

*Hazardous Waste Management Series :
HAZWAMS/.../2005-2006*

**“Guidelines for Storage of Incinerable Hazardous Wastes
by the Operators of Common Hazardous Waste Treatment, Storage and
Disposal Facilities and Captive HW Incinerators”**



CENTRAL POLLUTION CONTROL BOARD

(Ministry of Environment & Forests)

Parivesh Bhawan, East Arjun Nagar

DELHI -110 032

e-mail: cpcb@nic.in Website: www.cpcb.nic.in

November 2008

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केन्द्रीय प्रदूषण नियंत्रण बोर्ड

(भारत सरकार का संगठन)

पर्यावरण एवं वन मंत्रालय

Central Pollution Control Board

(A Govt. of India Organisation)

Ministry of Environment & Forests

Phone : 22304948/22307233

ज. मो. माऊसकर, भा.प्र.से.

अध्यक्ष

J. M. MAUSKAR, IAS

Chairman

FOREWORD

Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) including Hazardous Waste Incinerators are indeed essential for treatment and disposal of hazardous wastes in an environmentally sound manner. Although, both, the earlier Hazardous Waste (Management & Handling) Rules, 1989 and the newly notified Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 stipulate necessary provisions for proper collection, reception, transport, treatment, storage and disposal of hazardous wastes, there was a serious incident of fire recently in one of the TSDFs located in the State of Gujarat. In order to prevent recurrence of such fire accidents in future as well as to assess and examine the lacunas with regard to the measures being adopted by the common TSDFs and Incinerator Operators, especially for storage of incinerable hazardous waste, and to review the existing guidelines for storage of incinerable hazardous waste, Central Pollution Control Board constituted a Committee under the Chairmanship of Shri R.K. Garg, former Managing Director, Indian Rare Earths Limited, Mumbai. The Committee comprised experts from Oil Industry Safe Directorate (OISD), New Delhi; Petroleum & Explosives Safety Organisation (PESO), Nagpur; Disaster Management Institute, Bhopal, Engineers India Limited, New Delhi, Andhra Pradesh Pollution Control Board (APPCB), Maharashtra Pollution Control Board (MPCB), Mumbai; and Gujarat Pollution Control Board (GPCB), Gandhinagar as also representatives of Ministry of Environment & Forests (MoEF) and CPCB.

The R.K. Garg Committee held interactions with the SPCBs and TSDF operators and also visited the TSDF in Gujarat where fire accident took place. The present report was finalized after incorporating the inputs, suggestions and views received from the members of the Committee, State Pollution Control Boards, namely AP, Gujarat, Maharashtra, West Bengal, Punjab, Rajasthan, Kerala, Madhya Pradesh and Tamil Nadu, and the operators of TSDFs, especially M/s. RAMKY, Hyderabad; M/s. GEPIL, Surat and M/s. BEIL, Ankleshwar. The Report provides clear guidelines with respect to the time limit for storage of incinerable hazardous waste, measures to be taken at storage sheds so as to avoid spillages, leakage control and the need for proper record keeping and maintenance, including hazard analysis and safety audit.

The noteworthy contributions made by Shri R.K. Garg, Chairman of the Committee and other members of the Committee, SPCBs and TSDF Operators in preparation of the report deserve acknowledgement. The sincere efforts made by my colleagues Shri J. Chandra Babu, Environmental Engineer and Shri H.K. Karforma, Sr. Environmental Engineer & Incharge HWMD in finalization of the report under the able supervision and guidance of Dr. B. Sengupta, Former Member Secretary, CPCB, need also to be appreciated.

I hope this Document would be useful to the various stake holders for management of hazardous wastes in the country. The Operators of Common TSDFs including captive incinerators are expected to follow these Guidelines whereas SPCBs and PCCs are required to ensure its compliance.

(J.M. Mauskar)

11 November, 2008

CONTENTS

S.No	Description	Page Number
1.0.	Back Ground	1
2.0.	Deliberations of the Committee	1
2.1.	Major State-wise present incinerable hazardous waste generation, present capacity of the incinerators and proposed capacity in next 02 to 03 years	2
2.2.	Observations and Discussions	2
3.0	Recommendations of the Committee	4
3.1	Storage and Handling of Incinerable Hazardous Wastes	4
3.2	Recommended Storage Time and the Quantity of the Incinerable Hazardous Wastes.	7
3.3.	Hazard Analysis and Safety Audit.	7
Tables and Annexure:		
	Table 1. Major State-wise present incinerable hazardous waste generation, present capacity of the incinerators and proposed capacity in next 02 to 03 years.	2
	Annexure - I. Constitution of the Committee	8

1.0. Back Ground.

Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) facilitate collection, reception, transport, treatment, storage and disposal of hazardous wastes in an environmentally sound manner. The disposal facility may be having only a secured land fill (SLF) for ultimate disposal of hazardous wastes or may be having incineration alone or combination of secured landfill & incineration. At present, all the common disposal facility operators have not installed hazardous waste incinerator in view of either incinerable hazardous waste generation is not adequate enough for carrying out incineration in economical way or generation is not uniform in all the regions or operators might be in planning phase for installation of the hazardous waste incinerators as a part of the common disposal facilities.

Hazardous Waste (Management & Handling) Rules, 1989 as amended does not stipulate storage time limit either to the TSDF operators or to the Incineration Operators with regard to the storage of incinerable hazardous wastes within such facilities. It is a common practice by the operators of TSDF to store the hazardous waste (HW) till adequate quantum of Incinerable hazardous wastes is procured or accumulated in the common facilities for carrying out incineration as per a planned schedule or till the incinerator becomes operational in case of an incinerator under installation.

There was a fire in one of the storage shed of TSDF containing 293 MT of incinerable hazardous waste in drums at Ankaleshwar on April 03, 2008. In this fire, said quantity of wastes in the drums got burnt. In order to prevent occurrence of such accidents, Central Pollution Control Board (CPCB) have constituted a Committee vide office order No. F. No.B-29016 (SC)/1/06/HWMD/681 dated April 17, 2008 (**Annexure-1**), *with the following terms of reference:*

1. Prevention of fire hazards at TSDF site and major precautions to be taken.
2. Quantity of incinerable waste to be stored at TSDF site for incineration, considering the Incineration Capacity of TSDF site and HW (M & H) Rules.
3. Specification of the godown (s) and the major precaution to be taken in godown for storing hazardous waste in order to prevent fire hazard.
4. Any other aspects related to above with overall view to prevent such eventualities in future.

2.0. Deliberations of the Committee:

Committee held three meetings with the State Pollution Control Boards (SPCBs) namely Andhra Pradesh (AP), Maharashtra, Gujarat, Punjab, Tamilnadu (TN), Rajasthan, Madhya Pradesh (MP) and West Bengal (WB) as well as with the operators of incinerators namely RAMKY, Hyderabad; Gujarat Enviro Infrastructure Limited (GEPIL), Surat; and Bharuch Enviro Infrastructure Limited (BEIL), Ankaleshwar. One

meeting was held at the BEIL site. Prior to the meeting with the operators of TSDF, the Committee also had a visit to the BEIL, Ankaleshwar so as to assess the precautions/safety measures adopted by the operator after the accident.

2.1. The committee noted the information with regard to the incinerable hazardous waste generation quantities, present capacities of incinerators and the proposed expansion in incinerator capacities through setting-up of new incinerators or by expansion of the existing facilities provided by SPCBs during the interactions held and are as summarized in **Table 1**.

Table 1: Major State-wise present incinerable hazardous waste generation, present capacity of the incinerators and proposed capacity in next 02 to 03 years

Sl. No	Name of the State	Present incinerable hazardous waste generation in TPA	Capacity of the incinerator (s) in TPA			Total Incinerator (s) Capacity in next 02 to 03 years in TPA *
			Common	Captive or individual	Proposed incinerator (s) capacity in next 2 to 3 years	
1	Gujarat	1,06,000	32,600	4000	1,65,000	2,01,608
2	AP	31,700	20,000	5000	6000	31,000
3	Maharashtra	1,52,000	30,000	8500	40,000	78,500
4	WB	13,055	10,800	7000	-	17,800
5	TN	11,500	-	1,500	10,000	11,500
6	MP	5,000	Under installation	2,000	10,000	12,000
7	Rajasthan	23,025	-	5500	-	5,500

* *In some of the States, the incinerable hazardous wastes is proposed to be used as supplementary fuel in cement kilns*

2.2. Observations and Discussions:

2.2.1. In the State of Maharashtra, incinerable hazardous waste generation is much higher than the existing & the proposed incinerator capacity. Therefore, there is a need to plan for additional common incinerator.

The states which are not appearing in **Table - I** above like Punjab, Haryana, UP etc. should also take the corrective measures to add incineration capacity after reviewing the generation in their States.

- 2.2.2. During the visit to BEIL, it was observed by the Committee that the shed where fire took place has been reconstructed. The shed is now provided with adequate distances about 15m between the storage sheds, and the storage sheds has also been provided with the extended fire hydrant line, adequate space between the stacked drums, arrangements of automatic water sprinkling system around the shed, and alarm system. The Committee was informed that similar arrangements will be made for all the existing sheds as well as new sheds which are under construction.
- 2.2.3. The Committee noted that the normal time required for material to be taken up for incineration after receipt of the wastes at the facility could vary from 02 to 03 months to carryout activities like sampling, analysis, optimizing the mixing of different incinerable hazardous waste prior to the incineration. ***Taking into consideration the down time of the incinerator required for major maintenance or repairs which appears to be an annual activity, a maximum of six months storage time is considered appropriate.***
- 2.2.4. CPCB have published a document on “Guidelines for Common Hazardous Waste Incinerators in June 2005” (i.e. HAZWAMS/30/2005-2006), which cover transportation, storage, analytical facilities, feeding systems and combustion systems, pollution control devices and monitoring. However, fire detection and fire protection systems during storage and sampling, types of buildings for storage of hazardous wastes and the arrangements for stacking etc need to be further incorporated in the guidelines.
- 2.2.5. The incinerator facility operators informed that presently incinerable hazardous wastes are being received by them in the form of solid, liquid (organic and aqueous) as well as semi-solid in nature. However, this figure varies from facility to facility depending upon the manufacturing processes adopted by the industrial units i.e. solid: 10 -70 %; Semi-solid: 10-30 % and liquid: 30-60 %). Mostly, the operators receive wastes in barrels having capacity about 200 liters either supplied by the operator of the facility or owned by the member industries. It was also stated that the liquids are always taken up for incineration prior to the solids and their storage time is kept to the minimum.
- 2.2.6. It was informed by some of the SPCB representatives that some incinerable hazardous wastes are now being used along with the fuel in some cement kilns.

- 2.2.7. Some suggestion was made to provide intermediate storage so that the storage at the TSDF site could be restricted as practiced in some countries. However, in view of the some practical difficulties and the expenditure involved on providing safety systems like fire detection & protection etc. it has not found favor with the Committee.

3.0. Recommendations of the Committee:

3.1. Storage and Handling of Incinerable Hazardous Wastes:

After review of the existing guidelines of CPCB for storage of incinerable hazardous wastes, the revised guidelines for storage and handling of incinerable hazardous wastes are suggested as follows:

Storage Area (Storage Shed):

- a. Flammable, ignitable, reactive and non-compatible wastes should be stored separately and never should be stored in the same storage shed.
- b. Storage area may consist of different sheds for storing different kinds of incinerable hazardous wastes and sheds should be provided with suitable openings.
- c. Adequate storage capacity (*i.e. 50 % of the annual capacity of the hazardous waste incinerator*) should be provided in the premises.
- d. Storage area should be designed to withstand the load of material stocked and any damage from the material spillage.
- e. Storage area should be provided with the flameproof electrical fittings and it should be strictly adhered to.
- f. Automatic smoke, heat detection system should be provided in the sheds. Adequate fire fighting systems should be provided for the storage area, along with the areas in the facility.
- g. There should be at least 15 m distance between the storage sheds.
- h. Loading and unloading of wastes in storage sheds should only be done under the supervision of the well trained and experienced staff.
- i. Fire break of at least 04 meter between two blocks of stacked drums should be provided in the storage shed. One block of drum should not exceed 300 MT of waste.

- j. Minimum of 1 meter clear space should be left between two adjacent rows of drums in pair for inspection.
- k. The storage and handling should have at least two routes to escape in the event of any fire in the area.
- l. Doors and approaches of the storage area should be of suitable sizes for entry of fork lift and fire fighting equipment;
- m. The exhaust of the vehicles used for the purpose of handling, lifting and transportation within the facility such as forklifts or trucks should be fitted with the approved type of spark arrester.
- n. In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area should be provided with concrete floor or steel sheet depending on the characteristics of waste handled and the floor must be structurally sound and chemically compatible with wastes.
- o. Measures should be taken to prevent entry of runoff into the storage area. The Storage area shall be designed in such a way that the floor level is at least 150 mm above the maximum flood level.
- p. The storage area floor should be provided with secondary containment such as proper slopes as well as collection pit so as to collect wash water and the leakages/spills etc.
- q. All the storage yards should be provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills in roads or within the storage yards as well as accidental flow due to fire fighting.

Storage Drums/Containers:

- a. The container shall be made or lined with the suitable material, which will not react with, or in other words compatible with the hazardous wastes proposed to be stored.
- b. The stacking of drums in the storage area should be restricted to three high on pallets (wooden frames). Necessary precautionary measures should be taken so as to avoid stack collapse. However, for waste having flash point less than 65.5 °C, the drums should not be stacked more than one height.
- c. No drums should be opened in the storage sheds for sampling etc. and such activity should be done in designated places out side the storage areas;

- d. Drums containing wastes stored in the storage area should be labeled properly indicating mainly type, quantity, characteristics, source and date of storing etc.

Spillage/leakage control measures:

- a. The storage areas should be inspected daily for detecting any signs of leaks or deterioration if any. Leaking or deteriorated containers should be removed and ensured that such contents are transferred to a sound container.
- b. Incase of spills / leaks/dry adsorbents/cotton should be used for cleaning instead of water.
- c. Proper slope with collection pits be provided in the storage area so as to collect the spills/leakages.
- d. Storage areas should be provided with adequate number of spill kits at suitable locations. The spill kits should be provided with compatible sorbent material in adequate quantity.

Record Keeping and Maintenance:

- a. Proper records with regard to the industry –wise type of waste received, characteristics as well as the location of the wastes that have been stored in the facility need to be maintained.

Miscellaneous:

- a. Smoking shall be prohibited in and around the storage areas;
- b. Good house keeping need to be maintained around the storage areas.
- c. Signboards showing precautionary measures to be taken, in case of normal and emergency situations should be displayed at appropriate locations.
- d. To the extent possible, manual operations with in storage area are to be avoided. Incase of manual operation, proper precautions need to be taken, particularly during loading / unloading of liquid hazardous waste in drums.

- e. A system for inspection of storage area to check the conditions of the containers, spillages, leakages etc. should be established and proper records should be maintained.
- f. The wastes containing volatile solvents or other low vapor pressure chemicals should be adequately protected from direct exposure to sunlight and adequate ventilation should be provided.
- g. Tanks for storage of liquids waste should be properly dyked and should be provided with adequate transfer systems.
- h. Storage sites should have adequate & prompt emergency response equipment systems for the hazardous waste stored on-site. This should include fire fighting arrangement based on the risk assessment, spill management, evacuation and first aid.
- i. Immediately on receipt of the hazardous waste, it should be analyzed and depending upon its characteristics its storage should be finalized.
- j. Only persons authorized to enter and trained in hazardous waste handling procedures should have access to the storage site.
- k. Mock drill for onsite emergency should be conducted regularly and records maintained.

3.2. Recommended Storage time and the Quantity of the Incinerable Hazardous Wastes:

Normal storage of incinerable hazardous wastes at the incinerator site should be restricted to maximum of six months

3.3. Hazard Analysis and Safety Audit:

For every incinerator facility, a preliminary hazard analysis should be conducted. Safety Audit internally by the Operator every year & externally once in two years by a reputed expert agency should be carried out and same should be submitted to the SPCB/PCC.

Such conditions should be stipulated by SPCBs while granting authorization under Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 to the incinerator operators.

All the above recommendations are also applicable for captive incinerators.

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Annexure –I

CENTRAL POLLUTION CONTROL BOARD
 Hazardous Waste Management Division
 Parivesh Bhavan, East Arjun Nagar
 DELHI – 110 032

F. No.B-29016 (SC)/1/06/HWMD/672-681

April 17, 2008

OFFICE ORDER

Sub: Constitution of the Committee for “Limiting storage time for storage of incinerable hazardous wastes by the hazardous wastes treatment, storage and disposal facilities i.e. TSDF Operators”.

The Chairman, CPCB has constituted a Committee in order to finalize the maximum time permissible to the operators of TSDF facilities in the country for the storage of incinerable hazardous wastes. This is in view of the fire incident which has taken place at Ankaleshwar, Gujarat at TSDF site on 3rd April, 2008 in Shed no. 7 of M/s. Bharuch Enviro Infrastructure Limited. The composition of the committee is as follows:

1.	Dr. R. K. Garg	Chairman
2.	Representative of Disaster Management Institute, Bhopal	Member
3.	Representative of E.I.L, New Delhi	Member
4.	Representative of Oil Industries Safety Directorate	Member
5.	Representative of Department of Explosive, Nagpur	Member
6.	Member Secretary, CPCB	Member
7.	Representative of MoEF(HSMD)	Member
8.	Representative of Andhra Pradesh, Gujarat & Maharashtra PCB	Member
9.	Incharge, HWM Division, CPCB	Member Convener

2. Term of Reference of the Committee: *The terms of reference of the Committee are as follows:*

- i. Prevention of fire hazards at TSDF site and major precautions to be taken.
- ii. Quantity of incinerable waste to be stored at TSDF site for incineration, considering the Incineration Capacity of TSDF site and HWM Rules.
- iii. Specification of the godown(s) and the major precaution to be taken in godown for storing hazardous waste in order to prevent fire hazard.
- iv. Any other aspects related to above with overall view to prevent such eventualities in future.

3. **Tenure of the expert committee:** Tenure of the expert committee for fulfilling the tasks as per terms of reference would be *maximum of 3 months*.

4. **Reimbursement of TA/DA:** TA/DA will be paid only to the external expert members, as applicable, and as per the Central Government Rules, as and when invited from the external organizations other than the SPCBs/ PCCs/ MoEF/ CPCB.

5. **Honorarium:** An Honorarium of Rs. 3000/- per day (Rupee three thousands only) as sitting fee, for attending the meeting will be paid only to the non-official Expert Members.

This issue with the approval of the competent authority, Central Board.

Sd/-

(Dr. B. Sengupta)
Member Secretary

Copy for information to:

1. All the concerned (as per list enclosed) – You are requested to kindly nominate representative of your organization for attending the meetings of the Committee by April 25, 2008 positively.
2. PS to CCB, Delhi.
3. PS to MS, CPCB, Delhi.
4. ACO, CPCB, Delhi.

Sd/-

(Dr. B. Sengupta)
Member Secretary