

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

**ORIGINAL APPLICATION NO 66 of 2020 (SZ)**

**IN THE MATTER OF:**

Tribunal on its own motion SUO MOTU Based on the reports received from TNPCB on Oil leakage from ONGC pipeline in Thiruvarur District.

Applicant(s)

Versus

The Chief Secretary to Govt. of Tamilnadu & Others

Respondent(s)

**ORIGINAL APPLICATION NO 193 of 2020 (SZ)**

**IN THE MATTER OF:**

Tribunal on its own motion-SUO MOTU Based on the News item in Dinamalar Newspaper, Chennai Edition dated 24.09.2020, "Paddy field with crude oil as ONGC pipeline leaks"

Applicant(s)

Versus

The Chief Secretary to Govt. of Tamilnadu & Others

Respondent(s)

**INDEX**

S. No.	Particulars	Page No.
01	Joint Committee Report as per Hon'ble Tribunal Order dt. 11.01.2021 & 02.03.2021	01 - 12

**Place: Chennai  
Date: 28.05.2021**



*H.D. Zhu*  
Regional Director  
Central Pollution Control Board  
Regional Directorate, Chennai

**Report of the Joint Committee**  
**(As per Hon'ble National Green Tribunal, Southern Zone, Chennai**  
**Order dated 11.01.2021 & 02.03.2021 in OA no. 66/2020 and**  
**OA No. 193/2020)**

**1. Background**

The Honourable National Green Tribunal, Southern Zone, Chennai, in the matter of OA No. 193 of 2020 on 11.01.2021 stated and directed as;

*“... It may be mentioned here that in the joint committee report both the incidents were considered. But nothing has been mentioned about the nature of the things done in O.A.193/2020 in respect of the land belong to one Sivasanmugam in the report. But they have mentioned only the nature of incident etc will be same as mentioned in O.A.66/2020. But they have not mentioned the nature of the area affected in O.A.193/2020.*

*However, we direct the joint committee to look into this aspect again and submit further report to this Tribunal regarding the nature of action taken by ONGC on the basis of the directions given by them and whether that is sufficient to meet the situation to avoid such things in future and also give details regarding the nature of contamination and nature of extended area covered in the incident mentioned in O.A.193/2020 and submit a detailed report to this Tribunal before the next hearing date i.e. 02.03.2021 ...”*

Cultivation was started at the time of the incident happened in the agricultural land in the matter of OA No. 193/2020. So the committee decided to carry out the sampling after harvesting. Due to prolonged monsoon in the month of January 2021 and delay in harvesting, the committee carried out the soil sampling on 26.02.2021 and requested Hon'ble Tribunal further time to file the report.

Hon'ble Tribunal in its order dt. 03.03.2021 directed as follows;

*“... So considering the circumstances, we feel that some more time can be granted to the committee to submit a report. The committee is directed to submit a report to this Tribunal on or before 20.04.2021 ...”*

## 2. Action Taken by ONGC on the basis of the Committee Suggestions:

The action taken report submitted by ONGC based on the committee suggestions in the matter of OA no. 66/2020 is as follows;

SI No.	Committee Suggestions	Action Taken by ONGC
<b>General;</b>		
i.	ONGC shall ensure that, the soil from oil leaked area needs to be completely removed from the location. ONGC should ensure & monitor that, the landowners should not refill with same contaminated soil	<p>The contaminated soil from the oil leaked areas (OA 193/2020) is removed completely from the location and refilled with the fresh soil.</p> <p>It is informed that ONGC is monitoring the removal of the soil under the supervision of ONGC field crew and is not being done by the land owners.</p>
ii	ONGC shall carry out the assessment of soil quality periodically throughout the pipeline laid area and also to monitor at oil spilled location, so that accordingly corrective measures shall be implemented	<p>ONGC informed that due to the prolonged monsoon period there was a delay in the harvesting.</p> <p>The soil sample collection also requires necessary permission from the land owners.</p> <p>The process of collection of soil sample for assessment of its quality has been initiated.</p>
<b>Preventive measures for non-recurrence;</b>		
iii	Intelligent Pigging Studies for all pipelines shall be done periodically to assess the pipeline damage.	In line inspection to planned to conducted in 19 flow lines in the first phase. Based on outcome of the study, it will be extended to all other lines in phase wise.

iv	Corrosion monitoring probes or coupons can be installed at each well head to monitor the corrosion rate and optimize the Corrosion inhibitor injection rate, to improve the effectiveness of Corrosion Inhibitors. Suggested to conduct in field test on various corrosion inhibitors from different formulations to ensure the effectiveness of the same.	As a continuation of ONGC's R&D Institute IOGPT, Mumbai's earlier project titled "Failure Analysis of Flow Lines of Satellite Field including optimization of OCI Dosing system, Cauvery Asset" issued in March 2011, A new project has been awarded to study the effectiveness of various corrosion inhibitors and to recommend a suitable field specific corrosion inhibitor with required dosage rates.
v	Introduce intermittent Corrosion inhibitor injection points along the pipeline and inject the Corrosion Inhibitor through mobile facility periodically, this enables the effective corrosion inhibitor reaches all along the pipeline. A specialist flow assurance study can be performed to verify the impact on corrosion due to varying flow rates, terrain effects etc.	The length of the pipelines is less that will not require intermittent injection points. We ensure periodic dosing at the well head end that reaches all along the pipeline. The flow assurance study – Project has been assigned by ONGC's R&D Institute, IOGPT. Once their recommendations are received same shall be implemented.
vi	The periodic assessment of Pipe Integrity (including internal crack, corrosion and erosion) shall be made at least once in five years, so that the status of the pipeline shall be known and accordingly replacement period for the pipe shall be decided.	The proposal has been initiated for pipeline inspection by ONGC.
vii	External Corrosion Protection of pipeline shall be provided in all underground pipelines such as sacrificial anode method, impulse current method, poly ethylene coating etc., to avoid external corrosion of pipe.	All 4" underground pipelines are coated with 3 Layer Poly Ethylene coating for prevention external corrosion of the pipeline.

viii	Mothballing of pipeline which is temporarily not in use: As the pipelines are not piggable, just purging with nitrogen will not help removing the accumulated water. The water accumulated and left for longer forms dead leg and corrodes the portion of pipeline exposed. ONGC to consider flushing the pipeline with inhibited water (suitably treated or injection with inhibitors)	Mothballing of pipeline which is temporarily not in use is being followed as per the NGT recommendations.
<b><i>Reclamation Measures;</i></b>		
ix	<p>The following management strategies may be adopted as reclamation measure for improving the soil fertility in the affected sites</p> <ul style="list-style-type: none"> <li>• Lesser porosity may be improved by providing adequate drainage facilities, in-situ growing and incorporation of green manures crops besides adding available organic manures in the farm.</li> <li>• Application of gypsum based on gypsum requirement may be followed to reduce the alkalinity.</li> <li>• Leaching of salts with sufficient quantity of water and providing adequate drainage facilities to reduce the salinity and to increase the oxygen supply.</li> <li>• For reducing the acidity observed in the lower depths of site, lime application may be advocated to increase the pH so as to improve the nutrient availability.</li> <li>• For addressing reduced nutrient</li> </ul>	<p>These measures can be undertaken with the consent of the land owners. ONGC is conducting meetings with farmers to convince them to adopt these measures.</p> <p>Inspite of ONGC has assured all possible agricultural related support they are not ready for the application of balanced fertilizers which was offered to them.</p> <p>The farmers will be convinced to adopt these measures after conducting meeting with farmers along with agricultural department and revenue department.</p> <p>ONGC is collaboration with the SASTRA University, Thanjavur sponsored several farmers from ONGCs operational areas for the</p>

	availability and microbial load, soil test based balanced fertilization and organic manure addition may be followed.	Training Programme on “Organic Farming and use of New Technologies in Farming”. More farmers from operational areas will be provided training.
--	--	--

### **3. Nature of contamination and nature of extended area covered in the incident mentioned in O.A.193/2020**

ONGC oil pipeline leakage was happened on 22.09.2020 at Wells KMP# 64 in the field owned by Thiru. Sivashanmugam, S/o. Dhanasekaran, in survey No. 72/1, Erukattur Village, Koothanalur Taluk. ONGC has paid compensation of Rs 1,10,000/- for one acre of affected land. The owner informed that, he has four acres of land in which the oil leakage contained/ controlled in one acre without spreading to other areas and also informed that oil leak was arrested immediately by ONGC and also compensation was paid to him for one-acre land. He also informed that yield of crop is same in all four acres including affected farm.

However, the committee had onsite visit to the affected farm site at Thiruvarur on 26.02.2021 and carried out soil sampling to assess the contamination. The details are as follows;

#### **Details of sampling:**

About 13 soil samples were collected from the affected and non-affected fields in the site and assessed for their soil fertility. The soil texture of the affected farm site was clayey in nature and the farmer harvested the rice crop of thaladi season (Samba Rice). He has sown the field with pulse crop as rice fallow pulse. The observation on the crude oil leakage in the field showed a spread of 2 m from the point of pipeline. The crude oil pipelines were installed at a soil depth of 1.20 m from the surface. During the visit, it was noticed that the soil from the affected area was removed and refilled with the soil collected from nearby non-affected fields. Currently the farmer has no water source for irrigating the crops. The bore well he has also shallow at 30 feet depth and the canal water is also not available in this season.

Totally 13 soil samples were collected including 6 samples from various soil depth of the profile dug upto 1.8 m, where the oil pipeline leak happened. Four representative surface soil samples from the affected field (affected area of 1 acre) along with one sample each from non-affected field and refilled soil samples were also collected for fertility assessment. One contaminated soil sample is also collected, which is kept stored in bioremediation area for further treatment. A Profile was opened in the affected area where the crude oil leakage occurred and six soil samples in the profile were collected from the surface upto a depth of 1.80 m, below the pipeline. The details on the soil fertility assessment made are furnished below:



Profile digging at the site of oil leakage



Collection of profile and surface soil samples



Discussions with the farmer

*Visit to the affected farm site at Thiruvarur district*

The soil fertility assessment of the samples revealed no much variation in the soil physical properties viz., bulk density, particle density and porosity (Table 1) in the profile as well as in the surface soil samples. The porosity at different depths of soil profile was higher than the affected area indicating better water and air movement. The soil texture was predominantly clay loam in all the profile layers and surface samples except the affected surface soil which had clayey texture.

The basic soil properties such as pH, electrical conductivity and organic carbon content in the surface samples collected from the affected area was alkaline in soil reaction (8.06 to 8.60), low in soluble salt concentration (0.37 to 0.79 dS m<sup>-1</sup>) and low to medium in organic carbon content (0.31 to 0.60%) when compared to refilled profile samples. However, the profile samples collected at varied depth showed a slightly lesser pH than the affected soils while an increase in salinity after 30 cm depth was observed (1.02 to 2.32 dS m<sup>-1</sup>). The soils were non-calcareous to slightly calcareous in nature irrespective of affected and non affected areas (Table 1).

As regards the major nutrient availability, all the samples showed low nitrogen (<280 kg ha<sup>-1</sup>), low to high phosphorus and K availability. Considerable reduction in available nitrogen (30-40%), phosphorus (25-60%) and potassium (15-20%) was noticed with increasing soil depth (Table 2). The refilled soil has higher major nutrient availability than the affected field soil samples. The available nitrogen and potassium decreased with the soil depth in the profile

samples whereas an irregular trend was observed in phosphorus availability. No much changes in calcium and magnesium availability was noticed when compared to the samples collected from non-affected field. In contrary, sulphur availability was higher in the lower soil depth than the soil samples collected from affected and non affected fields. The micronutrient availability in all the soil samples were sufficient in Fe, Mn, Cu and B. However, the status of Zn was deficient in the soil samples collected from the affected areas, and also in the refilled soils. The surface layers (upto 60 cm) of the profile were having higher available Zn (1.34 to 2.20 mg kg<sup>-1</sup>) and Boron (2.12 to 2.58 mg kg<sup>-1</sup>). With increase in soil depth, the availability of zinc and copper decreased to a deficient level (>90 cm depth).

The heavy metal status in the soil samples collected from affected, non affected areas and the refilled samples possess trace quantity of all the metals and found below the toxicity limit. No significant variations between the affected and non-affected soil samples were observed (Table 3). The order of higher availability was Pb > Ni > Cd > Cr. The microbial load in the soil samples showed drastic reduction in the population when compared to samples collected from non-affected fields particularly with bacteria and actinomycetes. More than 60% reduction in bacteria and 40% in actinomycetes population was observed in the soil samples collected from the affected field as compared to the non- affected field.

### ***Conclusions:***

The soil fertility assessment of the samples collected from the affected and non-affected areas of the farm revealed no soil constraints. Petroleum Hydrocarbons TPH, GRO, DRO and Oil & Grease were also in below detection limit (Table 4). However, slight increase in salinity and sulphur status in the lower depth of the soil profile as compared to the surface soil level, needs to be monitored carefully to avoid soil salinization. The soil from the affected area was removed and refilled with bulk soil collected from nearby fields which has better soil properties and higher nutrient availability than the affected farm site. Hence balanced fertilization practices must be followed to get higher yield and to sustain soil health.

**Table 1: Soil physical and physico chemical properties of the soil samples collected from affected field**

S.No	Sample details	Physical properties				Physico chemical properties			
		Bulk density (g cc-1)	Particle density (g cc-1)	Porosity (%)	Texture	pH	EC (dS m-1)	Org. Carbon (%)	Calcareousness (%)
1.	Non affected field soil sample (as reference)	1.25	1.67	25.0	Clay loam	8.08	0.24	0.44	Slightly calcareous
Sample collected in One Acre of land where oil pipeline leak happened									
2.	Affected field sample -I	1.14	1.67	28.6	Clay loam	8.06	0.79	0.60	Non calcareous
3.	Affected field sample - II	1.18	1.54	23.5	Clay loam	8.45	0.42	0.31	Non calcareous
4.	Affected field sample - III	1.14	1.60	28.6	Clay loam	8.60	0.37	0.38	Slightly calcareous
5.	Affected field sample - IV	1.21	1.67	29.4	Clay	8.53	0.76	0.55	Non calcareous
Profile samples at different depths (Exact location where pipeline leaked happened)									
6.	0-30 cm	1.18	1.82	35.3	Clay loam	7.58	0.74	0.50	Slightly calcareous
7.	30-60 cm	1.11	1.74	33.3	Clay loam	7.68	1.02	0.39	Slightly calcareous
8.	60-90 cm	1.21	1.60	29.4	Clay loam	7.84	1.07	0.28	Slightly calcareous
9.	90-120 cm	1.11	1.67	33.3	Clay loam	7.91	2.32	0.24	Slightly calcareous
10.	120-150cm	1.14	1.82	35.3	Clay loam	7.86	1.20	0.21	Slightly calcareous
11.	150-180cm	1.18	1.74	29.4	Clay loam	7.95	1.02	0.18	Slightly calcareous
12.	Contaminated removed soil (collected from bioremediation yard)	1.14	1.54	25.7	Clay	7.98	0.80	0.69	Slightly calcareous
13.	Refilled soil	1.21	1.60	25.0	Clay loam	7.87	0.18	0.56	Non calcareous

**Table 2. Nutrient availability in the soil samples collected form affected field**

S.No	Sample details	Major Nutrient availability (kg ha-1)			Secondary and Micronutrients availability (mg kg-1)							
		Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Sulphur	Zinc	Iron	Manganese	Copper	Boron
1.	Non affected field sample (as reference)	196	23.0	269	1725	708	16.3	1.13	27.6	7.75	2.23	0.70
Sample collected in One Acre of land where oil pipeline leak happened												
2.	Affected field sample -I	123	16.6	240	1859	830	22.5	0.57	10.8	17.0	2.16	1.47
3.	Affected field sample -II	245	16.5	212	1355	627	25.0	0.28	10.5	7.29	1.64	1.44
4.	Affected field sample -III	182	15.0	218	1424	650	24.9	0.67	9.22	5.24	0.92	1.73
5.	Affected field sample -IV	179	9.0	264	1176	481	15.0	0.44	32.5	9.52	2.98	1.28
Profile samples at different depths (Exact location where pipeline leaked happened)												
6.	0-30 cm	160	9.0	213	1401	653	17.5	2.20	12.7	11.1	2.65	2.58
7.	30-60 cm	148	16.3	202	2076	1008	25.9	1.34	6.86	7.35	1.42	2.12
8.	60-90 cm	184	9.0	237	1873	845	34.1	0.69	6.95	6.54	0.95	1.64
9.	90-120 cm	120	14.3	197	1979	890	45.1	0.40	5.82	3.93	0.81	1.98
10.	120-150cm	150	15.5	166	1835	833	48.7	0.44	5.15	3.82	0.50	1.66
11.	150-180cm	119	17.1	141	1437	663	33.6	0.71	5.12	3.58	0.42	0.98
12.	Contaminated removed soil (collected from bioremediation yard)	213	9.0	231	1964	883	26.5	1.59	31.2	16.2	2.61	1.98
13.	Refilled soil	196	11.0	261	1096	463	25.2	0.59	13.6	9.85	1.78	2.08

**Table 3. Microbial load and heavy metal availability in the soil samples collected form affected field**

S.No	Sample details	Microbial load			Heavy metal availability (mg kg <sup>-1</sup> )			
		Bacteria (x 10 <sup>6</sup> CFU g <sup>-1</sup> )	Fungi (x 10 <sup>4</sup> CFU g <sup>-1</sup> )	Actinomycetes (x 10 <sup>2</sup> CFU g <sup>-1</sup> )	Cadmium	Lead	Chromium	Nickel
1.	Non affected field sample (as reference)	28.0	12.0	12.0	0.28	2.75	0.10	0.82
Sample collected in One Acre of land where oil pipeline leak happened								
2.	Affected field sample -I	11.0	26.0	10.0	0.31	2.85	0.07	1.01
3.	Affected field sample -II	13.0	7.0	9.0	0.23	2.52	0.10	0.67
4.	Affected field sample -III	18.0	11.0	12.0	0.30	2.06	0.09	0.71
5.	Affected field sample -IV	19.0	9.0	4.0	0.29	2.51	0.08	0.70
Profile samples at different depths (Exact location where pipeline leaked happened)								
6.	0-30 cm	24.0	12.0	7.0	0.29	2.42	0.09	0.70
7.	30-60 cm	12.0	7.0	6.0	0.21	2.04	0.06	0.24
8.	60-90 cm	9.0	6.0	10.0	0.19	2.55	0.08	0.68
9.	90-120 cm	18.0	7.0	9.0	0.14	2.68	0.07	0.91
10.	120-150cm	20.0	5.0	6.0	0.08	2.76	0.08	0.27
11.	150-180cm	36.0	8.0	9.0	0.25	3.04	0.09	0.30
12.	Contaminated removed soil (collected from bioremediation yard)	35.0	9.0	4.0	0.33	3.35	0.09	1.20
13.	Refilled soil	18.0	19.0	6.0	0.19	2.09	0.03	1.00

**Table 4. Petroleum Hydrocarbons**

Sample details	Parameters	Concentration (mg/kg)
Affected field sample –I, II, III & IV Profile samples at different depths 0-30 cm, 60-90 cm, 120-150cm & 150-180 cm	TPH, GRO, DRO and Oil & Grease	BLQ(LOQ:0.1)

***Recommendations:***

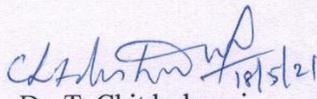
The soil samples collected from the affected area had a constraint of salinity and reduced microbial population. Hence, the following management strategies are suggested:

- Leaching of salts with sufficient quantity of water and providing adequate drainage facilities may reduce the salinisation and sulphur content.
- Soil test based balanced fertilization practices through integrated nutrient management may be followed to sustain the soil fertility, to improve the microbial population and crop yield in the affected areas.
- Since the crude oil leaked soil was completely removed and refilled with the fresh soil, no much constraint in the field was observed. However, the poor fertility of the refilled soil particularly in Zn availability needs to be managed to achieve higher yields.
- ONGC shall bear the cost of disbursement of the micro nutrients to the affected farmers for three consecutive years, in order to replenish the Zn deficiency in the refilled soil, for achieving good yield.

***If ONGC adopt & properly implement the preventive measures for non-recurrence as suggested in the report and the notification Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Petroleum and Petroleum Products Pipelines) Regulations, 2016, such oil leak incidents shall be avoided in future.***

  
V. Saritha, IAS,  
District Collector,  
Tiruvarur District.

  
R. Rajkumar  
Scientist 'D'  
CPCB, RD, Chennai

  
Dr. T. Chitdeshwari  
Prof. (SS&AC)  
Dept. of Soil Science and Agriculture  
Chemistry, TNAU, Coimbatore

  
R. Gunaseelan  
DEE, TNPCB  
Nagapattinam

**BEFORE THE NATIONAL GREEN  
TRIBUNAL (SOUTHERN ZONE)  
CHENNAI**

**Original Application No. 66 of 2020 (SZ)**

Tribunal on its own motion SUO MOTU Based  
on the reports received from TNPCB on Oil  
leakage from ONGC pipeline in Thiruvarur  
District

... Applicant

vs

The Chief Secretary, Government of Tamil Nadu,  
Chennai and Others.

...Respondent(s)

**Original Application No. 193 of 2020 (SZ)**

Tribunal on its own motion-SUO MOTU Based  
on the News item in Dinamalar Newspaper,  
Chennai Edition dated 24.09.2020,“Paddy field  
with crude oil as ONGC pipeline leaks”

... Applicant

vs

The Chief Secretary, Government of Tamil Nadu,  
Chennai and Others.

...Respondent(s)

**JOINT COMMITTEE REPORT FILED  
ON BEHALF CENTRAL POLLUTION  
CONTROL BOARD (CPCB)**

**Advocate P. Jayalakshmi**

**COUNSELS FOR CPCB**