

# MINISTRY OF ENVIRONMENT AND FORESTS

## NOTIFICATION

New Delhi, the 25<sup>th</sup> September, 2000

S.O. 908(E).- Whereas the draft of the Municipal Solid Wastes (Management and Handling) Rules, 1999 were published under the notification of the Government of India in the Ministry of Environment and Forests number S.O. 783(E), dated, the 27<sup>th</sup> September, 1999 in the Gazette of India, Part II, Section 3, Sub-section (ii) of the same date inviting objections and suggestions from the persons likely to be affected thereby, before the expiry of the period of sixty days from the date on which the copies of the Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 5<sup>th</sup> October, 1999;

And whereas the objections and suggestions received from the public in respect of the said draft rules have been duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules to regulate the management and handling of the municipal solid wastes, namely :-

### 1. Short title and commencement .--

- (1) These rules may be called the Municipal Solid Wastes (Management and Handling) Rules, 2000.
- (2) Save as otherwise provided in these rules, they shall come into force on the date of their publication in the Official Gazette.

**2. Application .--** These rules shall apply to every municipal authority responsible for collection, segregation, storage, transportation,, processing and disposal of municipal solid wastes .

**3. Definitions.--** In these rules, unless the context otherwise requires ,--

- (i) "anaerobic digestion" means a controlled process involving microbial decomposition of organic matter in the absence of oxygen;
- (ii) "authorization" means the consent given by the Board or Committee to the "operator of a facility" ;
- (iii) "biodegradable substance" means a substance that can be degraded by micro-organisms;
- (iv) "biomethanation" means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas;
- (v) "collection" means lifting and removal of solid wastes from collection points or any other location;
- (vi) "composting" means a controlled process involving microbial decomposition of organic matter;
- (vii) "demolition and construction waste" means wastes from building materials debris and rubble resulting from construction, re-modelling, repair and demolition operation;

- (viii) "disposal" means final disposal of municipal solid wastes in terms of the specified measures to prevent contamination of ground-water, surface water and ambient air quality;
- (ix) "Form" means a Form appended to these rules;
- (x) "generator of wastes" means persons or establishments generating municipal solid wastes;
- (xi) "kabaris or junk dealers" means persons who buy multiple recyclable wastes and undertake secondary segregation such that the waste is ready to be sold to reprocessors. On an average a junkdealer handles 1500 kgs of waste.
- (xii) 'Informal Recycling Sector' means all adults engaged in picking up waste from dustbins, waste segregation and waste trading who are outside the payroll of a government or private registered agency. This may include waste pickers, itinerant buyers, kabaris, (junk dealers) thiawalas and reprocessors.
- (xiii) 'Itinerant buyers' means those persons who buy high value waste from households.
- (xiv) "landfilling" means disposal of residual solid wastes on land in a facility designed with protective measures against pollution of ground water, surface water and air fugitive dust, wind-blown litter, bad odour, fire hazard, bird menace, pests or rodents, greenhouse gas emissions, slope instability and erosion;
- (xv) "leachate" means liquid that seeps through solid wastes or other medium and has extracts of dissolved or suspended material from it;
- (xvi) "lysimeter" is a device used to measure rate of movement of water through or from a soil layer or is used to collect percolated water for quality analysis;
- (xvii) "municipal authority" means Municipal Corporation, Municipality, Nagar Palika, Nagar Nigam, Nagar Panchayat, Municipal Council including notified area committee (NAC) or any other local body constituted under the relevant statutes and, where the management and handling of municipal solid waste is entrusted to such agency;
- (xviii) "municipal solid waste" includes commercial and residential wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes;
- (xix) "operator of a facility" means a person who owns or operates a facility for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes and also includes any other agency appointed as such by the municipal authority for the management and handling of municipal solid wastes in the respective areas;
- (xx) "pelletisation" means a process whereby pellets are prepared which are small cubes or cylindrical pieces made out of solid wastes and includes fuel pellets which are also referred as refuse derived fuel;
- (xxi) "processing" means the process by which solid wastes are transformed into new or recycled products;
- (xxii) "recycling" means the process of transforming segregated solid wastes into raw materials for producing new products, which may or may not be similar to the original products;
- (xxiii) "Schedule" means a Schedule appended to these rules;
- (xxiv) "segregation" means to separate the municipal solid wastes into the groups of organic, inorganic, recyclables and hazardous wastes;
- (xxv) "State Board or the Committee" means the State Pollution Control Board of a State, or as the case may be, the Pollution Control Committee of a Union territory;
- (xxvi) "storage" means the temporary containment of municipal solid wastes in a manner so as to prevent littering, attraction to vectors, stray animals and excessive foul odour;
- (xxvii) "transportation" means conveyance of municipal solid wastes from place to place hygienically through specially designed transport system so as to prevent foul odour, littering, unsightly conditions and accessibility to vectors;
- (xxviii) "Thiawalas" means persons at the intermediate level between wastepickers and kabaris / junkdealers. They operate by buying high value waste at fixed hours in a fixed place, particularly at commercial centres and shopping areas where aggregate waste is delivered to them.

- (xxix) "vadose water" water which occurs between the ground, surface and the water table that is the unsaturated zone;
- (xxx) "vermicomposting" is a process of using earthworms for conversion of bio-degradable wastes into compost.
- (xxxi) "Wholesale dealers" means waste traders who specialise in trade of single recyclable waste. On an average a wholesale dealer handles approximately 60, 000 kgs of waste.
- (xxxii) "Waste pickers" are the first and the lowest point in the recycling chain. They collect recyclable waste from market places, municipal collection points and dustbins , sort and segregate them. They may sit at one point or be itinerant.

#### 4. Responsibility of municipal authority .-

- (1) Every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes.
- (2) The municipal authority or an operator of a facility shall make an application in Form-I, for grant of authorization for setting up waste processing and disposal facility including landfills from the State Board or the Committee in order to comply with the implementation programme laid down in Schedule I.
- (3) The municipal authority shall comply with these rules as per the implementation schedule laid down in Schedule I.
- (4) The municipal authority shall furnish its annual report in Form-II,-
  - (a) to the Secretary-incharge of the Department of Urban Development of the concerned State or as the case may be of the Union territory, in case of a metropolitan city; or
  - (b) to the District Magistrate or the Deputy Commissioner concerned in case of all other towns and cities,

with a copy to the State Board or the Committee on or before the 30<sup>th</sup> day of June every year.

#### 5. Responsibility of the State Government and the Union territory Administrations .-

- (1) The Secretary-incharge of the Department of Urban Development of the concerned State or the Union territory, as the case may be, shall have the overall responsibility for the enforcement of the provisions of these rules in the metropolitan cities.
- (2) The District Magistrate or the Deputy Commissioner of the concerned district shall have the overall responsibility for the enforcement of the provisions of these rules within the territorial limits of their jurisdiction.

#### 6. Responsibility of the Central Pollution Control Board and the State Board or the Committees .-

- (1) The State Board or the Committee shall monitor the compliance of the standards regarding ground water, ambient air, leachate quality and the compost quality including incineration standards as specified under Schedules II, III and IV.
- (2) The State Board or the Committee, after the receipt of application from the municipal authority or the operator of a facility in Form I, for grant of authorization for setting up waste processing and disposal facility including landfills, shall examine the proposal

taking into consideration the views of other agencies like the State Urban Development Department, the Town and Country Planning Department, Air Port or Air Base Authority, the Ground Water Board or any such other agency prior to issuing the authorization.

- (3) The State Board or the Committee shall issue the authorization in **Form-III** to the municipal authority or an operator of a facility within forty-five days stipulating compliance criteria and standards as specified in **Schedules II, III and IV** including such other conditions, as may be necessary.
- (4) The authorization shall be valid for a given period and after the validity is over, a fresh authorization shall be required.
- (5) The Central Pollution Control Board shall co-ordinate with the State Boards and the Committees with particular reference to implementation and review of standards and guidelines and compilation of monitoring data.

#### **7. Management of municipal solid wastes .-**

- (1) Any municipal solid waste generated in a city or a town, shall be managed and handled in accordance with the compliance criteria and the procedure laid down in **Schedule-II**.
- (2) The waste processing and disposal facilities to be set up by the municipal authority on their own or through an operator of a facility shall meet the specifications and standards as specified in **Schedules III and IV**.

#### **8. Annual Reports .—**

- (1) The State Boards and the Committees shall prepare and submit to the Central Pollution Control Board an annual report with regard to the implementation of these rules by the 15<sup>th</sup> of September every year in **Form-IV**.
- (2) The Central Pollution Control Board shall prepare the consolidated annual review report on management of municipal solid wastes and forward it to the Central Government alongwith its recommendations before the 15<sup>th</sup> of December every year.

**9. Accident Reporting .-**When an accident occurs at any municipal solid wastes collection, segregation, storage, processing, treatment and inimize facility or landfill site or during the transportation of such wastes, the municipal authority shall forthwith report the accident in **Form-V** to the Secretary in-charge of the Urban Development Department in metropolitan cities, and to District Collector or Deputy Commissioner in all other cases.

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Schedule I

[see rules 4(2) and (3)]

Implementation Schedule

Serial No.	Compliance Criteria	Schedule
1.	Setting up of waste processing and disposal facilities	By 31.12.2003 or earlier
2.	Monitoring the performance of waste processing and disposal facilities	Once in six months
3.	Improvement of existing landfill sites as per provisions of these rules	By 31.12.2001 or earlier
4.	Identification of landfill sites for future use and making site (s) ready for operation	By 31.12.2002 or earlier

Schedule -II

[see rules 6(1) and (3), 7(1)]

Management of Municipal Solid Wastes

S.no	Parameters	Compliance criteria
1.	Collection of municipal solid wastes	<p>1. Littering of municipal solid waste shall be prohibited in cities, towns and in urban areas notified by the State Governments. To prohibit littering and facilitate compliance, the following steps shall be taken by the municipal authority, namely :-</p> <ul style="list-style-type: none"> <li>(i) Organising house-to-house collection of municipal solid wastes through any of the methods, like community bin collection (central bin), house-to-house collection, collection on regular pre-informed timings and scheduling by using bell ringing of musical vehicle (without exceeding permissible noise levels);</li> <li>(ii) Devising collection of waste from slums and squatter areas or localities including hotels, restaurants, office complexes and commercial areas;</li> <li>(iii) Wastes from slaughter houses, meat and fish markets, fruits and vegetable markets, which are biodegradable in nature, shall be managed to make use of such wastes;</li> </ul>

		<ul style="list-style-type: none"> <li>(iv) Bio-medical wastes and industrial wastes shall not be mixed with municipal solid wastes and such wastes shall follow the rules separately specified for the purpose;</li> <li>(v) Collected waste from residential and other areas shall be transferred to community bin by hand-driven minimize d carts or other small vehicles;</li> <li>(vi) Horticultural and construction or demolition wastes or debris shall be separately collected and disposed off following proper norms. Similarly, wastes generated at dairies shall be regulated in accordance with the State laws;</li> <li>(vii) Waste (garbage, dry leaves) shall not be burnt;</li> <li>(viii) Stray animals shall not be allowed to move around waste storage facilities or at any other place in the city or town and shall be managed in accordance with the State laws.</li> </ul> <p>2. The municipal authority shall notify waste collection schedule and the likely method to be adopted for public benefit in a city or town.</p> <p>3. It shall be the responsibility of generator of wastes to avoid littering and ensure delivery of wastes in accordance with the collection and segregation system to be notified by the municipal authority as per para 1(2) of this Schedule.</p> <p>4. The municipal authority shall involve existing wastepickers in the door-to-door collectors of MSW and shall as such have first rights over recyclable wastes</p>
2.	Segregation of municipal solid wastes	<p>In order to encourage the citizens, municipal authority shall minimize awareness programmes for segregation of wastes and shall promote recycling or reuse of segregated materials.</p> <p>The municipal authority shall undertake phased programme to ensure community participation in waste segregation .For this purpose, regular meetings at quarterly intervals shall be arranged by the municipal authorities with representatives of local resident welfare associations and non-governmental organizations.</p> <p>The municipal authority shall involve the informal waste recycling community in segregation by allocating them spaces for segregation and storage of small amounts of waste for upto 7 days for selling purposes.</p>
3.	Storage of municipal solid wastes	<p>Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic and insanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities, namely :-</p> <ul style="list-style-type: none"> <li>(i) Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users;</li> <li>(ii) Storage facilities to be set up by municipal authorities or any other agency shall be so designed that wastes stored are not</li> </ul>

		<p>exposed to open atmosphere and shall be aesthetically acceptable and user-friendly;</p> <p>(iii) The municipal authority shall involve the informal waste recycling sector in segregation by allocating them spaces for segregation and storage of small amounts of waste for upto 7 days for selling purposes.</p> <p>(iv) Storage facilities or 'bins' shall have 'easy to operate' design for handling, transfer and transportation of waste. Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be printed white and those for storage of other wastes shall be printed black;</p> <p>(v) Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers.</p>
4.	Transportation of municipal solid wastes	<p>Vehicles used for transportation of wastes shall be covered. Waste should not be visible to public, nor exposed to open environment preventing their scattering. The following criteria shall be met, namely:-</p> <p>(i) The storage facilities set up by municipal authorities shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing;</p> <p>(ii) Transportation vehicles shall be so designed that multiple handling of wastes, prior to final disposal, is avoided.</p> <p>(iii) A mixture of transportation forms shall be allowed so as to encourage non-polluting vehicles, reduce greenhouse gases and also encourage operators to transport waste to short distance waste depots.</p>
5.	Processing of municipal solid wastes	<p>Municipal authorities shall adopt suitable technology or combination of such technologies to make use of wastes so as to minimize burden on landfill. Following criteria shall be adopted, namely:-</p> <p>(i) The biodegradable wastes shall be processed by composting, vermicomposting, anaerobic digestion or any other appropriate biological processing for stabilization of wastes. It shall be ensured that compost or any other end product shall comply with standards as specified in Schedule-IV;</p> <p>(ii) Mixed waste containing recoverable resources shall follow the route of recycling as operating in the informal sector recognised as the formal route of recycling. Incineration with or without energy recovery including pelletisation can also be used for processing wastes in specific cases. Municipal authority or the operator of a facility wishing to use other state-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down before applying for grant of authorization.</p> <p>(iii) Provision for, space shall be made before the MSW is processed</p>

		<p>to enable the informal sector (Waste pickers and junk dealers) to further collect the recyclables (Schedule - V)</p> <p>(iv) Spaces of work of the informal sector to be treated as the 'recovery centre for recyclables'. (Schedule - V)</p> <p>(v) Organized reuse through weekly markets etc. will be encouraged and space and permission for this provided</p>
6.	Disposal of municipal solid wastes	<p>Land filling shall be restricted to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing. Land filling shall also be carried out for residues of waste processing facilities as well as pre-processing rejects from waste processing facilities. Land filling of mixed waste shall be avoided unless the same is found unsuitable for waste processing. Under unavoidable circumstances or till installation of alternate facilities, land-filling shall be done following proper norms. Landfill sites shall meet the specifications as given in Schedule -III.</p>

### Schedule III

[see rules 6(1) and (3), 7(2)]

#### Specifications for Landfill Sites

##### Site Selection

1. In areas falling under the jurisdiction of 'Development Authorities' it shall be the responsibility of such Development Authorities to identify the landfill sites and hand over the sites to the concerned municipal authority for development, operation and maintenance. Elsewhere, this responsibility shall lie with the concerned municipal authority.
2. Selection of landfill sites shall be based on examination of environmental issues. The Department of Urban Development of the State or the Union territory shall co-ordinate with the concerned organisations for obtaining the necessary approvals and clearances.
3. The landfill site shall be planned and designed with proper documentation of a phased construction plan as well as a closure plan.
4. The landfill sites shall be selected to make use of nearby wastes processing facility. Otherwise, wastes processing facility shall be planned as an integral part of the landfill site.
5. The existing landfill sites which continue to be used for more than five years, shall be improved in accordance of the specifications given in this Schedule.
6. Biomedical wastes shall be disposed off in accordance with the Bio-medical Wastes (Management and Handling) Rules, 1998 and hazardous wastes shall be managed in accordance with the Hazardous Wastes (Management and Handling ) Rules, 1989, as amended from time to time.
7. The landfill site shall be large enough to last for 20-25 years. Full efforts will be made to ensure that minimum wastes are disposed in the landfill, and maximum possible waste to be recycled or composted as per the rules.
8. The landfill site shall be away from habitation clusters, forest areas, water bodies monuments, National Parks, Wetlands and places of important cultural, historical or religious interest.

9. A buffer zone of no-development shall be maintained around landfill site and shall be incorporated in the Town Planning Department's land-use plans.
10. Landfill site shall be away from airport including airbase. Necessary approval of airport or airbase authorities prior to the setting up of the landfill site shall be obtained in cases where the site is to be located within 20 km of an airport or airbase.

### Facilities at the Site

11. Landfill site shall be fenced or hedged and provided with proper gate to monitor incoming vehicles or other modes of transportation.
12. The landfill site shall be well protected to prevent entry of minimize d persons and stray animals.
13. Approach and other internal roads for free movement of vehicles and other machinery shall exist at the landfill site.
14. The landfill site shall have wastes inspection facility to monitor wastes brought in for landfill, office facility for record keeping and shelter for keeping equipment and machinery including pollution monitoring equipments.
15. Provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipments and other facilities as may be required shall be provided.
16. Utilities such as drinking water (preferably bathing facilities for workers) and lighting arrangements for easy landfill operations when carried out in night hours shall be provided.
17. Safety provisions including health inspections of workers at landfill site shall be periodically made.
18. Adequate space and facilities shall be provided for the waste pickers to further segregate the recyclables from the MSW going for the landfilling at a designated corner of the landfill as it would reduce the quantity of waste to be land-filled & save on space. ( Schedule- V)

### Specifications for land filling

19. Wastes subjected to land filling shall be compacted in thin layers using landfill compactors to achieve high density of the wastes. In high rainfall areas where heavy compactors cannot be used alternative measures shall be adopted.
20. Wastes shall be covered immediately or at the end of each working day with minimum 10 cm of soil, inert debris or construction material till such time waste processing facilities for composting or recycling or energy recovery are set up as per Schedule I.
21. Prior to the commencement of monsoon season, an intermediate cover of 40-65 cm thickness of soil shall be placed on the landfill with proper compaction and grading to prevent infiltration during monsoon. Proper drainage berms shall be constructed to divert run-off away from the active cell of the landfill.
22. After completion of landfill, a final cover shall be designed to minimize infiltration and erosion. The final cover shall meet the following specifications, namely :--
  - (a) The final cover shall have a barrier soil layer comprising of 60 cms of clay or amended soil with permeability coefficient less than  $1 \times 10^{-7}$  cm/sec.
  - (b) On top of the barrier soil layer there shall be a drainage layer of 15 cm.
  - (c) On top of the drainage layer there shall be a vegetative layer of 45 cm to support natural plant growth and to minimize erosion.

### Pollution prevention

23. In order to prevent pollution problems from landfill operations, the following provisions shall be made, namely :-

- (a) Diversion of storm water drains to minimize leachate generation and prevent pollution of surface water and also for avoiding flooding and creation of marshy conditions;
- (b) Construction of a non-permeable lining system at the base and walls of waste disposal area. For landfill receiving residues of waste processing facilities or mixed waste or waste having contamination of hazardous materials (such as aerosols, bleaches, polishes, batteries, waste oils, paint products and pesticides) minimum liner specifications shall be a composite barrier having 1.5 mm high density polyethylene (HDPE) geomembrane, or equivalent, overlying 90 cm of soil (clay or amended soil) having permeability coefficient not greater than  $1 \times 10^{-7}$  cm/sec. The highest level of water table shall be at least two meter below the base of clay or amended soil barrier layer;
- (c) Provisions for management of leachates collection and treatment shall be made. The treated leachates shall meet the standards specified in Schedule- IV;
- (d) Prevention of run-off from landfill area entering any stream, river, lake or pond.

### Water Quality Monitoring

- 24. Before establishing any landfill site, baseline data of ground water quality in the area shall be collected and kept in record for future reference. The ground water quality within 50 metres of the periphery of landfill site shall be periodically monitored to ensure that the ground water is not contaminated beyond acceptable limit as decided by the Ground Water Board or the State Board or the Committee. Such monitoring shall be carried out to cover different seasons in a year that is, summer, monsoon and post-monsoon period.
- 25. Usage of groundwater in and around landfill sites for any purpose (including drinking and irrigation) is to be considered after ensuring its quality. The following specifications for drinking water quality shall apply for monitoring purpose, namely :-

S.No.	Parameters	IS 10500: 1991 Desirable limit ( mg/l except for pH)
1.	Arsenic	0.05
2.	Cadmium	0.01
3	Chromium	0.05
4.	Copper	0.05
5.	Cyanide	0.05
6.	Lead	0.05
7.	Mercury	0.001
8.	Nickel	-
9.	Nitrate as NO <sub>3</sub>	45.0
10	PH	6.5-8.5

11.	Iron	0.3
12.	Total hardness (as CaCO <sub>3</sub> )	300.0
13.	Chlorides	250
14.	Dissolved solids	500
15.	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	0.001
16.	Zinc	5.0
17.	Sulphate (as SO <sub>4</sub> )	200

### Ambient Air Quality Monitoring

26. Installation of landfill gas control system including gas collection system shall be made at landfill site to minimize odour generation, prevent off-site migration of gases and to protect vegetation planted on the rehabilitated landfill surface.
27. The concentration of methane gas generated at landfill site shall not exceed 25 per cent of the lower explosive limit (LEL).
28. The landfill gas from the collection facility at a landfill site shall be utilized for either direct thermal applications or power generation, as per viability. Otherwise, landfill gas shall be burnt (flared) and shall not be allowed to directly escape to the atmosphere or for illegal tapping. Passive venting shall be allowed if its minimize d or flaring is not possible.
29. Ambient air quality at the landfill site and at the vicinity shall be monitored to meet the following specified standards, namely :-

S.No.	Parameters	Acceptable levels
(i)	Sulphur dioxide	120 µg/m <sup>3</sup> (24 hours)
(ii)	Suspended Particulate Matter	500 µg/m <sup>3</sup> (24 hours)
(iii)	Methane	Not to exceed 25 per cent of the lower explosive limit (equivalent to 650 mg/m <sup>3</sup> )
(iv)	Ammonia daily average	
	(Sample duration 24 hrs)	0.4 mg/m <sup>3</sup> (400 µg/m <sup>3</sup> )
(v)	Carbon monoxide	1 hour average : 2 mg/m <sup>3</sup> 8 hour average : 1 mg/m <sup>3</sup>

30. The ambient air quality monitoring shall be carried out by the concerned authority as per the following schedule, namely:-

- (a) Six times in a year for cities having population of more than fifty lakhs;
- (b) Four times in a year for cities having population between ten and fifty lakhs;
- (c) Two times in a year for town or cities having population between one and ten lakhs.

#### **Plantation at Landfill Site**

31. A vegetative cover shall be provided over the completed site in accordance with the and following specifications, namely :-

- (a) Selection of locally adopted non-edible perennial plants that are resistant to drought and extreme temperatures shall be allowed to grow;
- (b) The plants grown be such that their roots do not penetrate more than 30 cms. This condition shall apply till the landfill is minimized;
- (c) Selected plants shall have ability to thrive on low-nutrient soil with minimum nutrient addition;
- (d) Plantation to be made in sufficient density to minimize soil erosion.

#### **Closure of Landfill Site and Post-care**

32. The post-closure care of landfill site shall be conducted for at least fifteen years and long term monitoring or care plan shall consist of the following, namely :-

- (a) Maintaining the integrity and effectiveness of final cover, making repairs and preventing run-on and run-off from eroding or otherwise damaging the final cover;
- (b) Monitoring leachate collection system in accordance with the requirement;
- (c) Monitoring of ground water in accordance with requirements and maintaining ground water quality;
- (d) Maintaining and operating the landfill gas collection system to meet the standards.

33. Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous and leachate analysis comply with the specified standards.

#### **Special provisions for hilly areas**

34. Cities and towns located on hills shall have location-specific methods evolved for final disposal of solid wastes by the municipal authority with the approval of the concerned State Board or the Committee. The municipal authority shall set up processing facilities for utilization of biodegradable organic wastes. The inert and non-biodegradable waste shall be used for building roads or filling-up of appropriate areas on hills. Because of constraints in finding adequate land in hilly areas, wastes not suitable for road-laying or filling up shall be disposed of in specially designed landfills.

#### Schedule IV

[see rules 6(1) and (3), 7(2)]

#### Standards for Composting, Treated Leachates and Incineration

1. The waste processing or disposal facilities shall include composting, incineration, pelletisation, energy recovery or any other facility based on state-of-the-art technology duly approved by the Central Pollution Control Board
2. In case of engagement of private agency by the municipal authority, a specific agreement between the municipal authority and the private agency shall be made particularly, for supply of solid waste and other relevant terms and conditions.
3. In order to prevent pollution problems from compost plant and other processing facilities, the following shall be complied with, namely :-
  - (i) The incoming wastes at site shall be maintained prior to further processing. To the extent possible, the waste storage area should be covered. If, such storage is done in an open area, it shall be provided with impermeable base with facility for collection of leachate and surface water run-off into lined drains leading to a leachate treatment and disposal facility;
  - (ii) Necessary precautions shall be taken to minimize nuisance of odour, flies, rodents, bird menace and fire hazard;
  - (iii) In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements be worked out for diversion of wastes to the landfill site;
  - (iv) Pre-process and post-process rejects shall be removed from the processing facility on regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclables shall be sent for well designed landfill site(s).
  - (v) In case of compost plant, the windrow area shall be provided with impermeable base. Such a base shall be made of concrete or compacted clay, 50 cm thick, having permeability coefficient less than  $10^{-7}$  cm/sec. The base shall be provided with 1 to 2 per cent slope and circled by lined drains for collection of leachate or surface run-off;
  - (vi) Ambient air quality monitoring shall be regularly carried out particularly for checking odour nuisance at down-wind direction on the boundary of processing plant.
  - (vii) In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:-

Parameters	Concentration not to exceed * (mg/kg dry basis , except pH value and C/N ratio)
Arsenic	10.00
Cadmium	5.00
Chromium	50.00
Copper	300.00
Lead	100.00

Mercury	0.15
Nickel	50.00
Zinc	1000.00
C/N ratio	20-40
PH	5.5-8.5

\* Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.

4. The disposal of treated leachates shall follow the following standards, namely:-

S.No	Parameter	Standards ( Mode of Disposal )		
		Inland surface water	Public sewers	Land disposal
1.	Suspended solids, mg/l, max	100	600	200
2.	Dissolved solids (inorganic) mg/l, max.	2100	2100	2100
3	PH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Ammonical nitrogen (as N), mg/l, max.	50	50	-
5	Total Kjeldahl nitrogen (as N), mg/l, max.	100	-	-
6	Biochemical oxygen demand ( 3 days at 27 <sup>0</sup> C) max.(mg/l)	30	350	100
7	Chemical oxygen demand, mg/l, max.	250	-	-
8	Arsenic (as As), mg/l, max	0.2	0.2	0.2
9	Mercury (as Hg), mg/l, max	0.01	0.01	-
10	Lead (as Pb), mg/l, max	0.1	1.0	-
11	Cadmium (as Cd), mg/l, max	2.0	1.0	-

12	Total Chromium (as Cr), mg/l, max.	2.0	2.0	-
13	Copper (as Cu), mg/l, max.	3.0	3.0	-
14	Zinc (as Zn), mg/l, max.	5.0	15	-
15	Nickel (as Ni), mg/l, max	3.0	3.0	-
16	Cyanide (as CN), mg/l, max.	0.2	2.0	0.2
17	Chloride (as Cl), mg/l, max.	1000	1000	600
18	Fluoride (as F), mg/l, max	2.0	1.5	-
19	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) mg/l, max.	1.0	5.0	-

Note : While discharging treated leachates into inland surface waters, quantity of leachates being discharged and the quantity of dilution water available in the receiving water body shall be given due consideration.

The incinerators shall meet the following operating and emission standards, namely:-

**A. Operating Standards**

(1) The combustion efficiency (CE) shall be at least 99.00%.

(2) The combustion efficiency is computed as follows :

$$C.E. = \frac{\%CO_2}{\%CO_2 + \%CO} \times 100$$

**B. Emission Standards**

Parameters	Concentration mg/Nm <sup>3</sup> at (12% CO <sub>2</sub> correction)
(1) Particulate matter	150
(2) Nitrogen Oxides	450
(3) HCl	50
(4) Minimum stack height shall be 30 metres above ground.	
(5) Volatile organic compounds in ash shall not be more than	0.01%.

**Note :**

- (1) Suitably designed pollution control devices shall be installed or retrofitted with the incinerator to achieve the above emission limits, if necessary.
- (2) Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants
- (3) Chlorinated plastics shall not be incinerated.

- (4) Toxic metals in incineration ash shall be limited within the regulatory quantities as specified in the Hazardous Wastes (Management and Handling) Rules, 1989 as amended from time to time.
- (5) Only low sulphur fuel like I.d.o., I.s.h.s or Diesel shall be used as fuel in the incinerator.

**SCHEDULE -V**

**ROLE OF THE INFORMAL SECTOR IN MSW COLLECTION**

**1. Activities of the informal sector**

- (i) "The rate of the informal sector" comprising of the door-to-door collectors of MSW, waste pickers, junk dealers etc. shall be given due appreciation.
- (ii) The informal sector shall be considered as an important ingredient by the "Development Authorities" while planning & implementing the MSW management system.
- (iii) The informal sector shall be provided due prominence in activities such door-to-door collection, primary collection, segregation, storage and processing of MSW.

**2. Provisions to be made for the Informal Sector.**

- (i) 'Development Authorities' shall register the waste pickers and provide safety gear and MSW handling equipment
- (ii) 'Development Authorities' shall make provisions for providing basic medical facilities including primary health -care and immunization (Tetanus, HIV), regular health check ups for the informal sector.
- (iii) 'Development authorities' shall allot spaces for work to each category of informal sector using the following per 100,000 population norm

Category	Norm per 100,000 population
Wastepickers	215
Thiawalas	33
Kabaris/ Junk dealers	10
Wholesale dealers	1

- (iv) "Development Authorities" shall allocate following space for the informal sector to be treated as resource recovery centres for recyclables to ensure an efficient MSW system:

Category	Spatial requirement sq ft/ per person
Wastepickers	60 sq ft. of space near the dhalao or collection point for segregation
Thiawalas	25 sq ft. in commercial centres and market places
Junkdealers	3000 sq ft. in a commercial centre for storage of waste and shelter for workers
Wholesale dealers	60,000 sq ft in the commercial centres

Form -I

[see rules 4(2) & 6(2)]

Application for obtaining authorization

To,  
The Member Secretary

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1.	Name of the municipal authority/Name of the agency appointed by the municipal authority	:	
2.	Correspondence address  Telephone No.  Fax No.	:	
3.	Nodal Officer & designation(Officer authorised by the municipal authority or agency responsible for operation of processing or disposal facility)	:	
4.	Authorization applied for (Please tick mark)	:	(a) Setting up & operation of waste rocessing facility  (b)Setting up & operation of disposal facility
5.	Detailed proposal of waste processing/disposal facility (to be attached ) to include	:	
5.1	<b>Processing of Waste</b>  i. Location of site ii. Name of waste processing technology iii. Details of processing technology iv. Quantity of waste to be processed per day v. Site clearance (from local authority) vi. Details of agreement between municipal authority and operating agency vii. Utilization programme for waste processed (Product utilization) viii. Methodology for disposal of waste processing rejects (quantity and quality) ix. Measures to be taken for prevention and control of environmental pollution x. Investment on Project and expected returns	:	

	xi. Measures to be taken for safety of workers working in the plant		
5.2	<b>Disposal of Waste</b>  i. Number of sites indentified ii. Layout maps of site iii. Quantity of waste to be disposed per day iv. Nature and composition of waste v. Details of methodology or criteria followed for site selection vi. Details of existing site under operation vii. Methodology and operational details of landfilling viii. Measures taken to check enviornmental pollution	:	
Date		Signature of Nodal Officer	

Form - II

[See rule 4(4)]

Format of Annual Report to be submitted by the Municipal Authority

- (i) Name of City/Town:.....
- (ii) Population .....
- (iii) Name of municipal body:..... and Address  
.....  
.....

Telephone No. : .....

Fax : .....

- (iv) Name of Incharge dealing with municipal solid wastes .....  
..... with designation  
.....

1. Quantity and composition of solid wastes

- (i) Total quantity of wastes generated per day  
-----

- (ii) Total quantity of wastes collected per day  
-----

- (iii) Total quantity of wastes processed for :

- (a) Composting: .....
- (b) Vermiculture: .....
- (c) Pellets: .....
- (d) Others, if any, please specify .....

- (iv) Total quantity of waste disposed by landfilling:  
.....

- (a) No. of landfill sites used : .....
- (b) Area used: .....
- (c) Whether Weigh bridge facilities available : Yes/No
- (d) Whether area is fenced : Yes/No
- (e) Lighting facility on site : Yes/No

- (f) Whether equipment like Bulldozer, Compactors etc. available. (Please specify)  
:-----
- (g) Total Manpower available on site: -----
- (h) Whether covering is done on daily basis : Yes/No
- (i) Whether covering material is used and whether it is adequately available : -----  
-----
- (j) Provisions for gas venting provided : Available (Yes/No) /Not available
- (k) Provision for leachate collection : Provisions made/ Provisions not made

**2. Storage facilities**

- (i) Area covered for collection of wastes : -----
- (ii) no. of houses covered : -----
- (iii) Whether house-to-house collection is practised (if yes, whether done by Municipality or through Private Agency or Non-Governmental Organisation) : -----
- (iv) Bins : -----

Specifications Existing Proposed  
(Shape & Size) Numbers for future  
-----

- a. RCC Bins (Capacity) :
- b. Trolleys (Capacity) :
- c. Containers (Capacity) :
- d. Dumper Placers :
- e. Others, please specify :
- (v) Whether all bins/collection spots are attended for daily lifting of garbage : Yes/No
- (vi) Whether lifting of garbage from dustbins is manual or mechanical i.e. for example by using of front-end loaders (Please tick mark) : Manual/Loader/Others, please specify

### 3. Transportation

	Existing number	Actually Required/Proposed
(i) Truck :		
(ii) Truck-Tipper :		
(iii) Tractor-Trailer :		
(iv) Refuse-collector :		
(v) Dumper-placers :		
(vi) Animal Cart :		
(vii) Tricycle :		
(viii) Others (please specify) :		

### 4. Whether any proposal has been made to improve solid wastes management practices

### 5. Are any efforts made to call for private firms etc. to attempt for processing of waste utilising technologies like :

	Waste Utilisation Technology	Proposals	Steps taken (Quantity to be processed)
i. Composting :			
ii. Vermiculture :			
iii. Pelletisation :			
iv. Others if any, Please specify :			

### 6. What provisions are available and how these are implemented to check unhygienic operations of :

- i. Dairy related activities :
- ii. Slaughter houses and unauthorised slaughtering :
- iii. Malba (cnstruction debris) lifting :

iv. Encroachment in Parks, Footpaths etc. :

7. How many slums are identified and whether these are provided with sanitation facilities :

8. Are municipal magistrates appointed for Taking penal action : Yes/No

[ If yes, how many cases registered & settled during last three years (give year-wise details)]

9. Hospital waste management

i. How many Hospitals/Clinics under the control of the Corporation:

ii. What methods are followed for disposal of bio-medical wastes ?:

iii. Do you have any proposal for setting up of common treatment facility for disposal of bio-medical wastes :

iv. How many private Nursing Homes, Clinics etc. are operating in the city/town and what steps have been taken to check disposal of their wastes :

Signature of Municipal Commissioner

Dated :

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Form -III

[See-rule 6(2)]

Format for Issue of Authorisation

File No.: \_\_\_\_\_

Date: \_\_\_\_\_

To,

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ref: Your application number \_\_\_\_\_ dt. \_\_\_\_\_

The \_\_\_\_\_ State Pollution Control Board/Pollution Control Committee after examining the proposal hereby authorises \_\_\_\_\_ having their administrative office at \_\_\_\_\_ to set up and operate waste processing/waste disposal facility at \_\_\_\_\_ on the terms and conditions (including the standards to comply) attached to this authorization letter.

1. The validity of this authorization is till \_\_\_\_\_. After the validity, renewal of authorization is to be sought.
2. The \_\_\_\_\_ State Pollution Control Board/Pollution Control Committees may, at any time, revoke any of the conditions applicable under the authorization and shall communicate the same in writing.
3. Any violation of the provision of the Municipal Solid Wastes (Management and Handling) Rules, 2000 will attract the penal provision of the Environment (Protection) Act, 1986 (29 of 1986).

(Member Secretary)

State Pollution Control Board/  
Pollution Control Committee

Date :

Place :

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Form - IV

[see rule 8(1)]

**Format of Annual Review Report to be submitted by the State Pollution Control Board/Committees to the Central Pollution Control Board**

To,  
The Chairman,  
Central Pollution Control Board,  
(Ministry of Environment and Forests )  
Government of India,  
'Parivesh Bhawan', East Arjun Nagar,  
DELHI- 110 0032.

1.	Name of the State/Union territory	:	
2.	Name & address of the State Pollution Control	:	
3.	Board/Pollution Control Committee Number of municipal authorities responsible for management of municipal solid wastes in the State/Union territory under these rules	:	
4.	A Summary Statement on progress made by municipal authorities in respect of implementation of Schedule I [rule 4(3)]	:	Please attach as Annexure-I
5.	A Summary Statement on progress made by municipal authorities in respect of implementation of Schedule II [rules 6(1) and (3), 7(1)]	:	Please attach as Annexure-II
6.	A Summary Statement on progress made by municipal authorities in respect of implementation of Schedule III [rules 6(1) and (3), 7(2)]	:	Please attach as Annexure-III
7.	A summary statement on progress made by municipal authorities in respect of implementation of Schedule IV [rules 6(1) and (3), 7(2)]	:	Please attach as Annexure-IV
Date: _____		Chairman or the Member Secretary  State Pollution Control Board/  Pollution Control Committee	
Place : _____			

Form - V

[see rule 9]

Accident reporting

1.	Date and time of accident	:	
2.	Sequence of events leading to accident	:	
3.	The waste involved in accident	:	
4.	Assessment of the effects of the accidents on human health and the environment	:	
5.	Emergency measures taken	:	
6.	Steps taken to alleviate the effects of accidents	:	
7.	Steps taken to prevent the recurrence of such an accident	:	
Date : .....		Signature : .....	
Place : .....		Designation : .....	

V. Rajagopalan, Jt. Secy.  
[F.No.17-2/95-HSMD]