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

ORIGINAL APPLICATION NO. 176 OF 2013 (SZ)
(EARLIER OA NO. 562 of 2018 (PB))

IN THE MATTER OF

V.P Krishnamoorthy

.....Applicant

Versus

Union of India & Ors

.....Respondents

INDEX

Advocate for the Respondent: TNPCB
Tr. S. Sai Sathya Jith,
Advocate, Chennai

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REPORT FILED ON BEHALF OF THE RESPONDENT – TAMIL NADU POLLUTION CONTROL BOARD

I, R. Rajamanickam, S/o P.M. Ramasamy , Hindu, aged about 57 years, having office at No.76, Mount Salai, Guindy, Chennai-600 032, do hereby solemnly affirm and sincerely state as follows:

I am the Joint Chief Environmental Engineer, Tamil Nadu Pollution Control Board and I am filing this Report on behalf Tamil Nadu Polution Control Board and as such I am well acquainted with the facts of the case as per records.

1. It is respectfully submitted that the Hon'ble National Green Tribunal, Southern Bench, Chennai, in the matter of O. A. No. 176 of 2013 (SZ) (Earlier O. A. No. 562 of 2018); V. P. Krishnamoorthy Vs. Union of India & Ors, passed an order dated 27.05.2021 that:

> *11. The Tamil Nadu Pollution control Board is also directed to carry out the directions issued by the central Pollution Control Board in their status report which has been mentioned above.*
>
> *15. The Central Pollution Control Board as well as the Tamil Nadu Pollution Control Board and the M/s BPCL are directed to file their further status and compliance report including the steps taken regarding the health*

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TAMIL NADU POLLUTION CONTROL BOARD
No. 76, MOUNT SALAI, CHENNAI-600 032

study that is directed to be done by the ICMR and submit the reports to this Tribunal on or before 27.08.2021 by e-filing in the form Searchable PDF/OCR supportable PDF and not in the form of Image PDF along with necessary hardcopies to be produced as per Rules".

2. It is respectfully submitted that in pursuance to the above order dated 27.5.2021, the said site was inspected by Officials of TNPCB & CPCB on 6.8.2021 and the joint inspection report is enclosed vide Annexure -1A.

3. It is respectfully submitted that TNPCB convened a meeting on 23.04.2021 through video conference to review the status of award of health study to ICMR. The meeting was attended by the officials of CPCB, TNPCB, ICMR and BPCL and minutes of the meeting is enclosed vide Annexure – 2A. . Based on the meeting, ICMR submitted the proposal vide letter dated May 12, 2021 to TNPCB and expressed that commencement of study will be taken up only after subsidence of the COVID -19 Pandemic.

4. It is respectfully submitted that TNPCB organized second meeting on 11.08.2021 at TNPCB, Chennai to review the status of progress of the project including health study by ICMR. The meeting was attended by the officials of CPCB, TNPCB, ICMR and BPCL. In the meeting ICMR expressed willingness to start the study on issue of work order by TNPCB along with payment of 90 % of project cost. In the meeting, it was convinced that payment will be routed through TNPCB either in the form of Cheque or DD drawn by BPCL in the name of ICMR and insisted to furnish work plan

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with cost of the study project. The minutes of meeting is enclosed as Annexure .3A.

5. It is respectfully submitted that ICMR has furnished work plan wherein the duration of the study is mentioned 10 months (1 month for preparatory activities, 6 months for field data collection and 3 months for laboratory testing and data analysis) and the health study will be started immediately after the initial payment of 90% of the project cost.

6. It is respectfully submitted that TNPCB has communicated M/s BPCL vide letter dated 13.08.2021 to issue work order to ICMR along with release of 90% of the total project cost Rs. 1,01, 40413.00 in the mode of DD favour of "The Director, ICMR NIE" payable at Chennai.

Under the above circumstances, it is humbly prayed that this Hon'ble National Green Tribunal (Southern Zone) may be pleased to take this Report on record and pass 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.

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TAMIL NADU POLLUTION CONTROL BOARD
No. 76, MOUNT SALAI, CHENNAI-600 032

BEFORE ME

VERIFICATION

I, R. Rajamanickam, S/o P.M. Ramasamy, working as Joint Chief Environmental Engineer, Tamil Nadu Pollution Control Board, Chennai - 600032, do hereby submit that the contents of the above report are true to the best of my knowledge through records.

Verified at Chennai on this 13th day of September, 2021.

13/9/2021

JOINT CHIEF ENVIRONMENTAL ENGINEER
TAMIL NADU POLLUTION CONTROL BOARD
No. 76, MOUNT SALAI, CHENNAI-600 032

Annexure -1A

Compliance Status Report of CPCB and TNPCB in the matter of O. A. No 176 of 2013 (SZ) (Earlier OA No 562 of 2018 (PB)), V. P. Krishnamurthy Vs Union of India & Ors, as per order dated May 27, 2021.

Background:

The Hon'ble National Green Tribunal, Southern Bench, Chennai, in the matter of O. A. No. 176 of 2013 (SZ) (Earlier O. A. No. 562 of 2018); V. P. Krishnamoorthy Vs. Union of India & Ors, passed an order dated 27.05.2021 that:

"8. It is seen from the reply statement that they have given a detailed reason as to why they have to such conclusion in their report regarding the compliance report showing some deficiencies in the SVE system and directing the M/s BPCL to modify the same. Being an expert body on this aspect, we accept the reply submitted by the Central Pollution Control Board in this regards and direct the M/s BPCL to carry out the directions issued by the Central Pollution Control Board as requested for in this reply statement namely, direct the M/s BPCL to carry out detailed site investigation and risk investigation study to evolve Site Specific Target Levels (SSTLs) for remediation of oil contaminated site at Tondiarpet, Chennai and direct the M/s BPCL to augment SVE system by connecting as many well as possible and by operating both SVE system simultaneously to optimal extraction rate.

9. So, M/s BPCL is directed to carry out these directions issued by the Central Pollution Control Board as part of remediation process.

10. The Learned Counsel appearing for the M/s BPCL submitted that they have already complied with the directions as well. If that be the case, the Central Pollution Control Board is directed to inspect these areas with the Tamil Nadu Pollution Control Board and ascertain as to whether the directions issued by them have been complied with or not. If it is not complied with, then they are directed to issue further necessary direction in this regard and submit a detailed report to this Tribunal before the next hearing date.

11. The Tamil Nadu Pollution control Board is also directed to carry out the directions issued by the central Pollution Control Board in their status report which has been mentioned above.

15. The Central Pollution Control Board as well as the Tamil Nadu Pollution Control Board and the M/s BPCL are directed to file their further status and compliance report including the steps taken regarding the health study that is directed to be done by the ICMR and submit the reports to this Tribunal on or before 27.08.2021 by e-filing in the form Searchable PDF/OCR supportable PDF and not in the form of Image PDF along with necessary hardcopies to be produced as per Rules".

A copy of the said order is annexed at **Annexure-I**.

1. Status of Compliance by BPCL w.r.t CPCB directions:

A. To carry out detailed site investigation and risk assessment study to evolve Site Specific Target Level (SSTLs) for remediation of Oil contaminated site at Tondiarpet, Chennai;

M/s BPCL submitted the Detailed Site Assessment Report (Post CMRL Excavation) on 06.08.2021, the summary of the assessments are as below;

i. Three soil borings of depth 70 feet, & dia of 8 inch (one near to the Oil pipe where leakage occurred (hot spot) , second one in peripheral of south side, third one in peripheral of North-East direction) were installed at the strategic locations adjacent to existing monitoring wells. The soils samples were taken in 5 feet interval, the samples were analysed, the mass reduction in terms of Total Petroleum Hydro Carbon(TPH) in six year span is depicted in **Annexure – 2**. The analysis reports indicates that;

- Low concentrations of Diesel Range Organics (DRO) were reported in almost all samples, the detected concentrations are in the range of 0.08 mg/kg -

144.61 mg/kg.

- Gasoline Range Organics (GRO) were found below detectable limit (0.01 mg/kg) in most of the samples analysed. Low concentrations were reported at few locations, ranging from 0.02 mg/kg to 4.49 mg/kg.
- Low concentrations of Total Petroleum Hydrocarbon (TPH) were reported in almost all samples, the detected concentrations ranged from 0.08 mg/kgto 153.83 mg/kg.
- Higher concentrations of TPH were reported in soil samples collected between 35-36.5 feet bgs in MW-26A (153.83 mg/kg.) located near SVE-3, 10-11.5 feet bgs in Boring-2 (25.09 mg/kg) located near MW-16AB in Devi polymer property, and in ASB-1 (23.02 mg/kg) & (50.58 mg/kg) located near MW-1AB in Vardhraj Perumal Koil Street.
- Benzene, Toulene, ethyl benzene, Xylene, PAH and naphthalene were not reported in any of the soil samples.
- The DRO & TPH Concentrations detected in soil samples collected in February 2021 are significantly lower, compared to the concentrations recorded in 2015 siteassessment.

Overall, there is a significant reduction in petroleum hydrocarbon concentrations in soilcompared to 2015 data. As per the Ministry of Environment and Forestry (MOEF) document titled Guidance document for assessment and remediation of contaminated sites in India, dated March 2015, screening levels for benzene at 0.5 mg/kg, xylenesat 5 mg/kg, toluene at 3 mg/kg naphthalene at 1 mg/kg and ethylbenzene 5 mg/kg, for a residential neighborhood. For TPH an intervention response level of 5,000 mg/kg. TPH, benzene, xylenes, ethylbenzene, and naphthalene concentration are low and not exceeded the response levels. At a few areas high DRO and TPH concentrations continue to exist (MW-26A, MW-25AB and ASB-1) between 20 - 55 feet bgs that warrant continuation of remediation.

ii. Seven more new wells (5 shallow wells having depth of 25-35 feet and 2 deep wells of 65-75 feet) were installed to compensate the wells abandoned due to CMRL Excavation, all these wells were monitored once in a month, the reduction of contamination is given at **Annexure -3**.

The analysis reports of Shallow wells;

- DRO was not detected in most of the shallow screened monitoring wells. Low concentrations were reported at few wells ranging from 0.08 mg/L to 0.66 mg/L at MW-25A and MW-26A respectively which are adjacent to abounded wells MW-17A & MW-12A.

- TPH was not detected in most of the shallow screened monitoring wells. Low concentrations were reported at few wells ranging from 0.08 mg/L to 0.66 mg/L at MW-25A and MW-26A respectively.

- Benzene and naphthalene were not reported in any of the groundwater samples collected. only Xylenes reported in MW-2A with concentration of 76.50 mg/L.

- The DRO & TPH Concentrations detected in groundwater samples collected from the existing shallow screened wells and newly installed wells adjacent to the abounded wells in March 2021 are significantly lower, compared to the DRO & TPH concentrations recorded in 2015 site assessment.

- Polycyclic Aromatic hydrocarbons (PAH) were not detected in any of the ground water samples.

The analysis reports of Deep wells;

- DRO was not detected in most of the shallow screened monitoring wells. Low concentrations were reported at few wells ranging from 0.10 mg/L to 0.35 mg/L at MW-26B and MW-3B, respectively.

- TPH was not detected in most of the shallow screened monitoring wells. Low concentrations were reported at few wells ranging from 0.10 mg/L to 0.35 mg/L at MW-26B and MW-3B, respectively.

- Benzene and naphthalene were not reported in any of the groundwater samples collected. Only Xylenes reported in MW-3B with concentration of 22.97 mg/L.

- The DRO & TPH Concentrations detected in groundwater samples collected from the existing deep screened wells and newly installed wells adjacent to the abounded wells in March 2021 are significantly lower, compared to the DRO & TPH concentrations recorded in 2015 site assessment.

- Polycyclic Aromatic hydrocarbons (PAH) were not detected in any of the ground water samples.

Overall, the groundwater analytical data indicates that concentration of petroleum hydrocarbons in groundwater within the shallow and deep-screened monitoring wells has decreased significantly since 2015. As per the Ministry of Environment and Forestry (MOEF) document titled Guidance document for assessment and remediation of contaminated sites in India, dated March 2015, identifies screening levels for, benzene at 0.005 mg/L, xylenes at 0.5 mg/L, toluene at 0.7 mg/L TPH at 0.5 mg/L and ethylbenzene 0.3 mg/L, for drinking water. TPH, benzene, and ethylbenzene concentrations are not exceeding the screening levels.

iii. Quantification of Residual Hydrocarbon mass in contaminated site;

- Based on the analytical data and TPH Iso concentration contour maps of Soil [0'-50'] feet bgs, the lateral extent of petroleum hydrocarbon impact to soil was calculated.

- Approximately, **1053.93 kg** of residual TPH is estimated to be present in soil in comparison to estimated mass of 32,797.61 kg of TPH in 2015 (**Annexure – 4**).
- Based on the Groundwater analytical data and TPH Iso concentration contour maps of groundwater in shallow and deep screened wells (**Annexure -5**) the lateral extent and impact of petroleum hydrocarbon impact to groundwater was calculated.
- Residual mass in groundwater is estimated to be approximately 2.11 kg in March 2021, compared to 1,380.97 kg of TPH estimated in 2015 (**Annexure – 6**).

iv. Mass Balance Summary of TPH during 2015 – 2021

The total mass estimated in 2015 assessment, Mass removed by SVE units and absorbent socks, Mass removed by CMRL activity and unaccounted mass removed by SVE units during the high slug movement into the treatment system till February 2021 and the remaining mass present at site in 2021 are given below;

Initial Mass (2015) (Kg)	***Mass Removed by SVE (2016-2021) (Kg)***	***Mass Removed by Socks (2015-2020) (Kg)***	***Mass Removed by CMRL (2018-2019) (Kg)***	***Mass Removed by SVE units (Unaccounted)/ Natural Attenuation factors (Kg)***	***Mass Remaining (2021) (Kg)***
34,178.57	***16,739.58***	***69.093***	***4,849.137***	***11,464.717***	***1056.043***

v. Observations and recommendations of the re assessment study

- Significant reduction in soil and groundwater concentrations is being observeddue to remedial efforts and natural attenuation.
- Residual mass continues to be present in the 25 to 35 feet bgs interval that warrants continuation of remediation.
- Although low concentrations of petroleum hydrocarbons are being reported in groundwater samples, not recommend to use of

groundwater in private bore wells.

- Higher concentrations of DRO and TPH observed between 25 and 35 feet bgs at a few locations, hence to continue SVE systems to reduce concentration of petroleum hydrocarbons in soil for a period of at least 6 months.
- Also to continued operation of the air sparge system located at SVE Unit -2. In addition, study recommends operation of a second air sparge system at SVE Unit-1 and connecting the second AS system to wells AS-3a and SVE-8.
- And also recommend to connecting newly installed wells 26A, located in the alley, and MW-25A, located in Devi Polymer property to the SVE-2, and SVE-1 respectively.

B. **To install soil Gas Probes to monitor VOCs in Vadose zone of sub-soil at 3 locations in affected area, which shall become part of revised remediation scheme;**

No Soil Gas Probes to monitor VOC in Vadose zone of sub soil is installed, it is informed that " since the low concentration in the influent air samples of the SVE system, installation of soil gas probes may not help in monitoring of VOC."

C. ***To augment SVE system by connecting as many wells as possible and by operating both the SVE systems simultaneously to optimal extraction rate;***

Presently operating two SVE systems to mitigate petroleum hydrocarbon impact on the subsurface near VPK Street and TH Road, Tondiarpet, Chennai. The SVE -1 system consists of **10 HP extraction blower** & SVE -2 system consists of a **20 HP Liquid ring vacuum pump** used to extract petroleum hydrocarbon vapors from the contaminated area using vapor extraction wells. The extracted vapors are abated in a catalytic oxidizer & thermal oxidizer rated at **250 (CFM)** and **500 (CFM)** in systems SVE-1 and SVE-2, respectively. As per National Green Tribunal (NGT) court order and based on affidavit filed

by CPCB on 6th July 2017, the consultant of M/s BPCL (M/s Stratus Environmental INC) obtained permission from CMRL to access the contaminated area under its control. The Stratus began operating the SVE -1 system in May 2016 and SVE-2 beginning **22nd September 2017**. SVE-1 is operated 24-hours a day and SVE -2 is being operated for **12 hours** since **10th June 2020.**

SVE -1 is connected with 8 wells (MW- 2A, 3A, 4, 5, 7, 8, 9 & MW – 16A) and SVE- 2 is connected with 7 wells (MW – 2A, 4A, 26A, SVE-1, 11, 12). The Air sparging unit -1 is started operated at SVE-2 system and connected to 4 Sparging wells (AS – 6, ASB – 1, AS – 2, DBAS – 1). However, in SVE -1, commissioning of air compressor is under progress, it is informed that before August 31, 2021, five air sparging wells (AS-4,5,7,3a and SVE-8) will be connected to SVE -1 system.

SVE Systems –Performance Summary

- SVE system 1 has operated for **34,311 hours** since 20th May 2016 and SVE system 2 operated for **3,581 hours** since 13th January 2020 as of June 2021.

- The SVE -1 unit has extracted approx. **15,058.05 Kilograms of petroleum hydrocarbons,** as of June 2021.

- The SVE -2 unit has extracted approx. **1,887.94 Kilograms of petroleum hydrocarbons** as of June 2021.

- Total amount of petroleum hydrocarbon vapor extracted beneath the subsurface soil through SVE 1 & 2 was estimated an amount of **16,945.99 Kilograms** (Approximately) as of June 2021.

D. To take immediate steps to entrust the health impact study to ICMR ;

- As per the follow-up of CPCB, TNPCB convened meeting on 23.04.2021 through Video conference to review the status of award of health study to ICMR. The meeting was attended by the officials of CPCB, TNPCB, ICMR and BPCL. The discussions held and conclusion of meetings are as below;

- M/s BPCL informed that they are coordinating with ICMR to entrust the study of health hazard in the oil contaminated site at Tondiarpet and also informed about they obtained technical & financial approval from corporate office for awarding the project to ICMR.

- ICMR informed that the project proposal was considered by various committees of ICMR and also expressed that the project could not dealt directly with ICMR due to conflict of interest and influence by the funder and requested to arrange payment of cost of study either through TNPCB or CPCB.

- ICMR also expressed the suggestion of Human Ethics committee to carrying out the health hazard study after the COVID -19 Pandemic in view of the data collection like blood and urine samples from the affected people in the oil contaminated site at Tondiarpet will not reflect the correct picture.

- On detailed discussion, CPCB & TNPCB official asked ICMR to furnish detailed project report of National Institute of Epidemiology containing proposal of health hazard study at affected place of Tondiarpet with information on proposed date of commencement of the study. The copy of Minutes meeting is enclosed at **Annexure -7**

- As decided in the meeting, ICMR submitted the proposal vide letter dated May 12, 2021 **(Annexure -8)** to TNPCB and expressed that commencement of study only after subsidence of the COVID -19 Pandemic.

- On further follow up of CPCB, TNPCB organised meeting on 11.08.2021 at TNPCB, H.O., Chennai to review the status of ICMR to take up of project. The meeting was attended by the officials of CPCB, TNPCB, ICMR and BPCL. In the meeting ICMR expressed willingness to start the study on issue of work order by TNPCB along with payment of 90 % of project cost. In the meeting it was convinced that payment will routed through TNPCB either in the form of Cheque or DD drawn by BPCL in the name of ICMR, the minutes of meeting is enclosed as **Annexure .9**.

- Subsequently ICMR expressed vide mail dated August 12, 2021 that "***Since the reported number of COVID 19 cases have been reduced, we wish to undertake the study upon receipt of the funds from TNPCB, ffunds can be transferred from TNPCB to the account of ICMR-NIE mentioned in the mandate form or through a DD drawn in favour of "The Director, ICMR NIE", payable at Chennai"***
- As per the ICMR proposal, the duration of the study is 10 months (1 month for preparatory activities, 6 months for field data collection and 3 months for laboratory testing and data analysis) , the study duration starts from the date of receipt of funds.
- On receipt of proposal, TNPCB directed M/s BPCL vide letter dated 13.08.2021 to issue work order to ICMR along with release of 90% of the total project cost Rs. 1,01, 40413.00 in the mode of DD favour of "The Director, ICMR NIE" payable at Chennai and the same may be delivered to ICMR through O/o TNPCB.

2. Status of Remediation work of Oil contaminated site at Tondiarpet, Chennai

i) BPCL installed Soil Vapour Extractions (SVE) system to extract mass of Petroleum hydrocarbons from soil and groundwater, 1st SVE was commissioned in May, 2016. The vapours extracted from wells are disposed by incineration in catalytic oxidiser.

ii) Operation of 1st SVE system got disrupted during the year 2017 due to commencement of Chennai Metro Rail Limited works, which resulted in disconnection of underground pipe network of various monitoring wells, vapour extraction wells and air spraining wells connected to 1st SVE system. As a result, the said SVE system was relocated and re-commissioned between September-October, 2018.

iii) Due to limited capacity of 1st SVE system, Committee constituted by Hon'ble NGT under Chairman, CPCB directed BPCL to install additional SVE system. Accordingly, BPCL has installed 2nd SVE system in November, 2019 with vapour extraction capacity of 500 cubic feet per minute (cfm). Some of the SVE wells and Air Sparging wells are connected to 2nd SVE system located in the premises of Dal Mill property along V.P.K. Street.

iv) During joint monitoring by CPCB and TNPCB on August 06,2021 both SVE systems were found in operation.

v) 1st SVE system was connected with 8 Soil Vapour Extraction wells ((MW- 2A, 3A, 4, 5, 7, 8, 9 & MW – 16A). During monitoring, extraction of petroleum hydrocarbon mass was observed from all 8 wells and operating at 98 - 99 cfm against the designed capacity of 250 cfm.

vi) At the time of inspection, 2nd SVE system was connected with 7 monitoring wells MW-16A and extraction petroleum hydrocarbon mass was observed from 5 wells only. It was operating at 210-225 cfm against the designed capacity of 500 cfm.

vii) Monitoring team conducted performance of both SVE systems by taking gas samples from inlets and outlets. The performance of both SVE system is given at **Annexure-10**. Study indicates that 1st SVE system was operating at 1/3rd of design capacity with destruction

efficiency of 58-59%, whereas 2nd SVE system was operating at 45% capacity with 98% destruction efficiency.

viii) As per records, 1st SVE system has been operating round the clock and soil vapours extracted from 8 wells at a rate of about 27-28 cfm, which is diluted with air to 96-99 cfm. Similarly, SVE -2 was found operated for 11 -12 hrs in a day and soil vapours extracted from 5 wells at a rate of 140 – 155, which is diluted with air to 210 -225 cfm. As per the field data maintained by the operator, the hours of operation, field flow rate, inlet-outlet VOC concentration values, system flow rate and field data of past 18 month for SVE 1 and 11 month for SVE 2 system are given at **Annexure-11**.

ix) Monthly performance data indicates that so far about 16,945.94 kg of Gasoline Range Organics (GRO) has been extracted from soil and groundwater till June2021 at an average of about 102.72 & 143.38 kg of GRO extracted per month through SVE 1 & 2 respectively. Summary of Monthly performance data of SVE system is given at **Annexure–12**.

x) It was observed that vapours from different wells were extracted without air sparging in SVE 1 system. Field data indicates that the extracted vapours has only GRO which is having lower carbon ranges, however higher carbon range from soil and groundwater can be extracted through SVE system when air sparging is performed. This is evident from the fact that analysis results of groundwater indicate presence of DRO, TPH and THC which are of higher carbon ranges.

3. Water Quality study conducted by CPCB & TNPCB

A team of officials from CPCB and TNPCB carried out groundwater sampling in oil contaminated site at Tondairpet, Chennai on August 06, 2021. Samples were collected from monitoring wells located in and

around the impacted area. Observations and findings of the groundwater quality study is given below:

i) At the time of sampling it was noticed that, 7 out of 22 shallow monitoring wells were abandoned due to Chennai Metro Rail Limited (CMRL) construction works. To replace abandoned wells 5 more new wells were constructed near to abandoned wells. There was no accessibility to collect samples from 5 monitoring wells, hence remaining 15 shallow monitoring wells were monitored.

ii) Out of 10 deep monitoring wells, 2 wells were abandoned due to CMRL works, to replace these, two more constructed to represent abandoned wells. During inspection 3wells were not having access (being junction road and private premises), therefore samples were collected from 7 deep monitoring wells, the details of MWs installed and map showing its location are given at **Annexure–13.**

iii) The analysis report of groundwater samples carried out from monitoring wells on 06.08.2021 is given at **Annexure-14**.

iv) It is observed that, groundwater quality in shallow wells located in outer delineated boundary shows no traces of any petroleum compounds. However, monitoring wells located in core area i.e MW-2A, 4A, 15A, 16A, 25A and 30 A shows presence of TPH, DRO,THC and TOC.

v) Similarly in Deep monitoring wells located in outer delineated boundary shows no traces of any petroleum compounds, the well located in core area i,e MW 3B & 7B reported the traces of petroleum compunds.

vi) Concentration of Mineral Oil was found within permissible limit of 0.5 mg/L in all monitored wells..

vii) As per the analysis report, no traces of petroleum compounds observed in South and West delineated boundary of contaminated site. However, traces of petroleum compounds were observed in core area as well as in North and South-East direction of outer delineated boundary of contaminated area.

4. Conclusions :

i. M/s BPCL has taken steps to reassessment of contaminated site upon completion of CMRL works by installing new bores and additional monitoring wells, as per the assessment concentration of petroleum hydrocarbon in soil found reduced significantly compared to 2015 data. As per Guidance document for assessment and remediation of contaminated sites, The concentration of Chemicals of Concern in soil were found less than screening levels (benzene - 0.5 mg/kg, xylenes - 5 mg/kg, toluene - 3 mg/kg, naphthalene - 1 mg/kg, ethylbenzene -5 mg/kg, TPH - 5,000 mg/kg). At a few areas high DRO and TPH concentrations continue to exist (MW-26A, MW-25AB and ASB-1) between 20 - 55 feet bgs that warrant continuation of remediation.

ii. The groundwater analytical data indicates that concentration of petroleum hydrocarbons in groundwater within the shallow and deep-screened monitoring wells has decreased significantly since 2015. As per Guidance document for assessment and remediation of contaminated sites, The concentration of Chemicals of Concern ground water found less than screening levels (benzene at -0.005 mg/L, xylenes - 0.5 mg/L, toluene - 0.7 mg/L TPH - 0.5 mg/L and ethylbenzene -0.3 mg/L).

iii. As per the Mass balance summary, estimated total mass of petroleum Hydrocarbon was 34,178.57 kg (in 2015), the mass removed through remediation is 16,739.58, through socks – 69.093 kg(floating oil), through CMRL exaction – 4,849.137 kg and natural Attenuation- 11,464.717kg. Mass remaining in soil is 1056.043 kg.

iv. Both SVEs are in operation and wells are connected to both SVE system, the inlet concentration at SVE-1 indicates the significant reduction in South and South- East direction

v. ICMR expressed to commence the study on receipt of work order along with payment of 90% of project from TNPCB.

5. As per the findings of groundwater quality monitoring and the progress in carrying out health study by ICMR, the following are submitted for consideration of Hon'ble Tribunal:

i) May grant about 10 months' time for completion of qualitative health study in affected area by ICMR with project funding from BPCL by considering the constraint due to COVID – 19 pandemic.

ii) BPCL may optimize operation of 1st SVE system by installing air sparging to improve extraction of Higher Carbon ranges from soil.

iii) BPCL may carryout reference soil & ground water analysis by taking samples (from different depth) from 500 mts away from the contaminated site in upward direction to understand the concentration of Hydro carbon in non-contaminated area and also to fix the target level of remediation.

iv) TNPCB may conduct regular monitoring of ground water as well as performance of SVE systems to ensure the continues operation of remediation activity.

Hon'ble Tribunal may be pleased to pass appropriate order.

Dr. R. Umaiyakunjaram
District Environmental Engineer
TNPCB, Arumbakkam,Chennai

H.D. Varalaxmi
Sc. E & Regional Director
CPCB, Regional Directorate (Chennai)

Annexure -2A

TAMIL NADU POLLUTION CONTROL BOARD

MINUTES OF MEETING CONDUCTED ON 23.04.2021 THROUGH VC (ONLINE) WITH THE OFFICIALS OF M/S. BHARAT PETROLEUM CORPORATION LIMITED (BPCL) AND NATIONAL INSTITUTE OF EPIDEMIOLOGY (ICMR) TO REVIEW THE STATUS OF ACTION BEING TAKEN BY THEM IN RESPECT OF STUDY ON HEALTH HAZARD IN THE OIL CONTAMINATED SITE AT TONDIARPET AS PER HONBLE NGT ORDER IN O.A NO.562/2019.

A meeting to review on the status of action being taken by BPCL & ICMR in respect of study on health hazard in the oil contaminated site at Tondiarpet was organized by TNPCB on 23.04.2021 through VC (online) as per the intimation of CPCB in compliance of Hon'ble NGT (PB) in its order dated:18.09.2019 in OA No.562/2019 (earlier 176/ 2013).

The officials of CPCB, TNPCB, BPCL, ICMR are participated. A list of participants of the meeting is enclosed as **Annexure -I**

This meeting was conducted in continuation to the earlier meeting held on 19.11.20219 at TNPCB Corporate Office, Guindy.

Shri R. Kannan, Additional Chief Environmental Engineer, TNPCB welcomed officials from CPCB, ICMR and BPCL. The meeting was started with brief introduction about the directions given by the Hon'ble NGT regarding conducting health hazard study in Oil contaminated site at Tondairpet and decision taken in last meeting to award this study to ICMR as per the Hon'ble NGT order. The Regional Director, CPCB asked BPCL to brief about steps taken to award the Health study to ICMR. In this regard following discussions were held in detail;

- BPCL officials informed that they are coordinating with ICMR to entrust the study of health hazards in the oil contaminated site at Tondiarpet as per the directive of Honb'le NGT. And also informed that, they obtained the technical and financial approval from corporate office for awarding the project to ICMR.
- ICMR officials informed that the undertaking of the health hazard study at affected place of Tondiarpet is under consideration and being processed for approval of various internal committees such as Scientific Advisory

Committee and Human Ethics Committee of National Institute of Epidemiology. Further, he informed that the study period will be of nine months from awarding of the work and such period may also be extended due to prevailing Covide-19 pandemic. He added that the cost of the study is estimated Rs.1.12 crore approximately and ICMR will not be dealt directly with BPCL on receiving cost of study due to conflict of interest and influence by the funder and requested to arrange payment of cost of study either through TNPCB or CPCB.

- During interaction, BPCL officials requested CPCB to advise ICMR to speed up their internal approval process so as to take up the study at the earliest.
- ICMR officials informed that Human Ethics Committee of ICMR has suggested carrying out the health hazard study after the COVID-19 situation in view of the data collection like blood and urine samples from the affected people in the oil contaminated place at Tondiarpet will not reflect the accurate information.

After detailed discussion, Regional Director (south), CPCB, finally concluded that ICMR shall furnish a detailed report obtained from National Institute of Epidemiology containing proposal of health hazard study at affected place of Tondiarpet with information of proposed date of start of the study, time duration along with cost estimation, release of fund for study etc... to CPCB & TNPCB so as to proceed further in this regard as per Hon'ble Court order.

With the above decision, the meeting was concluded

Additional Chief Environmental Engineer

Annexure -3A

TAMIL NADU POLLUTION CONTROL BOARD

MINUTES OF MEETING CONDUCTED ON 11.8.2021 WITH THE OFFICIALS OF CPCB, M/S. BHARAT PETROLEUM CORPORATION LIMITED (BPCL) AND NATIONAL INSTITUTE OF EPIDEMIOLOGY (ICMR) TO REVIEW THE STATUS OF ACTION BEING TAKEN BY THEM IN RESPECT OF STUDY ON HEALTH HAZARD IN THE OIL CONTAMINATED SITE AT TONDIARPET AS PER HONBLE NGT ORDER IN O.A NO. 176/2013 (EARLIER O.A. No. 562/2018).

A meeting to review on the status of action being taken by BPCL & ICMR in respect of study on health hazard in the oil contaminated site at Tondiarpet was organized by TNPCB on 11.8.2021 as per the intimation of CPCB in compliance of Hon'ble NGT (PB) in its order dated: 27.5.2021 in OA No.176/2013 (earlier 562/2018).

The officials of CPCB, TNPCB, BPCL, ICMR are participated. A list of participants of the meeting is enclosed as **Annexure –I**

This meeting was conducted in continuation to the earlier meeting held on 24.4.2021 at TNPCB Corporate Office, Guindy.

The Member Secretary, TNPCB welcomed officials from CPCB, ICMR and BPCL, briefed the directions given by the Hon'ble NGT in O.A No. 176/2013 in order Dt. 27.5.2021 to the Central Pollution Control Board as well as Tamil Nadu Pollution Control Board and M/s BPCL are directed to file their further status and compliance report including the steps taken regarding further remediation process that is being suggested by the CPCB and regarding the health study that is directed to be done by the ICMR and submit the reports to this Tribunal on or before 27.08.2021.

Regarding status to know on stage remediation process being carried out at site, a joint field inspection was held on 6.8.2021 with officials of CPCB, TNPCB & M/s BPCL. Further M/s BPCL has requested to apply one time Authorization under HOWM Rules 2016, through online to carry out the treatment of 5,450 KL oil contaminated water collected from CMRL construction area, as vetted by CPCB.

No. 76, MOUNT SALAI, GUINDY, CHENNAI - 600 032.
Telephone : 22353134 to 141, Fax : 044-22353068
Email : tnpcb-chn@gov.in Web : www.tnpcb.gov.in

The ICMR consented to take up the study of health hazards immediately in the oil contaminated site at Tondiarpet as per the directive of Honb'le NGT and ICMR will not be dealt directly with BPCL on receiving cost of study due to conflict of interest and influence by the funder and requested to arrange payment of cost of study either through TNPCB or CPCB.

Based on the above discussion following decision were taken.

- The ICMR was asked to furnish the revised time schedule of study & schedule of payment details if any to TNPCB.
- The BPCL was asked to issue work order to conduct such study to ICMR as per the proposal given by the ICMR. The release of payment for the above study shall be given, as per the payment schedule given by ICMR in the form of Demand draft to TNPCB to avoid conflict of interest.
- The BPCL shall apply one time authorization through online, under HOWM Rules 2016 for the treatment of 5,450 KL oil contaminated water collected from CMRL construction area as vetted by CPCB
- The DEE, Chennai was requested to furnish the status report on the ongoing remediation work at BPBL Tondiarpet based on the joint inspection carried out on 6.8.2021.

With the above decision, the meeting was concluded

For Member Secretary

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI.
ORIGINAL APPLICATION NO. 176 OF 2013 (SZ)
(EARLIER OA NO. 562 of 2018 (PB))

IN THE MATTER OF

V.P Krishnamoorthy

.....Applicant

Versus

Union of India & Ors

...Respondent(s)

REPORT FILED ON BEHALF OF THE RESPONDENT - TAMIL NADU POLLUTION CONTROL BOARD.

Advocate for the Respondent: TNPCB
Tr. S. Sai Sathya Jith,
Advocate, Chennai

Date: 13.09.2021

Date of Hearing: 14.09.2021