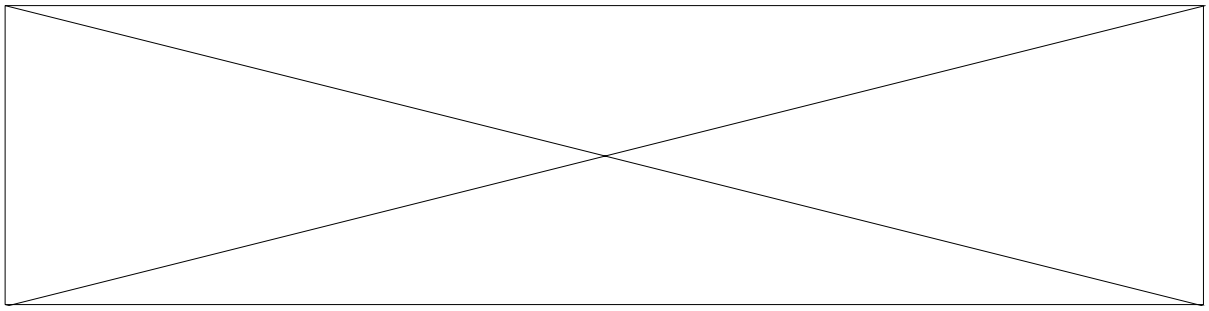

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CENTRAL POLLUTION CONTROL BOARD

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NATIONAL POLICY ON

HAZARDOUS WASTE MANAGEMENT

1.0 Hazardous Waste Management Scenario

The hazardous waste generated in the country as per the Hazardous Waste Management Rules, 1989 is about 4.4 million tones out of which 38.3% is recyclable, 4.3% is incinerable and the remaining 57.4% is disposable in secured landfills. Twelve States of the country (Maharashtra, Gujarat, Tamil Nadu, Orissa, Madhya Pradesh, Assam, Uttar Pradesh, West Bengal, Kerala, Andhra Pradesh, Karnataka and Rajasthan) account for 97% of total waste generation. The top five waste generating States are Maharashtra, Gujarat, Andhra Pradesh, Tamil Nadu and Orissa. On the other hand, States such as Himachal Pradesh, Jammu & Kashmir, all the North Eastern States excepting Assam generate less than 20,000 MT per annum. Given the wide variations in quantity and nature of waste generated across States and also considering the wide variations in climatic as well as hydro-geological conditions in different regions of the country, the approach to waste management has to be essentially State-specific.

Consequent upon amendments made in the year 2000 and subsequently in 2003,the State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) are in the process of re-inventorising hazardous waste generated. The current exercise has brought to light the serious short-comings in the earlier inventorisation. As a result, the total quantum of waste generated as well as its composition in terms of landfillable, incinerable etc. waste would undergo substantial changes. Nevertheless, the geographical distribution of waste generated and its

distribution amongst the States is unlikely to undergo major changes.

While it is well recognised that inventorisation has to be reviewed and updated periodically to account for growing industrialisation, it is necessary to prepare a reliable inventory as this forms the basis for planning treatment and disposal facilities. While field verification supplemented by stoichiometric assessments would be the ideal way forward, reasonably reliable estimates can be prepared based on product wise-guidance prepared by expert institutions on waste streams generated and quantities thereof.

Bulk of the waste currently generated is accounted for by industries in the small and medium scale sectors. In the absence of common disposal facilities, the waste generators have been accorded temporary permission to store waste in their premises except in areas serviced by common facilities that have come up in the States of Gujarat, Maharashtra and Andhra Pradesh. The lack of common facilities has been a major factor in mushrooming of illegal dump sites since most of the units in the small and medium sector do not have adequate space within their premises to arrange for storage over several years.

There has been considerable delay in notifying sites for hazardous waste disposal. Of the 93 sites identified, only 30 have been notified. The State Governments should not only expedite notification of sites based on environmental impact assessment but play a catalytic role and persuade the industry associations to set up common facilities. Such common facilities would need to be planned based on reliable estimate of current waste generation and projections for the future.

2.0 The Basel Convention

India is a Party to the Basel Convention on transboundary movement of hazardous wastes. The basic objectives of the Basel Convention are control and reduction of transboundary movements of hazardous and other wastes subject to the Basel Convention, prevention and minimization of their generation, environmentally sound management of such wastes and active promotion of the transfer and use of cleaner technologies.

As a Party to the Convention, India is obliged to regulate and minimise the import of Hazardous Waste or other wastes for disposal or sham re-cycling and also to prohibit export of waste to Parties, which have prohibited the import of such wastes. As a Party India is also required to minimise generation of hazardous waste taking into account social, technological and economic aspects. Further, hazardous waste generated in the country is also required to be managed in an environmentally sound manner. India, as a Party, can prevent the import of hazardous waste or other waste if it has reason to believe that the waste in question will not be managed in an environmentally sound manner.

3.0 Regulatory Frame Work

In order to manage hazardous waste (HW), mainly solids, semi-solid and other

Industrial wastes which are not covered by the Water & Air Acts, and also to enable the authorities to control handling, treatment, transport and disposal of waste in an environmentally sound manner, Ministry of Environment & Forests, Government of India notified the **Hazardous Waste (Management & Handling) Rules on July 28, 1989** under the Provisions of the Environment (Protection) Act, 1986 and was further amended in the year 2000 & 2003.

Amendments to the Rules were made in 2000 and 2003 to identify hazardous wastes by means of industrial processes and waste streams in Schedule I and also by way of concentrations of specified constituents of the hazardous waste in Schedule II. Categories of wastes banned for export and import have also been defined (Schedule-8) The procedure for registration of the recyclers / reprocessors with environmentally sound facilities for processing waste categories such as used lead acid batteries, non-ferrous metal and used oil as contained in schedule-4 and schedule – 5 respectively has also been laid down.

Further, separate Rules have also been notified for specified wastes in continuation of the above Rules, for Bio-medical Wastes as well as used lead acid batteries.

4.0 Priorities in Hazardous Waste Management

Ranking of options in Hazardous Wastes Management follows the widely accepted hierarchical preference for waste management in general. Accordingly, waste avoidance and minimisation ranks the highest followed by recycling and safe disposal of waste generated.

4.1 Waste Avoidance and Waste Minimisation

Given the difficulties in handling of hazardous wastes and the serious adverse impacts that result form improper management of such wastes, waste avoidance and minimisation gather added significance. Unlike other sectors of industrial activity, it is necessary to have a closer look at processes generating hazardous wastes rather than leave technological options entirely to the entrepreneur. Such an assessment of the avenues for waste avoidance/minimisation would naturally be industry-specific and product-specific.

On priority, it would be necessary to identify for action industry sectors which continue to adopt out-dated and highly polluting technology generating significant quantities of hazardous wastes. A case in point is the paper and pulp industry which continues with elemental chlorine based bleaching whereas there has been a major shift the world over to elemental chlorine-free bleaching. Similarly, the conversion of mercury cell based caustic soda manufacturing to membrane cell process would need to be expedited. Economic incentives, wherever needed for switch-over to cleaner production processes would need to be provided to offset additional financial burden and make such switch-over a financially attractive option.

The entire chemical industry would need to be studied through industry specific assessments on cleaner technology options leading to waste avoidance / minimisation and resource recovery. Within the chemical industry group, major segments such as pesticides and pesticide intermediates, dyes and dye intermediates as well as bulk drugs and intermediates would require special focus.

In these industry categories, wherever laboratory scale demonstrations have been completed as in the case of H-acid manufacture wherein suitability of catalytic hydrogenation has been well established, pilot plants would need to be set up to enable speedier adoption by the industry. In cases wherein techno-economic feasibility of cleaner production process has been well established and already adopted by some units such as adoption of cyanide-free electroplating, a dialogue should be started forthwith with the concerned industry associations for switch-over within a specified time period. In the petrochemicals, pesticides and Dyes and dye intermediates sectors, product-wise opportunities available for recovery of resources such as solvents, other reagents and by-products as well as re-generation of spent catalysts have been well documented. This exercise needs to be followed up by setting up dedicated task forces under the guidance of concerned CSIR laboratories and such task forces could serve as an inter-face between industry associations and CSIR laboratories to carry the work forward for actual application in field conditions.

4.2 Recycling of Hazardous Waste

Recycling of non-ferrous metallic wastes such as zinc dross, brass dross, used lead acid batteries, copper oxide mill scale and used lubricating oil offer attractive options for resource recovery in an environmentally sound and techno-economically feasible manner. Current gap between demand and supply of lead, zinc and copper as well as the projected widening of the gap due to rapid growth in demand arising from the automobiles sector etc. serve as added incentives for re-cycling. As compared to primary production of metals, re-cycling is energy efficient and environment friendly subject to a careful selection processing technology and disposal of wastes generated.

At present, there are about 200 recyclers of non-ferrous metallic wastes/waste oil who are registered under the HW Rules. Registrations have been granted based on their possessing facilities for environmentally sound re-processing and suitable facilities for disposal of wastes generated. However, but for a few exceptions, almost the entire recycling takes place in the small scale sector. As such, there are serious limitations on technology upgradation which would be necessary to ensure that re-processing is done as per guidelines evolved by the Basel Convention.

In order to promote technology upgradation, it would be necessary to make a distinction between re-processors with State-of-the-art facilities which meet the Basel Convention guidelines and those that do not. The current import regime would need to be re-examined to give access to imports of non-ferrous metallic wastes to only State-of-the-art facilities from a prospective date. In fact, such Units could also be given preferential access to wastes generated within the country. Need for other economic incentives would also need to be considered to offset additional burden arising from enhanced capital investment and recurring expenditure on pollution control and waste disposal.

While the traditional approach to pollution control in India has been to stipulate industry-specific standards and leave the choice of technology to the entrepreneur, a break from convention was made in the case of used oil re-processing and technology upgradation was legally mandated from a prospective date. Such an approach would need to be examined for its usefulness and relevance in re-cycling of non-ferrous metallic wastes as well.

Despite the registration scheme for recyclers, the menace of recycling in the unorganised sector with all its attendant environmental and health hazards still continues. This underscores the importance of channelisation of wastes generated. While the battery Rules, 2000 mandate return of used lead acid batteries, compliance remains unsatisfactory. It would be necessary to look into the causes thereof and devise suitable economic incentives such as advance recycling tax which is suitably structured to provide adequate incentive for the battery users to return used batteries to authorised dealers. Simultaneously, an organised drive would be necessary to break the nexus between scrap dealers, backyard smelters and those engaged in battery re-conditioning.

At present, there are no re-processing facilities in the country to recover toxic metals such as mercury from thermometers, tube-lights etc. and cadmium from batteries, etc. Considering the potential for serious health impacts posed by co-disposal of such hazardous wastes with municipal solid wastes, development of a system for channelisation of such wastes and development of re-processing facilities deserve to be accorded high priority.

4.3 Safe disposal of Hazardous Waste Generated

The third and the last option is to dispose of the hazardous waste safely. Depending on the waste category, land disposal or incineration could be adopted. Design and operation of such facilities, either captive or common need to strictly adhere to the guidelines. Supervision of such facilities during construction stage is of paramount importance. Common facilities should invariably be equipped with laboratory facilities to verify waste categorisation.

5.0 Setting up of Common Facilities

At present, there are 2 integrated Hazardous Waste Management facilities in the States of Andhra Pradesh and Maharashtra in addition to common landfill facilities available in Gujarat. States are currently at various stages of planning their common facilities. Common facilities including integrated facilities have to be planned following the polluter-pays principle although at the initial stages a certain level of assistance from the State Governments could significantly accelerate the process of setting up of these facilities and also ensure their viability in the initial years which is vital. Currently, several State Governments have made available land at concessional rates for setting up of these facilities which are part of the state's industrial infra-structure on the lines of Common Effluent Treatment Plants. For economic viability of common facilities, waste assurance is undoubtedly the single most important factor. Considering the urgency to set up common facilities and also the imperative to make them viable given the dire consequences to human health and environment the absence of such facilities could lead to, setting up of common facilities calls for scientific planning backed by sound economic rationale. Transportation costs could account for a significant portion of total treatment costs particularly in the case of landfillable wastes.

(i) An integrated waste management facility should be designed to handle atleast 1 lakh tonne / annum of hazardous wastes; such a facility should comprise of a secured landfill, intractable waste stores, incinerator, reuse/ recycling facility, laboratory capable of comprehensive analysis, arrangement for transportation and

handling of wastes including supporting infrastructure. Such a facility should be permitted one per State (until interstate movement of hazardous waste comes into place).

(ii) The integrated facility as indicated above should have a Zone of coverage of 200 kms radius from the facility.

(iii) This facility should be located close to the major waste generation area.

(iv) Beyond the Zone of coverage (where transport cost plays a major role), smaller facilities (satellite facility) comprising only of a secured landfill including waste stabilization / solidification facility, laboratory capable of Finger Printing Analysis, Mechanised Transportation and Handling of Wastes and a transfer station should be established, where feasible.

(v) These facilities should be linked with the integrated facility of the State for comprehensive analysis of wastes, storage of intractable wastes, incineration and such other services.

(vi) These transfer stations cum landfill facilities should be atleast 300 kms from each other and the integrated facility.

(vii) All liability for these facilities shall also rest with the integrated waste management facility.

(viii) After the first integrated facility reaches satisfactory level of capacity utilisation (50% of estimated waste) further integrated facilities can be planned.

(ix) New bio-medical waste treatment facilities, both common and individual, should not be allowed within forty kms. of an integrated facility since bio-medical wastes can also be handled at the integrated facilities.

5.2 Interstate transportation of Hazardous Wastes

Interstate movement of hazardous wastes would be required when (a) landfillable waste generated by a State is less than the pre-determined level of say 20,000 MTA (b) for a company with units located in several states and wishing to incinerate wastes at one facility and (c) for incineration purposes when incinerable waste generation in a State is not adequate to support 3000 MTA of incineration. Facilities for landfilling / incineration should be set-up within one year.

In some of the States like Delhi, Kerala, Himachal Pradesh, Chandigarh and North East States etc., efforts for development of hazardous waste disposal facilities are still in progress. There are difficulties in identifying sites as the quantity of waste generation is low and is not viable for disposal by landfilling or availability of GW table close to the surface of the ground or high annual rainfall or high transportation cost. Therefore, it is felt that in case of Delhi, Kerala, Himachal Pradesh, Chandigarh and North Eastern States etc., combined facility with neighboring state including inter-state movement is required due to various factors such as land availability and the amount of waste generated suitable for landfilling / incineration.

Based on mutual consultations between the State Boards including the system of differential rates to be charged for wastes coming from other States, interstate movement of hazardous wastes for the interim period (say one year) may be allowed for the Units in States where common facilities are yet to be developed.

For proper tracking of HW disposal in an environmentally sound manner followed the manifest system, 5% of disposal charges may be made available to concerned SPCBs / PCCs where the wastes are proposed to be disposed by the occupier/operator of a facility satellite facility.

5.3 Use of Cement Kilns for HW incineration

Incineration of high calorific value hazardous wastes in cement kilns is a safe alternative to conventional disposal in dedicated waste incinerators. Sludges from petrochemical, oil refinery and paint industries as well as spent solvent from pesticide industries are particularly suitable.

In the cement kilns, the high flame temperature of around 2000^0C and high material temperature of around 1400^0C and large residence time of around 4-5 seconds ensure complete combustion of all organic compounds. Acid gases formed during combustion are neutralised by the alkaline raw material. The non-combustible residue including heavy metals gets incorporated into clinker in an irreversible manner.

The spread of cement industry in India across the States makes this option particularly attractive in the Indian context. That about 250 cement works in Europe utilise about 3 million tons of hazardous wastes indicates the potential that this option holds for India given that in India we have over 200 cement kilns and the incinerable hazardous wastes generated is only about ----- MTs. Trial runs need to be taken up under close supervision to study suitability of this option under Indian conditions in all major HW generating States.

6.0 Illegal Dumpsites and remediation

In the absence of common facilities, illegal and clandestine dumping of Hazardous Waste has been reported in many States. Even after waste disposal facilities have become operational in some States, the problem persists since illegal dumping helps avoid costs of transportation and disposal. To prevent the problem from growing out of proportions, surveillance, especially during night hours, both by enforcement agencies as well as industry associations should be made effective.

Rehabilitation of dumpsites should be based on scientific assessment of contamination of soil and groundwater and projected future damage based on modelling. The strategy for intervention, whether the focus should be on excavation of waste at site to the nearest TSDF and measures to prevent further spread of contamination through containment measures would suffice or whether site remediation should be taken up and, if so, the approach therefor would vary from site to site depending on nature of pollutants, future damage potential and remediation costs and benefits thereof. In any case, the ‘Polluter Pays’ Principle has to be basis for cost-sharing unless it becomes impossible to identify the culprits through finger printing of contaminants and tracing the wastes back to the producer.

In cases where it becomes impossible to track down the culprits, a dedicated fund needs to be created at the State level to which manadatory contributions from all producers of hazardous wastes could be prescribed. For removal of HW wastes from premises of Units to the nearest TSDF, the individual producers should also be levied a fine for indiscriminate disposal within premises in violation of conditions of authorisation for secured on-site storage for a temporary period.

The problem of hazardous wastes and chemicals lying in Units which have been closed should also be tackled strictly based on the 'Polluter-Pays' Principle.

7.0 Custom & Laboratory Strengthening

Customs play an important role in regulating import of hazardous wastes into the country. Cases of illegal imports of hazardous wastes have clearly indicated the need to plug existing loopholes. Priority areas for action include training of customs staff engaged in inspection as well as sampling and also upgradation of customs labs.

Appraisers carrying out inspection of goods received and having discretion to pick up samples need to be trained to pick up representative samples to achieve the best results. In addition to sampling techniques, assessors should be made aware of current hazardous wastes regulations, documentation requirements etc. Equally important is the need to upgrade laboratory facilities at all major ports of entry. Difficulties faced recently by customs authorities in distinguishing between used oil and waste oil serves as a case in point to identify the gaps. Lack of laboratory facilities for analysis of trace organics such as PCBs could either result in holding up of supplies for long periods of time merely on grounds of suspicion or lead to illegal imports of waste oil under the garb of used oil. As a first step, a through assessment of laboratory facilities available at all the ports, in particular, facilities available both in terms of equipment and trained man-power and equipment for analysis of all important heavy metals and trace organics, should be taken up and a time-bound plan prepared for their upgradation. Till such time all the ports are upgraded both in terms of equipment and training of laboratory personnel,, it would be necessary to consider channelisation of all hazardous wastes through selected ports well equipped to handle them and for this purpose, ports may be categorised suitably. As an interim measure, outsourcing of laboratory related work to laboratories recognised under the EP Act in respect of all relevant parameters may be considered.

Synchronising Customs categorisation of wastes with amendments in the Hazardous Wastes Rules should be made automatic so that the customs lists need not be amended every time there is a change in the lists of various waste categories in the HW Rules. Incidentally, this would also help in eliminating the time gap between amendments in the HW Rules and the Customs waste lists which causes avoidable confusion. Harmonisation of custom codes with the international system as amended from time to time should also be accorded high priority.

8.0 Disposal of date expired and banned pesticides

There are significant quantities of date expired pesticides lying in various States and concerned departments are looking for safe disposal. The options available are (i)

to reprocess wherever possible by the industry who has supplied earlier; (ii) to appropriately incinerate either through dedicated incinerators of individual industries or through available with common integrated facilities. In order to deal with such hazardous wastes, interstate transportation should be permitted by the concerned State Governments and also disposal in a facility as per above said options available.

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