

**Terms of Reference for carrying out study in District-Moradabad Uttar Pradesh for assessment of Environmental Problem due to unauthorised/unscientific recycling of E-Waste and disposal of Black powder generated from process of recycling through Low Cost In-Situ Technology for On-Site Treatment and Stabilization of heaps of milled black powder lying along the bank of river Ramganga, Moradabad.**

**1- Need for Study :**

In District-Moradabad of Uttar Pradesh, unauthorised/unscientific E-Waste processing without any environmental safeguards has led to environmental pollution and unsafe disposal of solid waste (Black powder) which is hazardous in nature on the banks of Ramganga river. The unscientific process being adopted involves dismantling, crude chemical leaching of Printed Circuit Boards, burning of wires/waste electrical & electronic components, grinding of residues and washing of metal rich residue (milled Black powder) in water to remove lighter non metallic fraction. The e-waste and metallurgical slag is burnt and ball milled to produce milled powder which is subject to washing for recovery of metallic fraction. As a result of such unscientific and unauthorised recycling of e-waste and metallurgical slag, the residual Black powder is dumped on the banks of Ramganga river at Dashwanghat, Barbalan, Nawabpura, Nagfani and Karula areas.

U.P. Pollution Control Board in coordination with district administration got the quantification and characterization done, of Black powder/waste lying dumped on the Bank of Ramganga river in Moradabad at Dashwanghat, Barbalan, Nawabpura, Nagfani and Karula areas. The estimated quantity is assessed at approximately 25000 to 26000 cubic meters and the specific gravity of Black powder has been found to be 0.7 to 0.97 in 04 samples. The Black powder contains metals like Chromium, Cadmium, Copper, Lead, Nickel, Manganese and Zinc in the Black powder. The concentration of metals in the Black powder is above the threshold limit as specified in schedule-II of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 thus rendering the dumped Black powder as Hazardous Waste.

The processing of e-waste is to be done as per the provisions of The E-waste (Management) Rules, 2016 and the disposal of Black powder of hazardous nature lying dumped on the banks of Ramganga river at Dashwanghat, Barbalan, Nawabpura, Nagfani and Karula areas is to be done as per the provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

## **2- Objective of Study & Scope of Work :**

### **Part-1**

#### **Survey of present scenario of e-waste recycling (Dismantling or/and Recycling) in Moradabad and proposed solution for e-waste recycling as per the provisions of The E-waste (Management) Rules, 2016.**

1. Survey of E-waste recycling units in Moradabad for assessment of their E-waste handling capacity, operations carried out for E-waste recycling i.e only Dismantling or Dismantling followed by Recycling, extent of man power involved, power load etc.
2. Source of E-waste supply and its compliance status as per E-waste Rules 2016.
3. Assessment of suitability of Area for carrying out E-waste recycling operation.
4. Assessment of Pollution (Effluent/Emission/Solidwaste) in Recycling units in Moradabad and suggestions for pollution control.
5. Adequacy of E-waste Recycling process being carried out vis-a-vis E-waste Rules, 2016.
6. Possible solutions to the problem of E-waste Recycling in Moradabad.
7. Economic & Technical viability of setting up of integrated E-waste recycling facility with provision of skill development centre.

### **Part-2**

#### **Environmentally Safe disposal of Black powder of hazardous nature lying dumped on the banks of Ramganga river at Dashwanghat, Barbalan, Nawabpura, Nagfani and Karula areas as per the provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.**

##### **Step A. Detailed Site Assessment & Investigation**

- Identify sources of contamination contributing to the pollution of the site (that is the banks of River Ramganga and the adjoining areas where E-Waste processing was practiced) between U/s of the river at Moradabad up to d/s of the river at Moradabad (within stretch of about 8Km).
- Study basic features of the site i.e. collection of available information on the site like site maps (topographical, geological), hydro-geological information, information from local authorities, information on the type of polluting-sources, wastes stored / disposed at site(site visits and desk work).
- Identification of previous and current land use pattern on subject site.
- Selection of the available observation wells (Bore Well) in the watershed covering the site, for monitoring water level and quality monitoring at appropriate locations, & Inventory details like total depth of the well
- Description of area with respect to existing land use and potential areas of environmental/ecological risk
- Preparation of groundwater level contour maps w.r.t. msl and ascertaining groundwater flow direction.
- Comprehensive analysis for 2 samples each of soil, sub-soil, surface water, ground water for major ions, heavy metals, VOCs, Semi Volatiles, and other relevant parameters related to the contaminated site as per national / international accredited testing procedures.

- Identify the Chemicals of Concern (COCs) in subject site
- Establish background concentration levels for the Chemicals of Concern (COCs)
- Develop a conceptual site plan/model. The conceptual site plan comprise three elements (i) Sources of contamination, (ii) Receptors and (iii) Potential pathways linking the two.
- Groundwater flow processes & contaminant transport processes to visualize the contaminant plume in groundwater if any.
- Delineate the boundaries, longitudinal and cross section of the contaminated site through topographic and other engineering surveys and prepare a base map of the project site (both CAD drawings and Google maps should be used).
- Estimate the quantity of contaminants and their concentrations including secondary pollutants, if any.
- The expected number of samples;

S.No	Details of sampling activity	Number of samples
1.	Establish monitoring wells with adequate structure for protection of wells.	4 wells
2.	Comprehensive sample analysis Top Soil (< 0.5m) – 2 Sub-soil ( 1.0 -2.0 ) - 2 Sediment – 2 Surface water – 2 Ground water -2	8
3.	Sample Analysis for COCs in and around subject site; Soil – 20 Sediments – 12 Surface water - 8 Groundwater - 12 Background samples Soil - 1 Sediments – 1	54
4	Analysis of Waste - 2 TCLP for heavy metals and inorganic compounds	2
5	Screening for heavy metals along the banks of the river using surface XRF	80 – 100 in-situ screening points

*Note: The number of samples may vary up to 10% depending on site specific requirements and/or for cross checking.*

- The expected approach for detailed site investigation shall be;
  - i. The area of investigation should be identified considering the main pathways, air and water transport of contaminates.
  - ii. Prior to any drilling or sampling work, a detailed map showing the site and its surroundings is required to document sampling points, findings and later the concentrations of contaminants. If such a map is not available, it should be generated based on a survey of the area.

- iii. All locations where waste was dumped shall be clearly identified. Available wells in the surroundings should be identified and tested for identified pollutant. The depth of the wells should be recorded and surveyed against mean seal level.
- iv. The depth of the bore wells should depend on the geological and hydro-geological conditions. If these conditions are unknown, a test bore for geological logging needs to be installed. The filter sections of the wells should all be in same depth considering the geological conditions.
- v. Surface water samples and sediment samples shall be collected from all identified surface water bodies with respect to subject site. Composite samples are not recommended. Groundwater-monitoring along the down gradient should be carried out as per requirement.
- vi. Intrusive investigation should include the soil underneath and surrounding the waste in order to identify the depth and extent of contamination.
- vii. If there is any potential source of contamination other than milled black powder, the same shall be investigated.
- viii. At least 2 waste samples dumped at subject site should be tested for heavy metals and inorganic compounds (listed in Schedule-II of HOWM Rules, 2016) in leachate extracted as per Toxicity Characteristic Leaching Procedure (TCLP) and values be expressed in mg/L.
- ix. Evaluation of the results should be carried out in order to identify potential sources pathways and receptors, and to identify the entire quantity of waste buried and contamination present.

#### **Step B. Risk Assessment**

- i. Suggest target values for treatment and remediation based on qualitative risk assessment.

#### **Step C. Options for In-situ treatment / Remediation**

- Evaluate multiple options for in-situ remediation of the contaminated soils, sediments and groundwater along the banks of the river based on economic feasibility, complexity, technology, effectiveness, execution aspects, previous performance, safety, locally available skills, etc.
- Assess the environmental and social impacts of treatment options, based on detailed field surveys and investigations.
- Recommend treatment options and appropriate Remediation strategies, considering the future land use and target contaminant concentrations. The options should be recommended based on (i) environmental risks due to the contamination, (ii) compliance with the standards based on techno-economic feasibility (iii) performance based approach that is based on verifiable success in similar situations.
- Implementation strategy should consider options such as conventional turnkey or Engineer-Procure-Construct (EPC) contracts and finalize suitable site specific treatment option strategy in consultation with UPPCB.

#### **Step D. Design of treatment plan and submission of DPR**

Submit a DPR for the approved remediation option, comprising detailed designs, engineering drawings, cost estimates and implementation schedule. The DPR should also be accompanied with detailed cost estimates for execution of treatment/remediation works. The execution of

the treatment and remediation plan as per DPR shall be carried out upon the approval of UPPCB, subsequently.

**Step E. Execution of In-situ treatment with approved treatment option**

**3- General Terms & Conditions**

- I. The consultant shall submit three copies of draft final report and final report, after including comments of UPPCB and CPCB. Beside this, a soft copy of draft final report and final report in MS word format will also be submitted.
- II. Consultant shall make presentations on interim report, draft final report, etc as and when required.
- III. Consultant shall inform schedule of field study to UPPCB well in advance, so that the UPPCB officials may also participate.
- IV. All the information generated and collected by consultant during the execution of the project is strictly confidential and sole property of UPPCB.
- V. In case, UPPCB is not satisfied with the progress of project as planned, consultant may be asked to refund the installments released.
- VI. In case of delay in execution of project, consultant shall provide reason for the same in writing.
- VII. In case of dispute during project execution and afterwards, the matter shall be referred to Chairman, UPPCB to arbitrate. The decision of Chairman, UPPCB will be final and binding.

**4- Time Schedule :**

**Final outputs (i.e. Reports, Drawing, etc.) that will be required of the consultant Delivery Schedules.**

Activities/Deliverables	Time in Months											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Part - 1 (Survey of present scenario of e-waste recycling (Dismantling or/and Recycling) in Moradabad and proposed solution)</b>												
<b>Part - 2 (In-situ treatment)</b>												
Detailed Site Assessment and Investigation (Step-1)												
Risk Assessment (Step-2)												
Options for in-situ treatment (Step-3)												
Submission of Detailed Project Report including the Designs of treatment / remediation units along with detailed technical document, specifications and cost break-up. Getting approval of the same.(Step-4)												
Execution of In-situ treatment / remediation with approved treatment option(Step-5)												

## 5- Estimated Cost Break-up

Activities/Deliverables	Estimated Cost	Quantity of Work
<b>Part-1</b>		
Survey of present scenario of e-waste recycling (Dismantling or/and Recycling) in Moradabad and proposed solution for e-waste recycling as per the provisions of The E-waste (Management) Rules, 2016.		
<b>Part-2</b>		
Submission of detailed site assessment report		
Presentation on findings and suggested remedial options		
Submission of Draft DPR		
Final DPR along with designs of treatment / remediation units with detailed technical document, specifications and cost break-up.		
Execution of Remediation works to comply with target remediation objectives and standards.	To be decided at Stage-II	To be decided at Stage-II

## 6- Facilities by UPPCB

- 1) Organizing meeting with stakeholders and District Administration, Moradabad
- 2) Deputing officer(s) to accompany consultant during field visits

## 7- Compensation for delay

The consultant shall strictly follow the time schedule for the project. The consultant shall pay an amount equal to ten percent of the total cost of the work as compensation, for every week's delay after the due period, provided that the entire amount of compensation to be paid under the provisions of this clause shall not exceed twenty five percent of the total cost of the work.

## 8- Arbitration clause/Dispute resolution

In case dispute arises, while work is in progress or after the completion, matter shall be referred to the Chairman, U.P. Pollution Control Board for decision. The decision of Chairman, UPPCB will be final and binding on the parties to the MoU. Arbitration shall be governed by The Arbitration and Concillation Act, 1996.

## 9- Eligibility criteria/qualification

1. The agency should have at least 10 years of experience in executing environmental studies.
2. The agency should have ample National and International experience on Integrated e-waste processing solutions & Hazardous Waste disposal practices along with low cost In-Situ Treatment & Stabilization Techniques.

3. The agency should have worked with MoEF & CC, CPCB and other State Pollution Control Boards in the field of Integrated e-waste processing solutions & Hazardous Waste disposal practices along with low cost In-Situ Treatment & Stabilization Techniques.
4. The agency should preferably have its own NABL/Environment(Protection) Act accredited laboratory else, tie up with NABL/Environment(Protection) Act accredited laboratory for relevant emission, effluent and solid waste parameters. Also, it should have emission and effluent monitoring experience of at least 3 years.
5. The agency should have valid ISO 9001 certification.
6. The agency should have its own qualified technical & scientific staff.

The interested expert agencies are requested to submit following documents:

1. Profile of the agency with supporting documents for qualifications.
2. Brief of environmental projects completed during last three years, with one page summary, cost, duration and name & address of the client for each project.
3. Bio-data of technical & scientific personnel likely to be assigned with the project
4. Details of laboratory facilities available.

The interested parties are requested to submit **Sealed** Technical & Financial Expression of Interest proposal to "The Member Secretary, U.P. Pollution Control Board, TC-12V, Vibhuti Khand, Gomti Nagar, Lucknow and the last date of submissions is 02-11-2017 by 6.00 PM.

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