

# **Report on the Storm Water Sample taken by the SACEM from the Local Canal in the Region**

**Compiled by  
SIPCOT Area Community Environmental Monitoring (SACEM)**

**September 2010**  
**[www.sipcotcuddalore.com](http://www.sipcotcuddalore.com)**



## The Incident:

On 25 August 2010 at about 9.30 am, residents of villages in and around SIPCOT Cuddalore noticed yellow colour water with strong ammonia like odour at the canal opposite the Kudikadu Bus Stop. This canal is meant to drain the storm water from the SIPCOT units. It had been raining for the last few days and there was quite a bit of water that had collected in the canal. The canal runs parallel to NH45A or the East Coast Road from Tagros in the north of the SIPCOT Complex to Sangolikuppam village in the South. At Sangolikuppam village this canal meets the east-flowing Pillukuthu canal which drains into river Uppanar.

At the time of the incident, trained monitors from SIPCOT Area Community Environmental Monitoring (SACEM) group reported a strong odour from the effluent near the Kudikadu bus stop. The monitors ranked the odour at 8 on a scale of 1 to 10. They reported that the odour was accompanied by an eye burning sensation. Following the canal further towards the South, SACEM found black effluent with an oily layer and an acidic fruity odour near the petrol pump at Kudikadu. The water caused an itching sensation when touched. The source of the effluent was traceable up to the open canal opposite TASMAL, and downstream of Shasun Chemicals. A visual survey by the monitors revealed that storm water drains and canals fed by such drains from other industries were free of visible pollution.

These effluents were found downstream of TANFAC, Clariant and Shasun.. In the absence of a monitoring mechanism, it is difficult to ascertain the exact source of the effluents.

SIPCOT residents, in the past have pointed out several such incidents of illegal effluent discharge to the Tamil Nadu Pollution Control Board (TNPCB) and yet these incidents continue to be repeated. Between October 2004 and August 2010 at least 32 incidents of effluent discharge on the land have been documented and reported to the TNPCB<sup>i</sup>. Angered by the continuous apathy of the TNPCB and in the light of this fresh violation, SIPCOT residents, mostly from Sangolikuppam village blocked the National Highway as a mark of protest.

Local police was the first to intervene at site to end the blockade but people refused to give in to the pressure and demanded immediate action on the units responsible. Later the Village Administrative Officer (VAO), Tehsildar and the District Environment Engineer (DEE) of TNPCB intervened in the matter. There was the usual back and forth between the police, VAO and DEE on the question of role of their department in such circumstances. While the VAO and police were eager to remove the blockade they were not so forthcoming on taking action on the errant units. The negotiations between the villagers and the government representatives went on for about three hours and finally the blockade was removed upon assurance from DEE that:

- 1) the effluent would be cleaned up immediately,
- 2) sample would be taken to ascertain the contaminants,
- 3) adequate action would be taken on the units responsible.

Guided by SACEM volunteers, the DEE took three liquid samples. See map attached for locations. SACEM took parallel samples of water from the two locations of the three where the Board had taken its samples. Samples were taken between 12.40 pm and 1.15 pm in white plastic bottles supplied by TNPCB. Samples were labelled "Mark 1" and "Mark 2" without revealing location. The labeled samples were stored at room temperature and handed over to M/s Sargam Laboratory Pvt. Ltd in Chennai at 11.30 am . Analysis for effluent parameters was commissioned. These parameters include:

pH at 25<sup>0</sup>C  
Total Dissolved Solids  
Total Suspended Solids  
Chlorides as Cl-  
Sulphates as SO4--  
Oil & Grease

BOD (3 days /27°C)  
COD

**Sample Results:**

Despite assurances that sample results will be shared, the TNPCB has not yet released the results. This is consistent with the Board's non-transparent functioning. Results from Sargam Laboratory was obtained on 6 September 2010.

**Results of Analysis** (see full report in Annexure 1):

**Sample “Mark 1”:** Taken from Canal on the West across the ECR at the Sangolikuppam Bus Stop:

Parameters	Results*	Permissible Limit As per TNPCB (For ETP Outlet) (Max.)	Number of times the results were above limits	Description of Procedure adopted by the Lab:APHA 21st Edition 2005
pH at 25°C	7.12	5.5 - 9	Within Limits	4500 H <sup>+</sup> A, B
Total Dissolved Solids	1580	2100	Within Limits	2540 C
Total Suspended Solids	98	100	Within Limits	2540 D
Chlorides as Cl-	470	1000	Within Limits	4500 Cl- B
Sulphates as SO <sub>4</sub> —	149	1000	Within Limits	4500 SO <sub>4</sub> <sup>2-</sup> E
Oil & Grease	32	10	<b>3.2 times above Limits</b>	5520 O&G B
BOD (3 days /27°C)	68	30	<b>2.26 times above Limits</b>	IS 3025 1993 R.2003 P. 44
COD	248	250	Within Limits	5220 C

\*Results expressed in mg/l. except pH

**Sample”Mark 2”:** Taken at the Canal near the Service Road at the TASMAL Godown at Kudikadu Village

Parameters	Results*	Permissible Limit As per TNPCB (For ETP Outlet) (Max.)	Number of times the results were above limits	Description of Procedure adopted by the Lab:APHA 21st Edition 2005
pH at 25°C	8.35	5.5 - 9	Within Limits	4500 H <sup>+</sup> A, B
Total Dissolved Solids	6018	2100	<b>2.86 times above Limits</b>	2540 C
Total Suspended Solids	248	100	<b>2.48 times above Limits</b>	2540 D
Chlorides as Cl-	1125	1000	<b>1.125 times above Limits</b>	4500 Cl- B
Sulphates as SO <sub>4</sub> —	474	1000	Within Limits	4500 SO <sub>4</sub> <sup>2-</sup> E
Oil & Grease	99	10	<b>9.9 times above Limits</b>	5520 O&G B
BOD (3 days /27°C)	160	30	<b>5.3 times above Limits</b>	IS 3025 1993 R.2003 P. 44
COD	156160	250	<b>624.6 times above Limits</b>	5220 C

\*Results expressed in mg/l. except pH

**Interpretation of the Results:**

Both samples do not meet the standards for Oil & Grease and Biological Oxygen Demand (BOD). The sample from Kudikadu village fails to meet the standards for Total Suspended Solids (TSS), Total

Dissolved Solids (TDS), Chlorides and Chemical Oxygen Demand (COD).

**What is the relevance of these parameters:**

1. **Total Suspended Solids (TSS):** Total Suspended Solids (TSS) are solids in water that can be trapped by filter. The discharge of excessive levels of TSS can cause ecologically harmful high levels of turbidity. If water becomes too turbid, it loses the ability to support a wide variety of plants and other aquatic organisms. The decrease in water clarity can affect the ability of a fish to see and catch food. Suspended sediments can also clog fish gills, reduce growth rates, decrease resistance to diseases and thus result in fish kills. It is also known that in water bodies "high turbidity levels can reduce the amount of light reaching lower depths, which can inhibit growth of submerged aquatic plants and consequently affect species which are dependent on them, such as fish and shellfish."<sup>ii</sup>

Water quality standards for turbidity are often expressed as a limit on the percent increase over natural or background levels of turbidity in the water body receiving the discharge. For example, the U.S. EPA recommends that: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."<sup>iii</sup>

2. **Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD):** The discharge of excessive levels of BOD or COD can cause ecologically harmful low levels of dissolved oxygen.

Dissolved oxygen (DO) refers to the volume of oxygen that is contained in water. Oxygen enters the water by photosynthesis of aquatic plants and by the transfer of oxygen across the air-water interface. The amount of oxygen that can be held by the water depends on the water temperature, salinity, and pressure. DO increases with decreasing temperature, with decreasing salinity (i.e. freshwater holds more oxygen than does saltwater). The introduction of excess organic matter may result in a depletion of oxygen from an aquatic system. Prolonged exposure to low dissolved oxygen levels may not directly kill an organism, but will increase its susceptibility to other environmental stresses. Exposure to very low levels for over four days may kill most of the vegetation in a system.

It has been noted that, "(low dissolved oxygen) is a significant problem for coastal waters that receive a lot of runoff that contain nutrients (for example, nitrogen and phosphorous and other oxygen-demanding biological wastes). Excessive nutrients in aquatic systems stimulate algal growth, which in turn uses up the oxygen needed to maintain healthy fish and shellfish populations."<sup>iv</sup>

Water quality standards for dissolved oxygen levels in marine waters are usually expressed as the minimum level of dissolved oxygen necessary to support adult and/or larval populations of marine life. The exact numeric standard for dissolved oxygen is site-specific, but is never less than 2.3 milligrams of dissolved oxygen per liter.<sup>v</sup>

3. **Oil & Grease:** According to the New South Wales Department of Environment and Conservation: "Oil and grease in effluent can block irrigation systems, and more importantly block soil pores subsequently causing anaerobic conditions in the soil which will both reduce plant growth and potentially create odours. The rate of decomposition of oil and grease depends on soil and climatic conditions as well as the nature of the oil/grease product. Well-aerated soils in warm humid climates maximise the break down of oil and grease."<sup>vi</sup>

According to Dr. Mark Chernaik, Staff Scientist at Environment Law Alliance Worldwide, US: "These high levels of oil & grease also raise concerns about levels of toxic constituents that may be present, but were not specifically tested for. That is, the oil and grease levels are so high as to warrant further of testing of water in these canals for specific, toxic organic components.

For example, toluene is a common organic solvent likely to be used by several industries within the SIPCOT industrial complex. Toluene, when discharged to water, would partition into the oil & grease fraction. According to the Canadian Water Quality Guidelines for the Protection of Agricultural Water Use, water used for livestock watering should not contain more than 0.024 mg/L of toluene.<sup>vii</sup>

If less than 0.1% of the oil & grease fraction of the two water samples consisted of toluene, then these samples would contain toluene levels that would render such water unfit for use for livestock watering.”

**4. Total Dissolved Solids:** Total Dissolved Solids (TDS) are solids in water that can pass through a filter. TDS is a measure of amount of materials dissolved in water. The extreme levels of TDS in water adversely affect the aquatic life. High TDS concentration may also reduce the water clarity, contribute to a decrease in photosynthesis, combine with toxic compounds and heavy metals, and lead to an increase in water temperature.

**Follow up action of the TNPCB:**

The TNPCB has not published the results of analysis of the samples collected at the spot at the time of the incident. It has failed to keep its promise of an immediate clean up and remediation of the contaminated sites. The contaminated water was left behind for days. On 30 August 2010, TNPCB officials called for a meeting in SIPCOT Project Office of some of the residents from Sangolikuppam and announced that the effluent was discharged by Shasun Chemicals & Drugs Ltd. The Results of Analysis, though, was not shared. Instead of detailing the action taken by the Board on the unit as per the provisions of the Water Act and Environmental Protection Act, the TNPCB played the role of a go-between and asked the residents for their demands from the unit. The residents demanded a clean up of the site and provision of clean drinking water to the village. Later that day, three tankers were seen collecting water from the canal and taking it within the premises of Shasun Chemicals. Water only from certain areas of the canal was collected. Overall cleanup is still pending. Supply of clean drinking water from the company stopped within a week of the meeting.

**Follow up action by the police:**

When the police arrived on the spot of the road blockade on the 25<sup>th</sup> August, the residents explained to them their complaint and the history of inaction. As usual, police officials professed helplessness as the matter was the mandate of the TNPCB. Moreover since police officials explained that their only mandate was to restore law and order in the region, they wanted the blockade to be removed. Local residents at this point highlighted the various sections under the Indian Penal Code (IPC) that authorises the police to register cases for environmental crimes (please refer to Annexure 2 for complete lists of sections under IPC to guarantee environmental protection). However, the police restricted its role to removing the blockade without resolving the issue. Even worse, the police filed an FIR (first information report) naming 72 persons, including women, who had participated in the road blockade. No FIR was filed against the polluters.

**What ought to have been done?**

**By the Police:**

The local police should have registered a FIR under Sections 277, 278 and 284 of the Indian Penal Code (See Annexure 2 for details on these Sections) against the SIPCOT units. It should have then accompanied the TNPCB officials for samples, and based on the results and analysis of Board identified the unit responsible for the discharge of effluents into the public canal and taken action as per the law.

**By the District Administration:**

The District Administration should have ensured that the police took appropriate action on the errant units that caused the problem and should have protected its citizens from being victimised by the

police. It should have shared the results of the sample results taken by the TNPCB with the local public and taken measures appropriate to build confidence in the general public about their health and safety.

**By the TNPCB:**

The TNPCB should have had the site of contamination immediately cordoned off and cleaned up in a scientific manner. It should have shared the results of analysis with residents as a part of report back to the communities. The Environment Protection Act and the Water Act mandatorily require the TNPCB to issue show-cause notice and initiate prosecution for willful violation of the laws. Also, the TNPCB ought to have conducted a root-cause analysis with a view to making recommendations to ensure that such incidents are not repeated in the future. This rather than the public relations role as a broker of peace between a polluter and its victims ought to have been the course of action followed by TNPCB.

**Demands:**

Based on the sequence of events listed above and the results of the effluents found in the samples taken by the community members, we demand:

1. Disclosure of sample results taken by the TNPCB.
2. Action on the errant unit by the TNPCB as prescribed by the EP Act and Water Act, including prosecution of the Directors of the errant unit by the TNPCB .
3. Immediate withdrawal of the FIR lodged against the residents of Sangolikuppam for protesting violations of SIPCOT industries.
4. The local police should register a fresh FIR on the unit responsible for the contamination and follow the due course of law.

# ANNEXURE 1

## Report given by SARGAM LABORATORY PVT LTD of the effluent samples taken by the SIPCOT Residents

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Issued to:

M/s. Community Environmental Monitoring  
H-31/39 Asthalakshmi Gardens  
Besant Nagar  
Chennai 600 090.

**Report Number: 950217**

Report date : 06.09.2010

Page : 1 of 1

Sample Description : Effluent Water – Mark – 1

Received on : 27.08.2010

Sample drawn by : Customer

Commenced on : 27.08.2010

Customer's Reference : Letter dated Nil.

Completed on : 06.09.2010

PARAMETERS	RESULTS	Permissible Limit As per TNPCB (For ETP Outlet) (Max.)	PROCEDURE :APHA 21st Edition 2005
pH at 25°C	7.12	5.5 - 9	4500 H <sup>+</sup> A, B
Total Dissolved Solids	1580	2100	2540 C
Total Suspended Solids	98	100	2540 D
Chlorides as Cl <sup>-</sup>	470	1000	4500 Cl <sup>-</sup> B
Sulphates as SO <sub>4</sub> <sup>—</sup>	149	1000	4500 SO <sub>4</sub> <sup>2-</sup> E
Oil & Grease	32	10	5520 O&G B
BOD (3 days /27°C)	68	30	IS 3025 1993 R.2003 P. 44
COD	248	250	5220 C

Results expressed in mg/l. except pH

**Opinion** – The above sample does not meet the requirement of TNPCB Limits with respect to the parameters Oil & Grease & BOD.

..... End .....

**Issued to:**

M/s. Community Environmental Monitoring  
H-31/39 Asthalakshmi Gardens  
Besant Nagar  
Chennai 600 090.

**Report Number: 950218**

Report date : 06.09.2010

Page : 1 of 1

Sample Description : Effluent Water – Mark – 2

Received on : 27.08.2010

Sample drawn by : Customer

Commenced on : 27.08.2010

Customer's Reference : Letter dated Nil.

Completed on : 06.09.2010

PARAMETERS	RESULTS	Permissible Limit As per TNPCB (For ETP Outlet) (Max.)	PROCEDURE :APHA 21st Edition 2005
pH at 25°C	8.35	5.5 - 9	4500 H <sup>+</sup> A, B
Total Dissolved Solids	6018	2100	2540 C
Total Suspended Solids	248	100	2540 D
Chlorides as Cl-	1125	1000	4500 Cl- B
Sulphates as SO <sub>4</sub> —	474	1000	4500 SO <sub>4</sub> <sup>2-</sup> E
Oil & Grease	99	10	5520 O&G B
BOD (3 days /27°C)	160	30	IS 3025 1993 R.2003 P. 44
COD	156160	250	5220 C

Results expressed in mg/l. except pH

**Opinion** – The above sample does not meet the requirement of TNPCB Limits with respect to the parameters TDS, TSS, Chloride, Oil&Grease, BOD & COD.

## ANNEXURE 2

### Relevant Sections under the Indian Penal Code that Apply to Situations of Pollution in Our Community

**a) Section 277 - Fouling water of public spring or reservoir:**

Description: *Whoever voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used, shall be punished with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five hundred rupees, or with both.*

**b) Section 284 - Negligent conduct with respect to poisonous substance:**

Description: *Whoever does, with any poisonous substance, any act in a manner so rash or negligent as to endanger human life, or to be likely to cause hurt or injury to any person, or knowingly or negligently omits to take such order with any poisonous substance in his possession as is sufficient to guard against any probable danger to human life from such poisonous substance, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both.*

**c) Section 278 - Making atmosphere noxious to health:**

Description: *Whoever voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhood or passing along a public way, shall be punished with fine which may extend to five hundred rupees.*

When any of the above case causes death of a person or many persons then death due to negligence, complaint under sec 304-A of the IPC may be used in addition to these provisions.

**d) Section 304-A – Causing death by negligence:**

Description: *Whoever causes the death of any person by doing any rash or negligent act not amounting to culpable homicide, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both.*

- i [http://www.sipcotcuddalore.com/downloads/incident\\_compilation\\_cuddalore.pdf](http://www.sipcotcuddalore.com/downloads/incident_compilation_cuddalore.pdf)  
Scorecard on Environment and Safety in SIPCOT, Cuddalore, January to December 2007  
[http://www.sipcotcuddalore.com/downloads/sipcot\\_environmental\\_scorecard\\_2007.pdf](http://www.sipcotcuddalore.com/downloads/sipcot_environmental_scorecard_2007.pdf)
- ii <http://en.wikipedia.org/wiki/Turbidity>
- iii See: U.S. EPA (1986) "Quality criteria for water": <http://www.epa.gov/waterscience/criteria/library/goldbook.pdf>
- iv See: <http://www.epa.gov/waterscience/criteria/dissolved/dofacts.html>
- v See: Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Saltwater): Cape Cod to Cape Hatteras  
<http://www.epa.gov/waterscience/criteria/dissolved/docriteria.pdf>
- vi See: Environmental Guidelines Use of Effluent by Irrigation  
<http://www.environment.nsw.gov.au/resources/water/effguide.pdf>
- vii See: <http://cegg-rcqe.ccme.ca/download/en/132>