Terms of references for Inventorization and Characterization of Hazardous Waste categories
Under the
Capacity Building and Industrial Pollution Management Project (CBIPMP)
World Bank Assisted Project
ParyavaranaBhavan, A-III, Industrial Estate, Sanathnagar, Hyderabad-500 018

1. INTRODUCTION

The Government of India, through its Ministry of Environment & Forests, is implementing a World Bank funded project titled "Capacity Building for Industrial Pollution Management" with the objective of strengthening the environmental management capacity of central and state level regulatory authorities with emphasis on rehabilitation of polluted sites and for undertaking area-based demonstration projects on remediation of contaminated sites. The project also aims at developing a "National Program for the Rehabilitation of Polluted Sites" to reduce or eliminate the environmental and health risks associated with legacy pollution.

2. PROJECT DESCRIPTION

Two states, Andhra Pradesh and West Bengal, have been identified for undertaking remediation of contaminated sites as demonstration projects and also for conducting other studies aimed at more fruitful regulation of hazardous wastes. The State Pollution Control Boards of the two states will be responsible for implementation of the project at the state level.

The main components implemented by APPCB are

I. Strengthening of Environmental Institutions - This component is aimed at building capacity for addressing pollution remediation, through pilot site remediation, developing risk-based technical solutions to implement measures for intercepting, containing or treating, as well as monitoring the environment and health impacts in the project areas

II. Investments in Priority Remediation and Environmental Improvements - Technical and administrative support for remediation of Noor Mohammad Kunta Lake near

Hyderabad and closure and containment of Kadapa Municipal Solid Waste Site in Kadapa District are taken as priority areas in Andhra Pradesh under this component.

III. Project Management - for effective and transparent implementation of the project.

3. OBJECTIVE

Create an inventory and detailed geo-referenced database of the industrial facilities on the territory of Andhra Pradesh, collect key data and information of facilities and complexes relevant for their pollution potential and create a map depicting the geographic distribution of pollution hazards within the state.

Introduction to the proposed Inventory of Industries

In addition to the above listed activities the Andhra Pradesh Pollution Control Board proposes to add to the project the creation of an Inventory of all the Industries and an Inventory of Hazardous waste generating industries in the State of Andhra Pradesh, which should be geo-referenced.

The main aim of the project is to (i) create a database and introduce or apply a categorization system of industry types which takes into account their outputs, main required resources and main waste types and quantities generated; (ii) understand the spatial distribution of these industries across the State of Andhra Pradesh; (iii) create analytical algorithms to define the overall pollution potential of different districts of Andhra Pradesh and (iv) advanced create an application of this database that enables optimum routing of solid waste streams, Effluent treatment Plants including Common Effluent Treatment plants transport of effluents and use of common infrastructure for e.g. waste or wastewater treatment. This data is useful for effective decision making of the Board.

4. SCOPE OF WORK

The work will be carried out through the following broad steps:-

Step 1 : Preliminary Study

Objective: to collect, collate and review the existing data and general information on hazardous waste generating sources.

- The data such as list of Industries, and other details as per consent orders will be provided by APPCB. The consultant shall obtain data from other sources such as Industries Dept., DIC, Factories Dept., A. P. Transco., APIIC, Mines & Geology, Revenue Department, Civil Supplies Department. This data should be consolidated in consultation with respective Regional Offices of the Board.
- The consultant shall closely interact with Regional Office of the Board for correctness of the data being collected
- Tap other sources such as Public Complaints, legal proceedings on issues relating to environmental damages, information from other monitoring programs, media news, articles/publications on environmental contamination, etc.
- Identify possible hazardous wastes generated by the newly listed units based on available information on process and raw materials.
- Finalise the list of industries inconsultation with the project authorities to carry-out further field verification.

Output : A preliminary inventory of hazardous waste generating activities (Industries, recyclers, waste management facilities etc.) and an estimate of the waste generation in the state

Step 2 : Field visits

Objective : to verify waste generation record in respect to handling, storage, treatment, recycling and disposal practices and adequacy of existing waste management infrastructure in the state

The Consultant shall conduct a thorough review of the available data on the units identified in Step 1 and verify :-

I. Inventory of all the Industries as per their list finalized in the step -1duly collecting the information and putting the information on GIS platform initially at 1:25,000 scale, further mapping at 1:10,000 scale can be taken up for the identified sites (Hyderabadregion which includes Greater Hyderabad Municipal corporation and Medak district and Visakhapatnam region which includes Greater Visakhapatnam Municipal corporation area covering industrial pockets up to Anakapalli).The methodology shall be followed as per **Annexure-I**

II. Inventory and characterization of the hazardous waste. The methodology shall be followed as per **Annexure-II**

III. If the area of Industry is more than 50 acres, multiple coordinates at various corners shall be collected.

IV. Data shall also be collected for the unlisted industries that the consultant comes across during the field work.

V. The consultant shall calculate the total volume of industrial waste water (effluent) generated and treated, total load of BOD, COD, Heavy Metals etc., in the entire state, district wise and river basin wise and coastal areas based on existing data and information from the APPCB and Industries.

The consultant shall also visit

- the Common Hazardous Waste Treatment Storage and Disposal Facility at Dundigal, Rangareddy district and Pharma City, Vizag to review the capacity of the plant and systems

compared to the hazardous waste inventory and also the practices for waste treatment and disposal, and

Output: An updated list of hazardous waste generating, recycling and handling units, in a consistent and comparable format, clearly identifying the nature and type of wastes and giving an estimate of the hazardous waste generation from each unit, the handling, storage, treatment and disposal practices, information on any visible contamination of land or surface water, the performance of the CHWTSDF, the disposal of industrial hazardous waste etc.

Step 3:

Objective : Determination of hazardous waste generation factors for certain dominant small and medium sector industries to facilitate realistic waste inventorisation in these units

The consultant shall visit units in the following small and medium industry sectors and conduct studies for their raw material, process, product and production efficiency in order to determine the process specific hazardous Waste Generation Factors (WGF) with respect to raw material or product quantity :-

- Bulk Drug manufacturing units
- Power plants (Thermal, Bio-mass based)
- Cement Plants
- Sponge Iron plants
- Metal finishing units (Galvanizing, Electroplating)
- petroleum refineries

Andhra Pradesh has an abundance of above mentioned sector of industries under the that together contribute substantially to the total hazardous waste generation in the state. The operators of these units are not aware of the waste characteristics and correct quantification

methods and hence waste generation records submitted to the State PCB are often not realistic. As such information is important for better regulation and planning, the estimation of waste generation factors for these industry segments will help the APPCB in framing a realistic policy for waste management in these small and medium industries.

Output : A comprehensive list of all hazardous waste types generated from these six identified industrial operations alongwith process specific waste generation factors expressed as ratio of major raw material / major product.

Step 4 :

The consultant shall determine through the aforementioned studies and field visits

- the total quantity of hazardous waste being generated in the state as compared to the quantity being treated at the existing Common Hazardous Waste Treatment Storage and Disposal Facilities at Dundigal and Pharmacity
- the total quantity of recyclable hazardous waste being generated in the state as compared to the quantity being treated Cement Plants, common Haz.waste Incinerators and other enduses
- the adequacy of the existing CHWTSDF and the need for more facilities in view of the quantity of hazardous waste generation ascertained through this study.
- The collected coordinate data duly updating the attribute data shall be converted into a thematic layer for submission. The consultant should finalize the data in consultation with Board.
- The final data shall be submitted in soft / hard copy as per deliverables list and should in line with the NIC data base.
- Symbology shall be created in ArcGIS Desktop version as per the specification of APPCB – GIS.

5. DELIVERABLES

The entire assignment is expected to follow all guidelines of the World Bank and necessary approvals may be taken from APPCB whenever required. The assignment shall be for a period of 12 months and the delivery schedule shall be as follows :-

1. Preliminary study report with list of units identified for field visits (Step 1 and part of Step 2) - within 3 months of mobilization
2. Second Interim Report after completing field visits (Step 2 and Part of Step 3) - within 8 months of mobilization
3. Draft final report - within 10 months of mobilization
4. Final report after incorporating changes suggested by the Board – within 12 months of mobilization

All deliverables shall be provided in colour hard copies (3 copies for draft version and 10 copies for final version) and also in electronic form.

6. PROCEDURES FOR REVIEW OF REPORTS

The consultant shall also make presentations before the Project Steering Committee, the Project Implementation Unit of APPCB and the Technical Evaluation Panel of the MoEF as and when required. A copy of the reports will be sent to the Technical Evaluation Panel of the MoEF for their views. The recommendations of the TEP, Steering Committee and APPCB shall be incorporated/ implemented by the consultant firm.

7. CONSULTANT/ FIRM QUALIFICATIONS

Key Position	Area of Specific Expertise Desired	Minimum Qualification required and Professional Experience Desired

1. Team Leader	Hazardous waste management, waste characterization, industrial operations, process control, contaminated/ polluted site investigation, etc.	Masters degree in chemical, civil engineering or environmental science, technology or engineering or related discipline with minimum of 15 years experience in industrial environmental issues and 5 years of the specific expertise in hazardous waste management.
Technical Specialists		
a. Environmental Engineer / Hazardous Waste Management Expert (at least two specialists)	a. Hazardous waste management, related regulations, best practices, site assessments and remediation techniques	All technical specialists shall have Masters degree in related discipline with minimum of 10 years experience and 5 years of specific expertise. All technical specialists are expected to be familiar with the Indian industrial setup, environmental policies, environmental enforcement / compliance structure & issues.
b. Environmental scientist/ chemist	b. Sampling and analysis of hazardous waste samples, development of sampling protocol, knowledge of contaminant	

Annexure - I

INVENTORY OF INDUSTRY

Identification of Industries and break up	- District wise, Regional Office Wise – Zonal Office Wise. - Major, medium and small scale - Red, Orange and Green – Hazardous* and Non-Hazardous *(* a detailed inventory of hazardous industries/hazardous wastes will be taken up separately)* - Category of industry – like distillery, sugar, textile, bulk drug etc., - Annual turnover of the industry - Total number of employees
- Location and Basic Information	▪ Longitude , Latitude and River basin/catchment of any water body of significance ▪ Full address, contact person, telephone, fax, e-mail. ▪ Products manufactured and installed capacity ▪ Raw materials – storage provided ▪ Source of water for industrial and domestic use ▪ Water consumption – for processes, cooling and domestic purposes

	▪ Water consumption per tonne of product manufactured ▪ Waste water generation per tonne of product ▪ Number of outlets for the waste water ▪ Fuel consumption – coal, furnace oil, natural gas etc., ▪ Number of stacks ▪ Solid waste – hazardous, non-hazardous, MSW generation ▪ Power consumption ▪ Amount of water cess paid per annum ▪ Consent to Establish and Consent to Operate and HWA from A.P. Pollution Control Board and EC from MoEF/APSEA ▪ Any town ship attached to the industry
- **Characterization of wastewater** o Treated wastewater disposal facilities	o Characteristics of wastewater before and after treatment o Wastewater treatment systems o Capital cost of wastewater treatment system o Operation and maintenance cost of wastewater treatment system o Point of disposal of treated /untreated effluent – on land, into public sewers, inland surface waters/coastal waters, estuaries o Mode of disposal – through closed conduit, open channel, marine outfall o Reuse and recycle of treated effluent
- Public complaints, if any - **Characterization of stack emissions**	o o Characteristics of emissions before and after treatment o Capital cost of air pollution control system o Operation and maintenance cost of air pollution control system o Ratio of Annual turnover to Annual

- Clean technologies and waste minimization practices - **Fugitive emissions** - **Corporate responsibilities – details**	Environmental Management Cost o Major sources of fugitive emissions o Control systems adopted o Shop floor air quality

All the above information to be collected in 12months time and submitted on GIS Platform

Annexure - II

Inventory of Hazardous Industries/ Wastes

(As per EP (Act) – Hazardous (Management, Handling and Transboundary movement) Rules, 23rd September 2009).

Identification of hazardous waste generating units including ports & harbors and ships operating within5 km of the coastal waters

Location and Details of Industry	o District wise, Regional Office wise zonal office wise. o Major, medium and small scale o Longitude, Latitude and River basin o Full address, contact person, telephone, fax, e-mail. o Products manufactured and installed capacity o Raw materials
- Characterization of hazardous waste and categorization into	o Schedule I o Schedule II o E1-Flammable o E2-Corrosive o E3-Explosive o E4-Toxic o E5-Carcinogenic,Mutagenic and Endocrine disruptive
- Quantification of hazardous waste	o Sector wise & district wise o Stream wise in each sector - Liquid, Solid & Semisolid o Used oil, waste oil quantities o Verification of quantities by mass balance studies for major industrial sectors o Clean technologies and waste minimization practices o Present hazardous waste management practices o Solvent recovery o Recovery, reuse, recycle. o Co-processing of HW o Disposal facilities

- Captive secure land fill – capacity of storage?
- Authorization from A.P. Pollution Control Board – details (Form 2)
- Annual returns in Form 4 submitted to APPCB
- Transport to TSDF name of TSDF operator
- Tariff for handling non-incinerable HW
- Tariff for incineration
- Distance to the TSDF
- Annual burden on the industry for Hazardous Waste Management
- Frequency of transport of HW to TSDF (verify the manifest records)
- Analysis of soil, surface water and ground water samples collected in and around the industry.
- Any environmental impact study undertaken?
- Public complaints, if any
- On-site emergency plan prepared or not?
- Protective gear provided or not for the persons working on the site?
- Permission for Export of hazardous Waste (Form 7)
- Permission for Import of Hazardous Waste (Form 7)