

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
OA. No.95 OF 2018

IN THE MATTER OF:

ARYAVART FOUNDATION

APPLICANT

VERSUS

M/s VAPI GREEN ENVIRO Ltd. & Ors.


RESPONDENTS

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REPORT ON DAMAGE ASSESSMENT OF RIVER DAMANGANGA, COST OF RESTORATION, ACCOUNTABILITY & LIABILITIES OF DEFAULTING INDUSTRIES & CETP, VAPI, GUJARAT

(As per order Hon'ble National Green Tribunal (NGT), Principal Bench, New Delhi in Original Application NO. 95 of 2018 (Aryavart Foundation Vs. M/s. Vapi Green Enviro Ltd. (CETP, Vapi) & Ors)

Prepared By



FOR SUBMISSION TO






**HON'BLE NATIONAL GREEN TRIBUNAL (NGT),
PRINCIPAL BENCH, NEW DELHI**

MAY 2019

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THE COMMITTEE

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Chapter 1:

INTRODUCTION

1.0 BACKGROUND:

Hon'ble National Green Tribunal, Principal Bench, New Delhi passed order on 11.01.2019 in Original Application (OA) NO. 95 of 2018 in the matter of Aryavart Foundation Vs. M/s Vapi Green Enviro Ltd. (CETP, Vapi) & Ors (**Appendix 1**).

The matter was regarding discharge of untreated/partially treated trade effluent by more than 500 industrial units in Vapi industrial cluster into River Damanganga. Bill khadi, a natural drain also receives wastewaters from various sources which joins Kolak river which ultimately meets with the Sea. The river Damanganga carries all the pollution load to the sea near Daman. The impact of discharge is serious threat primarily to the aquatic life in the river as well as sea. The directive is also in response to non-compliance inland surface water discharge standards by the VEGL (CETP).

In the said matter vide order dated 11.01.2019 various committees were constituted for execution of the order in para no. 55. In accordance with one of the order in para no. 55 (i), five member committee was constituted comprising representatives/nominees of Central Pollution Control Board (CPCB), Indian Institute of Management (IIM) Ahmedabad, Indian Institute of Technology (IIT) Gandhinagar, National Environmental Engineering Research Institute (NEERI) Nagpur and Gujarat Pollution Control Board (GPCB) to assess the extent of damage and cost of restoration of the environment and individual accountability & liability of CETP and polluting industrial units.

1.1 THE COMMITTEE:

In accordance to the order of Hon'ble NGT, committee constituted with following members:

Name	Institute
Prof Anish Sugathan	Indian Institute of Management (IIM) Ahmedabad
Prof Chinmay Ghoroi	Indian Institute of Technology (IIT) Gandhinagar
Shri M Karthik	National Environmental Engineering Research Institute (NEERI), Nagpur
Shri B.R. Gajjar	Gujarat Pollution Control Board (GPCB), Regional Office, Vapi
Shri Pratik Bharne	Central Pollution Control Board (CPCB), Regional Directorate (West), Vadodara (Nodal Agency)

1.2 THE TASKS ASSIGNED TO THE COMMITTEE:

The Committee was assigned the following tasks as per the order:

- Assessment of extent of damage and cost of restoration of environment
- Suggestion of steps for restoration of the environment.
- Giving hearing to the CETP operator and the units identified as polluting by the GPCB.
- Assessment of accountability of CETP and individual accountability of polluting industrial units and quantification of the amount of liability on "Polluters Pays Principle".

1.3 APPROACH

The study was conducted with the following activities:

- Visit to CETP and River Damanganga
- Sampling of CETP Vapi and different locations of River Damanganga
- Information/Data collection from CETP operator, GPCB, CPCB, other departments, reference of reports of NEERI, NIO, NGT orders etc
- Hearing to defaulting industrial units and CETP operator
- Meetings and discussions
- Preparation of report

The report is structured on the following contents. The **Chapter 1** discusses about background of the present directive, formation of the Committee, task assigned to the committee and its approach. **Chapter 2** presents details about VAPI Industrial Area including GIDC drainage network, CETP (Vapi Green Enviro Limited) and its performance, Brief information about River Daman ganga and Bill Khadi etc., GIDC drainage network, about CETP treatment scheme and their upgradation plan and status of the disposal pipeline. The **Chapter 3** discuss about the performance of CETP comprising of regular intel - outlet data (from GPCB, CPCB and CETP) and the data of the sample taken during the CETP visit by committee members; Data analysis and overall observation including the excess COD discharged to Daman Ganga over the years. In the **Chapter 4**, we have discussed about the extent of damage in terms of the water quality of the river Damanganga using monitoring data during committee visit and other monitoring data from CPCB and GPCB including the damage to the Arabian sea coast water (beaches). The damage to the river water quality data is presented in terms of physico-chemical and biological characteristics of river water, pesticide residue in river water including the damage to aquatic life. The details about the bio-assay test conducted by CSIR-NEERI also mentioned including the salinity of water due to tidal effect which prevent usage of the river water for the agriculture and drinking purpose. Steps for restoration of the river Damanganga is discussed in **Chapter 5** in terms of responsibility of respective agencies - GIDC, CETP and regulatory authority, local bodies in terms of the short term and long term plan to restore the river. **Chapter 6** describes the cost of restoration (considering discharges to meet the regulatory norms by treating the wastewater domestic as well as industrial).

In **Chapter 7**, the assessment of accountability of defaulting industries and CETP is described along with the liability for environment compensation. The basis for calculating liability/Environmental Compensation (EC) and hearing details of defaulting Industries and CETP is described along with the list of defaulting industries, compensation/liability of individual and CETP also listed in a tabular form. In the last Chapter (**Chapter 8**), committee describes overall conclusion and recommendations.

Chapter 2:

ABOUT THE AREA - GIDC VAPI AND RIVER DAMANGANGA

2.0 VAPI INDUSTRIAL AREA

Vapi is located in south Gujarat. Vapi Industrial Area, developed by Gujarat Industrial Development Corporation (GIDC), came into existence in 1967 – 1968. The estate, developed in phases, now spreads over 1200 hectares. Category and Scale wise breakup of industries under the ambit of GPCB permission is depicted in the table below (**Table 2.1**) and charts (**Figure 2.1** and **2.2**). The majority of the industries of red category (78%) which comprises 522 small industries (83.5%), 41 medium industries (6.5%) and 64 large industries (10%).

Table 2.1: Category and scale wise breakup of industries.

Category	Small	Medium	Large	Total
Red	522	41	64	627
Orange	125	3	1	129
Green	133	1	3	137
Total	780	45	68	893

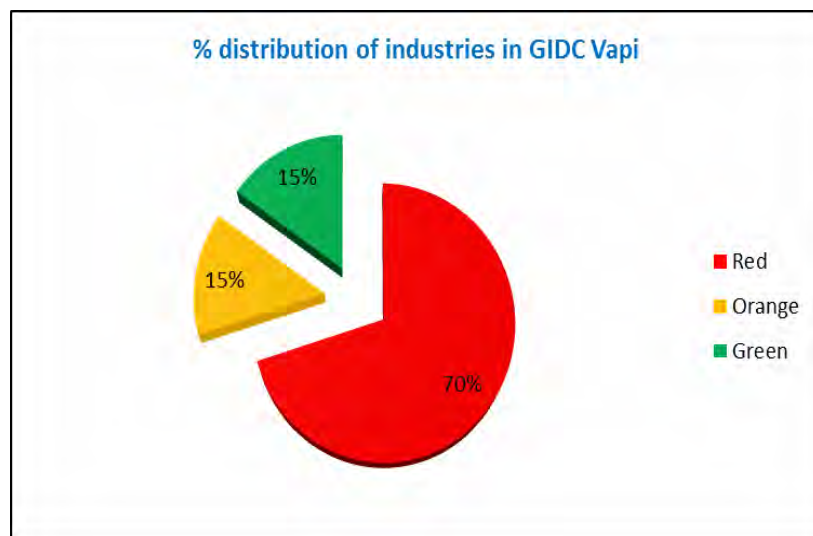


Figure 2.1: Distribution of Industries Based on Category in GIDC Vapi

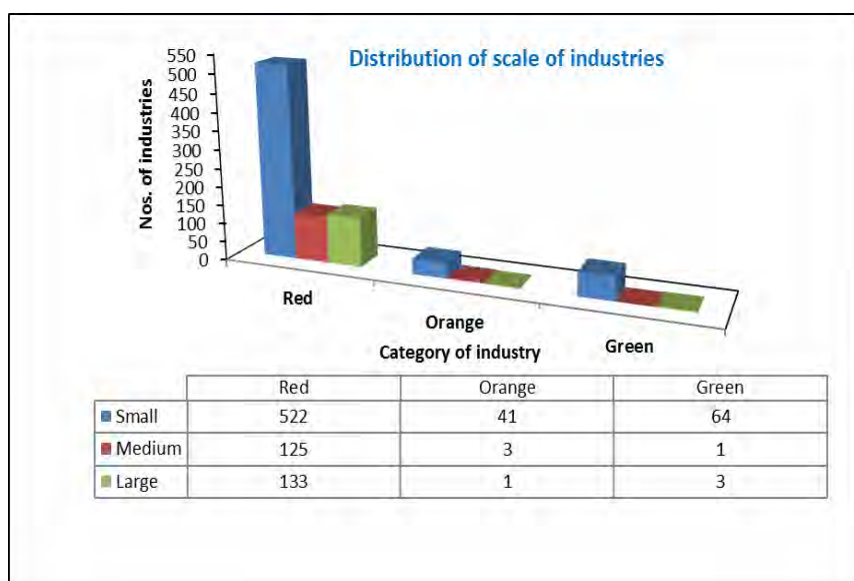


Figure 2.2: Distribution of scale of industries.

Major industries in the Vapi GIDC are Chemicals (~32.4%), Dyes and Dye intermediates (~12.6%), Textile (~6.3%) Paper and pulp (4.4%), pharmaceuticals (3.3%), Pesticides (~1.8%) and others (38.8%). The sector wise distribution of industries are given in **Table 2.2**.

Table 2.2: Sector Wise Distribution of Different Type Industries

Different Sectors	Number
Chemicals	290
Dyes & Dyes Intermediates	113
Textile	57
Pulp & Paper	40
Pharmaceuticals	30
Pesticides	16
Others	347

The location of Vapi Industrial Area, CETP and River Damanganga is shown in satellite imagery given in **Figure 2.3**. It shows the Vapi GIDC, river Damanganga and its course towards Arabian sea.



Figure 2.3: Location of Vapi Industrial Area, CETP and River Damanganga

2.1 RIVER DAMANGANGA & NATURAL DRAIN - BILL KHADI

2.1.1 RIVER DAMANGANGA:

River Damanganga, originates from Western Ghats (Sahyadri hills) near Valveri village in Nashik District of Maharashtra and traverse (almost in the east to west direction) through Maharashtra, UT of Dadra Nagar Haveli (DNH), Gujarat and UT of Daman & Diu (DD), and meets the Arabian Sea. The river traverses a distance of about 132 kms. Madhuban Dam is constructed on the upstream of the river and the stretch of the river from Madhuban Dam up to confluence with Arabian sea is about 42 km. Gujarat Industrial Development Corporation (GIDC) has constructed a weir near National Highway 8 (Mumbai – Ahmedabad), which caters to the need of water supply in the Vapi area for domestic and industrial use.

In the stretch from GIDC Weir at Vapi to the Arabian Sea near Daman, the River Damanganga receives wastewaters from CETP, Vapi (55 MLD), pipeline discharge of M/s GHCL (Textile Unit) and Bhilad (approx. ~ 2.5 MLD). Earlier, Twin Distilleries (0.8 MLD) were discharging effluents into river Damanganga. However, post shifting to grain based distillation and implementing zero discharge system, there is no discharge from this distillery.

Apart from the industrial effluents, the River Damanganga also receives domestic sewage from Silvassa, Vapi and Daman area through multiple small drains. The quality of River Damanganga is impacted by all the pollution load it receives from different pollution sources as mentioned above. The location map of River Damanganga River which start at Madhuban reservoir meet at the Arabian sea is shown in **Figure 2.4**.

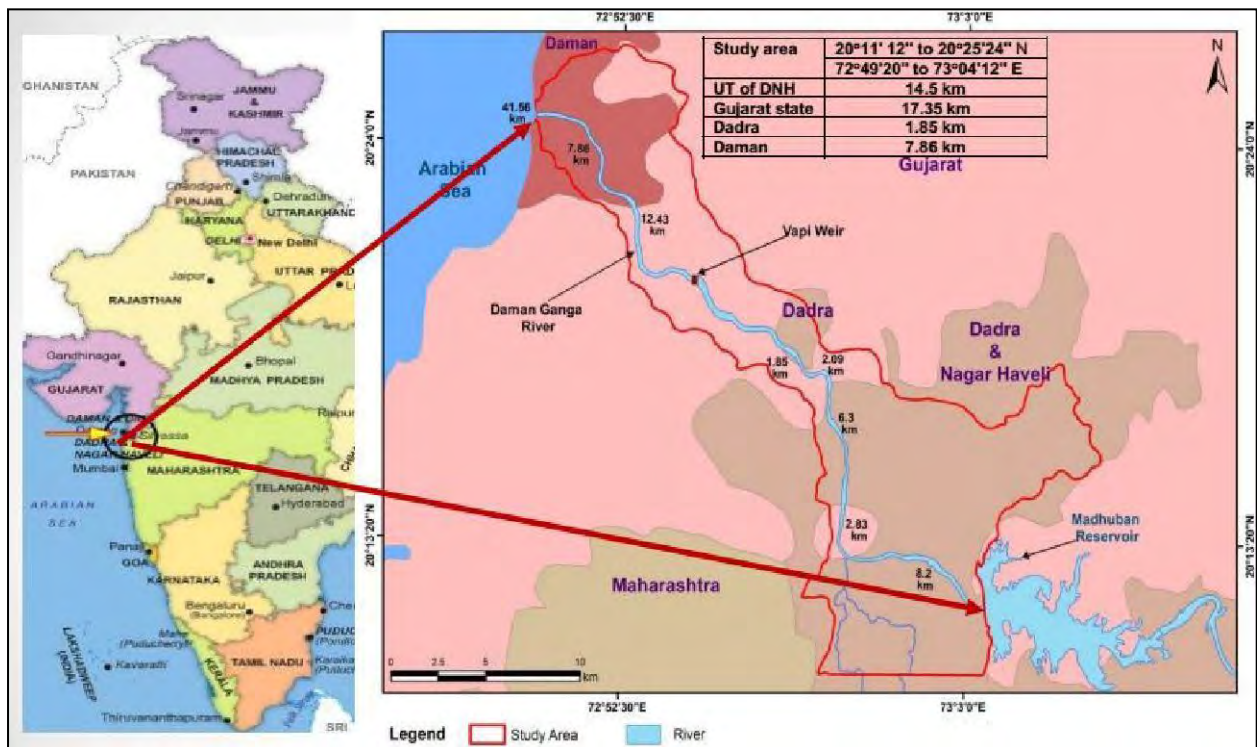


Figure 2.4: Location map of Damanganga River

2.1.2 BILL KHADI

Bill Khadi, a natural drain, passes through the GIDC industrial Estate Vapi, Chharwada and GIDC residential area. It meets river Kolak near National Highway-8 (Mumbai - Ahmedabad). While passing through the GIDC area it receives wastewaters (domestic as well as industrial) due to illegal discharges (if any), washing activities by scrap vendors, overflow of GIDC drainage system, pumping stations, and domestic wastewater from residential area of GIDC, chharwada etc. The Bill khadi is provided with concrete lining in the GIDC as well as in the residential area.

A bund with gate has been provided at Bill Khadi at the end of GIDC area to avoid further flow of wastewater into Bill khadi which then passes through residential areas. Drainage manholes (along the Bill khadi) and Pumping Station (PS-6) (at the end of GIDC area) are provided so that the wastewaters from Bill Khadi can reach the CETP for treatment. In the monsoon, the overflow is released through the bund gate.

2.2 GIDC DRAINAGE NETWORK

Gujarat Industrial Development Corporation (GIDC) has provided underground drainage network for carrying industrial wastewater to CETP for the treatment. The details of drainage network and pumping stations, members units attached to pumping stations (PS) in Vapi estate are given below (**Table 2.3**). The details of the pumps are given in **Table 2.4**. **Table 2.5** described the details about each of the pumping station and the corresponding connecting industries (sector wise).

Table 2.3: Details of GIDC drainage network

Total Length of Pipeline (KM)	79
Total Pumping Station	07
Industrial Pumping Station	04
Other Pumping Station	03
Online COD & NH3-N meters installed at PS	P.S. 3 & 6
Online pH correction System (pH meter and Caustic dosing)	all Industrial pumping stations.

Table 2.4: Details of pumps

Sr. No	Location	Pump Type	HP	Flow rate m ³ /hr	No. Pump set	
					W	S
1	Pumping Station – 1 II-phase	Non-Clog Sewage Submersible	160	1020	2	2
2	Pumping Station – 2 GIDC Housing	Non-Clog Sewage Submersible	40/20	300/150	1	1
3	Pumping Station – 3 IV - Phase	Non-Clog Sewage Submersible	75/50	500/300	1	1
4	Pumping Station	Non-Clog Sewage	75/40	500/300	1	1

	– 4 J – Type Area	Submersible				
5	Pumping Station – 6 III - Phase	Non-Clog Sewage Submersible	125	1000	2	1
6	Pumping Station – 7 GIDC Housing	Non-Clog Sewage Submersible	50/20	350/150	1	1
7	Pumping Station – 8 GIDC Housing	Non-Clog Sewage Submersible	45/20	300/150	1	1
W - working; S - Standby						

Table 2.5: Pumping Station wise CETP member units

Sr. No	Pumping Station	No. of Units Attached
1	By Gravity	91
2	PS-1	159
3	PS-3	84
4	PS-4	32
5	PS-6	152
6	No Drainage (Transport using tankers)	1
Total		519

2.3 COMMON EFFLUENT TREATMENT PLANT (CETP)

CETP (VGEL) is located near National Highway 8, River Damanganga, GIDC Estate, Vapi, Dist-Valsad. The CETP, Vapi was designed by National Environmental Engineering Research Institute (NEERI), Nagpur in collaboration with Kirloskar consultants for a capacity of 55 MLD. **Fig. 2.5** presents the location of the CETP on the banks of river Damanganga. It was commissioned in January 1997. The CETP is designed for the following parameters (**Table 2.6**).



Figure 2.5: Location map of CETP at Vapi and flow of river Damanganga

Table 2.6: CETP design parameters

Parameter	Influent	Effluent
pH	6.5-8.5	6.5-8.5
BOD (mg/l)	400	100
COD(mg/l)	1000	250
SS (mg/l)	300	100

M/s Vapi Green Enviro Ltd (VGEL) formerly known as Vapi Waste & Effluent Management Company Ltd (VWEMCL) operates the CETP and a TSDF. The company incorporated in pursuant to the suggestions of Hon'ble High Court of Gujarat Gujarat to manage the CETP and other environment related activities. Accordingly the company took over the CETP built by Gujarat Industrial Development Corporation (GIDC) in 1998. The Board of directors of M/s VGEL consist of GIDC Vice Chairman and Managing Director as nominee director and other directors from Industries.

CETP Vapi is receiving the partially treated effluent from member industries (present members 519) which are located in GIDC area through underground drainage network besides receiving domestic wastewater from GIDC residential areas.

2.3.1 PRESENT TREATMENT SCHEME OF CETP

The wastewater treatment consists of pre-primary, primary (physico-chemical treatment) and secondary biological oxidation treatment process based on activated sludge process. The final treated effluent is discharge into the River Damanganga.

The operational units of the CETP are:

Pre-primary : Auto screen, Grit Chamber(2 nos.), Equalization Tank (3 nos.)

Primary treatment : Flash Mixer (2 nos.) & Flocculator (4 nos.) & Primary Clarifiers (2 nos.)

Secondary Treatment: Aeration tanks (2 nos.), Secondary Clarifier (2 nos.)

The sludge is handled through sludge thickeners, centrifuges and sludge drying beds and ultimately disposed to TSDF of M/s VGEL.

M/s VGEL has established four stage forced circulation common multiple effect evaporator (CMEE) of 200 KLD capacity in March 2015, with the CETP premise. The CMEE is provided to handle refractory COD & high strength TDS effluent streams generated from pesticides, bulk drugs, dyes intermediate etc. The CMEE has been designed to handle TDS ranging from 3 – 12.5% and COD: 20,000 – 1,00,000 mg/L. Presently, around 86 nos. of industries have become members with common MEE and reported booked quantity of effluent is app. 157 KLD from member industries. The effluent from member industries are collected and conveyed to MEE through tankers. Spray dryer (4 KL/hr) is in operation for handling the concentrate generated from CMEE.

The various unit operations & processes handled at the CETP for handling concentrated & lean effluent streams are depicted in in Figure 2.6. Few photographs of CETP is given in Figure 2.7.

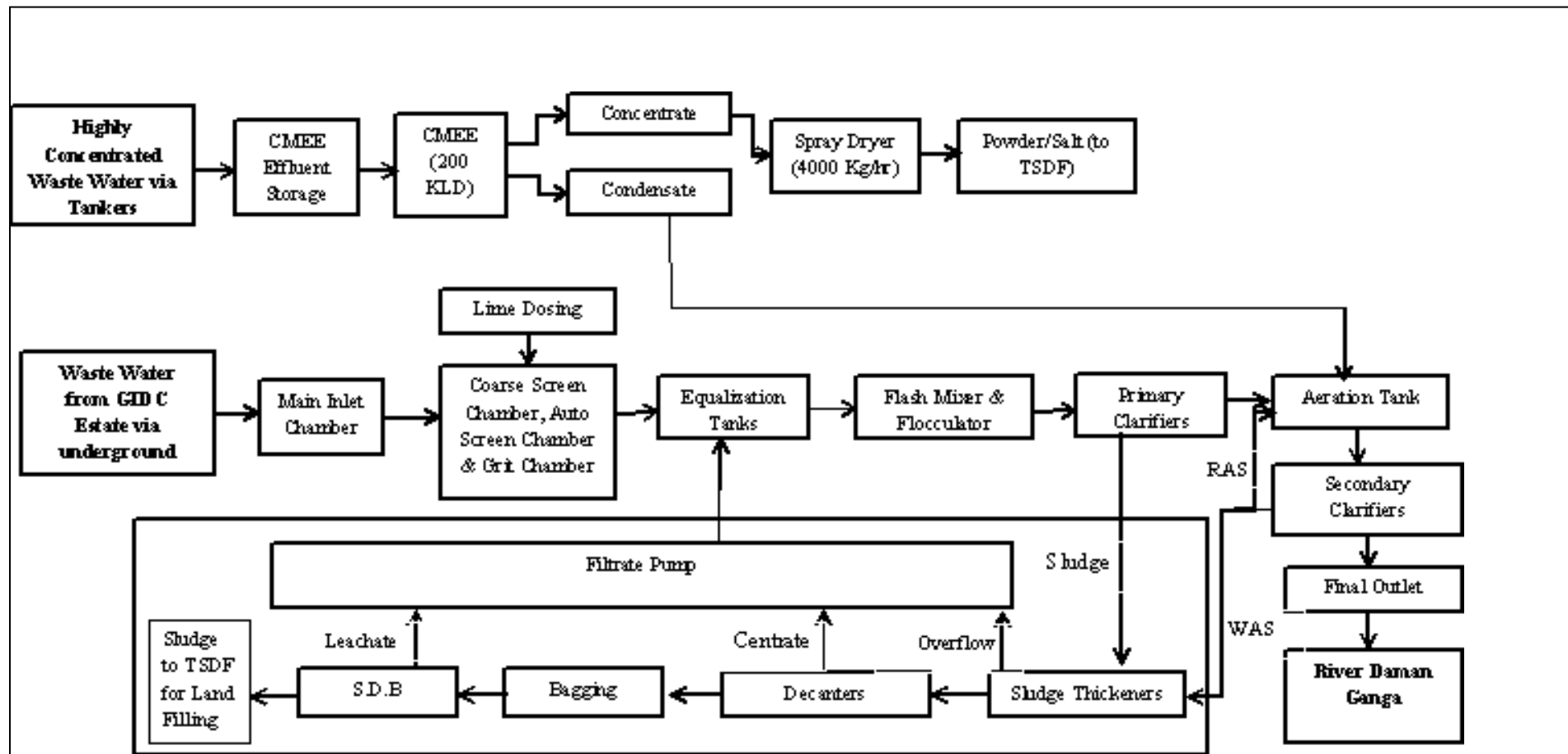


Figure 2.6: Process Flow Diagram of CETP

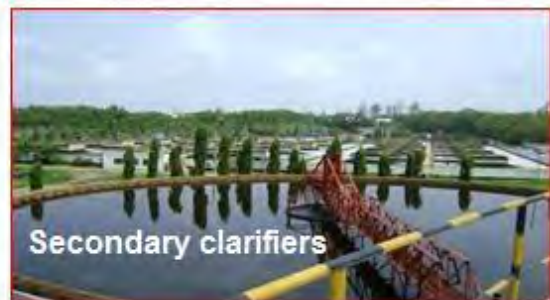
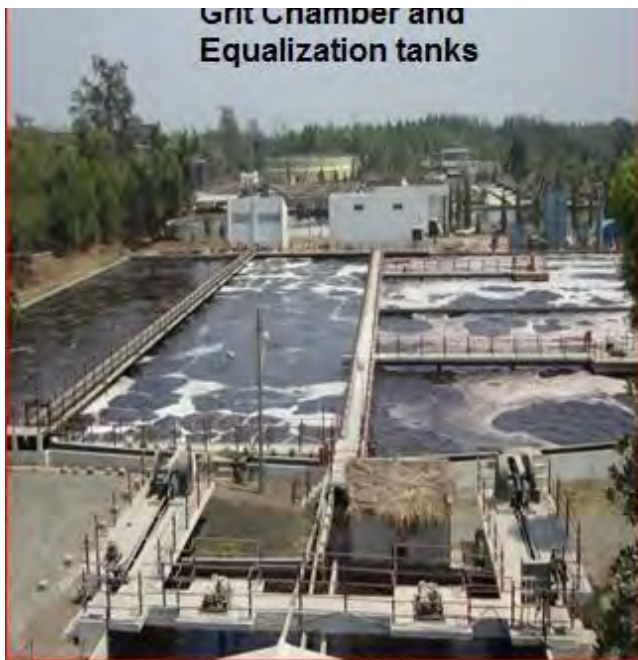


Figure 2.7: Photographs of CETP



GIDC Weir view from NH-8



CETP Discharge into River Damanganga



Constriction of River Damanganga flow due to Bridge Construction



River water Colour after CETP discharge



River Damnaganga Jari Causeway



River water colour at jari causeway



River Damanganga – Daman Jetty



River Damanganga – Daman Jetty

Figure: 2.8: Picture from discharge site, Vapi weir and Daman jetty

2.3.2 Upgradation/Capacity Enhancement of Plan of CETP:

- It is informed that the M/s VGEL has proposed to enhance the hydraulic capacity of existing CETP and also spray dryer system. M/s VGEL is going for expansion of CETP in two phases. In phase-I 55 MLD to 70 MLD immediate for which CTE is obtained and awaiting for EC. For Phase-II, 70 MLD to 100 MLD within one year.
- For Phase-I expansion i.e. 55 MLD to 70 MLD, two existing UASB reactors of 7.5 MLD each which are currently not in operation, will be converted to aeration tanks.
- M/s VGEL has also proposed Acid Bank with capacity 300 MTD which will take care of spent acids generated in the GIDC estate so that spent acids with high COD, TDS shall not come to CETP. It also helps in recycling and reuse for other purposes.
- In addition, VGEL prepared the action plan (**Table 2.7**) for improving their performance and meet the discharge norms.

Table 2.7: Action Plan from VGEL to Improve Performance of CETP

Sr. No.	Actions Point	Details	Remarks
1	To re-activation of Captive MEE at member units.	The Member Industries having MEE at their premises and sending waste water to CMEE has been instructed to run their own facility and treat their highly concentrated waste water in their own in-house Captive MEE facility. VGEL had already sent a request letter to GPCB to issue directions to the Concerned Industry Member units in this regard.	This will help to reduce the hydraulic load on Common MEE operating at CETP Vapi.
2	Divert Concentrate (MEE - Bottom) of Captive MEE units for treatment in CSD at CETP.	Captive MEE members who are not having ATFD/SD for the treatment of their MEE concentrate will be instructed to send their Concentrate to CSD facility at CETP Vapi, through dedicated Tankers fitted with GPS and Manifest Systems. GPCB may be requested to issue Notice of directions in this regard to Captive MEE Units.	This will provide proper treatment of concentrate streams and reduce the High Levels of Refractory COD chance of mixing with inlet waste water hence to meet Inlet Norms at CETP.
3	Identification of Color imparting Industries.	To reduce color in CETP inlet effluent VGEL has started analyzing color in monitoring samples. VGEL has identified Industries and shall help them out to treat the same at source.	Reduction of color by member industries at source will reduce color at CETP inlet and at outlet.
4	Control Room Concept for Monitoring to be Established at CETP.	On-line Monitoring of PS-3 and PS-6 are also monitored from this Control Room and necessary checking information are passed on to Day and Night Vigilance Monitoring Team at the various Industry sub sectors for better control of effluent quality on 24x7 basis. It will be strengthened by Database Management Software, which will provide round the clock information for effective monitoring and control.	Effective Control on Monitoring activity will enhance the efficiency of Monitoring activities which will help in reduction of inlet load to CETP.
5	Installation of one 8000 Kg/Hr capacity Common	Presently, CSD is in operation.	More Concentrated waste water can be treated from Small scale industries which

	Spray Dryer (CSD) for high TDS wastewater.		will reduce refractory COD in CETP inlet and outlet.
6	Technical Assistance to Member Industries.	<p>VGEL has started providing technical help to its member industries to carryout treatability studies and providing suitable technology for treatment of waste water at their plant itself (primary treatment).</p> <p>Various lab scale trials at CETP are being done with waste water from member industries and treatability study outcomes are shared with problematic member units.</p>	<p>Implementation of Industry specific primary wastewater treatment like chlorination/sodium hypochlorite dosing, lime dosing and press filter, etc. will help to improve CETP inlet quality.</p> <p>Proper operation of Primary ETP by Member industries will reduce shock/over loading to CETP.</p>
7	Segregation of non-biodegradable waste water having high Refractory COD from member industries.	Non-Biodegradable waste water from Pesticide/Pharma/Dyes and Intermediates will be separated and taking them to CETP by dedicated tankers for physicochemical treatment through Electro oxidation/chemical oxidation followed by treatment at CMEE/CSD.	<p>This system will help CETP to reduce refractory COD at Inlet of CETP which will help CETP to meet COD norm at outlet.</p> <p>Those waste will be treated under CMEE or Spray Dryer instead of allowing discharge in CETP.</p>
8	Proper Operation of GIDC Pumping Stations.	To provide all the pumping stations with Automatic level indicators and Automatic system to switch on DG set in case of power failure.	This will ensure smooth functioning of Pumping stations, hence reduce shock loads at CETP.
9	Bio-assay test facility to be provided at CETP	More appropriate state of the art Bio-assay testing facility will be provided at CETP to measure Toxicity of waste water on regular basis.	Bio-assay testing facility at CETP will help to review the status, analyze toxicants if any and remedy thereupon.
10.	Over ground pipelines to carry the waste water from Member Industries to CETP.	<p>Industries and GIDC shall have to install over ground pipeline with SCADA system and continuous auto sampler, collection wells shall be installed in consultation with VGEL and GPCB.</p> <p>Notice will be issued by GIDC to the effect that large and medium Industries should install lines within one month and Small Industries should do within 3 months.</p>	<p>GIDC will implement this scheme in coordination with VGEL and VGEL will pay the cost of installation of such a facility implemented by GIDC.</p> <p>If ghost lines are found, VGEL will take steps to cancel the membership of that member industry and inform GPCB for permanent closure in order to control unauthorized inlet discharges.</p> <p>Size of the pipeline shall be</p>

			decided by GIDC as per quantity of effluent discharged.
11.	Compulsory Sampling of Member Industries.	Compulsory sampling of discharge of all member industries of VGEL shall be carried out and tested at least Four times a year. Sampling will be done on basis of random allotment and pickup by computer based systems.	A monitoring supervising and advisory committee consisting of two Technical Directors of VGEL Board has been constituted and CEO-VGEL will coordinate with the above committee for the effective monitoring of member industries.
13.	Appointment Technical Expert from National Level Reputed Institutes like IITs for Evaluation of VGEL's effectiveness and performance.	To review the overall Operational effectiveness of VGEL's Systems by a third party Expert of National Repute and to suggest any improvements required to meet the Country's Environmental Laws.	Review of VGEL's Operational Systems' Effectiveness by a Technical Expert from National Level reputed Institutes like IITs will help to critically audit the VGEL systems and suggest any additional measures to enhance the performance of VGEL to maintain the state of the art systems in VGEL.

- The details of various capacity enhancement activities are depicted in the below table (**Table 2.8**) along with the estimated cost and target time for commissioning.

Table 2.8: CETP expansion plan as per VGEL

S.No	Name of project	Cost (Crores)	Time of execution, (months)
1	Capacity augmentation from 55 to 70 MLD	6.50	06
2	Disposal pipe line extension 3.5 Km	41.00	12
3	Deep Sea Discharge for 100 MLD	200.00	24
4.	Capacity augmentation from 70 to 100 MLD	150.00	36
5.	Spray dryer 8 TPH evaporation rate	10.00	06
6.	Acid Bank 300 MTD	21.00	24
	Total	442.80	

- As per order of Hon'ble NGT (WZ), Pune in O.A. No. 109 of 2014, CETP has planned for disposal pipeline up to 3.5 km from present location in the river towards the Arabian Sea. The matter was between Tarun Patel Vs Collector, Valsad & Ors related to pipeline for disposal of CETP effluent into deep sea (marine outfall). The Application is disposed 27.10.2017 with direction to VGEL to extend the discharge point through the pipeline and a diffuser system as earlier suggested by NIO to the location at 20⁰21'45.290N, 72⁰ 52' 51.98" E approximately 4.5 km downstream from existing discharge location of CETP, Vapi in the Damanganga estuary within a period of 18 months at their own cost. Though, the matter was for marine outfall, instead of deep sea pipeline, the said order was given for pipeline up to 4.5 km from present discharge location in consideration of amicable resolution in meeting between Applicant, GPCB, NIO, VGEL (CETP) and representative of villagers in view of difficulties in implementing the deep sea pipeline project due to resistance from locals faced by collector Daman (Daman Administration).

It is learned that National Institute of Oceanography (NIO) further studied the locations and it is stated in the report in November 2018 that now revised the discharge location with pipeline up to 3.5 downstream instead of 4.5 km from present location. However, as per report-"PIPELINE ROUTE SURVEY AND DIFFUSER DESIGN FOR DISCHARGE OF TREATED INDUSTRIAL EFFLUENTS GENERATED BY CETP, VAPI"- *the proposed location is on temporary basis as there is no enough dilution for disposal of effluent in the estuarine waterbody, and hence the pipeline should be extended to offshore location in future. The pipeline should be laid along river bank and very close to water column and it should be buried wherever it is possible. Since very low dilutions are available at this proposed location, increase in outfall quantity of more than 55 MLD is not advisable at this location. Hence the release of 100 MLD as proposed by VGEL for future expansion is not recommended at this location.*"

Collector, Daman approached Hon'ble NGT, PB, New Delhi through Review Application No. 21 of 2018 for review of the order dated 27.10.2017 and delay in condonation, However, Hon'ble NGT dismissed the said RA and

related Misc Applications. Further, Daman collector approached Hon'ble Supreme Court with Civil Appeal Dairy No (s) 9808/2019 (arising out of impugned final judgement and order dated 14.12.2018 in RA No. 21 of 2018 and 27.10.2017 in OA No. 109 of 2014 passed by the National Green Tribunal, Western Zone, Pune).

Hon'ble Supreme Court in its order dated 15.04.2019 stayed the operation of the directions contained in the order dated 27.10.2017 of the Hon'ble NGT, Pune in OA No. 109 of 2017 (WZ) and the order dated 14.12.2018 in RA No. 21 of 2018.

Chapter 3:

PERFORMANCE OF CETP

3.1 PERFORMANCE OF CETP:

GPCB and CPCB monitors CETP regularly almost on fortnightly and on quarterly basis respectively since many years. Analysis results of monitoring carried out by CETP (VGEL), GPCB and CPCB in the past as secondary data are provided at **Appendix - 2A** (CETP data), **Appendix - 2B** (GPCB data) and **Appendix - 2C** (CPCB data)

3.1.1 CETP MONITORING DURING COMMITTEE VISIT:

Stage wise grab sampling was carried out on 12.02.2019 at CETP, Vapi during the visit of the committee. The samples were analyzed at laboratory of GPCB, Vapi. The sampling was carried out at following locations:

1. Inlet to CETP (Out of equalization Tank)
2. Outlet of primary clarifier no. 1
3. Outlet of primary clarifier no. 2
4. Outlet of secondary clarifier no. 1
5. Outlet of secondary clarifier no. 2
6. Final outlet of CETP

The results of analysis is presented in **Table 3.1**. It is observed from recent monitoring carried out on 12.02.2019 that CETP is not meeting the inlet norms as well as final discharge norms for parameters COD, FDS, Chloride & Sulphate. COD (258 mg/l) slightly exceeds the Outlet norm (250 mg/l), though other parameters such as pH, TSS, BOD, NH₃-N, phenols are meeting the outlet norms, the NH₃-N, Phenols, FDS, COD are not meeting the Inlet norms.

Table 3.1: Results of Analysis on Samples Collected during Committee Visit

Sampling location(s)	Parameter(s)								
	pH	TSS	FDS	BOD	COD	NH ₃ -N	Phenols	Cl ⁻	SO ₄ ²⁻
Inlet Norms	6.5-8.5	300	2100	400	1000	50	1	600	1000
Inlet to CETP (outlet of eqt tank)	8.02	188	4714	288	1184	55	2.37	2009	1440
Outlet of primary clarifier no. 1	7.24	118	5010	213	939	53	1.84	3178	1275
Outlet of primary clarifier no. 2	7.28	92	4612	191	907	51	1.56	2439	1127
Outlet of secondary clarifier no. 1	7.41	50	4596	34	284	48	0.88	2329	1107
Outlet of secondary clarifier no. 2	7.38	32	4808	31	255	42	1.07	2309	1093
Final outlet of CETP	7.21	34	4852	28	258	43	0.839	1984	1535
GPCB prescribed Norms (Outlet)	6.5-8.5	100	2100	30	250	50	1	600	1000
Note-Concentration of all the parameters are expressed in mg/L, except pH.									

3.2 OVERALL OBSERVATION ON CETP PERFORMANCE:

- The CETP receives raw effluent in the range of 47.5 MLD to 55 MLD with an average of 53.5 MLD.
- The quantum of effluents received from the industries and domestic sewage is about 53.88 MLD and 6.5 MLD respectively (2018).
- Domestic sewage helps in nutrient augmentation besides addition of biodegradable component to initiate biodegradation of the receiving components (dyes/dye intermediates, chemical). It also helps in dilution.
- The yearly average *inlet COD data* over the last five years is far above the permissible inlet limit (1000 mg/l) except for the year of 2016 (**Figure 3.1**). Similarly, average outlet COD data over the last five years are above the permissible limit (250 mg/l). **Figure 3.2** shows that in 2016 when inlet COD level is below the prescribed limit (as per GPCB data), CETP was able to maintain the

discharge quality i.e, outlet COD (260 mg/l) very close norm (250 mg/l). Though, there is an improvement over the years, CETP could not maintain the discharge norm continuously. **Thus, it is imperative that CETP should strictly maintain its inlet COD norm well below prescribed inlet norm 1000 mg/l.**

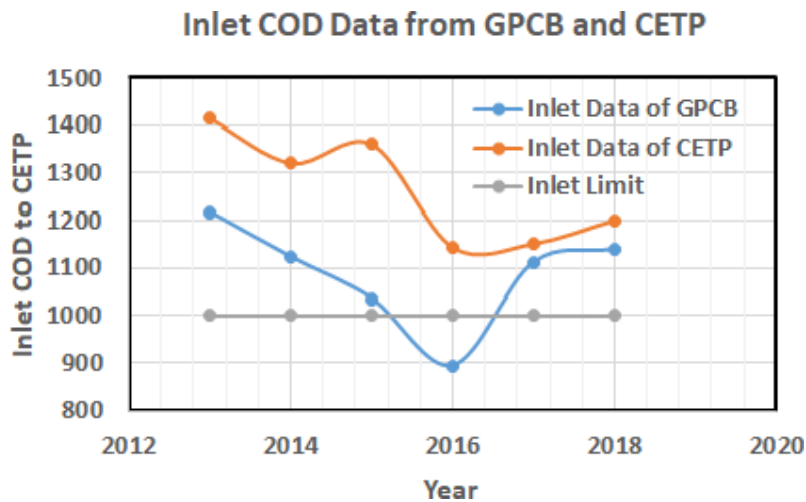


Figure 3.1: Inlet COD data from GPCB and CETP data

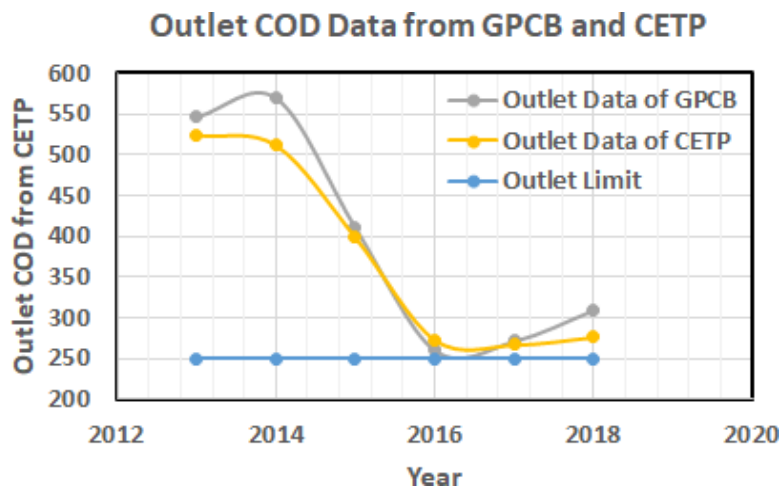


Figure 3.2: Outlet COD data from GPCB and CETP data

- CPCB carry out quarterly monitoring of CETP Vapi. The last 10 years data from CPCB shown in Figure 3.3 & 3.4. The analysis results shows that there is an improvement in COD reduction over the years and it was minimum in the

year of 2016 .However, CETP largely fails to maintain the prescribed inlet and outlet norms.

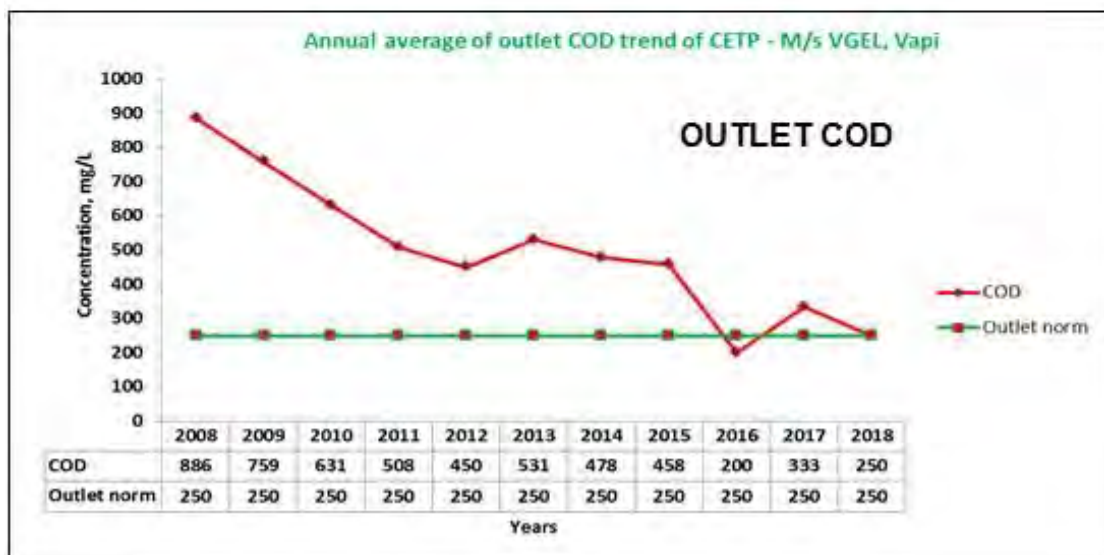
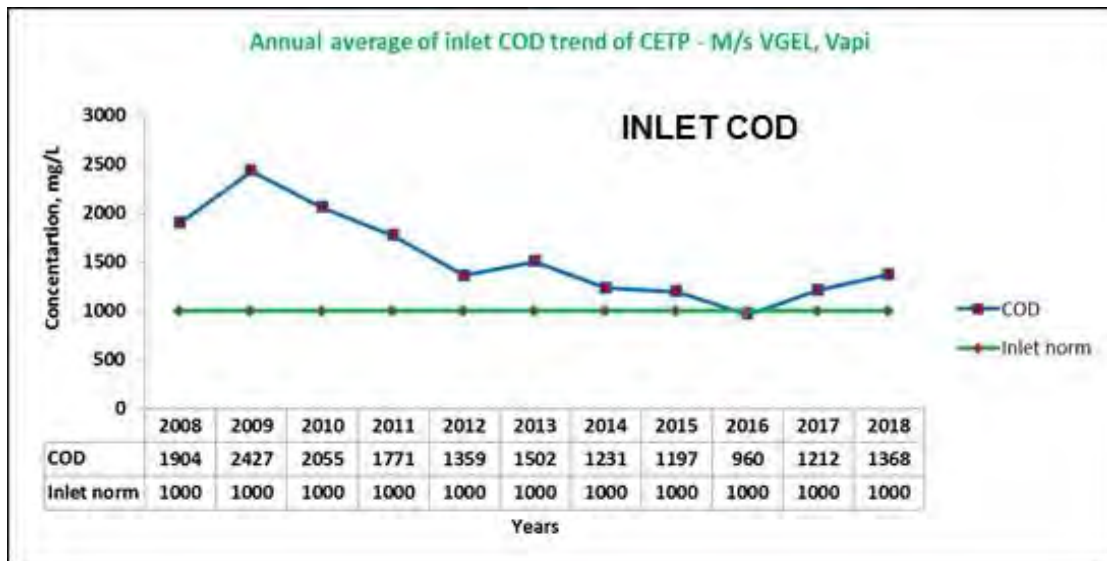


Figure 3.3 & 3.4: CETP inlet & outlet COD data as per CPCB monitoring (2008-18)

- The average COD data from VGEL for the period 2009-18 shows improvement in both inlet and outlet (Figure 3.5). However, CETP is not able to meet the inlet (1000 mg/l) as well as outlet (250 mg/l) COD norms.

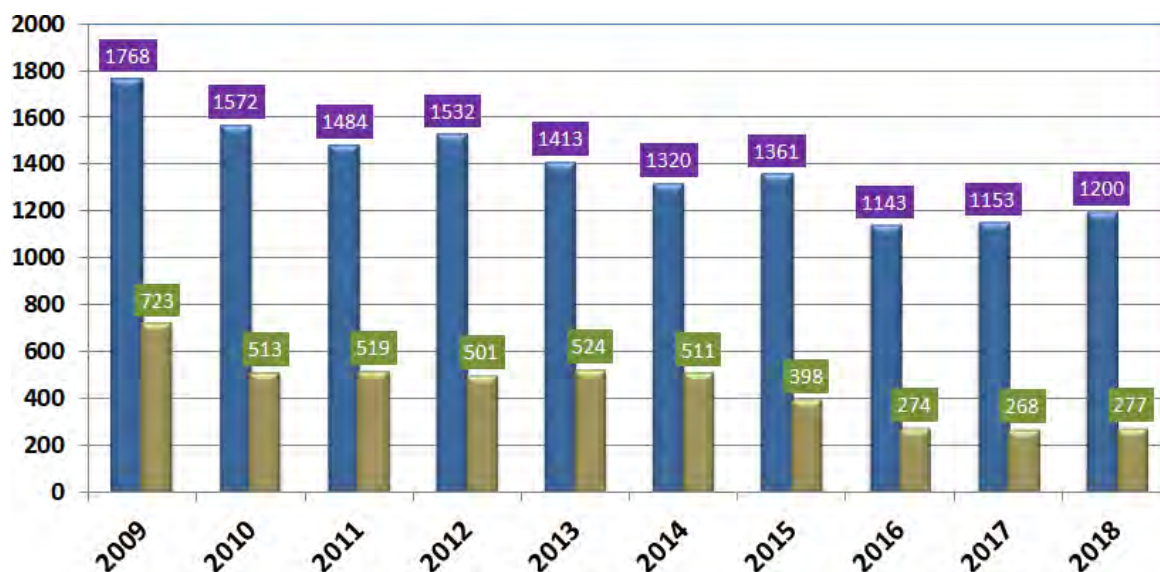


Figure 3.5: COD values of both inlet and outlet of Vapi CETP

- The yearwise COD load is estimated and presented in Table 3.2. It is inferred from the Table that there is a reduction in outlet COD over last five years (approximately 50% reduction from the year 2013. However, the reduction in excess load (beyond statutory norms of 250 mg/l) discharged was one tenth of the load with respect to the year 2013.

Table 3.2: COD Load calculation in last 5 years

Year	Flow (MLD)	Outlet COD (mg/l)	Outlet COD Load (MT/Y)	Excess COD at Outlet (mg/l)	Excess COD Load at Outlet (MT/Y)
2013	53.9	524.0	10308.9	274.0	5390.5
2014	53.9	511.0	10053.2	261.0	5134.8
2015	53.5	398.0	7771.9	148.0	2890.1
2016	53.2	273.0	5301.1	23.0	446.6
2017	52.6	267.0	5124.2	17.0	326.3
2018	53.9	276.5	5437.7	26.5	521.2

- Similarly, the excess average yearly load due to BOD (at CETP discharge point) is 2.84 MT/day (based on the five-year average from 2013 to 2018).
- It is observed from the above analysis and the data provided in **Appendix 2** that though there is improvement over the year in the treatment at CETP and treated effluent quality, still CETP is not able to meet outlet norms broadly for

COD, FDS, Chloride Sulphate and Color. Inlet quality is not meeting with inlet norms of CETP which shows that some members industries are discharging without meeting specified inlet norms as mentioned in the consents of member industries issued by GPCB. However, it is observed that there is improvement in inlet effluent quality over the years.

- The member industries are discharging their effluent in GIDC underground drainage system which leads to CETP. M/s VGEL –CETP needs to ensure that all the member industries discharge the trade effluent meeting the inlet norms of CETP. In case of non-compliance, the list of such industrial units need to be provided to GPCB for necessary action against such units
- The improving trend of treated effluent quality may be attributed due to source reduction, best management practices adopted by individual member industries of CETP, vigilance and enforcement of GPCB. The various upgradation done in operation of different units of CETP, identification and segregation of high COD and TDS effluent streams from member industries and treatment through common MEE is encouraging. The various matters through Applications in Hon'ble NGT improved the situations over the years. Particularly improvement in the year 2016 and sometimes observed to be meeting with the COD norms in the Outlet which attributed towards the efforts taken up by GPCB and M/s VGEL due to Original Application No 89 of 2014 (Tarun Patel VS Gujarat Pollution Control Board & Ors) & 109 of 2014 (Tarun Patel Vs The Collector, Valsad & Ors.) in National Green Tribunal (NGT) (WZ), Pune. However, Vapi CETP is required to improve and strictly maintain the inlet quality, operate properly and upgrade adequately so as to meet the norms continuously.
- In the recent monitoring on 12.02.2019, there is reduction of 82 % TSS, 90 % BOD & 78 % COD reduction due to treatment in CETP. If there is reduction in inlet quality of the CETP, there are chances that CETP will be able to achieve outlet norms.

Chapter 4:

DAMAGE TO RIVER DAMANGANGA & ARABIAN SEA COAST

Water quality of the River Damanganga studied over the year by GPCB, CPCB and under project by NEERI which was sponsored by PCC, Daman. The water quality data is available from CPCB, GPCB and recent report of NEERI, Nagpur. The water quality get affected due to different discharges and CETP Vapi discharge is the major among all. The subsequent sections are described with damage to water quality of river Damanganga based on the data from CPCB, GPCB and NEERI. The monitoring of Bill khadi also periodically carried out by GPCB

Bill Khadi, which meets with River Kolak, passing through the GIDC area, receives wastewaters (domestic as well as industrial) due to illegal discharges (if any), washing activities by scrap vendors, overflow of GIDC drainage system, pumping stations, and domestic wastewater from residential area of GIDC, chharwada etc. Drainage manholes and Pumping Station (PS-6) at the end of ind estate are provided to take wastewater to CETP for treatment. A bund with gate also has been provided at Bill Khadi at the end of GIDC area to avoid further flow of wastewater into Bill khadi which then passes through residential areas. However, sometimes industrial wastewater along with domestic wastewater flowing in Bill khadi as observed from results of CPCB and GPCB. The results are provided at **Appendix 3 A (GPCB Monitoring) & 3 B (CPCB Monitoring)**.

The sea water quality due to discharges into the river damanganga are taken in to the consideration by the committee from the National Institute of Oceanography (NIO) report which was submitted to Hon'ble National Green Tribunal (WZ), Pune in pursuance to the order dated 13.11.2017 in O.A.No. 99/2017 (Tarun Patel VS MoEF&CC & Ors) regarding Sea Water Quality and Pollution-Vapi-Daman Area, Gujarat. NIO carried out sea water monitoring at Daman-vapi Area.

4.1 EXTENT OF DAMAGE TO WATER QUALITY - RIVER DAMANGANGA

4.1.1 IMPACT AREA-

The impact area of the river Damanganga is the stretch from downstream GIDC weir and the discharge out of CETP to Daman jetty (confluences of river to the Arabian Sea at Daman) which is about 13 km.

4.1.2 DISCHARGES INTO THE RIVER IN THE IMPACT AREA:

In the stretch of GIDC Weir Vapi (Downstream) to the Arabian Sea, River Damanganga receives effluent from CETP, Vapi (approx. ~ 55 MLD), pipeline discharge of M/s GHCL (Textile Unit), Bhilad (approx. ~ 2.5 MLD). Apart from the industrial effluent, the River Damanganga also receives domestic wastewater from Vapi and Daman area through different drains.

The CETP effluent quality is discussed in **Chapter 3**. The discharge of M/s GHCL Unit (Textile) to the river Damanganga is at the downstream of CETP Vapi discharge point. The Effluent quantity is about 2.5 MLD. GPCB RO, Sarigam regularly carry out monitoring and analysis results which are given in **Appendix 4**. Similarly, the major sewage discharges into the river Damanganga are through some natural drains near Jari causeway from vapi town through Kalkada Khadi and industrial areas in Daman, and from Moti Daman and Nani Daman area. Regular monitoring carry out by GPCB at kalkada khadi (natural drain) and analysis results are given in **Appendix 5**.

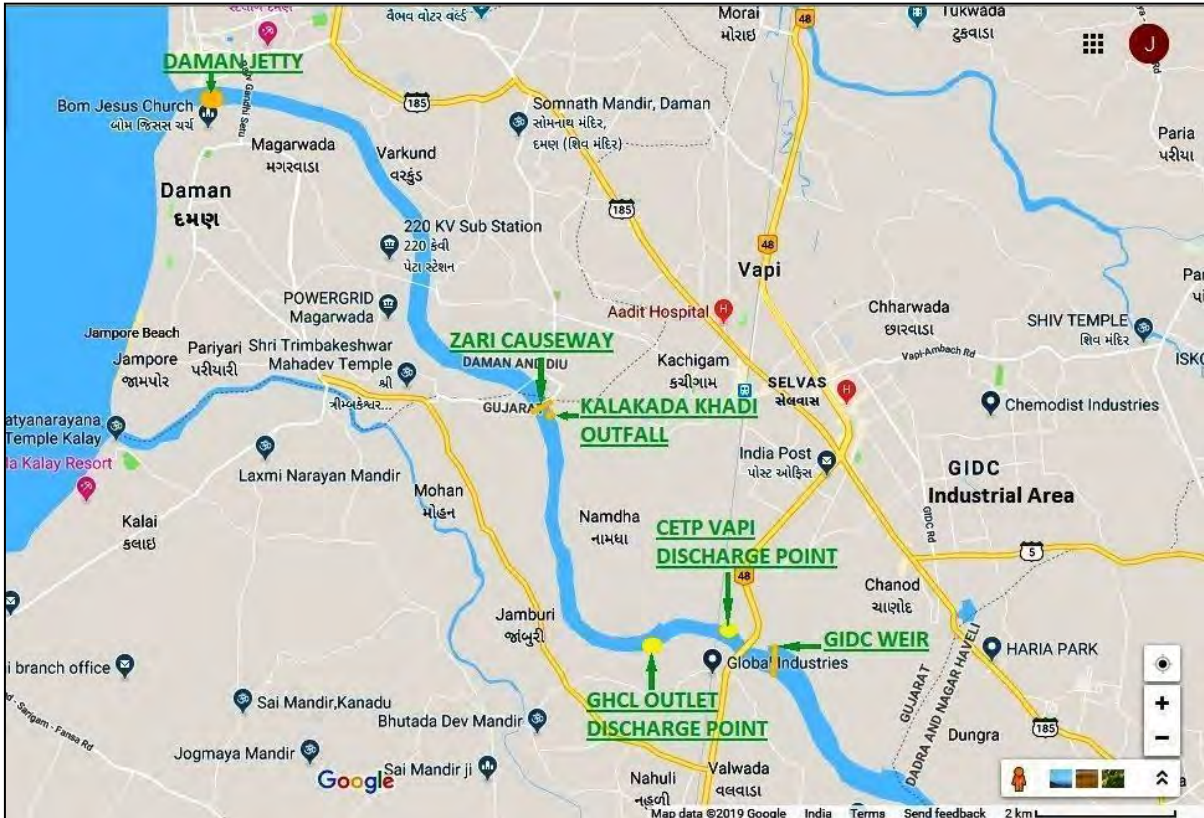


Figure 4.1: Discharges into in the Impact Area- River Damanganga

4.1.3 QUALITY OF RIVER DAMANGANGA

The quality of river Damanganga is monitored jointly by GPCB, PCC and VGEL on monthly basis at different stretches along the River Damanganga. CPCB also carry out quarterly monitoring at three locations to know the effect of CETP discharge in to River Damanganga i.e. at GIDC weir (before CETP discharge), Zari causeway and Daman jetty (mouth of estuary Damanganga) after CETP discharge. The results of monitoring carried as above are provided at **Appendix 6 A (GPCB), and Appendix 6 B (CPCB).**

The committee also has taken into account of a study sponsored by Pollution Control Committee (PCC), Daman & Diu and Dadra & Nagar Haveli carried out by CSIR-NEERI. The study was submitted in May 2018. The following section provides the observations and findings of the various monitoring carried out on the impact area.

4.1.3.1 QUALITY OF RIVER DAMANGANGA DURING VISIT OF COMMITTEE

The sampling of river Damanganga at three locations are carried out during committee visit on 12.02.2019 and samples were analysed at laboratory GPCB, RO, Vapi. Analysis results are provided at following **Table 4.1**.

Table 4.1: Analysis results of water sampling carried out at River Damanganga

Sampling Location	pH	DO	SS	FDS	BOD	COD	NH ₃ -N	Phenol	Cl ⁻	SO ₄ ²⁻
GIDC weir [#]	--	6.8	--	--	1.4	10	1.4	--	--	--
Near Railway Bridge	7.24	4.1	16	680	3	33	8.26	0.075	312	259
Zari Causeway	7.18	5.6	22	678	2.8	23	4.19	BDL	313	204
Daman Jetty	7.81	6.1	46	12890	1.7	27	1.63	BDL	8807	216

(Note:#GIDC weir-GPCB sampling-Avg for year 2018, Concentration is expressed as mg/l except pH).

4.1.4 DAMAGE TO RIVER WATER QUALITY- PHYSICO-CHEMICAL ENVIRONMENT (BASED ON PHYSICOCHEMICAL CHARACTERISTICS OF RIVER WATER)

- ❑ As shown in the **Table 4.1**, the pH, and D.O., BOD ranged between 7.2-7.8, 4.1 - 6.1 mg/l, 2.0 -3.0 mg/L respectively.
- ❑ TDS of the river water ranged from 678 mg/l near Jari causeway to 12,890 mg/l at Daman Jetty. The TDS concentration below the bridge near CETP outlet is 680 mg/l among the sampling points. The river TDS is anticipated to increase in salinity concentrations from riverine zone to estuarine zone and then sea.
- ❑ The concentration of COD was higher below the bridge near CETP outlet (33 mg/l) which reduces to 23 mg/l near Jari causeway and 27 mg/l near the Daman Jetty. This is attributed to the CETP final treated effluent discharge, as the concentration of COD at Upstream side i.e. GIDC weir is 10 mg/l.

- The colour of the river samples collected ranged between dark brown (1500 HU) at the CETP outlet to pale yellow (75 HU) near the Daman Jetty based on CSIR-NEERI's report. Other parameters from the same report are as follows.
- Ammonia (N), fluoride, nitrate and phenols concentrations are in the range of BDL-3.9 mg/l, 0.007-0.35 mg/l, 0.06-27.03 mg/l and 0.1-12.87mg/l respectively.
 - Total Kjeldhal Nitrogen (TKN) and total Phosphates are in the range of 9.53-67.32 and 0.07-29.89 mg/l respectively.
 - Concentrations of sodium ions at sampling point ranges between 96 (Jerry Causeway) - 3200 mg/l (Daman Jetty) with near CETP outlet concentrations of Sodium at 312 mg/L.
 - Concentrations of chlorides at sampling point ranges between 312 (Near CETP outlet) - 8807 mg/l (Daman Jetty). Concentration at Jerry Causeway of Chlorides is 313 mg/L. This closely follows higher concentrations near the CETP outlet and decreasing downwards. The sodium and chlorides concentrations are expected to increase near the estuarine/Marine zone.

This is a clear indication of industrial pollution positively due to CETP Vapi.

- In addition, the reports from CSIR-NEERI (Page nos.15, 19, 25, 33) and CSIR-NIO (Page no. 20) indicated presence of heavy metal based on analysis of river and sea water. The metals such as arsenic (as As), cadmium (as Cd) and nickel (as Ni) are in the range of BDL-0.01 mg/l, BDL-0.01 mg/l and BDL-0.06 mg/l respectively. Copper (as Cu), manganese (as Mn), zinc (as Zn) and chromium (as Cr) concentrations were in the range 0.007-0.08 mg/l, 0.08-0.21 mg/l, 0.01-0.1 mg/l, BDL-0.05 mg/l respectively. Aluminum (as Al), lead (as Pb), mercury (as Hg) and iron (as Fe) concentrations in the samples varied in the range 0.2-2.14 mg/l, BDL-0.08 mg/l, BDL-0.006 mg/l and BDL-0.81 mg/l. Vanadium was found in the range of BDL-1.13 mg/l.

The presences of above metals are below the detectable limit of the instrument to fractions.

- ❑ Pesticide Residue in River Water, Out of 10 organochlorine pesticides tested none was detected in most of the analyzed samples. In some sample, a few pesticides were detected above the detection limit of GC-EDC (0.5 mg/L). However, their presence could not be confirmed by GS-MS analysis as their concentrations were below the detection limit of GC-MS (1 mg/L).

As observed from results of CPCB, GPCB (**Appendix 6A , 6 B**), there is increase in concentration of pollutants after CETP discharge at Namdha and Jari Causeway along the Damanganga river with respect to water quality at GIDC weir (which can be considered as almost river water without effect of pollution). This shows that there is damage to water quality of River Damanganga.

Polluted river stretches have been divided in five priority categories i.e. I, II, III, IV & V depending upon the levels of BOD. As per CPCB Report - "River Stretches for Restoration of Water Quality", CPCB, Sept 2018 and February 2015, river stretch- Kachigaon to Vapi (GIDC weir to Jari Causeway) of river Damanganga is Priority-IV where as it was Priority-II as per CPCB Report in 2010 (Priority - I being most polluted and Priority -V being best rating). ***This means, the river stretch is improving over time, but still there are pollutants as evident from the above data.***

Also based on the historical data of CPCB, the quantum of pollution load indicated decreasing trend of major pollutants such as COD and BOD over the years. Variations in pollutants over the year in River Damanganga as well as quality at GIDC weir (u/s of CETP discharge and Jari causeway (d/s of CETP discharge) are represented **Figure 4.3-4.5**. This is in line with the improvement in the quality of treated effluent of CETP though CETP is not meeting with outlet standards for parameter COD, TDS, and Colour. Hence, upgradation of CETP treatment scheme is paramount to reduce pollution reaching the river Daman Ganga.

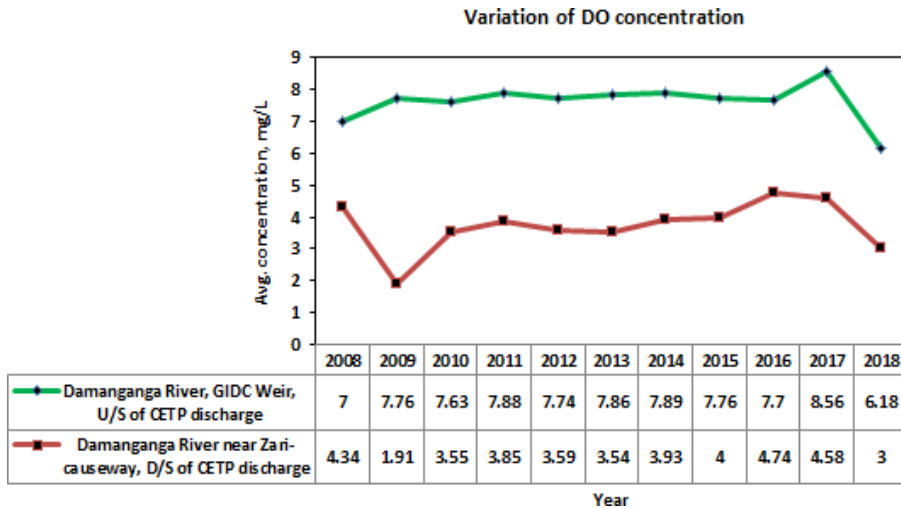


Figure 4.2 : Variations in DO over the year in River Damanganga as well as quality at GIDC weir (u/s of CETP discharge) and Jari causeway (d/s of CETP discharge) (Source-CPCB)

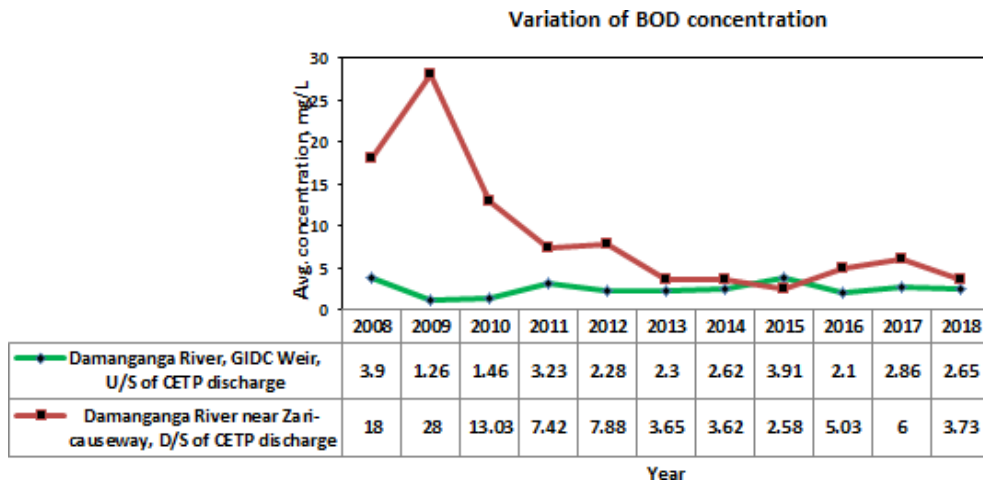


Figure 4.3 : Variations in BOD over the year in River Damanganga as well as quality at GIDC weir (u/s of CETP discharge) and Jari causeway (d/s of CETP discharge) (Source-CPCB)

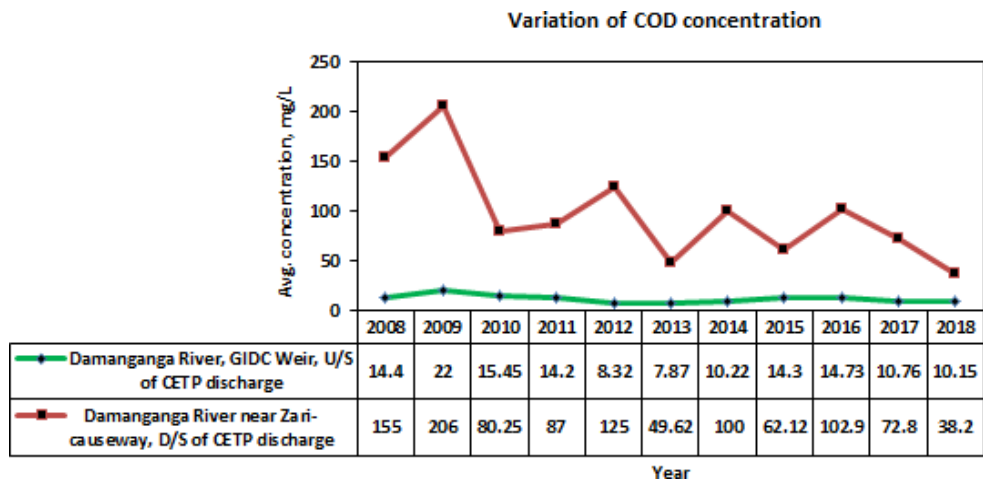


Figure 4.4 : Variations in COD over the year in River Damanganga as well as quality at GIDC weir (u/s of CETP discharge) and Jari causeway (d/s of CETP discharge) (Source-CPCB)

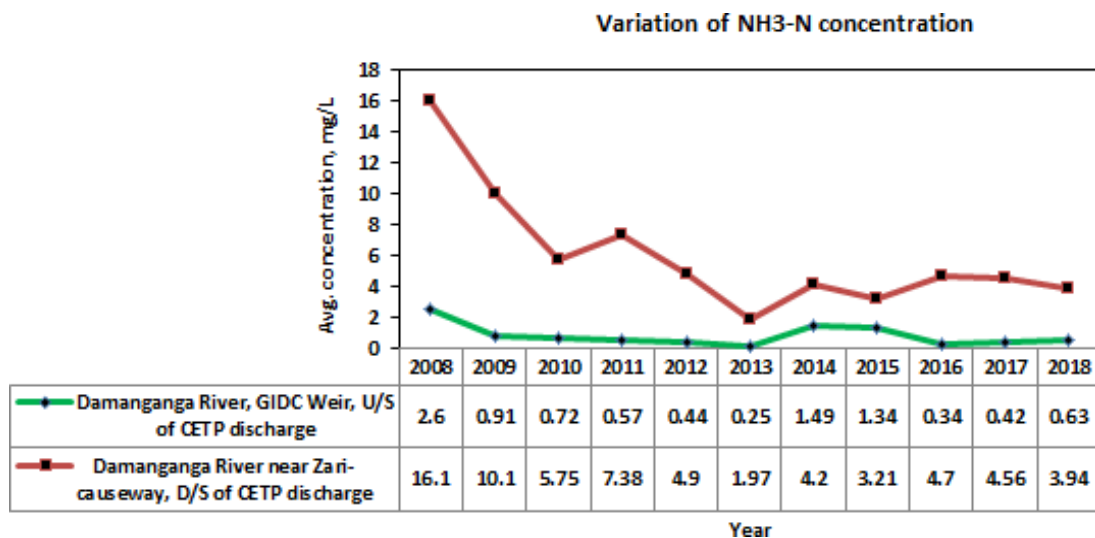


Figure 4.5 : Variations in NH₃-N over the year in River Damanganga as well as quality at GIDC weir (u/s of CETP discharge) and Jari causeway (d/s of CETP discharge) (Source-CPCB)

4.1.5 DAMAGE TO RIVER WATER QUALITY - BIOLOGICAL ENVIRONMENT

The structure of an aquatic community is determined by the quality of water in the ecosystem. The baseline status of biotic component of the river was evaluated by CSIR-NEERI on phytoplankton and zooplankton of the river indicated the following conditions.

Phytoplankton

Shannon-Wiener Diversity Index (SWI) is a measure of diversity which takes into account the total count and the individual count in water sample. A high value of SWI shows increase in both richness and evenness of the community, indicating minimum impact if organic pollution on the biotic community. The density of phytoplankton ranged from 87-548/m³. In Daman Ganga River, the phytoplankton diversity index (SWI) ranged from 1.78-2.72 indicating ***medium impact of pollution***.

The Palmer's Pollution Index (PPI) is the sum of pollution indices of all the algal species or the genera detected in the particular sample. As per Palmer (1969), a total score of 0 to 10 indicates lack of organic pollution; 10-15 indicates moderate pollution; 15-20 indicates probable high organic pollution and 20 or more confirms high organic pollution. During this monitoring, all samples, showed minimum organic pollution. Overall the PPI value was observed in the range of 8-17. This indirectly indicates the deleterious impact of industrial discharges into the Daman Ganga river.

Zooplankton

Zooplankton population diversity was represented by 7 genera belonging to 2 groups namely Rotifer and Copepoda in descending order of dominance. The density of zooplankton in the studies river stretch varied from 6,133-1,03,400/m³. The Shannon Wiener Diversity Index (SWI) varying from 1.33-1.99 which indicates ***moderate level on zooplanktons diversity***.

4.1.6 DAMAGE TO AQUATIC LIFE

Based on the Interactions with local community it was conveyed that fishing activity is not conducted in the stretch downstream of CETP discharge. However, no reply was received from Fisheries Department, Valsad District for fish catch in the stretch from CETP discharge location to Jari Causeway.

Fisheries Department of Union Territory of Daman & Diu, replied that there is no fish catch in the stretch from jaryi causeway to Daman jetty due to pollution. Though there is no fish catch in River/estuary, fish catch data in Daman Area-Arabian Sea is available with Fisheries department and data provided is given in following **Table 4.2**.

Table 4.2: Fish Catch Data in Daman Area-Arabian Sea

Year	Quantity (Tonnes)
2009-10	983.64
2010-11	1105.44
2011-12	1206.54
2012-13	1144.34
2013-14	1000.98
2014-15	1736.65
2015-16	1543.72
2016-17	1795.845
2017-18	1375.16
2018-19	1058.13

4.1.7 BIO-ASSAY TESTS - CONDUCTED BY CSIR-NEERI

The study conducted by CSIR-NEERI on fish bioassay test was also carried out in **CETP final treated effluent**. Fish mortality was observed at 75% and 100% wastewater concentration. After an exposure of 72 h, the recorded fish mortality was 20% for the sample with 75% wastewater, whereas 100% fish mortality was recorded during 96 h of exposure. In 100% wastewater concentration fish mortality registered was 20%, 80% and 100% within exposure time of 48, 72 and 96 h respectively. Fish mortality rate was very high at 100% compared to 75% wastewater concentration indicating presence of toxic constituents in the CETP discharge.

4.1.8 USE OF WATER FOR AGRICULTURE AND DRINKING PURPOSE

As per information provided by Damanganga Canal Distry Division No.3 Balitha (Vapi), there is no consumption of water from Damanganga River i.e. from downstream of GIDC weir (after CETP discharge) to Jari Causeway for agriculture purpose or industrial purpose in vapi area as well as in areas on both banks. The water for domestic, agriculture and drinking purpose is provided in Vapi and Daman area from Damanganga Canal System (Madhuban Dam/GIDC weir).

Further, it is mentioned in the NIO Map, that High Tide Line reaches up to the railway bridge near CETP outlet and due to saline effect on the river water quality, it is not used for drinking and irrigation purpose in the downstream stretch (about 13 km) besides pollution impact on the river.

Though, river stretch based on BOD falls under Priority - 4 criteria, **presence of other pollutants discharged from the CETP outlet affected the biological environment moderately** which is reflected in SWI index, PPI index.

4.2 EXTENT OF DAMAGE TO THE SEA COAST

The impact on the marine environment is assessed by National Institute of Oceanography (NIO), The study was conducted on water and sediment quality along the beaches of Tadgam, Jampore, Devka and Tithal for a period of three-weeks during March and April 2018 in compliance to order (13.12.2017) of Hon'ble National Green Tribunal (WZ), Pune in O.A.No. 99/2017 (Tarun Patel VS MoEF&CC & Ors) regarding Sea Water Quality & Pollution-Vapi-Daman Area, Gujarat. Jampore and Devaka beaches are on either sides of confluence of River Damanganga into the Arabian Sea in UT of Daman & Diu (Daman Area) where as Tadgam (Sarigam) on South of Daman and Tithal in north of Daman (near Valsad) in Gujarat. The summary and conclusion of the NIO report is given in **Appendix 7**.

Some of the main conclusions from the report are given below-

- The average Dissolved Oxygen (DO) at these four beaches is always above 4.5 mg/l and the average DO values recorded at these beaches are of the order reported for other beaches along the west coast of India.

- The average COD values at four beaches are low or comparable with those reported for other coastal sites along the coast of India and do not reveal any significant enhancement
- The levels of dissolved trace metals: Cr, Fe, Co, Ni, Cu, Zn and Hg in seawater of these four beaches indicate baseline concentrations when compared with their levels in water of other coastal areas of India.
- Comparison of petroleum hydrocarbons (PHc) and phenols available for the west coast of India with results of these beaches does not reveal any enhancement in their level in the beach waters.
- The waters of these 4 beaches contained high load of faecal coliform (FC) in water and sediment suggesting contamination by sewage.
- The concentration of trace metals: Cr, Co, Ni, Cu, Zn and Hg in sediment of these beaches indicates lithogenic levels and suggest that sediment is largely free from anthropogenic contamination from trace metals
- From comparison of levels of PHc, organic Carbon and Phosphorus in sediments of these beaches with those reported for other marine areas, the absence of enhancement of levels of these constituents in beach sediments, is evident.
- PAH's and Organo-chlorines and Organophosphate based pesticides are well below the limit of detection from the beach in the sediments of these beaches.

NIO report conducted on the marine environment has stated that there is no evidence of significant deterioration of environmental quality of the beachfront environment. The study conducted by CSIR-NEERI also indicated pesticides concentrations at levels below the detectable levels of instrument analysis.

4.3 ECONOMIC VALUATION AND DAMAGE ASSESSMENT

Ecological systems, like the biological and natural system supported by Damanganga river, provide both ecosystem goods (like food, raw material etc.) and services (such as biodiversity sustenance, waste assimilation etc.) that are critical for life-support and human welfare in the vicinity of the ecosystem¹. We shall refer to such valuable goods and services together as *ecosystem services* in this report for brevity. Recent studies in environmental economics have enumerated a growing list of ecosystem services and the valuable functions they provide ^{1, 2, 3}.

The ecosystem services provided by the river Damanganga contributes directly or indirectly to the overall welfare of people in the vicinity and visitors to the area, and therefore represents inherent economic value. However, unlike commercial goods and services, not all the valuable functions provided by eco-services have a direct market. Therefore, in the absence of rigorous empirical studies conducted over extended periods of time, the valuation exercises are difficult to execute and subject to several assumptions built on expert judgement. In addition to unsettled methodological and conceptual debates on estimating the economic value of ecological services and functions, there is paucity of empirical studies that estimate economic valuation of ecological services in the Indian context.

Therefore, we take two alternative methodological approach to compute the valuation of the damages. In the first approach, the valuation of selected eco-services derived from the river are summed and a prorated benefit transfer approach is used to derive valuation in the context of river Damanganga. In the second approach, the shadow prices of pollution loads of major polluting component are obtained, summed and the same is converted to corresponding Indian currency. The two approaches are described in detail below:

¹ Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., ... & Raskin, R. G. (1997). The value of the world's ecosystem services and natural capital. *nature*, 387(6630), 253.

² De Groot, R. S. (1987). Environmental functions as a unifying concept for ecology and economics. *Environmentalist*, 7(2), 105-109.

³ De Groot, R. S. (1992). Functions of nature: evaluation of nature in environmental planning, management and decision making. Wolters-Noordhoff BV.

4.3.1 APPROACH - I: DIRECT BENEFIT TRANSFER METHOD

Globally, there are several valuation studies across a wide range of biomes and ecosystems, notably large initiatives like the *The Economics of Ecosystems and Biodiversity* (TEEB) project set up in 2007 and led by the United Nations Environment Programme has developed a comprehensive global assessment of economic aspects of ecosystem services^{4,5}.

Therefore in order to estimate the economic value of the Damanganga river system downstream of the CETP, we follow the *benefit transfer* method⁶ matching valuation estimates from the TEEB database .

First, the appropriate eco-services and functions provided by the river Damanganga applicable to the context are selected. Second, the economic value of the river system under study is computed by selecting a unit area per year value estimate from the TEEB database for an ecosystem/biome that closely matches with that of Damanganga downstream of CETP for a given eco-function using the *benefit transfer* method⁶. Finally, we compute the value of each of the selected eco-functions provided by Damanganga by prorated scaling, application of inflation rates and currency rate conversions of the unit values obtained from the TEEB database.

The ecosystem services and functions found applicable to the Damanganga river downstream of CETP Vapi is listed in Table 4.3.1 below. Corresponding to each function the unit economic value per unit area per year estimated by the reference study from a closely matching context is listed in column 2 of the table. After currency conversion and inflation adjustment to year 2013 (cols. 3-4), the corresponding unit area per year of Indian Rupee value is listed in column 6. Considering **339.5** hectares of waterbody area for the pollution affected downstream of Damanganga (the water body area used is shown in **Figure 4.6** below). This area represents the average area of the waterbody measured at one point in time (2019). Pro-rated value of the respective eco-function is listed in column 7 of the table.

⁴Van der Ploeg, S. and R.S. de Groot (2010) The TEEB Valuation Database – a searchable database of 1310 estimates of monetary values of ecosystem services. Foundation for Sustainable Development, Wageningen, The Netherlands.

⁵Ring, I., Hansjürgens, B., Elmqvist, T., Wittmer, H., & Sukhdev, P. (2010). Challenges in framing the economics of ecosystems and biodiversity: the TEEB initiative. *Current Opinion in Environmental Sustainability*, 2(1-2), 15-26.

⁶Johnston, R. J., Rolfe, J., Rosenberger, R. S., & Brouwer, R. (2015). *Benefit transfer of environmental and resource values* (Vol. 14). New York: Springer.



Figure 4.6: Damanganga river water body area considered for valuation (339.49 hectares highlighted in green)

Summing up the selected eco-services and functions, it is estimated that the Damanganga river downstream of CETP has a valuation of **INR 22.29 Cr./Yr** for the year 2013. This value is extrapolated to five more years: **INR 22.29 Cr/yr in 2013 to INR 35.90 in 2018 in Table 4.3.**

In **Table 4.4**, based on an average estimated river water flow quantity rate of 365 MLD⁷, and the CETP discharge quantity rates (col. 3), the pollution concentration in the river if effluent is discharged as per standards (COD 250 mg/l) is computed in col. (6). The actual pollution concentration based on actual effluent flow and concentration is computed in col. (7) and the corresponding excess concentration due to standard breach is shown in col.(9).

⁷ Computed using inflow-outflow concentration balance equation using data from NEERI's report on "Study on pollution status of river Daman Ganga: development of pollution abatement strategies for river system". The following formula is used $\text{River inflow} = \frac{(\text{CETP discharge concentration} - \text{River downstream concentration}) \times (\text{CETP discharge volume})}{(\text{River downstream concentration} - \text{River upstream concentration})} = \frac{(564-80) \times 53}{(80-10)} = \text{rounded to } 365 \text{ MLD}$

**Table 4.3 : Economic Value of ecosystem services and functions selected
for Damanganga downstream of CETP Vapi**

(1) Water use functions (Ecological Services and Functions)	(2) Study Valuation Estimate (USD/ha/yr)	(3) Year of Study	(4) USD to INR Conv. Rate	(5) Inflation adjusted valuation in INR/ha/yr (in 2013)	(6) Damanganga Ecoservices (Cr.INR/Year) (@ 339.5 ha downstream river area)	(7) Reference
Food : Fish	\$1,259.00	1999	43.118	₹206,149	₹7.00	Economic valuation of mangrove ecosystems: potential and limitations. Economics of Environment and Development (CREED) Working Paper Series No. 14, 54pp.
Water : Misc. water uses	\$3.37	2007	40.987	₹245	₹0.01	Islam, M. and J.B. Braden (2006) Bio-economic development of floodplains: farming versus fishing in Bangladesh. Environment and Development Economics 11: 95-126.
Aesthetic : Attractive landscapes	\$3,905.55	2007	40.987	₹283,586	₹9.63	Gerrans, P. (1994) An economic valuation of the Jandakot wetlands. Western Australia: Edith Cowan University, ISBN: 0729801756. 100pp.
Inspiration : Cultural/Spiritual use	\$792.81	2007	40.987	₹57,567	₹1.95	Kirkland, W.T. (1988) Preserving the Whangamarino wetland: an application of the contingent valuation method. Massey University, NZ
Genepool : Biodiversity protection	\$169.14	1994	31.371	₹32,452	₹1.10	Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V. O'Neill, J. Paruel, R.G. Raskin, P. Sutton and M. van den Belt (1997) The value of the world's ecosystem service and natural capital. Nature 387: 253-260.
Recreation : Ecotourism	\$492.00	2000	45.079	₹76,567	₹2.60	Schuyt, K. and L. Brander (2004) Living waters: conserving the source of life. The economic values of the world's wetlands. Gland, Switzerland: WWF International and Amsterdam: Institute for Environmental Studies.
Total Eco-Services Valuation of Damanganga downstream of CETP Vapi (Cr.INR/Yr)					₹22.29	

Assuming that about 50% damages occur to the river system if the river COD concentration is 35 mg/l and close to nil damages for 10 mg/l (river COD concentration in the pristine GIDC Vapi weir)⁸, the James concentration loss model⁹ is used to compute the percentage extent of damage due to the total pollution in the river (col. 9). **Figure 4.7** below shows this assumption graphically. Pollution damages if effluents are discharged as per the standards (col 10). Accordingly the total loss of economic value due to total pollution is estimated in col.11 and the loss due to pollution in excess of the river discharge standard is shown in col.12.

⁸ This assumption is based on expert judgment considering the typical level of pollution observed in the Damanganga river. The damage rate in percentage computed in Col. 9 and 10 is contingent on this assumption.

⁹ James, L. D., & Lee, R. R. (1971). Economics of water resources planning. Economics of water resources planning.

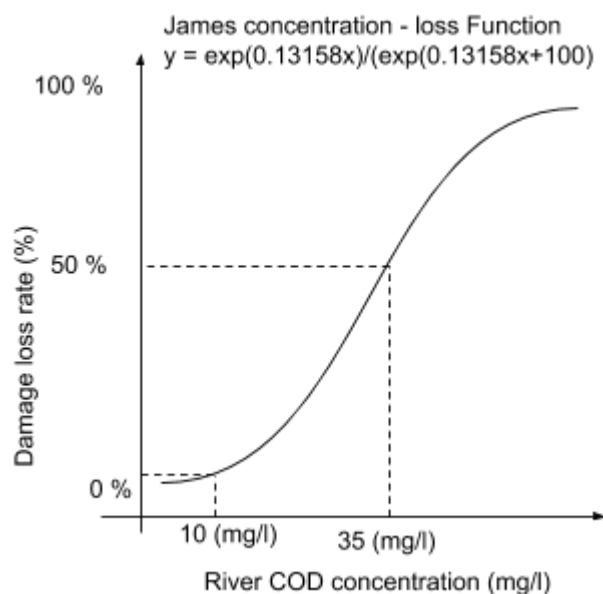


Figure 4.7: Concentration loss function assumed for computing the percentage damage rate

Year	Inflation adjusted Ecological services valuation for Damanganga downstream (Cr. INR/Yr)	CETP discharge quantity (MLD)	CETP actual discharge concentration (COD mg/l)	CETP discharge breaching standard of 250 (mg/l)	River pollution concentration if discharged at standard of 250 (COD mg/l)	Actual River concentration (COD mg/l)	Excess river COD concentration due to standard breach (mg/l)	Pollution Damage Rate for actual river concentration (a)	Pollution Damage Rate if following standards (a)	Damage due to total pollution (Cr.INR/yr)	Damage due to pollution in excess of standards (Cr.INR/yr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2013	₹22.29	53.7	524.0	274.0	36.7	77.0	40.3	99.60%	55.72%	₹22.20	₹9.78
2014	₹24.52	53.8	511.0	261.0	36.9	75.3	38.5	99.51%	56.10%	₹24.40	₹10.64
2015	₹26.97	53.2	398.0	148.0	36.4	58.0	21.6	95.36%	54.63%	₹25.72	₹10.98
2016	₹29.67	53.0	274.0	24.0	36.3	39.8	3.5	65.27%	54.30%	₹19.36	₹3.26
2017	₹32.63	52.0	267.0	17.0	35.6	38.0	2.4	59.77%	51.94%	₹19.51	₹2.56
2018	₹35.90	53.9	277.0	27.0	36.9	40.9	4.0	68.51%	56.28%	₹24.59	₹4.39
										Total	₹41.61

The value loss due to total pollution in the river Damanganga ranges from **Rs 19.36 Cr./year** to **Rs 25.72 Cr./year** during the period 2013 to 2018. Of this total, the damages that may be attributed to pollution from CETP in excess of the stipulated standard of COD 250 mg/l is in the range of **Rs 2.56 Cr./year** to **Rs 10.98 Cr./year** during the same period of 2013 to 2018, with an average of **INR 6.93 Cr./year**, cumulatively amounting to **Rs 41.61 Cr** for six years.

4.3.2: APPROACH - II : SHADOW COST OF POLLUTION LOAD AND BENEFIT TRANSFER METHOD

Due to lack of availability of detailed baseline data related to above damage parameters, various studies have been referred to arrive at the damage costs. Approach of shadow pricing mechanism is used for damage cost calculation. The shadow price refers to the value of damage which could have been avoided if the treatment would have been done for the pollutant loads. Thus the basis of economic evaluation is avoided cost method. Shadow prices (avoided cost) have been referred from Hernandez-Sancho et.al. paper of 2010¹⁰. The paper describes the shadow prices for each pollutant individually and are represented in Table 4.5.

In order to estimate the damages done to the river, the GPCB discharge standards have been taken into consideration. The base data for each parameter is taken from the CETP (VGEL) data (being on daily sampling basis and more data) shared with the committee for the last 5 years. The discharge limit is being breached, are considered for analysis and yearly average value for each parameter is taken for calculation. The estimation of damage cost is done for 2018 values. An average of 6% inflation for each year is considered from the base year of calculation.

Table 4.5: Shadow Damage Cost for Each Pollutant in Euro per Kg

Pollutant	Shadow Cost in Euro per Kg (2010)*
Nitrogen	16.353
Phosphorous	30.944
Suspended Solids	0.005
Biological Oxygen Demand	0.033
Chemical Oxygen Demand	0.098
<i>*These shadow costs are based on a water value of Euro 0.7/m³ in Spain in 2009</i>	

Using the unit pollutant load shadow cost the total cost for each pollutant load due to excess pollution is calculated and given in **Tables 4.6 to 4.9** respectively for

¹⁰Molinos-Senante, M., Hernández-Sancho, F., & Sala-Garrido, R. (2010). Economic feasibility study for wastewater treatment: A cost-benefit analysis. *Science of the Total Environment*, 408(20), 4396-4402.

COD, BOD, TSS and Nitrogen. Further, it is suggested that the calculated values should be considered as conservative estimates, due to following key assumptions:

1. The CETP discharge is creating damage to river ecosystem. The calculation is based on the excess COD, TSS, NH₃-N and BOD (no phosphorous data available for CETP) discharged into the river.
2. The pollutant load values which are within the standards is also contributing damage to the river ecosystem in addition to the excess discharge.
3. The current calculation only takes the discharge during the recent years 2013-2018 into consideration.

**Table 4.6 Cost of Damages for Excess COD Discharge in Rs Crore per year
(Expressed in 2018)**

Year	Discharge in MLD (million liters per day)	Breaching Standard, value of COD in mg/l (above 250 mg/l)	Load exceeding the standard in Kg/Day	Cost in Rs Crore/Year (2018)
2013	53.65	274	14717	5.08
2014	53.82	261	14047	4.85
2015	53.16	148	7872	2.72
2016	53.01	29	1515	0.52
2017	51.96	29	1498	0.52
2018	53.90	28	1527	0.53

Table 4.7: Cost of Damages for Excess BOD Discharge in Rs Crore (2018)

Year	Discharge in MLD	Breaching Standard, value of BOD in mg/l (above 30 mg/l)	Load exceeding the standard in Kg/Day	Cost in Rs Crore (2018)
2013	53.65	41.17	2208	0.26
2014	53.82	22.50	1211	0.42
2015	53.16	0.00	0	0.00
2016	53.01	0.00	0	0.00
2017	51.96	0.83	43	0.01
2018	53.90	0.67	36	0.01

Table 4.8: Cost of Damages for Excess TSS Discharge in Rs Crore (2018)

Year	Discharge in MLD	Breaching Standard, value of TSS in mg/l (above 100 mg/l)	Load exceeding the standard in Kg/Day	Cost in Rs Crore (2018)
2013	53.65	77.83	4175	0.07
2014	53.82	61.17	3292	0.06
2015	53.16	0.50	27	0.00
2016	53.01	1.33	71	0.00
2017	51.96	0.17	9	0.00
2018	53.90	0.00	0	0.00

Table 4.9: Cost of Damages for Excess Nitrogen Discharge in Rs Crore (2018)

Year	Discharge in MLD	Breaching Standard, value of N in mg/l (above 50 mg/l)	Load exceeding the standard in Kg/Day	Cost in Rs Crore (2018)
2013	53.65	3.3	179	10.31
2014	53.82	4.3	233	13.44
2015	53.16	0.2	9	0.51
2016	53.01	0.8	44	2.55
2017	51.96	4.4	229	13.23
2018	53.90	3.8	207	11.91

The total damage for each combining the damages of all the pollutant is given in

Table 4.10 below:

Table 4.10: Total Yearly Damages from Each Pollutant

Year	Damage Cost in Crore (expressed in 2018 Rs)				
	COD	BOD	TSS	N	Total
2013	5.08	0.26	0.07	10.31	15.72
2014	4.85	0.42	0.06	13.44	18.77
2015	2.72	0.00	0.00	0.51	3.23
2016	0.52	0.00	0.00	2.55	3.07
2017	0.52	0.01	0.00	13.23	13.76
2018	0.53	0.01	0.00	11.91	12.45
Total in Last 6 Years in Rs. Crore					67.00
Average damage in each year (due to excess discharge) in Rs. Crore					11.17

Therefore using Approach II, (Table 4.10) a **cumulative damage of Rs. 67.00 Crore has been estimated due to excess discharge of pollutants in the river ecosystem in last six years between 2013- 2018.** Yearly damages range from **Rs. 3.07 Cr/yr to 18.77 Cr/yr** with an average of **Rs. 11.17 Crore** damage to environment in each year.

A summary comparing the damages estimated by the two approaches is tabulated in **Table 4.11** below:

Table 4.11: Summary of damages estimated using two alternative approaches

Approach - I : Direct Benefit Transfer Method	
Yearly economic damage range	INR 2.56— 10.98, Cr./year
Average economic damages (2013-18)	INR 6.93 Cr./year
Cumulative economic damages (2013-18)	INR 41.61 Cr.
Approach - II : Shadow Cost of Pollution Load and Benefit Transfer Method	
Yearly economic damage range	INR 3.07 — 18.77 Cr./year
Average economic damages (2013-18)	INR 11.17 Cr./year
Cumulative economic damages (2013-18)	INR 67.00 Cr.

As there are many methods for environment damage estimation and all of them use reasonable assumptions, we have used two different approaches to calculate the damage. While Approach – I is based on the economic valuation of eco-services rendered by the river considering a representative critical pollutant (COD) for damage estimation. Approach-II is based on the CETP discharge outlet norms for the pollutants: COD, NH₃-N, TSS, and BOD, independent of river water quality. Using two alternative methods the cumulative economic damages are estimated to be in a comparable range (INR 41.61 Cr for the Approach-I and INR 67.00 Cr for Approach-II during the year 2013 to 2018).

Chapter 5:

STEPS FOR RESTORATION OF RIVER

5.1: STEPS FOR RESTORATION OF RIVER DAMANGANGA

River restoration refers to a wide variety of ecological, physical, spatial and management measures and practices aimed at restoring the natural state and functioning of the river system in support of biodiversity, recreation, flood management and landscape development. By restoring natural conditions, river restoration improves the resilience of the river systems and provides the framework for the sustainable multifunctional use of estuaries, rivers and streams. River restoration is an integral part of sustainable water management. River rejuvenation/restoration is an effort aimed at restoring poor health of overexploited and polluted rivers. The most common goals of river and stream restoration are to improve water quality, manage or replant riparian vegetation, enhance in-stream habitat, provide for fish passage, and stabilize banks. The general practices for accomplishing these goals are diverse and overlapping. Few of these may not be possible to be implemented in all the cases. The strategy generally should include:

- ❑ Prevention of use of rivers/lakes and reservoirs for bathing of humans, animals and washing of vehicles and animals.
- ❑ Control of pollutants reaching river from industries, domestic sewage and agricultural areas - through CETPs, STPs, soil bank planted with local tree species which are particularly useful for construction, housing and fuel. These constructs should be completely capable of arresting pollutants in their vicinity.
- ❑ Clearing of pollutants in the river bed through dredging, riverfront development, river linking and waterways.
- ❑ Watershed management.
- ❑ Construction of small check-dams along the catchment area.
- ❑ Scientific assessment of quantum of environmental flow in each stretch.

- ❑ Rejuvenation of lakes and wetlands along the river basin.
- ❑ Protection of floodplains from encroachment.

The fact that most towns and cities have developed near rivers illustrates their importance to humans. Many of the benefits, along with biodiversity and habitat, are compromised if rivers are modified. River restoration projects encourage local communities to engage in their local environment, raising awareness of environmental issues. To ensure local communities benefit as much as possible from river restoration projects, it is important to involve all interested organisations and local bodies/individuals from

the outset. Restoration of the environment of river Damanganga requires following a sequence of **actions** as suggested in the following section. The restoration of the river is

In natural attenuation, the pollution level in the environment (soil, water, ground-water, air and soil) is reduced through natural processes, without human intervention, within a timeframe based on the pollution load and intensity. The natural processes may be physical, chemical or biological in nature. They cause the concentration, mass, volume, mobility and/or toxicity of the pollution in the environment to fall.

achieved through natural attenuation in a time frame.

5.1.1 ACTIONS TO BE UNDERTAKEN AT GIDC BY GIDC/NOTIFIED AREA AUTHORITY

- As the industries discharges to GIDC drainage through underground pipeline therefore it is difficult to monitor the industries. It is recommended to provide the surface/overground pipeline from industries to manhole/sump of GIDC drainage network and to remove all underground discharge line of industrial unit to manhole of underground GIDC drainage. This should be verified/certified by independent third party. Further, it is responsibility of VGEL and Notified area authority to check that there is NO unauthorized (ghost lines) connection gets established. Further, it is recommended to lay surface pipeline conveyance system up to CETP, wherever technically feasible by removing underground existing pipeline.
- Restoration of any damaged stormwater drains to prevent entry of wastewaters into the natural drains in the industrial estate. Entry of industrial

wastewater in Bill khadi and its flow downstream to GIDC estate should be prevented.

- Proper design and construction of stormwater drains within the industrial estate where it is not provided particularly:
 - in low lying areas to prevent stagnation of storm water contaminated with industrial wastes.
 - to prevent indiscriminate entry of contaminated storm water into natural drains.
 - GIDC should ensure and make their underground drainage system fully working. If any choking occurs in drain line, that should be attend immediately.

5.1.2 ACTIONS TO BE UNDERTAKEN AT CETP LEVEL:

- CETP shall carry out monitoring and analysis of all industries including all streams of wastewater, product wise and shall identify High COD/High TDS (refractory COD Stream). Based on that, CETP shall monitor the inlet quantity to CMEE/Spray dryer industry wise and shall submit data to GPCB monthly for identification of any discrepancies which will be helpful in taking actions.
- All the member units have to provide overhead tank and discharge their primary/secondary treated effluent (CETP Inlet norms) from their overhead tank through above ground pipeline to the respective sumps. Between the overhead tank and sump room, members have to provide strainer, valve and sampling point. From the sump room, wastewater flows under gravity to the pumping station from where the effluent is pumped to collection tank of CETP. The quantity and quality of the effluent can be monitored employing the system mentioned hereunder:

Quantity Monitoring:

- All the sump rooms should be equipped with SCADA-PLC system for controlling quantity of the effluent discharged by each of the member units.
- All the member units should be given discharge schedule for their registered effluent quantity to CETP. The quantity of effluent discharged by member units to sump room shall be governed by SCADA-PLC system.

- No member unit shall discharge the effluent to the CETP more than their permitted quantity, after the discharge time or registered quantity is over; the valve provided in SCADA PLC will be automatically closed.

Quality Monitoring:

- All the sump rooms shall be equipped with auto samplers for controlling the quality of effluent discharged by members.,which can be accessible by VGEL.If require,it should also be accessible for GPCB.
- Known quantity of composite effluent sample shall be collected in the bottle of specific member, which is equipped in the auto sampler for analysis. The following day, the samples would be split into 3 parts and sealed at the same time. One bottle is barcoded and analysed at the CETP. The second sample kept for joint testing and third given to the specific member unit,
- The result of analysis shall be sent to the member unit through software based SMS system. If the member units have query on the results of analysis, they have to intimate the CETP within 2 days of SMS. After that bill shall be generated through software based system.
- Proper operation, maintenance and up-gradation of CETP to meet the norms as prescribed in **Chapter 6 (Table 6.1)**.
- As the per recommendation given in the NEERI report regarding scientific upgradation of CETP for color & recalcitrant pollutants (refractory COD) including reject management with final aim of achieving ZLD. This is anticipated to result in recovery of good quality water that could be reused for industrial process and hence fresh water conservation. However, achieving ZLD for such huge volume of effluent will be difficult based on cost, operation & maintenance problems as it requires a separate network due to use of treated water by the industries.

The feasibility of conducting recovery of water from the CETP effluents necessitates a separate study considering the heterogeneity of effluents received by the CETP due to varying influent concentrations from the multitude of member units.

The study should assess the effluent treatment options for recovery of the CETP water with capital and operational costs. This study may be conducted by National Institutes working in the area of water/wastewater treatment.

5.1.3 ACTIONS TO BE TAKEN AT REGULATORY LEVEL:

- Continuous strict vigilance, identification and action against defaulting industries.
- GPCB and GIDC jointly to ensure that the process wastewaters from industries do not enter the storm water drains. It may be achieved through construction of dykes or tanks by Industry to collect and introduce into the wastewater treatment scheme.
- GPCB and PCC have already submitted River Action Plans as per order of Hon'ble NGT in the OA. No. 673 of 2018 (M.A. No. 1777/2018) which is based on the News item published in "The Hindu" authored by Shri Jacob Koshy titled " More river stretches are now critically polluted: CPCB"

5.1.4 ACTIONS TO BE TAKEN BY LOCAL BODIES (MUNICIPAL COUNCIL):

- Proper design and construction of stormwater drains and sewerage network within the local bodies where it is not provided particularly:
 - in low lying areas to prevent stagnation of storm water contaminated with wastes.
 - to prevent indiscriminate entry of contaminated storm water into natural drains and finally river Damanganga.
- Control domestic/commercial wastewaters (sewage) discharges into the River through proper collection and treatment from residential and commercial areas and treatment through STPs. The STPs shall be designed to reuse of treated sewage for industrial reuse/ landscaping / firefighting and agriculture purpose.
- Prevent dumping of solid waste from towns and villages on the banks of river.
 - Identification of plots for solid waste landfill development.

The above steps/actions to be taken for the restoration of the river are summarised in Short term Measures and Long term Measures.

Short Term Measures (1 year):

- To address reduction of COD less than 250 mg/l immediately by conducting rapid environmental audit of the member units to improve onsite effluent treatment performance so as to meet the CETP inlet norm - Time period 3 Months.
- Non-biodegradable/ refractory COD effluents of industrial units may be shifted to CMEE/Spray drier of CETP and to keep records (identify the members and track their discharge) & shall monitor it with generation of such waste water. - Time period 3 Months.
- CETP shall implement upgradation to achieve the discharge standards for parameters particularly COD and colour based on research studies - 12 Months.
- Spray drying capacity improvement to hand highly concentrated COD to avoid liquid discharge -3 Months.
- It is recommended to provide the surface/overground pipeline from industries to GIDC network (manhole/sump) with SCADA system for effluent quantity and quality monitoring of individual industrial wastewater - 12 months.

Long term measures (1- 5 years):

- A feasibility study shall be conducted on environmental and socio-economic parameters on the deep sea discharge which should contain suitable sites for disposal.
- Institutes such as IIT Gandhinagar (DSIR - IIT Gandhinagar Common Research & Technology Development Hub for Chemical Processes)/ National Productivity Council may be approached to handle the wastewaters from micro-small industries (<25 KLD) prior to sending of their effluents to the CETP. Workshops may be conducted to study the problems, issues and challenges faced by the dye & intermediate manufacturers and chemical units.
- A national inventory of dyes and dye intermediates may be prepared for alternative green dyes, chemicals or process. The project may be funded by the respective textile ministry, industries, MoEF&CC. Prominent research institutions in the area should be involved in this initiative.

- The treated effluent from STPs should be reused by the industrial units falling in the area.
- Scientific assessment and feasibility of minimum environmental flow of Damanganga river for release of water from the Madhuban Dam. The study to be conducted by National Institutes to restore the ecosystem.

Other long term measures

- Protection of floodplains from encroachment.
- Assessment of basin sediments for desilting of river bed, if necessary.
- Community participation to be encouraged. Awareness program should be conducted for local people /students for importance of cleaning the river and the source of pollution.
- Afforestation program on Damanganga river bank
- River Front Development, eco-tourism and promotion of water sports.
- Agricultural and farm yard management surrounding the river path.
- Standard protocols for river restoration to be followed such as:
 - The design of a river restoration project should be based on a specific guiding principles of a more dynamic, healthy river.
 - The river's ecological condition must show measurable improvement.
 - The river system must be more self-sustaining and resilient to external perturbations, so that only minimal follow up maintenance is needed.
 - During the projects implementation phase, no lasting harm should be inflicted on the ecosystem.
 - Both pre-and post-assessments must be completed and data made publicly available.

Chapter 6:

COST OF RESTORATION

6.1: COST OF RESTORATION

River restoration is the process of managing rivers to reinstate natural processes to restore biodiversity, providing benefits to both people and aquatic life. Reintroducing natural processes can reshape rivers to provide the diversity of habitats required for a healthy river ecosystem and ensure their long-term recovery by addressing the root cause of the issue. Some rivers have been extensively modified to accommodate societal needs for food production, flood protection and economic activity so it is not always possible or desirable to restore to a pristine condition.

The most fundamental challenge facing successful restoration of aquatic systems is to establish a clear understanding of the cause and effect relationships between the physical/biochemical processes at work within the river environment which has been altered by human activities.

Estimation of cost of river restoration includes multitude of factors. The restoration of river has been broken into short term and long term measures. The major costs considered in the report is expressed in the following **Table 6.1**. Costs function is not included in the long term measures as it has to be estimated by the Central/State agencies prior to completion of short term measures. Institutes of National repute may be employed to study on the specific aspects and arrive at an estimate for restoration of the river activity.

In general, the long and short term measure work effectively based on the cycle presented in **Fig. 6.1**. Since the section of the river from GIDC weir to the Daman Jetty is small, all the above criteria may not be applicable.



Fig: 6.1: Cyclical Activity in Restoration of River

Measures mentioned in the **Chapter-5** for the restoration of the environment with respect to river Damanganga broadly have following components (with reference to sources of pollution) that have to be considered Table 6.1.

Table: 6.1: Cost Estimate for River Restoration Programme

Sr. No	Item (s)	Approximate Capital Cost (Crores)
Short Term Measures		
A	GIDC/Industrial Area	
1	Surface pipeline/Overground Pipelines from industries to GIDC drainage network, refurbishment of underground drainage network	95 ¹
2	SCADA system for all 519 member industries including CETP inlet/outlet along with the all pumping stations	10 ^{1&2}
B	CETP (Existing- 55 MLD)	
	Adoption of tertiary treatment technology for removal of colour and COD based on the following options or any other treatment technology based on recent studies	Capital cost

	□ Option 1 - Ozonation (or)	100 ¹
	□ Option 2 - Electro-chlorination	100 to 120
	Increase in spray drying capacity	10 ¹
C	Sewage Treatment Plants	
	Vapi Area – 4 nos (~60 MLD total capacity)	233 ³
	Daman Area – 2 nos (~70 MLD total capacity)	272 ⁺
D	MSW Management – 2 nos for Vapi Area	11 ³
	Total (in Crore)	731 to 751

Reference:

1. CETP Vapi & extrapolated based on GIDC Ankleshwar estimation
2. GESCSL CETP, Vatva, Ahmedabad
3. Vapi Municipal Council
(Already provided in River Action Plan wrt NGT case no OA No. 673/2018 (M.A.No.1777/2018 on most polluted river stretches)
4. + Extrapolated based on expert judgement based River Action Plan submitted by PCC, Daman wrt NGT case no O.A. No.673/2018 on most polluted river stretches)

Chapter 7:

ASSESSMENT OF ACCOUNTABILITY OF DEFAULTING INDUSTRIES AND CETP AND LIABILITY/COMPENSATION

One of the assigned task to the committee was to hear individual polluting units not meeting the norms and to quantify the amount of liability on “Polluters Pay” principle which can be invoked by regulatory body to enforce pollution norms not only as “Precautionary Principle” but also as remedial action if the unit is found to be polluting and not meeting the prescribed norms.

As per para 55 (i.b) of the Hon’ble NGT order dated 11.01.2019- “ the committee may give hearing to the CETP operator and the units identified as polluting by the GPCB for which list will be furnished by the GPCB to the committee indicating the period and nature of default”

Accordingly, GPCB provided a list of defaulting industries (34 nos.) for the period from January 2018 to December 2018 of the member units of the CETP who have been issued closure directions under section-33 A of the Water (Prevention & Control of Pollution) Act 1974. Further, GPCB provided another list of defaulting industries (10 nos.) which is submitted to GPCB by M/s VGEL (CETP). The committee carried out hearing to the defaulting industries and CETP operator at Vapi on 08.03.2019 and 09.03.2019.

The industry wise details including category, scale, dates of visit, closure direction, revocation of closure direction, reason for closure/nature of default, hearing of industries and observation of the committee, compensation amount etc are provided at **Appendix-8** whereas the details of the hearing of CETP is provided at **Appendix-9**. The Environmental compensation calculation sheet provided at **Appendix-10**. The basis for calculation of compensation is described in subsequent

section. The list of the defaulting industries and environmental compensation is given are in **Table 7.2**.

7.1 OBSERVATIONS BASED ON HEARING OF THE DEFAULTING INDUSTRIES

- It is observed that the industries were found accountable for the non-compliances of discharge norms/and or other non-compliances with consent conditions. The compensation amount calculated and required to be paid by the respective defaulting industries.
- As observed from the list of defaulting industries, scale wise distribution is Large Scale-5, Medium Scale-8, and Small Scale - 31.
- The some industries who are defaulter for multiple times should get immediate and severe punishment such as removal of memberships by VGEL (CETP) and prosecution under law.
- As per the list given by GPCB, total 44 industries (including multiple non-compliance of same industry) found to be non-compliance. The total volume contribution of the 44 industries is found to be only 2.2 MLD which is miniscule with respect to 55 MLD of CETP capacity (519 member industries). The defaulting industries might have been more than the list provided, however, finding defaulters in the present system needs improvement with change in quality and frequency of monitoring, vigilance of GPCB and VGEL (CETP) as steps suggested in **Chapter-5**. As the status of defaulting industries remains dynamic, GPCB needs to take action against such units. This will help in improving the compliance of the member industries as well as quality of the inlet effluent to CETP which will be helpful in meeting outlet norms.
- GPCB issued Show Cause Notices to defaulting industries regarding depositing interim compensations with CPCB as per Hon'ble NGT order (11.01.2019) para 55 (ii) & (ii.a). Vapi Industries Association/Defaulting industries approached Hon'ble Supreme Court (Civil Appeal Diary Nos. 5264/2019) and as per order dated 22.02.2019 the Hon'ble Supreme Court stayed direction in respect of interim compensation contained in impugned order of Hon'ble NGT dated 11.01.2019) for two weeks and to approach the NGT. Accordingly, VGEL (CETP)/Defaulting industries approached NGT with

IAs and as per order of Hon'ble NGT dated 09.04.2019 status quo with regard to requirement of deposit to continue, CPCB to submit the report within four weeks and matter for consideration is on 13.05.2019. As on 08.04.2019, CETP deposited Rs. 10 crores and following industries have deposited interim compensation.

7.2 OBSERVATIONS BASED ON HEARING OF CETP OPERATOR

- As the CETP is non-complied with outlet norms for some parameters and causing pollution in River Damanganga, it is accountable for paying compensation. Committee taken the note of various measures taken up by CETP to improve the inlet as well as outlet quality, however, still some more measures are required to be taken further for meeting norms (Inlet as well as outlet). Over the years, it is observed that the inlet as well as outlet quality of the effluent of CETP is improved and CETP is slightly exceeding the - COD (critical parameter). The main issue of the effluent is due to refractory COD and Colour.
- The committee has noted Action Plan for the meeting norms where some in house improvement in existing units, segregation of waste from member units, quality & quantity sampling of member units, identification of colour imparting units etc. Also installation of Common MEE & Common Spray Dryer (CSD) and planning CSD for High COD & High TDS wastewater. CETP has planned expansion of hydraulic load, however, up-gradation in terms of reducing pollutant (COD & Colour) are not properly incorporated in the Action Plan.
- CETP is also carrying out monitoring and collecting samples of different industries to check on inlet quality of CETP, the list of defaulting should be given to GPCB for necessary action. If the inlet quality is met with then there are chances of meeting the outlet norms with proper operation and maintenance of treatment units.
- Though, CETP discharges treated effluent in river which is having effect of tides causing water saline water resulting into no potable use (not used for drinking / irrigation / bathing / washing), there is deterioration in water quality due to other pollutants.

- The committee has taken note of report of NIO and also improvement in class of priority as per categorisation of river which shows that there has been remarkable improvement in the water quality of the downstream of CETP discharge location. In the downstream of CETP existing location, though there are number of discharges, CETP is major causing damage to the environment.
- Regarding request from CETP operator to the committee that the member industries should not be penalized, since the CETP is already being penalized for the same offence in the same area and they are being penalized multiple times (financial loss due to closure, bank guarantee, additional treatment cost from CETP etc) for same offence; the committee is not agreeing above and levying env compensation due to their non-compliances with discharge norms/consent conditions. The committee noted the issue of meeting CETP inlet norm COD: 1000 mg/l by small scale industries (340 out of 520) with only primary treatment and only @ 5 % load of 340 SSI unit to CETP (out of 55 MLD).
- It is informed that VGEL undertakes to coordinate with Vapi Industries specifically SSI units to technically upgrade their treatment systems and the technology to make them environmentally and economically viable in collaboration with IIT Gandhinagar (CRTDH) / SVNIT, Surat / IIT, Mumbai / National Chemical Institute (CISR), Pune / GCPC, Gandhinagar, etc. The committee noted and mentioned in the report as one of the long term measures in steps for restoration.
- CETP requested that Interim Deposit of Rs.10 crore made by CETP- Vapi to CPCB as per the NGT Order (para 55 (ii)), should be allotted to the CETP- Vapi, to be spent on upgradation and technological improvement of CETP- Vapi to adopt appropriate modern technologies, and help improve the discharge quality of effluent. It is mentioned by committee that as per said order of Hon'ble NGT as per para 55 (iii) the amount may be utilized by the CPCB for restoration of the environment. In the cost of restoration, upgradation of CETP, quality & Quantity monitoring system etc are suggested.

**Table 7.1: List of Industries - Interim Compensation Paid as per order
Dated 11.01.2019 (NGT OA No. 95 of 2018)**

Sr. No.	GPCB ID	Name of Industries	Scale of Industries	Interim Compensation paid in consideration of Hon'ble NGT Order, (INR)
1.	29990	Amardeep Chemical Industries Pvt. Limited	Small	2,500,000
2.	34228	Amitech Chemicals Private Limited	Small	2,500,000
3.	23074	Amoli Organics P Ltd	Large	10,000,000
4.	23260	Centre Point Industries	Small	2,500,000
5.	23278	Chemodist Industries	Small	2,500,000
6.	23410	Dy-Mach Pharma	Small	2,500,000
7.	23569	Hemani Industries Limited	Medium	5,000,000
8.	23575	Heranba Industries Ltd (Unit: 2)	Large	10,000,000
9.	23574	Heranba Industries Ltd (Unit I)	Large	10,000,000
10.	23728	Keva Fragrances Pvt.Ltd	Medium	5,000,000
11.	23868	Mangalam Drugs & Organics (Unit-1)	Medium	5,000,000
12.	23380	Micas Organics Ltd (Unit-I)	Large	10,000,000

13.	24577	Micas Organics Limited (Unit-V)	Small	2,500,000
14.	24121	Pidilite Industries Ltd.	Large	10,000,000
15.	34233	Supreet Chemicals Pvt.Ltd.(Unit-3)	Small	2,500,000
16.	24805	Vital Laboratories Pvt Ltd	Medium	5,000,000
17.	24843	Zen Pharma	Small	2,500,000

7.3 BASIS FOR CALCULATING LIABILITY/ ENVIRONMENTAL COMPENSATION

The base formula taken as per para 6 of the order of Hon'ble NGT in the O.A. No. 593/2017 (Paryavaran Suraksha Samiti & Anr Vs Union of India & Ors) dated 19.02.2019 which is given at **Appendix-11**. As given in the order, the environmental compensation (EC) based on following formula-

$$EC = (PI \times N \times R \times S \times LF)$$

Where, EC is Environmental Compensation in ₹

PI = Pollution Index of industrial sector

N = Number of days of violation took place

R = A factor in Rupees (Rs) for EC

S = Factor for scale of operation

LF = Location factor

Committee considered additional amount in addition to amount calculated from above formula for industries which discharged excess COD than the prescribed norm.

The environmental compensation (EC) for industries who is **discharging COD higher than norm (i.e. 250 mg/l)**

$$EC = (PI \times N \times R \times S \times LF) + (DQ \times N \times NECOD \times RsKL)$$

PI = Pollution Index of industrial sector

The average pollution index of 80, 50 and 30 were taken as Environmental Compensation for Red, Orange and Green categories of industries, respectively. However, as CETP is constantly discharging the effluent above the prescribed norm, therefore PI = 80 is used for VGEL (CETP)

N = Number of days of violation took place for which violation took place is the period between the day of violation observed and the day of compliance verified by PCB/SPCB/PCC

R = A factor in Rupees (Rs) which is a minimum of 100 to maximum of 500.

R is considered as Rs 100 for small industries, Rs 300 for medium and Rs 500 for large scale industries including CETP

S = Factor for scale of operation.

For small S = 0.5, For medium S = 1 and larger unit S = 1.5

LF = Location factor,

It is based on population of the city/town and location of the industrial unit on the location of the industrial unit. For the industrial unit located within municipal boundary or up to 10 km distance from the municipal boundary of the city/town, different LF used. For Vapi with population less than 1 million, LF is 1.0, However, **LF is considered as 1.5 in consideration of Vapi as polluted area/chemical industrial estate.**

DQ is the effluent discharge quantity of the industry (in Kilolitres)

NECOD is the normalized excess COD. If permissible discharge COD (PDCOD) is 1000 mg/l and the industry is discharging 1550 mg/l (actual discharge COD - ADCOD), the value of NECOD = $(PDCOD - ADCOD)/PDCOD = (1550 - 1000)/1000 = 0.55$. Rs per KL is the fine in Rs per KL of effluent discharge as per the VGEL (CETP)

Additional charge due to excess COD is not included in the calculations for the industries who are in the list of defaulting industries provided by VGEL as VGEL has already taken additional treatment charges for excess COD from such industries based on their own data.

Sr. No	Discharge Volume	Rs. Per KL Discharge
1	Upto 25 KLD	15
2	26 to 100 KLD	17
3	>100 KLD	20

Table 7.2: Defaulting Industries and its Environmental Compensation / Liability (as per committee calculation)

Sr. No.	GPCB ID	Name of Industries	Address	Env Compensation, (INR)
1	29990	Amardeep Chemical Industries (P) Limited	Plot No.:A2/8, Phase 1, GIDC, Vapi	138,000
2	34228	Amitech Chemicals (P) Limited	Plot No:1401/6, Phase 3, GIDC, Vapi	609,400
3	23074	Amoli Organics (P) Ltd	Plot No. 322/4,40 Shed Area, GIDC, Vapi	3,780,000
4	23218	Bhavini Products	Plot No. 176/7- A, Phase 2, GIDC, Vapi.	476,325
5	23260	Centre Point Industries	Plot No.316, 40 Shed Area, GIDC, Vapi	150,000
6A	23278	Chemodist Industries	Plot No. 808-B-2, Phase 3, GIDC, Vapi	642,000
6B	23278	Chemodist Industries	Plot No. 808-B-2, Phase 3, GIDC, Vapi	228,000
6C	23278	Chemodist Industries	Plot No. 808-B-2, Phase 3, GIDC, Vapi	354,452
6D	23278	Chemodist Industries	Plot No. 808-B-2, Phase 3, GIDC, Vapi	186,000
7	23410	Dy-Mach Pharma	Plot No.C-1/2344, 2343, 2345, 2346, Phase 3, GIDC, Vapi	196,606

8	23435	Faze Three Limited	J Type ,Phase I,P NO 71, GIDC, Vapi	720,000
9	24427	Galvadeco Parts (P) Limited	Plot No. 1702/A, Phase-3, GIDC, Vapi	2,016,000
10A	23569	Hemani Industries Limited	Plot No.780/1,2, 40 Shed Area, GIDC, Vapi	763,928
10B	23569	Hemani Industries Limited	Plot No.780/1,2, 40 Shed Area, GIDC, Vapi	3,348,000
11	23575	Heranba Industries Ltd (Unit: 2)	Plot No. A-2,2214/2215, Phase 3, GIDC, Vapi	2,430,000
12A	23574	Heranba Industries Ltd (Unit I)	Plot No.1504,1505,1506, Phase 3, GIDC, Vapi	2,430,000
12B	23574	Heranba Industries Ltd (Unit I)	Plot No.1504,1505,1506, Phase 3, GIDC, Vapi	1,710,000
13	23577	Hiren Enterprises	Plot No. 2327/2, Phase 3, GIDC, Vapi	168,000
14	23728	KEVA FRAGRANCES Pvt.Ltd	Plot no. 170-175, Phase 2, GIDC, Vapi	1,044,000
15	23781	Krishna Dyes & Chemicals	Plot No. C-1/2615, Phase 2, GIDC, Vapi	534,138
16	23868	Mangalam Drugs & Organics (Unit-1)	Plot No. 187, Phase 2, GIDC, Vapi	936,000
17	24045	Orient Organics	Plot no. 5306/2, Phase 3, GIDC, Vapi	258,712
18	24776	Venkteshwar PvtLtd	Plot no. 1201/1, Phase 3, GIDC, Vapi	492,040
19A	34959	Jayshiv Chemicals (P) Limited	Plot No. 2807/2, Phase 3, GIDC Vapi	192,000
19B	34959	Jayshiv Chemicals (P) Limited	Plot No. 2807/2, Phase 3, GIDC Vapi	126,000
19C	34959	Jayshiv Chemicals (P) Limited	Plot No. 2807/2, Phase 3, GIDC Vapi	0 [#]
20	23380	Micas Organics Ltd	Plot No.297/5,8, Phase 2, GIDC,	1,710,000

		(Unit-I)	Vapi	
21	24577	Micas Organics Limited (Unit-V)	Plot no. 287/2B, GIDC, Vapi	174,000
22	24121	Pidilite Industries Ltd.	Plot no. 74,74-1,77-II, 78,79, J Type Area, Phase 1, GIDC, Vapi	2,101,843
23A	24135	Polysperse Chemicals	Plot No.J-2329, Phase 3, GIDC Vapi	462,000
23B	24135	Polysperse Chemicals	Plot No.J-2329, Phase 3, GIDC Vapi	120,000
24	23312	Shri Hari Textiles (P) Ltd.	Plot No. 1205-2, GIDC, Vapi	354,000
25	24391	Shiv Shakti Industries	Plot no. 924, Phase 4, GIDC, Vapi	546,000
26	51359	Siddharth Wet Processing	Gala No.49, Phase-2, Opp. Padam Plastic, GIDC, Vapi	105,000
27	24871	Silcal Laboratories	Plot No. C-1-B-1107/6, GIDC, Vapi	408,000
28	23501	Sumitomo Chemical (India) (P). Ltd	Plot No C-5/185, Next to GPCB, Vapi	324,329
29	24826	Sunrise Speciality Colours	Plot no. 7,8,9/3, Phase 1, GIDC, Vapi	611,453
30	34233	Supreet Chemicals (P).Ltd.(Unit-3)	Plot. No. 2808, Phase 3, GIDC, Vapi	192,588
31	24615	Supriya Dyechem	Plot No. C-1/B-2604, Phase III, Vapi	259,643
32	24751	Vapi Care Pharma (P) Ltd	Plot No. 225/3,GIDC, Vapi	2,594,718
33A	24805	Vital Laboratories (P) Ltd	Plot No. 1710, Phase 3, GIDC, Vapi	1,935,827
33B	24805	Vital Laboratories (P) Ltd	Plot No. 1710, Phase 3, GIDC, Vapi	1,226,870
33C	24805	Vital Laboratories (P)Ltd	Plot No. 1710, Phase 3, GIDC, Vapi	885,686

34	24843	Zen Pharma	Plot No. 75/1,Phase -I, GIDC, Vapi	132,000
35	24268	Ruby Red(India)	Plot no. 798/1, GIDC, Vapi	324,000
36	24223	Rama Pulp & Paper Ltd.	Plot No.293-294, GIDC, Vapi	2,402,268
37	24235	Ratna Product	Plot No. J-758/4, GIDC, Vapi	294,000
38	23059	Skyline Polycoats (P) Ltd	Plot No. C1B/68, 100 Shed Area, GIDC, Vapi	456,000
39	23632	Hatkesh Chem & Engg. Ind	Plot No. C1-85, 100 Shed Area, GIDC Vapi	558,000
40	24032	Nylo Speciality Colours	Plot No. C1B/651/1, 100 Shed Area, GIDC, Vapi	606,000
41	24103	Pearl Colour Industry	Plot No. C1/2614, Phase 3, GIDC, Vapi	294,000
42	24163	Pravin Industry	Plot No. C1/6118, Phase 4, GIDC Vapi	528,000
43	24202	Rainbow Chemical	Plot No. 6021/A, Phase 4, GIDC, Vapi	354,000
44	29518	Dalmia Polypro Industries (P). Ltd.	Plot No. 780/3, 40 Shed Area, GIDC Vapi	510,000
			Total	Rs. 4,43,99,827

Note #- EC= 0 as non-compliance period -VGEL (CETP) is overlapping with the duration of non-compliance due to closure direction issued by GPCB during the same period.

Chapter 8:

CONCLUSION & RECOMMENDATIONS

As per the order Hon'ble National Green Tribunal, Principal Bench, New Delhi dated 11.01.2019 in Original Application (OA) NO. 95 of 2018 in the matter of Aryavart Foundation Vs. M/s Vapi Green Enviro Ltd. (CETP, Vapi) & Ors, five member committee was constituted to assess the extent of damage, cost of restoration of the environment, individual accountability & liability of CETP and polluting industrial units.

The committee conducted field visit to CETP, surveyed across the river at few sites to have a first hand view of the damage due to the CETP. Wastewater sampling was conducted across the treatment flow line and analysed at GPCB lab along with samples collected from river Damanganga. Hearing was given to defaulting industrial units and CETP operator. Data was collected from CETP management, GPCB, CPCB, other departments, reference of reports of NEERI, NIO, NGT orders to fulfill the task assigned.

The wastewaters generated from the industries in GIDC Vapi area conveyed to CETP through underground drain, and further treated effluent from CETP discharge to River Damanganga. Besides the industrial effluents, the River Damanganga also receives domestic wastewater from Silvassa, Vapi and Daman area through different small drains. The major source of pollution load is from CETP Vapi. The quality of River Damanganga gets deteriorated due to pollution load received from different pollution sources as mentioned above.

The CETP was commissioned in the year 1997 and has made several upgradations in unit treatment and process operations over the years. Recently, the CETP augmented with Common Multiple Effect Evaporator & Common Spray Dryer for High COD & High TDS wastewater. It was observed from results of analysis of the inlet and outlet wastewaters from multiple data sets of CPCB, GPCB & VGEL that there was improvement over the years in treated wastewater quality which is significant in 2016. However the CETP was not able to meet outlet norms broadly for

COD, FDS, Chlorides, Sulphates and Color. Major reasons for the non-compliance of GPCB norms are briefly presented hereunder:

1. Some of the member units are discharging without proper treatment to their process wastewaters prior to the discharge into the CETP. Failure to adhere to the CETP Inlet quality norms is one of the reasons for the CETP not meeting the final treated effluent quality.
2. The presence of refractory COD & Colour in the presence of high salt concentration which becomes difficult to treat and meet statutory norms under the existing treatment scheme.

As observed from results of CPCB, GPCB and NEERI, there is increase in the concentration of pollutants post CETP discharge at Namdha and Jari Causeway along the Damanganga river vis-a-vis river water quality at GIDC weir (which can be considered as river water without effect of pollution). Aesthetically, the impact of pollution in the river Damanganga is observed for about 13 km from Vapi weir. This is supported by the CSIR-NEERI Report (2016-2017). The report also stresses on the toxicity of the CETP wastewater on the to fish. Based on the Interactions with local community and Fisheries Department of UT of Daman & Diu, it was conveyed that fishing is not carried out on the stretch downstream of CETP discharge due to river pollution. However data on marine fish catch in the sea near Daman is available.

There is no consumption of water from Damanganga River i.e. from downstream of GIDC weir (after CETP discharge) to Jari Causeway for agriculture purpose and industrial purpose in vapi area. The water for domestic, agriculture and drinking purpose is provided in Vapi and Daman area from Damanganga Canal System (Madhuban Dam/GIDC weir). Further, it is mentioned in the NIO Map, that High Tide Line reaches up to the railway bridge near CETP outlet and due to saline effect on the river water quality, it is not used for drinking and irrigation purpose in the downstream stretch (about 13 km) besides pollution impact on the river.

Also based on the historical data of CPCB, the quantum of pollution load indicated decreasing trend of major pollutants such as COD and BOD over the years. This is in line with the improvement in the quality of treated effluent of CETP

though CETP is not meeting with outlet standards for parameter COD, TDS, and Colour. Hence, upgradation of CETP treatment scheme is paramount to reduce pollution reaching the river Daman Ganga. There is improvement in the river water quality as per priority categorisation from Priority - II (2010) to Priority - IV (2015 & 2018) as inferred from CPCB report for the river stretch: Kachigaon to Vapi (GIDC weir to Jari Causeway (Priority - I being most polluted and Priority -V being best rating). Though, river stretch falls under Priority IV (based on BOD), presence of other pollutants discharged from the CETP outlet affected the biological and physico-chemical environment of the river.

The impact on the coastal marine environment (4 beaches- Tadgam, Jampore, Devka and Tithal) due to industrial discharges through rivers/drains in the area assessed by National Institute of Oceanography (NIO) (2018) and report has stated that there is no evidence of significant deterioration of environmental quality of the beachfront environment. The waters of these 4 beaches contained high load of fecal coliform (FC) in water and sediment suggesting contamination by sewage. The study conducted by CSIR-NEERI also indicated pesticides concentrations at levels below the detectable levels of instrument analysis.

Restoration of the environment of river Damanganga requires following broad steps which are suggested based on treatment of pollutants and discharge into river Damanganga as per environmental norms:

- Improvement/up-gradation in the wastewater collection through surface/over ground pipeline from industries to manhole/sump of GIDC drainage network and to remove all underground discharge line of industrial unit to manhole of underground GIDC drainage. Further, it is recommended to lay surface pipeline conveyance system up to CETP, wherever technically feasible by removing underground existing pipeline.
- Restoration of existing & construction of new storm water drain to prevent entry of wastewaters into the natural drains in the industrial estate.
- Monitoring and analysis of all industries including all streams of wastewater, product wise and shall identify High COD/High TDS (refractory COD) Stream for identification of any discrepancies which will be helpful in taking actions
- Quality & Quantity Monitoring with SCADA-PLC system for controlling quantity & quality of the effluent discharged by each of the member units.

- Proper operation, maintenance and up-gradation of CETP to meet the norms prescribed by GPCB
- Strict vigilance, identification and action against defaulting industries.
- Proper design and construction of stormwater drains and sewerage network, STP within the local bodies
- STPs shall be designed to reuse of treated sewage for industrial reuse/ landscaping / firefighting and agriculture purpose.
- Prevent dumping of solid waste from towns and villages on the banks of river.

The other steps for restoration suggested are-

- Minimum environmental flow of Damanganga river for release of water from the Madhuban Dam.
- Afforestation
- River front development
- Agricultural and farm yard management surrounding the river path.

In view of the consideration of the steps for the restoration of the environment of river Damanganga suggested based on treatment of pollutants and discharge as per environmental norms, the cost of restoration comes about **Rs. 751 crore** for over ground pipeline network from industries to GIDC manhole/sump, quality & quantity monitoring SCADA system, upgradation of CETP, construction of STPs, management of MSW in the area.

As there are many methods for environment damage estimation and all of them use reasonable assumptions, the committee has used two different approaches to calculate the damage. While Approach - I is based on the economic valuation of eco-services rendered by the river considering a representative critical pollutant (COD) for damage estimation. Approach-II is based on the CETP discharge outlet norms for the pollutants: COD, NH₃-N, TSS, and BOD, independent of river water quality. Using two alternative methods the cumulative economic damages are estimated to be in a comparable range (**INR 41.61 Cr for the Approach-I and INR 67.00 Cr for Approach-II during the year 2013 to 2018**).

Using the recent six years (2013-2018) data and employing two alternate methods, the yearly average economic damages are estimated to be in the comparable range of **INR 6.93 Cr/year (Approach-I) and INR 11.17 cr/Year (Approach-II)**.

One of the assigned task to the committee was to hear individual polluting units not meeting the norms and to quantify the amount of liability on “Polluters Pay” principle. Accordingly, hearing conducted of 44 industries as per list of defaulting industries provided by GPCB. It was observed that the industries were found accountable for the non-compliances of discharge norms/and or other non-compliances of other consent conditions. The compensation amount of **Rs. 4,43,99,827** (Rs. Four crore forty three lakh ninety nine thousand eight hundred twenty seven) was calculated and required to be paid by the respective defaulting industries for environmental compensation.

In respect of the defaulting industries they should be asked to deposit Environmental Compensation to CPCB as calculated by the committee and provided in **Chapter 7 (Table-7.2)**. Further an amount of **Rs. 1,31,50,000/-** should be deposited by the CETP-VGEL besides **Rs. 10** crore already submitted to CPCB as per order dated 11.01.2019 of Hon’ble NGT, Principal Bench, New Delhi. As the CETP is non-complied with outlet norms for some parameters and causing pollution in River Damanganga, it is accountable for paying compensation. Few industries who are periodical defaulters should be taken to task to a maximum of temporary membership cancellation which could be followed by appropriate action by GPCB.

As observed from scale wise distribution (Large Scale-5, Medium Scale-8, and Small Scale – 31) of defaulting industries, non-compliances from small scale industries are more and that to from dye & dyes intermediate industries. The defaulting industries might be more than the list provided. This can be arrested with implementation of steps suggested in **Section 5.1.1, 5.1.2, 5.1.3** in **Chapter - 5** like quality & quantity monitoring, vigilance of GPCB and VGEL (CETP).

Based on the Hon’ble NGT directives, the various actions have been identified to restore the river Damanganga and reduce environmental damages in future. Few agencies such as GIDC, VGEL CETP, GPCB, CPCB, Municipality/local bodies are identified which are connected to the river in consideration. **The committee’s recommendations have been delineated in the section 5.1.1 to 5.1.4 Chapter - 5** based on short term and long term measures to improve the condition of the river.

Appendixes
1 - 11

Item No. 05

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 95/2018
(M.A. No. 1029/2018)

Aryavart Foundation

Applicant(s)

Versus

M/s Vapi Green Enviro Ltd. & Ors.

Respondent(s)

Date of hearing: 11.01.2019

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

For Applicant(s): Mr. Raj Panjwani, Senior Advocate with Dr. Surender Singh Hooda, Advocate

For Respondent (s): Mr. M.S. Kalra, Advocate for R-1
Mr. Shlok Chandra with Mr. Ritesh Kumar Sharma, Advocates for CPCB
Mr. Dhruv Pal, Advocate for GPCB

ORDER

1. The issue for consideration in this matter is discharge of untreated/partially treated trade effluents by more than 500 industrial units in Vapi Industrial Cluster into Daman Ganga River in District Valsad in Gujrat which meets the Arabian Sea. The effluents comprise of untreated coloured chemical liquids. Apart from Daman Ganga River, the other water body in which effluents are discharged is the *Bill Khadi* (a drain) which also falls into the Arabian Sea.
2. Case of the Applicant is that Common Effluent Treatment Plant (CETP) is being operated in the area by Respondent No. 1, M/s. Vapi Green Enviro Limited (Old name - Vapi Waste & Effluent Management Co. Ltd.) reportedly since 01.01.1997. The impact of discharge is serious threat to the aquatic life in the river as well as in the sea.

3. A study was carried out in February 2017 by the National Environmental Engineering Research Institute (NEERI). It was found that:

"The fish bioassay study on the final treated effluent sample discharged from Vapi CETP into the river indicates 100% mortality at 50, 75 and 100% waste water concentrations within 24 h exposure time (Plate 4.56). The experimental results presented in Table 9.6 reveal toxic nature of the treated effluent from Vapi CETP. Thus, it can be concluded from the fish bioassay study that the final treated effluent from Vapi CETP with high colour intensity, organic and inorganic matters is having toxic effect on aquatic life of Daman Ganga River. Therefore, Vapi CETP effluent must be treated adequately to remove the pollution parameters before discharging into Daman Ganga River."

"The final treated effluent discharge from the existing Vapi CETP (D-11A) has not only caused deterioration of the river water quality with respect to the colour and recalcitrant parameters but also has imparted toxic effect on aquatic life of Daman Ganga River (segment-II). Therefore, Vapi CETP must be scientifically upgraded for colour and recalcitrant pollutants removal including reject management with a final aim of achieving zero liquid effluent discharge as delineated under Section 11.0. This will result in recovery of good quality water, which can be reused as process water by the industries, leading to fresh water conservation."

4. Further case set out in the application is that Respondent No. 2, Gujarat Pollution Control Board (GPCB), carried out inspection and tested the water quality from P-Equalization Tank (Inlet) on 25.10.2017 and found that the same was not meeting the standards. Samples were also taken from overflow of primary clarifier (Inlet) and the storage tank and similar results were noticed. Tests were also carried out on 06.11.2017, 28.11.2017, 07.12.2017, 27.12.2017, 30.12.2017, 23.01.2018, 29.01.2018, 31.01.2018 and 05.02.2018 and same results were found. From the final outlet also similar results were seen on 27.12.2017, 30.12.2017, 23.01.2018 and 29.01.2018.
5. GPCB issued show cause notice dated 25.10.2017 and 01.11.2017 and direction under Section 33A of the Water (Prevention and Control

of Pollution) Act, 1974 requiring steps to be taken so that inlet and outlet norms are maintained. Applicants have annexed letter of the GPCB dated 23.12.2013 under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 and Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 to the CETP unit for renewing consent to operate for the CETP for the period upto 06.09.2018, subject to the norms laid down therein being maintained. The letter specifies the standards of inlet to be met by the units as well as outlet for which CETP is responsible. Various steps/reports from October 2017 onwards, however, show that the prescribed norms were not maintained.

6. The applicant accordingly seeks direction for taking appropriate steps, including up-gradation of CETP, restraining the CETP from receiving effluents from member units not conforming to the norms, recovering cost of damage to the environment.
7. The application was filed before this Tribunal on 26.02.2018 and notice was issued.
8. The parties appeared before the Tribunal including the CETP operator, GPCB, MoEF&CC, Gujarat Industrial Development Corporation (GIDC) and the Central Pollution Control Board (CPCB). Due opportunity has been given to file pleadings.
9. The Respondent No. 1, CETP operator for the industrial area of Vapi has stated that the CETP was commissioned in the year 1997. By 2001, all waste water generated in the industrial area was linked to the CETP. It also caters to the domestic sewage. It has complied with the earlier directions of NGT, Pune Bench in O.A. No. 109/2014, order dated 01.04.2014 to lay pipeline from existing discharge point to downstream 4.5 km. It is maintaining discharge norms. The

discharge was on the higher side as tanks had not been cleaned for many years.

10. The GPCB has referred to the order of the NGT dated 01.04.2014 in O.A. No. 34/2013 directing the Respondent no. 1 to maintain the laid down standards of effluent discharge. The industrial units were directed to set up/up-grade treatment plants. The GPCB was directed to use Bank Guarantee regime for improvement in pollution control systems.
11. The GPCB further submitted that the Vapi industrial estate is spread over 1117 hectares and is largest industrial area in Asia. It has industrial units of small, medium and large size in diverse sectors, such as Chemicals, Pharmaceuticals, Pesticides, Dyes & Dyes Intermediate and Pulp & Paper. There is substantial consumption of water in the production processes and resultantly there is discharge of effluents. The CETP was set up in the year 1997 and is operated by Respondent No. 1. The industrial units are required to do basic treatment of their effluents in their own premises which refers to Primary Effluent Treatment Plant (PETP). The Respondent No. 1 collects effluents through underground pipeline network and after primary, secondary and tertiary treatment at CETP, discharges effluents into Daman Ganga River at designated place. Each member industry is to provide basic treatment facilities to meet CETP inlet norms. Five hundred and nineteen (519) industrial units are members of CETP. Due to unsatisfactory treatment of effluents by CETP, and also based on Comprehensive Environmental Pollution Index (CEPI), Vapi industrial cluster was declared critically polluted Area on 13.01.2010. Major up-gradation was undertaken by the CETP by investing Rs. 464 Crores which led to improvement in the quality of effluent discharge. Accordingly, vide order dated 25.11.2016, the MoEF&CC lifted the moratorium on setting up of new

industries and expansion of existing industries. Certain industries have been identified as generating high COD. Common spray dryers have been developed in March 2018.

12. On earlier hearing, the Tribunal had before it the Order dated 01.04.2014 in O.A. No. 34/2013 of this Tribunal which showed that the CETP was not satisfactorily working.¹ There was need to take innovative enforcement measures by the GPCB.² It was held therein that though the Pollution Control Board could not apply the of “Polluter Pays” Principle as a punitive measure, it could take Bank Guarantee for non-compliance for ensuring improvement since the CETP was continuously not meeting the norms and such norms could not be relaxed.³ The CPCB in its reply dated 25.04.2018 stated that average value of inlet and outlet were not as per norms.⁴

13. In view of above, on 29.08.2018, the Tribunal directed the GPCB to take appropriate action in accordance with law in the matter for failure of mandatory requirements laid down by the Hon'ble Supreme Court in *Paryavaran Suraksha Samiti and Ors. vs. Union of India (UOI) and Ors.*⁵, for operational and effective ETPs. CPCB was to oversee the compliance of the order and action taken report was required to be filed.

14. In compliance of above order, the GPCB and the CPCB have filed their reports. The GPCB in its report dated 28.09.2018 states as follows:

“It is observed that Inlet quality - COD, NH₃-N and TSS are not meeting with inlet norms whereas COD and TSS at outlet of CETP are not meeting with Outlet norms.

CPCB, RD, Vadodara carry out quarterly monitoring of CETP, Vapi. The latest monitoring carried out on 11.08.2018 and results are provided at Annexure-III. It is observed that Inlet quality - TSS, FDS, BOD, COD and NH₃-N are not meeting

¹ Para 5

² Para 23

³ Para 32 & 33

⁴ Para 10

⁵ (2017) 5 SCC 326

with inlet norms whereas TSS, FD, COD, NH₃-N & Phenols at outlet of CETP are not meeting with outlet norms.

M/s VGEL (CETP) reportedly takes internal actions among the defaulting member units as per M/s VGEL monitoring but so far not provided the list of defaulting industries to GPCB though it is expected as per the Hon'ble NGT Order dated 29.08.2018, and also as per notices of direction issued by GPCB.

M/s VGEL (CETP) has not provided any action plan to comply with both inlet as well as outlet norms during the above review.”

15. GPCB has also stated that it has issued notice under Section 33A of the Water (Prevention and Control of Pollution) Act, 1974 for up-gradation of the CETP to achieve the standard of discharge and till then to take preventive action.

16. There is also a report dated 10.01.2019 of inspection carried out on 03.01.2019. The inspection team at the time of inspection comprised Regional Director, CPCB,-; Scientist-D, CPCB,-; Unit Head-Vapi, GPCB,-; Regional Officer, GPCB,-; AEE, GPCB, -; AGM, (Process) and CEO, VGEL(CETP) Vapi, -; three Directors of VGEL, Vapi and President Director, VIA, VGEL, Vapi

17. The frequency of compliance and non-compliance in the context of BOD, COD, NH₃N and TSS are as follows:

BOD			
<i>Inlet</i>		<i>Outlet</i>	
<i>Compliance</i>	<i>Non-compliance</i>	<i>Compliance</i>	<i>Non-compliance</i>
12	1	6	7
COD			
<i>Inlet</i>		<i>Outlet</i>	
<i>Compliance</i>	<i>Non-compliance</i>	<i>Compliance</i>	<i>Non-compliance</i>
0	13	3	10
NH3-N			
<i>Inlet</i>		<i>Outlet</i>	
<i>Compliance</i>	<i>Non-compliance</i>	<i>Compliance</i>	<i>Non-compliance</i>
0	13	9	4
TSS			
<i>Inlet</i>		<i>Outlet</i>	
<i>Compliance</i>	<i>Non-compliance</i>	<i>Compliance</i>	<i>Non-compliance</i>
4	9	6	7

18. As noted earlier, notice under Section 33A of the Water (Prevention and Control of Pollution) Act, 1974 was issued to the CETP while internal action is to be taken by the CETP itself.
19. We have heard the learned Counsel for the parties.
20. Learned Counsel for the applicant submitted that discharge of untreated effluents is beyond any doubt from the reports to which not only CPCB and GPCB but also the representatives of the CETP are party. The CETP operator, the polluting units and the GPCB may be made accountable for preventive and remedial steps, including punitive action and recovery of damages for restoration of the environment and by way of deterrent action.
21. Learned Counsel for Respondent No. 1 submitted that the operator of CETP is taking all such steps as are possible and no direction is called for. Learned Counsel for GPCB has not disputed the inspection reports which clearly demonstrates that the standards are not being met. On that basis, the GPCB has already issued notice to the CETP as well as to some of the industrial units for remedial actions. Thus, the GPCB has done its job. Learned Counsel for CPCB submitted that in view of the report of inspection carried out on 03.01.2019, CETP as well as the industrial units are clearly proved to be non-compliant with the laid down parameters for which appropriate directions may be issued by this Tribunal. There is continued failure of enforcement of law.
22. The questions that arise for consideration are as follows:
- i. Whether the CETP operator and its member units have failed to comply with the conditions of consent and norms of environment and caused pollution? If so, the manner in which they are to be held accountable?

- ii. Does the functioning of CETP in the present case and of CETPs in general in the country calls for review and modification?
- iii. Whether the State Pollution Control Board in the present case and regulatory authorities have not performed their duties as per the expectation and if so, what are the steps necessary to achieve the objects for which the Pollution Control Boards/Committees have been constituted under the Water Air and the Air Act?
- iv. What are the conclusions and what are the directions required to be issued by this Tribunal?

23. We now proceed to deal with the questions for consideration seriatim.

Re (i): Whether the CETP operator and its member units have failed to comply with the conditions of consent and caused pollution? If so, the manner in which they are to be held accountable?

24. We have reproduced the reports of inspections dated 28.09.2018 and 10.01.2019 clearly showing the CETP as well as the industrial units to be non-compliant. In support of the said reports, test reports have also been annexed. There is no reason to doubt the veracity of reports of inspections conducted by the joint team of representatives of CPCB, GPCB and the CETP operators. Thus, it is concluded that the CETP operator and the member units generally have failed to comply with the environmental norms for which they are held to be accountable.

25. Though, there are observations in order dated 01.04.2014 by the two-member Pune Bench of this Tribunal referred to earlier, that “Polluter Pays” principle cannot be invoked as a punitive measure and only ‘Precautionary Principle’ of requiring Bank Guarantee can be applied, the said view is in ignorance of the binding legal precedents in the judgment of the Hon’ble Supreme Court⁶ which lay down that

⁶ Indian Council for Enviro Legal Action & Ors. v. Union of India & Ors. (1996) 3 SCC 212 Para 16, Vellore Citizens Welfare Forum v. Union of India & Ors. (1996)5SCC647 Para 12 to 18 - holding that ‘Polluter Pay’ principle is

'Polluter Pays' principle is ingrained in the environmental jurisprudence of the country as well as statutory mandate under Section 20 of the NGT Act, 2010. This was considered in the recent order of the Tribunal (by four Member Bench) in *Paryavaran Suraksha Samiti and Anr. Vs. Union of India & Ors.*⁷, *Parveen Kakar & Ors. Vs. Ministry of Environment & Forests & Ors.*⁸ and in *News Item published in "The Asian Age" Authored by Sanjay Kaw titled "CPCB to rank industrial units on pollution levels"*⁹ wherein this Tribunal held that:

"11. Needless to say that it will be open to the SPCBs/Committees and CPCB to take coercive measures including recovery of compensation for the damage to the environment on 'Polluter Pays' principle as well as also to direct taking of such precautionary measures as may be necessary on the basis of 'Precautionary principle'."

26. This Tribunal has to follow principles of natural justice if it is to finally assess the damages. The Tribunal can also require the statutory authorities to perform their duty in the matter. We have heard the CETP operators but we have not heard the individual industrial units though CETP represents such units. The reports indicate deficiency in inlet as well as outlet which is evidence of failure of CETP operators as well as individual industrial cluster. Thus, there is objective material available to act against both- CETP operator and individual units. While on proved facts, interim arrangement is proposed, statutory authorities may finally determine the extent of accountability of the industrial units and such units may be given opportunity of hearing by the SPCB and the CPCB. To enable this to be done, we propose to constitute a Committee to hear

accepted principle and part of environmental law of the country, even without specific statute. *M.C. Mehta v. Union of India & Ors.*, W.P.(C) No. 13029/2015 order dated 24.10.2017 of Supreme Court of India

⁷ O.A. No. 593/2017 Order dated 03.08.2018: The Tribunal directed CPCB to take penal action against those accountable for failure in setting up CETPs/ETPs/STPs and to recover compensation for damage to the environment.

⁸ O.A. No. 661/2018, Order dated 08.01.2019: The Tribunal stated that the Pollution Control Board had failed to perform its duties in taking statutorily mandated coercive measures under Section 31A of the Air (Prevention and Control of Pollution) Act, 1981 and 33B of the Water (Prevention and Control of Pollution) Act, 1974 or initiating prosecution. This Tribunal directed CPCB to exercise its statutory powers to determine and recover damages for violation of environmental norms by the respondent therein.

⁹ O.A. No. 1038/2018, Order dated 13.12.2018.

individual polluting units not meeting the norms and to quantify the amount of liability on “Polluter Pays” principle which can clearly be invoked by the regulatory body to enforce pollution norms not only as a ‘Precautionary Principle’ but also as remedial action if the unit is found to be polluting and not meeting the prescribed norms. Any other interpretation would grant immunity to the polluters and will not be conducive to the protection of the environment. We answer the question accordingly.

Re(ii): Does the functioning of CETP in the present case and of CETPs in general in the country calls for review and modification?

27. CETP Scheme was developed primarily to meet specific objectives under the Environment (Protection) Rules, 1986. It has, however, been found that inspite of setting up of CETPs, the environmental norms have not been maintained at several places in the country. The MoEF&CC itself imposed a moratorium for grant of permissions for setting up of industries in critically polluted areas/industrial clusters identified by the CPCB as shown by letter dated 25.11.2016. Time bound action plans were required to be prepared for improvement of environment quality in such clusters/areas. Moratorium was, thereafter, lifted in respect of certain clusters from time to time based on CEPI score subject to certain conditions.
28. The recent experience shows that situation at several places in the country is far from being satisfactory. This Tribunal has taken cognizance of the serious pollution caused on account of failure of CETPs vide order dated 13.12.2018 in *News Item published in “The Asian Age” Authored by Sanjay Kaw titled “CPCB to rank industrial units on pollution levels”*. It was noted that 43 industrial clusters in 16 States were identified as Critically Polluted Areas and 32 industrial clusters were categorized as Seriously Polluted Areas. In 2017-18, the number of identified polluted industrial clusters went

upto 100. Accordingly, the Tribunal directed the State Pollution Control Board to finalize time bound action plan to restore the environmental quality as per norms laid down by the CPCB and directed CPCB and SPCBs /PCCs to take coercive measures against the violators on the basis of 'Precautionary Principle' and 'Polluter Pays' principle.

29. This apart, in *Arvind Pundalik Mhatre v. Ministry of Environment, Forest and Climate Change & Ors.*¹⁰ the CETP was found not fully functional and effluents were being discharged at Taloja in the river *Kasaradi*. This Tribunal directed imposition of an amount of Rs. 5 Crores for severe impact on environment on account of non-functioning of the CETP resulting in imminent danger to the life of local population.

30. In *Rashid Ali Warsi Vs. UPSIDC & Ors.*¹¹, the Tribunal dealt with discharge of untreated effluents by textile units in Tronica City, Ghaziabad. CETP was not functional to the extent of requisite capacity and operating without valid consent. Member industries of CETP were directed to comply with PETP standards as prescribed by UPPCB.

31. In *Sidhgarbyang Kalyan Sewa Samiti, Sitargang, District – Udham Singh Nagar Vs. State of Uttarakhand & Ors.*¹², the Tribunal dealt with was pollution in Sitarganj by industries. The STPs/CETP were not functional and untreated effluents and hazardous chemical were being discharged in open drain. It was noted that CETP was working without valid Consent to Operate (CTO). CPCB was directed to carry out fresh inspection of the CETP and the industries. The State PCB

¹⁰ O.A. No. 125/2018 Order dated 11.07.2018

¹¹ O.A. No. 317/2015 Order dated 13.11.2018

¹² O.A. No. 123/2018 Order dated 13.11.2018

was directed to take appropriate legal action against CETP and erring industries.

32. In *Indian Council for Enviro-Legal Action & Ors. Vs. Jammu and Kashmir State Pollution Control Board & Ors.*¹³, the Tribunal considered discharge of effluents by industries in river Basantar, Jammu. The industries were operating without valid consent. There was delay in establishment of CETP and STP. As a result, untreated sewage waste and effluents were discharged in the river. The SIDCO and Municipal Council were held liable to pay compensation for restoration of environment and failure in installing STPs respectively.
33. In *Paryavaran Suraksha Samiti and Anr. Vs. Union of India & Ors.*¹⁴, the Tribunal dealt with the issue of establishment and functioning of CETPs/ETPs/STPs in all the States and the question whether the effluents were treated as per prescribed limits or not. This Tribunal noted the requirements of continuous monitoring of CETPs/ETPs/STPs by the statutory authorities and directed that CPCB to take penal action against those accountable for failure in setting up CETPs/ETPs/STPs and to recover compensation for damage to the environment.
34. In *Stench Grips Mansa's Sacred Ghaggar River (Suo-Motu Case) and Yogender Kumar*¹⁵, the matter dealt with River Ghaggar which had turned into a polluted water body on account of discharge of effluents. The Tribunal noted failure of authorities in taking action against persons responsible for violation of law and directed to constitute Special Task Force to submit action taken report. The Tribunal directed that an action plan be prepared for preventing

¹³ O.A. No. 483/2016 Order dated 22.11.2018

¹⁴ O.A. No. 593/2017 Order dated 03.08.2018

¹⁵ O.A. No. 138/2016 (Case No. 559/19/11/14) and O.A. No. 139/2016 (Case No. 600/19/11/14) (TNHRC) Order dated 07.08.2018

discharge of untreated effluents in the river by setting up CETPs/ETPs/STPs.

35. In *Hero Motocorp Limited Vs. Union of India & Ors.*¹⁶, the Tribunal directed the Uttarakhand Pollution Control Board to regularly monitor the appellant unit for discharge of effluents.
36. From the above, it is clear that there is a large-scale failure of the CETP which calls for an extensive review regarding the functioning of CETPs in the country, reasons for its failure in meeting the prescribed norms and possible solutions to rectify the problems by the MoEF&CC and the CPCB. In the light of this, Expert Committee may be constituted for the purpose and be asked to submit its report in six months. Question No. (ii) is answered accordingly.

Re(iii): Whether the State Pollution Control Board in the present case and regulatory authorities have not performed their duties as per the expected norms and if so, what are the steps necessary to achieve the objects for which the Pollution Control Boards/Committees have been constituted under the Water Air and the Air Act?

37. The test reports compiled by a joint inspection team clearly shows the non-compliance by the CETP and industrial units as already noticed. We have also noted frequent failure of CETP mechanism while considering Question No. (ii). The SPCB has not shown that it took any stringent action as required which can act as deterrent against violation of pollution norms. Simply issuing notice has not brought about the desired results. No closures have been ordered, nor prosecution launched nor other adequate preventive and remedial measures, including assessment and recovery of damages taken. In this respect, there is failure of GPCB. We may only observe that even a regulatory authority may be held accountable if it colludes with polluters by being required to pay damages or errant officers being held liable for action, including prosecution. Frequent failures of

¹⁶ Appeal No. 55/2018 Order dated 27.09.2018

regulatory bodies need to be remedied for meaningful enforcement of environmental norms. This Tribunal in *Threat to life arising out of coal mining in South Garo Hills district Vs. State of Meghalaya & Ors.*¹⁷, held that State machinery is also required to compensate for their negligence and failure which may act as deterrent against the officers who neglected their basic duty of protecting the environment or colluded with the polluters and law violators. The polluters as well as colluding officers are to be made accountable not only by prosecution or closure of industry but also by assessing and recovering such damages for loss to the environment as it may not only compensate the environment or victims but also act as deterrent to prevent further damage.

38. It is well acknowledged that there is serious threat to the environment in this country. Studies show huge number of pollution related deaths and diseases¹⁸. Any violation of laid down environmental norms has to be seriously viewed and sternly dealt with.

39. It was in the year 1974 that the Water (Prevention and Control of Pollution) Act, 1974 was enacted after noticing that problem of pollution of rivers and streams had assumed considerable importance and urgency on account of growth of industries, threatening the sources of drinking water, the aquatic life and sources of irrigation. After considering the Expert Committee reports on the subject, the statutory framework was adopted giving enormous powers to the Pollution Control Boards (PCBs) for closure, prohibition or regulation of any industries operation or process as well as filing of complaints for prosecution. Minimum sentences have been laid down for violation

¹⁷ O.A. No. 110(T_{HC})/2012 Order dated 04.01.2019 para 28-29

¹⁸ https://niti.gov.in/writereaddata/files/new_initiatives/presentation-on-CWMI.pdf India ranks 120th in 122 countries in Water Quality Index as per Niti Ayog Report, <https://www.thehindu.com/sci-tech/energy-and-environment/india-ranked-no-1-in-pollution-related-deaths-report/article19887858.ece> Most pollution-linked deaths occur in India, <https://www.hindustantimes.com/india-news/delhi-world-s-most-polluted-city-mumbai-worse-than-beijing-who/story-m4JFT063r7x4Ti8ZbHF7mM.html> Delhi's most polluted city, Mumbai worse than Beijing as per WHO; http://www.un.org/waterforlifedecade/pdf/global_drinking_water_quality_index.pdf WHO Water Quality Index.

of the norms. Polluter Pays Principle is an accepted norm within the purview of regulatory regime. The statutory functions of the PCBs, include programs for prevention, abatement and control of pollution and exercise all incidental powers. The CPCB has powers to issue directions to the State Boards. Needless to say, that similar provisions have been made for protection of air quality under the Air (Prevention and Control of Pollution) Act, 1981 as well as for other environmental issues under the Environment (Protection) Act, 1986.

40. As already noted, the SPCB is equally accountable for its failure and in appropriate cases can be prosecuted for conspiracy or collusion with other offenders causing pollution. The pollution cannot be allowed to be profitable activity and deterrent action must be taken wherever pollution is found so as to render causing of pollution unprofitable and unacceptable to prevent damage to the health and lives of the citizens. Any polluter must be subjected to heavy and deterrent economic sanctions. Unfortunately, this is not happening as expected for which failure the regulatory authority cannot disown their responsibility.

41. We note that the State of Environment in the country, even as per official figures, is alarming. As many as 351 river stretches have been declared to be polluted by the CPCB. Vide order dated 20.09.2018 in *Original Application No. 673/2018, News item published in 'The Hindu' authored by Shri. Jacob Koshy Titled "More river stretches are now critically polluted: CPCB"*, this Tribunal considered the issue of such polluted stretches and noticed the directions of the Hon'ble Supreme Court from time to time for stopping discharge of untreated sewage and effluents in water bodies. Such discharge causes serious diseases, including Cholera and Typhoid. Sewage treatment capacity was disproportionate to the sewage generated. As per some studies noted in the order, 75 to 80% water is polluted in India. Pollution of

River Yamuna¹⁹, Ganga²⁰, Hindon²¹, Ghaggar²², Sutlej and Beas²³, Son²⁴, Subarnarekha²⁵, Ami²⁶ were also noted. The States were directed to prepare action plans to make the water of the polluted river stretches atleast fit for bathing within six months from the dates of preparation of approved action plans. When the matter was reviewed on 19.12.2018, it was found that only 16 States had prepared action plans, most of which were not complete. The direction was issued for payment of environmental compensation per month by every State/UT for failure to prepare action plan and also to furnish Performance Guarantees for execution of the action plans within the stipulated time.

42. This Tribunal in *News Item Published in "The Times of India" Authored by Shri Vishwa Mohan Titled "NCAP with Multiple timelines to Clear Air in 102 Cities to be released around August 15"*²⁷ has dealt with the issue of 102 air polluted cities identified by the CPCB. Taking into account eminent threat to human health as a result of air pollution, this Tribunal directed all the States/UTs with non-attainment cities to prepare action plans for bringing down the standards of air quality within the prescribed norms within six months. The Tribunal further constituted the Air Quality Monitoring Committee to ensure implementation of such action plans. The CPCB and the SPCBs were entrusted with the responsibility to design a robust nation-wide ambient air quality monitoring program to strengthen the existing monitoring network.

¹⁹ Manoj Mishra Vs. Union Of India O.A. No. 6/2012 order dated 26.07.2018

²⁰ M.C. Mehta vs. Union of India O.A. No. 200/2014 order dated 06.08.2018

²¹ Doaba Paryavaran Samiti vs. State of U.P. and Ors. O. A. No. 231/2014 Order dated 08.08.2018

²² Stench Grips Mansa's Sacred Ghaggar River (Suo-Motu Case) and Yogender Kumar O.A. No. 138/2016 Order dated 07.08.2018

²³ Sobha Singh and Ors. Vs. State of Punjab and Ors. O.A. No. 916/2018 Order dated 14.11.2018

²⁴ Amarshakti vs. State of Bihar and Ors. O.A. No. 596/2016 Order dated 24.08.2018

²⁵ Sudarsan das vs. State of West Bengal and Ors. O.A. No. 173/2018 Order dated 04.09.2018

²⁶ Meera Shukla vs. Municipal Corporation, Gorakhpur and Ors. O.A. No. 116/2014 Order dated 25.10.2018

²⁷ Original Application No. 681/2018 Order dated 08.10.2018

43. In re: *Compliance of Municipal Solid Waste Management Rules, 2016*²⁸, the Tribunal directed preparation of action plans for solid waste management consistent with the Solid Waste Management Rules, 2016 in view of the fact that as per annual report of the CPCB prepared in April 2018, most of the States were not complying with the statutory rules.

44. As already noted earlier, this Tribunal considered the matter of polluted industrial clusters in *News Item published in "The Asian Age" Authored by Sanjay Kaw titled "CPCB to rank industrial units on pollution levels"* vide order dated 13.12.2018. It was noted that 43 industrial clusters in 16 States were identified as Critically Polluted Areas and 32 industrial clusters were categorized as Seriously Polluted Areas. In 2017-18, the number of identified polluted industrial clusters went upto 100. Accordingly, the Tribunal directed the State Pollution Control Board to finalize time bound action plan to restore the environmental quality as per the norms laid down by the CPCB and directed CPCB and SPCBs to take coercive measures against the violators on the basis of 'Precautionary Principle' and 'Polluter Pays Principle'.

45. In *Techi Tagi Tara Vs. Rajendra Singh Bhandari & Ors.*²⁹, the Hon'ble Supreme Court noted that the State Pollution Control Boards (SPCBs) continued to be manned by persons not having expertise or

²⁸ Original Application No. 606/2018 Order dated 31.08.2018

²⁹ (2018) 11 SCC 734 para 3-4, 28-34: The judgment takes into consideration various Committees appointed laying down guidelines for the functioning of SPCBs viz.,

- (a) Bhattacharya Committee (1984) proposed that the structural organization of SPCBs should consist of technical services, scientific services, planning, legal services, administrative services, accounts, training cell and research and development.
- (b) The Bellappa Committee (1990) - Recommended (i) introducing elaborate monitoring, reporting and organizational systems at the national level along with four regional centres and one training cell in each Board, (ii) effecting suitable changes in the Boards recruitment policy to enable them induct persons with suitable academic qualifications, and (iii) ensuring that the Chairman and Member-Secretary are appointed for a minimum of three years.
- (c) The Administrative Staff College of India (1994) - Recommended, inter alia, that (i) the SPCBs be reoriented for implementing the instrument mix of legislation and regulation, fiscal incentives, voluntary agreements, information campaigns and educational programmes.
- (d) The Menon Committee - Recommending that the State Governments should not interfere with recruitment policies of the SPCBs, especially where the Boards are making efforts to equip their institutions with more and better trained engineering and scientific staff.

professional experience. The State Governments were not able to appoint qualified, impartial, and politically neutral persons of high standing to the crucial regulatory posts. Political appointments were being made in blatant violation of Apex Court guidelines to debar favorable persons being appointed.³⁰ The appointments being made did not inspire the confidence of the people. The Hon'ble Supreme Court directed all the States to frame guidelines and recruitment rules within six months. It may be pertinent to lay emphasis on the following observations of the Hon'ble Supreme Court in the aforesaid judgment:

“Unless corrective measures are taken at the earliest, the State Governments should not be surprised if petitions are filed against the State for the issuance of a writ of quo warranto in respect of the appointment of the Chairperson and members of the SPCBs. We make it clear that it is left open to public spirited individuals to move the appropriate High Court for the issuance of a writ of quo warranto if any person who does not meet the statutory or constitutional requirements is appointed as a Chairperson or a member of any SPCB or is presently continuing as such.”

46. In addition to this, the Parliamentary Standing Committee on Science and Technology, Environment and Forest, August 2012 in its recommendations on the working of the SPCBs was perturbed to note that the SPCBs were not performing their duties vigilantly and recommended that MoEF&CC must ensure proper and effective coordination between the CPCB and SPCBs and take necessary steps to make the Pollution Control Boards functional and ensure that the discharge their duties effectively and efficiently.³¹

³⁰ *Ibid.* The judgment notes the report of the Tata Institute of Social Sciences published in 2013 titled “Environmental Regulatory Authorities in India: An Assessment of State Pollution Control Boards” which stated about the appointments to the SPCBs that time and again across state governments have not been able to choose a qualified, impartial, and politically neutral person of high standing to this crucial regulatory post. The recent appointments of chairpersons of various State Pollution Control Boards are in blatant violation of the Apex Court guidelines. The primary lacuna with this kind of appointment was that it did not evoke any trust in the people that decisions taken by an ex-official of the State or a former political leader, appointed to this regulatory post through what appeared to be a totally non-transparent unilateral decision. Many senior environmental scientists and other officers of various State Pollution Control Boards have expressed their concern for appointing bureaucrats and political leader as Chairpersons who they feel not able to create a favourable atmosphere and an effective work culture in the functioning of the Board.

³¹ Accessible at:
<http://164.100.47.5/newcommittee/reports/EnglishCommittees/Committee%20on%20S%20and%20T,%20Env.%20and%20Forests/230.pdf>

47. During the hearing it was stated by the learned Counsel for the GPCB that guidelines in terms of *Techi Tagi Tara* (supra) have been issued and thus, the judgment has been complied with. However, he has not been able to dispute that the persons appointed are not having technical or professional qualifications or background as expected.
48. This Tribunal, on 20.07.2018, in *Satish Kumar vs. U.O.I & Ors.*³² also observed that persons of judicial background may be required in key position in PCBs as several functions of the SPCBs are quasi-judicial.
49. The order of this Tribunal dated 07.08.2018 in *Stench Grips Mansa's Sacred Ghaggar River (Suo-Moto Case)*³³ noted that a task force must be constituted in every district and State to give reports on the environmental issues which should be published on the websites.
50. The Tribunal in the order on 08.08.2018 in *Doaba Paryavaran Samiti Vs. State of U.P. & Ors.*³⁴ noted that statutory authorities had miserably failed and were required to be held accountable for their failure.
51. In view of the fact clean environment, apart from other statutory provisions, is a mandate of Article 21 of the Constitution, causing of pollution having serious implications on health of the citizens cannot be accepted and no responsible authority could simply throw its hands in despair.³⁵
52. Thus, there being far from satisfactory governance on the part of the SPCBs, as depicted by the compiled data, resulting in large number of deaths and diseases in the country, remedial measures are required. Lack of effective governance in the present case is patent from absence of steps for prosecution of the guilty persons or recovery of

³² O.A No. 56 (THC) of 2013

³³ O.A. No. 138/2016 (T_{NHRC})

³⁴ O.A. No. 231/2014

³⁵ *Supra* note 18

damages for restoration of the environment which is primary responsibility of the SPCB. Appointment process does contribute to such ineffectiveness.

53. There is, thus, urgent need to review the qualification and appointment procedure so as to realistically comply with the mandate of the judgment of the Hon'ble Supreme Court. There is also need to carry out performance audit of functioning of all the Pollution Control Boards and Pollution Control Committees in the country and to identify remedial steps required in manning and functioning of SPCBs and PCCs or otherwise. Unless strong effective regulatory regime is in place, and shortcomings identified and remedied to expect clean environment would be unrealistic and merely a dream.

Re(iv): What are the conclusions and what are the directions required to be issued by this Tribunal?

54. The above observations lead us to conclude as follows:

- i. CETP operator and the concerned industrial units have failed to comply with the pollution norms and are required to be made accountable for their failure within the framework of the regulatory regime with the assistance of experts making the CPCB as nodal agency to determine the extent of damage caused to the environment and cost of restoration.
- ii. The CETP and polluting industrial units must be required to deposit an interim amount for damage to the environment and for the cost of restoration pending further orders to be passed in the light of Expert Committee Report proposed to be constituted.
- iii. Functioning of CETP in the country generally calls for review in view of the fact that there are large number of failures in the existing CETP mechanism, as earlier noted. The abovementioned cases cannot be taken to be only isolated

cases. As many as 100 industrial clusters have been identified by the CPCB itself as critically polluted which supports the need for review.

- iv. The regulatory regime in the form of SPCBs has not been as effective as expected as noted by the Hon'ble Supreme Court in *Techi Tagi Tara Vs. Rajendra Singh Bhandari & Ors.* (supra). This is partly on account of appointments not being upto the mark as well as absence of audit of performance and monitoring mechanism. This needs to be remedied in light of performance audit and study by an Expert Committee.

55. Accordingly, we direct as follows:

- (i) We direct constitution of following Committee to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units:

- a) Representative of CPCB.
- b) Representative of IIM, Ahmadabad.
- c) Nominee of IIT, Ahmadabad.
- d) Scientist nominated by NEERI.
- e) Representative of GPCB.

- (i.a) The Committee may give its report within three months. The Committee will be entitled to take any factual or technical inputs in the manner found necessary. CPCB will be the nodal agency for the purpose. The Committee may also suggest steps for restoration of the environment.

- (i.b) The Committee may give hearing to the CETP operator and the units identified as polluting by the GPCB for which list will be furnished by the GPCB to the Committee indicating the period and nature of default within one month.

- (i.c) The GPCB may inform the defaulting units for compliance of this order.
- (i.d) The Committee may also consider data already available with it since the affidavit filed by the CPCB does indicate availability of such data with the CPCB.
- (i.e) The GPCB may also consider exercise of its statutory powers of prosecution which power is coupled with duty.
- (ii) Having regard to entirety of factual situation in the present case, we direct that except the green and white categories of industries, other category of defaulting industries connected to the CETP must make deposit with the CPCB, towards interim compensation within one month as follows:
- a) Large Industries – Rs. 1 Crore each.
 - b) Medium Industries – Rs. 50 Lakhs each.
 - c) Small Industries – Rs. 25 Lakhs each.
- (ii.a) The CETP may deposit a sum of Rs. 10 Crores with the CPCB towards interim compensation within one month.
- (iii) The amount may be utilized by the CPCB for restoration of the environment.
- (iv) The CPCB shall undertake jointly with GPCB extensive surveillance and monitoring of CETPs and at regular interval of three months and submit its report to this Tribunal.
- (v) We direct constitution of following Committee to review the functioning of the CETP in the country and to suggest modifications, if necessary:
- a) Representative of the MoEF&CC.
 - b) Representative of the CPCB.

- c) Representative of NEERI.
- (v.a) The representative of the CPCB will be the nodal agency. The report may be furnished within three months.
- (vi) The CPCB may conduct Performance Audit of all the SPCBs and Pollution Control Committees (PCCs) within six months by constituting appropriate expert inspection teams and furnish a report to this Tribunal. The CPCB may consider making Performance Audit at suitable intervals a regular feature of its working.
- (vii) We direct the MoEF&CC to constitute a three-member Expert Committee to consider steps to be taken to comply with the mandate of directions of the Hon'ble Supreme Court in *Techi Tagi Tara Vs. Rajendra Singh Bhandari & Ors. (supra)* and suggestions for improvement, if any to remedy the existing deficiencies in the effective functioning of the regulatory bodies for meaningful protection of the environment.
- (vii.a) The Committee may suggest guidelines for functioning of the SPCBs and broad steps required for bringing air and water quality in polluted stretches and cities and industrial clusters and coastal/eco-sensitive zones within the prescribed norms and measures to be adopted, including recovery of damages, prosecution of offenders, restitution of contaminated and degraded environmental sites.
- (vii.b) The report of the Committee may be furnished before the next date.
- (viii) The CPCB may consider issuing appropriate directions in exercise of its statutory powers in the light of expert studies which may be carried out.

56. Copy of the order may be sent to CPCB by email and all reports in pursuance of the above directions be sent to this Tribunal at filing.ngt@gmail.com

List for further consideration on 19.08.2019.

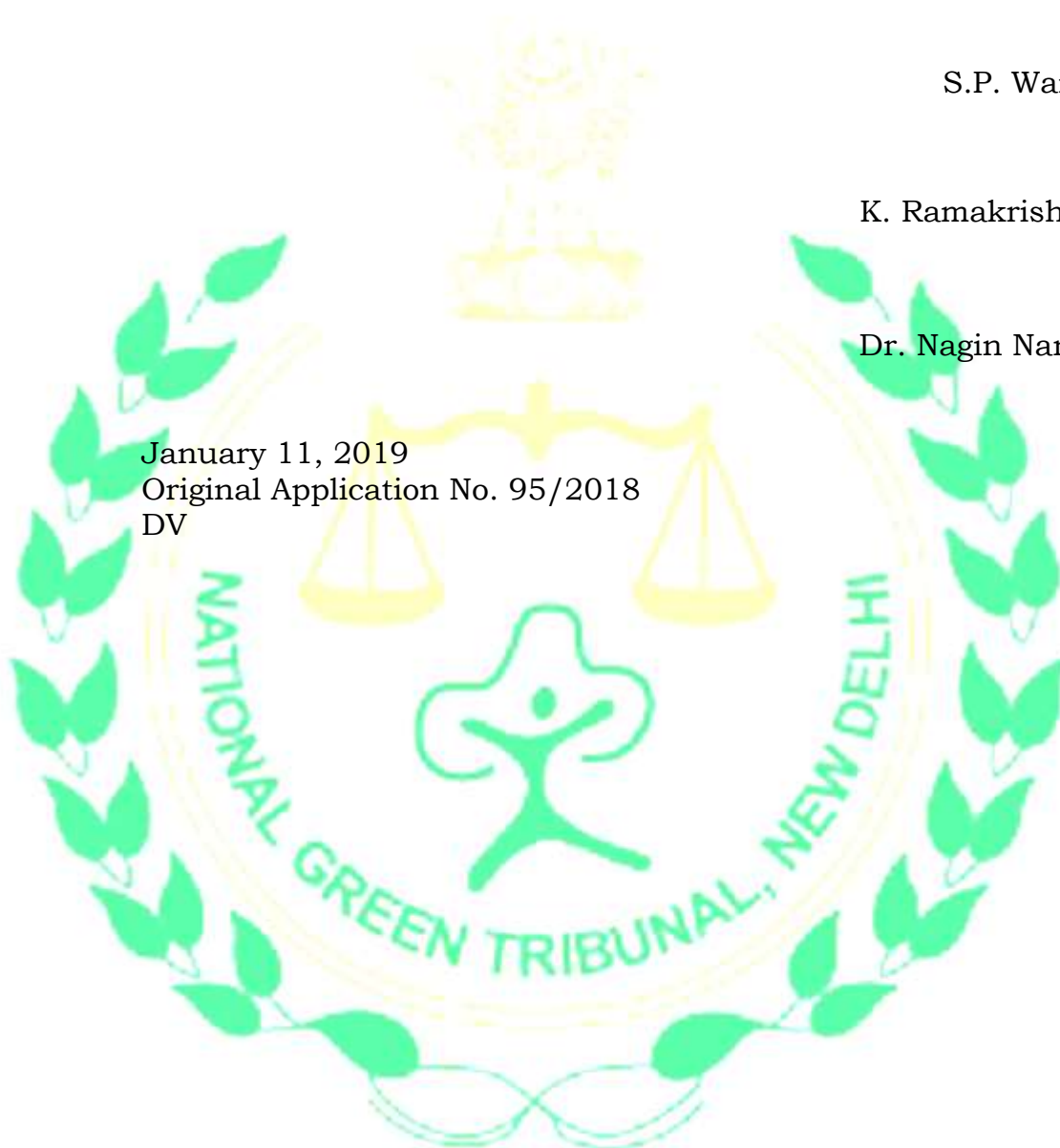
Adarsh Kumar Goel, CP

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

January 11, 2019
Original Application No. 95/2018
DV



APPENDIX 2A

RESULTS OF CETP MONITORING (M/S VGEL)

(Monthly Average)

Month	Flow M3/Day		COD (mg/l)		BOD (mg/l)		TSS (mg/l)		NH3-N	
	Inlet	Outlet	Inlet	Outlet	Inlet		Inlet	Outlet	Inlet	Outlet
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Jan-13	53480	53148	1763	564	614	81	776	199	58	62
Feb-13	53977	53684	1711	558	585	82	775	166	54	62
Mar-13	53628	53514	1809	577	617	80	854	165	52	57
Apr-13	53899	53370	1648	602	528	73	685	175	50	45
May-13	52154	51962	1512	550	494	78	683	199	60	44
Jun-13	54978	54652	1150	415	371	53	550	143	40	31
Jul-13	55248	55064	858	365	255	46	402	199	29	22
Aug-13	54725	54896	1170	517	334	54	516	204	35	30
Sep-13	54839	54585	1280	536	392	84	588	168	53	54
Oct-13	53008	52882	1417	558	416	88	620	161	60	55
Nov-13	52435	51987	1392	549	448	77	633	183	55	49
Dec-13	54482	53997	1264	501	398	58	508	172	43	42

Jan-14	53792	53518	1329	518	441	66	553	146	59	57
Feb-14	52086	52386	1418	540	424	72	614	166	73	73
Mar-14	54298	53947	1511	563	465	59	642	181	64	70
Apr-14	53373	53442	1452	539	453	50	669	156	63	52
May-14	54261	53970	1282	547	355	47	624	187	65	48
Jun-14	54989	55129	1460	564	391	53	690	173	73	48
Jul-14	55218	55096	1079	424	295	43	523	165	55	35
Aug-14	54246	54888	1053	507	252	66	506	191	36	25
Sep-14	54869	54329	1153	532	297	77	493	168	44	31
Oct-14	54082	53866	1351	504	346	37	574	154	52	38
Nov-14	53184	52870	1397	456	332	27	597	143	67	39
Dec-14	52525	52387	1368	438	382	17	493	104	65	38

Month	Flow M3/Day		COD (mg/l)		BOD (mg/l)		TSS (mg/l)		NH3-N	
	Inlet	Outlet	Inlet	Outlet	Inlet		Inlet	Outlet	Inlet	Outlet
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Jan-15	53940	53356	1285	411	362	23	518	90	56	48
Feb-15	53848	54022	1373	419	398	23	593	92	45	50
Mar-15	52958	52866	1407	420	345	20	592	73	55	52
Apr-15	52851	52310	1473	422	362	28	647	91	56	32
May-15	50212	49758	1429	453	330	24	618	84	61	43
Jun-15	53481	53276	1269	374	294	18	559	88	55	35
Jul-15	55642	55429	1223	356	323	28	591	104	59	39
Aug-15	54902	53970	1284	345	361	21	594	77	60	29
Sep-15	54115	53864	1403	371	366	22	596	86	50	30
Oct-15	52752	52560	1471	419	349	25	557	82	71	41
Nov-15	53647	53319	1289	372	271	25	365	74	66	39
Dec-15	53941	53202	1431	415	341	29	529	102	61	45
Jan-16	53419	53214	1349	367	373	19	439	96	59	52
Feb-16	53350	53089	1248	316	302	16	376	77	46	45
Mar-16	54183	54096	1239	301	279	12	352	77	43	29
Apr-16	53660	53462	1151	256	318	11	421	77	59	42
May-16	53543	53341	1052	255	261	18	383	65	63	47
Jun-16	53575	53065	1209	265	263	15	367	69	64	46
Jul-16	55429	55722	873	226	194	15	322	90	54	32
Aug-16	54825	55125	895	226	224	16	373	80	53	36
Sep-16	54829	54698	1007	238	215	13	317	69	54	40
Oct-16	54066	53723	1124	254	304	16	332	58	64	51
Nov-16	48168	47894	1281	288	318	21	356	91	66	54
Dec-16	49909	48658	1294	291	342	24	493	116	63	53

Month	Flow M3/Day		COD (mg/l)		BOD (mg/l)		TSS (mg/l)		NH3-N	
	Inlet	Outlet	Inlet	Outlet	Inlet		Inlet	Outlet	Inlet	Outlet
	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Jan-17	49959	47388	1205	285	312	23	460	102	70	66
Feb-17	51032	49505	1344	310	358	29	490	93	62	55
Mar-17	52083	52083	1218	266	300	23	482	86	61	55
Apr-17	53758	53891	1274	312	323	30	466	82	65	60
May-17	54144	53990	1170	299	326	37	371	86	61	58
Jun-17	51475	50461	1131	264	285	29	342	89	48	43
Jul-17	55280	55085	805	174	178	11	293	75	24	20
Aug-17	55328	55296	972	217	231	19	421	90	40	35
Sep-17	53648	53313	1027	221	228	19	292	64	45	42
Oct-17	51217	49970	1095	275	261	20	335	78	54	50
Nov-17	50142	49547	1298	315	351	33	429	83	65	56
Dec-17	52903	52935	1272	270	305	23	456	90	57	53
Jan-18	53724	53748	1236	261	366	23	393	71	53	45
Feb-18	53858	53998	1193	256	319	21	441	49	43	35
Mar-18	53340	53217	1310	305	280	31	412	64	63	53
Apr-18	53625	53898	1168	260	282	28	463	77	53	51
May-18	53239	53272	1063	242	226	26	431	85	43	39
Jun-18	54650	54641	1103	258	189	22	382	85	61	51
Jul-18	55082	55224	949	236	260	17	427	89	54	54
Aug-18	54585	54849	1265	293	307	27	398	81	63	59
Sep-18	53812	53662	1305	319	336	28	463	88	69	65
Oct-18	53628	53487	1298	310	336	35	412	91	54	51
Nov-18	53679	53514	1239	278	319	25	363	81	60	52
Dec-18	53369	53275	1272	300	330	32	490	87	68	60

APPENDIX 2B

RESULTS OF MONITORING CARRIED AT CETP VAPI BY GPCB, RO, VAPI

(2013-2018) (MONTHLY AVERAGE)

Inlet of CETP Year - 2013

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.74	62	2359	543	1020
February	7.43	27.44	1773	543	532
March	7.5	27.44	612	180	214
April	7.078	43.792	1616.8	529.6	540
May	7.685	64.4	1269	329.5	432
June	7.22	11.76	677	216	606
July	---	---	---	---	---
August	7.62	24.92	685.67	---	501.7
September	7.313	34.185	975.75	293.5	412
October	7.851	41.44	1315	454	502
November	7.67	82.848	1108.2	421	674.2
December	7.453	60.312	983.5	264.67	519.2

Outlet of CETP

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.29	28.28	619.5	177	193
February	7.44	50.4	606	178	170
March	7.46	51.52	373	91	222
April	7.61	51.19	410	108	166
May	7.68	64.4	1269	329.5	432
June	7.4	22.4	432.66	124	165.33
July	6.87	21.84	207	76	168
August	6.90	23.33	389.5	---	190.33
September	7.57	40.89	688.5	274.5	208.5
October	7.72	50.4	408	144	388
November	7.38	77.71	645.75	231.67	223
December	7.80	37.16	507.273	155.286	210.8

Inlet of CETP Year - 2014

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.68	40.4	1209	458	690
February	7.37	55.305	1551.3	281.5	1036
March	7.46	118.7	1627.5	319	521
April	7.821	70.28	1028.5	256	797.5
May	7.91	38.36	582	148.5	322
June	8.095	25.5	913.5	255.5	540
July	7.49	28.6114	587.57	140.285	312.3
August	7.73	37.49	1431.7	297	580
September	7.56	44.115	1323.5	314.67	366.5
October	7.41	35.62	1181	320	405
November	7.96	66.105	895	182	332
December	7.55	50.41	1125.6	280.75	399.4
Avg.	7.66	50.90	1121.34	271.10	525.14

Outlet of CETP

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.60	29.96	387.5	133	114
February	7.45	53.05	592.25	177	145.5
March	7.73	54.32	705	205	145
April	7.02	45.17	477.33	171	312
May	7.42	13.42	610	137	152
June	7.75	49.69	441	115	188
July	7.30	15.44	391.44	81.44	158.22
August	7.29	24.05	554.75	104.75	211
September	7.43	25.23	599.2	145.66	216
October	7.23	35.24	1227.5	388	198
November	7.55	33.63	382	72	117
December	7.33	38.168	457.57	92	129.71
Avg.	7.42	34.78	568.79	151.82	173.86

Inlet of CETP - Year - 2015

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.74	43.70	967.22	146.43	299.78
February	7.53	57.02	1146.71	246.00	267.71
March	7.75	33.76	849.25	190.3	408.3
April	7.49	46.20	935.11	225.50	378.44
May	7.77	54.28	982.43	176.75	363.71
June	7.76	23.93	1179.00	271.00	554.00
July	7.67	32.86	906.00	235.30	229.60
August	7.72	74.45	1128.40	277.20	728.40
September	7.61	46.11	1008.67	307.67	739.33
October	7.87	80.18	1101.00	253.00	386.00
November	7.68	50.03	1125.40	338.40	219.20
December	7.66	64.61	1080.86	231	211.71
Avg.	7.69	50.59	1034.17	244.72	398.85

Outlet of CETP – Year 2015

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.59	40.63	383.9	61.38	143.20
February	7.42	36.27	348.25	56.88	140.00
March	7.43	41.39	478.00	47.00	159.00
April	7.57	29.42	390.56	53.83	178.67
May	7.41	30.703	418.75	51.40	114.75
June	7.54	17.802	326.60	34.00	171.20
July	7.43	27.68	454.18	64.64	118.36
August	7.46	28.39	382.33	57.00	108.67
September	7.31	29.40	334.25	44.25	98.50
October	7.36	37.99	370.22	36.56	73.11
November	7.55	42.79	532.29	75.00	126.00
December	7.43	43.95	497.00	39.00	174.00
Avg.	7.46	33.87	409.69	61.37	131.18

Inlet of CETP Year - 2016

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.63	49.46	1115.05	370.07	323.12
February	7.84	43.66	835.33	287.37	313.27
March	7.55	27.12	868.20	205.50	139.10
April	8.03	51.87	866.30	193.40	113.20
May	7.96	72.08	1031.30	254.20	201.40
June	7.95	62.37	947.80	219.00	250.80
July	7.73	49.53	635.70	147.70	192.50
August	7.68	21.92	574	149.5	135.67
September	7.65	42.12	863.67	208.89	295
October	7.93	43.56	793.33	196.9	187.5
November	7.82	67.21	1149.44	301.11	205.78
December	7.81	52.91	1033.6	299.8	200.4
Avg.	7.80	48.6	892.81	236.12	213.14

outlet of CETP Year 2016

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.49	43.34	356.95	58.53	118
February	7.55	37.12	336.75	42.37	109.64
March	7.62	27.44	297.83	39.52	62.17
April	7.54	34.36	239.90	32.59	52.12
May	7.39	36.08	254.33	37.11	63.55
June	7.26	29.85	235.80	28.88	79.00
July	7.19	27.39	213.80	26.38	81.85
August	7.20	23.06	181.5	24.5	57
September	7.23	23.56	226.33	31	66.22
October	7.57	28.39	220.75	24.08	57
November	7.43	35.46	303.78	44	72.89
December	7.26	44.85	259.6	28	82.8
Avg.	7.39	32.57	260.61	34.75	75.19

Inlet of CETP Year – 2017

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.68	64.34	1445.75	367.62	290.5
February	7.74	84.25	1261.25	255	428.5
March	7.86	58.68	1026.12	225.67	413.67
April	7.97	57.57	1105.5	233.5	250.5
May	7.79	44.71	1041.5	226.17	248.33
June	7.87	36.97	760	155	114.67
July	7.43	33.76	771	172.28	150
August	7.40	58.24	907.17	239.17	106.3
September	8.04	50.21	1102	236.5	268
October	7.73	110.09	1404.7	286	157.3
November	7.82	87.21	1004.5	221.5	321
December	7.56	82.37	1496.3	219.67	270
Avg.	7.74	64.03	1110.48	236.50	251.56

Outlet of CETP Vapi Year- 2017

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.39	56.01	293.5	34.25	77.5
February	7.59	57.5	266.75	29.5	77
March	7.27	45.62	245.25	27.33	81
April	7.34	26.55	240.25	26	73.5
May	7.33	37.41	251.33	28.33	69.33
June	7.23	35.18	228.33	26	65.33
July	7.3	30.82	232	33.28	84.86
August	7.36	49.05	268	40.83	88
September	7.39	36.71	249.5	30.5	54
October	7.58	41.81	296.67	41.33	59.33
November	7.45	55.78	300.5	38	103
December	7.67	54.81	390.33	28.33	40.67
Avg.	7.40	43.93	271.86	31.97	72.79

Inlet of CETP , Year - 2018

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	1000 mg/l	400 mg/l	300 mg/l
January	7.54	65.19	1181.33	290.33	283.50
February	7.75	55.15	910.00	202.50	178.00
March	7.95	106.86	1524.50	402.50	436.00
April	7.88	71.85	981.00	230.33	445.33
May	8.01	74.20	1068.50	268.75	239.00
June	7.66	76.75	808.67	196.00	287.67
July	7.45	75.04	833.00	232.50	246.00
August	8.41	89.25	1370.50	394.00	253.00
September	7.98	85.82	1489.50	400.00	917.50
October	7.38	105.45	1261.75	330.00	406.75
November	7.77	65.87	1080.67	279.00	335.33
December	8.02	59.28	1149.75	271.50	353.75
Avg.	7.81	77.55	1138.26	291.45	365.15

Outlet of CETP Year 2018

Parameter	pH	NH3	COD	BOD	SS
Limit ->	6.5 TO 8.5	50 mg/l	250 mg/l	30 mg/l	100 mg/l
January	7.54	48.63	317.33	31.83	39.67
February	7.77	53.82	275.00	31.00	119.00
March	7.97	90.38	524.00	126.00	72.00
April	7.65	73.21	390.67	82.67	84.00
May	7.70	49.79	267.00	45.50	69.00
June	7.58	49.86	222.00	27.00	78.00
July	7.60	45.65	263.17	35.67	97.67
August	7.46	60.21	285.00	35.00	105.00
September	7.62	50.21	343.00	48.00	120.00
October	7.66	55.23	303.50	44.75	122.50
November	7.74	51.60	259.00	29.00	95.33
December	7.77	46.46	267.50	33.00	94.50
Avg.	7.67	56.25	309.76	47.45	91.38

**RESULTS OF SAMPLING CARRIED OUT AT CETP VAPI
BY CPCB, RD, VADODARA**

**ANNUAL AVERAGE CONCENTRATION OF VARIOUS INLET & OUTLET
PARAMETERS**

(Calendar year 2008-2012) (Annual Average- 4 quarterly values)

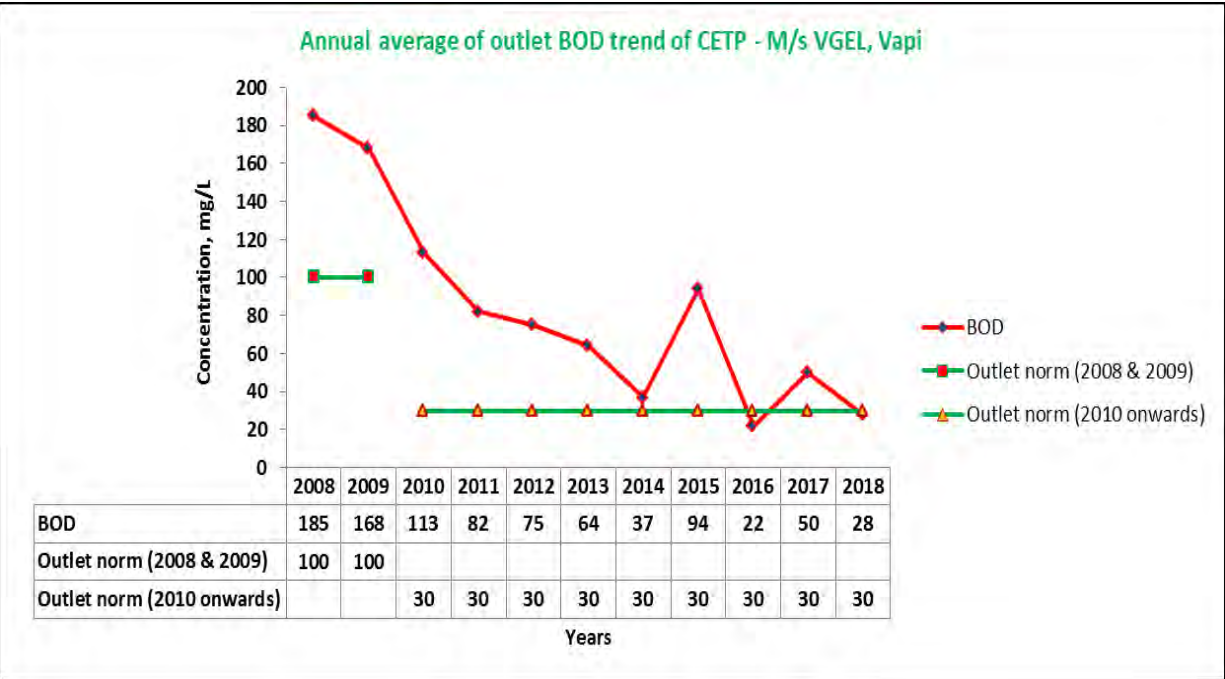
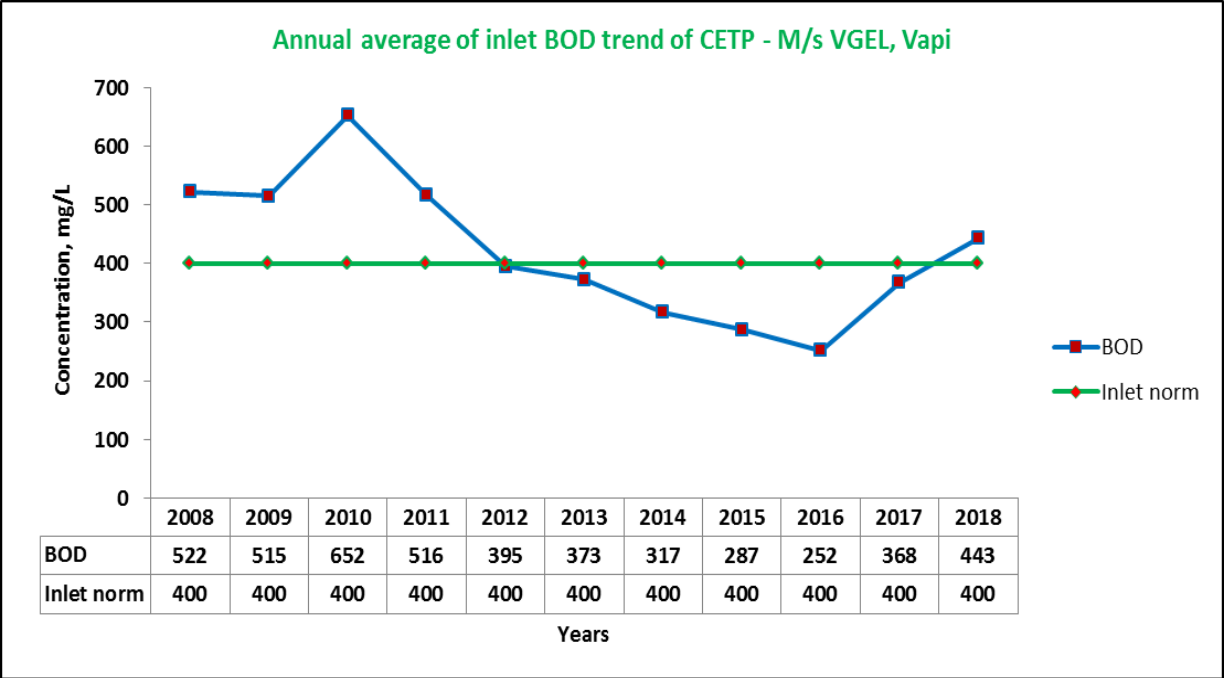
Sampling location(s) & Year(s)	Parameters									
	pH	TSS	TDS	BOD	COD	O & G	NH ₃ -N	Phenols	S ⁻²	CN ⁻
Inlet-2008	6.04-7.53	358	6716	522.2	1904.4	34.2	194.4	--	--	--
Outlet-2008	6.32-7.66	290.5	6957.4	185.4	886.5	21.02	184.2	--	--	--
Inlet-2009	6.58-7.6	782	7555.8	515.8	2427	35.6	87.2	--	--	--
Outlet-2009	6.9-7.56	342.8	7539.8	168.5	759	19.5	83.8	--	--	--
Inlet-2010	6.57-7.01	1440.5	7591	652.5	2055	58	60.5	3.055	2.24	0.13
Outlet-2010	6.99-7.50	221.8	7870.4	113	631	21.8	59	1.6	1.56	0.18
Inlet-2011	6.83-7.54	681.5	8987.3	516	1771.8	22.6	48.9	2.8	3.4	0.85
Outlet-2011	7.25-7.52	127.8	7620.8	82	508.3	11.9	49.7	0.9	2.5	0.3
Inlet-2012	6.55-7.81	311.8	6674	395.3	1359.5	30.7	51.6	2.16	1.84	0.85
Outlet-2012	6.56-7.43	136.5	6775.3	75.8	450	15.5	32.4	1.25	1.7	0.33

Note : Concentration of all the parameters are expressed in mg/L, except pH
: Mode of sampling – Grab
: Annual average of four quarterly values

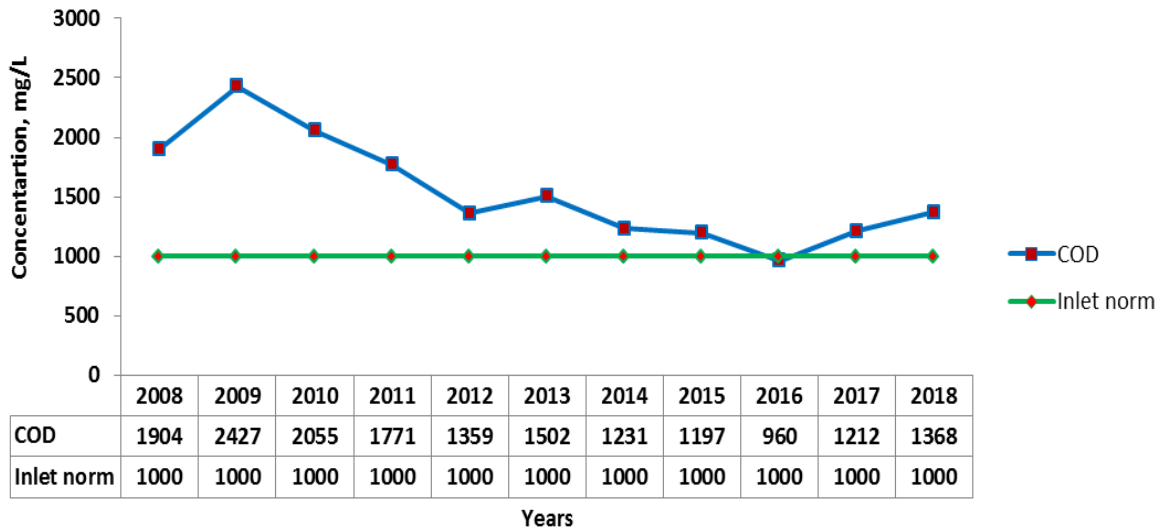
ANNUAL AVERAGE CONCENTRATION OF VARIOUS INLET & OUTLET PARAMETERS (Calendar year 2013-2018)

Sampling location(s) & Year(s)	Parameters									
	pH	TSS	TDS	BOD	COD	O & G	NH ₃ -N	Phenols	S ⁻²	CN ⁻
Inlet-2013	6.97-7.9	783.3	7811.3	373.3	1502	--	44.4	3.3	--	--
Outlet-2013	7.3-7.85	204	8120.8	64	531.8	20	44.4	1.9	5.1	0.66
Inlet-2014	6.67-7.86	423	9084	309	1339.5	--	51.6	2.47	--	--
Outlet-2014	6.72-7.17	132	9117	37	474.5	2.92	48.3	0.66	1.38	0.45
Inlet-2015	7.34-7.73	564.2	7772.6	289.6	1197.4	4.5	54.3	4.7	26.4	0.32
Outlet-2015	6.73-7.68	143.6	7808.4	97	458.8	8.3	56.9	0.86	1.13	0.40
Inlet-2016	6.83-8.4	376.4	6545.4	252.6	960.4	--	51	2.6	--	--
Outlet-2016	6.82-7.03	140.6	8400.6	22	200.2	4.2	17.4	0.3	0.8	0.1
Inlet-2017	6.51-8.29	249.75	7144.5	368.5	1212	--	69	--	--	--
Outlet-2017	6.47-7.56	72.75	7673	50	333.75	3.75	47.06	3.39	0.288	0.089
Inlet-2018	7.69-8.1	270	8081	443	1368	8.35	85	5.18	4.38	0.12
Outlet-2018	7.15-7.64	57.25	7277	28	250	2.46	53	1.14	.68	0.11

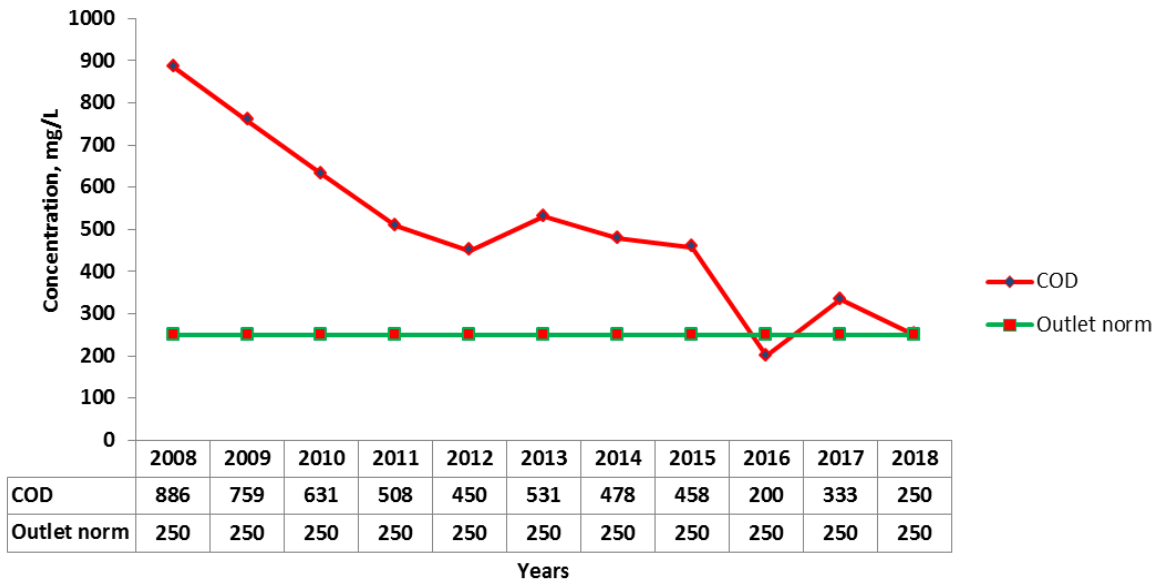
Note : Concentration of all the parameters are expressed in mg/L, except pH
: Mode of sampling – Grab
: Annual average of four quarterly values

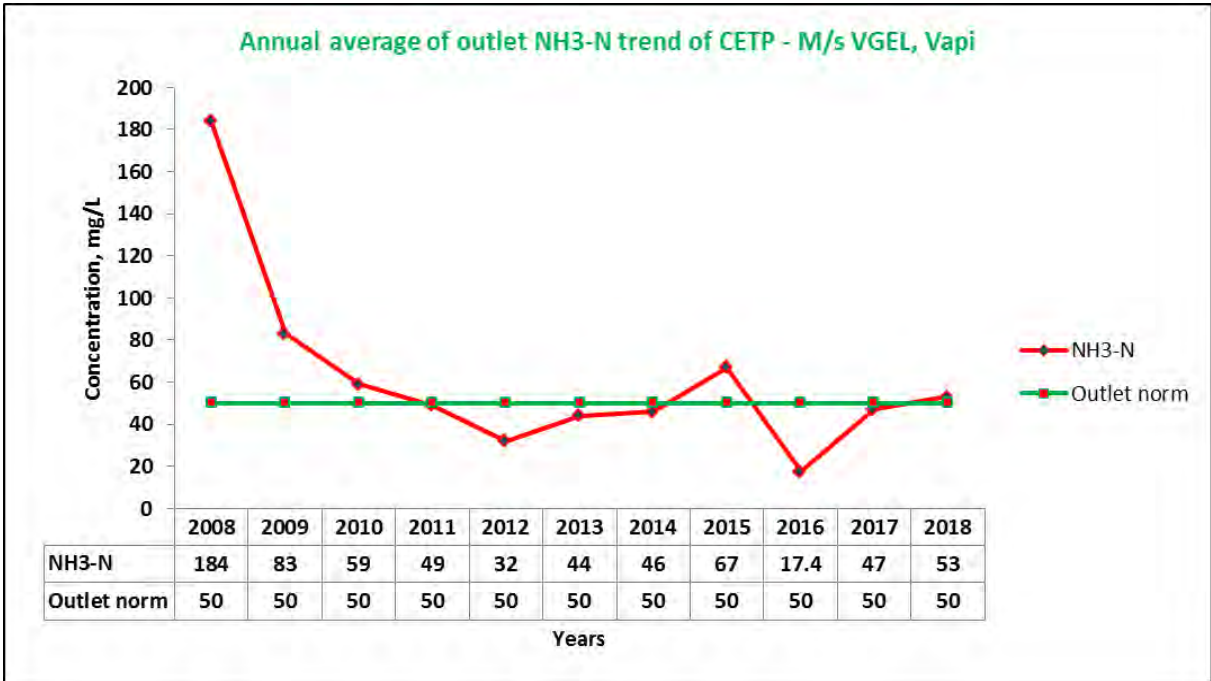
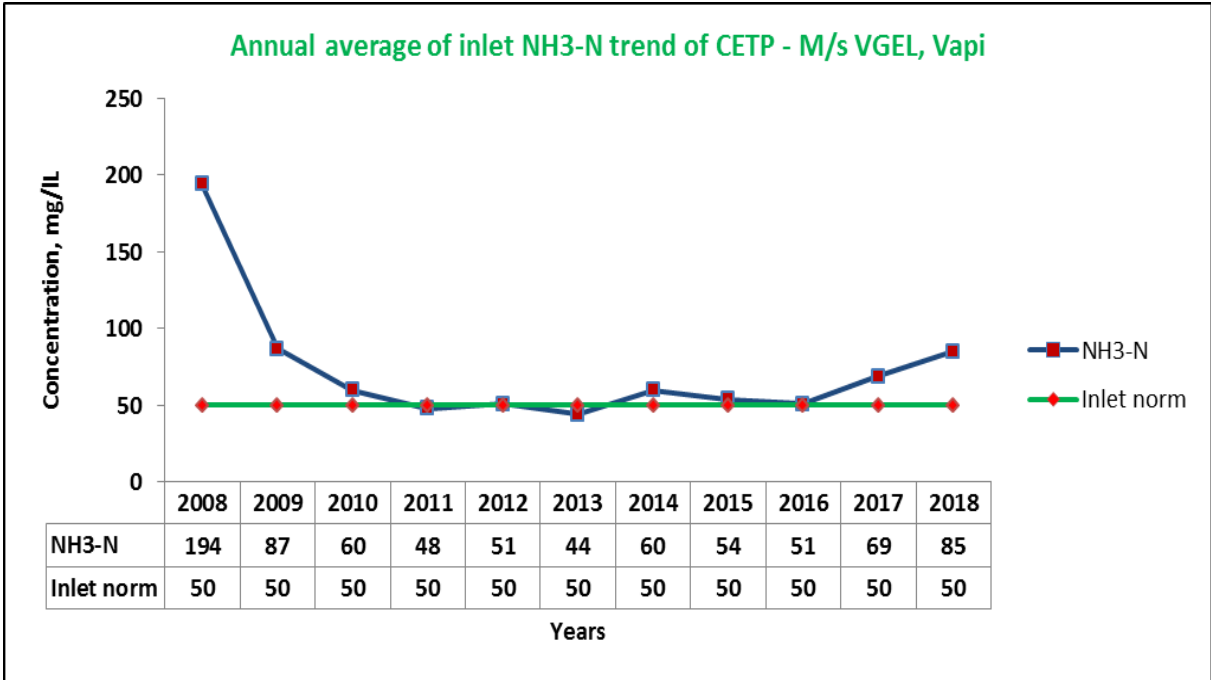


Annual average of inlet COD trend of CETP - M/s VGEL, Vapi



Annual average of outlet COD trend of CETP - M/s VGEL, Vapi





Appendix- 3 A
GPCB Monitoring

ANALYSIS RESULTS OF MONITORING CARRIED OUT AT
BILL KHADI, VAPI

(Sampling location- Bill Khadi at Koparli Road, Vapi)

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
02-01-2013	7.69	52.00	12.00	48.00	9.52
01-02-2013	8.10	22.00	8.00	32.00	3.36
04-02-2013	7.99	28.00	1.30	11.00	7.28
02-03-2013	7.53	50.00	13.00	43.00	31.36
02-04-2013	7.69	16.00	6.70	26.00	8.40
02-05-2013	7.57	16.00	14.00	56.00	8.40
03-06-2013	7.61	38.00	5.60	32.00	11.76

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
02-07-2013	8.13	42.00	53.00	180.00	5.60
01-08-2013	7.48	66.00	51.00	115.00	5.60
03-09-2013	7.15	38.00	49.00	139.00	3.36
01-10-2013	7.62	42.00	31.00	69.00	2.24
22-11-2013	8.18	32.00	27.00	79.00	1.68
02-12-2013	7.60	22.00	22.00	69.00	17.92

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
06-01-2014	7.82	18.00	7.00	28.00	2.80
05-02-2014	7.38	24.00	>5	32.00	5.60
10-03-2014	7.25	16.00	8.00	54.00	2.24
02-04-2014	7.48	16.00	0.60	36.00	6.16
05-05-2014	7.81	20.00	0.40	8.00	1.12
06-06-2014	7.65	66.00	15.00	72.00	1.69

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
01-07-2014	7.19	10.00	34.00	87.00	1.70
04-08-2014	7.16	32.00	0.80	36.00	1.68
02-09-2014	7.24	26.00	7.00	52.00	2.20
10-10-2014	8.09	30.00	26.00	114.00	6.10
03-11-2014	8.30	24.00	>5	24.00	1.11
03-12-2014	7.48	36.00	16.00	73.00	6.26

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
06-01-2015	7.08 4	14	<5	43	1.11
03-02-2015	7.32	66	5	59	5.94
05-02-2015	7.63	28	15	141	6.22
04-03-2015	7.28	14	5.5	67	2.56
06-04-2015	7.36	72	10	100	3.48
01-05-2015	7.43	60	20	123	3.09
09-06-2015	7.38	28	13	49	3.68

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
01-07-2015	7.68	48	6	67	16.3
04-08-2015	7.48	38	5	34	1.13
02-09-2015	7.34	22	5	47	1.69
05-10-2015	7.32	34	19	242	1.39
03-11-2015	7.35	14	5	18	1.39
02-12-2015	7.88	22	18	74	2.4

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
02-01-2016	7.38	24	9	42	0.83
02-02-2016	7.32	42	8	52	13.65
02-03-2016	8.03	30	14	91	13.59
02-04-2016	7.73	8	8	47	3.49
03-05-2016	7.91	38	7	44	16.81
02-06-2016	7.19	40	35	176	15.8

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
04-07-2016	6.97	136	9	74	0.3
03-08-2016	7.12	106	6	44	0.3
02-09-2016	7.8	44	5	26	8.27
03-10-2016	7.03	58	2.7	27	14.64
07-11-2016	7.38	32	5	28	10.16
05-12-2016	7.27	44	8	30	17.2

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
03-01-2017	6.71	128	26	122	3.43
02-02-2017	8.03	16	15	132	13.58
01-03-2017	7.11	10	4	35	18.18
06-04-2017	7.85	82	2.1	25	15.4
05-05-2017	7.31	58	6	64	14.66
06-06-2017	7.05	64	8	83	21.95

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
04-07-2017	7.57	28	3.2	22	2.55
04-08-2017	7.19	98	9	44	52.7
06-09-2017	7.43	22	12	67	1.14
03-10-2017	6.82	54	15	125	14.12
02-11-2017	7.23	44	4	34	17.21
04-12-2017	7.61	20	10	69	24.57

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
05-01-2018	7.08	44	4.1	38	8.21
01-02-2018	7.67	38	19	88	15.61
01-03-2018	7.03	42	6	38	17.11
04-04-2018	7.03	18	10	42	15.83
01-05-2018	7.91	18	9.3	45	16.17
07-06-2018	7.9	28	2.7	25	BDL

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
04-07-2018	7.08	8	12	110	6.95
09-08-2018	7.41	132	9	68	13.02
05-09-2018	7.59	24	9	92	8.43
05-10-2018	7.54	30	13	121	12.21
17-11-2018	7.54	34	5.4	44	0.35
04-12-2018	7.45	30	6	31	3.55

ANALYSIS RESULTS OF MONITORING CARRIED OUT AT BILL KHADI, VAPI
(Sampling location- Bill Khadi at Koparli Road, Vapi)

Year	Parameters			
	pH	SS	COD	NH ₃ -N
11-10-13	7.152	46	137	31.92
12-10-13	6.823	40	130	9.52
14-10-13	7.959	66	127	5.6
15-10-13	8.007	112	109	15.68
15-10-13	7.019	136	145	17.92
21-10-13	7.545	26	44	24.08
31-10-13	7.601	36	90	5.6
07-11-13	7.462	62	79	5.6
14-11-13	8.008	72	61	6.72
20-11-13	7.956	30	72	7.28
22-11-13	8.14	32	86	2.8
23-11-13	7.115	24	62	6.72
23-11-13	8.144	32	91	7.84
27-11-13	7.482	28	163	3.36

Year	Parameters			
	pH	SS	COD	NH ₃ -N
29-11-13	7.435	20	17	7.84
02-12-13	7.468	26	78	4.48
10-12-13	7.767	42	69	3.36
11-12-13	7.02	28	66	2.8
11-12-13	7.309	24	39	10.08
12-12-13	7.365	32	13	4.48
15-12-13	7.539	72	87	19.04
18-12-13	7.495	48	112	8.96
18-12-13	7.655	28	107	7.84
20-12-13	7.627	24	15	19.6
20-12-13	7.815	24	23	29.12
26-12-13	8.096	22	42	1.68
27-12-13	7.904	28	42	6.72

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
14-05-14	7.14	86	--	127	7.22
03-06-14	7.46	258	--	263	30
19-06-14	7.9	124	--	310	19.04
12-07-14	7.21	142	52	147	9.71
30-07-14	7.28	228	--	102	2.2
03-08-14	7.31	182	15	56	9.98
06-08-14	7.29	286	--	42	1.68
29-08-14	7.672	14	5	53	7.13
04-09-14	6.935	48	--	72	4.39
07-09-14	8.157	64	--	93	12.88

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
23-04-15	7.54	94	35	135	4.03
09-05-15	7.15	54	8	90	3.94
12-05-15	6.871	124	8	90	46.23
04-06-15	7.57	240	--	148	58.28
10-06-15	7.29	--	28	141	28.86
11-06-15	7.49	--	6	49	5.19
13-06-15	7.56	--	19	207	25.37
18-06-15	7.14	--	16	108	0.56
23-06-15	6.6	--	12	117	3.39
25-06-15	7.34	--	8	112	5.65
26-06-15	6.83	--	9	127	4.52
26-06-15	6.98	--	15	161	17.5
27-06-15	7.56	--	8	122	18.63
29-06-15	7.65	--	9	104	20.89
30-06-15	7.91	--	8	125	0.56
01-07-15	7.72	--	5	34	28.11
08-07-15	7.42	--	10	119	3.92

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
27-07-15	7.28	--	10	132	1.67
29-07-15	7.1	--	15	144	8.33
03-08-15	7.49	--	22	116	25.51
05-08-15	7.07	--	10	113	45.91
05-08-15	7.55	--	12	129	0.57
06-08-15	7.44	--	13	148	17
11-08-15	7.23	--	16	159	1.13
24-08-15	7.8	--	8	114	24.27
01-09-15	8.07	--	9	130	8.47
03-09-15	7.17	--	9	89	14.06
10-09-15	7.68	--	14	169	0.56
13-09-15	7.67	--	3	20	0.56
15-09-15	7	--	9	121	2.8
18-09-15	7.68	--	13	164	0.56
20-09-15	8.08	--	10	135	1.68
02-10-15	7.01	--	13	185	12.32
08-10-15	7.43	--	19	167	23.43

09-07-15	7.43	--	13	181	8.4
13-07-15	7.24	--	23	67	6.69
16-07-15	7.56	--	17	71	5.58
20-07-15	7.33	--	5	31	10.04
20-07-15	6.94	218	--	39	16.73
21-07-15	7.41	172	13	118	6.14
23-07-15	7.67	118	15	153	11.16
23-07-15	7.2	224	19	122	1.11
24-07-15	7.02	64	13	149	7.22
27-07-15	7.36	126	16	166	0.56

14-10-15	7.86	--	15	153	5.62
15-10-15	7.39	--	17	220	14.06
18-10-15	6.52	--	9	87	1.12
19-10-15	7.5	--	10	77	10.12
26-10-15	7.12	--	12	147	2.8
05-11-15	7.37	--	19	119	6.69
02-12-15	7.53	--	14	114	0.6
10-12-15	7.71	--	21	84	9.71
17-12-15	7.27	--	42	180	4.02
19-12-15	7.28	--	45	203	4.59

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
06-01-16	7.22	--	25	93	10.91
07-01-16	7.06	--	14	64	4.58
16-01-16	6.79	--	21	122	5.57
21-01-16	7.25	--	--	66	6.69
09-02-16	8.02	--	--	184	19.6
23-02-16	7.53	--	120	1057	14.82
24-02-16	7.67	--	--	586	20.11
29-02-16	7.37	--	--	867	14.59
02-03-16	6.51	--	--	1225	12.41
03-03-16	7.28	--	--	79	8.86
05-03-16	7.81	12	--	59	9.18
07-03-16	7.01	--	--	931	3.02
12-03-16	8.25	4	--	79	12.17
13-03-16	7.32	38	--	149	10.13
13-03-16	7.23	6	--	172	4.68
16-03-16	7.97	12	--	74	6.38
17-03-16	7.59	56	--	242	19.5
18-03-16	7.07	52	--	123	11.14

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
14-06-16	7.06	40	15	59	7.09
28-06-16	7.48	292	9	89	1.18
29-06-16	7.32	230	12	98	1.18
01-07-16	7.33	136	9	82	1.18
02-07-16	6.84	475	28	110	1.18
04-07-16	7.01	62	16	79	4.13
09-07-16	6.83	222	29	115	4.13
12-07-16	7.82	306	22	154	3.54
19-07-16	7.29	220	13	105	3.54
22-07-16	6.87	56	11	85	1.18
28-07-16	7.38	338	17	150	16.78
28-07-16	7.29	520	16	180	11.39
02-08-16	6.79	334	18	159	0.6
10-08-16	7.92	46	19	73	3
13-08-16	7.21	28	21	119	46.82
20-08-16	6.85	835	152	831	12.41
22-08-16	7.79	64	37	126	7.68
30-08-16	6.79	78	35	141	5.91

25-03-16	7.57	78	--	87	8.19
26-03-16	7.44	54	20	70	8.55
31-03-16	4.52	10	9	71	6.5
05-04-16	7.77	20	8	42	6.72
12-04-16	7.43	36	14	64	2.74
21-04-16	7.23	82	19	85	10.17
22-04-16	7.95	28	10	105	1.27
26-04-16	7.79	72	24	81	13.35
29-04-16	7.62	14	10	58	31.78
03-05-16	7.63	32	12	81	6.38
04-06-16	6.78	32	10	80	12.29

23-09-16	7.08	30	9	73	4.01
07-10-16	6.94	78	9	76	13.12
07-10-16	7.06	16	5	46	7.16
08-10-16	7.05	76	8	55	2.39
08-10-16	7.31	18	9	75	18.49
09-10-16	7.19	90	9	83	11.93
10-10-16	7.62	70	12	137	18.49
10-10-16	7.57	52	--	65	14.91
12-10-16	7.56	60	--	131	26.84
13-10-16	7.32	64	8	70	26.24
15-10-16	8.03	100	38	169	22.46

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
16-10-16	6.61	80	57	267	30.42
17-10-16	7.61	44	38	151	17.14
19-10-16	7.96	74	--	108	20.69
24-10-16	7.65	124	55	415	50.18
03-11-16	6.77	208	9	91	25.41
04-11-16	7.86	194	74	274	20.33
05-11-16	7.83	252	18	333	43.83
08-11-16	7.38	434	16	470	17.79

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
09-11-16	7.33	282	20	178	14.55
24-11-16	7.66	86	13	75	15.41
28-11-16	7.19	136	21	123	1.14
06-12-16	7.12	460	24	98	24.07
14-12-16	6.91	156	28	130	31.84
20-12-16	7.01	102	21	159	34.12
26-12-16	6.91	150	16	135	28.43

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
01-02-17	6.92	152	14	115	20.94
14-02-17	7.13	354	23	86	24.34
15-02-17	7.08	284	17	105	27.73
18-04-17	8.09	50	33	110	12.69
20-04-17	7.48	108	34	115	19.28
09-05-17	7.84	448	82	454	24.01
27-06-17	6.75	150	13	130	8.57

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
20-07-17	7.31	100	16	121	1.89
21-07-17	7.38	46	7	58	4.99
22-07-17	7.51	300	9	138	4.26
24-07-17	7.28	42	25	105	3.8
25-07-17	6.88	42	6	48	5.36
20-08-17	7.33	340	6	39	21.95
20-08-17	7.23	220	--	617	7.52

28-06-17	6.88	112	10	110	5.81	21-08-17	7.72	60	15	243	2.51
29-06-17	7.12	58	9	116	10.83	29-08-17	6.62	80	25	116	2.91
06-07-17	7.36	40	48	234	9.3	29-09-17	7.51	334	12	108	18.64
06-07-17	7.36	44	38	172	7.63	10-10-17	6.85	70	8	95	15.95
17-07-17	7.03	500	7.1	51	1.03	23-11-17	6.99	94	48	400	20.06
18-07-17	7.15	432	17	136	3.04	05-12-17	7.8	468	201	719	27.7
18-07-17	7.35	160	14	115	1.26	16-12-17	6.66	114	14	137	25.06

Year	Parameters				
	pH	SS	BOD	COD	NH ₃ -N
22-07-18	7.46	62	5	84	4.65
30-07-18	7.44	120	44	299	8.66
04-08-18	7.6	186	15	108	19.77
10-08-18	7.32	38	10	95	9.19
29-09-18	7.6	158	53	325	40.12
01-10-18	7.72	240	295	866	34.71
07-10-18	7.18	88	20	172	46.8
13-10-18	7.5	566	60	343	68.02

Source: GPCB, RO – Vapi

Note:

- All the parameters are expressed in mg/L, except pH
- (--) Indicates particular parameter not analyzed.

Appendix- 3 B

**ANALYSIS RESULTS OF MONITORING CARRIED OUT BY CPCB AT
BIL KHADI, VAPI
(Sampling location- Bill Khadi Near Bridge on NH-8, Vapi)**

Year	Parameters									
	pH	TSS	TDS	BOD	COD	O & G	NH ₃ -N	Phenols	S ⁻²	CN ⁻
28.09.2010	6.55	34	1244	59	169	15	11	0.23	0.20	0.44
26.11.2010	7.19	41	1380	82	222	8.5	14	0.69	0.7	0.159
29.03.2011	7.54	19	406	43	103	7.71	16.2	--	--	0.20
08.09.2011	7.65	33	1176	44	131	2.2	10.2	--	0.45	--
28.02.2012	7.60	12.4	496	23.5	94	6.8	13.29	BDL	2.11	0.10
18.07.2012	6.82	2129	1466	129	1179*	--	10.6	--	0.49	--
19.07.2012	7.32	237	1247	86	311*	--	14.8	0.89	1.09	--
20.07.2012	7.24	69	1328	56	198	--	7.9	0.72	1.02	--
26.02.2013	7.73	5.7	316	13.4	58.6	--	6.76	0.08	0.45	--
23.11.2013	7.56	25.7	760	42	110	3.3	11.8	--	6.4	--
03.12.2013	7.45	14.3	611	15.6	133	--	13.71	1.11	--	--
21.02.2014	6.74	24	565	25	100	2.7	13.99	0.251	1.4	0.104
01.07.2014	7.58	16	760	35.4	127	2.2	26.4	0.36	0.31	0.23
22.09.2014	7.41	30	826	57	281	3.12	9.3	0.20	2.1	0.14
29.12.2014	7.15	27	731	40	120	5.02	15.8	0.268	0.312	--
25.03.2015	7.53	24	603	22	85	0.66	11.7	0.47	3.2	0.16
03.06.2015	6.89	32	932	21.2	77	2.4	20.16	0.61	3.2	BDL
15.09.2015	6.95	98	1054	97.1	293	1.0	9.1	0.79	--	0.186
30.12.2015	7.20	30	929	118	268	16.5	23	1.18	6.3	--
21.03.2016	7.39	23	644	35	87	0.64	16.14	0.041	4.3	0.16
27.06.2016	7.07	93	1654	158	345	5.48	9.42	0.4	1.89	0.138
14.09.2016	7.52	72	1216	85	207	7.4	23	0.23	BDL	0.117
08.02.2017	7.25	60	1258	165	348	1.3	25.7	0.99	0.16	0.05
26.05.2017	6.81	30	628	29.4	101	1.6	12.32	0.106	3.29	0.043
19.09.2017	7.17	30	523	25.1	67	2.4	3.46	0.33	BDL	0.16
20.12.2017	6.91	38	1782	110	359	3.37	58.11	3.95	1.46	0.035

Year	Parameters									
	pH	TSS	TDS	BOD	COD	O & G	NH ₃ -N	Phenols	S ⁻²	CN ⁻
09.03.2018	7.27	28	691	44.3	90	3.2	15.67	0.83	--	--
11.05.2018	7.69	16	743	24.1	62.5	--	12.7	0.074	0.73	--
11.08.2018	7.13	48	775	58	153	3.75	9.8	0.52	0.8	0.05

Source: CPCB, RD (West), Vadodara

Note:

- All the parameters are expressed in mg/L, except pH.
- (--) Indicates particular parameter not analyzed.
- BDL: Below Detectable Limit.

APPENDIX- 4

**RESULTS OF MONITORING –M/S GHCL (TEXTILE), BHILAD
GPCB, RO, Sarigam**

Final Outlet of ETP (For Year 2016)

Sample ID & Date	Type	BOD	CHL	COD	COL	NH3	O&G	pH	SS	SUP	TDS	TMP
Permissible Values (mg/L)		100	600	250	100	50	10	8.5	100	1000	2100	40
195649-16/09/2016	APP	47	242	241	20	42.34	3.6	7.67	90	944	2432	30
190256-30/06/2016	ROU	56	163	219	5	21.27	2.2	7.57	92	356	1026	30
188133-30/05/2016	SCN	330	667	1361	10	45.65	2.4	7.65	110	1173	3690	30
185925-28/04/2016	ROU	58	195	230	60	19.7	4.4	7.72	80	437	1818	30
184773-06/04/2016	VIG	35	460	130	10	4.48	1.2	7.56	30	162	960	38
181264-27/02/2016	APP	25	403	207	20	12.16	3.8	7.8	16	186	1476	30
177539-06/01/2016	SCN	210	122	886	80	3.44	2.4	10.02	275	106	1115	33
177585-06/01/2016	SCN	32	113	169	10	3.44	BDL	7.52	40	41	820	30
Average		99.13	295.63	430.38	26.88	19.06	2.86	7.94	91.63	425.63	1667.13	31.38

Final outlet of ETP (For Year 2017)

Sample ID & Date	Type	BOD	CHL	COD	COL	NH3	O&G	pH	SS	SUP	TDS	TMP
Permissible Values (mg/L)		100	600	250	100	50	10	8.5	100	1000	2100	40
224193-28/12/2017	COM	57	1065	235	20	47.27	2	7.63	200	452	3157	30
221854-18/11/2017	VIG	29	588	236	5	19	0.8	7.82	90	45	1968	28
215984-08/08/2017	ROU	49	520	242	30	6.9	1.8	7.39	56	274	1676	31
210406-07/05/2017	NOT	47	705	243	5	25.64	2.8	7.22	76	614	3014	30
205609-16/02/2017	VIG	99	430	363	20	1.6	0.8	8.07	86	81	1912	29
205505-15/02/2017	APP	41	413	210	30	7.92	3	7.92	110	1750	4560	30
Average		53.67	620.17	254.83	18.33	18.06	1.87	7.68	103.00	536.00	2714.50	29.67

From Final outlet of ETP (For Year 2018)

Sample ID & Date	Type	BOD	CHL	COD	COL	NH3	O&G	pH	PHE	SS	SUP	TDS	TMP
Permissible Values (mg/L)		100	600	250	100	50	10	8.5	1	100	1000	2100	40
245318-22/10/2018	ROU	45	250	245	20	32.97	BDL	7.37	0.8	90	57	1020	31
244410-06/10/2018	VIG	43	390	222	20	14.3	BDL	7.26	0.36	96	157	1510	29
242181-10/09/2018	COM	34	215	239	30	27.73	BDL	7.64	0.28	90	105	1096	31
241367-31/08/2018	VIG	42	255	242	20	6.4	BDL	7.26	BDL	90	204	1002	28
236152-12/06/2018	VIG	49	443	255	10	18.36	BDL	8.48	BDL	38	333	1872	29
234801-23/05/2018	VIG	58	440	246	30	14.63	1.4	8.13	0.114	86	295	2534	31
234619-21/05/2018	ROU	62	429	280	30	34.93	4.4	7.18	BDL	96	396	3500	31
229706-15/03/2018	COM	59	411	265	10	14.93	3.2	8.29	BDL	92	457	1950	30
229533-13/03/2018	VIG	46	201	240	15	11.62	1.2	8.01	BDL	92	549	1790	28
224754-03/01/2018	COM	37	332	143	5	2.71	3.2	7.94	0.056	58	135	1096	29
Average		47.50	336.60	237.70	19.00	17.86	2.68	7.78	0.32	82.80	268.80	1737.00	29.70

Sample ID & Date	BOD	CHL	COD	COL	NH3	O&G	pH	PHE	SS	SUP	TDS	TMP
2016	99.13	295.63	430.38	26.88	19.06	2.86	7.94	--	91.63	425.63	1667.13	31.38
2017	53.67	620.17	254.83	18.33	18.06	1.87	7.68	--	103.00	536.00	2714.50	29.67
2018	47.5	336.6	237.7	19	17.85	2.68	7.77	0.322	82.8	268.8	1737	29.7

**ANALYSIS RESULTS OF DOMESTIC WASTEWATER COMING TO RIVER DAMANGANGA
THROUGH KALAKADA KHADI (NATURAL DRAIN) NEAR JAR CAUSEWAY
(Source GPCB)
Year 2018**

<u>Samp ID & Dt</u>	<u>pH</u>	<u>NH3-N</u>	<u>COD</u>	<u>BOD</u>	<u>SS</u>
248235-05/12/2018	7.48	3.26	61	15	114
247134-22/11/2018	8.15	3.72	41	3.5	114
244504-06/10/2018	7.46	2.09	48	8	118
241992-06/09/2018	7.79	7.15	38	10	74
240519-10/08/2018	7.09	12.85	61	8	186
237652-03/07/2018	8.32	7.53	70	10	4
236653-20/06/2018	7.66	18.04	32	2.9	26
235747-06/06/2018	7.71	1.24	30	2.7	12
233878-09/05/2018	7.69	17.38	38	10	24
231181-05/04/2018	7.56	29.97	40	9	28
228827-03/03/2018	7.47	30.8	35	8	22
227199-05/02/2018	7.53	23.52	38	8	16
227034-02/02/2018	7.29	12.36	32	2.2	28
225305-07/01/2018	7.19	6.22	32	2.2	20
Average 2018	8	13	43	7	56

YEAR 2017

<u>Samp ID & Dt</u>	<u>pH</u>	<u>NH3-N</u>	<u>COD</u>	<u>BOD</u>	<u>SS</u>
222808-04/12/2017	7.83	12.2	18	3.4	38
220622-02/11/2017	7.43	15.06	80	8	46
219478-04/10/2017	7.77	16.18	67	4.8	20
218520-20/09/2017	7.51	10.2	56	2.7	114
217948-07/09/2017	7.41	14.59	68	5	36
215591-02/08/2017	7.23	8.18	22	3.6	110
213440-03/07/2017	7.91	2.41	24	3.8	52
212190-08/06/2017	7.61	10.58	98	3	24
210400-06/05/2017	7.46	18.42	48	3.4	12
208811-07/04/2017	7.73	17.17	28	2.6	30
206758-02/03/2017	7.21	21.58	32	2.6	28
204655-03/02/2017	8.05	3.4	87	2.7	78
202537-04/01/2017	7.66	23.17	33	6	28
Average	8	13	51	4	47

YEAR 2016

<u>Samp ID & Dt</u>	<u>pH</u>	<u>NH3-N</u>	<u>COD</u>	<u>BOD</u>	<u>SS</u>
200936-06/12/2016	7.32	0.29	24	4	18
199328-07/11/2016	7.64	10.16	22	2.3	44
197216-04/10/2016	7.46	5.07	16	1.8	98
194649-03/09/2016	8.21	3.55	17	4	20
192838-04/08/2016	7.61	0.3	22	1.1	176
191414-13/07/2016	7.16	0.29	20	0.8	142
190769-04/07/2016	7.2	17.13	35	6	62
188593-03/06/2016	7.4	21.07	48	9.2	42
187151-11/05/2016	7.87	1.74	40	2.8	104
184366-04/04/2016	8.42	15.07	48	10	10
182637-11/03/2016	8.48	11.59	36	2	26
181576-02/03/2016	8.39	24.93	57	13	18
179694-03/02/2016	7.86	12.47	43	8	38
177389-04/01/2016	7.78	0.57	57	8	16
Average	8	9	35	5	58

YEAR 2015

Samp ID & Dt	pH	NH3	COD	BOD	SS
174930-03/12/2015	7.49	0.6	33	2.2	8
173550-05/11/2015	7.42	1.67	74	19	20
172783-28/10/2015	7.92	0.84	44	10	50
171778-07/10/2015	7.6	1.67	123	20	6
171610-06/10/2015	7.87	1.39	52	0.2	10
169267-03/09/2015	7.4	1.97	44	8	24
167765-05/08/2015	8.12	1.42	38	5	32
165654-02/07/2015	7.56	1.12	40	8	174
164271-10/06/2015	8.46	2.26	83	20	10
164365-10/06/2015	7.87	3.46	89	17	96
162312-05/05/2015	6.72	3.37	109	17	106
160524-07/04/2015	7.72	2.61	85	8	212
158655-04/03/2015	7.9	21.93	182	21	26
157075-04/02/2015	7.69	6.79	67	6	6
155036-02/01/2015	7.92	3.07	46	7	74
Average	8	4	74	11	57

YEAR 2014

<u>Samp ID & Dt</u>	<u>pH</u>	<u>NH3</u>	<u>COD</u>	<u>BOD</u>	<u>SS</u>
153856-11/12/2014	7.83	8.25	59	12	64
153407-04/12/2014	7.838	10.25	51	15	22
151781-10/11/2014	7.97	8.32	96	13	156
150474-10/10/2014	8.21	11.6	34	>5	16
147749-04/09/2014	7.475	3.29	26	>5	36
145799-05/08/2014	7.3	0.56	8	0.3	58
143738-03/07/2014	7.61	2.02	143	29	72
141928-06/06/2014	7.49	6.18	344	92	122
139993-02/05/2014	8.166	2.24	106	31	166
138325-03/04/2014	7.707	29.12	95	17.2	34
136656-07/03/2014	7.297	10.08	107	33	16
134964-06/02/2014	7.76	5.88	68	16	20
133090-07/01/2014	7.738	2.8	82	24	32
Average 2014	8	8	94	26	63

YEAR 2013

<u>Samp ID & Dt</u>	<u>pH</u>	<u>NH3-N</u>	<u>COD</u>	<u>BOD</u>	<u>SS</u>
128427-01/11/2013	7.821	0.84	168	62	28
127006-04/10/2013	7.613	0.56	50	13	32
124903-04/09/2013	8.123	1.12	77	22	36
122959-02/08/2013	7.737	0.56	54	17	78
121330-03/07/2013	8.058	19.6	69	0.4	34
119587-01/06/2013	7.38	2.8	32	6.8	240
118200-03/05/2013	7.2	5.88	12	1.8	58
116314-03/04/2013	7.62	19.6	26	7	70
114752-04/03/2013	7.48	21.28	82	20	84
112816-01/02/2013	7.73	2.8	16	2.1	40
110878-01/01/2013	8.21	2.24	10	1.1	8
	8	7	54	14	64

APPENDIX 6 A**RIVER WATER QUALITY - GPCB, PCC & VGEL JOINT MONITORING**

(Fortnightly monitoring- Annual average values are given in Tables)

VAPI WEIR				
YEAR	DO	BOD	COD	NH3-N
2013	7.0	1.0	4.7	0.5
2014	7.3	0.2	4.3	0.3
2015	7.1	0.2	5.5	0.3
2016	7.3	0.4	5.6	0.3
2017	7.2	0.4	7.2	0.3
2018	6.8	1.4	10.0	1.4

NAMDHA				
YEAR	DO	BOD	COD	NH3-N
2013	5.2	1.2	11.7	2.5
2014	6.1	1.7	31.0	2.5
2015	5.1	3.9	34.0	1.2
2016	4.9	3.5	27.9	1.2
2017	6.2	1.9	16.9	1.4
2018	5.6	4.5	29.9	5.2

ZARI CAUSEWAY				
YEAR	DO	BOD	COD	NH3-N
2013	5.3	1.4	12.2	2.0
2014	5.5	2.1	34.5	1.7
2015	5.0	3.4	37.3	1.0
2016	5.3	2.7	25.5	1.1
2017	6.3	1.9	16.5	1.2
2018	5.6	3.7	26.3	4.9

JETTY DAMAN				
YEAR	DO	BOD	COD	NH3-N
2013	6.1	1.4	13.6	1.1
2014	6.9	0.6	13.6	0.8
2015	6.4	0.5	15.5	0.5
2016	6.6	0.9	11.1	0.6
2017	6.8	1.1	13.6	0.9
2018	6.3	7.2	33.3	3.3

COD				
YEAR	VAPI WEIR	NAMDHA	ZARI CAUSEWAY	JETTY DAMAN
2013	4.7	11.7	12.2	13.6
2014	4.3	31.0	34.5	13.6
2015	5.5	34.0	37.3	15.5
2016	5.6	27.9	25.5	11.1
2017	7.2	16.9	16.5	13.6
2018	10.0	29.9	26.3	33.3

DO				
YEAR	VAPI WEIR	NAMDHA	ZARI CAUSEWAY	JETTY DAMAN
2013	7.0	5.2	5.3	6.1
2014	7.3	6.1	5.5	6.9
2015	7.1	5.1	5.0	6.4
2016	7.3	4.9	5.3	6.6
2017	7.2	6.2	6.3	6.8
2018	6.8	5.6	5.6	6.3

BOD				
YEAR	VAPI WEIR	NAMDHA	ZARI CAUSEWAY	JETTY DAMAN
2013	1.0	1.2	1.4	1.4
2014	0.2	1.7	2.1	0.6
2015	0.2	3.9	3.4	0.5
2016	0.4	3.5	2.7	0.9
2017	0.4	1.9	1.9	1.1
2018	1.4	4.5	3.7	7.2

NH3-N				
YEAR	VAPI WEIR	NAMDHA	ZARI CAUSEWAY	JETTY DAMAN
2013	0.5	2.5	2.0	1.1
2014	0.3	2.5	1.7	0.8
2015	0.3	1.2	1.0	0.5
2016	0.3	1.2	1.1	0.6
2017	0.3	1.4	1.2	0.9
2018	1.4	5.2	4.9	3.3

APPENDIX 5 B

QUALITY OF RIVER DAMANGANGA-CPCB, RD (W), VADODARA

(Quarterly monitoring i.e. 4 monitoring in year, annual average-average of four values)

Table: Annual average concentration of various parameters monitored during calendar year (2008-2018)

Sampling location & Year	Parameters						
	pH	DO	TDS	BOD	COD	NH ₃ -N	Phenols
D-1: 2008	8.5-9.2	7.0	195.8	3.9	14.4	2.6	0.3
D-2: 2008	7.26-8.52	4.34	6014.8	18.0	155	16.1	0.3
D-3: 2008	8.23-8.41	4.15	10586.33	19.53	74.66	6.026	0.18
D-1: 2009	8.06-9	7.76	228	1.26	22	0.91	0.007
D-2: 2009	6.71-7.67	1.91	19456.8	28	206	10.1	0.13
D-3: 2009	7.01-8.03	3.75	29422	9.2	146.8	4.25	0.046
D-1: 2010	7.98	7.63	169.5	1.46	15.45	0.72	0.15
D-2: 2010	7.10	3.55	15359	13.03	80.25	5.75	0.25
D-3: 2010	7.31	5.0	23198.25	11.35	114.25	1.23	0.24
D-1: 2011	8.058	7.88	160.2	3.23	14.2	0.57	NA
D-2: 2011	7.64	3.85	9277.8	7.42	87	7.38	0.024
D-3: 2011	7.79	5.31	17429.6	5.86	89.8	1.99	0.020
D-1: 2012	7.50	7.74	207.4	2.28	8.32	0.44	0.11
D-2: 2012	7.068	3.59	10903.6	7.88	125.04	4.9	0.107
D-3: 2012	7.16	5.59	22316.6	11.37	143.44	2.41	0.038
D-1: 2013	8.10	7.86	196	2.3	7.87	0.25	0.04
D-2: 2013	7.70	3.54	1777	3.65	49.62	1.97	0.057
D-3: 2013	7.67	4.26	10568.5	4.8	71.52	1.65	0.33
D-1: 2014	7.92	7.89	194.75	2.62	10.22	1.49	0.03
D-2: 2014	7.49	3.93	10370.75	3.62	100.2	4.20	0.11
D-3: 2014	7.63	5.22	19096.25	2.4	161.57	3.17	0.06
D-1: 2015	8.18	7.765	206	3.91	14.3	1.34	0.041
D-2: 2015	7.49	4.01	8549.25	2.58	62.12	3.21	0.096
D-3: 2015	7.71	5.75	27724	2.25	87.32	2.23	0.301
D-1: 2016	7.86-8.2	7.7	206.67	2.10	14.73	0.34	NA
D-2: 2016	7.43-8.11	4.74	3770	5.03	102.87	4.70	NA
D-3: 2016	7.69-7.9	6.64	16714	2.93	110.70	1.05	NA

D-1: 2017	7.29-8.72	8.56	159.5	2.86	10.76	0.42	NA
D-2: 2017	7.29-8.72	4.58	159.50	6	72.79	4.56	NA
D-3: 2017	6.84-7.88	5.79	5296.25	4.005	112.89	2.49	NA
Sampling location & Year	Parameters						
	pH	DO	TDS	BOD	COD	NH₃-N	Phenols
D-1: 2018	7.92-8.98	6.1875	139.5	2.65	10.15	0.6325	NA
D-2: 2018	7.46-8.22	3.05	2114.5	3.7325	38.2	3.9425	NA

Note:

- All the parameters are expressed in mg/l, except pH.
- Mode of sampling: Grab.
- BDL: Below Detectable Limit

Note : Concentration of all parameters is expressed in mg/l, except pH.

- : D-1 Damanganga River, GIDC Weir, U/S of CETP discharge.
- : D-2 Damanganga River near Zari-causeway (Gujarat-Daman Border).
- : D-3 Damanganga River, Near bridge joining Moti Daman & Nani Daman, near mouth of Damanganga Estuary
- : BDL Below Detectable Limit
- : NA Not analyzed.

GAP 3198 / 3212 / 3213

DISTRIBUTION RESTRICTED

**Monitoring of Tadgam, Tithal, Jampore and Devka
Beaches in Valsad District of Gujarat and Union
Territory of Daman (Part I, II & III)**

SPONSORED BY

Central Pollution Control Board, New Delhi,
Gujarat Pollution Control Board, Gandhinagar &
Pollution Control Committee, UTs of Daman & Diu

August 2018

	<p>सीएसआईआर - राष्ट्रीय समुद्र विज्ञान संस्थान CSIR - NATIONAL INSTITUTE OF OCEANOGRAPHY (वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद) (COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH) क्षेत्रीय केंद्र : चार बंगला, अंधेरी (प.) मुंबई - 400 053. Regional Centre : 4 Bungalows, Andheri (W), Mumbai - 400 053. (फोन) Tel : 022-26359605-08 • (फैक्स) Fax: 022-26384627 (ई-मेल) e-mail: rcm@nio.org</p>	
<p>HQ: दोना पावला, गोवा भारत / Dona Paula, Goa - 403 004.</p>		

EXECUTIVE SUMMARY

Hon'ble National Green Tribunal, Western Zone Bench, Pune (NGT, WB), in their order dated 13.11.2017 in response to original application No. 99/2017 (WZ), Tarun Patel Vs MoEFCC & Ors directed CSIR-National Institute of Oceanography (CSIR-NIO) to carry out weekly monitoring for three (3) weeks along the beaches of Tadgam and Tithal (Valsad district, Gujarat), also Jampore and Devka beaches (Union Territory, Daman). The order has stated to collect water samples from aforementioned beaches and analyse them for Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and other chemical parameters by use of High Performance Liquid Chromatography (HPLC) and Gas-Chromatography (GC). This is to assess the status of toxic and other substances present in the above beaches. Later, the Gujarat Pollution Control Board (GPCB), Central Pollution Control Board (CPCB) and the Pollution Control Committee, UT of Daman & Diu and Dadra Nagar Haveli, in their respective letters have requested CSIR-NIO to consider above matter and carryout the study. Hence, for the ease of official handling, this project was numbered as part I, part II and part III. However, to compare the results, the report is prepared as one single report.

CSIR-NIO carried out monitoring on 15.3.2018, 22.3.2018 and 3.4.2018 covering 3 weeks at Tadgam, Jampore, Devka and Tithal beaches. Water and sediment samples were collected at two stations on every single beach at Low Tide (LT) and High Tides (HT). Also, samples from areas close to visible effluent discharge site such as pipeline located in the vicinity of Tadgam Beach were also collected. In addition to the parameters for water quality, sediment quality and microbiological studies, organic pollutants such as Pesticides (Organochlorines (OCs) and Organophosphorus (OPs)) and Polycyclic Aromatic Hydrocarbons (PAHs) were measured in the sediment samples after its processing and extraction. This is because the organic compounds in water often reveals wide fluctuation as their concentrations depend on the location and time of sampling, nature of compound and chemical characteristics of water. Moreover, several trace concentration of organic compounds/pollutants get rapidly fixed to SS and thus removed from the water column. It has been observed in several instances that even close to location of direct source, the organic content in water often decreases to normal value making the assessment of ambient contamination through analyses of water, a difficult task

All the samples of this study subjected to the chemical as well as microbiological analyses was to broadly address the following objective,

- To evaluate prevailing status of water and sediment quality of Tadgam, Jampore, Devka and Tithal beaches.

The present report contains information on results of water and sediment quality determined at two stations on every beach monitored for three times at low tide and high tide period during 15.3.2018, 22.3.2018 and 3.4.2018. An effluent pipeline of M/s. Sarigam Clean Initiative (12.5 MLD Cap. CETP) located at Sarigam (GIDC) carries treated waste water (total length – 13.23 km laid down; onshore – 11.73 km & offshore – 1.5 km) & its disposal point is into the Arabian Sea at village Tadgam with diffuser system (GPCB). Hence, an additional station was sampled on this beach. The beaches around India is sparsely studied for their water quality. Therefore, the water and sediment quality results obtained from this study at Tadgam, Jampore, Devka and Tithal beaches were further compared with chemical and microbiological data available for coastal and nearshore waters around India.

Water Quality

The seawater temperature along Tadgam, Jampore, Devka and Tithal beaches were ranged at 25.5–31.0, 26.0–31.0, 27.0–33.0 and 28.0–33.0 °C respectively. The water temperature varied in accordance with prevailing air temperature in the region and moreover, did not exceed 35°C (considered as threshold limit for tropical aquatic species). The pH varied in the range of 7.7–8.2, 7.9–8.2, 7.7–8.1 and 7.8–8.6 respectively at Tadgam, Jampore, Devka and Tithal beaches as commonly observed for nearshore coastal waters and do not reveal any abnormal value. Suspended solids (SS) concentration was ranged at 227–686, 84–13001, 81–1219, 34–10857 mg/l in Tadgam, Jampore, Devka and Tithal beaches respectively are common in highly dynamic nearshore waters. Salinity was in the range of 35.2–36.1, 32.9–36.5, 31.7–34.5 and 33.2–36.3 psu respectively at Tadgam, Jampore, Devka and Tithal beaches and comparable to normal seawater salinity. Concentrations of Dissolved Oxygen (DO) varied at the range of 5.6–7.2, 3.6–8.5, 4.9–8.2 and 4.9–7.5 mg/l in Tadgam, Jampore, Devka and Tithal beaches respectively are in good levels to support diverse biota and in line with DO reported for coastal and nearshore waters around India. However, the waters in the vicinity of effluent pipeline at Tadgam (TGD) showed lower DO value of range <0.1–3.3 mg/l indicating impact of industrial discharge. During sampling in low tide the effluent pipeline was seen exposed and the effluent did not mix effectively with the ambient seawater as seen in plate 3 & 4. However,

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during third sampling of April 3, 2018, DO concentrations were between 5.9 and 7.8 mg/l, as flow of effluent was not seen on 3.4.2018. Biochemical Oxygen Demand (BOD) values were ranged as 2.2–4.9, 1.6–5.2, 1.0–3.6 and 1.6–4.6 mg/l at Tadgam, Jampore, Devka and Tithal beaches respectively was comparable with BOD values around Indian coast. BOD values in the samples collected from the vicinity of ruptured effluent pipe line however ranged between 21.1 mg/l and 27.5 mg/l during low tide of 15 and 22 March, 2018 clearly revealing their source in the effluent. Measurement of COD in seawater is difficult and general method of COD employed for freshwater and waste water often lead to misleading results because of high Chloride (Cl) content of seawater. Hence, specially designed method for the estimation of COD in seawater reported in the literature was applied for the COD measurement in present study. The ranges of Chemical Oxygen Demand (COD) values in waters from Tadgam, Jampore, Devka and Tithal beaches were 60–132.5, 22.5–95.0, 76.5–115.8 and 97–129 mg/l respectively, with COD at TGD was in the range of 102.5–150 mg/l. The ranges of COD obtained in this study was comparable with COD values reported for coastal water bodies in India and world, also do not reveal any significant enhancement.

The Phosphate ($\text{PO}_4^{3-}\text{-P}$) was ranged at 1.0–4.6, 1.0–4.8, 0.6–7.3 and 1.6–8.4 $\mu\text{mol/l}$ in Tadgam, Jampore, Devka and Tithal beaches respectively, are in line with $\text{PO}_4^{3-}\text{-P}$ observed in coastal water bodies around India. Exceptionally, higher $\text{PO}_4^{3-}\text{-P}$ (57.3 $\mu\text{mol/l}$) obtained at TGD was influenced by the of industrial discharge at Tadgam. Nitrate ($\text{NO}_3^-\text{-N}$) at Tadgam, Jampore, Devka and Tithal beaches was in range of 8.7–15.7, 5.8–13.8, 11.3–15.1 and 5.4–14.7 $\mu\text{mol/l}$ respectively, are in line with values commonly recorded in nearshore coastal waters. Concentrations of Nitrite ($\text{NO}_2^-\text{-N}$) was in range of 0.3–1.4, 0.2–1.2, 0.8–2.0 and 0–4.0 $\mu\text{mol/l}$ at Tadgam, Jampore, Devka and Tithal beaches respectively. Ammonia ($\text{NH}_4^+\text{-N}$) was in range of 0.4–4.1, 1.1–7.7, 0.5–9.9 and 0.3–5.8 $\mu\text{mol/l}$ at Tadgam, Jampore, Devka and Tithal beaches respectively, with an exceptionally higher value of $\text{NH}_4^+\text{-N}$ (28.7 $\mu\text{mol/l}$) was recorded at TGD being impacted by industrial discharge. The observed levels of $\text{NO}_3^-\text{-N}$, $\text{NO}_2^-\text{-N}$, $\text{NH}_4^+\text{-N}$ and $\text{PO}_4^{3-}\text{-P}$ in water of these beaches are in line with those reported for other sites along the coast of India and do not reveal unusual nutrient enrichment.

The concentration of Petroleum Hydrocarbons (PHc) in water ranged at 3.5–11.4, 1.9–12.5, 2.4–10.7 and 2.8–8.1 $\mu\text{g/l}$ in Tadgam, Jampore, Devka and Tithal beaches respectively, with highest at TGD (PHc = 46.2 $\mu\text{g/l}$) are in order for nearshore waters. Similarly, the ranges of Phenol in waters of Tadgam, Jampore, Devka and Tithal beaches were

49–122.6, 28.3–152.2, 19.9–205 and 16.1–155.3 $\mu\text{g/l}$ respectively, are in order for nearshore waters. Comparison of PHc and phenols values available for the west coast of India with the results for these beaches does not reveal any enhancement in their levels in the beach waters. The levels of dissolved trace metals: Cr, Fe, Co, Ni, Cu, Zn and Hg in water of these four beaches indicate baseline concentrations when compared with their levels in water of other coastal areas of India.

Sediment Quality

The averages of metals in the sediments (dry wt.) collected from Tadgam, Jampore, Devka and Tithal beaches showed minimal variability during all the three sampling period of this study. The average concentrations of metals such as Al, Cu, Fe, Cr, Ni, and Zn were comparatively higher in sediments from Devka and Tithal beaches as compared to other two beaches, which indicate lithogenic characteristic of the sediment of the area. However, a higher concentration of Cr at Tadgam (TG1 and TG2) during almost all the sampling events indicate its input from anthropogenic sources. The ranges of C_{org} observed in Tadgam, Jampore, Devka and Tithal beach sediments of this study were comparable with the same found along west coast of India. The PHc in this study are in the range of PHc commonly reported in coastal sediment. The buildup of phosphorus, organic carbon and PHc was absent in the study area including the wastewater release site.

The results of GC-MS analysis confirmed that the targeted PAHs, OCs and OPs are not detected indicative of negligible presence of harmful organic substances in the sediment samples of all four beaches.

Microbiological characteristics

Bacterial count in terms of Total Viable Count (TVC in $\times 10^4$ CFU/ml) count was in the range of 3.5–11.5, 5.0–6.5, 8.5–12.5 and 5.0–7.5 in the waters from Tadgam, Jampore, Devka and Tithal beaches respectively. The presence of Faecal coliforms (FC) was detected with maximum numbers, which was ranged as 0–5, 3–25, 4–5 and 2–4 CFU/ml in Tadgam, Jampore, Devka and Tithal beaches respectively. In sediment the TVC and FC were higher in counts which is common in coastal waters of India. Overall, the microbial counts in water and sediment are comparable with data available for coastal regions of India.

5 SUMMARY AND CONCLUSION

The water and sediment quality along Tadgam, Jampore, Devka and Tithal beaches were monitored for a period of three-weeks during March and April 2018. The status of prevailing marine environment is primarily assessed based on the comparison of observed chemical and microbiological parameters in water and sediment of these beaches with the data available for the coastal waters of India and elsewhere. The four beaches investigated for their environmental status are situated in the vicinity of cities of the industrially important districts of Valsad and UT Daman and are popular tourist and recreational destinations. In addition to industrial effluents, release of sewage from domestic sources and hotels through creeks and nullahs can also be the source of contaminants to the coastal water influencing these beaches during tidal inundation.

The SS adsorbs a number of organic and inorganic pollutants which eventually settle burdening the sediment. Hence, sediments are good indicator of integrated impact of several contaminants, particularly trace metals, PHc, PAHs and pesticides. Some of these pollutants can leach into overlying water under changing redox conditions coupled with their re-suspension by tidal movements and waves. Disturbance of bed sediment can also lead to the release of nutrients and microbes to the water column. Based on the monitoring of Tadgam, Jampore, Devka and Tithal beaches conducted in March-April 2018 and comparison of results with the published information for the coastal waters of India and elsewhere, the following conclusions have emerged:

- The pipeline carrying effluent from the Sarigam industrial area is ruptured and when exposed at low tide, the effluent is seen spreading on the Tadgam beach in the vicinity of the pipeline. At Devka beach, a pipeline discharges sewage in the nearby coastal water.
- High SS values recorded at these four beaches are due to dispersion of the beach sediment in water due to tidal movements and wave action, commonly occurring in nearshore zones.
- The average dissolved oxygen (DO) at these four beaches is always above 4.5 mg/l except for the water samples collected near the pipeline carrying effluent from the Sarigam industrial area across Tadgam beach (Station TGD). Under the influence of the effluent the DO is depleted and BOD is relatively high in the beach water in the vicinity of effluent discharge. However, such changes are not evident at a location about 1.2-2 km towards north from the pipeline. The

average DO values recorded at these beaches are of the order reported for other sites along the west coast of India.

- Except at Station TGD (Tadgam beach) the BOD of water of these four beaches is in the range expected for segments along the west coast of India.
- The average COD values at four beaches are low or comparable with those reported for other coastal sites along the coast of India and do not reveal any significant enhancement.
- Except for $\text{NH}_4^+\text{-N}$ at TGD location, the observed levels of $\text{NO}_3^-\text{-N}$, $\text{NO}_2^-\text{-N}$, $\text{NH}_4^+\text{-N}$ and $\text{PO}_4^{3-}\text{-P}$ in water of these beaches are in line with those reported for other sites along the coast of India and do not reveal unusual nutrient enrichment.
- The levels of dissolved trace metals: Cr, Fe, Co, Ni, Cu, Zn and Hg in water of these four beaches indicate baseline concentrations when compared with their levels in water of other coastal areas of India.
- Comparison of PHc and phenols values available for the west coast of India with the results for these beaches does not reveal any enhancement in their levels in the beach waters.
- The waters of these four beaches sustain high load of faecal coliforms (FC) in water and sediment suggesting contamination by sewage.
- The concentrations of trace metals: Cr, Co, Ni, Cu, Zn and Hg in sediments of these beaches indicate lithogenic levels and suggest that the sediment is largely free from anthropogenic contamination from trace metals.
- From comparison of levels of PHc, organic carbon and phosphorus in sediment of these beaches with those reported for other marine areas, the absence of enhancement of levels of these constituents in beach sediments, is evident.
- PAHs and Organochlorines (OCs) and Organophosphorus (OPs) pesticides are below the limit of detection in the sediment of these beaches.
- Overall, it is concluded that there is no evidence for significant deterioration of environmental quality of the four beaches investigated except for high faecal coliform counts which is common in coastal waters of India. Low DO and high BOD in the vicinity of the ruptured pipeline at the Tadgam beach is due to the impact of effluent.

DETAILS OF DEFAULTING INDUSTRIES-
GPCB ACTION, HEARING AND COMPENSATION

01. Amardeep Chemical Industries Pvt. Limited

Sr. No.	Item	Details
1.	Name of Industry	Amardeep Chemical Industries Pvt. Limited Plot No.:A2/8, Phase 1, GIDC, Vapi
2.	GPCB ID	29990
3.	Year of Establishment/Commissioning	01.08.2010
4.	Product Type	Pharma Intermediate
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	3.1 KLD
8.	Date of Inspection/Visit	28.02.2018 & 01.03.2018
9.	Date of Direction of Closure Order	08.03.2018
10.	Date of Visit for Revocation Order	22.03.2018
11.	Date of Revocation Order	05.05.2018
12.	Period of Noncompliance	23 Days
13.	Reason for Closure	<p>☒ Unit has carried out Production of Femendazole without EC/CTE/CC&A.</p> <p>☒ Methylene Chloroformate is utilized as a raw material for manufacturing of Femendazole and unit received 80 Nos. of Drums, Out of these 2 Nos. of Drums are leakage and heavy smell is observed.</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit and he agreed that production of Femendazole was carried out without EC/CTE.</p> <p>☒ Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,38,000 /-

02. Amitech Chemicals Private Limited

Sr. No.	Item	Details
1.	Name of Industry	Amitech Chemicals Private Limited Plot No:1401/6,Phase-3,GIDC,Vapi
2.	GPCB ID	34228
3.	Year of Establishment/Commissioning	01.04.1996
4.	Product Type	Dyes and Dyes Intermediate 2 Chloro Ethyl Amine Hydro Chloride – 20 MT/Month
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	2 KLD
8.	Date of Inspection/Visit	21.07.2018
9.	Date of Direction of Closure Order	01.09.2018
10.	Date of Visit for Revocation Order	16.10.2018 & 29.10.2018
11.	Date of Revocation Order	05.11.2018
12.	Period of Noncompliance	101 Days
13.	Reason for Closure	<p>☒ Looking to analysis report of waste water sample collected from final outlet of ETP, result of parameters; BOD = 580 mg/L (limit = 400 mg/L), COD = 2122 mg/L (limit = 1000 mg/L), TDS = 16720 mg/L (limit = 2100 mg/L), which exceed the permissible limit.</p> <p>☒ ETP units were not operated efficiently</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit and it was argued that their newly constructed ETP was under stabilization stage, So collected sample from final outlet was not meeting with norms.</p> <p>☒ As unit was discharging waste water into CETP without meeting norms. Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 6,09,400 /-

03. Amoli Organics P Ltd

Sr. No.	Item	Details
1.	Name of Industry	Amoli Organics P Ltd Plot No. 322/4,40 Shed Area, GIDC, Vapi
2.	GPCB ID	23074
3.	Year of Establishment/Commissioning	21.12.1992
4.	Product Type	Bulk Drugs
5.	Category	Red
6.	Scale	Large
7.	Discharge Quantity	120 KLD
8.	Date of Inspection/Visit	20.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	31.05.2018
11.	Date of Revocation Order	19.06.2018
12.	Period of Noncompliance	42 Days
13.	Reason for Closure	<p>✘ Unit has constructed new building adjacent to the existing production plant for the manufacturing of Bulk Drug without obtaining required EC from the competent authority.</p> <p>✘ ETP consisting of Primary, Secondary and Tertiary unit provided, which is found in operation, however ETP units were not properly approachable to visualized treatment of wastewater. All the unit of ETP are scattered and divided by wall, therefore it was not possible to inspect in sequential manner.</p> <p>✘ At the time of inspection, in the tertiary unit diluted wastewater was observed (reveals from the physical characteristics of wastewater stored in different units of ETP).</p> <p>✘ There was a continuous discharge of water observed from the Ejector connected to the</p>

		<p>reactor. At the time of inspection intense emission of VOCs is observed from the same place.</p> <p>☒ Unit has not provided isolated / dedicated storage area for the various type of solid wastes / residues generated from the plant premises.</p> <p>☒ At the time of inspection tanker loading of concentrated wastewater was observed, being sent to Common Facility of RSPL at Ankleshwar without obtaining required permission of the Board, as well as unit was failed to provide details of quantity of such wastewater sent to MEE.</p> <p>☒ It was stated by contacted person that this kind of practice is used since last 2 years without any approval.</p> <p>☒ From the manufacturing process, spent Aluminum Chloride is generated; regarding disposal of the same person contacted has shown ignorance.</p> <p>☒ Process residue and unrecovered spent solvent were found unaccountable.</p> <p>☒ For collection of high COD steam for the incineration as per the CCA, industry has not provided any kind of system and 3-4 barrels are found in the premises. However, on asking for the same contacted person was unable to reply accordingly.</p> <p>☒ Unit is storing diluted wastewater in final holding tank, which is not actual treated wastewater</p> <p>☒ In the provided ETP, unit's wide variations of quality of wastewater (envisaged from the colour) hence to evaluate the performance of ETP units stage wise sample is collected viz. 1) From the collection tank - B/T, 2) From the final treated wastewater disposal tank - A/T, 3) From the overflow of primary settling tank after flash mixer 4) From the Secondary treated waste water tank.</p>
14.	Committee	☒ Unit had represented that collected waste water

	Hearing/Observation	<p>sample from final treated waste water holding tank was within norms.</p> <p>⊗ However in consideration of observations during inspection "unit was found non complied for the reasons including diluted wastewater was observed in tertiary ETP units (reveals from the physical characteristics of wastewater stored in different units of ETP), and tanker loading of concentrated wastewater was observed, being sent to Common Facility of RSPL at Ankleshwar without obtaining required permission of the Board, as well as unit was failed to provide details of quantity of such wastewater sent to MEE". Moreover, the results of the analysis of treated wastewater is not in congruence to the theoretical/practical efficiency for removal of COD through the existing treatment system (In absence of quantity of concentrated w/w stream, sent to MEE) for this kind of effluent.</p> <p>⊗ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 37,80,000/-

04. Bhavini Products

Sr. No.	Item	Details
1.	Name of Industry	Bhavini Products Plot No. 176/7- A, Phase No : II, GIDC, Vapi.
2.	GPCB ID	23218
3.	Year of Establishment/Commissioning	15.06.2006
4.	Product Type	Organic Chemicals Manufacturing
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	0.55 KLD
8.	Date of Inspection/Visit	14.08.2018 & 16.08.2018
9.	Date of Direction of Closure Order	17.09.2018
10.	Date of Visit for Revocation Order	16.10.2018 & 31.10.2018
11.	Date of Revocation Order	05.11.2018
12.	Period of Noncompliance	79 Days
13.	Reason for Closure	<p>☒ Light yellowish colour waste water having @2 pH was coming from hole of boundary wall of unit behind premises of unit in green belt of GIDC due to leakage in water circulation pump to generate vacuum during distillation process.</p> <p>☒ Result of same collected from GIDC green belt behind M/s Bhavini products shows pH- 1.52, COD - 4568 mg/l and Phenolic compound - 3.51 mg/l.</p> <p>☒ Huge quantity of process, reprocess, raw materials and residue filled drums was kept within premises in open.</p> <p>☒ Housekeeping of plant was found poor due to spillages.</p> <p>☒ High irritation and storage smell of VOC was felt near centrifuge area.</p>

14.	Committee Hearing/Observation	<p>☒ Unit had represented that due to rains, they could not carry out requisite maintenance work of pump which led to acidic wastewater discharge and going outside from boundary wall.</p> <p>☒ Committee heard representative of this unit and he agreed that illegal discharge was done of acidic effluent through boundary wall (COD - 4568 mg/L and pH - 1.52).</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 4,76,325/-

05. Centre Point Industries

Sr. No.	Item	Details
1.	Name of Industry	Centre Point Industries Plot No.316, 40 Shed Area, GIDC, Vapi
2.	GPCB ID	23260
3.	Year of Establishment/Commissioning	01.01.1992
4.	Product Type	Dyes and Dye - Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	5.3 KLD
8.	Date of Inspection/Visit	21.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	15.05.2018
11.	Date of Revocation Order	29.05.2018
12.	Period of Noncompliance	25 Days
13.	Reason for Closure	☒ It is observed that wastewater flowing into the inlet drain leading to ETP is being continuously let off with the minor flow of contaminated water

		<p>through back side boundary wall was going on into Kutchha drain passing backside of industry through created outlet.</p> <p>✘ Unit has stored iron waste and Gypsum in huge quantity on to the open land located at the backside of the unit. Moreover, isolated storage area for the storage of solid waste is not provided.</p> <p>✘ Provided ETP units were found not in operation. Moreover, maintenance of the ETP units, also found poor.</p>
14.	Committee Hearing/Observation	<p>✘ Unit has represented that, waste water spillage/leakage was done by adjoining engineering unit.</p> <p>✘ However in consideration of inspection remarks of GPCB, it is observed that wastewater flowing into the inlet drain leading to ETP is being continuously let off with the minor flow of contaminated water through backside. Boundary wall of this unit and was going into Kutchha drain passing backside of Industry through created outlet and the sample collected from this output shows COD 410 mg/L, which reflects that there is a presence of chemical. Further, such effluent is not envisaged from engineering units. It indicates that wastewater collected from backside had been spilled from M/s Centre point which violates consent condition. ETP was not in operation and maintenance of the ETP units are also found poor. Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,50,000/-

06A Chemodist Industries

Sr. No.	Item	Details
1.	Name of Industry	Chemodist Industries Plot No. 808-B-2, Phase - III, GIDC, Vapi
2.	GPCB ID	23278
3.	Year of Establishment/Commissioning	01.01.1997
4.	Product Type	Food Colour
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	14 KLD
8.	Date of Inspection/Visit	28.12.2017
9.	Date of Direction of Closure Order	20.03.2018
10.	Date of Visit for Revocation Order	13.04.2018
11.	Date of Revocation Order	21.05.2018
12.	Period of Noncompliance	107 Days
13.	Reason for Closure	<p>⊗ Ponding of Industrial waste water observed at many places within premises & housekeeping of the unit was observed very bad.</p> <p>⊗ Analysis result of collection tank shows Colour - 8000 pt.co.sc, TDS - 44,450 mg/L, COD - 8274 mg/L, BOD - 3533 mg/L.</p> <p>⊗ Analysis result of Final outlet of ETP shows Colour - 400 pt.co.sc, TDS - 1872 mg/L, COD - 164 mg/L, BOD - 35 mg/L. which indicates that unit was doing dilution with fresh water</p>
14.	Committee Hearing/Observation	<p>⊗ Committee heard representative of this unit.</p> <p>⊗ As per GPCB inspection report, unit was doing dilution with fresh water instead of treating effluent as inferred from TDS inlet & outlet results.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 6,42,000/-

06B. Chemodist Industries

Sr. No.	Item	Details
1.	Name of Industry	Chemodist Industries Plot No. 808-B-2, Phase - III, GIDC, Vapi
2.	GPCB ID	23278
3.	Year of Establishment/Commissioning	01.01.1997
4.	Product Type	Food Colour
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	14 KLD
8.	Date of Inspection/Visit	31.07.2018
9.	Date of Direction of Closure Order	28.08.2018
10.	Date of Visit for Revocation Order	06.09.2018
11.	Date of Revocation Order	17.09.2018
12.	Period of Noncompliance	38 Days
13.	Reason for Closure	<p>☒ Result of sample collected from storm water drain which was coming from roof top shows color 4000 pt.co.sc, TDS-1100 mg/l and COD-283 mg/l. This contaminated waste water goes to Bill khadi through open storm water drain.</p> <p>☒ Flexible pipe lines were observed near fresh water tank & sand filter area. Reddish colored wastewater was spread near those areas.</p> <p>☒ Housekeeping of ETP area found poor.</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit.</p> <p>☒ As per GPCB inspection report, coloured waste water was observed in the in the storm water drain having characteristics of color4000 pt.co.sc, TDS- 1100 mg/l and COD- 283 mg/l which is leading to Bill Khadi.</p> <p>☒ GPCB issued earlier issued closure direction and direction was further revoked as mentioned in above Table 6A</p> <p>☒ Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 2,28,000/-

06C. Chemodist Industries

Sr. No.	Item	Details
1.	Name of Industry	Chemodist Industries Plot No. 808-B-2, Phase - III, GIDC, Vapi
2.	GPCB ID	23278
3.	Year of Establishment/Commissioning	01.01.1997
4.	Product Type	Food Colour
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	14 KLD
8.	Date of Inspection/Visit	16.10.2018
9.	Date of Direction of Closure Order	22.11.2018
10.	Date of Visit for Revocation Order	05.12.2018
11.	Date of Revocation Order	24.12.2018
12.	Period of Noncompliance	51 Days
13.	Reason for Closure	<p>☒ Treated waste water is discharge into GIDC underground drain</p> <p>☒ Result of the sample collected from final ETP units which shows result of TDS = 13900 mg/L (limit 2100), color = 4000 pt.Co. Sc. (limit 100), BOD = 1680 mg/L (limit 400 mg/L), COD = 5524 mg/L (limit 1000 mg/L)</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit.</p> <p>☒ As per GPCB, inspection report unit was discharging wastewater into GIDC underground drain which is not as per CETP inlet norms.</p> <p>☒ GPCB issued earlier two times closure directions & further directions were revoked as mentioned in Table 6A& 6B as above.</p> <p>☒ Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 3,54,452/-

06 D__Chemodist Industries (As per list of defaulting units- provided by VGEL-CETP)

Sr. No.	Item	Details
1.	Name of Industry	Chemodist Industries Plot No. 808-B-2, Phase - III, GIDC, Vapi
2.	GPCB ID	23278
3.	Year of Establishment/Commissioning	01.01.1997
4.	Product Type	Food Colour
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	14 KLD
8.	Period of Noncompliance	31 Days*
9.	Reason for Closure	---
10.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit</p> <p>☒ As per VGEL Data (3 monitoring), the COD : 1104 mg/l on 24.12.2018, 3808 on 16.10.2018, 1680 mg/l on 04.10.2018, the industry found non-compliance with CETP inlet norms.</p> <p>☒ Earlier GPCB has issued three times closure directions and further directions were revoked as mentioned in Tables 6A, 6 B & 6 C</p> <ul style="list-style-type: none"> • Therefore this unit is liable for environmental compensation.
11.	Compensation Amount	<p>Rs. 1,86,000/-</p> <p>*(31 days= 82 days of non-compliance of VGEL(04.10.2018-24.12.2018) - 52 days of non-compliance as per GPCB report (16.10.2018-05.12.2018-refer 6C above)</p>

07. Dy-Mach Pharma

Sr. No.	Item	Details
1.	Name of Industry	Dy-Mach Pharma Plot No.C-1/2344,2343,2345,2346, Phase- III, GIDC, Vapi
2.	GPCB ID	23410
3.	Year of Establishment/Commissioning	01.04.1980
4.	Product Type	Pharmaceuticals
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	13.11 KLD
8.	Date of Inspection/Visit	26.03.2018
9.	Date of Direction of Closure Order	31.03.2018
10.	Date of Visit for Revocation Order	26.04.2018
11.	Date of Revocation Order	10.05.2018
12.	Period of Noncompliance	32 Days
13.	Reason for Closure	<p>⊗ Industrial plant visited on 26/03/2018 it was found that flow meter provided at final outlet found faulty and not maintained ETP operation logbook.</p> <p>⊗ Sample collected on dated 26/03/2018 from collection tank shows pH- 7 .11 , Ammonical Nitrogen- 2.06 mg/l and COD- 1743 mg/l. Sample collected from final outlet of ETP shows pH-7.21, Ammonical Nitrogen-2.93 mg/l and COD – 1732 mg/l.</p> <p>⊗ Sample result shows that, unit has not carried out treatment of industrial waste water properly. You are not sending concentrated water to CMEE on regular basis</p>

14.	Committee Hearing/Observation	<p>☒ Unit had represented that waste water sample was collected from final holding tank and not from final outlet Moreover, final holding tank is having system to discharge in (1) final outlet and (2) to divert into collection tank for treatment if required so unit is not liable for interim compensation.</p> <p>☒ However, as per GPCB inspection report, wastewater was collected from final holding tank which was not meeting norms, it indicates that there was no proper treatment to wastewater. There is line up to final discharge point from the final holding tank. The collected sample of wastewater was considered as final treated effluent which was not meeting with norms (i.e. COD - 1743 mg/L).</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,96,606/-

08. Faze Three Limited

Sr. No.	Item	Details
1.	Name of Industry	Faze Three Limited J Type ,Phase I,P NO 71, GIDC, Vapi
2.	GPCB ID	23435
3.	Year of Establishment/Commissioning	22.06.2005
4.	Product Type	Yarn / Textile processing involving any effluent/emission generating processes including bleaching, dyeing, printing and colouring
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	955.7 KLD
8.	Date of Inspection/Visit	05.10.2018
9.	Date of Direction of	16.10.2018

	Closure Order	
10.	Date of Visit for Revocation Order	24.10.2018
11.	Date of Revocation Order	31.10.2018
12.	Period of Noncompliance	20 Days
13.	Reason for Closure	<p>☒ At the outside chamber of unit, in GIDC storm water drain purple coloured waste water existing having same nature of waste water as into ETP units.</p> <p>☒ In GIDC storm water drain purple coloured waste water flowing below railway track and meeting to natural drain.</p> <p>☒ Purple coloured waste water discharged through final discharge line of unit through underground route in to storm water drain, which ultimately meeting to river Damanganga.</p>
14.	Committee Hearing/Observation	<p>☒ Unit has represented that they have not made any direct discharge into GIDC open surface storm water drain from their unit.</p> <p>☒ However as per inspection report/ analysis report clearly indicates that there was effluent discharge from the unit, as colourless water is observed in the upstream of the unit and after that i.e. in downstream purple coloured waste water observed in GIDC open surface drain which was similar as colour of waste water in collection tank of ETP of the unit. It indicates that their carrying pipeline upto CETP is leaked and leaked wastewater from pipeline flow into GIDC surface drain leading to River Damanganga instead of going into CETP.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 7,20,000/-

09 Galvadeco Parts Pvt Limited

Sr. No.	Item	Details
1.	Name of Industry	Galvadeco Parts Pvt Limited (Old Name:Shree Hardik Plating) Plot No. 1702/A, Phase-III, GIDC, Vapi
2.	GPCB ID	24427
3.	Year of Establishment/Commissioning	15.05.2006
4.	Product Type	Industry or process involving metal surface treatment or process such as pickling/electroplating/paint stripping/heat treatment using cyanide bath/phosphating or finishing and anodizing / enamellings/ galvanizing
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	29 KLD
8.	Date of Inspection/Visit	03.08.2018
9.	Date of Direction of Closure Order	14.09.2018
10.	Date of Visit for Revocation Order	27.09.2018
11.	Date of Revocation Order	08.10.2018
12.	Period of Noncompliance	56 Days
13.	Reason for Closure	<p>☒ Yellowish color waste water of nearby ETP area was deposited through leakage/ spillage.</p> <p>☒ Yellowish color waste water of nearby ETP area was flowing to unit's storm water drain due to leakage/ spillage.</p> <p>☒ Result of sample collected from GIDC open storm drain in front of the main gate of the unit outside premises shows Suspended Soils-480 mg/l, Total Chromium 3.70 mg/l, hexavalent chromium - 2.28 mg/l, Copper - 5.32 mg/l and nickel - 3.49 mg/l.</p>

		☒ Result of sample collected from unit's storm water drain shows Total Chromium - 5.31 mg/l, Hexavalent chromium - 4.02 mg/l, Copper – 5.42 mg/l and nickel – 3.71 mg/l.
14.	Committee Hearing/Observation	<p>☒ Unit has made representation that they have not made direct discharge of the effluent into GIDC storm water drain.</p> <p>☒ However, GPCB Inspection/analysis report indicates that effluent containing heavy metals was observed in storm water drain of the unit as well as into GIDC storm water drain due to spillage and leakages from the unit's premises which indicates that the unit has discharged wastewater into storm drain in the premises which meets with GIDC storm water drain.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 20,16,000/-

10A Hemani Industries Limited

Sr. No.	Item	Details
1.	Name of Industry	Hemani Industries Limited (Old Name:Hemani Intermediates Pvt.Ltd) Plot No.780/1,2, 40 Shed Area, GIDC, Vapi
2.	GPCB ID	23569
3.	Year of Establishment/Commissioning	10.02.1995
4.	Product Type	Organic Chemicals manufacturing
5.	Category	Red
6.	Scale	Medium
7.	Discharge capacity	65 KLD
8.	Date of Inspection/Visit	20.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	08.05.2018

11.	Date of Revocation Order	30.05.2018
12.	Period of Noncompliance	19 Days
13.	Reason for Closure	<p>⊗ Generated low COD wastewater being treated in ETP units - consisting of Primary, Secondary and Tertiary, however, at the time of inspection launder of secondary clarifier was found submerged with wastewater moreover it was found under maintenance.</p> <p>⊗ Unit has stored approximately 2.5 Lakhs liters primarily treated wastewater holding sump; person contacted has shown ignorance regarding such huge storage.</p> <p>⊗ Moreover, such tank approach ladder and mounted peripheral railings on sump was found highly corroded.</p> <p>⊗ Overall civil structures of ETP units are found damaged / eroded and leaking of wastewater from the connected pumps was observed.</p> <p>⊗ Unit is located on bank of Bill Khadi, there are three septic tanks in series found with outlet which are protruding towards the Bill Khadi through provided boundary wall, and discharge of any sort of wastewater from the created outlet could not be ruled out.</p> <p>⊗ Mixed Effluent i.e. industrial and domestic were found in the Bill Khadi behind this factory. However, it was not approachable.</p> <p>⊗ In the provided hazardous waste area two more outlets were observed, being opened into nearby passing Bill Khadi.</p> <p>⊗ Unit has not maintained the required logbook for MEE feed for the quantification of high COD waste water evaporated. In the provided MEE for the evaporation of high COD wastewater unit has not provided VOC skipper for emanation of the generated VOC from the evaporated wastewater into ambient.</p>

		<p>☒ Unit has provided valve operated outlet emerging from Aeration tank which is dubious.</p> <p>☒ Industry was generating dilute H₂SO₄ as well as diluted HCL about 25200 MT/Year and 1200 MT/Year respectively. However, they could not produced the data to whom it is to be sold.</p> <p>☒ Verifying the logbook for the management of the concentrated effluen, last entry was found on 14th April 2018, then after it was totally blank. It seems that logbook is being manipulated accordingly.</p> <p>☒ Hazardous waste were stored on the Bank of Bill Khadi, which side industry has no compound wall. There is enough chance for spillage of Hazardous waste into Bill Khadi.</p> <p>☒ ETP units are towards the Bill Khadi, there was no pucca flooring in the ETP premises which may intrude seeped/leaked waste water into underground strata. Overall housekeeping of ETP units are found poor.</p>
14.	Committee Hearing/Observation	<p>☒ Unit had represented that during inspection waste water sample was not collected from final outlet but it was collected from final holding tank so they are not liable for compensation</p> <p>☒ However, as per GPCB inspection/analysis report, the sample collected from final treated waste water holding tank indicates that COD - 4807 mg/l and TDS - 174125 mg/l which is more than inlet norms of CETP. It indicates that there was no proper treatment to wastewater. The collected sample of wastewater was considered as final treated effluent which was not meeting with norms (i.e. COD - 4807 mg/L).</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 7,63,928/-

10B Hemani Industries Limited

Sr. No.	Item	Details
1.	Name of Industry	Hemani Industries Limited (Old Name:Hemani Intermediates Pvt.Ltd) Plot No.780/1,2, 40 Shed Area, GIDC, Vapi
2.	GPCB ID	23569
3.	Year of Establishment/Commissioning	10.02.1995
4.	Product Type	Organic Chemicals manufacturing
5.	Category	Red
6.	Scale	Medium
7.	Discharge capacity	65 KLD
8.	Date of Inspection/Visit	03.10.2018
9.	Date of Direction of Closure Order	10.12.2018
10.	Date of Visit for Revocation Order	03.01.2019
11.	Date of Revocation Order	22.01.2019
12.	Period of Noncompliance	93 Days
13.	Reason for Closure	<p>☒ Looking to the analysis report, there was no proper segregation of waste water.</p> <p>☒ Result of sample collected from final outlet of ETP shows TDS - 29016 mg/L (Limit - 2100 mg/L)</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit and he agreed that there was no any proper segregation system due to which the unit was not meeting with CETP inlet norms but now unit has made proper segregation system.</p> <p>☒ As per GPCB report, there was no proper segregation and final outlet sample was not meeting with Norms.</p> <p>☒ GPCB issued direction earlier as mentioned in Table 10A</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 33,48,000/- (refer Appendix--)

11. Heranba Industries Ltd (Unit: 2)

Sr. No.	Item	Details
1.	Name of Industry	Heranba Industries Ltd (Unit: 2) Plot No. A-2,2214/2215, Phase No :III, GIDC, Vapi
2.	GPCB ID	23575
3.	Year of Establishment/Commissioning	01.08.2010
4.	Product Type	Pesticides (technical) (excluding formulation)
5.	Category	Red
6.	Scale	Large
7.	Discharge Quantity	47 KLD
8.	Date of Inspection/Visit	20.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	16.05.2018
11.	Date of Revocation Order	30.05.2018
12.	Period of Noncompliance	27 Days
13.	Reason for Closure	<p>☒ Unit has provided MEE for high COD wastewater generated from their sister concern unit II for ultimate disposal. Unit is receiving such high COD wastewater from Unit II through overhead pipeline for MEE. It is observed that unit has not obtained the required permission of the Board for the transfer / conveying of wastewater through overhead pipeline which is passing above the laid down storm water drain of the GIDC Estate.</p> <p>☒ Further condensate water is again transferring to other sister concern for further reuse instead of reusing in the same unit.</p> <p>☒ Pipeline is also passing through natural nalla, and leakages may mix with other domestic effluent in the natural nalla.</p> <p>☒ The acid storage tank was found open and fuming from the tank found abnormally in the</p>

		<p>factory premises.</p> <p>☒ Contacted person was not able to clarify as well as ready to show logbook of disposal of process waste i.e. Aluminum Chloride and distillation residue.</p> <p>☒ In both the unit no ammonia recovery system is provided.</p> <p>☒ In both the unit there is no dedicated storage of Hazardous Waste.</p> <p>☒ Unit has provided storm water drain which is found functional and outlet of the same emerging into the Estate storm water drain.</p> <p>☒ Unit is instructed to install and operate the EMS as per the obtained CCA as well as maintained the records for the treatment and disposal of high COD and low COD wastewater.</p> <p>☒ Provided approach to the ETP units are not ease and safe.</p> <p>☒ Unit of the ETP are not sequential manner.</p>
14.	Committee Hearing/Observation	<p>☒ Unit has made representation that during inspection they were not discharging wastewater without meeting norms and not liable for liability/compensation.</p> <p>☒ However, as per GPCB report, Unit has not obtained permission from GPCB for conveyance of wastewater through overhead pipe line from Unit-II to Unit-I which running parallel to storm water drain. There were other non-compliances such as ammonia recovery system was not implemented, no-proper hazardous waste storage, acid fumes from tanks etc.</p> <p>As there were other violations though not related to wastewater, the unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 24,30,000/-

12A Heranba Industries Ltd (Unit I)

Sr. No.	Item	Details
1.	Name of Industry	Heranba Industries Ltd (Unit I) Plot No.1504,1505,1506, Phase-III, GIDC, Vapi
2.	GPCB ID	23574
3.	Year of Establishment/Commissioning	01.04.1996
4.	Product Type	Pesticides (technical) (excluding formulation)
5.	Category	Red
6.	Scale	Large
7.	Discharge Quantity	15.387 KLD
8.	Date of Inspection/Visit	20.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	16.05.2018
11.	Date of Revocation Order	30.05.2018
12.	Period of Noncompliance	27 Days
13.	Reason for Closure	<p>☒ Unit has provided MEE for high COD wastewater generated from their sister concern unit II for ultimate disposal. Unit is receiving such high COD wastewater from Unit II through overhead pipeline for MEE. It is observed that unit has not obtained the required permission of the Board for the transfer / conveying of wastewater through overhead pipeline which is passing above the laid down storm water drain of the GIDC Estate.</p> <p>☒ Further condensate water is again transferring to other sister concern for further reuse instead of reusing in the same unit.</p> <p>☒ Pipeline is also passing through natural nalla, and leakages may mix with other domestic effluent in the natural nalla.</p> <p>☒ The acid storage tank was found open and fuming from the tank found abnormally in the factory Premises.</p> <p>☒ Contacted person was not able to clarify as well as ready to show logbook of disposal of process</p>

		<p>waste i.e. Aluminum Chloride and distillation residue.</p> <p>☒ In both the unit no ammonia recovery system is provided.</p> <p>☒ In both the unit there is no dedicated storage of Hazardous Waste.</p> <p>☒ Unit has provided Storm water drain which is found functional and outlet of the same emerging into the Estate storm water drain.</p> <p>☒ Unit is instructed to install and operate the EMS as per the obtained CCA as well as maintained the records for the treatment and disposal of high COD and low COD wastewater.</p> <p>☒ Provided approach to the ETP units are not ease and safe.</p> <p>☒ Unit of the ETP are not sequential manner.</p>
14.	Committee Hearing/Observation	<p>☒ Unit has made representation that during inspection they were not discharging wastewater without meeting norms and not liable for liability/compensation.</p> <p>☒ However, as per GPCB report, Unit has not obtained permission from GPCB for conveyance of wastewater through overhead pipe line from Unit-II to Unit-I which running parallel to storm water drain. There were other non-compliances such as condensate water is again transferring to unit-II for further reuse instead of reusing in unit-I, ammonia recovery system was not implemented, no-proper hazardous waste storage, acid fumes from tanks etc.</p> <p>As there were other violations though not related to wastewater, the unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 24,30,000/-

12B. Heranba Industries Ltd (Unit I)

Sr. No.	Item	Details
1.	Name of Industry	Heranba Industries Ltd (Unit I) Plot No.1504,1505,1506, Phase-III, GIDC, Vapi
2.	GPCB ID	23574
3.	Year of Establishment/Commissioning	01.04.1996
4.	Product Type	Pesticides (technical) (excluding formulation)
5.	Category	Red
6.	Scale	Large
7.	Discharge Quantity	15.387 KLD
8.	Date of Inspection/Visit	09.11.2018
9.	Date of Direction of Closure Order	14.11.2018
10.	Date of Visit for Revocation Order	27.11.2018
11.	Date of Revocation Order	07.12.2018
12.	Period of Noncompliance	19 Days
13.	Reason for Closure	<p>⊗ During the loading of spent HBr into tanker blast occurred, which resulted in death of one helper and injury to one operator.</p> <p>⊗ The unit was engaged in selling of spent HBr without obtaining necessary permission of the board.</p>
14.	Committee Hearing/Observation	<p>⊗ Committee heard representative of this unit. Unit submitted that during inspection on 09/11/2018, there was an accident in tanker during filling & HBr got leaked. No waste water generated whatever HBr quantity spilled on floor was recollected.</p> <p>⊗ However, as per GPCB report, Unit was sending/selling HBr to Micas Organics Ltd (Old Name:- Dhiraj Intermediates Pvt.Ltd- (Unit-I). Both the units were not having permissions</p>

		<p>under Hazardous & Other Waste (Management & Transboundary Movement) Rules 2016</p> <p>☒ GPCB issued direction as mentioned in Table 12 A</p> <p>Therefore, due to violation under HOWM Rules 2016, unit is liable for environment compensation.</p>
15.	Compensation Amount	Rs. 17,10,000/-

13. Hiren Enterprises

Sr. No.	Item	Details
1.	Name of Industry	Hiren Enterprises Plot No. 2327/2, Phase III, GIDC, Vapi
2.	GPCB ID	23577
3.	Year of Establishment/Commissioning	01.12.1992
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	0.4 KLD
8.	Date of Inspection/Visit	06.07.2018
9.	Date of Direction of Closure Order	19.07.2018
10.	Date of Visit for Revocation Order	02.08.2018
11.	Date of Revocation Order	15.09.2018
12.	Period of Noncompliance	28 Days
13.	Reason for Closure	<p>☒ Reddish coloured water flowing from main gate of factory, crossing the road and leading to GIDC storm water drain and further into Damanganga water supply canal nearby the unit.</p> <p>☒ Spillage and leakage of waste water from the production plant having pH=2 mixed with ice water, which further goes outside the premises.</p> <p>☒ Housekeeping of premises was found very bad.</p>

		<p>⊗ ETP units found not in operation and also housekeeping of ETP was very poor</p> <p>⊗ Unit has not maintained logbook records regarding ETP operation.</p> <p>⊗ Flow meter provided at final outlet of ETP was found faulty</p>
14.	Committee Hearing/Observation	<p>⊗ Unit represented that due to rainy season there was water accumulation inside the unit as it is located in low laying area. They have made request to GIDC to clean the underground drain system near their unit. GIDC officer had complained to GPCB about the leakage of waste water from this unit. At that time, their ice transfer lift was under maintenance and they had kept the ice near entrance gate where effluent was spread due to poor housekeeping and leakages and spillages which resulted into coloured and acidic waste water going outside the factory premises leading to GIDC storm water drain</p> <p>⊗ As per GPCB report, acidic wastewater observed going out of unit instead of going to their ETP, ETP was not in operation which were non-compliances.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,68,000/-

14. KEVA FRAGRANCES Pvt.Ltd

Sr. No.	Item	Details
1.	Name of Industry	KEVA FRAGRANCES Pvt.Ltd (OLD NAME K.V.AROCHEM PVT. LTD.) Plot no. 170-175, Phase II, GIDC, Vapi 15 Days effect
2.	GPCB ID	23728
3.	Year of Establishment/Commissioning	01.01.1980
4.	Product Type	Organic Chemicals manufacturing
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	164.78 KLD
8.	Date of Inspection/Visit	14.06.2018
9.	Date of Direction of Closure Order	06.07.2018
10.	Date of Visit for Revocation Order	12.07.2018
11.	Date of Revocation Order	23.07.2018
12.	Period of Noncompliance	29 Days
13.	Reason for Closure	<ul style="list-style-type: none"> ☒ Unit has provided concentrated stream collection tank and diluted stream collection tank adjoining ☒ Floating aerators were out of order (i.e. not working) ☒ Many flexible pipes for transferring waste water. Further, industry has not provided separate pipeline for collection of concentrated stream in small tanks. ☒ Concentrated wastewater observed into Diluted wastewater collection tank ☒ Generated concentrated waste water movement was done through movable/portable tanks and also using flexible pipes for transferring of concentrated wastewater. ☒ At back side of the unit, waste water observed

		<p>into natural drain/open nallah.</p> <p>☒ Unit was giving Hazardous waste to the industries, who have not obtained permission under Rule – 9 of Hazardous and other Wastes (Management and Transboundary Movement) Rules – 2016.</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that during said inspection there waste water sample was not collected from final outlet and not discharging wastewater and we were complying all prevailing environmental rules and regulations.</p> <p>☒ However, it is observed from the GPCB report that concentrated effluent was observed into diluted wastewater collection tank. Concentrated wastewater should be collected in concentrated wastewater collection tank and should be treated in MEE as per consent condition. But, as concentrated wastewater was taken in to collection tank of dilute wastewater stream for treatment in ETP, it might lead to CETP. Moreover unit was giving Hazardous waste to the industries, who have not obtained permission under Rule-9 of Hazardous and other Wastes (Management and Transboundary Movement) Rules -2016.</p> <p>Therefore, this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 10,44,000/-

15. Krishna Dyes & Chemicals

Sr. No.	Item	Details
1.	Name of Industry	Krishna Dyes & Chemicals Plot No. C-1/2615, Phase - II, GIDC, Vapi
2.	GPCB ID	23781
3.	Year of Establishment/Commissioning	01.04.1993

4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	3 KLD
8.	Date of Inspection/Visit	16.10.2018
9.	Date of Direction of Closure Order	23.11.2018
10.	Date of Visit for Revocation Order	11.01.2019
11.	Date of Revocation Order	Yet Not Revoked
12.	Period of Noncompliance	88 Days (Note: On 11.01.2019 it is verified that unit has upgraded ETP which is ready for operation.)
13.	Reason for Closure	<p>☒ The unit has provided multiple pipelines after treatment for bypassing tertiary treatment and this pipeline were used to discharge primary treated w/w into underground drain.</p> <p>☒ Result of w/w sample collected from unauthorized outlet shows TDS 14450 mg/L, COD 2550 mg/L, BOD 750 mg/L, Phenolic Compounds 3.74 mg/L and colour 5000 pt.co.sc</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that now they have complied all the conditions and now upgraded their ETP and now ready for operation. Unit was not in operation, as issued directions were not revoked</p> <p>☒ It is observed from the GPCB inspection report and analysis report that unit has provided multiple pipelines and discharging primary treated wastewater into underground drain leading to CETP without meeting norms (TDS 14450 mg/L, COD 2550 mg/L, BOD 750 mg/L, Phenolic Compounds 3.74 mg/L and colour 5000 pt.co.sc.).</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 5,34,138/-

16. Mangalam Drugs & Organics (Unit-1)

Sr. No.	Item	Details
1.	Name of Industry	Mangalam Drugs & Organics (Unit-1) Plot No. 187, Phase II, GIDC, Vapi.
2.	GPCB ID	23868
3.	Year of Establishment/Commissioning	25.07.2018
4.	Product Type	Pharmaceuticals
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	35.05 KLD
8.	Date of Inspection/Visit	20.04.2018
9.	Date of Direction of Closure Order	02.05.2018
10.	Date of Visit for Revocation Order	15.05.2018
11.	Date of Revocation Order	30.05.2018
12.	Period of Noncompliance	26 Days
13.	Reason for Closure	<p>☒ At the time of visit concentrated effluent was being discharged through the flexible pipe into the part of settling tank for further conventional treatment. It is observed that stored high COD wastewater in storage tank no. ST 1 C - 10 is being discharged through connected flexible pipe at the bottom of the mentioned tank leading to ETP.</p> <p>☒ The high COD effluent is to be sent to their sister concern unit i.e. Mangalam Drugs and Organics Ltd (Unit-II), which has installed and commissioned captive MEE for concentrated / high COD value effluent generated from both units.</p> <p>☒ At the time of inspection two tanks having capacity 10 KL (HDPE) where found full of such kind of effluent. Both the tanks were connected by T - section at the bottom which can be operated any time by connecting flexible pipe for</p>

		<p>the discharge of high COD effluent.</p> <ul style="list-style-type: none"> ⊗ Looking to the nature of the product and as per the requirement industry has not provided adequate segregation system of high COD effluent at source. ⊗ While asking details about process residue and on recovered solvent from this plant, they were unable to reply about management including the present stock as well as disposal. ⊗ The spent HCL generated in Unit 1, 50 MT/Month was utilized in the production plant which was not convincing looking to the nature of the Plant. ⊗ Overall observations reveal that industry was diluting generated high COD effluent which was being meant to dispose off into MEE was being treated along with generated the low COD waste water in conventional ETP units.
14.	Committee Hearing/Observation	<ul style="list-style-type: none"> ⊗ Unit represented that during the inspection of GPCB unit was not discharging any waste water into CETP and they are only collecting batch wise effluent and after checking its COD level they decide to transfer it into High COD storage tank or into conventional ETP. Also during that period original fixed pipeline was under fabrication they were using flexible pipeline for transferring of effluent into collection tank of conventional ETP. ⊗ However as per GPCB Report, concentrated effluent (COD - 28123 mg/l) was being transferred through the flexible pipe into the settling tank for further conventional treatment in ETP instead of sending to MEE of sister concern unit i.e. Mangalam Drugs and Organics Ltd (Unit-2) as mentioned in the consent. Industry has not provided adequate segregation system of high COD effluent at source. Industry was diluting high COD effluent along with low COD effluent in conventional ETP units. There was improper management of process residue and recovered solvent.

		Therefore this unit is liable for environmental compensation.
15.	Compensation Amount	Rs. 9,36,000/-

17. Orient Organics

Sr. No.	Item	Details
1.	Name of Industry	Orient Organics Plot no. 5306/2, Phase No :III, GIDC, Vapi
2.	GPCB ID	24045
3.	Year of Establishment/Commissioning	20.02.2009
4.	Product Type	Organic Chemicals manufacturing
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	ZLD Unit
8.	Date of Inspection/Visit	08.09.2018
9.	Date of Direction of Closure Order	04.10.2018
10.	Date of Visit for Revocation Order	20.10.2018
11.	Date of Revocation Order	31.10.2018
12.	Period of Noncompliance	43 Days
13.	Reason for Closure	<p>☒ Blackish colored waste water was coming outside on the road from unit. Blackish colored waste water flowing from factory main gate wall & crossing the road & leading GIDC storm water drain which is ultimately goes in to bill khadi.</p> <p>☒ Unit has stored spent solvent contain drums for distillation purpose on land without pacca flooring within premises. Due to drum washing activity waste water from washing/spillages (having pH @ 9) & mixed with rainy water, which is further goes outside the factory premises.</p> <p>☒ Housekeeping within premises was found very bad and no proper storage arrangement was</p>

		<p>observed for storage of raw materials drums.</p> <p>☒ Result of sample collected from pounding inside factory premises shows pH-8.98, COD-3207 mg/l and BOD-919 mg/l</p> <p>☒ Result of sample collected from pounding outside factory premises shows pH-8.81, COD-2179 mg/l and BOD-750 mg/l</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that due to heavy rains, they had put a drum to collect rain water from the roof, which toppled and the same spread outside their unit and sample of the same water was collected by GPCB. However, on asking about the drum, representative said that the drum may be contaminated and therefore, the sample collected was not as per the norms.</p> <p>☒ However, as per GPCB report, blackish colored waste water was coming outside on the road from unit leading to GIDC storm water drain which is ultimately goes in to bill khadi. GPCB collected samples and it was observed that sample collected from pounding inside factory premises shows pH-8.98, COD-3207 mg/l and BOD-919 mg/l and sample collected from pounding outside factory premises shows pH-8.81, COD-2179 mg/l and BOD-750 mg/l. Unit was discharging wastewater above norms outside the premises, instead of treating. Further, Unit stored spent solvent contain drums for distillation purpose on land without pacca flooring within premises. There was no proper storage arrangement observed for storage of raw materials drums.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 2,58,712/-

18. Venkateshwar Pvt. Ltd.

Sr. No.	Item	Details
1.	Name of Industry	Venkateshwar Pvt. Ltd. Plot no. 1201/1, PHASE-III, GIDC, Vapi
2.	GPCB ID	24776
3.	Year of Establishment/Commissioning	10.05.2005
4.	Product Type	Yarn / Textile processing involving any effluent/emission generating processes including bleaching, dyeing, printing and colouring
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	37 KLD
8.	Date of Inspection/Visit	31.07.2018
9.	Date of Direction of Closure Order	28.08.2018
10.	Date of Visit for Revocation Order	15.09.2018 & 16.10.2018
11.	Date of Revocation Order	31.10.2018
12.	Period of Noncompliance	78 Days
13.	Reason for Closure	<p>☒ ETP units were found not in operation although into final outlet discharge of effluent observed directly from the effluent collection tank.</p> <p>☒ Reddish waste water observed into final outlet of ETP unit.</p> <p>☒ Logbook of ETP operation data was not maintained by unit</p> <p>☒ Looking to analysis report of waste water sample collated from final outlet of ETP, result of parameter are; COD -1490 mg/l, Color-1500 pt.co.sc., Phenolic compound- 1.65 mg/l</p>
14.	Committee Hearing/Observation	☒ Unit had represented that their ETP was under maintenance and due to mistake of ETP operator there was overflow of effluent and hence there was discharge of effluent. They agreed for the

		<p>same.</p> <p>As per GPCB report, there was discharge of wastewater without meeting norms.</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 4,92,040/-

19A. Jayshiv Chemicals Pvt Limited

Sr. No.	Item	Details
1.	Name of Industry	Jayshiv Chemicals Pvt Limited Plot No. 2807/2, 3rd Phase, GIDC Vapi
2.	GPCB ID	34959
3.	Year of Establishment/Commissioning	01.02.2009
4.	Product Type	Inorganic Pigment
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	33.4 KLD
8.	Date of Inspection/Visit	26.03.2018
9.	Date of Direction of Closure Order	31.03.2018
10.	Date of Visit for Revocation Order	26.04.2018
11.	Date of Revocation Order	10.05.2018
12.	Period of Noncompliance	32 Days
13.	Reason for Closure	As Industrial plant visited on 26.03.2018 it was found that you are carried out production of pink and blue colour/pigment without obtained EC.
14.	Committee Hearing/Observation	Owner of Jayshiv Chemicals Pvt Ltd represented that, this unit was given on rent to M/s Chemodist Industries. As the unit has defaulted no of times, they decided to cancel rent agreement and gave intimation to M/s. Chemodist Industries for cancellation of the rent agreement and to vacate their plot and therefore Jayshiv Chemicals Pvt

		<p>Limited(Original owner) is not liable to pay environment compensation. They further represented that M/s Chemodist Industries should pay compensation.</p> <p>⊗ However, as unit is manufacturing pink and blue colour/pigment without EC and Moreover, Unit had not made requisite procedure to change the name in GPCB record, except informing regarding renting the premises/unit. Still, as per GPCB record, owner of this premises is Jayshiv Chemicals Pvt Limited.</p> <p>Therefore, M/s Jayshiv Chemicals Pvt Ltd, is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,92,000/-

19 B Jayshiv Chemicals Pvt Limited

Sr. No.	Item	Details
1.	Name of Industry	Jayshiv Chemicals Pvt Limited Plot No. 2807/2, 3rd Phase, GIDC, Vapi
2.	GPCB ID	34959
3.	Year of Establishment/Commissioning	01.02.2009
4.	Product Type	Inorganic Pigment
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	33.4 KLD
8.	Date of Inspection/Visit	12.10.2018 & 15.10.2018
9.	Date of Direction of Closure Order	20.10.2018
10.	Date of Visit for Revocation Order	01.11.2018 (Power supply disconnection was verified on dated 01.11.2018. This unit is yet not revoked and unit has stopped all the production activities which was

		verified on dated 01.11.2018)
11.	Date of Revocation Order	Yet Not Revoked
12.	Period of Noncompliance	21 Days
13.	Reason for Closure	<p>⊗ Waste water discharged from the final discharge point of the industry having pH @2 on pH strip and orange colour directly from their production area, passing near their HCL storage tank and after passes nearby their ETP & finally goes to the final discharge point of the industry leading to CETP through GIDC u/g drainage system.</p> <p>⊗ Flexible hose pipes along with movable pumps were found in production area, Ro plant area, HCL storage area and ETP area.</p> <p>⊗ Unit has removed connections of flexible pipes and also started fresh water to dilute/washout traces of colour and @2 pH of untreated waste water flowing on surface by starting overflowing of fresh water storage tank located near HCL storage tank.</p> <p>⊗ At the time of visit, provided ETP units units were found not in operation, which indicates that ETP is not operated regularly.</p> <p>⊗ Final outlet chamber of ETP (outside the factory premises), there was dark red coloured effluent observed flowing into GIDC u/g drainage.</p> <p>⊗ One waste water sample was collected from this outlet chamber & sample having pH @ 2 on pH strip.</p> <p>⊗ Further while checking GIDC u/g drainage from downstream of unit outlet chamber & while checking the chamber there is also red coloured effluent observed flowing into GIDC u/g drainage chamber, which is further leading to CETP Vapi through Pumping station No.6.</p>
14.	Committee Hearing/Observation	⊗ Owner of Jayshiv Chemicals Pvt Ltd represented that, this unit was given on rent to M/s Chemodist Industries. As the unit has defaulted no of times,

		<p>they decided to cancel rent agreement and gave intimation to M/s. Chemodist Industries for cancellation of the rent agreement and to vacate their plot and therefore Jayshiv Chemicals Pvt Limited(Original owner) is not liable to pay environment compensation. They further represented that M/s Chemodist Industries should pay compensation.</p> <p>As per GPCB report, unit was discharging wastewater without any treatment and the waste water is highly acidic & was not meeting with norms, ETP was not in operation. Moreover, Unit had not made requisite procedure to change the name in GPCB record, except informing regarding renting the premises/unit. Still, as per GPCB record, owner of this premises is Jayshiv Chemicals Pvt Limited.</p> <p>Therefore, M/s Jayshiv Chemicals Pvt Ltd, is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,26,000/-

19 C Jayshiv Chemicals Pvt Ltd (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Jayshiv Chemical Pvt Ltd. Plot No. 2807/2, 3rd Phase, GIDC Vapi
2.	GPCB ID	34959
3.	Year of Establishment/Commissioning	01.02.2009
4.	Product Type	Inorganic Pigment
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	33.4 KLD
8.	Period of Noncompliance	The non-compliance period (VGEL-CETP) is within the non-compliance period as per GPCB as mentioned in Table 19 B

9.	Reason for Closure	Unit is found defaulting by VGEL
10.	Committee Hearing/Observation	<ul style="list-style-type: none"> As mentioned in Table 19 B As per VGEL report, the analysis results shows COD: 12640 mg/l (15.10.2018), 1464 mg/l (12.10.2018) which were non-complying with CETP inlet norms.
11.	Compensation Amount	--

20. Micas Organics Ltd (Unit - 1)

Sr. No.	Item	Details
1.	Name of Industry	Micas Organics Ltd (Unit - 1) Old Name:-Dhiraj Intermediates Pvt.Ltd Plot No.297/5,8, Phase-II, GIDC, Vapi
2.	GPCB ID	23380
3.	Year of Establishment/Commissioning	01.01.1996
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Large
7.	Discharge Quantity	172 KLD
8.	Date of Inspection/Visit	09.11.2018
9.	Date of Direction of Closure Order	14.11.2018
10.	Date of Visit for Revocation Order	27.11.2018
11.	Date of Revocation Order	07.12.2018
12.	Period of Noncompliance	19 Days
13.	Reason for Closure	⊗ The unit was engaged in receiving of spent HBr from M/S Heranba Industries Limited (unit 1) without obtaining necessary permission of the Board
14.	Committee Hearing/Observation	<ul style="list-style-type: none"> Unit represented that no wastewater generated in their premises. There was an accident in premises of M/s Heranba Industries Limited (unit 1) and excepted to bring HBr for further process

		<p>in their premises and there were no intention to pollute environment.</p> <ul style="list-style-type: none"> As per GPCB report, the unit was engaged in receiving of spent HBr from M/s Heranba Ind Ltd (Unit-1) without obtaining permission under Rule-9 of Hazardous & Other Waste (Management & Transboundary Movement) under <p>Therefore, the unit is liable for Environment compensation.</p>
15.	Compensation Amount	Rs. 17,10,000/-

21. Micas Organics Limited (Unit-V)

Sr. No.	Item	Details
1.	Name of Industry	Micas Organics Limited (Unit-V) Old Name :Sunbright & Pigments Pvt.Ltd Plot no. 287/2B, GIDC, Vapi
2.	GPCB ID	24577
3.	Year of Establishment/Commissioning	12.05.1992
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	76.53 KLD
8.	Date of Inspection/Visit	13.12.2017
9.	Date of Direction of Closure Order	02.01.2018
10.	Date of Visit for Revocation Order	10.01.2018
11.	Date of Revocation Order	23.01.2018
12.	Period of Noncompliance	29 Days
13.	Reason for Closure	<p>☒ Unit has carried out Production of Organic Pigment without CTE/CCA.</p> <p>☒ Unit has not provided adequate ETP for</p>

		generated waste water from above manufacturing process.
14.	Committee Hearing/Observation	<p>☒ Unit represented that they were not manufacturing organic pigment and claimed that as there was no significant COD in analysis report which indirectly indicated that they have not manufactured organic pigment.</p> <p>☒ However, inspection report clearly indicates that they have manufactured organic pigment as raw materials were laying in the premises. It was also agreed that they have taken trial previously but not on the day of inspection. So for the treatment of the effluent generated from the manufacturing of organic pigment, unit is not having adequate ETP.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,74,000/-

22. Pidilite Industries Ltd.

Sr. No.	Item	Details
1.	Name of Industry	Pidilite Industries Ltd. Plot no. 74,74-1,77-II,78,79, , J Type Area, Phase-I, GIDC, Vapi
2.	GPCB ID	24121
3.	Year of Establishment/Commissioning	Organic Chemicals manufacturing
4.	Product Type	01.01.1981
5.	Category	Red
6.	Scale	Large
7.	Discharge capacity	68.61 KLD
8.	Date of Inspection/Visit	25.09.2018
9.	Date of Direction of Closure Order	11.10.2018

10.	Date of Visit for Revocation Order	17.10.2018
11.	Date of Revocation Order	31.10.2018
12.	Period of Noncompliance	23 Days
13.	Reason for Closure	<p>⊗ The unit has provided bypass system to disposed untreated waste water from syntex tank in which unit fill untreated wastewater and from bottom of this tank, the unit have provided flexible pipe line leading to GIDC open surface drain.</p> <p>⊗ During visit untreated w/w discharge from the syntax was observed & ultimately untreated wastewater was being discharge which was going in to GIDC open surface drain and ultimately goes to river Damanganga.</p> <p>⊗ Wastewater sample of this bypass (unauthorized outlet) was collected. Which show BOD – 820 mg/L, COD – 2187 mg/L (limit for inlet of CETP BOD – 400 mg/L, COD – 1000 mg/L).</p>
14.	Committee Hearing/Observation	<p>⊗ Unit represented that they are having regular collection tank but due to more effluent got collected, they had transferred wastewater into extra syntex tank. Instead of taking the effluent to collection tank for further treatment by mistake, operator another end of flexible pipeline into stormwater drain which was going to GIDC open surface drain.</p> <p>⊗ As there was discharge of wastewater having BOD – 820 mg/l, COD – 2187 mg/L was going into GIDC stormwater drain instead of going in to ETP for treatment which was non-compliance.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 21,01,843/-

23 A Polysperse Chemicals

Sr. No.	Item	Details
1.	Name of Industry	Polysperse Chemicals Plot No.J-2329, Phase-III, GIDC Vapi 15 Days
2.	GPCB ID	24135
3.	Year of Establishment/Commissioning	14.03.2009
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	2.5 KLD
8.	Date of Inspection/Visit	06.04.2018
9.	Date of Direction of Closure Order	23.05.2018
10.	Date of Visit for Revocation Order	21.06.2018
11.	Date of Revocation Order	06.07.2018
12.	Period of Noncompliance	77 days
13.	Reason for Closure	<ul style="list-style-type: none"> ✘ Unit has not operated ETP units regularly and efficiently. ✘ Collection tank and neutralization tanks were filled with acidic wastewater. ✘ Collection tank, neutralizer and final discharge line were connected with multiple connections. ✘ 3 Amino Acid 4 MethoxyAcetanilide was stocked near reaction vessel which was not early mentioned in raw material list. ✘ Provided flow meter at final outlet was found faulty. ✘ Unit has not provided sand filter and carbon filter. ✘ Sample collected from storage tank of neutralizer shows BOD – 1567 mg/l, COD – 5411 mg/l, pH – 1.97 and TDS – 35994 mg/l. ✘ Unit has stored hazardous waste in haphazardly.
14.	Committee	✘ Unit represented that due to the mistake of

	Hearing/Observation	<p>operator effluent was discharged from another tank which was not as per norms. The unit was not in operation as closure directions were yet not revoked by GPCB for which representative of the unit informed that proper system would be provided and discharge effluent only after verifying standards.</p> <p>As per GPCB reports, Sample collected from storage tank of neutralizer shows BOD – 1567 mg/l, COD – 5411 mg/l, pH – 1.97 and TDS – 35994 mg/l. Collection tank and neutralization tanks were filled with acidic waste water. Collection tank, neutralizer and final discharge line were connected with multiple connections. Unit has stored hazardous waste in haphazardly.</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 4,62,000/-

23 B Polysperse Chemicals

Sr. No.	Item	Details
1.	Name of Industry	Polysperse Chemicals Plot No.J-2329, Phase-III, GIDC Vapi
2.	GPCB ID	24135
3.	Year of Establishment/Commissioning	14.03.2009
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	2.5 KLD
8.	Date of Inspection/Visit	13.10.2018
9.	Date of Direction of Closure Order	20.10.2018
10.	Date of Visit for Revocation Order	01.11.2018 (Power supply disconnection was verified on dated 01.11.2018. This unit is yet not revoked and unit

		has stopped all the production activity which was verified on dated 01.11.2018)
11.	Date of Revocation Order	Yet Not Revoked
12.	Period of Noncompliance	20 Days
13.	Reason for Closure	<p>☒ In the GIDC u/g drainage opposite to this unit, highly Acidic Green coloured waste water (with 42°C) is found flowing in the GIDC u/g drainage.</p> <p>☒ The highly Acidic Green coloured hot waste water was found stored in collection tank of the unit and found filled with 3/4th level of the waste water and remaining part of collection tank is found wet.</p> <p>☒ Looking to the same physical appearance of w/w filled in collection tank and waste water flow in GIDC u/g drain indicate that industry has directly discharged their untreated waste water from collection tank of ETP into GIDC u/g drainage.</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that due to the mistake of operator effluent was discharged from another tank which was not as per norms. Presently unit is not in operation as closure direction is not yet revoked. Further, unit mentioned that he will not start their unit till proper lock system shall be provided to discharge effluent within norms.</p> <p>☒ As per GPCB report, the wastewater flowing in underground drainage system was of the same colour/pH (acidic) that filled in collection tank which indicated that industry has directly discharged their untreated waste water from collection tank of ETP into GIDC which shows non-compliance.</p> <p>☒ GPCB issued earlier closure direction as mentioned in Table 23 A.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,20,000/-

24. Shri Hari Textiles Pvt Ltd.

Sr. No.	Item	Details
1.	Name of Industry	Shri Hari Textiles Pvt Ltd.(formerly as Crimphon Yarn) Plot No. 1205-2, GIDC, Vapi.
2.	GPCB ID	23312
3.	Year of Establishment/Commissioning	01.04.1990
4.	Product Type	Yarn / Textile processing involving any effluent/emission generating processes including bleaching, dyeing, printing and colouring
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	60 KLD
8.	Date of Inspection/Visit	19.07.2018
9.	Date of Direction of Closure Order	30.08.2018
10.	Date of Visit for Revocation Order	15.09.2018 (Power supply disconnection was verified on dated 15.09.2018. This unit is yet not revoked and unit has stopped all the production activity which was verified on dated 15.09.2018)
11.	Date of Revocation Order	Not Yet Revoked
12.	Period of Noncompliance	59 Days
13.	Reason for Closure	<ul style="list-style-type: none"> ✘ Fabric sizing process started without CTE/CCA of the Board ✘ New boiler (capacity 7TPH) installed without CTE/CCA of the Board ✘ APCM provided with the existing boiler (2 TPH) was found dismantled ✘ Coal was stored in to open area
14.	Committee Hearing/Observation	✘ Unit represented that they were not doing fabric sizing process and only machineries were provided. They also agreed that they have installed and started boiler (7 TPH) for which

		<p>they have applied for necessary permission. They added that they were not doing any discharge during inspection.</p> <p>⊗ As per GPCB report, as unit has installed and started boiler (7 TPH) without necessary permission and Fabric sizing process started without CTE/CCA of the Board which are non-compliances.</p> <p>Therefore, this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 3,54,000/-

25. Shiv Shakti Industries

Sr. No.	Item	Details
1.	Name of Industry	Shiv Shakti Industries Plot no. 924, Phase-IV, GIDC, Vapi - 396195
2.	GPCB ID	24391
3.	Year of Establishment/Commissioning	01.04.1998
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	6 KLD
8.	Date of Inspection/Visit	19.07.2018
9.	Date of Direction of Closure Order	11.09.2018
10.	Date of Visit for Revocation Order	17.10.2018
11.	Date of Revocation Order	31.10.2018
12.	Period of Noncompliance	91 Days
13.	Reason for Closure	⊗ The unit were discharging waste water with high Ammonical Nitrogen (1430 mg/l) against outlet norm i.e. 50 mg/l, into GIDC drain.

		⊗ Flow meter provided at ETP final outlet was not in operation.
14.	Committee Hearing/Observation	<p>⊗ Unit represented that they were not having any treatment facility for the removal of ammonical nitrogen from the effluent and also as they are having very small plot size therefore not able to provide adequate treatment facility. Now they have started segregation of the effluent and effluent stream of Ammonical Nitrogen is directly collected and sent to CMEE. Unit agreed that there was non-compliance from their side.</p> <p>⊗ As the unit was discharging high ammonical nitrogen without meeting norms and unit was not having proper ETP which shows non-compliances.</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 5,46,000/-

26. Ms Siddharth Wet Processing

Sr. No.	Item	Details
1.	Name of Industry	Ms Siddharth Wet Processing Gala No.49, Phase-2, Opp. Padam Plastic, GIDC, Vapi
2.	GPCB ID	51359
3.	Year of Establishment/Commissioning	01.07.2016
4.	Product Type	Yarn / Textile processing involving any effluent/emission generating processes including bleaching, dyeing, printing and colouring
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	---
8.	Date of Inspection/Visit	05.12.2018
9.	Date of Direction of	26.12.2018

	Closure Order	
10.	Date of Visit for Revocation Order	01.01.2019
11.	Date of Revocation Order	Yet Not Revoked. Plant and machinery was removed which was verified on dated 01.01.2019.
12.	Period of Noncompliance	28 Days
13.	Reason for Closure	<p>☒ Unit have not obtained CTE/CC&A of the Board</p> <p>☒ Unit have discharged waste water generated from washing activity directly into GIDC storm water drain without any treatment</p> <p>☒ Result of samples collected from untreated waste water from the outlet of the unit shows pH - 6.73, COD - 3500 mg/L, BOD - 1065 mg/L and Colour - 400 pt. co. sc.</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that they are having only laundry for washing of cloths.</p> <p>☒ However, as per GPCB report, as the waste water generated from the washing is showing results pH - 6.73, COD - 3500 mg/L, BOD - 1065 mg/L and Colour - 400 pt. co. sc. which unit was discharging in to GIDC drainage system leading to CETP. The concentration of wastewater are higher than CETP inlet norms. The unit has not obtained GPCB consent.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 1,05,000/- (while calculating compensation, category is considered as orange instead of red considering Criteria for Categorisation of industry)

27. Silcal Laboratories

Sr. No.	Item	Details
1.	Name of Industry	Silcal Laboratories Plot No. C-1-B-1107/6, GIDC, Vapi
2.	GPCB ID	24871
3.	Year of Establishment/Commissioning	01.04.2003
4.	Product Type	Organic Chemicals manufacturing (pigment)
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	4.9 KLD
8.	Date of Inspection/Visit	21.08.2018, 29.08.2018 & 15.09.2018
9.	Date of Direction of Closure Order	04.10.2018
10.	Date of Visit for Revocation Order	27.10.2018
11.	Date of Revocation Order	27.12.2018
12.	Period of Noncompliance	68 Days
13.	Reason for Closure	<ul style="list-style-type: none"> ⊗ Housekeeping inside of plant was poor ⊗ Neighbour plot was vacant, in which light blue colour water was observed. ⊗ Unit has not obtained permission of the board for spray dryer ⊗ Shed made of Tarpaulin in open area & Terrace having bluish particle, wash out of the same with rain water stored into nearby open vacant & same water goes to Bill khadi ⊗ 40-50 MT ETP waste was found within premises ⊗ The vacant plot adjoining to unit having six tank, out of which one tank filled up with acidic effluent and other tanks with water. ⊗ During excavation of common boundary wall of the unit & M/s Accra Pac (India) Pvt Ltd, green colour acidic wastewater seen ⊗ Acidic green colour wastewater seen parallel to

		wall having ph 4 to 6
14.	Committee Hearing/Observation	<p>☒ Unit represented that unit is located in low lying area and next to their unit there is open plot which is at lower level than their unit. Due to heavy rains, blue colour water accumulated in the open plot next to their unit. They also added that they have collected all the water from the neighbouring plot and treated it in their ETP.</p> <p>☒ As per GPCB inspection report, it was observed that due to accumulation of blue particles (pigment-product of the unit) on the shed (made of tarpaulin in open area) and terrace, which washed out due to rain and blue colour wastewater accumulated in neighbouring open plot. Further, acidic effluent stored in one of the tank, acidic green colour effluent observed along the common boundary, permission not obtained for spray dryer, large quantum of waste stored in the premises instead sending to TSDF which shows non-compliances.</p> <p>☒ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 4,08,000/-

28. Sumitomo Chemical (India) Pvt. Ltd

Sr. No.	Item	Details
1.	Name of Industry	M/s. Sumitomo Chemical (India) pvt. ltd [Old name Gujarat Krishichem Corporation P NO C-5/185, Next to GPCB, Vapi
2.	GPCB ID	23501
3.	Year of Establishment/Commissioning	03.07.1983
4.	Product Type	Pesticides/Insecticides/Fungicides/Herbicides/Agrochemical Formulation
5.	Category	Orange

6.	Scale	Small
7.	Discharge capacity	2 KLD
8.	Date of Inspection/Visit	04.07.2018
9.	Date of Direction of Closure Order	14.09.2018
10.	Date of Visit for Revocation Order	27.09.2018
11.	Date of Revocation Order	08.10.2018
12.	Period of Noncompliance	86 Days
13.	Reason for Closure	☒ The unit were discharging high COD waste water into GIDC drain i.e. 1709 mg/L against norm i.e. 1000 mg/L.
14.	Committee Hearing/Observation	☒ Unit represented that due to heavy rains and as their unit is in low lying area resulting in to water accumulation and wastewaters mixed with rain water. During the same time, GPCB visited and collected sample which were more than CETP inlet norms. ☒ As per GPCB Analysis Report, there was discharge of effluent having COD - 1709 mg/l which was non-compliance and hence the unit is liable for environmental compliance.
15.	Compensation Amount	Rs. 3,24,329/-

29. Anjana Industries

Sr. No.	Item	Details
1.	Name of Industry	Anjana Industries [New Name : Sunrise Speciality Colours] Plot no. 7,8,9/3, PHASE-I, GIDC ESTATE, Vapi – 396195
2.	GPCB ID	24826
3.	Year of Establishment/Commissioning	15.08.2009
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	9.463 KLD

8.	Date of Inspection/Visit	07.04.2018
9.	Date of Direction of Closure Order	19.05.2018
10.	Date of Visit for Revocation Order	13.07.2018
11.	Date of Revocation Order	23.07.2018
12.	Period of Noncompliance	98 Days
13.	Reason for Closure	<p>☒ During inspection effluent observed in provided ETP unit but there is no any pumping /flow of effluent observed and it was found that, (a) Sand bed & carbon bed found not in operative condition, (b) No biomass observed in aeration tank, (c) Primary settling tank found empty, (d) Filter press found in non used condition, (e) Maintenance of ETP very poor, (f) Treated wastewater holding tank observed filled with dark red coloured effluent and pH= 9 observed on pH strip.</p> <p>☒ Results of analysis report of waste water sample collected from treated wastewater holding tank, result of parameters are; BOD = 717 mg/L (Limit = 400 mg/L), COD = 2686 mg/L (limit = 1000 mg/L), TDS = 18756 (limit = 2100 mg/L)</p> <p>☒ Unit has not provided storage area for hazardous waste storage.</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that their ETP was in maintenance and hence they were not able to maintain their effluent as per norms.</p> <p>☒ As per GPCB inspection report, unit was found in operation whereas ETP was not properly operational, treated effluent holding tank sample shows: BOD-717 mg/L(Norm:400 mg/L), COD-2686 mg/L (Norm:1000 mg/L), there was no proper waste storage area which shows non-compliances.</p> <p>Therefore this unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 6,11,453/-

30. Supreet Chemicals Pvt.Ltd. (Unit-3)

Sr. No.	Item	Details
1.	Name of Industry	Supreet Chemicals Pvt.Ltd. (Unit-3) Plot. No. 2808, 3rd Phase, GIDC, Vapi.
2.	GPCB ID	34233
3.	Year of Establishment/Commissioning	01.11.2008
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	4 KLD
8.	Date of Inspection/Visit	26.03.2018
9.	Date of Direction of Closure Order	31.03.2018
10.	Date of Visit for Revocation Order	26.04.2018
11.	Date of Revocation Order	11.05.2018
12.	Period of Noncompliance	32 Days
13.	Reason for Closure	<p>⊗ Industrial plant visited on 26/03/2018 it was found that aeration tank was empty and filter nutsch was dry.</p> <p>⊗ Sample collected on dated 26/03/2018 from collection tank shows pH - 12.28, Ammonical Nitrogen - 1141.15 mg/l, phenolic compounds - 7.836 mg/l and COD - 6115 mg/l. Sample collected from final outlet of ETP shows pH- 6.94, Ammonical Nitrogen - 46.34 mg/l, phenolic compounds - 1.758 mg/l and COD - 1306 mg/l.</p> <p>⊗ Looking to the condition of ETP units and sample results of collection and final outlet it shows that unit has not carried out proper secondary treatment to the effluent. Further, without proper treatment the reduction of COD and Ammonical Nitrogen is not acceptable.</p>
14.	Committee	⊗ Unit represented that during the inspection of

	Hearing/Observation	<p>GPCB unit was not discharging any waste water into CETP and also added that their aeration tank of ETP was under maintenance.</p> <p>⊗ However, as per inspection report even though aeration tank was under maintenance, production is going on and waste water was observed in collection tank and final treated waste water holding tank and results of the sample collected were not as per the inlet norms of CETP.</p> <p>⊗ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 1,92,588/-

31. Supriya Dyechem

Sr. No.	Item	Details
1.	Name of Industry	Supriya Dyechem C-1/B-2604, Phase III, Vapi 15 Days
2.	GPCB ID	24615
3.	Year of Establishment/Commissioning	01.06.1981
4.	Product Type	Organic Chemicals manufacturing
5.	Category	Red
6.	Scale	Small
7.	Discharge capacity	1.6 KLD
8.	Date of Inspection/Visit	25.05.2018
9.	Date of Direction of Closure Order	27.06.2018
10.	Date of Visit for Revocation Order	06.07.2018
11.	Date of Revocation Order	19.07.2018
12.	Period of Noncompliance	43 Days
13.	Reason for Closure	⊗ Analysis report of the sample collected from

		treated waste water holding tank is found as BOD = 730 mg/l (limit =400 mg/l), COD = 2592 mg/l (limit = 1000 mg/l), TDS = 5362 mg/l (limit = 2100 mg/l), Ammonical Nitrogen =1628 mg/l (limit = 50 mg/l), Chlorides = 1624 mg/l (limit = 60 mg/l), which exceed the permissible limit.
14.	Committee Hearing/Observation	<p>☒ Unit represented that they have provided low COD collection tank and high COD collection tank adjoining to each other and there was leakage/spillages of waste water from high COD collection tank to low COD collection. They agreed upon their mistake and now presently they have taken corrective measures.</p> <p>☒ As per GPCB report, sample collected from final treated wastewater holding tank and analysis results reveal that COD, BOD, NH3-N etc were not meeting with the CETP inlet norms which was non-compliance.</p> <p>☒ Therefore this unit is liable for environmental compensation</p>
16.	Compensation Amount	Rs. 2,59,643/-

32. Vapi Care Pharma Pvt Ltd

Sr. No.	Item	Details
1.	Name of Industry	Vapi Care Pharma Pvt Ltd Plot no. 225/3,GIDC, Vapi.
2.	GPCB ID	24751
3.	Year of Establishment/Commissioning	01.02.2005
4.	Product Type	Pharmaceutical formulation and for R&D purpose-[For sustained release/extended release of drugs only and for commercial purpose]
5.	Category	Red
6.	Scale	Medium
7.	Discharge capacity	21.550 KLD
8.	Date of Inspection/Visit	30.11.2017

9.	Date of Direction of Closure Order	02.02.2018
10.	Date of Visit for Revocation Order	08.02.2018
11.	Date of Revocation Order	19.02.2018
12.	Period of Noncompliance	71 Days
13.	Reason for Closure	<p>ⓧ Industrial waste water going in rain storm water drain due to leakages in bottom valve of settling Tank and analysis result shows COD - 2428 mg/L, BOD - 595 mg/L.</p> <p>ⓧ Analysis result of Final Outlet of ETP Shows COD - 2687 mg/L, BOD - 644 mg/L.</p>
14.	Committee Hearing/Observation	<p>ⓧ Committee heard representative of this unit and he agreed that due to leakages wastewater was going into storm water drain having characteristics of COD - 2428 mg/l and BOD - 595 mg/l.</p> <p>ⓧ As per GPCB report, due to leakages from settling tank, wastewater was going into storm water drain having characteristics of COD - 2428 mg/l and BOD - 595 mg/l and Final Outlet of ETP Shows COD - 2687 mg/L, BOD - 644 mg/L which were non-compliance.</p> <p>ⓧ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 25,94,718/-

33A. Vital Laboratories Pvt Ltd

Sr. No.	Item	Details
1.	Name of Industry	Vital Laboratories Pvt Ltd Plot no. 1710, Phase No :III, GIDC Vapi
2.	GPCB ID	24805
3.	Year of Establishment/Commissioning	01.12.2004

4.	Product Type	Pharmaceuticals
5.	Category	Red
6.	Scale	Medium
7.	Discharge capacity	14 KLD
8.	Date of Inspection/Visit	22.05.2018
9.	Date of Direction of Closure Order	30.06.2018
10.	Date of Visit for Revocation Order	12.07.2018
11.	Date of Revocation Order	23.07.2018
12.	Period of Noncompliance	52 Days
13.	Reason for Closure	<p>☒ Leakages/spillages of waste water on floor within premises and ultimately going to GIDC storm water drain and smell of solvent smelt from this waste water</p> <p>☒ Sample collected from flooring of the premises shows COD-6845 mg/L & TDS- 3360 mg/L</p> <p>☒ Unnecessary pipes & pipelines were Most of the lines were removed by the observed into collection tanks of high concentrated stream & low concentrated stream</p> <p>☒ Details for tanker rejected due to higher result of NH3-N was not produced.</p> <p>☒ Both tanks are located adjoining and single common pump used for concentrated and diluted wastewater</p> <p>☒ Both collection tank found full up to top level, further ETP units primary clarifier, secondary clarifier were found not in operation.</p> <p>☒ Unit has not maintained ETP operation logbook.</p> <p>☒ Unit has stored hazardous waste in haphazardly manner near ETP collection tank within premises.</p> <p>☒ Unit has not maintained EMS operation records.</p>
14.	Committee Hearing/Observation	☒ Unit represented that there was leakage and spillage on the floor within the premises due to mistake which was going in to GIDC Storm water

		<p>drain and now they have taken corrective measures.</p> <p>⊗ As per GPCB report, leakages/spillages of waste water on floor within premises (COD-6845 mg/L & TDS- 3360 mg/L) and ultimately going to GIDC storm water drain and smell of solvent smelt from this waste water, collection tanks (diluted & concentrated stream) found full whereas other ETP units (primary clarifier, secondary clarifier) were found not in operation shows improper operation of ETP, not maintained ETP operation logbook. Further, unit had stored hazardous waste in haphazardly manner near ETP collection tank within premises. All the above shows various non-compliances.</p> <p>⊗ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 19,35,827/-

33B. Vital Laboratories Pvt Ltd

Sr. No.	Item	Details
1.	Name of Industry	Vital Laboratories Pvt Ltd Plot no. 1710, Phase No :III, GIDC VAPI
2.	GPCB ID	24805
3.	Year of Establishment/Commissioning	01.12.2004
4.	Product Type	Pharmaceuticals
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	14 KLD
8.	Date of Inspection/Visit	21.09.2018
9.	Date of Direction of Closure Order	16.10.2018
10.	Date of Visit for Revocation Order	24.10.2018
11.	Date of Revocation	05.11.2018

	Order	
12.	Period of Noncompliance	34 Days
13.	Reason for Closure	<p>☒ Unit again started collection of High COD wastewater into low COD collection tank.</p> <p>☒ Dead biomass observed in aeration tank</p> <p>☒ Looking to analysis report of waste water sample collected from final holding outlet of ETP, results of parameters are; COD - 1402 mg/l (limit -1000 mg/L), Ammonical Nitrogen - 203.49 (limit - 50 mg/L)</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that treated effluent discharge through tankers to CETP after meeting norms.</p> <p>☒ As per GPCB report, results of wastewater sample collected from final holding outlet of ETP, shows COD-1402 mg/l (limit -1000 mg/L), Ammonical Nitrogen - 203.49 (limit - 50 mg/L) which were not meeting with CETP inlet norms. Wastewater disposed to CETP through tankers.</p> <p>Further, collection of High COD & low COD wastewater was not proper as unit started collection of High COD wastewater into low COD collection tank and dead biomass observed in aeration tank shows improper operation of ETP.</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 12,26,870/-

33 C. Vital Laboratories Pvt Ltd

Sr. No.	Item	Details
1.	Name of Industry	Vital Laboratories Pvt Ltd Plot no. 1710, Phase No :III, GIDC VAPI
2.	GPCB ID	24805
3.	Year of	01.12.2004

	Establishment/Commissioning	
4.	Product Type	Pharmaceuticals
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	14 KLD
8.	Date of Inspection/Visit	15.12.2018
9.	Date of Direction of Closure Order	26.12.2018
10.	Date of Visit for Revocation Order	01.01.2019
11.	Date of Revocation Order	Yet not revoked.
12.	Period of Noncompliance	18 Days
13.	Reason for Closure	<p>☒ Discharged acidic waste water into storm water drain</p> <p>☒ Acidic wastewater was accumulated to nearby industrial unit</p> <p>☒ Analysis report of waste water sample collected from the accumulated acidic waste water from ponding near boundary wall of the unit, results of parameters are; pH – 3.02, Ammonical Nitrogen – 543.46 mg/L, TDS – 16304 mg/L, COD – 4692 mg/L, BOD– 1245 mg/L and Phenolic Compounds – 29.11 mg/L.</p> <p>☒ Analysis report of waste water sample collected from storm water drain within premises of M/S Craft Corner Paper Mills, results of parameters are; pH – 3.10, Ammonical Nitrogen – 974 mg/L, TDS –144964 mg/L, COD – 63880 mg/L, BOD – 21500 mg/L and Phenolic Compounds – 39.55 mg/L.</p>
14.	Committee Hearing/Observation	<p>☒ Committee heard representative of this unit and unit informed that due to leakage in fire hydrant line and HCL storage tank acidic waste water was leaking into neighbouring unit i.e. M/s Craft Corner Paper Mills. Presently, they repaired all the leakages and cleared all the leaked water.</p>

		<p>Presently, unit is not in operation as it is not yet revoked.</p> <p>As per GPCB report, unit discharged acidic waste water into storm water drain, and acidic wastewater was accumulated to adjoining industrial unit (M/s Craft Corner Paper Mills). Analysis results of wastewater sample (collected from storm water drain within premises of M/S Craft Corner Paper Mills) shows pH-3.10, Ammonical Nitrogen-974 mg/l, TDS-144964 mg/l, COD-63880 mg/l, BOD-21500 mg/l and Phenolic Compounds – 39.55 mg/L).</p> <p>Analysis results of waste water sample (collected from the accumulated acidic waste water from ponding near boundary wall of the unit), pH – 3.02, Ammonical Nitrogen – 543.46 mg/L, TDS – 16304 mg/L, COD – 4692 mg/L, BOD- 1245 mg/L and Phenolic Compounds – 29.11 mg/L.</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 8,85,686/-

34. Zen Pharma

Sr. No.	Item	Details
1.	Name of Industry	Zen Pharma 75/1,Phase -I, GIDC, Vapi
2.	GPCB ID	24843
3.	Year of Establishment/Commissioning	01.04.1996
4.	Product Type	Pharmaceutical formulation and for R&D purpose- [For sustained release/extended release of drugs only and for commercial purpose]
5.	Category	Red

6.	Scale	Small
7.	Discharge capacity	65 KLD
8.	Date of Inspection/Visit	04.10.2018
9.	Date of Direction of Closure Order	20.10.2018
10.	Date of Visit for Revocation Order	25.10.2018
11.	Date of Revocation Order	03.11.2018
12.	Period of Noncompliance	22 Days
13.	Reason for Closure	<p>☒ Unit has made hole in compound wall & provided arrangement for illegal disposal of waste water by providing 8 inch HPDE & 2 inch flexible pipe.</p> <p>☒ Reddish coloured waste water was going into GIDC storm water drain from unit's boundary wall through 8 inch HPDE pipe. Also 2 inch dia flexible pipe was in storm water drain at above said place, which leads to river damanganga through natural drain.</p> <p>☒ Red coloured waste water flowing into storm water drain at location railway culvert up to this industry.</p> <p>☒ ETP units were in operation, but no ETP units having coloured waste water.</p> <p>☒ Unit has provided 1HP pump near water drain which suction pipe in storm water drain and delivery pipe in GIDC storm water drain outside compound wall.</p> <p>☒ Result of sample collected from GIDC storm water drain chamber behind boundary wall of unit shows pH-6.65, COD-972 mg/l, and colour-250 pt.co.sc.</p> <p>☒ Result of sample collected from storm water drain within premises of the unit shows pH-6.64, COD-818 mg/l, and colour-300 pt.co.sc.</p>
14.	Committee Hearing/Observation	☒ Unit represented that it is located in low lying area and due to heavy rains water get accumulated in their unit and they had put

		<p>flexible pipeline to clear accumulated water. Further, accumulated water cleared by the unit.</p> <p>As per GPCB report, rain water contaminated and accumulated in the unit. The results of the wastewater going out of the unit i.e. into GIDC storm water drain, shows pH-6.65, COD-972 mg/l, and colour-250 pt.co.sc (colour-red) instead of going to ETP. ETP shows improper operation. Unit has made hole in compound wall & provided arrangement for illegal disposal of waste water by providing 8 inch HPDE & 2 inch flexible pipe. The above observations shows non-compliances</p> <p>Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 1,32,000/-

35. Ruby Red (India)

Sr. No.	Item	Details
1.	Name of Industry	Ruby Red(India) Plot no. 798/1, GIDC, Vapi 15 Days
2.	GPCB ID	24268
3.	Year of Establishment/Commissioning	15.06.1988
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	7.33 KLD
8.	Date of Inspection/Visit	07.10.2018
9.	Date of Direction of Closure Order	22.11.2018
10.	Date of Visit for Revocation Order	29.11.2018

11.	Date of Revocation Order	29.12.2018
12.	Period of Noncompliance	54 Days
13.	Reason for Closure	<p>✘ Flexible pipes were observed at ETP units. Unit has provided treated waste water holding tank just adjacent to collection tank of ETP and there was also observed flexible pipe at these tanks.</p> <p>✘ Multi Connection were observed at effluent lifting pump line</p> <p>✘ Unit has not maintained ETP operation logbook</p> <p>✘ Drain provided for collection of waste water generated into collection tank was observed not adequate, improper gradient and without acid proof lining</p> <p>✘ Housekeeping was observed very poor</p>
14.	Committee Hearing/Observation	<p>✘ Unit represented that there was pipe corrosion of the fixed pipeline and hence they have provided flexible pipeline. Now, after inspection they complied with non complied points like Acid proof lining provided, Multi Connection removed etc</p> <p>✘ GPCB inspection report indicates non-compliance in respect of flexible pipes, corrosion in fixed pipes, drain provided for collection of wastewater was not adequate, improper gradient and without acid proof lining, no ETP log book.</p> <p>✘ Therefore this unit is liable for environmental compensation</p>
15.	Compensation Amount	Rs. 3,24,000/-

36. Rama Pulp & Paper Ltd.

Sr. No.	Item	Details
1.	Name of Industry	Rama Pulp & Paper Ltd. Plot No.293-294, GIDC, Vapi
2.	GPCB ID	24223
3.	Year of Establishment/Commissioning	10.12.1983

4.	Product Type	Pulp & Paper (waste paper based without bleaching process to manufacture Kraft paper)
5.	Category	Red
6.	Scale	Medium
7.	Discharge Quantity	37 KLD
8.	Date of Inspection/Visit	17.05.2018
9.	Date of Direction of Closure Order	13.07.2018
10.	Date of Visit for Revocation Order	20.07.2018
11.	Date of Revocation Order	06.08.2018
12.	Period of Noncompliance	65 Days
13.	Reason for Closure	<p>☒ Result of sample collected from final outlet of ETP shows COD - 2523 mg/L (limit -1000 mg/L) & BOD -626 mg/L (limit - 400 mg/L).</p> <p>☒ Leakages & overflow observed in ETP Area.</p>
14.	Committee Hearing/Observation	<p>☒ Unit represented that there was problem in the aeration, ETP and therefore the results of the sample collected did not meet with norms. Now they have provided diffused aeration system.</p> <p>☒ As per GPCB report, analysis results of final outlet shows COD-2523 mg/L & BOD-626 mg/L which are more than CETP inlet norms . Therefore, the unit is liable for environmental compensation.</p>
15.	Compensation Amount	Rs. 24,02,268/-

37. Ratna Product (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Ratna Product Plot No. J-758/4, GIDC Vapi
2.	GPCB ID	24235

3.	Year of Establishment/Commissioning	01.01.1998
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	1.5 KLD
8.	Period of Noncompliance	49 Days (05.10.2018-22.11.2018)
9.	Committee Hearing/Observation	<p>☒ Unit has agreed that they are discharging their ETP effluent not meeting with discharge norms as observed by VGEL. Unit represented that ETP would be upgraded for Zero Liquid Discharge.</p> <p>☒ As the unit was discharging wastewater above the CETP inlet norms, as per VGEL report, (COD: 13440 mg/l (05.10.2018), 6120 mg/l (03.11.2018), 20320 mg/l (15.11.2018), 15040 mg/l (22.11.2018)),</p> <p>Therefore this unit is liable for environmental compensation.</p>
10.	Compensation Amount	Rs. 2,94,000/-

38. Skyline Polycats Pvt Ltd (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Skyline Polycats Pvt Ltd Plot No. C1B/68, 100 Shed Area, GIDC Vapi
2.	GPCB ID	23059
3.	Year of Establishment/Commissioning	15.04.1998
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	0.5 KLD
8.	Period of Noncompliance	76 Days (02.11.2018-16.01.2019)
9.	Committee Hearing/Observation	☒ The unit represented that there were spillages & leakages from their industrial plant to GIDC

		<p>underground drainage which was observed by during one of the visit by VGEL and further there was non-compliances in respect of COD. Now, planned for dismantling of plant & machineries for revamping of industrial plant including prevention of seepage/leakages.</p> <p>⊗ As the unit was discharging wastewater above the CETP inlet norms (COD: 10640 mg/l, NH3-N:64 mg/l, SS: 208 mg/l (02.11.2018), COD: 1104 mg/l (08.11.2018), COD: 2884 mg/l (20.11.2018), COD: 6560 mg/l & 7280 mg/l, NH3-N: 61 & 103 mg/l (21.11.2018)), COD: 7520 mg/l, NH3-N: 81 mg/l (23.11.2018), COD: 7040 & 21440 mg/l, SS-1712 mg/l, NH3-N:86 mg/l (07.12.2018), COD: 10720 mg/l, NH3-N:112 mg/l (16.01.2019) as per VGEL report.</p> <p>Therefore this unit is liable for environmental compensation.</p>
10.	Compensation Amount	Rs. 4,56,000/-

39. Hatkesh Chem & Engg. Ind (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Hatkesh Chem & Engg. Ind Plot No. C1-85, 100 Shed Area, GIDC Vapi
2.	GPCB ID	23632
3.	Year of Establishment/Commissioning	01.06.2008
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	19 KLD
8.	Period of Noncompliance	93 Days (08.10.2018-08.01.2019)
9.	Committee Hearing/Observation	<p>⊗ Unit agreed for discharging wastewater without meeting the CETP inlet norms as per VGEL report.</p> <ul style="list-style-type: none"> As the unit was discharging wastewater above

		<p>the CETP inlet norms (COD: 7000 mg/l, NH3-N: 980 mg/l, SS: 196 mg/l (08.10.2018), COD: 19200 mg/l, NH3-N-271 mg/l, SS: 172 mg/l (30.12.2018), 5280 mg/l, NH3-N: 148 mg/l, SS: 1892 mg/l (08.01.2019), as per VGEL report.</p> <p>Therefore this unit is liable for environmental compensation.</p>
10.	Compensation Amount	Rs. 5,58,000/-

40. Nylo Speciality Colours (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Nylo Speciality Colours Plot No. C1B/651/1, 100 Shed Area, GIDC, Vapi
2.	GPCB ID	24032
3.	Year of Establishment/Commissioning	15.10.1988
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	3 KLD
8.	Period of Noncompliance	101 Days (1.10.2018-09.01.2019)
9.	Committee Hearing/Observation	<p>☒ Unit agreed that they were discharging wastewater without meeting with discharge norms and ETP would be upgraded.</p> <p>☒ As the unit was discharging wastewater above the CETP inlet norms (COD: 9320 mg/l, (01.10.2018), COD:12320 mg/l, SS: 1748 mg/l (28.11.2018), COD: 4080 mg/l (30.12.201), COD: 6080 mg/l, (09.01.2019) as per VGEL report.</p> <p>Therefore this unit is liable for environmental compensation.</p>
10.	Compensation Amount	Rs. 6,06,000/-

41. Pearl Colour industry (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Pearl Colour Industry Plot No. C1/2614, 3rd Phase, GIDC Vapi
2.	GPCB ID	24103
3.	Year of Establishment/Commissioning	20.03.2011
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	2.5 KLD
8.	Period of Noncompliance	49 Days (20.11.2018-07.01.2019)
9.	Committee Hearing/Observation	<p>☒ Unit agreed for discharging wastewater without meeting with discharge norms and ETP would be upgraded.</p> <p>☒ As the unit was discharging wastewater above the CETP inlet norms (COD: 2608 mg/l, (20.11.2018), COD: 3920 mg/l, NH3-N:296 mg/l (28.12.2018), COD: 4320 mg/l, NH3-N: 392 mg/l, SS: 1212 mg/l (22.12.2018), COD: 2560 mg/l, NH3-N: 249 mg/l (02.01.2019) COD: 4480 mg/l, NH3-N: 728 (07.01.2019) as per VGEL report.</p> <p>Therefore this unit is liable for environmental compensation.</p>
10.	Compensation Amount	Rs. 2,94,000/-

42. Pravin Industry (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Pravin Industry Plot No. C1/6118, 4th Phase, GIDC Vapi
2.	GPCB ID	24163
3.	Year of Establishment/Commissioning	31.07.1986
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	9 KLD
8.	Period of Noncompliance	88 Days (20.10.2018-15.01.2019)
9.	Committee Hearing/Observation	<p>☒ Unit agreed for discharging wastewater without meeting with discharge norms and ETP would be upgraded.</p> <p>☒ As per VGEL Analysis report, the unit was discharging wastewater above the CETP inlet norms (NH3-N:168 mg/l, (20.10.2018), NH3-N:72 mg/l (02.11.2018), COD: 16320 mg/l, NH3-N: 2660 mg/l, SS: 5644 mg/l (07.12.2018), COD: 11680 mg/l, NH3-N: 1414 mg/l (13.12.2018) COD: 3936 mg/l, NH3-N: 2100 (15.01.2019)</p> <p>Therefore this unit is liable for environmental compensation.</p>
11.	Compensation Amount	Rs. 5,28,000/-

43. Rainbow Chemical (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Rainbow Chemical Plot No. 6021/A, 4th Phase, GIDC Vapi
2.	GPCB ID	24202
3.	Year of Establishment/Commissioning	12.05.1992
4.	Product Type	Dyes and Dye- Intermediates
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	14 KLD
8.	Period of Noncompliance	59 Days (18.11.2018-15.01.2019)
9.	Committee Hearing/Observation	<p>☒ Unit represented that there was wastewater discharge without meeting with CETP inlet norms.</p> <p>☒ As per VGEL analysis report, the unit was discharging wastewater above the CETP inlet norms (COD: 12160 mg/l, SS:5676 mg/l, (18.11.2018), COD: 6000 mg/l (22.11.2018), COD: 2640 mg/l (05.12.2018), COD: 11600 mg/l, NH3-N: 61 mg/l (21.12.2018) COD: 2720 mg/l (29.12.2019), COD: 10400 mg/l, NH3-N: 61 mg/l (10.01.2019, COD: 3440 mg/l (15.01.2019) .</p> <p>Therefore this unit is liable for environmental compensation.</p>
11.	Compensation Amount	Rs. 3,54,000/-

44. Dalmia Polpro Ind Pvt Ltd (As per list of defaulting Industries- VGEL (CETP))

Sr. No.	Item	Details
1.	Name of Industry	M/s. Dalmia Polypro Industries Pvt. Ltd. (formalry Known as Dalmia Dye Chem Industries) Plot No. 780/3, 40 Shed Area, GIDC Vapi
2.	GPCB ID	29518
3.	Year of Establishment/Commissioning	01.06.2006
4.	Product Type	Scrap Dealer (with Washing)
5.	Category	Red
6.	Scale	Small
7.	Discharge Quantity	44.9 KLD
8.	Period of Noncompliance	85 Days (17.10.2018-09.01.2019)
9.	Reason for Closure	Unit is found defaulting by VGEL
10.	Committee Hearing/Observation	<p>☒ Unit represented that only washing of plastic bottles (water)/PET bottles which were clean already and their wastewater is mostly biodegradable which is not damageable to bio-environment of CETP. The plant supporting Swachh Bharat Mission by engaged in recycling of plastic bottles. Unit further represented that VGEL has given a letter to GPCB requesting for removal of the name of the industry from defaulting list submitted to GPCB based on the review of list by Technical Monitoring Committee of VGEL wrt biodegradability of the wastewater which will not damage to bio-environment of CETP, company's letter to VGEL regarding leakages of pumps/motors/interruption of their discharge system. The unit also requested to GPCB for the removal of the name.</p> <p>☒ Committee has not considered any of the claims made by the unit and further, as per the analysis results of VGEL, the unit was discharging</p>

		<p>wastewater without meeting with CETP inlet norms i.e. COD: 1904 mg/l,(17.10.2018), COD: 4880 mg/l, SS: 4844 mg/l (29.10.2018), COD: 1360 mg/l (15.11.2018), COD: 1632 mg/l (30.11.2018), COD: 1488 (07.12.2018) COD: 1584 mg/l (08.12.2018), COD: 1904 mg/l (10.12.2018), COD: 1576 mg/l (19.12.2018), COD: 1424 mg/l (31.12.2018), COD: 1440 mg/l (05.01.2019), COD: 3800 mg/l, SS: 980 mg/l (09.01.2019).</p> <p>Therefore this unit is liable for environmental compensation.</p>
11.	Compensation Amount	Rs. 5,10,000/-

DETAILS OF HEARING AND COMPENSATION CETP OPERATOR

Sr. No.	Item	Details
1.	Name of Industry	M/s. Vapi Green Enviro Limited (VGEL, Vapi) – CETP Plot No. Ext. 1/4, Near Damanganga River, GIDC, Vapi.
2.	GPCB ID	24764
3.	Year of Establishment/Commissioning	17.01.1997
4.	Product Type	CETP
5.	Category	Red
6.	Scale	Large
7.	Discharge capacity	55 MLD
8.	Date of Inspection/Visit	Twice in a month by GPCB, Quarterly by CPCB
9.	Date of Direction of Closure Order	NA
10.	Date of Visit for Revocation Order	NA
11.	Date of Revocation Order	NA
12.	Period of Noncompliance	365 Days
13.	Committee Hearing/Observation	Please see below
14.	Compensation Amount	Rs.11,31,56, 000

CETP (VGEL) Representation:

1. CETP – Vapi discharges treated effluent in tidal zone of Damanganga Estuary which is having saline water with no potable use (not used for drinking / irrigation / bathing / washing). So there is no deterioration in water quality in any manner.
2. The Dissolved Oxygen level in the Damanganga Estuary water downstream of CETP- Vapi discharge location has improved from 4.5 to 5.8.

3. As per National Institute of Oceanography – Mumbai report on the beaches of Damanganga Estuary classified the beaches on both sides of the point where Damanganga Estuary meets the Arabian sea, namely Jampore beach & Devka Beach are found to be in line with other Indian beaches where no effluent is discharged. Not only that even the COD levels as per attached sheet with the report shows it as the 2nd best among the beaches reported in it after Uran (Ref Aug NIO 2018 report).
4. As per the CPCB Report (Sep 2018) the DamanGanga river water quality in the stretch after CETP discharge point to the downstream has on the contrary improved, which can be seen as it had been Priority-2 in the year 2010, while Over the years it has improved to Priority-4 in the year 2018,(Priority 1 being most polluted and priority 5 being the best rating) which shows that there has been remarkable improvement in the water quality of the downstream of CETP discharge location.
5. In the downstream side of CETP existing location, it is not the only solitary discharge, there are another 22 discharges into DamanGanga, they should also be considered while examining the damage to the environment, if any.
6. There is a joint monitoring of water quality in Damanganga Estuary by GPCB, DPCC & CETP-Vapi on monthly basis. The sample is tested by a 3rd party which is a Govt, approved laboratory, and which submits its report to the DPCC & GPCB. The reports has amply shown improvement of the Damanganga Estuary water quality.
7. For improving the effluent outlet quality CETP have installed already one MEE (200KL/day) & spray drier (96KL/day) in the year 2018 and CETP have already placed order for one more additional spray dryer (192 KL/day). This will take care of the high COD and high TDS effluent generated by the member units which will be taken by tanker
8. As per the Hon'ble NGT (WZ), Pune Order, CETP-Vapi is in the process of extending their discharge location 3.5 KM downstream of the existing discharge point as per NIO recommendation and also in the process of taking it to Deep sea in the process. The of Board of Directors of VGEL, has already approved, vide meeting Dated 17th Dec 2018 Rs 41 Cr for this project and the we are in the process of appointing Project Execution Consultant. We are committed to take the pipeline to Deep sea and would humbly request the committee & NGT to help us by convincing the Daman Administration to allow us to do so.
9. CETP humbly request to Hon'ble NGT and expert committee, the member industries should not be penalized, since the CETP is already being penalized for the same offence in the same area. Further they are being penalized multiple times for same offence;
 - a) The factories are given closure for one month to two months, during which period they pay salaries, interests on banks and all other expenses without production activities which is a financial burden.

- b) Bank guarantees are given to GPCB, which sometimes get forfeited.
 - c) The member units are sending their effluent through closed system to the CETP, so the effluent is neither going to the river or Khadi, nor to the surface or underground water bodies. So as such no damage to the environment by the industries.
 - d) Whenever the effluent doesn't meet discharge parameters, members are paying additional treatment charges to the CETP.
 - e) CETP had deposited Rs. 10 Crores towards environment compensation. This amount is ultimately from funds of CETP and this fund is from pockets of member units.
 - f) Out of the 520 units, 340 are SSI units, who are supposed to do primary treatment and for further treatment the concept of CETP came into existence. It is known that it is not possible to get the COD below 1000 ppm simple primary treatment, so they should be given a limit parameter of at least 5000 ppm COD limit and NGT should help them to get it from relevant authority.
 - g) The effluent load of these 340 SSI units (with less than 25 KL/day of water consumption) is less than 3 MLD out of the total 55 MLD received by the CETP, which is about 5%, so we humbly request NGT to take a sympathetic view for the SSI units.
 - h) Certain small units are unable to bear environment compensation, due to their poor economic condition.
10. VGEL undertakes to co-ordinate with Vapi Industries specifically SSI units to technically upgrade their treatment systems and the technology to make them environmentally and economically viable in collaboration with IIT, Gandhinagar / SVNIT, Surat / IIT, Mumbai / National Chemical Institute (CISR), Pune / GCPC, Gandhinagar, etc.
11. The Interim Deposit of Rs.10 crore made by CETP- Vapi to CPCB as per the NGT Order, we humbly request that this should be allotted to the CETP-Vapi, to be spent on upgradation and technological improvement of CETP-Vapi to adopt appropriate modern technologies, and help improve the discharge quality of effluent.

Committee Hearing/Observations:

As the CETP is non-complied with outlet norms for some parameters and causing pollution in River Damanganga, it is accountable for paying compensation. Committee taken the note of various measures taken up by CETP to improve the inlet as well as outlet quality, however, still some more measures are required to be taken further for meeting norms (Inlet as well as). Over the years, it is observed that the inlet as well as outlet quality of the effluent of CETP is improved and CETP is slightly exceeding the -COD (critical parameter). The main issue of the effluent is due to refractory COD and Colour.

The committee has noted Action Plan for the meeting norms where some in house improvement in existing units, segregation of waste from member units, over ground pipeline network, sampling of member units, identification of colour imparting units etc. And also installation of Common MEE & Common Spray Dryer (CSD) and planning CSD for High COD & High TDS wastewater. CETP has planned expansion of hydraulic load, however, up-gradation in terms of reducing pollutant (COD & Colour) are not properly incorporated in the Action Plan.

CETP is also carrying out monitoring and collecting samples of different industries to check on inlet quality of CETP, the list of defaulting should be given to GPCB for necessary Action. If the inlet quality is met with then there are chances of meeting the outlet norms with proper operation and maintenance of treatment units.

Though, CETP discharges treated effluent in Damanganga River which is having effect of tides causing water saline water resulting into no potable use (not used for drinking / irrigation / bathing / washing), there is deterioration in water quality due to other pollutants.

The committee has taken note of report of NIO and also improvement in class of priority as per categorisation of river which shows that there has been remarkable improvement in the water quality of the downstream of CETP discharge location. In the downstream of CETP existing location, though there are number of discharges, CETP is major causing damage to the environment.

Regarding request from CETP operator to the committee that the member industries should not be penalized, since the CETP is already being penalized for the same offence in the same area and they are being penalized multiple times (financial loss due to closure, bank guarantee, additional treatment cost from CETP etc) for same offence;the committee is not agreeing above and levying env compensation due to their non-compliances with discharge norms/consent conditions. The committee noted the issue of meeting CETP inlet norm COD: 1000 mg/l by small scale industries (340 out of 520) with only primary treatment and only @ 5 % load of 340 SSI unit to CETP (out of 55 MLD)

It is informed that VGEL undertakes to co-ordinate with Vapi Industries specifically SSI units to technically upgrade their treatment systems and the technology to make them environmentally and economically viable in collaboration with IIT, Gandhinagar / SVNIT, Surat / IIT, Mumbai / National Chemical Institute (CISR), Pune / GCPC, Gandhinagar, etc. The committee noted and mentioned in the report as one of the long term measures in steps for restoration.

CETP requested that Interim Deposit of Rs.10 crore made by CETP- Vapi to CPCB as per the NGT Order (para 55 (ii)), should be allotted to the CETP-Vapi, to be spent on upgradation and technological improvement of CETP-Vapi to adopt appropriate modern

technologies, and help improve the discharge quality of effluent. It is mentioned by committee that as per said order of Hon'ble NGT as per para 55 (iii) the amount may be utilised by the CPCB for restoration of the environment. In the cost of restoration, overground pipeline network (as for as possible), upgradation of CETP and quality & Quantity monitoring system are suggested.

APPENDIX-10

ENVIRONMENTAL COMPENSATION CALCULATION SHEET

Sr. No.	GPCB ID	Name of Industries	Scale	PI	N	LF	S	R	EC(A) = PI x N x LF x S x R	Discharge Quantity in KL	Excess COD Factor = COD Analyzed - Permitted COD/Permitted COD	Additional Charge EC(B) = N x DQ x NECOD x Rs./KL	Final EC = EC (A) + EC (B)
1	29990	Amardeep Chemical Industries Pvt. Limited	S	80	23	1.5	0.5	100	₹138,000	3.1	0	₹0	₹138,000
2	34228	Amitech Chemicals Private Limited	S	80	101	1.5	0.5	100	₹606,000	2	1.122	₹3,400	₹609,400
3	23074	Amoli Organics P Ltd	L	80	42	1.5	1.5	500	₹3,780,000	120	0	₹0	₹3,780,000
4	23218	Bhavini Products	S	80	79	1.5	0.5	100	₹474,000	0.55	3.568	₹2,325	₹476,325
5	23260	Centre Point Industries	S	80	25	1.5	0.5	100	₹150,000	5.3	0	₹0	₹150,000
6A	23278	Chemodist Industries	S	80	107	1.5	0.5	100	₹642,000	14	0	₹0	₹642,000
6B	23278	Chemodist Industries	S	80	38	1.5	0.5	100	₹228,000	14	0	₹0	₹228,000
6C	23278	Chemodist Industries	S	80	51	1.5	0.5	100	₹306,000	14	4.524	₹48,452	₹354,452
6D	23278	Chemodist Industries	S	80	31	1.5	0.5	100	₹186,000	14	0	₹0	₹186,000
7	23410	Dy-Mach Pharma	S	80	32	1.5	0.5	100	₹192,000	13.11	0.732	₹4,606	₹196,606
8	23435	Faze Three Limited	M	80	20	1.5	1	300	₹720,000	955.7	0	₹0	₹720,000
9	24427	Galvadeco Parts Pvt Limited	M	80	56	1.5	1	300	₹2,016,000	29	0	₹0	₹2,016,000
10A	23569	Hemani Industries Limited	M	80	19	1.5	1	300	₹684,000	65	3.807	₹79,928	₹763,928
10B	23569	Hemani Industries Limited	M	80	93	1.5	1	300	₹3,348,000	65	0	₹0	₹3,348,000

Sr. No.	GPCB ID	Name of Industries	Scale	PI	N	LF	S	R	EC(A) = PI x N x LF x S x R	Discharge Quantity in KL	Excess COD Factor = COD Analyzed - Permitted COD/Permitted COD	Additional Charge EC(B) = N x DQ x NECOD x Rs./KL	Final EC = EC (A) + EC (B)
11	23575	Heranba Industries Ltd (Unit: 2)	L	80	27	1.5	1.5	500	₹2,430,000	47	0	₹0	₹2,430,000
12A	23574	Heranba Industries Ltd(Unit I)	L	80	27	1.5	1.5	500	₹2,430,000	15.387	0	₹0	₹2,430,000
12B	23574	Heranba Industries Ltd(Unit I)	L	80	19	1.5	1.5	500	₹1,710,000	15.387	0	₹0	₹1,710,000
13	23577	Hiren Enterprises	S	80	28	1.5	0.5	100	₹168,000	0.4	0	₹0	₹168,000
14	23728	KEVA FRAGRANCES Pvt.Ltd	M	80	29	1.5	1	300	₹1,044,000	164.78	0	₹0	₹1,044,000
15	23781	Krishna Dyes & Chemicals	S	80	88	1.5	0.5	100	₹528,000	3	1.55	₹6,138	₹534,138
16	23868	Mangalam Drugs& Organics (Unit-1)	M	80	26	1.5	1	300	₹936,000	35.05	0	₹0	₹936,000
17	24045	Orient Organics	S	80	43	1.5	0.5	100	₹258,000	0.5	2.207	₹712	₹258,712
18	24776	Venkteshwar PvtLtd	S	80	78	1.5	0.5	100	₹468,000	37	0.49	₹24,040	₹492,040
19A	34959	Jayshiv Chemicals Pvt Limited	S	80	32	1.5	0.5	100	₹192,000	33.4	0	₹0	₹192,000
19B	34959	Jayshiv Chemicals Pvt Limited	S	80	21	1.5	0.5	100	₹126,000	33.4	0	₹0	₹126,000
19C	34959	Jayshiv Chemicals Pvt Limited	S	80	0	1.5	0.5	100	₹0	33.4	0	₹0	₹0
20	23380	Micas Organics Ltd (Unit-I)	L	80	19	1.5	1.5	500	₹1,710,000	172	0	₹0	₹1,710,000
21	24577	Micas Organics Limited (Unit-V)	S	80	29	1.5	0.5	100	₹174,000	76.53	0	₹0	₹174,000
22	24121	Pidilite IndustriesLtd.	L	80	23	1.5	1.5	500	₹2,070,000	68.61	1.187	₹31,843	₹2,101,843
23A	24135	PolysperseChemicals	S	80	77	1.5	0.5	100	₹462,000	2.5	0	₹0	₹462,000

Sr. No.	GPCB ID	Name of Industries	Scale	PI	N	LF	S	R	EC(A) = PI x N x LF x S x R	Discharge Quantity in KL	Excess COD Factor = COD Analyzed - Permitted COD/Permitted COD	Additional Charge EC(B) = N x DQ x NECOD x Rs./KL	Final EC = EC (A) + EC (B)
23B	24135	PolysperseChemicals	S	80	20	1.5	0.5	100	₹120,000	2.5	0	₹0	₹120,000
24	23312	Shri Hari Textiles Pvt Ltd.	S	80	59	1.5	0.5	100	₹354,000	60	0	₹0	₹354,000
25	24391	Shiv Shakti Industries	S	80	91	1.5	0.5	100	₹546,000	6	0	₹0	₹546,000
26	51359	SiddharthWet Processing	S	50	28	1.5	0.5	100	₹105,000		2.5	₹0	₹105,000
27	24871	Silcal Laboratories	S	80	68	1.5	0.5	100	₹408,000	4.9	0	₹0	₹408,000
28	23501	Sumitomo Chemical (India) pvt. ltd	S	50	86	1.5	0.5	100	₹322,500	2	0.709	₹1,829	₹324,329
29	24826	Sunrise Speciality Colours	S	80	98	1.5	0.5	100	₹588,000	9.463	1.686	₹23,453	₹611,453
30	34233	Supreet Chemicals Pvt.Ltd.(Unit-3)	S	80	32	1.5	0.5	100	₹192,000	4	0.306	₹588	₹192,588
31	24615	Supriya Dyechem	S	80	43	1.5	0.5	100	₹258,000	1.6	1.592	₹1,643	₹259,643
32	24751	Vapi Care Pharma Pvt Ltd	M	80	71	1.5	1	300	₹2,556,000	21.55	1.687	₹38,718	₹2,594,718
33A	24805	Vital Laboratories Pvt Ltd	M	80	52	1.5	1	300	₹1,872,000	14	5.845	₹63,827	₹1,935,827
33B	24805	Vital Laboratories Pvt Ltd	M	80	34	1.5	1	300	₹1,224,000	14	0.402	₹2,870	₹1,226,870
33C	24805	Vital Laboratories Pvt Ltd	M	80	18	1.5	1	300	₹648,000	14	62.88	₹237,686	₹885,686
34	24843	Zen Pharma	S	80	22	1.5	0.5	100	₹132,000	65	0	₹0	₹132,000
35	24268	Ruby Red(India)	S	80	54	1.5	0.5	100	₹324,000	7.33	0	₹0	₹324,000
36	24223	Rama Pulp & Paper Ltd.	M	80	65	1.5	1	300	₹2,340,000	37	1.523	₹62,268	₹2,402,268
37	24235	Ratna Product	S	80	49	1.5	0.5	100	₹294,000	1.5	0	₹0	₹294,000
38	23059	Skyline Polycoats Pvt Ltd	S	80	76	1.5	0.5	100	₹456,000	0.5	0	₹0	₹456,000

Sr. No.	GPCB ID	Name of Industries	Scale	PI	N	LF	S	R	EC(A) = PI x N x LF x S x R	Discharge Quantity in KL	Excess COD Factor = COD Analyzed - Permitted COD/Permitted COD	Additional Charge EC(B) = N x DQ x NECOD x Rs./KL	Final EC = EC (A) + EC (B)
39	23632	Hatkesh Chem & Engg. Ind	S	80	93	1.5	0.5	100	₹558,000	19	0	₹0	₹558,000
40	24032	Nylo Speciality Colours	S	80	101	1.5	0.5	100	₹606,000	3	0	₹0	₹606,000
41	24103	Pearl Colour Industry	S	80	49	1.5	0.5	100	₹294,000	2.5	0	₹0	₹294,000
42	24163	Pravin Industry	S	80	88	1.5	0.5	100	₹528,000	9	0	₹0	₹528,000
43	24202	Rainbow Chemical	S	80	59	1.5	0.5	100	₹354,000	14	0	₹0	₹354,000
44	29518	Dalmia Polypro Industries Pvt. Ltd.	S	80	85	1.5	0.5	100	₹510,000	44.9	0	₹0	₹510,000
45	24764	CETP of VGEL, Vapi	L	80	365	1.5	1.5	500	₹32,850,000	55000	0.2	₹80,300,000	₹113,150,000
									₹76,615,500				₹157,549,827

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 593/2017
(W.P.)(Civil) No. 375/2012)

Paryavaran Suraksha Samiti & Anr.

Applicant(s)

Versus

Union of India & Ors.

Respondent(s)

Date of hearing: 19.02.2019

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S.P. WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

For Applicant(s):

For Respondent (s): Mr. Shlok Chandra, Advocate for CPCB

ORDER

1. The issue for consideration is establishment and functioning of ETPs/CETPs/STPs. The Hon'ble Supreme Court vide order dated 22.02.2017 in *Paryavaran Suraksha Samiti Vs. Union of India*¹ directed that the said matter be monitored by this Tribunal.
2. Accordingly, on 25.05.2017, notice was issued to the Central Pollution Control Board (CPCB), all the State Pollution Control Boards (SPCBs)/ Pollution Control Committees(PCCs) and the Ministry of Environment, Forest and Climate Change (MoEF&CC). They filed their status reports

¹ (2017) 5 SCC 326

and found serious deficiencies. Actions were initiated to remedy the situation. After considering the status report, the Tribunal, vide orders dated 04.07.2017, 18.09.2017 and 11.10.2017, sought information about the steps taken by the SPCBs/PCCs.

3. Vide order dated 03.08.2018, the matter was reviewed and it was noted that having regard to the fact that in absence of functional ETPs/CETPs/STPs, untreated effluents are discharged in water bodies leading to contamination of water. Such contamination is cause of various diseases and also adverse consequence on aquatic organism due to decreased level of oxygen.
4. The Tribunal directed the CPCB to prepare an action plan. Direction was also given for monitoring by a Committee of two officers – one each representing MoEF&CC and CPCB at least once in every month. CPCB was required to place the progress report every three months on the website and take penal action for failure by way of recovery of compensation for damage to the environment, apart from other steps.
5. CPCB has filed its reports dated 04.09.2018, 28.11.2018 and 12.12.2018. In the report dated 04.09.2018, an action plan has been proposed which includes monitoring by the SPCBs/PCCs and a mechanism for penal action. In the report dated 28.11.2018, the compliance status of different States has been summed up as follows:

“5.0 Compliance Status of ETPs/CETPs/STPs reported by SPCBs/PCCs

As on 26.11.2018, the compliance status reports for ETPs/CETPs/STPs were received from 25 SPCBs/PCCs namely- Andhra Pradesh, Chandigarh, Meghalaya, Puducherry, Tamil Nadu, Jammu and Kashmir, Tripura,

Telangana, Punjab, Bihar, Nagaland, Sikkim, Chhattisgarh, Daman & Diu, Dadra Nagar Haveli, Goa, Arunachal Pradesh, West Bengal Madhya Pradesh, Kerala, Odisha, Himachal Pradesh, Mizoram, Karnataka and Maharashtra. However, no such compliance status reports were received from 11 SPCBs/PCCs, namely, Andaman and Nicobar Islands, Assam, Delhi, Gujarat, Haryana, Jharkhand, Lakshadweep, Manipur, Rajasthan, Uttar Pradesh and Uttarakhand. The information received from the 25 SPCBs/PCCs were analysed and the shortcomings observed were communicated to concerned SPCBs/PCCs for rectification. Subsequently, updated/corrected information, after rectifying the shortcomings, were received from 8 SPCBs/PCCs, namely- Tamil Nadu, Jammu and Kashmir, Meghalaya, Tripura, Puducherry, Maharashtra, Goa and Daman Diu.

The State-wise summary of the compliance status, including the updated status based on the information received from SPCBs/PCCs is given at Annexure-IX.

- i. As per the data received from 25 SPCBs/PCCs, out of total 44838 number of industries requiring ETPs, 44100 industries are operating with functional ETPs and 439 industries are operating without ETPs. Show-cause notices and closure directions have been issued to 164 and 284 industries respectively for operating without ETPs. Legal cases have been filed against 5 industries and action is under process for 259 industries. Out of 44100 operational industries, 42035 industries are complying with environmental standards and 701 industries are non-complying. Show-cause notices and closure directions have been issued to 388 and 138 industries respectively for non-compliance. Legal cases have been filed against 4 industries and action is under process for 179 industries.
- ii. As per the data received from 25 SPCBs/PCCs, there are total 97 CETPs, out of which 84 CETPs are complying with environmental standards and 11 CETPs are non-complying. Show-cause notices and closure directions have been issued to 7 and 4 CETPs respectively for noncompliance. Legal cases have been filed against 6 CETPs and action is under process for 2 CETPs.
- iii. As per the data received from 25 SPCBs/PCCs, there are total 3956 STPs, out of which, 3713

STPs are complying with environmental standards and 243 STPs are non-complying. Show cause notices and closure directions have been issued to 101 and 11 STPs respectively for noncompliance. Legal cases have been filed against 9 STPs and action is under process for 75 STPs.

iv. As per the data received from 25 SPCBs/PCCs, there are 20 CETPs in construction stage and 12 CETPs is in proposal stage. Whereas, for STPs, 139 projects are under construction stage and 177 projects are under proposal stage.

v. As per the data received from 25 SPCBs/PCCs, 5 SPCBs/PCCs namely- Andhra Pradesh, Goa, Himachal Pradesh, Meghalaya and Telangana are displaying OCEMS data in public domain. The links provided by Bihar, Kerala and Maharashtra are password protected and not available in public domain. Jammu and Kashmir, Madhya Pradesh, Punjab and Tamil Nadu have not provided appropriate web links. Daman and Diu, Dadra and Nagar Haveli and Karnataka have clarified that they are in the process of providing the web-links in this regard.”

6. The report dated 12.12.2018 annexes an amended Annexure 7 which relates to methodology for assessing environmental compensation and action plan to utilize the fund.

“3.1 In the instances as mentioned at a, b and c above, Pollution Index may be used as a basis to levy the Environmental Compensation. CPCB has published guidelines for categorization of industries into Red, Orange, Green and White based on concept of Pollution Index (PI). The Pollution Index is arrived after considering quantity & quality of emissions/ effluents generated, types of hazardous wastes generated and consumption of resources. Pollution Index of an industrial sector is a numerical number in the range of 0 to 100 and can be represented as follows:

PI = f (Water Pollution Score, Air Pollution Score & HW Generation Score)

Pollution Index is a number from 0 to 100 and increasing value of PI denotes the increasing degree of pollution hazard from the industrial sector.

CPCB has issued directions to all SPCBs/PCCs on 07.03.2016 to adopt the methodology and follow guidelines prepared by CPCB for categorization of industrial sectors into Red, Orange, Green and White.

The concept of Pollution Index, which was deliberated widely with all stakeholders and agreed, shall be used for calculating Environmental Compensation. This may help in implementation of such provision throughout the country, a successful initiative in vital field of industrial pollution control.

After considering various factors including the policy implementation issues, Committee has come up with following formula for levying the Environmental Compensation in instances as mentioned at a, b and c including non-compliance of the environmental standards / violation of directions.

The Environmental Compensation shall be based on the following formula:

$$EC = P \times N \times R \times S \times LF$$

Where, EC is Environmental Compensation in ₹

PI = Pollution Index of industrial sector

N = Number of days of violation took place

R = A factor in Rupees (₹) for EC

S = Factor for scale of operation

LF = Location factor

The formula incorporates the anticipated severity of environmental pollution in terms of Pollution Index, duration of violation in terms of number of days, scale of operation in terms of micro & small/medium/large industry and location in terms of proximity to the large habitations.

Note:-

- a. The industrial sectors have been categorized into Red, Orange and Green, based on their Pollution Index in the range of 60 to 100, 41 to 59 and 21 to 40, respectively. It was suggested that the average pollution index of 80, 50 and 30 may be taken for calculating the Environmental Compensation for Red, Orange and Green categories of industries, respectively.
- b. N, number of days for which violation took place is the period between the day of violation observed/due date of direction's compliance and the day of compliance verified by PCB/SPCB/PCC.
- c. R is a factor in Rupees, which may be a minimum of 100 and maximum of 500. It is suggested to consider R as 250, as the Environmental Compensation in cases of violation.

- d. S could be based on small/medium/large industry categorization, which may be 0.5 for micro or small, 1.0 for medium and 1.5 for large units.
- e. LF, could be based on population of the city/town and location of the industrial unit. For the industrial unit located within municipal boundary or up to 10 km distance from the municipal boundary of the city/town, following factors (LF) may be used:

Sl. No.	Population* (million)	Location Factor# (LF)
1.	Less than 1	1.0
2.	1 to <5	1.25
3.	5 to <10	1.5
4.	10 and above	2.0

•Population of the city/town as per the latest Census of India
 #LF will be 1.0 in case unit is located >10km from municipal boundary

For critically polluted areas / Ecologically Sensitive areas, the scope of LF may be examined further.

- f. In any case, minimum Environmental Compensation shall be R 5000/day.

3.2 In other instances i.e. d, e and f, the environmental compensation may contain two parts — one requires providing immediate relief and other long-term measures such as remediation. In all these cases, detailed investigations are required from expert institutions/organizations based on which environmental compensation will be decided. CPCB shall list the expert institutions for this purpose.

In such cases, comprehensive plan for remediation of environmental pollution may be prepared and executed under the supervision of a committee with representatives of SPCB, CPCB and expert institutions/organizations.

3.3 As Committee also discussed that the EC shall also be levied on all violations of Graded Response Action Plan (GRAP) in Delhi NCR. The implementing agencies for each activity have been identified and the EC will be levied on these agencies. These violations attract graded amounts of EC depending on the state of ambient air quality, which are given in Annexure-III.”

7. The recommendations in this regard are as follows:-

“5.1 To begin with, Environmental Compensation may be levied by CPCB only when CPCB has issued the directions under the Environment (Protection) Act, 1986. In case of a, b and c, Environmental Compensation may be calculated based on the formula "EC = PI x N x R x 5 x LF", wherein, PI may be taken as 80, 50 and 30 for red, orange and green category of

industries, respectively, and R may be taken as 250. S and LF may be taken as prescribed in the preceding paragraphs.

5.2 In case of d, e and f, the Environmental Compensation may be levied based on the detailed investigations by Expert Institutions/Organizations.

5.3 In case of violations of GRAP, as enforced in Delhi-NCR, Environmental Compensation commended in Annexure-III may be levied to defaulting agencies.

8. Annexure 3 is as Follows:-

“Annexure-III

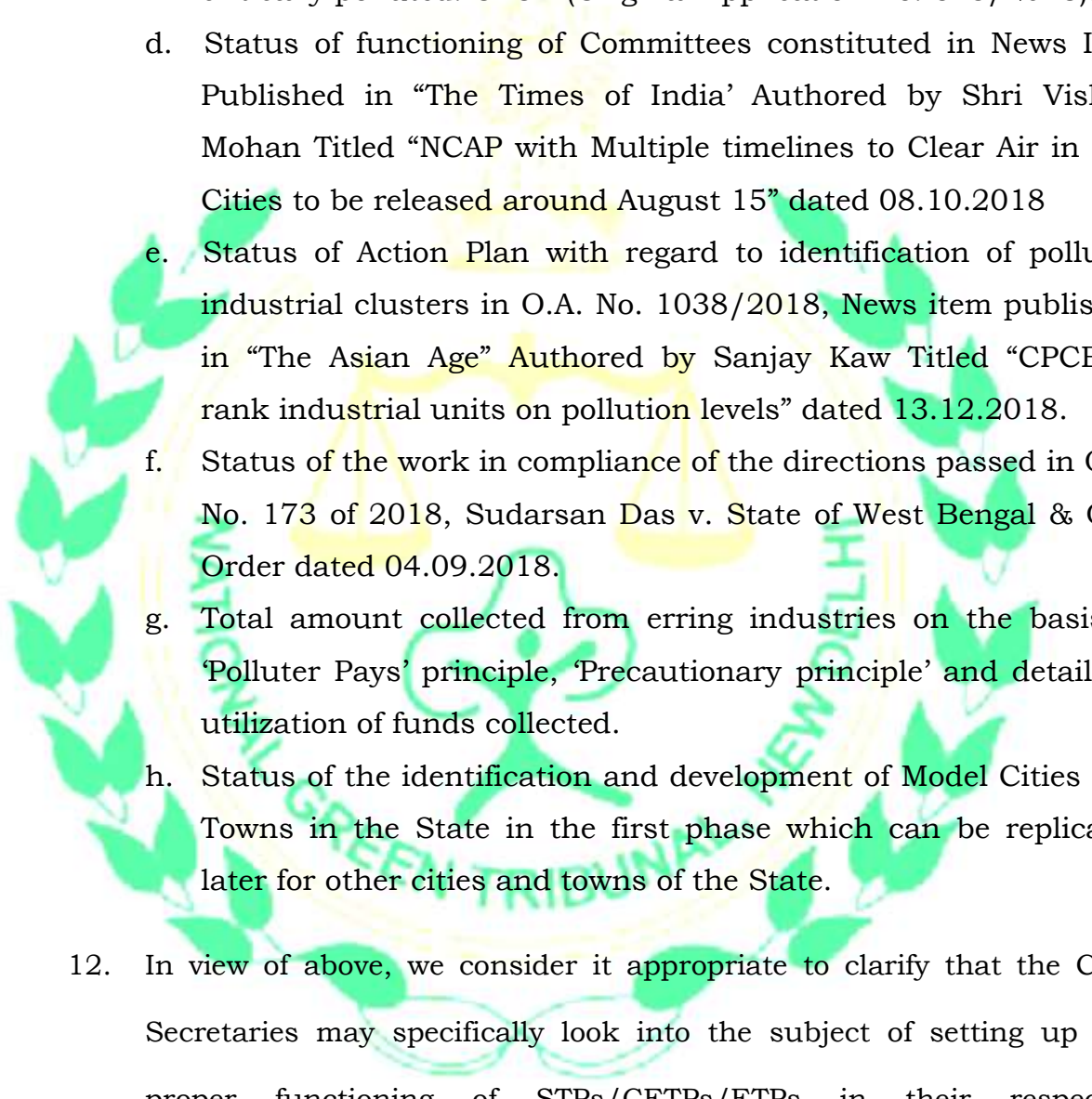
Environmental Compensation to be levied on all violations of Graded Response Action Plan (GRAP) in Delhi NCR

ACTIVITY	STATE OF AIR QUALITY	ENVIRONMENTAL COMPENSATION
Industrial Emissions	Severe+/Emergency	Rs. 1.0 Crore
	Severe	Rs. 50 Lakh
	Very Poor	Rs. 25 Lakh
	Moderate to Poor	Rs. 10 Lakh
<i>Vapour Recovery Systems (VRS) at Outlets of Oil Companies</i>		
a) Not installed	Target Date	Rs. 1.0 Crore
b) Non-Functional	Very poor to Severe +	Rs. 50.0 Lakh
	Moderate to poor	Rs. 25.0 Lakh
Construction sites (Offending plot more than 20,000 Sq.m.)	Severe +/Emergency	Rs. 1.0 Crore
	Severe	Rs. 50 Lakh
	Very Poor	Rs. 25 Lakh
	Moderate to Poor	Rs. 10 Lakh
Solid waste/garbage dumping in Industrial Estates	Very poor to severe +	Rs. 25.0 Lakh
	Moderate to Poor	Rs. 10.0 Lakh
<i>Failure to water sprinkling on unpaved roads</i>		
a) Hot-spots	Very poor to Severe +	Rs. 25.0 Lakh
b) Other than Hot-spots	Very poor to Severe +	Rs. 10.0 Lakh

9. We are informed that a separate report is being prepared for municipal solid waste and sewage. The CPCB may also include the subject of loss

to ecological services due to illegal mining, due to deforestation or any other damage to the environment, even though the same may not be directly on account of discharge of effluents or sewage. The CPCB may also take inputs from other expert bodies such as Institute of Economic Growth, Centre for Science and Environment (CSE), The Energy and Resources Institute (TERI) and Indian Institute of Forest Management, Bhopal.

10. We may also note that directly linked to the subject of contamination of water by discharge of untreated effluents and sewage is the issue of remedial action to be taken for 351 critically polluted river stretches identified by the CPCB which is subject matter of consideration before this Tribunal in *Original Application No. 673/2018, News item published in "The Hindu" authored by Shri Jacob Koshy titled "More river stretches are now critically polluted: CPCB.*
11. Vide orders dated 20.09.2018 and 19.12.2018, the Tribunal directed the concerned States to prepare action plans to bring the water quality as per prescribed standards. This direction implies taking of steps to set up STPs/ETPs/CEPTs and to monitor their proper functioning. Thereafter, on 16.01.2019, in *Original Application No. 606 of 2018 Compliance of Municipal Solid Waste Management Rules, 2016*, the Tribunal directed presence of Chief Secretaries of all the States on different dates with a view to review the progress in different States on vital issues affecting environment. Such vital issues specifically include:

- 
- a. Status of compliance of SWM Rule, 2016, Plastic Waste Management Rules, 2016 and Bio-Medical Waste Management Rules, 2016 in their respective areas.
 - c. Status of the Action Plan in compliance vide order dated 20.09.2018 in the News Item published in “The Hindu” authored by Shri Jacob Koshy Titled “More river stretches are now critically polluted: CPCB (Original Application No. 673/2018).
 - d. Status of functioning of Committees constituted in News Item Published in “The Times of India’ Authored by Shri Vishwa Mohan Titled “NCAP with Multiple timelines to Clear Air in 102 Cities to be released around August 15” dated 08.10.2018
 - e. Status of Action Plan with regard to identification of polluted industrial clusters in O.A. No. 1038/2018, News item published in “The Asian Age” Authored by Sanjay Kaw Titled “CPCB to rank industrial units on pollution levels” dated 13.12.2018.
 - f. Status of the work in compliance of the directions passed in O.A. No. 173 of 2018, Sudarsan Das v. State of West Bengal & Ors. Order dated 04.09.2018.
 - g. Total amount collected from erring industries on the basis of ‘Polluter Pays’ principle, ‘Precautionary principle’ and details of utilization of funds collected.
 - h. Status of the identification and development of Model Cities and Towns in the State in the first phase which can be replicated later for other cities and towns of the State.
12. In view of above, we consider it appropriate to clarify that the Chief Secretaries may specifically look into the subject of setting up and proper functioning of STPs/CETPs/ETPs in their respective jurisdiction. The directions of CPCB in the present case may have a bearing on the said proceedings. Accordingly, we direct the CPCB to forward a copy of its report to all the Chief Secretaries so that the same

can be looked into before the Chief Secretaries appear before this Tribunal with the progress report in the matter.

13. The CPCB may also compile its monitoring report with reference to 97 CETPs installed in different States after undertaking study about status of their efficient functioning and remedial steps required in the matter. This matter is directly linked to the remedial steps for 100 critically polluted industrial clusters being dealt with by this Tribunal in *Original Application No. 1038 of 2018*, News item published in "The Asian Age" Authored by Sanjay Kaw Titled "Central Pollution Control Board to rank industrial units on pollution levels" wherein certain directions have already been issued to the CPCB for coordination of the steps to be taken. The issue is also being considered in *Original Application No. 95/2018, Aryavrat Foundation Vs. M/s Vapi Green Enviro Ltd. & Ors.* and has been dealt with vide order dated 11.01.2019. The same is now listed on 19.03.2019. The CPCB may furnish its report in the matter in the said case. A copy of this order be placed in the files of *Original Application No. 606/2018*, *Original Application No. 673/2018* and *Original Application No. 1038/2018*.

14. We note the statement made by the learned Counsel for the CPCB that the following States have not furnished the relevant data to the CPCB:

- a) Assam
- b) Delhi
- c) Haryana
- d) Jharkhand
- e) Lakshadweep
- f) Manipur

g) Uttar Pradesh

h) Uttarakhand

15. This aspect may be looked into by the Chief Secretaries and progress on the subject may be furnished by the concerned Chief Secretaries at the time of their appearance before this Tribunal.

16. Further report received from the CPCB may also be placed for consideration on or before 31.05.2019.

17. The CPCB may send a copy of this order to the Chief Secretaries of all the States by e-mail for compliance.

List for further consideration on 19.08.2019 alongwith Original Application No. 95/2019.



Adarsh Kumar Goel, CP

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

February 19, 2019
Original Application No. 593/2017
(W.P.)(Civil) No. 375/2012)
P & DV