BEFORE THE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, CHENNAI

OA No. 180 of 2023 (SZ)

**IN THE MATTER OF :**

**Tribunal on its own motion SUO MOTU**

**... Applicant**

**Vs**

**The District Collector,**

**and Ors.**

**... Respondents**

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DATED AT CHENNAI ON THIS THE 21st DAY OF MARCH, 2025

**M/S. AAV PARTNERS**
**S. SARAVANAN**
**E.KARTHIKEYAN**
**COUNSEL FOR 7TH RESPONDENT**

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**SUMMARY OF REPORT SUBMITTED BY THE 7th RESPONDENT**

I, V. Sriram, Son of M.S. Viswanathan, aged about 58 years, having address at 536, Anna Salai, Teynampet, Chennai – 600018, do hereby solemnly affirm and sincerely state as follows :

1. I state that I am the Chief General Manager (HSE), in the Chennai Petroleum Corporation Limited, the Applicant/Appellant herein and as such I am well acquainted with the facts of the case and am competent to swear this affidavit.

2. I state that the compilation of reports submitted may be read as a part and parcel of this present summary.

3. I state that the present summary is being submitted to summarize and analyze the report submitted highlighting the discrepancies in the report submitted by the IIT in the present matter.

4. I state that all that is stated in the summary of the report is true to the best of my knowledge and belief and I have not suppressed any material fact.

Solemnly affirmed at Chennai on this *
the 21st day of March, 2025 and in *
signed in my presence *

BEFORE ME

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## ABSTRACT

| Sl.No | Description |
|---|---|
| | **IIT – Petroleum Engineering report findings** |
| 1 | **Comments on IIT – Civil Engineering report :**<br>• Comparison of TPH values (in water) by IITM – CE & other agencies - TPH values of IITM – CE are exorbitantly high in water<br>• Comparison of TPH values (in sediments) by IITM – CE & other agencies - TPH values of IITM – CE are exorbitantly high in sediments<br>• Oil will take longer period to reach sediments<br>• Failure to analyze the upstream TPH content<br>• Comparison of estimation of oil with IIT – CE & other readings (Estimation of oil quantity through satellite image is 14.48 MT (18.1 KL) as against IIT-CE reported value of 517 MT)<br>• Inappropriate source identification & matching<br>• Field verification confirms that most of the tanks are not inside CPCL<br>• Various assumption without any true measurement |
| 2 | **2017 Ship collision Vs 2023 Oil spill incident**<br>• Comparison of ship collision incident in 2017 & 2023 Oil spill incident:<br>• Discrepancies in area of spread & estimation of oil spill quantity<br>• Oil quantification through satellite image & spatial distribution analysis study<br>• Accuracy of oil estimation through the above study |
| 3 | **CPCL Tank Integrity study** |

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| | |
|---|---|
| | • Ground Penetrating Radar (GPR) study of randomly chosen tanks reveals that the structural integrity remains sound & there are no material degradation.<br>• Physical verification of Tank Maintenance & Inspection (M&I) activities shows that all the tanks are maintained well |
| **IIT – Ocean Engineering report findings** | |
| 1 | 19th Nov, 2023 images reveal no oil |
| 2 | 7th Dec, 2023 images oil quantity calculated by multiplying the oil thickness in each pixel by the pixel's coverage area<br>Oil quantity estimated is 16.4 MT (20.53 KL) only |
| 3 | 26th Dec, 2023 shows that there is no oil |
| 4 | Characteristics of oil – requires longer duration for settling – higher oil quantity in the sediments is unreasonable |
| 5 | Present TPH analysis in the sediments shows lesser values only in the downstream to CPCL & in the upstream also presence of TPH noticed due to continuous discharge of urban runoff, municipal waste, oil releases from fishing boats and commercial/industrial discharges into the Buckingham Canal |
| 6 | No visible oil traces could be noticed during the field survey |
| 7 | Flood inundation map clearly shows flow depths significantly exceeding the capacity of the Kosasthalayar river during continuous precipitation in Dec,2023 |
| 8 | Overflow of water from canal to the adjoining area is confirmed due to the excess water release from Puzal & Poondi from the hydrological model study. |

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| Comments on IIT- 2nd report submitted by TNPCB on 28.02.25 | |
|---|---|
| 4 | • IIT 2nd report observed TPH value at upstream of CPCL / Manali Industries<br>• Higher values of TPH reported in IITM 1st and 2nd report<br>• IIT 2nd report not commented on lower TPH value of other reports<br>• IIT 2nd report not commented on source identification |

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## EXECUTIVE SUMMARY OF IIT – PETROLEUM ENGINEERING REPORT

**IIT – Petroleum Engineering report is attached as Annexure-R1**

**A. Based on the review of the IITM Civil Engineering report (Annexure – R2 ), National Centre for Coastal Research (NCCR)(Annexure – R3 ), National Institute of Oceanography (NIO) (Annexure – R4), The Energy and Resources Institute (TERI) (Annexure – R5) and Tamil Nadu Pollution Control Board reports observations (Annexure – R6) and comments by IITM Petroleum Engineering team are given below:**

1. Total Petroleum Hydrocarbon (TPH) content in water is very high in IIT Madras CE report (280 – 7210 mg/lit) compared to TNPCB, NCCR, NIO & TERI reports (0.0277 – 3.9 mg/lit). This may be due to random sampling. **(Pl refer Page No.: 18 of Compilation)**
2. Total Petroleum Hydrocarbon (TPH) content in sediments is very high in IITM-CE report (13,600 – 46,550 mg/Kg) compared to NCCR, NIO and TERI reports (5.84 – 1830 mg/Kg). Oil estimation by IITM-CE using such higher TPH values in sediments resulted in huge quantity of oil. This is due to extrapolation of TPH content, taking sample at few concentrated locations and applying the same for the entire area. **(Pl refer Page No.: 18 and 19 of Compilation)**
3. Oil being a lighter component /low density, tends to float over the surface of water. Settling & percolation of oil in the sediment requires longer duration. TPH value of IITM CE report in the range of 13,600 – 46,550 mg/Kg is unrealistic. **(Pl refer page No.: 19 of Compilation)**
4. The effects due to preexisting TPH values due to urban runoff, domestic discharge and also through other anthropogenic activities have not been considered in the IITM-CE report. (Pl refer page No.: 19 of Compilation)

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5. Estimation of oil quantity using TPH values of NIO, NCCR & TERI is around 0.34 to 12.9 Tons of oil **(Pl refer Page No.: 20 of Compilation)** and the values of these reports are consistent with the present oil estimation through satellite image study viz. 14.48 MT. **(pl refer Page No:36 of Compilation)**. However, wide variance is observed in estimation of oil quantity by IITM – CE report (517 MT). 517 MT of oil in sediments is a case of over-estimation, arrived due to higher TPH value reported in the IITM CE report. TPH value has been taken at certain concentrated locations and extrapolated for the entire area. Oil quantity estimated on this basis is not an appropriate method.

   On the other hand, Satellite image captures oil quantity (14.48 MT) based on the thicknesses spread across the area. Oil estimation based on the Spatial Distribution will be more accurate

6. IITM-CE report has identified 30 Nos of open reservoirs as the main source of oil spill. Based on the field visit to CPCL and google map coordinate study it is confirmed that 13 open reservoirs are not inside CPCL and belong to other companies. **(Pl refer Page No.: 21 and 22 of Compilation)**

7. Out of 30 open reservoirs, IITM-CE pointed out 12 reservoirs as the main source of oil spill. However, it may be noted that: (Pl refer page No.: 22 of Compilation)

   - 2 of these reservoirs are outside CPCL and belong to other companies.
   - 8 reservoirs are used as raw water reservoirs, storm ponds, Guard Pond, Fire water ponds for storing oil free water only
   - 2 reservoirs are above ground and are used for storing sediments.

8. Apart from the above, IITM-CE report has considered numerous assumptions, as listed below and are not based on true measurements, as detailed in this report. ***(Please refer Page Nos : 31 and 32 of Compilation)***

   - **Assumption 1:** TPH content estimated in discrete points was considered as average TPH and used to calculate oil quantity for the entire area

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- **Assumption 2:** Uniform thickness (0.1 mm) was assumed for entire residential and industrial area without any basis.
- **Assumption 3:** Depth of oil estimation in pool was assumed as 1 mm without any measurement and applied uniformly to all the area.
- **Assumption 4:** 10,000 sq.m of oil pool was arbitrarily considered in mangrove area and another 10,000 sq.m of oil pool near pipelines.
- **Assumption 5:** Area calculated based on the oil marking height & length of the mangrove tree area, is unscientific as the mangroves will have branches & space between trees etc. The report considered the whole area like a wall and arrived at the area.
- **Assumption 6:** The report has erroneously assumed 0.01 mm oil thickness over the mangrove trees.
- **Assumption 7:** Assumption of oil layer of 10 mm without any basis in open reservoir tanks.

Oil estimation based on such assumptions would always leads to erroneous value.

**B. Observation and findings of estimation of oil quantity & comparison of 2017 ship collision incident through satellite images are furnished below.**

1. Based on the satellite image of 29th Jan 2017, it is confirmed that the 2017 oil spill, caused by a collision near the Ennore port, resulted in a dense oil slick extending over 197 $KM^2$ and impacting more than 60 KM of coastline with a volume of approximately 223.5 cubic meter (178.8 MT) **(Page No: 33 and 34 of Compilation)**

   This is consistent with the established reports of 194 MT from published articles and confirms that Satellite based estimation methodology, as a suitable and reliable tool.

2. On similar lines, Satellite image estimation was carried out for 2023 oil

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spill. Based on the satellite image of 6th Dec 2023, oil spill triggered by cyclone Michaung affected 1.81 $KM^2$ in the stretch from Manali Industrial Area to Ennore Creek area. The quantum of oil assessed through the satellite image in the Buckingham canal, Kosasthalaiyar river and nearby area shows spillage of 18.1 cubic meters (14.48 metric Tons) **(Page No:36 of Compilation)**

3. Extent of spillage & quantity assessed through satellite image above clearly indicates that the quantum of oil spill in ship collision incident occurred in Jan 2017 is much higher than Dec'23 incident.

**C. Observation and findings of GPR study on tank integrity.**

1. IITM-CE Department have indicated that breach of oil from storage tanks could be one of the source of oil spill. In order to ascertain the Integrity of the Tanks, Five critical Tanks were chosen on random basis for the GPR study. Based on tank integrity study using GPR (in Tanks 106, 119, 121, 801 & 802) carried out by IIT – PE, the structural integrity remains sound, with no signs of material degradation. **(Page No: 39 – 50 of Compilation)**

2. Physical verification of the tanks and scrutiny of Maintenance & Inspection (M&I) records of storage tanks maintained by CPCL revealed that all the tanks are in good condition. **(Page No: 39 – 50 of Compilation)**

In conclusion, the following inference are drawn: **(Page No: 8 of Compilation)**

A. TPH values of IITM CE report are abnormally high and resulted in higher estimation of oil quantity. Further source validation was not also reflecting real scenario

B. Based on the analysis of satellite images in 2017 & 2023 & the field survey carried out, it is concluded that the quantum of oil spill is estimated to be 18.1 cubic meters (14.48 metric tonnes).

C. CPCL tanks are intact and there are no oil leaks observed from the tanks.

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**EXECUTIVE SUMMARY OF IIT – OCEAN ENGINEERING**

**REPORT (IIT – Ocean Engineering report is attached as Annexure-R7)**

1. The image acquired on 19th November 2023, prior to the oil spill, was analysed to establish baseline conditions of the study area. The pre-spill image showed no traces of oil contamination, with natural features such as water bodies and surrounding vegetation appearing in their typical spectral characteristics. **(Page No:227 of the Compilation)**
2. Satellite observations on 7th Dec, 2023 image revealed the oil spill quantity from Manali industrial area to Ennore creek including the residential / adjacent area is 20.53 $M^3$ (16.4 T). **The oil volume was calculated by multiplying the oil thickness in each pixel by the pixel's coverage area. The combination of oil fraction, thickness, and volume maps offers a comprehensive understanding of the spill's magnitude and distribution, enabling informed decision-making for mitigation and remediation efforts. (Page No:227 of the Compilation)**
3. The 26th Dec, 2023 post-mitigation image was examined to evaluate the effectiveness of the clean-up operations. The oil volume image showed no visible traces of oil, suggesting successful removal. **(Page No:227 of the Compilation)**
4. Oil typically floats on water due to its lower density, and when an oil spill occurs, the oil tends to remain on the water surface rather than settling down to the channel bed and requires longer period for settling.
   **(Page No:227 & 257 of the Compilation)**
5. The TPH estimates from the ground based discrete sediment samples are highly biased. Extrapolation of such TPH values from discrete samples to arrive oil quantity for the entire area would lead to erroneous results. **(Page No:227 & 257 of the Compilation)**
6. Present sediment analysis at upstream of Manali Industrial area reveals TPH concentration in the range of 1-5 mg/Kg and downstream is 1 to 30 mg/Kg **(Page No:259 of the Compilation)**. This is in line with similar study

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submitted by Barath kumar et al., in Aug 2023 & NCCR.

7. The persistent presence of TPH in the channel bed sediments is likely due to the continuous discharge of urban runoff, municipal waste, oil releases from fishing boats and commercial/industrial discharges into the Buckingham Canal and Ennore creek. **(Page No:259 of the Compilation)**
8. No visible oil traces were observed on the water surface during the field survey. **(Page No:227 of the Compilation)**
9. The flood inundation map was generated during the cyclonic rainfall event, with flow contributions from the Puzhal and Poondi Lakes, in addition to precipitation across the region. **(Page No:227 of the Compilation)**
    - The entire catchment area experienced continuous precipitation and runoff flows, resulting in flow depths significantly exceeding the capacity of the Kosasthalaiyar river.
    - This caused the overflow of the water from the canal to the adjoining areas and led to the reverse flow of water in the canal segments during high tide.
    - The continuous precipitation, surface runoff and flows coming from Poondi and Puzhal Lakes increased the water volume and depth in the river and canal, leading to the reversal and overflow of water from the canal to the adjoining areas (70000 cusec approx. in K-river).

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## COMMENTS ON IIT 2ND REPORT SUBMITTED BY TNPCB ON 28.02.2025

*(IIT – 2nd report furnished by TNPCB to this Hon'ble Tribunal is attached as Annexure – R9)*

Para wise comments on IIT 2nd report submitted by TNPCB to the Hon'ble Court on 28.02.25, is furnished as ***Annexure – R10***. However, some of the critical observations on the report is furnished below.

**1. IIT 2nd report observed TPH value at upstream of CPCL / Manali Industries**

TNPCB has submitted in their report on 7th Dec 2023 that oil presence was observed in the upstream of CPCL. **(Page No:338 of the Compilation).**

CPCL is again reiterating that the TPH value at Ennore creek is mostly due to anthropogenic sources like sewage wastewater and solid waste dumps which means there existed various other source of pollution & contaminations .

CPCL has submitted M/s TERI report on 09.09.24 to this Hon'ble Court and the findings of M/s TERI is reproduced below.

- The Physico-Chemical analysis of water, sediment, plant and fish samples collected from Buckingham canal, Ennore Creek and Kosasthalaiyar river revealed that the Anthropogenic sources like sewage wastewater and solid waste dumps contributed in the occurrence of pollution in the water and sediment quality.
- The reported contamination of various pollutants in water and sediments is mainly from domestic wastewater released into Buckingham canal over a period of time. **(Page No:184 of the Compilation)**

Study carried out by IITM Petroleum Engineering and IITM Oceanography also confirms the above and is furnished below.

IITM Petroleum Engineering:

*The effects due to pre-existing TPH values due to urban runoff, domestic discharge and also through other anthropogenic activities have not been*

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*considered in the IITM-CE report* **(Page No:53 of the Compilation)**

IITM- Oceanography:

*Present sediment analysis at* ***upstream of Manali Industrial area*** *reveals TPH concentration in the range of 1-5 mg/Kg and downstream is 1 to 30 mg/Kg. The persistent presence of TPH in the channel bed sediments is likely due to the continuous discharge of urban runoff, municipal waste, oil releases from fishing boats and commercial/industrial discharges into the Buckingham Canal and Ennore creek* **(Page No: 263 of the Compilation)**

In the first IITM report submitted by TNPCB on 09.09.2024, has not considered either the effect of anthropogenic activities or checked the TPH value in the upstream of CPCL. However, the IITM during their 2nd report, checked the TPH value in the upstream of CPCL and the same was submitted to this Hon'ble NGT on 28.02.25 by TNPCB.

**As per the IIT 2nd report, the TPH value of water and sediments in Buckingham canal upstream of CPCL is also high (Location L20) and is furnished below. (Page no. 290 to 293 of Compilation) (Google map showing location of L20 is attached as Annexure – R12)**

| Same ID & Location | Impact Zone | Water TPH g/L | Sediment TPH g/Kg | |
|---|---|---|---|---|
| | | June 2024 | June 2024 | Oct 2024 |
| L20 13.141573 & 80.278587 | Near CPCL Premises - B′ canal (Upstream of CPCL) | 1.64±0.11 | 16.41 ±7.00 | 12.24 ± 1.33 |
| Other B′ canal area | Down stream of CPCL | 0.33 to 6.49 | 0.34 to 23.04 | 22.31 to 30.44 |

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a) TPH value in water & sediment at upstream of CPCL is almost **50 to 60%** of TPH observed in downstream of CPCL.

**b)** In some of the locations, the **TPH value in water & sediment at downstream of CPCL ( L6,L7,L12,L15,L24,L28 & L30) are lesser than the TPH value upstream of CPCL ( L20) and in most of the other locations, the values are almost equal.** ***(Page No. 290 and 292 of Compilation)***

c) The above clearly indicates that the TPH value at Ennore creek was due to anthropogenic sources like sewage wastewater and solid waste dumps and not CPCL.

d) In few locations where higher value of TPH at the downstream of CPCL may be due to deposits of anthropogenic sources over the period of time.

2. **Higher values of TPH reported in IITM 1st and 2nd report**

In the 1st report, IITM reported higher TPH value of water and sediments. CPCL already raised this issue of reporting of higher TPH value in sediments and submitted to the Hon'ble court on 24.01.25 comparing with NIO , NCCR, & TERI reports. **(Page No. 350 of Compilation – Annexure – R13)** which is furnished below for ready reference.

**TPH in water in 1st report**

| Sl.No | Name of the Agency | Reference | As reported | Standardized to mg/lit |
|---|---|---|---|---|
| 1 | TNPCB | TNPCB has filed the TPH values in NGT on 27.02.24 | 0.217-2.458 mg/lit | **0.217-2.458** |
| 2 | NIO | TNPCB filed in NGT on NIO report on 09.09.24 | 0.025-2.11 mg/lit | **0.025-2.11** |

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| | | | | |
|---|---|---|---|---|
| 3 | NCCR | NCCR report | 27.77 – 1008 µg/ lit | 0.0277-1.008 |
| 4 | TERI | CPCL filed TERI report on 09. 09.24. | 0.2-3.9 mg/lit | 0.2-3.9 |
| 5 | IITM | TNPCB filed in NGT on IIT report on 09.09.24 | 0.28 g/L – 7.21 g/lit | 280-7210 |

**TPH in sediment in 1st report**

| Sl.No | Name of the Agency | Reference | As reported | Standardized to mg/kg |
|---|---|---|---|---|
| 1 | NIO | TNPCB filed in NGT on NIO report on 09.09.24 | 0.63– 1.83 mg/g | 630-1830 |
| 2 | NCCR | NCCR report | 100 – 1000 µg/gm | 100-1000 |
| 3 | TERI | CPCL filed TERI report on 09. 09.24. | 5.84-47.34 mg/Kg | 5.84-47.34 |
| 4 | IITM | TNPCB filed in NGT on IIT report on 09.09.24 | 13.6 -46.5 g/Kg | 13,600-46,550 |

In the 2nd report also IITM reported higher TPH values. CPCL has requested IIT oceanography to check the TPH value of sediments at upstream and downstream of CPCL/ Manali Industries. Comparative statement is furnished below. **(Page No:292 and 259 of the Compilation)**

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| Reports | Sample date | Upstream of CPCL in g/Kg | Downstream of CPCL in g/Kg |
|---|---|---|---|
| IIT 2nd report submitted by TNPCB | June 2024 | 16.41 ±7.00 | 0.34 to 23.04 |
| | Oct 2024 | 12.24 ± 1.33 | 22.31 to 30.44 |
| Present IIT oceanography report | Jan 2025 | 0.001 to 0.005 (1 – 5 mg/kg) (S1-S3) | 0.004-0.029 (4.6 – 30 mg/kg) (S4-S7) |

a) It is also submitted that the sediment TPH value at upstream and downstream reported are much higher than the value of IIT oceanography report. IIT oceanography report TPH values are in consistent with other reports submitted by NIO, TERI, NCCR & TNPCB.

b) In similar way, **IIT reported higher values in their 1st report, and this resulted in higher oil quantity estimation of 517 MT of oil quantity**.

**From the above, there may be error in the methodology of testing carried out by IIT-M (both 1st & 2nd).**

3. **IIT 2nd report not commented on lower TPH value of other reports**

IIT has not analyzed or taken into consideration on the reports of TNPCB, NCCR, NIO and TERI TPH values which are much lower.

4. **IIT 2nd report not commented on source identification**

In the report submitted to Hon'ble NGT on 24.01.2025, (Annexure – R13 page no: 351) discrepancies in the source identification by IIT 1st report was brought to the notice of NGT. Out of 30 Nos of open reservoirs, 13 do not belong to CPCL. Out of the 12 open reservoirs pointed out by IITM-CE report as the main source of oil spill, 2 reservoirs are outside CPCL and the balance reservoirs are also used as raw water reservoirs, storm ponds, Guard Pond,

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Fire water ponds for storing oil free water only. **(Page No: 6 of Compilation)**

The 2nd report submitted by IITM to TNPCB is silent on the above matter and confirms that the source identification is not correct and was erroneously done based on incorrect google findings

5. **Other statement of 2nd IIT report and the comments are furnished below.**
   **a.** Oil thickness assumptions were based on visual observations, and they were very conservative. **(Page No:285 of Compilation)**

   Comments: The field verification data would differ from person to person and is highly subjective. Perception by different agencies / persons will vary widely. Taking thickness value based on visual inspection is unscientific and leads to error.

   b. IIM – 2nd report **(Page No. 285 of Compilation)** mentioned that : "Any variation in estimates is due to the complexity and scale of oil dispersion in the environment"

   Comments: This is the disclaimer given in the 2nd IIT report which clearly indicates that the oil estimation is subjective and is based on perception.

   **c.** IITM admits that sample were taken from hotpots at various locations. **(Page no. 288 of Compilation)**

   "Soil samples were collected up to 4 feet deep, covering the hotspots where oil contamination was observed" and " The random sampling claim is inaccurate, as our samples were collected from identified hotspots, ensuring that contamination was systematically assessed across multiple locations" .

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Comments: IITM is clearly stating that they have taken samples from oil concentrated points mentioned as hot spots. Taking samples at hot spots and applying the values in other areas would have resulted in huge oil quantity estimation.

**d.** Our report explicitly states that several factors were excluded from the final estimate, such as floating oily sludge removed by CPCL's cleanup measures prior to our study (393 tonnes) **(Page no. 285 of Compilation)**

Comments : IITM states that 393 MT of oily sludge removed by CPCL is from "The Hindu Bureau" (**Page no. 62 of Compilation)** and it clearly reveals the fact that in the absence of reliable data they have taken from the News journal without verifying the veracity of the data.
The quantity of 395 MT is the oily water collected from the Ennore Creek area during the oil spill incident. The report has anonymously consider this quantity as 100% oil and used it for validating their data. The oily water from Ennore creek was removed using vacuum sucker which sucks both oil and water and thro' manual mode. During the initial period, the oily water received from the Ennore creek area was having thin layer of oil at the top whereas the drums received after 2 days it had water only. While receiving oily water drums, TNPCB officials also witnessed & recorded the above. During the oil spill incident, CPCL collected the above referred materials containing oil in the stretch from Ennore Creek area under the supervision of TNPCB & state authorities **CPCL treated this oily water & recovered oil amounts to 2.29 MT only.**

e. IITM referred report of ICFRE - Institute of Forest Biodiversity, Hyderabad which is still in progress. Salient points referred in ICFRE report is furnished below.

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i. Elevated microbial contamination was observed in both water and sediment samples across all measured parameters (ie. TVC, TC, FC, ECLO and SFLO) in the oil spill- affected areas, with significantly higher counts of total viable bacteria and **E. coli** compared to the control sites. This suggests disarray in natural filtration, **sewage leakage** and organic matter as a result of the oil spill has made the conditions apt for the proliferation of microbes in this region. **(Page no. 297 of Compilation)**

**Comments** : E. coli presence would be more due to sewage properties and the same was mentioned by ICFRE.

ii. According to the studies conducted it was observed that the oil spill impacted regions that had more variability in mangrove stand densities (9-53 plants/100 m2) in contrast to the more stable reference regions (11-34 plants/100m2) – **(Page no. 298 of Compilation)**

**Comments** : This clearly indicates that the mangroves were not affected as their densities are intact.

*The Principle Chief Conservator of Forest in his memo filed in NGT on 25.03.2024 also confirmed that there are no causalities of Mangrove which is furnished below*

*"3) The Chief Conservator of Forests Chennai Circle, Chennai has stated int eh report that there are no casualities of mangroves till date and continuous monitoring and assessment is being carried out for the healthy survival of the mangroves."*

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