

PRESS RELEASE

Hydrocarbon Activities Have Harmed Delta Environment, Scientific Analysis Reveals

CHENNAI. 09 August, 2017 -- Scientific analysis of soil, groundwater and surface water samples from Thanjavur, Thiruvarur and Nagapattinam confirm delta villagers' fears that hydrocarbon operations by ONGC and CPCL are harming the environment. The study also concluded that ONGC had failed to observe international best practices in responding to the June 30 oil spill leading to spread of contamination to public water courses and the Velloor irrigation canal. All seven samples – including four soil, two surface water and one groundwater – are contaminated by hydrocarbons linked to oil extraction or refining. Releasing the results in Chennai, the Solidarity Group for Justice and Accountability, a state-wide alliance of individuals and people's organisations, called for an independent third-party audit of the environmental impacts of ongoing hydrocarbon activities and remediation of contaminated sites at ONGC's cost. They demanded for the release of jailed villagers, and prosecution of negligent ONGC, TNPCB and district officials.

The results also contradict claims made by the state government, and hydrocarbon majors like ONGC and CPCL.

ONGC's claim: Oil leaks and spills are promptly attended to; contaminated lands are fully restored.

What the Results Say: Two soil samples were collected from a farm in Thirupunjai, Thiruvarur district, that was contaminated during an oil spill more than 10 years ago. The samples contained 1760 parts per million (or mg/kg) and 2983 mg/kg of Total Petroleum Hydrocarbon (TPH) respectively. The contaminated field had a perceptible odour of rancid petroleum. The soil was brittle, devoid of vegetation and had visible clumps of tar balls. Given that uncontaminated soils should have no trace of TPH, the levels found in the Thirupunjai field are exceedingly high and highlight the failure of ONGC to deploy remedial measures to restore the paddy lands. More than five acres in the vicinity of the contaminated field also lay fallow. Local farmers said rainwater flowing from the oil leak site had rendered surrounding fields also infertile. Crude oil pollution compromises the water holding capacity of soil, harms soil microbial population and reduces crop yields, particularly for paddy.

ONGC's claim: People prevented ONGC from tending to the June 30 oil spill and resultant contamination in Kathiramangalam

What the Results Say: Two sets of water and soil samples were taken from the Mr. Sriram Ramamoorthy's certified organic farm that bore the brunt of the June 30 oil leak from ONGC's crude oil pipeline. One set of surface water and soil samples were taken 10 days after the incident from a location about 50 feet away from the epicentre of the spill. The other was taken from the epicentre of the leak 13 days (soil) and 15 days (water) after the leak.

Surface water sample taken from the epicentre of the pollution contained 33.9 mg/L of TPH. The sample from 50 feet away was mixed with rainwater and contained 2.4 mg/L of TPH. The soil taken 50 feet from the epicentre contained 438 mg/kg of TPH, while the soil in the epicentre contained 1118 mg/kg. Uncontaminated surface water of irrigation quality or uncontaminated farmland soil should not contain any TPH.

Photographs taken by Kathiramangalam farmers reveal that contamination has been carried by rainwaters into the Velloor irrigation canal. ONGC has ignored repeated requests by the land-owner and farmers of surrounding lands to clean up the contamination.

Government Claims: Hydrocarbon extraction and processing does not harm the environment

What the Results Say: One sample of groundwater was taken from a handpump in Vellapakkam village, about 200 metres from CPCL's petroleum Narimanam refinery in Nagapattinam. The sample contained 0.2 mg/L of mineral oil, iron levels more than 37 times above permissible limits. The water had a strong odour of rotten egg suggesting the presence of hydrogen sulphide. Mineral oil contamination of groundwater is a result of petroleum refining. From oil spills to underground leaks, hydrocarbon extraction and processing activities are seen to be harming the environment.

Coming as they do when the government has announced plans for a 250 square km Petrochemical investment region, the results raise the disturbing prospect of similar pollution in the areas proposed to be covered by PCPIR.

The spread of contamination into the Velloor Irrigation Canal is a criminal offence as a public water source is being poisoned. Rather than act against the offender, the district administration has jailed villagers.

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The Media Kit can be downloaded at www.coastalresourcecentre.wordpress.com

பத்திரிகை வெளியிடு

ஹைட்ரோ கார்பன் எடுப்பது காவிரி டெல்டா சுற்றுச்சூழலைப் பாதித்துள்ளது- அறிவியல் ஆய்வுகள் காட்டும் உண்மை

சென்னை, 09 ஆகஸ்ட், 2017 — தஞ்சாவூர், திருவாரூர், நாகப்பட்டினம் மாவட்டங்களின் மண், நிலத்தடி நீர், நிலமேற்பரப்பு நீர் ஆகியவற்றின் மாதிரிகளை அறிவியல் ரீதியாகச் சோதித்த போது, ONGC மற்றும் CPCL -ன் ஹைட்ரோ கார்பன் திட்டச் செயல்பாடுகளின் காரணமாக சுற்றுச்சூழல் பாதிக்கப்பட்டுள்ளது என்ற டெல்டா விவசாயிகளின் அச்சம் சரியானதுதான் என்பது உறுதியானது. ஜூன் 30 அன்று நடைபெற்ற எண்ணெய் கசிவைக் கட்டுப்படுத்த சர்வதேச தரத்திலான சிறந்த முயற்சிகளை ONGC எடுக்கவில்லை என்பதால் எண்ணெய் பொது நீர் நிலைகளுக்கும் வெள்ளூர் பாசனக் கால்வாய்க்கும் பரவியது என்றும் ஆய்வு கண்டுணர்ந்தது. நான்கு மண் மாதிரிகளும், இரண்டு நிலமேற்பரப்பு நீர் மாதிரிகளும், நிலத்தடி நீர் மாதிரி ஒன்றும் ஆய்வு செய்யப்பட்டன. இந்த அனைத்து ஏழு மாதிரிகளும் எண்ணெய் துரப்பணம் அல்லது எண்ணெய் சுத்திகரிப்பு நிலையங்களுடன் தொடர்புள்ள ஹைட்ரோ கார்பனால் மாசுபட்டிருந்தன. “நீதி மற்றும் பொறுப்பேற்புரிமைக்கான ஒருமைப்பாடு குழு (Group for Justice and Accountability) இன்று அறிக்கையைச் சென்னையில் வெளியிட்டது. மாநிலத்தின் அமைப்புகள், தனிபர்களின் கூட்டமைப்பான இந்த அமைப்பு, ஹைட்ரோ கார்பன் தொடர்பாக நடைபெற்றுவரும் நடவடிக்கைகளின் சுற்றுச்சூழல் பாதிப்பு என்னவென்பதை மூன்றாம் தரப்பு ஒன்றின் மூலம் சுதந்திரமான முறையில் தணிக்கை செய்ய வேண்டும் என்றும் பாதிக்கப்பட்ட பகுதிகளை ONGCயின் செலவில் சுத்தப்படுத்திட வேண்டும் என்றும் அந்த அமைப்பு கோரியது. சிறையில் உள்ள கிராம மக்களை விடுதலை செய்ய வேண்டும் என்றும் ONGC, TNPCB மற்றும் மாவட்ட அரசு அதிகாரிகளை அவர்களின் கவனக்குறைவிற்காக தண்டனை நடவடிக்கைக்கு உட்படுத்த வேண்டும் என்றும் அமைப்பினர் கோருகின்றனர்.

தமிழ்நாடு அரசும் ஹைட்ரோ கார்பன் உற்பத்தியில் ஈடுபட்டுள்ள பெரிய நிறுவனங்களான ONGC மற்றும் CPCLன் கூற்றுகள் தவறானவை என்று காட்டுவதாகவும் ஆய்வின் முடிவுகள் இருக்கின்றன.

ONGC சொல்வது: எண்ணெய் கசிவுகளையும், எண்ணெய் கொட்டியதையும் மிகச் சரியாகக் கையாண்டோம்; மாசுபட்ட நிலம் மீட்டெடுக்கப்பட்டுவிட்டது.

சோதனை முடிவுகள் காட்டுவது: திருவாரூர் மாவட்டத்தின் திருப்பஞ்சையில் உள்ள பண்ணையில் 10 ஆண்டுகளுக்கு முன்பு எண்ணெய் கொட்டி மாசுபாடு ஏற்பட்டது. அந்த நிலத்திலிருந்து இரண்டு மண் மாதிரிகள் எடுக்கப்பட்டன. ஒரு மாதிரியில் மில்லியனில் 1760 பங்கு அளவுக்கு (அல்லது ஒரு மிகி/ கி.கி அளவுக்கு) பெட்ரோலிய-ஹைட்ரோ கார்பன் பொருட்கள் இருந்தன. மற்றொரு மாதிரியில் மில்லியனில் 2983 பங்கு அளவுக்கு (அல்லது ஒரு மிகி/ கி.கி அளவுக்கு) பெட்ரோலிய-ஹைட்ரோ கார்பன் பொருட்கள் (Total Petroleum Hydrocarbon -TPH) இருந்தன. சிதைந்துகொண்டிருக்கும் பெட்ரோலியத்தின் வாடை நிலத்தில் உணரப்பட்டது. நிலத்தின் மண் நொறுங்கும் தன்மைகொண்டதாகவும், புல்-பூண்டு இல்லாததாகவும் தார் பந்துகள் பரவிக் கிடப்பதாகவும் இருந்தது. மாசுபடாத நிலத்தில் TPH சுத்தமாக இருக்காது என்ற நிலையில், திருப்பஞ்சை நிலத்தில் இருக்கும் TPHன் மிக உயர்ந்த அளவாகும். மேலும், அந்த நெல் விளையும் பூமியை மீட்டெடுக்க ONGC எடுத்த முயற்சிகள் பலனிக்கவில்லை என்பதையும் காட்டுகின்றன. அங்கிருந்த நிலத்தில் 5 ஏக்கர் பரப்புக்கு மாசுபட்ட நிலம் தரிசாகக் கிடக்கிறது. அந்த நிலத்திலிருந்து மழை நீர் வெளியேறிப் பரவும் பிற வயல்களும் வளத்தை இழந்துவிட்டன என்று விவசாயிகள் சொல்கிறார்கள். நிலத்தின் நீர்ப்பிடித் தன்மையை குறை ஆயில் சிதைத்துவிடுகிறது. மண்ணில் உள்ள நுண்ணுயிர்களைக் கொன்று அவற்றின் எண்ணிக்கையைக் குறைத்துவிடுகிறது. பயிர் விளைச்சலை, குறிப்பாக நெல் மகசூலைக் குறைத்து விடுகிறது.

ONGC சொல்வது: ஜூன் 30 அன்று நிலத்தில் எண்ணெய் கொட்டியபோது அதனை நெருங்கவிடாமல் மக்கள் தடுத்தனர் என்றும் அதன் காரணமாகத்தான் கதிராமங்கலத்தின் நிலம் மாசுபட்டது என்றும் ONGC சொன்னது.

சோதனை முடிவுகள் காட்டுவது: திருமிகு ஸ்ரீராம் ராமமூர்த்தியின் பண்ணையில் ஜூன் 30

அன்று ONGCயின் குரூடு எண்ணெய் குழாயிலிருந்து வெளியேறிய எண்ணெய் பாய்ந்தது. அவருடைய பண்ணை சான்று பெற்ற இயற்கை விவசாயப் பண்ணையாகும். அந்தப் பண்ணையிலிருந்து நீர் மற்றும் மண் மாதிரிகள் 2 செட் எடுக்கப்பட்டன. மேற்பரப்பு நீர் மற்றும் மண் மாதிரிகள் ஒரு செட், சம்பவம் நடந்த 10 நாட்களுக்குப் பின்பு, எண்ணெய் கொட்டைய இடத்தின் மையத்திலிருந்து 50 அடி தொலைவில் எடுக்கப்பட்டன. 13 நாள் கழித்து எண்ணெய் கொட்டைய பகுதியின் மையத்திலிருந்து மண் மாதிரியும் 15 நாள் கழித்து நீர் மாதிரியும் எடுக்கப்பட்டன. இவை மற்றொரு செட்டாகும்.

மாசுபாட்டின் மையப் பகுதியிலிருந்து எடுக்கப்பட்ட நீர் மாதிரிகளில் TPHன் அளவு 33.9 மிகி/லிட்டர் என்பதாக இருந்தது. 50 மீட்டர் தொலைவில் எடுக்கப்பட்ட மாதிரி மழை நீர் கலந்த மாதிரியாகும். அந்த மாதிரியில் 2.4 மிகி/லிட்டர் TPH இருந்தது. விவசாயத்திற்கான நீர் மாசுபடாததாகவும் TPH இல்லாததாகவும் இருக்க வேண்டும். எண்ணெய் கொட்டைய மையத்திலிருந்து 50 மீட்டர் தொலைவில் எடுக்கப்பட்ட மண் மாதிரியில் 438 மிகி/கிகி TPH இருந்தது. அதேயிடத்திலிருந்து எடுக்கப்பட்ட மண்ணில் XXX மிகி/கிகி TPH இருந்தது.

மாசுபாடுகளை வெள்ளூர் பாசனக் கால்வாய்க்கு மழை நீர் கொண்டு சென்று சேர்த்திருப்பதை கதிராமங்கலம் விவசாயிகள் எடுத்த புகைப்படங்கள் காட்டின. மாசுபாட்டைச் சுத்தப்படுத்த வேண்டும் என்று சுற்றியுள்ள நிலத்தின் விவசாயிகள் திரும்பத் திரும்பக் கோரிய போதும் ONGC ஏதனையும் கண்டுகொள்ளவில்லை.

அரசு சொல்வது: ஹைடிரோ கார்பனை எடுப்பதும், சுத்திகரிப்பு செய்வதும் சுற்றுச்சூழலைப் பாதிக்காது.

சோதனை முடிவுகள் காட்டுவது: நாகப்பட்டி னத்தின் நரிமனத்தில் உள்ள CPCL பெட்ரோலியத்திலிருந்து 200 மீட்டர் தொலைவில் உள்ள கை ச்சம்பிலிருந்து (வெள்ளப்பாக்கம் கிராமம்) ஒரு குடிநீர் மாதிரி சேகரிக்கப்பட்டது. அந்த மாதிரியில் 0.2 மிகி/லி மினரல் எண்ணெய் இருந்தது. அனுமதிக்கத்தக்க அளவை விட 37 மடங்கு அதிகமானதாக இருப்பின் அளவு இருந்தது. அந்த நீர் அழகிய முட்டையின் கரும் வாடை உள்ளதாக இருந்தது ஹைடிரஜன் சல்பைடு இருப்பதைக் காட்டியது. எண்ணெய் கசிவு, நிலத்தடியில் கசிவு, ஹைடிரோ கார்பன் எடுப்பது அதனைச் சுத்திகரிப்பது என்ற நடவடிக்கைகள் சுற்றுச்சூழலைப் பாதிக்கின்றன என்பது தெரிகிறது.

250 சதுர கி.மீ பரப்பில் பெட்ரோலியத் தொழிலுக்கான மூலதனப் பகுதியை அரசு அறிவித்துள்ள சமயத்தில் வெளிவந்துள்ள இந்த ஆய்வறிக்கை PCPIRக்குள் வரும் பகுதிகளில் இதே போன்ற மாசுபாடுகள் ஏற்படும் வாய்ப்புள்ளது என்ற தொந்தரவு தரும் பிரச்சனையை வெளிப்படுத்துகிறது.

வெள்ளூர் பாசனக் கால்வாயை மாசுபடுத்தியது என்பதற்கு பொது நீராதாரம் நஞ்சாக்கப்பட்டது என்று பொருளாகும். எனவே, இது கிரிமினல் குற்றமாகும். இந்தக் குற்றத்தை இழைத்தவருக்கு எதிராகச் செயல்படுவதற்கு மாறாக, மாவட்ட நிர்வாகம் கிராம மக்களைச் சிறையில் அடைத்துள்ளது.

மேலும் தகவல்களுக்கு தொடர்புகொள்ளவும் -- 9444082401

மீடியா கிட் – www.coastalresourcecentre.wordpress.com

Report on Scientific Analysis of Soil and Water Samples Collected from Areas Impacted by Hydrocarbon Pollution in Cauvery Delta

August 2017

On June 30, 2017, an oil spill from a crude oil pipeline transporting crude and produced water from ONGC's production well KUT-35 in Kathiramangalam village contaminated a certified organic farm owned by Mr. Sriram Ramamoorthy. The leak triggered massive protest by Kathiramangalam villagers, and violent police action ensued. Eleven villagers were jailed. No action was taken against ONGC. As a result of the subsequent media glare, and the ongoing protests against hydrocarbon extraction, questions were raised regarding the environmental implications of hydrocarbon extraction and processing in delta districts.

In the ensuing days, villagers from Kathiramangalam and other parts of delta districts raised allegations that hydrocarbon extraction, conveyance and processing – by ONGC and other players including CPCL -- had contaminated groundwater and surface water. Farmers also alleged that ONGC was lax in tending to oil spills, and fields damaged by oil spills were not remediated by the public sector oil and gas company.

Industry best-practices require the periodic monitoring of groundwater around active hydrocarbon production wells and abandoned wells. Spill-response protocol also require hydrocarbon producers to

- first arrest and contain the spilled contaminants to prevent it from spreading;
- removal of spilled hydrocarbon from the surface, and send it to treatment plant before final disposal
- conduct an environmental assessment to estimate the depth and spread of the contamination
- remove and treat contaminated soil, and restore the site with healthy soil

The allegations by farmers from delta districts got wide media attention. ONGC denied the allegations. The Government of Tamil Nadu, working through various district administrations and the Police, have also supported ONGC's defence. The Tamil Nadu Pollution Control Board has been conspicuously absent.

However, the defence offered by ONGC and the Government of Tamil Nadu regarding the safety of hydrocarbon operations in delta districts is not borne out by any scientific evidence. On July 19, 2017, ONGC held a press conference to defend itself against the allegations. However, no scientific monitoring data was presented to demonstrate the quality of ONGC's operations. ONGC also did not present results of soil or surface water from the spill site in Kathiramangalam to demonstrate the effectiveness of their clean-up.

On July 9, the Solidarity Group for Justice and Accountability undertook a modest sampling exercise to assess the validity of villagers' claims and the hydrocarbon industry and Government's counterclaims. The Solidarity Group was also approached by farmer Mr. Sriram Ramamoorthy seeking assistance with identifying a suitable lab to test the samples of water and soil taken on July 13 and July 15 from his farm – the site of the June 30 crude oil spill. Mr. Ramamoorthy clarified that his requests to ONGC and TNPCB to take identical samples of surface water and soil samples to be analysed separately by ONGC and himself was denied.

Samples were analysed at CVR Labs (P) Ltd, a nationally accredited laboratory in Chennai. The findings of soil, surface water and groundwater analysis support the claims of villagers that hydrocarbon operations have harmed the environment.

The Sampling Exercise

A total of one groundwater sample, one surface water sample and three soil samples were collected on 9 July, 2017. The samples were collected by a trained sampler. Water samples were collected in 1 litre glass bottles pre-cleaned with dilute nitric acid. The samples were handled with nitrile gloves and filled to the brim to minimise volatilisation of hydrocarbons from the sample. Collected samples were labelled. GPS coordinates of sample locations were noted, and the samples were immediately stored in freezer packs pre-cooled by frozen ice-gel packs.

The three soil samples were collected from two locations in ziplock bags, double-bagged, labelled and stored in the freezer pack. The samples were conveyed to the laboratory within 24 hours.

In addition to the samples collected on 9 July, two additional samples collected by officials of the Agricultural Department on 13 and 15 July based on Mr. Ramamoorthy's request were separately sent for analysis. These samples were conveyed to the laboratory 10 days after the date of collection. These results are likely to be on the conservative side.

Findings

Date	Type of Sample	Sample Location	Result
9 July	Surface water, Kathiramangalam, Thanjavur Sample Code: KW3	Farm of Mr. Sriram Ramamoorthy – 20 metres from epicentre of oil spill N11°04.467' E079°31.602'	Mineral oil 0.3 mg/l Total Org Carbon 49 mg/l Oil and Grease 1.5 mg/l Total Petroleum Hydrocarbon 2.4 mg/l Odour Disagreeable Iron 16 times > permissible limits
9 July	Soil + mulch Kathiramangalam, Thanjavur Sample Code: KS1	Farm of Mr. Sriram Ramamoorthy – 20 metres from epicentre of oil spill N11°04.467' E079°31.602'	Total Petroleum Hydrocarbon 438 ppm
13 July	Surface water sample Kathiramangalam, Thanjavur Sample Code: KSW1	Farm of Mr. Sriram Ramamoorthy – from epicentre of oil spill	Total Petroleum Hydrocarbon 33.9 mg/L
15 July	Soil sample, Kathiramangalam, Thanjavur Sample Code: KSS1	Farm of Mr. Sriram Ramamoorthy – from epicentre of oil spill	Total Petroleum Hydrocarbon 1118 mg/L
9 July	Groundwater Vellapakkam, Nagapattinam Sample Code: NW1	Handpump, 60 foot bore. 200 metres from CPCL refinery in Narimanam N10°49.866' E079°48.132'	Mineral oil 0.2 mg/l Total Org Carbon 6 mg/l Oil and Grease 1 mg/l Odour Disagreeable Turbidity 43 times > permissible limits Iron 37 times > permissible limits

9 July	Soil sample (core 15 cm from surface) Thirupunjai, Thiruvarur Sample Code: TS1	From farm contaminated by pipeline leak more than 10 years ago. N10°44.814' E079°34.677'	Total Petroleum Hydrocarbon 1760 ppm
9 July	Soil sample (surface scrapings) Thirupunjai, Thiruvarur Sample Code: TS2	From farm contaminated by pipeline leak more than 10 years ago. N10°44.814' E079°34.677'	Total Petroleum Hydrocarbon 2983 ppm

Discussion

The results reveal that all seven samples – including four soil, two surface water and one groundwater – are contaminated by hydrocarbons linked to oil extraction or refining. The results also contradict claims made by the state government, and hydrocarbon majors like ONGC and CPCL that:

- oil leaks and spills are promptly attended to, and contaminated lands are fully restored;
- people prevented ONGC from tending to the June 30 oil spill and contamination in Kathiramangalam;
- hydrocarbon extraction and processing does not harm the environment.

ONGC's claim: Oil leaks and spills are promptly attended to; contaminated lands are fully restored.

What the Results Say: Two soil samples were collected from a farm in Thirupunjai, Thiruvarur district, that was contaminated during an oil spill more than 10 years ago. The samples contained 1760 parts per million (or mg/kg) and 2983 mg/kg of Total Petroleum Hydrocarbon (TPH) respectively. The contaminated field had a perceptible odour of rancid petroleum. The soil was brittle, devoid of vegetation and had visible clumps of tar balls. Given that uncontaminated soils should have no trace of TPH, the levels found in the Thirupunjai field are exceedingly high and highlight the failure of ONGC to deploy remedial measures to restore the paddy lands. More than five acres in the vicinity of the contaminated field also lay fallow. Local farmers said rainwater flowing from the oil leak site had rendered surrounding fields also infertile. Crude oil pollution compromises the water holding capacity of soil, harms soil microbial population and reduces crop yields, particularly for paddy.

ONGC's claim: People prevented ONGC from tending to the June 30 oil spill and resultant contamination in Kathiramangalam

What the Results Say: Two sets of water and soil samples were taken from the Mr. Sriram Ramamoorthy's certified organic farm that bore the brunt of the June 30 oil leak from ONGC's crude oil pipeline. One set of surface water and soil samples were taken 10 days after the incident from a location about 50 feet away from the epicentre of the spill. The other was taken from the epicentre of the leak 13 days (soil) and 15 days (water) after the leak.

Surface water sample taken from the epicentre of the pollution contained 33.9 mg/L of TPH. The sample from 50 feet away was mixed with rainwater and contained 2.4 mg/L of TPH. Uncontaminated surface water of irrigation quality should not contain any TPH. The soil taken 50 feet from the epicentre contained 438 mg/kg of TPH, while the soil in the epicentre contained 1118

mg/kg. Uncontaminated agricultural soil should not contain any TPH.

Photographs taken by Kathiramangalam farmers reveal that contamination has been carried by rainwaters into the Velloor irrigation canal. ONGC has ignored repeated requests by the land-owner and farmers of surrounding lands to clean up the contamination.

Government Claims: Hydrocarbon extraction and processing does not harm the environment

What the Results Say: One sample of groundwater was taken from a handpump in Vellapakkam village, about 200 metres from CPCL's petroleum Narimanam refinery in Nagapattinam. The sample contained 0.2 mg/L of mineral oil, iron levels more than 37 times above permissible limits. The water had a strong odour of rotten egg suggesting the presence of hydrogen sulphide. Mineral oil contamination of groundwater is a result of petroleum refining. From oil spills to underground leaks, hydrocarbon extraction and processing activities are seen to be harming the environment.

Conclusions and Recommendations

The results and the sequence of events till date lead us to conclude that:

- a) ONGC has failed to observe best international practices in responding to the June 30, 2017 oil spill.
- b) ONGC could and should have arrested further spread of oil contamination from the spill site into the irrigation canal by prompt action, but it has failed to do this.
- c) Contrary to its claims of quick and thorough remediation, ONGC had failed to clean-up a field in Thirupunjai, Thiruvavur, that was the site of a spill more than 10 years ago.
- d) CPCL's refinery in Narimanam, Nagapattinam, has contaminated groundwater resources.

We recommend as follows:

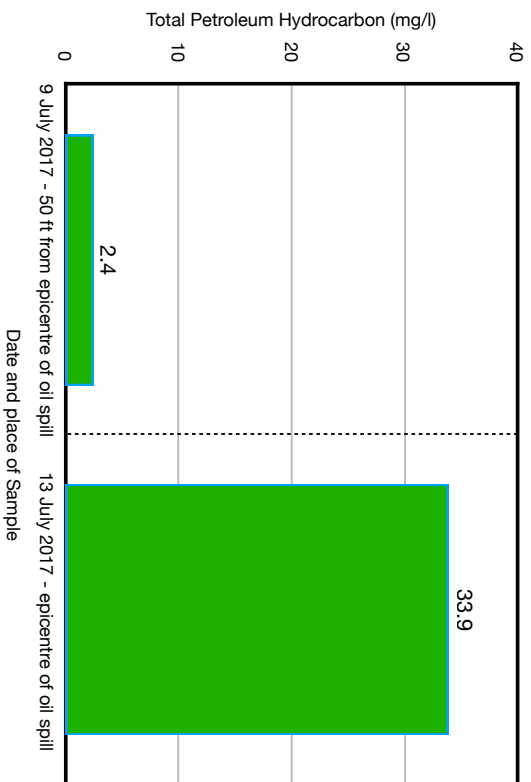
- a) All past spill sites should be identified, tested and remediated if found to be contaminated.
- b) The Kathiramangalam spill site should be cleaned up at the cost of polluter, and the land-owners compensated.
- c) ONGC officials, revenue and TNPCB officials must be prosecuted for negligent handling of a toxic substance and fouling public water courses.
- d) An independent assessment of groundwater quality must be carried out in and around ONGC and CPCL installations in the delta districts. Provisions for clean water in all affected panchayats must be made at the cost of the polluter.
- e) Given that the villagers had good reasons to protest, the police must immediately release the jailed villagers, and instead jail the ONGC officials responsible for the continuing pollution.

Solidarity Group for Justice and Accountability

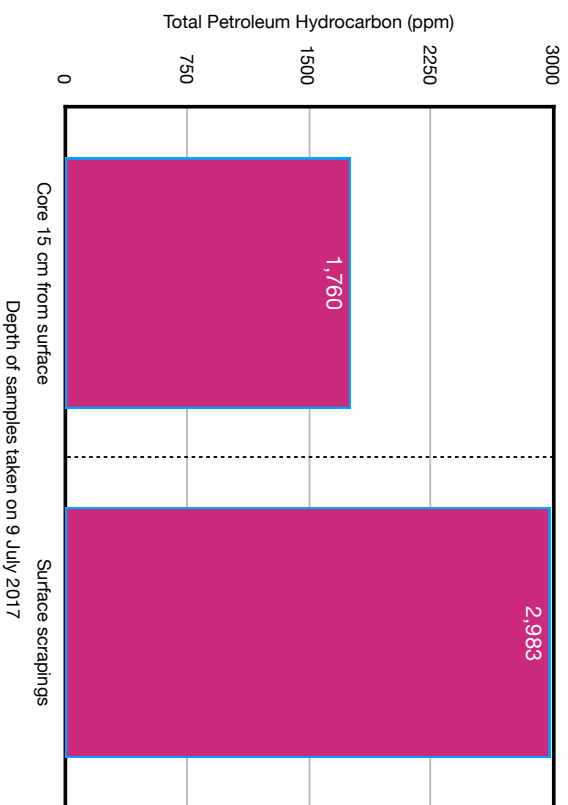
Chennai

9 August, 2017

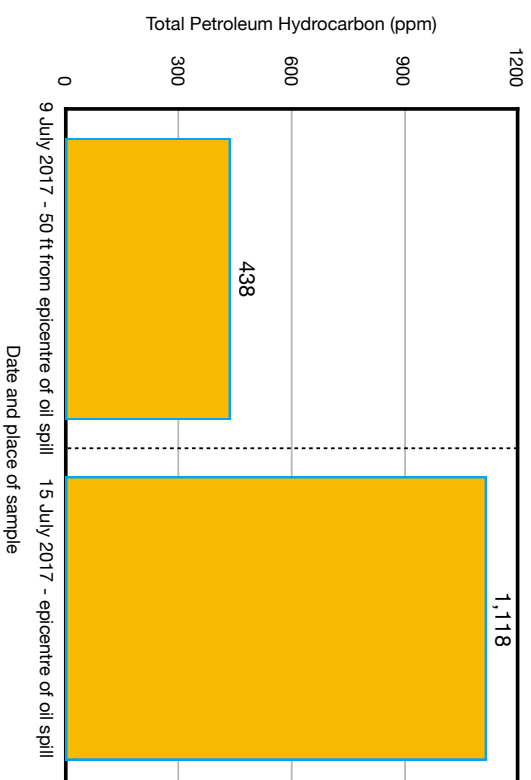
Surface Water Sample - Farm of Mr. Sriram Ramamoorthy, Kathiramanjalam, Thanjavur (N11°04.467' E079°31.602')



Soil Sample - Farm contaminated by pipeline leak more than 10 years ago, Thirupunjai, Thiruvavur (N10°44.814' E079°34.677')



Soil Sample - Farm of Mr. Sriram Ramamoorthy, Kathiramanjalam, Thanjavur (N11°04.467' E079°31.602')



Groundwater Sample - Handpump, 60 ft bore; 200 metres from CPCL Refinery in Narinaman, Vellapakam, Nagapattnam (N10°49.866' E079°48.132')

Odor	Mineral Oil	Oil and Grease	Turbidity	Iron
Disagreeable	0.2 mg/l	1 mg/l	43 times > permissible limits	37 times > permissible limits



CVR Labs (P) Limited

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Dignity Centre, 2nd Floor, New No. 2/9, Old No. 21 Abdul Razack Street,
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E-mail : info@cvrlabs.com | Web : www.cvrlabs.com

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Issued To :

Mr.Nityanand Jayaraman

No.92,3rd Cross Street,Thiruvalluvar Nagar,
Besant Nagar,Chennai - 600090.

Date of report : 03/08/2017

Received on : 29/07/2017

Commenced on : 29 /07/2017

Report Number : 17070283.01

Completed on : 03/08/2017

Sample Description : Soil Sample

Sample Identification : Field Soil - KSS1

S.No	Parameters	Protocol	Unit	Result
1	Total Petroleum Hydrocarbons	NWTPH-HCID- CVR/SOP/ENVI-91	ppm	1118

[Signature]
Verified By

For CVR LABS PVT. LTD.

[Signature]
Authorised Signatory

E.JANAKI
Asst. Quality Manager

Recognized / Approved by : NABL, BIS , Ministry of Environment & Forests , ISO 9001 : 2008 , OSHAS 18001 : 2007

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Date of report : 03/08/2017

Received on : 29/07/2017

Commenced on : 29 /07/2017

Completed on : 03/08/2017

Report Number : 17070283.02

Sample Description : Water Sample

Sample Identification : Field Water - KSW1

S.No	Parameters	Protocol	Unit	Result
1	Total Petroleum Hydrocarbons	NWTPH-HCID- CVR/SOP/ENVI-91	ppm	33.9
2	BTEX	USEPA 8260 B	µg/L	ND

f. k. s. k. s.
Verified By

CVR LABS PVT. LTD.

E. Janaki
Authorised Signatory

E.JANAKI
Asst. Quality Manager

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Issued To :

Mr.Nityanand Jayaraman

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Date of report : 14/07/2017

Received on : 10/07/2017

Commenced on : 10 /07/2017

Completed on : 14/07/2017

Report Number : 17070069.06

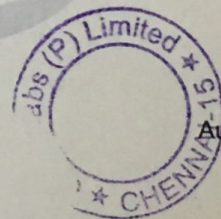
Sample Description : Soil Sample

Sample Identification : TS 1 - Core 15 CM

S.No	Parameters	Protocol	Unit	Result
1	Total Petroleum Hydrocarbons	NWTPH-HCID- CVR/SOP/ENVI-91	ppm	1760

*****END OF REPORT *****

f. jayaraman
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Date of report : 14/07/2017

Received on : 10/07/2017

Commenced on : 10 /07/2017

Completed on : 14/07/2017

Report Number : 17070069.07

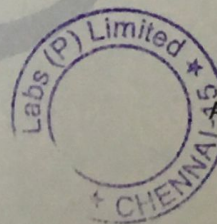
Sample Description : Soil Sample

Sample Identification : TS 2 - Surface Soil

S.No	Parameters	Protocol	Unit	Result
1	Total Petroleum Hydrocarbons	NWTPH-HCID- CVR/SOP/ENVI-91	ppm	2983

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Date of report : 14/07/2017

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Commenced on : 10 /07/2017

Completed on : 14/07/2017

Report Number : 17070069.05

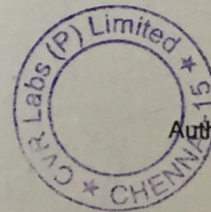
Sample Description : Soil Sample

Sample Identification : KS 1 - Hand Pump

S.No	Parameters	Protocol	Unit	Result
1	Total Petroleum Hydrocarbons	NWTPH-HCID- CVR/SOP/ENVI-91	ppm	438

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f. farsheg
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Date of report : 14/07/2017

Received on : 10/07/2017

Commenced on : 10 /07/2017

Completed on : 14/07/2017

Report Number : 17070069.04

Sample Description : Water Sample

Sample Identification : NW 1 - Hand Pump

S.No	Parameters	Protocol	Unit	Result	Specification as Per IS 10500-2012	
					Acceptable limit	Permissible limit *
1	Appearance after Filtration	By Visual Examination	-	Clear	NA	NA
2	Colour, Max	IS 3025 (Part - 4):1983 (Reaff.2012)	Hazen (True Colour)	40	5	15
3	Odour	IS 3025 (Part-5):1983 (Reaff.2006)	-	disagreeable	Agreeable	Agreeable
4	pH @ 25°C	IS 3025 (Part-11):1983 (Reaff.2006)	-	7.25	6.5-8.5	No relaxation
5	Taste	IS 3025 (Part-8):1984 (Reaff.2006)	-	Disagreeable	Agreeable	Agreeable
6	Turbidity, Max	IS 3025 (Part-10) : 1984 (Reaff. 2006)	NTU	217	1	5
7	Conductivity@ 25 ° C	IS 3025 (Part -14):1984(Reaff.2006)	µmhos/cm	2850	NA	NA
8	Total dissolved solids @ 180°C, Max	IS 3025 (Part-16):1984 (Reaff.2006)	mg/L	1570	500	2000
9	Total Hardness as CaCO ₃ , Max	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	505	200	600
10	Carbonate Hardness as CaCO ₃	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	439	NA	NA
11	Non Carbonate Hardness as CaCO ₃	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	66	NA	NA
12	Phenolphthalein Alkalinity as CaCO ₃	IS 3025 (Part-23):1986 (Reaff.2003)	mg/L		NA	NA

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CIN NO: U 74140TN1999PTC043582

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TEST REPORT

17070069.04

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S.No	Parameters	Protocol	Unit	Result	Specification as Per IS 10500-2012	
					Acceptable limit	Permissible limit *
13	Methyl orange Alkalinity as CaCO ₃ , Max	IS 3025 (Part-23):1986 (Reaff.2003)	mg/L	439	200	600
14	Calcium as Ca, Max	IS 3025 (Part-40):1991 (Reaff.2003)	mg/L	117	75	200
15	Magnesium as Mg, Max	IS 3025 (Part-46):1994 (Reaff.2003)	mg/L	51	30	100
16	Chloride as Cl, Max	IS 3025 (Part - 32):1988 (Reaff.2009)	mg/L	461	250	1000
17	Sulphate as SO ₄ , Max	IS 3025 (Part-24):1986 (Reaff.2009)	mg/L	142	200	400
18	Iron as Fe, Max	IS 3025 (Part-53):2003 (Reaff.2009)	mg/L	11.2	0.3	No relaxation
19	Total Silica as SiO ₂	IS 3025 (Part-35):1988	mg/L	16.4	NA	NA
20	Mineral Oil	IS 3025 (Part-39):1991	mg/L	0.2	-	-
21	Total Organic Carbon	APHA 22nd EDI: 2012	mg/L	6	-	-
22	Oil & Grease @ 105°C	IS 3025 (Part-39):1991	mg/L	1	-	-
23	Total Petroleum Hydrocarbons	NWTPH-HCID-CVR/SOP/ENVI-91	mg/L	BDL (DL:0.5mg/l)	-	-

BDL :Below Detection Limit; DL : Detection Limit NA - Not Applicable

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Page:1 of 2

Issued To :

Mr.Nityanand Jayaraman

No.92,3rd Cross Street,Thiruvalluvar Nagar,

Besant Nagar,Chennai - 600090.

Date of report : 14/07/2017

Received on : 10/07/2017

Commenced on : 10 /07/2017

Completed on : 14/07/2017

Report Number : 17070069.03

Sample Description : Water Sample

Sample Identification : KW 3 - Surface Water

S.No	Parameters	Protocol	Unit	Result	Specification as Per IS 10500-2012	
					Acceptable limit	Permissible limit *
1	Appearance after Filtration	By Visual Examination	-	Clear	NA	NA
2	Colour, Max	IS 3025 (Part - 4):1983 (Reaff.2012)	Hazen (True Colour)	60	5	15
3	Odour	IS 3025 (Part-5):1983 (Reaff.2006)	-	Disagreeable	Agreeable	Agreeable
4	pH @ 25°C	IS 3025 (Part-11):1983 (Reaff.2006)	-	7.69	6.5-8.5	No relaxation
5	Taste	IS 3025 (Part-8):1984 (Reaff.2006)	-	Disagreeable	Agreeable	Agreeable
6	Turbidity, Max	IS 3025 (Part-10) : 1984 (Reaff. 2006)	NTU	107	1	5
7	Conductivity@ 25 ° C	IS 3025 (Part -14):1984(Reaff.2006)	µmhos/cm	1262	NA	NA
8	Total dissolved solids @ 180°C, Max	IS 3025 (Part-16):1984 (Reaff.2006)	mg/L	725	500	2000
9	Total Hardness as CaCO ₃ , Max	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	212	200	600
10	Carbonate Hardness as CaCO ₃	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	158	NA	NA
11	Non Carbonate Hardness as CaCO ₃	IS 3025 (Part-21):1983 (Reaff.2006)	mg/L	54	NA	NA
12	Phenolphthalein Alkalinity as CaCO ₃	IS 3025 (Part-23):1986 (Reaff.2003)	mg/L	Nil	NA	NA

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TEST REPORT

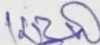
17070069.03

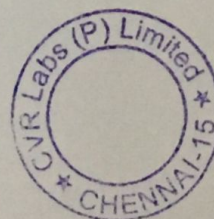
Page:2 of 2

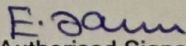
S.No	Parameters	Protocol	Unit	Result	Specification as Per IS 10500-2012	
					Acceptable limit	Permissible limit *
13	Methyl orange Alkalinity as CaCO ₃ , Max	IS 3025 (Part-23):1986 (Reaff.2003)	mg/L	158	200	600
14	Calcium as Ca, Max	IS 3025 (Part-40):1991 (Reaff.2003)	mg/L	65	75	200
15	Magnesium as Mg, Max	IS 3025 (Part-46):1994(Reaff.2003)	mg/L	12	30	100
16	Chloride as Cl, Max	IS 3025 (Part - 32):1988 (Reaff.2009)	mg/L	213	250	1000
17	Sulphate as SO ₄ , Max	IS 3025 (Part-24):1986 (Reaff.2009)	mg/L	97	200	400
18	Iron as Fe, Max	IS 3025 (Part-53):2003 (Reaff.2009)	mg/L	4.8	0.3	No relaxation
19	Total Silica as SiO ₂	IS 3025 (Part-35):1988	mg/L	5.0	NA	NA
20	Mineral Oil	IS 3025 (Part-39):1991	mg/L	0.3	-	-
21	Total Organic Carbon	APHA 22nd EDI: 2012	mg/L	49	-	-
22	Oil & Grease @ 105°C	IS 3025 (Part-39):1991	mg/L	1.5	-	-
23	Total Petroleum Hydrocarbons	NWTPH-HCID-CVR/SOP/ENVI-91	mg/L	2.40	-	-

BDL :Below Detection Limit; DL : Detection Limit NA - Not Applicable

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