

CUSECS: Solution or Pollution?

**An analysis of the quality of effluent discharged by Cuddalore
SIPCOT Industries Common Utilities Ltd into the ocean**

**Prepared by:
SIPCOT Area Community Environmental Monitoring, Cuddalore**

August 2010

www.sipcotcuddalore.com

Executive Summary:

Cuddalore SIPCOT Industries Common Utilities Ltd. (CUSECS) has been operating in SIPCOT Industrial Complex, Cuddalore since 2001. The facility is completely illegal and continues to operate without the mandatory licenses under the Environment Protection (EP) Act. The unit merely has a NOC from the Tamil Nadu Pollution Control Board (TNPCB) and is yet to obtain a Consent to Establish and Consent to Operate under the Air and Water Acts. Even the CRZ clearance for the unit was obtained post facto in 2005.

The unit is discharging effluent in the ocean in violation of the standards prescribed under the EP Act and the Central Pollution Control Board (CPCB). Information obtained under the Right to Information Act, 2005, by the TNPCB reveal the violation in the effluent discharge standards. According to the information:

1. The TNPCB took 19 samples at the effluent outfall of CUSECS sump VI between January to June 2010.
2. Results of analyses of these effluent samples indicate that ALL nineteen samples taken during that period violated one or more standards.
3. Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), Sulfide, and Ammonia in most of the analysis are above prescribed limits as per the General Standards of Discharge of Environmental Pollutants, Marine and Coastal Areas as per the Central Pollution Control Board.
4. Out of the 19 samples taken: Total Suspended Solids was above prescribed standards in 18 samples, Sulfide in 17, COD in 16, Ammonia in 15, BOD in 7, Total Nitrogen in 5 and pH in one sample.
5. The quantity of TSS in the effluents discharged is "particularly egregious" because it exceeds permissible limits by more than 10 times in the month of January 2010.
6. At least 5 show cause notices served on the unit since 2000 for violations of effluent standards.
7. Since 2004 there have been at least 15 documented incidents of effluent leak from CUSECS on land or in the river

Background of CUSECS:

The infrastructure for effluent collection and disposal in the SIPCOT industrial complex was commissioned in 2001, 19 years after the complex was established. Cuddalore SIPCOT Industries Common Utilities Ltd. (CUSECS) is the *collection and forwarding* system for allegedly “*treated effluent*” from industries in SIPCOT. The effluent is forwarded through through a network of pipelines and sumps to the sea off the coast of Rasapettai village. Setting up CUSECS was seen as a respite for the River Uppanar which until then had received untreated effluents from SIPCOT units. The increasing pollution levels of the river raised an alarm and eventually led the Tamil Nadu Pollution Control Board (TNPCB) to force the SIPCOT units to set up a system to discharge the effluents into the sea.

Initially 19 industries registered as members of CUSECS; currently, only 8 industries are members. They are:

M/s Arkema Peroxides Ltd

M/s Aurobindo Pharma Ltd

M/s Bayer Material Sciences Pvt Ltd

M/s Loyal Super Fabrics

M/s Pandian Chemicals Ltd

M/s Pioneer Jellice India Pvt Ltd

M/s SPIC Pharmaceuticals Ltd

M/s TANFAC Industries Ltd

According to TNPCB, some industries terminated their membership with CUSECS after achieving “zero discharge” or setting up independent mechanisms to dispose their effluents to the sea.

Illegal Facility

CUSECS is totally illegal. Construction was completed in 2000 without obtaining the mandatory Consent to Establish under Air and Water Acts from the Tamilnadu Pollution Control Board. The CUSECS Sump 6 was set up within CRZ 1 area despite the fact that as a collection and forwarding tank, it does not need to be located in the CRZ area. CRZ clearance was not obtained until November 2005, despite the fact that the law does not permit post-facto clearance. Till date, the unit functions without the requisite license – Consent to Operate – from the TNPCB under Air and Water Acts.

At least 5 show-cause notices have been issued by the TNPCB on the unit since 2000, for its failure to adhere to effluent standards prescribed by the Board. However, no further punitive action has been taken for consistent violation of effluent norms. Neither has the TNPCB chosen to address the more serious violation wherein the entire unit is constructed, located and functioning without the mandatory licenses under Air and Water Acts.

Illegality of CUSECS

- Operating since 2000 on a mere NOC from TNPCB
- No Consent to Establish till date
- No Consent to Operate till date
- CRZ clearance obtained post facto in November 2005
- At least 5 show cause notices served on the unit since 2000 for violations of effluent standards
- Since 2004 there have been at least 15 documented incidents of effluent leak from CUSECS on land or in the river

According to CUSECS, only pre-treated effluents are sent to the sea. The post-facto CRZ Clearance issued by the Ministry of Environment & Forests requires the TNPCB to monitor effluent quality at the discharge point at sea once in two days. Additionally, it requires the regular testing of treated effluents before they are pumped to sea to ensure that they are within norms.

However, according to a compliance monitoring report of 2008 (Letter No: EP/12.1/467/TN Dated 5 December 2008) of the Ministry of Environment & Forests, TNPCB monitors effluent quality at the discharge point only once in three months. Documents obtained under the Right to Information Act, 2005 about the sample analysis results at the outlet of CUSECS sump VI (i.e. the effluent that is finally discharged into the sea) reveal several serious violations of the prescribed limits set by the Central Pollution Control Board under the Indian Law.

There is no formal monitoring and regulatory regime governing CUSECS. Because the illegal facility is functioning with the tacit consent of the TNPCB, the TNPCB is unable to exercise any legal hold over it. Regulation is entirely voluntary. According to CUSECS, it routinely monitors the influent and when it receives inadequately treated effluents, it alerts the errant industry and urges them to set right the treatment process in future. The regulator plays no role in addressing the violation beyond issuing token warnings to the polluter.

Ministry of Environment and Forest's report on CUSECS compliance condition:

On 1.12.2008 the representatives of Ministry of Environment and Forests, CUSECS authorities and member industries inspected the CUSECS system in SIPCOT Cuddalore to check for its compliance status. Report prepared by the Ministry official concluded:

“Though the project authorities have established the system and working, the Consent for Operation has not been issued by TNPCB, Digital magnetic flow meters are not working in some pipelines and also six monthly reports are not being submitted to RO. In view of these the compliance is unsatisfactory and the monitoring report is herewith submitted for kind information, and necessary action, please.”

Compliance Status of CRZ Clearance conditions issued by the MoEF:

S No.	Condition	Comments by MoEF official after the inspection in 2008	Community Comment
1.	The facilities constructed for the project will not cause any inconvenience or disturbance to local communities including the fisherman.	As stated by the project authorities the pipeline (HDPE) is buried up to the sea and no inconveniences caused to the local communities including fishermen.	--
2.	Periodic monitoring (once in 2 days) of the water at the discharge point should be carried out to ensure that the effluent discharges are within the norms laid down by the Tamil Nadu State Pollution Control Board. The above analysis report should be submitted to TN State Pollution Control Board for necessary action.	The periodic monitoring once in three months at the diffuser point in the sea is carried out by TNPCB as against once in 2 days. The project authorities stated that monitoring once in 2 days at the diffuser point is highly impossible and because of this the monitoring work is assigned to TNPCB to monitor once in 3 months.	Condition not complied with.
3.	The project proponent should ensure that no leakage or discharge of effluents takes place in Uppanar river.	No leakage found so far	Between 2004-2009, at least 15 separate incidents of effluent spills from CUSECS pipeline on land, village canals and Uppanar river have been documented and reported to TNPCB.

4.	Any change in alignment or expansion of the project should be taken up only after obtaining necessary approval from the concerned authorities.	The project authorities stated that there is no change in the alignment.	--
5.	Six monthly status report including effluent quality data etc must be submitted to Ministry's Regional Office at Bangalore.	The project authorities have not submitted the six monthly reports to RO so far.	Not Complied. Not a single six monthly report had been filed at RO from the time the CRZ clearance was granted in November 2005 till December 2008.

CUSECS is a repeat offender. Even if one were to set aside the fact that this is a wholly illegal facility, CUSECS' environmental track record is poor contrary to its claims, the company discharges untreated effluents into the sea. Documents obtained under the Right to Information Act, 2005 about the sample analysis results at the outlet of CUSECS sump VI (i.e. the effluent that is finally discharged into the sea) reveal several serious violations of the prescribed limits set by the Central Pollution Control Board under the Indian Law.

According to the data obtained:

1. The TNPCB took 19 samples at the effluent outfall of CUSECS sump VI between January to June 2010.
2. Results of analyses of these effluent samples indicate that ALL nineteen samples taken during that period violated one or more standards.
3. Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), Sulfide, and Ammonia in most of the analysis are above prescribed limits as per the General Standards of Discharge of Environmental Pollutants, Marine and Coastal Areas as per the Central Pollution Control Board.
4. Out of the 19 samples taken: Total Suspended Solids was above prescribed standards in 18 samples, Sulfide in 17, COD in 16, Ammonia in 15, BOD in 7, Total Nitrogen in 5 and pH in one sample.
5. The quantity of TSS in the effluents discharged is "particularly egregious" because it exceeds permissible limits by more than 10 times in the month of January 2010.

Some of the key results of the analyses is presented in the table below:
(to see the full table please refer to Annexure 1)

Sample Date	Sample Location	Parameter, in mg/L											
		pH	TSS	TDS	Chloride	Sulphate	Oil & grease	BOD	COD	Sulfide	Ammonia	Phosphate	Total N
4-Jan-2010	Outlet of CUSECS Sump - VI	6.98	212	2484	865	225	2.8	65	397	8	417	0.6	504
13-Jan-2010	Outlet of CUSECS Sump - VI	6.17	1348	###	6798	1800	2.4	179	1777	14	74	1.1	89
22-Jan-2010	Outlet of CUSECS Sump - VI	6.33	76	1600	510	289	1.6	53	231	1.6	28	1.1	35
25-Jan-2010	Outlet of CUSECS Sump - VI	6.88	312	3936	1649	429	2	61	351	6	80	1.1	97
4-Feb-2010	Outlet of CUSECS Sump - VI	6.89	268	2732	1000	303	2	62	303	7.2	32	1	39
12-Feb-2010	Outlet of CUSECS Sump - VI	6.77	164	3940	1699	223	2	43	307	1.6	32	0.7	39
18-Feb-2010	Outlet of CUSECS Sump - VI	6.68	324	3816	1225	162	3	163	232	5	19	0.5	24
22-Feb-2010	Outlet of CUSECS Sump - VI	6.46	276	4216	1799	229	4	54	496	6	67	0.6	81
8-Mar-2010	Outlet of CUSECS Sump - VI	6.25	188	3836	1575	232	2	75	380	7	64	1	78
20-Mar-2010	Outlet of CUSECS Sump - VI	6.47	292	4064	1585	749	1	138	368	16	61.6	1	75.6
31-Mar-2010	Outlet of CUSECS Sump - VI	6.46	184	5888	1100	381	2	168	397	12.4	95	1.1	116
6-Apr-2010	Outlet of CUSECS Sump - VI	6.13	144	2404	790	554	4	34	238	14	88	1	107
18-Apr-2010	Outlet of CUSECS Sump - VI	6.48	136	2204	720	228	2.4	75	339	5.2	58.8	0.9	69.4
19-Apr-2010	Outlet of CUSECS Sump - VI	6.55	184	4948	2224	745	3	72	256	6.4	87	0.9	108
26-Apr-2010	Outlet of CUSECS Sump - VI	6.29	148	2796	1270	367	3	108	543	6.8	85	1	103
3-May-2010	Outlet of CUSECS Sump - VI	6.74	148	4848	2024	538	4	78	528	8	65	0.7	79
12-May-2010	Outlet of CUSECS Sump - VI	7.58	244	4872	2024	284	3	100	656	10	66	1	81
21-May-2010	Outlet of CUSECS Sump - VI	5.02	216	4276	1874	72	4	104	400	9	38	0.6	47
26-May-2010	Outlet of CUSECS Sump - VI	6.57	220	4844	2174	374	2	83	301	8	46	0.8	46

Applicable Standards

Item 55 B of Schedule I of the Environment Protection Rules, Treated Effluent Quality of Common Effluent Treatment Plant, discharge into Marine Coastal Areas

5.5 to	100	none	none	none	20	100	none	5	50	none	100
--------	-----	------	------	------	----	-----	------	---	----	------	-----

General Standards for Discharge of Environmental Pollutants, Marine and Coastal Areas

5.5 to	100	none	none	none	20	100	250	5	50	none	100
--------	-----	------	------	------	----	-----	-----	---	----	------	-----

<http://www.cpcb.nic.in/oldwebsite/Environmental%20Standards/Emission/standard32.html>

Implications of the results:

The discharge of excessive levels of TSS, BOD, COD, Ammonia and Nitrate can cause severe damage to the marine ecology, here are some details of the impacts:

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."

<http://en.wikipedia.org/wiki/Turbidity>

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."

See: U.S. EPA (1986) "Quality criteria for water"

<http://www.epa.gov/waterscience/criteria/library/goldbook.pdf>

In India the standards for TSS as prescribed under the Environment Protection Rules and the CPCB are 100 mg/L. According to Dr. Mark Chernaik, Staff Scientist at ELAW US, "it is possible that the discharge by CUSECS of excessive levels of TSS is causing ecologically harmful high levels of turbidity in marine waters in the vicinity of the outfall."

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."

See: <http://www.epa.gov/waterscience/criteria/dissolved/dofacts.html>

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.

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>

In India, the level of BOD prescribed for effluent water to be discharged in marine or coastal area under the Environment Protection rules and CPCB is 100 mg/L. The level of COD as per the CPCB has been prescribed at 250 mg/L.

After analysing the current data of CUSECS Dr. Chernaik notes that it is possible that the discharge by CUSECS of excessive levels of BOD or COD is causing ecologically harmful low levels of dissolved oxygen in marine waters in the vicinity of the outfall.

3. Sulphide: The discharge of excessive levels of hydrogen sulphide can cause ecologically

harmful high levels of hydrogen sulphide in the water. Hydrogen sulphide is directly toxic to fish and aquatic life. The U.S. EPA recommends that marine waters not contain more than 2 micrograms per liter of hydrogen sulphide to prevent acute toxic impacts to fish and aquatic life in marine waters.

See: <http://www.epa.gov/waterscience/criteria/wqctable/index.html>

and

U.S. EPA (1986) "Quality criteria for water"

<http://www.epa.gov/waterscience/criteria/library/goldbook.pdf>

While the prescribed standards of Sulphide in India is 5 mg/L, Sulphide levels in treated effluent by CUSECS are routinely several thousand times the U.S. EPA recommended water quality criterion for sulphide. Dr. Chernaik notes that it is probable that the discharge by CUSECS of excessive levels of hydrogen sulphide is causing ecologically harmful high levels of hydrogen sulphide in marine waters in the vicinity of the outfall.

4. **Nitrate:** Nitrates occur naturally; however the major sources of nitrates in the water include fertilizer, sewage and water runoffs. Elevated levels of these contaminants are linked to two major health problems. In infants, it leads to oxygen deficiency in blood thus causing bluish skin tone. In adults they can form chemicals called nitrosamines that have been linked to cancer. Excess of nitrates in marine ecosystem can adversely affect the flora and fauna. Nitrates are known to increase the algal growth which in turn uses up the oxygen in water required to support marine life.

5. **Ammonia:** The discharge of excessive levels of ammonia can cause ecologically harmful high levels of ammonia in the water. Ammonia is directly toxic to fish and aquatic life. The U.S. EPA recommends that to protect aquatic life, marine waters not contain ammonia in levels determined based on the pH and temperature of the marine water body. In warm, slightly alkaline marine waters, ammonia levels should not exceed a few milligrams per liter or lower.

U.S. EPA (1989) "Ambient Water Quality Criteria for Ammonia (Saltwater)"

<http://www.epa.gov/waterscience/criteria/library/ambientwqc/ammoniasalt1989.pdf>

See Tables 2 and 3 on pages 30 and 31.

Ammonia levels in treated effluent by CUSECS are routinely more than 50 milligrams per liter which is the prescribed standard as per the Environment Protection Rules and CPCB. Having seen the data from CUSECS and the levels of ammonia in it, Dr. Chernaik notes that it is probable that the discharge by CUSECS of excessive levels of ammonia is causing ecologically harmful high levels of ammonia in marine waters in the vicinity of the outfall.

Conclusion and Demands:

It is quite clear from the given data that the quality of effluents discharged by the CUSECS into the sea is in violation of the standards prescribed by Environment Protection Rules and the Central Pollution Control Board. It should be noted that this is not the first time such violations have been noticed in the effluent quality of CUSECS. Data as old as 2005-06 highlighted violations. According to the results of analyses of treated effluent samples from the CUSECS outlet to sea for the months November-December 2005 and January 2006, all five samples taken during that period violated one or more standards. It should also be noted that all the data was obtained by the TNPCB, thus the Board is well aware of years of violations of the CUSECS. Even then no action has been taken on CUSECS for these violations. These results also prove that a

common channel for effluent disposal for a diverse nature of industries makes it more difficult to locate the source of the problem for a lasting solution. Under these circumstances, SACEM demands:

1. Dismantling of CUSECS and constituting industry specific standards and effluent management systems.
2. Legal action on CUSECS for violation of standards of effluent discharge.
3. Prosecution of CUSECS officials for environmental contamination and for operating an illegal unit for the last ten years.
4. Action against errant TNPCB officials for knowingly perpetrating an illegality in the form of an unlicensed construction, unlicensed operation and failure to take action against routine and repeated pollution.