl ketone, Methanol, Isopropyl alcohol, Methylene Dichloride, Tetra Hydro Furan, Ethyl Acetate, Iso Propyl Ether, Dimethyl formamide, Butyl acetate, Methyl Acetate, Butanol, Benzene, Ethanol and Methyl Ethyl Ketone)	Industrial use of solvents; production or industrial use of synthetic dyes, dye intermediates and pigments; production/formulation of drugs/pharmaceuticals and healthcare products and production and formulation of pesticides including stockpiles	Recovered solvents/mixed solvents for Industrial use
2	APCD Dust/ Residue	LD Furnace/Electric Arc Furnace (EAF)/Blast Furnace of Steel Plant/captive Blast Furnace and Ferro-Alloy Plant	As Briquettes for further use in blast furnace to produce pig iron.
3	Spent Catalyst containing precious metals and ETP Sludge containing platinum	Petrochemical process and pyrolytic operation, petroleum refining, production of acids, production of nitrogenous and complex fertilizers, production/formulation of drugs/pharmaceuticals and ETP sludge	Recovery of Precious metals - Platinum, Iridium, Osmium, Palladium, Rhodium, Ruthium, Rhenium, Gold & Silver
4	Spent H_2SO_4	Pickling operations of MS rods / sheets	Ferrous Sulphate *(Not to be used in drinking water purification and to be used only for industrial purposes)*
5	Spent Acid - Containing Molybdenum	Filament and bulb Industry	Molybdenum Trioxide
6	Spent HCl	Metal surface cleaning in steel and rolling industry	Ferric Chloride *(Not to be used in drinking water purification or agriculture applications and to be used only for industrial purposes)*
7	Used Anode butt	Aluminium Smelter units	Carbon pellets and high energy coke for use in Steel furnaces/foundries
8	Used Anode butt	Aluminium Smelter units	Carbon blended coke/ electrode carbon paste/carburizer for use in Steel or Ferro Alloy furnaces
9	Used Anode butt (Pre-processed)	Aluminium Smelter units	Green anodes for use in Aluminium Smelters
10	Used Anode butt (Pre-processed)	Aluminium Smelter units	Carbon Electrode Paste for use in Ferro Alloy Plants
11	Coal Tar/Tarry Residue	Coal gasifier units	As supplementary fuel in furnace of sodium silicate units
12	Contaminated Container/ barrels/ drums	Pharmaceuticals, food processing, cosmetic, textile, paint formulation and beverages industries	Cleaned barrel and drums for industrial use and/or production of plastic granules.
13	Process and primary sludge of ETP – Pulp and Paper	Paper & Pulp Industry	Paper Board/ Mill Board / Card Board
14	Aluminium Dross	Refining and casting house of Aluminium smelter units	To recover aluminium metal (captive use)
15	Aluminium Dross	Refining and casting house of Aluminium smelter units	To recover aluminium metal
16	Oil based iron sludge	Grinding mill section of Ball & Roller bearings	Ferrous Sulphate *(Not to be used in drinking water purification or agriculture applications and to be used only for industrial purposes)*

S. No	Name of HW	Source of generation	Type of utilization/Intended use
17	Spent catalyst - Containing Mercury and mercury waste	Various industry	Mercury
18	Spent H_2SO_4 containing organic compounds	Dye and Dye intermediates units	Chemical Gypsum for use in cement plants
19	Spent fixer (hypo) solution	Photography / X-rays films	Silver metal for various use
20.	Hydro fluoro silicic acid – Acidic scrubber solution	Single Super Phosphate manufacturing industry	Recovered Sodium Silico Fluoride (Sodium fluorosilicate)for use in Glass industry.
21.	Spent Sulphuric Acid	Para Nitro Toluene Ortho Sulfonic Acid/Oxadiargyl Anthrquinone manufacturing industry	Ferrous Sulphate
22.	Vanadium Sludge	Alumina refineries	Vanadium metal
23.	Phenolic Waste water	Coal Gasifier condensate water	Quenching of hot gases in After Burning Chamber of Direct-reduced iron (DRI) kiln of Sponge Iron Industry
24.	Chemical sludge(Primary sludge) of ETP	Pulp & Paper Industry	For energy recovery in Atmospheric Fluidized Bed Combustion (AFBC) Boiler/Pressurized Fluidized Bed Combustion (PFBC) Boiler/Circulating Fluidized Bed Combustion (CFBC) Boiler for steam or electricity generation
25.	Spent Carbon (Carbon Slurry)	Urea manufacturing plant	Quenching of carbon slurry in the reactor for manufacturing carbon black.
26.	Spent Acid containing Molybdenum compound	Bulb filament manufacturing industries	Ammonium Molybdate
27.	Resin Waste (mixture of Bisphenol A and Epichlorohydrin)	Resin impregnation of electrical coils power/hydro equipments industries	For manufacturing of High Tension/Low Tension Insulators
28.	Spent Alumina	Polymerization in SWING unit of Petrochemical Plant	For manufacturing of Refractory material like Insulation bricks, Mortar, Castables, High Alumina bricks
29.	Spent Ion Exchange Resin	Demineralization (DM) Plant	For energy recovery in boiler for steam or power generation
30.	Spent Ion Exchange Resin	Demineralization (DM) Plant	For energy recovery in Direct-reduced iron (DRI) kiln of Sponge Iron Industry
31.	Tungsten Scrap	Metal cutting operation (using Tungsten carbide insert), mining tool buttons and worn out drills	For manufacturing Tungsten Carbide Powder.
32.	Spent Pot Lining	During production of Primary Aluminium from Alumina Smelting Industries	As a supplementary resource for manufacturing of Carbon Mineral Fuel
33.	Spent Sulphuric Acid	During manufacturing of 4,4 Diaminobenzene Sulphanilide	Isolation and purification of 2-NADSFA & 6-Acetyl APSA
34.	Coal Tar/Tarry Residue	Coal gasifier units	As supplementary fuel in furnace for energy recovery in Frit manufacturing units

S. No	Name of HW	Source of generation	Type of utilization/Intended use
35.	Gasifier Slag containing Nickel & Spent Catalyst containing Molybdenum	Nitrogenous Fertilizer Industry	For manufacturing of Alloy steel ingots and stainless steel ingots
36.	Synthetic Oil based mud/drill cuttings	Generated from Oil & Natural Gas Exploration	Road Construction / Oil recovery
37.	Flue Gas Cleaning Residue	Bag filter connected to steel scrap melting induction furnace	Zinc Metal extraction
38.	Spent Sulphuric Acid and Spent Sodium Thiosulphate	Spent Sulphuric Acid (generated during manufacturing of 3, 5-Dichloro Nitro Benzene) and Spent Sodium Thiosulphate (generated during manufacturing of 3, 5-Dichloro Aniline and m-Chloro Aniline)	For manufacturing of Nitrosyl Sulphuric Acid (NSA)
39.	Spent Phosphoric Acid	Generated during manufacturing of	Dibasic Calcium Phosphate
40.	Spent Sulphuric Acid	Generated during manufacturing of Vinyl Sulphone	For production of H-acid
41.	Waste Dichromate Solution	Generated during manufacturing of Ibuprofen	For production of Basic Chromium Sulphate
42.	Used Waste Thinner	Generated during cleaning of paint feeding lines using solvents	For manufacturing of Industrial Primer to be used as Automotive Paints
43.	Spent Aluminium Chloride	Generated during the production of CPC Green and 2, 4, 6-Trimethyl Benzoyl Chloride	As a supplementary resource to manufacture liquid Aluminum Hydroxide Chloride/ Poly Aluminum Chloride for further use in ETP (as coagulant) and paper industry (as sizing material) .
44.	Spent Sulphuric Acid	generated during manufacturing of G-Salt	for production of R-Complex and Gamma-acid
45.	Spent Ammonium Chloride	generated during manufacturing of Hexamethyl Disilazane	production of Ammonium Chloride
46.	Spent Sulphuric Acid	generated during manufacturing of 4, 4-Diaminobenzesulfanilide (DABSA)	for manufacturing Para Amino Benzene Sulphonic Acid (PABSA)
47.	Spent Liquid Glauber Salt	generated from ethoxylation step of Para Base Vinyl Sulphone manufacturing process	for manufacturing of Reactive Dye (Reactive Orange 2R)
48.	Spent Alkali Bromide and Spent Acid Bromide	Generated during manufacturing of pesticides, pharmaceuticals, and organic chemicals.	For production of liquid bromine
49	Spent Sulphuric acid	Generated during dye & dye intermediates and chemical manufacturing process.	As a neutralizing agent in CETP/ETP

Annexure XVII

Hazardous Waste Management in States/UTs not having common TSDFs and status of setting up of common TSDFs/sharing of common TSDFs (as informed by SPCB/PCC)

A. States/UTs not having either common incinerator or common SLF

SNo	States/UTs	Management Practice of HW	Status of setting up of common TSDF or sharing of other common TSDFs
1.	Andaman & Nicobar	The PCC informed that not felt necessary as there is no HW generating units	
2.	Arunachal Pradesh	Not Provided	
3.	Assam	• Hazardous wastes generated are being managed by recycling, reprocessing, captive treatment, captive SLF and captive incinerator etc. • Initiatives are being taken for utilization of incinerable and landfillable hazardous waste in cement plant and any other plant, for which study is going on.	• State government has allotted land and setting up of TSDF is under progress. • Assam PCB has informed that a plot of 100 bighas at Geleki, Sivasagar has been allotted by Govt. of Assam, however EOI invited for setting up of the facility has been forwarded to Govt of Assam is awaiting approval. • The proposal for setting up of TSDF has already been submitted to Govt. of Assam which is pending since 11th Feb 2016. Further initiative shall be taken for sharing common TSDF of other nearby state based on feasibility and viability.
4.	Bihar	• Transported to the authorized TSDF outside the state (i.e M/s Bharat Oil & Waste Management Company Ltd.) and co-processing in Cement Industries	-
5.	Chandigarh	• Generation quantity is very less, therefore TSDF of Punjab is being used • Chandigarh PCC has authorized one common incinerator in UP and one common Secured landfill in Punjab for disposal of HW generated.	-
6.	Chhattisgarh	• Recently sharing with Madhya Pradesh for disposal of incinerable HW, till then the same was stored within the unit's premises. • The cement industries have started co-processing of hazardous waste generated • Three major generators of landfillable wastes have established captive secured landfills • Generation of landfillable wastes from other industries are being stored within the premises.	• Chhattisgarh Environment Conservation Board (CECB) has informed that a site has been identified by CSIDC. Further, EOI has been floated by CSIDC on 27/09/2018 and next course of action is being taken for selection of appropriate facility operator.
7.	Delhi	• DPCC has requested for sharing of TSDF located at Pali, Haryana, however the same has not been materialized. • Two common incinerator facilities in UP have been authorized by DPCC for disposal of incinerable wastes.	• Delhi government has identified a site at Bawana, Delhi and land has been allotted to DSIIDC. • DSIIDC is in the process of finalizing bid for award of project at Bawana site
8.	Goa	• Incinerable HW generated by the units is disposed at M/s Mumbai Waste Management Ltd., Taloja, Maharashtra. • Waste is also sent for co-processing at cement kilns • Major generator of incinerable HW has its own liquid HW incinerator. • Major generator of Landfillable waste has its own captive secured landfill site.	• Goa PCB has informed that a plot of around 32582 m^2 has been allotted to M/s Goa Industries Environment Management Association (GIEMA) for establishment of common HW TSDF by GIDC. • Setting up of Common HWTSDF at pissurlem Industrial Estate, Goa is under process; EC has been obtained from MoEF&CC; Consent to Establish issued by Goa SPCB. M/s Paradigm Environmental Strategies Pvt. Ltd. Appointed and work order issued in Aug, 2018 • Awaiting approval of GIDC for the signing agreement of deed of lease between GWMC, GIDC and GEIMA. • Time targeted action plan has been submitted, wherein it has been mentioned that full operation of common HW TSDF commences in 18 months from the date of signing of agreement.
9.	Jammu & Kashmir	• J&K has authorized a facility in UP (M/s Bharat Oil Waste Management Ltd., Kanpur) for interstate transportation of	• A land of 80 kanals has been identified by SIDCO for common HWTSDF; • Environmental Clearance has been granted to M/s

		HW for its ultimate disposal. • Some of HW generating units store their waste within the premises. • Four HW generating units have captive incinerators	APR Project Pvt. Ltd. for the said project. Consent to Establish vide No. 1326 of 2014 dated 10/02/2014 has been granted to M/s APR Project Pvt. Ltd., Hyderabad. However no further progress by the private firm in setting up of the facility.
10.	Lakshadweep	Not Applicable	
11.	Manipur	-	• Manipur PCB has informed that they shall coordinate with state government for setting up of TSDF
12.	Meghalaya	• There are three units generating landfillable HW • Being stored in the concrete lined pit for disposal as and when common TSDF is available.	-
13.	Mizoram	• Most of HW generating industries are automobile repairing industry which are cottage type generating negligible amount of used oil.	• Setting up of TSDF is not feasible due to the topography and ecological factor of the state and Assam PCB has been requested to permit for disposal of HW generated in the upcoming TSDF • The Board therefore submitted a proposal to establish a common HW TSDF in Cachar or Karimganj, Assam, to be used by part of Assam, Tripura and Mizoram.
14.	Nagaland	• HW generated from the state is negligible.	• Looking for sharing arrangement of common TSDF.
15.	Puducherry	• Incinerable HW are being sent to common HW incinerator i.e M/s Gomti incinco, Bangalore, Karnataka • Landfillable HW are being sent to common TSDFs in Karnataka (M/s Mother Earth Environ Infra Ltd.) and in Tamilnadu (M/s GEPIL)	• Total landfillable and incinerable HW generated in the UT are very meagre. • Identification of land for setting up of TSDF is very difficult (not available as per the guidelines for setting up of TSDF).
16.	Sikkim	• The HW generated is being treated at West Bengal Waste Management Limited, Haldia, West Bengal	-
17.	Tripura	• Landfillable wastes are disposed at Devendra Chandra Nagar and incinerable wastes are incinerated at Hapania of Agartala Municipal Corporation	• Efforts are being made to set up one TSDF in state.

** HW Inventory for year 2016-17 as reported by SPCB/PCC*

B. States/UT having only common secured landfill and not having common Incinerator

SNo	States	Management Practice of HW	Status of setting up of common Incinerator
1.	Himachal Pradesh	Nil	
2.	Kerala	For incinerable hazardous wastes no sharing arrangement with any other TSDF	Generation of incinerable HW is too small to set up a common HW incinerator
3.	Odisha	Generation of incinerable HW is only a small fraction and are managed through captive incinerators.	The common secured landfill facility operator in Odisha has proposed to expand the facility with common HW incinerator, for which final EIA report has been submitted to MoEF&CC for EC and public hearing has been conducted on 06/11/2018. Time line of September 2019 is given for full operation of common TSDF.
4.	Punjab	Major industries generating incinerable hazardous waste have installed captive incinerators in their premises, which are 18 in number. In addition, incinerable wastes from the remaining industries is received by the TSDF operator and incinerated at incinerator, Kanpur.	SPCB informed that no common incinerator has been installed and the same was under planning. However, present status setting up of common incinerator is not provided.

Annexure XVIII

Action taken by State Pollution Control Board, Odisha against erring units for violation of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Sl. No.	Action Taken (2018-19)	Type of violations	No. of Units(Defaulters) / Quantity
1.	Recommended for Levying of financial penalty and enforcement of the provisions of the guidelines of CPCB "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and penalty". CPCB has approved the proposal and letter issued to the defaulters.	Violations of the provisions of the Rules and unscientific disposal of Hazardous Wastes	**03 Nos** 1. M/s National Aluminium Company Ltd., (Smelter Plant), Angul 2. M/s Vedanta Limited,(Smelter and CPP), Jharsuguda 3. Odisha Waste Management Project of M/s RamkyEnviro Engineers Ltd., Jajpur
2.	Show Cause Notice	Violations of the provisions of the Rules and unscientific disposal of Hazardous Wastes	**02 Nos.** 1. M/s National Aluminium Company Ltd., (Smelter Plant), Angul 2. M/s Vedanta Limited,(Smelter and CPP), Jharsuguda
3.	Suspension of Authorisation Order of Aluminium Dross reprocessing units	Storage of Hazardous Waste beyond the statutory period of 90 days and non-furnishing of manifest copies	**04 Nos.** 1. M/s Shiva Industries, Chhattisgarh 2. M/s Trade Well Industries, Chhattisgarh 3. M/s Matriachhaya Industries, Chhattisgarh 4. M/s Ashirwad Enterprise, Gujarat
4.	Refusal of Authorisation Order	Improper storage of Hazardous Wastes and non-compliance to Standard Operating Procedure of CPCB regarding utilization of Hazardous Waste and expansion of the industry without statutory clearances from the Board	**01 No** 1. M/s Gaurav Aluminium (Aluminium Dross reprocessing unit), Jharsuguda
5.	Direction to follow DPR finalized by CPCB for remediation of Contaminated Sites	Contaminated Sites	**02 Nos.** 1. M/s Orichem Ltd., Talcher 2. M/s Grasim Industries Ltd., Ganjam
6.	Persuasion with the TSDF operator for deposit of fund in the Escrow Account created at SBI, Bhubaneswar	--	**1 No.** 1. Odisha Waste Management Project of M/s RamkyEnviro Engineers Ltd., Jajpur (₹45 Lakhs)

Sl. No.	Action Taken (2018-19)	Type of violations	No. of Units(Defaulters) / Quantity
7.	Imposition of performance of Bank Guarantee for timely compliance	Construction of garland drains and settling pit, concreting of vehicle parking area, provision of hood and extraction system followed by scrubber in the treatment and stabilization pits, additional solar evaporation ponds	**1 No.** 1. Odisha Waste Management Project of M/s RamkyEnviro Engineers Ltd., Jajpur (₹ 12.84 Lakhs)