

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI.**

Original Application No. 186 of 2020 (SZ)

Tribunal on its own motion-SUO MOTU
Based on the News item in The New
Sunday Express Newspaper Dated:
20.07.2020, "Ranipet Residents health
at risk due to Pollution; Chromium waste
killing agriculture in Ranipet Poses long-term
health risks."

-Vs-

Union of India,
Rep. by its Secretary,
Ministry of Environment and
Forests and Climate Change
Indira ParavaranBhawan,
Jorbagh Road,
New Delhi- 110 003 & Others.

...Respondents

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Filed by

Thiru. Sai Sathyajith,
BSC, Chennai.

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AFFIDAVIT FILED ON BEHALF OF THE RESPONDENT
TAMIL NADU POLLUTION CONTROL BOARD

I, R.Kannan, Son of Ragavan, Hindu, aged about 60 years, having
office at No.76, Mount Road, Guindy, Chennai-600 032, do hereby
solemnly affirm and sincerely state as follows:-

1. I am the Member Secretary, Tamil Nadu Pollution Control Board,
Chennai - 600 032 and I am filing this Affidavit on behalf of the
Respondent TNPC Board and as such I am well acquainted with the facts
of the case from the records.


Member Secretary
Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
Chennai - 600 032.

2. It is respectfully submitted that this Hon'ble Tribunal has passed an order dated 01.07.2022 in 186 of 2020 (SZ) and directed inter alia as follows: -

Para 9: ... the Tamil Nadu Pollution Control Board filed a report signed by the officer on 04.05.2022, e-filed on 09.06.2022. In the report they have only mentioned that they may require huge amount for implementation of the action plan prepared by the committee to remedy the situation and they require Rs. 12 crores for the purpose of capping as a interim measure as approved by the Central Pollution Control Board. Along with Joint Committee report an action plan was also annexed. In the action plan, capping was provided as an interim measure and on site remediation process was provided as the permanent measure. The Ministry of Environment, Forests and Climate Change have also given certain guidelines as to how remediation process of the contaminated site will have to be carried out. That also provides for onsite remediation. Even if the capping is done, they will have to excavate and do the onsite remediation process for permanently resolve the issue and they can carry out the interim measure as mentioned in the action plan and simultaneously they may take steps for onsite remediation as directed in the action plan.

Para 11: we direct the Chief Secretary to Government, State of Tamil Nadu to find out the source for raising the fund for this purpose. The Chief Secretary to Government of Tamil Nadu should convene a meeting with the Additional Chief Secretary for Environment, Forests and Climate Change, Additional Chief Secretary to Government for Finance, Additional Chief Secretary to Government for Industries Department and


Member Secretary

Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
Chennai - 600 032.

the Chairman, Tamil Nadu Pollution Control Board and the Director of Central Pollution Control Board, Regional Office, Chennai to resolve the issue as to how the funds can be raised for the purpose and to provide the funds for the purpose of carrying out the remediation process which has to be done on war footing basis. It is to be noted that this issue is pending for more than 20 years without taking any steps for remediation of contaminated site which continuously poses danger to the health of the people in that locality and they are directed to come with the solution as to how they are going to implement the action plan in a war footing manner and submit a report to that extent to this Tribunal within a period of 15 days.

3. It is respectfully submitted that, in order to comply the above orders, the TNPCB vide letter dated 15.07.2022 has addressed the Additional Chief Secretary to Government, Environment Climate Change and Forest Department requesting to address a letter to the Chief Secretary to Government of Tamilnadu to convene a meeting with line departments in terms of the said order and to resolve the issue as to how the funds can be raised for the purpose and to provide the funds for the purpose of carrying out the remediation process which has to be done on war footing basis. In this connection, the Additional Chief Secretary to Government ECC&F Department has convened a preliminary meeting with TNPCB on 16.08.2022.

4. It is respectfully submitted that the consultant M/s. ERM India Pvt Ltd has given the following two options for remediation of chromium contaminated site at TCCL, Ranipet.


Member Secretary
Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
Chennai - 600 032.

Remediation proposal	Steps involved	Total project cost
Interim Remediation Measure	Capping over existing dump site with HDPE liner followed by geosynthetic liner with soil cover to facilitate vegetation area & Providing storm water drainage network	Rs. 12 crores
Full Scale Remediation Measure	Waste stabilization and storing in secured landfill at onsite (Rs. 255.22crores) & Ground water pumping and treatment for next 15 years (Rs. 290.83 crores)	Rs. 556 crores

5. It is respectfully submitted that the dump site exists for past more than 25 years causing wide spread pollution. In order to avoid further contamination, the TNPCB decided to go ahead with the interim measures approved by the CPCB. In this regard, the TNPCB vide B.P.No. 46 dated 09.12.2021 approved the proposal to implement the interim remedial measures at a cost of Rs. 12 crores. The expenditure shall be met initially from 'Environmental Compensation Fund' available with TNPCB and simultaneously TNPCB shall take action to recover the expenditure from polluters under "Polluter Pay Principle".

The interim remediation measures (Annexure-I) involves capping of existing waste dump site with single liner system with 2mm HDPE liner followed by geo-synthetic membrane and covering with soil to facilitate vegetation area. Providing storm water drainage network to ensure that the rainwater run-off does not enter into the waste from the surrounding area


 Member Secretary
 Tamil Nadu Pollution Control Board
 No.76, Mount Salai, Guindy,
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and that the rainwater from the cover area is properly drained into this storm water drain. The slope will be maintained such that under all circumstances the water from the surrounding and the cover area is drained out of the landfill area.

It is respectfully submitted that this interim remedial measure could be an effective temporary arrangement and arrest possible any further damage to the larger extend, till the implementation of full scale remediation measures and identifying the source of funding, to minimize further contamination. This interim measure shall be completed in a period of one year from the date of award of the work order to the contractor.

It is submitted that an estimated period about three months is required to go through statutory process of identifying contractor and award work. Therefore a total time period for completing the interim remediation measures will be one year and three months.

6. It is respectfully submitted that since the full scale remediation measures given by M/s. ERM India Pvt Ltd involves huge funding and it is a long term project, the TNPCB had a meeting on 29.07.2022 with IIT Madras and a Professor from University of Illinois, Chicago who is an expert in the field of hazardous waste dump site remediation. It is submitted that this effort is also taken after taking into consideration of CPCB Joint Committee report already available, in order to modify the same for practical execution purpose and for mobilization of fund without compromising remediation measures.

The Professor has mentioned that quantitative sustainability assessment framework study will help in identifying the sustainable


Member Secretary
Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
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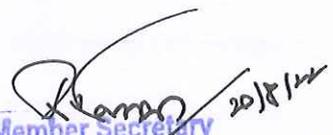
environmental remediation option for a particular site from the available options. In continuation to the meeting, the TNPCB vide letter dated 15.08.2022 (Annexure-II) has addressed the IIT Madras to furnish a proposal for conducting 'Quantitative Sustainability Assessment for Selecting Sustainable Remediation Options'. IIT Madras has agreed to take up the assessment and furnish the report within a period of three months.

It is respectfully submitted that once the Assessment report is received, it will be discussed with the CPCB. After finalization, it will be proceed further for source of funding and implementation.

Under the above circumstances, it is humbly prayed that this Hon'ble National Green Tribunal (Southern Zone) may be pleased to pass orders

- (i) To permit the TNPCB along with the other Government Departments to carryout the implementation of interim remediation measures as stated above.
- (ii) To permit the TNPCB along with the other Government Departments to continue the finalizing of the proposal for full scale remediation measures in consultation with IIT Madras and approach the Government Departments for funding.

and such further or other orders as this Hon'ble Tribunal may deem fit and proper in the facts and circumstances of this case and thus render justice.


Member Secretary
Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
Chennai - 600 032.

BEFORE ME

VERIFICATION

I, R. Kannan, Son of Ragavan, working as Member Secretary, Tamil Nadu Pollution Control Board, Chennai – 600 032 do hereby submit that the contents of above report are true to the best of my knowledge through records.


Member Secretary
Tamil Nadu Pollution Control Board
No.76, Mount Salai, Guindy,
Chennai - 600 032.

**BEFORE THE HON'BLE NGT (SZ),
CHENNAI**

Original Application No. 186 of 2020 (SZ)

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...Respondents

**REPORT FILED ON BEHALF OF THE
RESPONDENT – TAMILNADU
POLLUTION CONTROL BOARD.**

Advocate for Respondent: TNPCB
Thiru. Sai Sathyajith
BSC, Chennai.

Dated: 20.08.2022

FINAL REPORT

Central Pollution Control Board

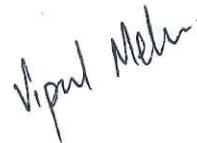
Preparation of DPR and
Providing Consultancy
Services for Remediation of
Contaminated Area: *Ranipet,
Vellore, Tamil Nadu, India*

**Step 6: Design of Remedial Plan and
Submission of DPR along with technical
documents and detailed specifications**

09 January 2019

Reference # I9729/0244871

Project Coordinator	Vipul Mehra <i>Principal Consultant</i>
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Remediation Expert:	Ravi Costa <i>Partner</i>
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This report has been prepared by ERM India Private Limited a member of Environmental Resources Management Group of companies, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

- Exposure to dust within and immediate outside the subject site due to excavation works impacting workers and nearby residents/occupants;
- Accidents, spillages of contaminated soil in the off-site areas resulting in traffic issues, regulatory issues and complaints by local people.

PPE Matrix

All the personnel working in these areas should use appropriate personal protection equipment (PPE). The minimum PPE requirements are as mentioned in *Table 5.2*.

Table 5.2 *PPE Requirement*

Activity	PPE Requirement
Evidently Waste and/ or Impacted Soil/ Waste/ Groundwater	i. Hard hat ii. Full Body Cover: Boiler Suite and/or Tyvek Suits iii. Vinyl gloves iv. Steel-toe chemical resistant boots v. Enclosed goggles vi. Respirator Protection: Dust mask
Uncontaminated Material	i. Cotton gloves ii. Steel-toe boots iii. Goggles iv. Dust mask v. Hard hat

Dust Control

Adequate precautionary measures for prevention of dust from excavation activities shall be undertaken at the Site. Some of these include (but are not restricted to) barricading of the area along with use of High Density Polyethylene (HDPE) sheets on the surface around the excavation zone and/or use of water sprinklers in order to prevent excessive dust in the work areas, as per requirement. This can be further mitigated using appropriate PPE.

5.3

INTERIM - SOIL AND WASTE REMEDIATION

As an interim remedial measure (as requested by CPCB and TNPCB), removal of contaminated waste as well as impacted soil from subject site would eliminate the scope of further leaching of contaminants into groundwater. This measure would gradually reduce concentrations in groundwater. This will also result in reclamation of about 58% of the contaminated land that can be utilized for industrial activities.

Upon on availability of adequate funds, the remediation technologies as envisaged in Detailed Project Report (DPR) can be implemented in conjunction with the interim measures.

The interim remedial measures will comprise of the following;

Table 5.3 *Interim Remedial Measures*

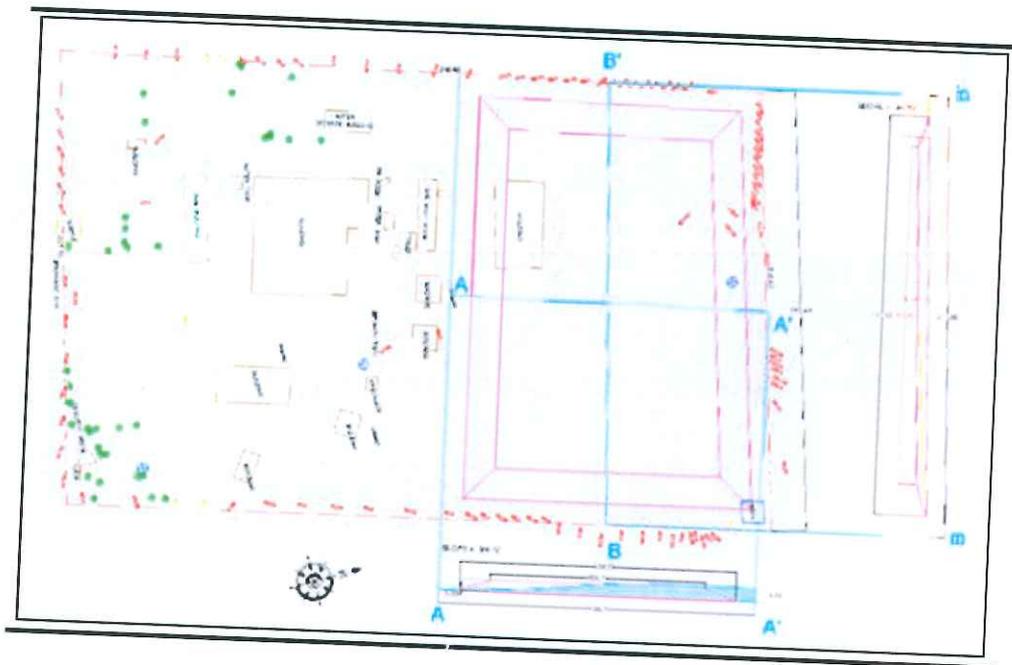
Matrix	Proposed Remedial Technique
Soil and Waste	Capping of existing waste dump with provision for storm water collection

5.3.1 *Capping of Waste*

The soil and waste will be capped in place with single layer liner system and capping consisting of 2mm HDPE liner followed by geo-synthetic membrane and covering with soil to facilitate vegetation. The activities anticipated to be implemented in the remedial approach for waste are given below.

The interim cap layout plan and elevations is provided below;

Figure 5.1 *Location of Interim Cap*



The schematic of the interim cap will be as per the guidelines provided under CPCB guidelines for cover systems. Estimated size of the proposed landfill cap is as follows;

- Length = 192 m (assuming 10m clearance from the boundary)
- Length inside = 161 m (assuming 15m clearance for 3H:1V)
- Width = 136 m (assuming 10m clearance from the boundary)
- With inside = 106 m (assuming 15m clearance for 3H:1V)
- Surface Area of Cap = 26,785 m² (with 10% buffer)

5.3.2 *Storm Water Drainage*

The storm water gutter is required to ensure that the rainwater run-off does not enter into the waste from the surrounding area and that the rainwater

from the cover area is properly drained into this drain. The drain slopes should be so maintained that under all circumstances the water from the surrounding and the cover area is drained out of the landfill area. Additionally, storm water drainage has to be provided across the site to prevent the storm water from flowing offsite.

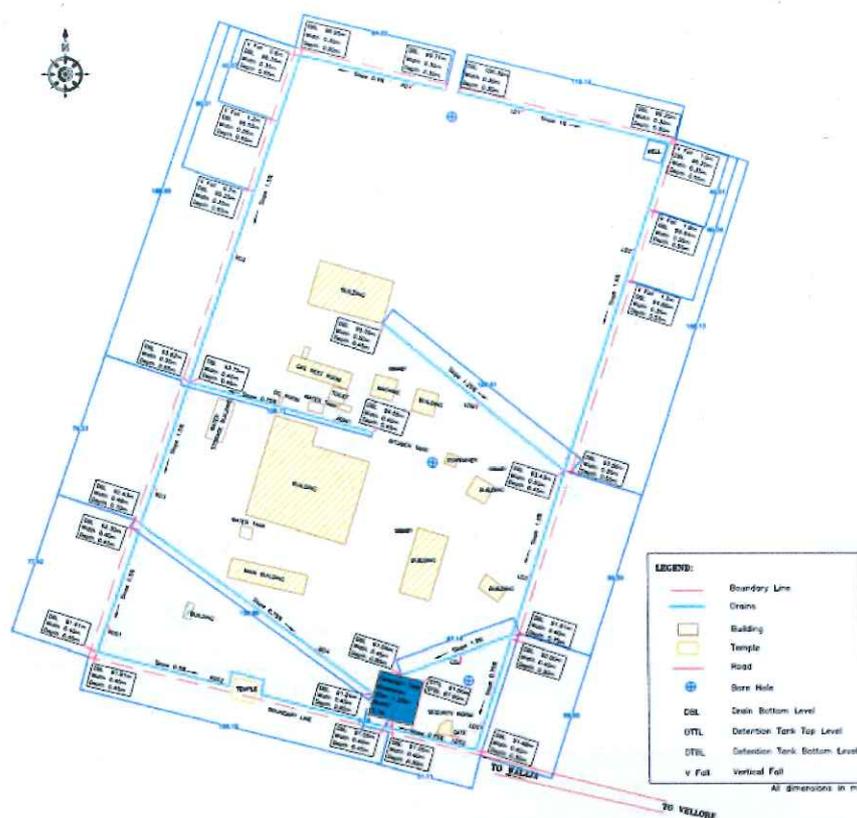
The design of the storm water drainage should consider estimated runoff, runoff coefficient, rainfall intensity, hydraulic design of the channels, and permissible velocities in the drain.

The following assumptions were considered in preparing the layout and design of the storm water system.

- The 1 hour rainfall maps of India for various return periods as given in IRC:SP 42-1994 was used for determining rainfall intensity of the study area. The one hour rainfall maps of India for return period of 5, 25, 50 years are prepared in IRC guidelines. Based on the analysis of the data, rainfall intensity has been considered acceptable as 80 mm/hour for 25-year return period.
- In the design of the internal drainage system, concrete bed with brick masonry walls drains is proposed. These Manning's "n" are considered as 0.015 for calculations.
- The minimum self-cleansing velocity in the internal drains is kept as 0.5 m/sec and the maximum permissible velocity up to 6 m/sec may be allowed for constructed drains with RCC. The flow regime was kept as subcritical and appropriate vertical falls were planned at steeply sloping areas to keep the flow regime in subcritical flow.

The layout and specifications of drainage system are provided in the figure below.

Figure 5.2 Drainage System Layout



The final layout and sizing of the drainage network will be prepared by the subcontractor prior to start of activities.

5.3.3

Schedule and Cost Estimate

The schedule of implementation of the selected interim remedial technology is subject to limiting field conditions. Assuming that the tasks are implemented without undue hindrance of any kind, the anticipated schedule is presented in Table 5.7 below.

Table 5.4 *Interim Remedial Implementation Schedule - Waste*

Activities	Sub-Activities	Anticipated Duration (months)
Earth Moving and Grading	Preliminary Survey	
	Preliminary drainage plan	2
	Preparation of grading plan	
Backfilling and Compaction	Phase wise grading	1
	Preparation of toe drain plan	1
Installation of Cap including toe drain	Trenching for toe drain	
Installation of Storm Water Drainage	Drainage layout plan	2
	Trenching for storm drain	
	Installation of collection tank	

The cost for capping and providing a storm water drainage is estimated to be INR 12 Crores. The components of this cost are presented in *Table 5.5* below. The cost presented below is an estimate for conditions as on dates of Step 3 studies and does not consider inflation or other changes in conditions

Table 5.5 *Interim Remedial Implementation Schedule - Waste*

Element	Price (INR)/Unit	Estimated Cost (INR)
Earth Moving	Lump sum	1,65,32,490
Compaction	Lump sum	17,06,000
Toe Drain Labor	Per month	5,00,000
Material Handling	Lump sum	42,05,865
Survey	Lump sum	1,35,125
Storm Water Drainage	Lump Sum	2,00,00,000
Geo-Membrane	Per m2	3,07,72,390
HDPE Liner	Per m2	46,15,858
Concrete for toe drain	Per m3	77,84,235
Top Soil	Per m2	1,60,56,000
Health & Safety Measures	Lump sum	20,00,000
Anticipated Capital Cost	Lump sum	10,43,07,964
Cost for Project Management	10% of Capital Cost	1,04,30,796
Permitting, Engineering and other costs	5% of Capital Cost	52,15,398
Total		11,99,54,159

5.3.4

Limitations:

- The proposed remediation activity can be performed only in case free access is given to the premises of the contaminated site.
- Costs does not include cost of electricity, demolition and treatment of existing structures/equipment, infrastructure development, land acquisition/lease (if required), inflation, etc.
- Groundwater contamination will be remaining.

5.4

FULL SCALE SOIL AND WASTE REMEDIATION

Based on the evaluation of shortlisted techniques proposed for Soil and Waste, and the regulatory requirements, excavation, treatment and on-Site disposal in a secure landfill (SLF) was identified to be the most sustainable option. This approach removes the chemicals of concern (Source removal) and eliminates further migration to soil and groundwater. This does not remediate the CoC in groundwater. Therefore, the impacts in soil and groundwater need to be addressed simultaneously.

This section presents the approach adopted for the areas where soil and waste was observed to be stored. Waste was observed to be stored in the northern portion of the Site while soil was found in the southern portion of the Site.



TAMIL NADU POLLUTION CONTROL BOARD

From

Tmt. Dr Jayanthi, M., I.F.S.,
Chairperson,
Tamil Nadu Pollution Control Board,
76, Mount Salai, Guindy,
Chennai - 600 032.

To

The Head of Department,
Department of Civil Engineering,
IIT Madras,
Sardar Patel Road, Adyar,
Chennai - 600 036.

Letter No.: T2 / TNPCB / F.33718 /VLR / 2022, dated: 15.08.2022

Sir,

Sub.: TNPCB -HWM - Remediation of Chromium contaminated Site at M/s Tamil Nadu Chromates Limited (TCCL) at No. 25, SIPCOT Industrial Complex, Ranipet, Walajah Taluk, Ranipet District - To conduct Quantitative Sustainability Assessment Framework for Selecting Remediation Options recommended by M/s ERM India Ltd - Regarding.

Ref.: DPR Prepared by M/s ERM India Pvt Ltd., Bangalore fore remediation of Chromium contaminated site at M/s TCCL, Ranipet. (copy enclosed)

I am to invite kind attention to the reference cited above. M/s Tamil Nadu Chromates and Chemicals Ltd (TCCL), a defunct unit located at Ranipet was operated between the years 1975 to 1995 manufactured sodium bichromate, basic chromium sulphate and sodium sulphate using chromate ore.

During its operation, about 2.2 Lakh Tonnes of chromium bearing hazardous waste generated was dumped at the backyard of the premises on open land over an extend area of 2 hectares to a height of 3 to 5 meters. The leachate generation from the chromium bearing hazardous waste of stockpile is causing chrome contamination of land, ground water in that area.

CPCB has entrusted M/s ERM India Pvt Ltd for preparation of Detailed Project Report (DPR) and providing consultancy for remediation of chromium contaminated area at TCCL. Accordingly M/s ERM India Pvt Ltd has conducted detailed study at contaminated site and submitted DPR. In the DPR, M/s ERM India Ltd has offered two options namely

No. 76, MOUNT SALAI, GUINDY, CHENNAI - 600 032.

Tel : 044-22353134 - 139 Fax : 044-22353068

Email : tnpccb-chn@gov.in Web : tnpccb.gov.in



TAMIL NADU POLLUTION CONTROL BOARD

- (i) **Interim remedial measure** – Capping over the existing dumpsite with HDPE liner followed by geo synthetic liner with soil cover to facilitate vegetation and also to provide garland storm water drain to divert the rain water
- (ii) **Full Scale remediation** – Waste Stabilization and storing in secured landfill at onsite followed by ground water pumping & treatment for next 15 years.

A Technical Presentation was made by Dr. Indumathi M Nambi, Department of Civil Engineering, IIT- Madras and Dr. Krishna R. Reddy, Professor of Civil & Environmental Engineering Director, Sustainable Engineering Research Lab Geotechnical & Geo environmental Engineering Lab University of Illinois at Chicago regarding the “Quantitative Sustainability Assessment Framework: Selecting Sustainable Closure and Groundwater Remediation Options” on 29/7/2022 in the Conference Hall of TNPCB before the Chairman & Member Secretary.

Wherein, it has been highlighted that the Quantitative Sustainability Assessment Framework will help in identifying the sustainable environmental remediation option for a particular site from the available options. Based on the technical presentation, it has been decided to conduct Quantitative Sustainability Assessment for Selecting Sustainable Remediation Options for the contaminated site at M/s TCCL, Ranipet.

Hence, it is requested to offer your proposal for conducting Quantitative Sustainability Assessment for Selecting Sustainable Remediation Options for the contaminated site at M/s TCCL, Ranipet.

The receipt of the letter shall be acknowledged.

Encl: DPR by ERM

Sd/-
Chairperson


For Chairperson

Copy to

Dr Indumathi M. Nambi
Professor,
Department of Civil Engineering
IIT Madras.