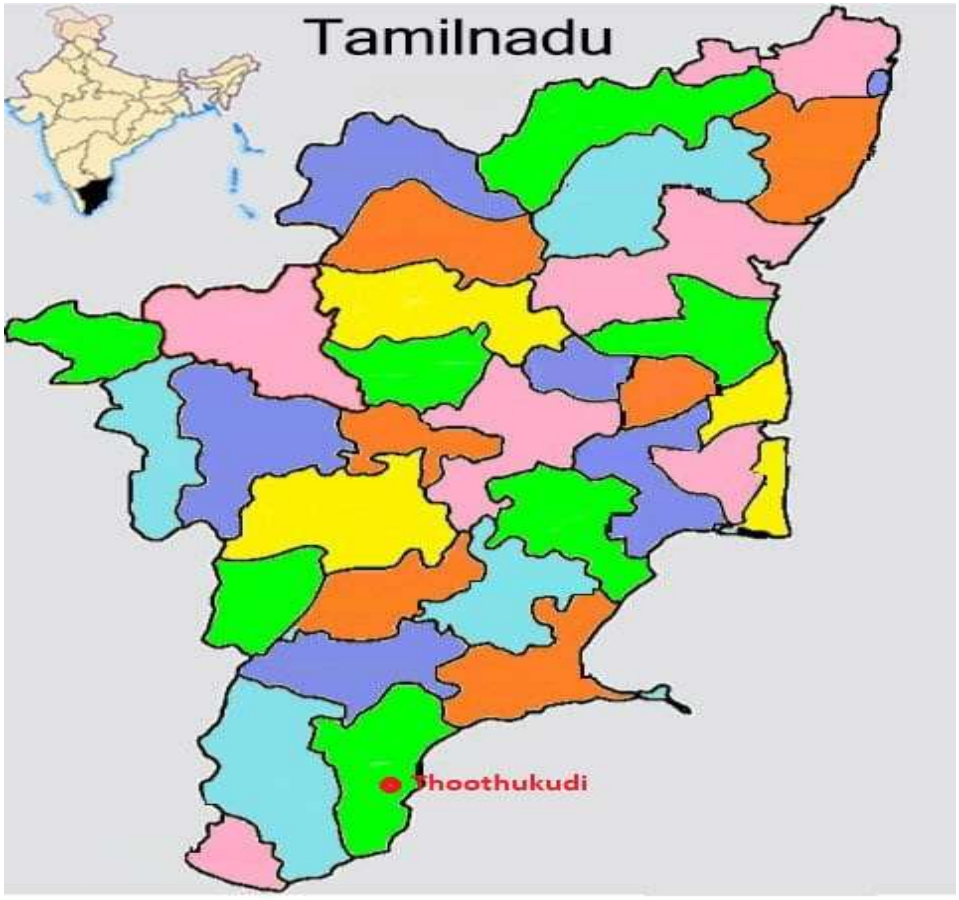
EVALUATION OF CEPI SCORE & ACTION PLAN FOR

CEPI AREA OF THOOTHUKUDI.



SUBMITTED

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TAMILNADU POLLUTION CONTROL BOARD

THOOTHUKUDI.

CONTENT

INTRODUCTION

1.0 INTRODUCTION:

Thoothukudi is a Port City and a Municipal Corporation and an Industrial City in Thoothukudi District in the Indian State of Tamil Nadu. The City lies in the Coromandel Coast of Bay of Bengal, Thoothukudi is the headquarters of Thoothukudi District. It is located about 590 Kilometers (367 miles) south of Chennai and 190 Kilometers (118 miles) northeast of Thiruvananthapuram (Trivandrum).

Thoothukudi City serves as the headquarters of Tamilnadu Mercantile Bank Limited, Major educational establishments in the city includes Thoothukudi Medical College, Fisheries College and Research Institute. Marine Training Academy, V.O.C. Arts & Science College, Government Polytechnic College and Anna University, Tuticorin Campus.

Thoothukudi is known as "Pearl City" due to the pearl fishing carried out in the town.Thoothukudi is one of the Fastest growing Major Ports in India. V.O. Chidambaranar Port, formerly Tuticorin Port is one of the 12 major ports in India. It was declared to be a major port on 11 July 1974.V.O. Chidambaram Port is an artificial port. This is the third international port in Tamil Nadu. It is the second-largest Port in Tamil Nadu and fourth – largest container terminal in India. It has services to USA, China, Europe, Sri Lanka and Mediterranean Countries.

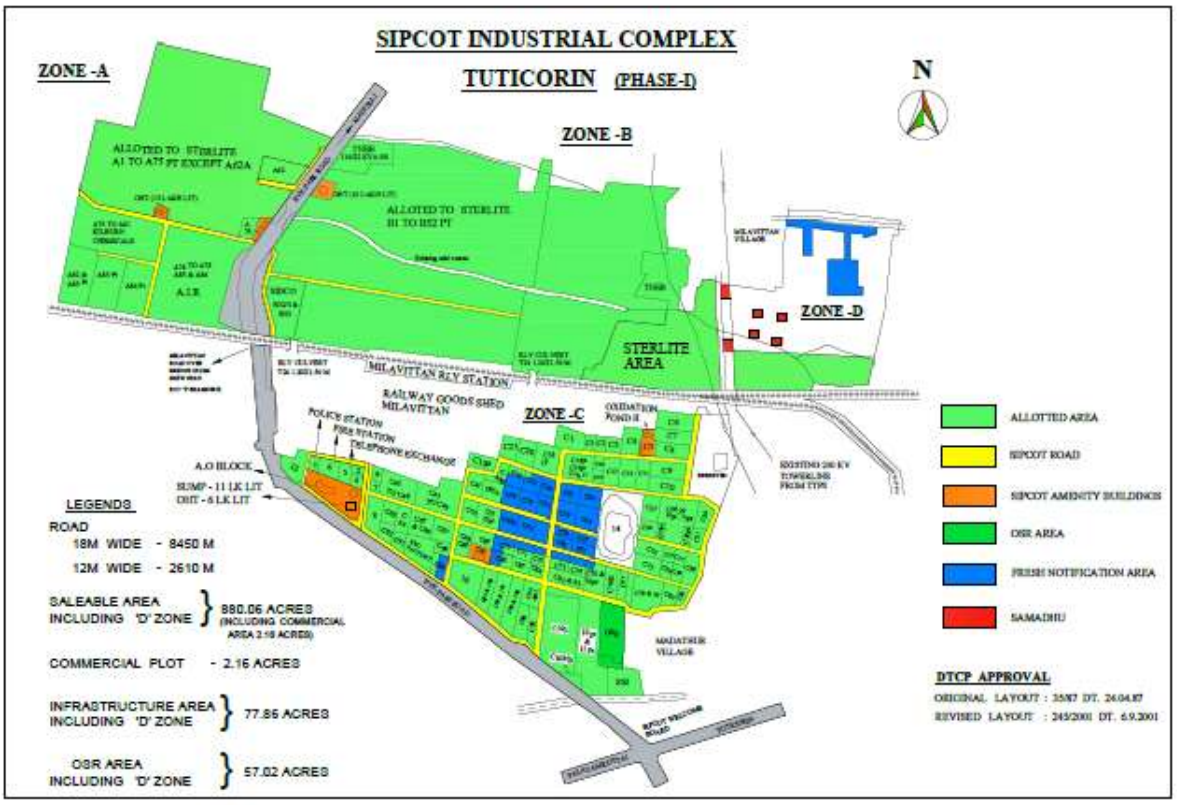
Thoothukudi is also an “Emerging Energy and Industrial Hub of South India” as a large number of Power Plants are located in the coastal city of Thoothukudi. The majority of the people of the city are employed in Salt Pans, Sea-Borne Trading, Fishing and Tourism.

A major attraction in the city is Our Lady of Snows Basilica, a 16th – century site. The 21 islands between Thoothukudi and Rameswaram shores in the Gulf of Mannar are noted as the First Marine Biosphere Reserve of India, and have around 36,000 species of flora and fauna. This protected area is called Gulf of Mannar Marine National Park.

1.1 CEPI Area Boundary details:

The CEPI area, Thoothukudi is the SIPCOT Industrial Complex located at Meelavittan village, Thoothukudi Taluk, Thoothukudi District. The entire SIPCOT industrial area is classified as **Core zone** having a total area of **4.18 Sq.km**. The further 2 km from the boundary of SIPCOT core zone is classified as **Impact zone** area and further 3 km from the Impact zone area is classified as **Buffer zone** area.

The SIPCOT is in existence since 1990. The total extent of SIPCOT area is 1032.68 acres. Thamirabarani River Water from Srivaikundam Dam is the source of water supply for SIPCOT industries. The water supply to SIPCOT industries is supplied by TWAD Board having its Water Treatment Plant at Manjaneerkayal, Srivaikundam Taluk, Thoothukudi District. There are two water supply schemes in practice wherein the 3MGD water supply scheme is exclusively for Sterlite Industries presently as Vedanta Limited Copper Smelter Plant and 1.7 MGD water supply scheme is for the other industries/facilities in SIPCOT area. The SIPCOT Industrial Complex is categorised as Zone A, Zone B and Zone C. The SIPCOT layout map is enclosed.



The Coordinates of the CEPI area ie. SIPCOT Industrial Complex is tabulated below:

S. No	Direction	Latitude	Longitude
1.	North	8º49’31.17”N	78 º5’13.17”E
2.	North-East	8 º 49’15.79”N	78 º 5’39.04”E
3.	East	8 º48’48.04”N	78 º 6’13.13”E
4.	South-East	8 º 48’17.77”N	78 º 5’59.71”E
5.	South	8 º47’58.18”N	78 º5’26.55”E
6.	South-West	8 º 48’19.33”N	78 º 5’2.88”E
7.	West	8 º 48’42.46”N	78 º 4’33.74”E

8.	North-West	8 º 49’21.73”N	78 º 4’27.31”E

1.2 Habitation details in CEPI Area:

The following habitations are located in the vicinity of the CEPI area (SIPCOT Industrial Complex).

S. No	Name of the habitation	Population in Nos	Distance from SIPCOT (KM)	Direction with respect to SIPCOT
1	Meelavittan Village	45863	Adjacent	East
2	Pandarampatti		1.1	North- East
3	Madathur		Adjacent	South-East
4	Silverpuram		1.19	East
5	Therku Veerapandiyapuram	1567	0.25	North –West
6	Kumar Rettiyarpuram		1.34	North - West
7	Kayaloorani		1.88	North - West
8	Sankaraperi	19844	2.3	North- East
9	Kormapallam	4912	1.4	South
Total Population		**72186**		

1.3 Eco Geological Features in and around CEPI Area

There is no eco-geological feature in around CEPI area of radius 5 km. A significant major tank is the Kormapallam tank which is located at a distance of 4.3 km from the CEPI area in the south-south west direction. The capacity of the tank is 229.39 million cubic feet with 61.25-million-meter water spread area and extensive water position. The tank gets bountiful water in the North East monsoon season and is normally fed by the North main channel of Srivaikundam anicut. The tank has 10 stone sluices through which water is released for irrigation of crops. In addition to irrigation,

from 1873 onwards, the 'Tuticorin municipality was providing drinking water supply from this tank. In the subsequent period, to provide and enhance storage capacity, the tank was deepened and widened and its bunds were strengthened. The total ayacut the tank irrigates is 2267 acres. The water also passes through its sluices to the lower tanks lying around Kormapallam

1.4 Industries details in CEPI Area:

The SIPCOT Industrial complex, Meelavittan consists of Vedanta Limited Copper Smelter Plant, a major 17 category of industries which is presently closed by TNPCB on 23/05/2018 and still remain closed due to non- compliance of consent conditions.

The industrial estate also consists of Titanium Dioxide Pigment Plant, Captive Thermal Power Plant, Sea food processing units, Activated Carbon unit etc., The CEPI area has 1 Nos of 17 category units, 7 Nos of Red category units and 28 Nos of Orange category of units which is tabulated below.

Red				Orange			
Large	Medium	Small	Total	Large	Medium	Small	Total
5	-	3	**8**	3	4	21	**28**

The details of the units are enclosed in **Annexure-1.**

1.5 Green Belt Development details in CEPI Area:

The industries in SIPCOT industrial area continue to develop green belt in the premises and around 55 hectares of land area has been developed as Green Belt area and I, 50,000 trees have been planted and maintained.

The photograph showing the green belt in SIPCOT and other industrial cluster is enclosed in **annexure-2.**

1.6 CEPI score declared by CPCB in 2018

Name of thePIA	Air	Water	Land	CEPI Score	Status ofEnvironment
Thoothukudi (Tamil Nadu)	29.75	46.00	61.00	66.34	An-Wn-Lc

As per the CEPI score Thoothukudi is classified as Severely Polluted Area (SPA).The calculated CEPI score is 66.34 which is only severely polluted [CEPI score 60-70] but the CEPI score assigned for Land Environment is mentioned as critical instead of severe.

The Calculation sheet for arriving CEPI score by CPCB 2018

Air Quality Analysis Report								
Pollutant	**Group**	**A1**	**A2**	**A (A1 x A2)**				
PM10	B	0.5	Large					
PM2.5	B	0.5						
Aresenic	C	3						
Total		4	4	16				
Pollutants	Avg (1)	Std (2)	EF [(3) = 1/2]	No.of Samples exceeding the standards	Total no.of Samples (S)	SNLF Value [(6) = 4/5x3]	SNLF Score (B)	
PM10	81.7	100	0.82	3	24	0.1	M	3.25
PM2.5	35.44	60	0.59	0	24	0	L	0

Aresenic	7.08	6	1.18	3	24	0.15	M	10.5
B Score = (B1 +B2 +B3)							B	13.75

C	0	<5%
D	0	A-A-A

AIR EPI	(A+B+C+D)	29.75

Water Quality Analysis Report

Pollutant	**Group**	**A1**	**A2**	A (A1 x A2)
TP	B	2	Large	
TKN	A	0.25		
Zn	A	0.25		
Total		2.5	4	10

Pollutants	Avg (1)	Std (2)	EF [(3) = 1/2]	No.of Samples exceding the standards	Total no.of Samples (s)	SNLF Value [(6) = 4/5x3]	SNLF Score (B)	
TP	0.38	0.3	1.28	3	3	1.28	C	30
TKN	1.14	3	0.38	0	3	0.00	L	0
Zn	0.25	0.3	0.84	0	3	0.00	L	1
B Score = (B1 +B2 +B3)							B	31

C	5	<5%		
D	0	A-A-A		

WATER EPI	(A+B+C+D)	46.00	

Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 x A2)
TDS	A	1	Large	
T.Hardness	A	0.25		
TKN	A	0.25		
Total		1.5	4	6

Pollutants	Avg (1)	Std (2)	EF [(3) = 1/2]	No.of Samples exceding the standards	Total no.of Samples (s)	SNLF Value [(6) = 4/5x3]	SNLF Score (B)	
TDS	6388.25	2000	3.19	21	24	2.79	C	10
T. Hardness	2004.08	600	3.49	21	24	3.05	C	30
TKN	2.33	1	2.33	15	24	1.46	C	10
B Score = (B1 +B2 +B3)							B	50

C	5	5-10 %
D	0	A-A-A

GW EPI	(A+B+C+D)	61.00		

Air	29.75

Water	46.00
Ground Water	61.00
CEPI SCORE	66.34

AIR ENVIRONMENT

2.0 AIR ENVIRONMENT

TNPCB regularly monitors the air quality of the City at three locations namely at **TNPCB Office, SIPCOT Industrial Complex,AVM Jewellery Building** located at North Cotton road and at **Raja Agency Building** located at Harbour Express Highway Road leading to Thoothukudi Port Trust under the National Ambient Air Quality Monitoring (NAAQM) Project funded by CPCB under the NAMP program for the parameters $PM_{10,}$ $PM_{2.5}$, SO_2 andNO_2monitoredtwice a week.

Also one number of Continuous Ambient Air Quality Monitoring (CAAQM) Station located at Meelavittan is also functioning and the data generated are being sent to TNPCB.

2.1Primary and Secondary Pollutants considered for AEPI:

The CPCB has considered Arsenic as Primary Pollutant and $PM_{10,}$ $PM_{2.5}$as Secondary Pollutants with respect to Air Environment Pollution Index and the individual score for air environment is 29.75.

2.2Air Quality Sampling Locations:

The Ambient Air Quality Survey was conducted by CPCB at **eight** locations during **February and March of 2018**which is shown below in the map and abulated.

S.No.	AAQ Station Code	Location	Latitude	Longitude
1.	AAQ - 1	Coastal EnergenPvt Ltd, Tuticorin	8°54’45.17’’ N	78°08’47.35’’E
2.	AAQ – 2	IND Bharath Power Gencom LTD, Tuticorin	8°52’00.00’’N	78°06’38.00’’E
3.	AAQ – 3	Gee Gee Kay PVT LTD, Tuticorin	8°51’11.00’’N	78°03’27.00’’E

4.	AAQ – 4	Jolly Metals, Tuticorin	8º49’30.22’’N	78º03’55.64’’E
5.	AAQ – 5	TAC Quarters D Block, Tuticorin	8º49’30.22’’N	78º03’55.64’’E
6.	AAQ -6	VOC B.ED College, Admin Block, Tuticorin	8º47’43.00’’N	78º07’56.00’’E
7.	AAQ – 7	VOC Port School,Tuticorin	8º45’04.00’’N	78º10’24.00’’E
8.	AAQ - 8	NTPL Type IV Quarters D Block, Tuticorin	8º44’28.00’’N	78º09’28.00’’E

2.3Status of AAQ in 2018 in CEPI Area:

The parameter PM_{10}, PM $_{2.5,}$ Arsenic (As) was monitored at 8 locations during the month of February and March 2018. It was noticed that parameter PM_{10}, & Arsenic (As) exceeds the limits at one location.

The sample result of the Ambient Air Quality survey conducted by CPCB on February 2018.

Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	Arsenic (As) (ng/m^3)
Standards	100	60	6

From the analysis report as conducted by CPCB during February/March'2018,it was noticed that parameter PM10 and Arsenic was found exceeded the limit at one location out of 8 locations namely VOC Port School, Thoothukudi. This location is in the other industrial cluster, Tuticorin. The average value for arsenic was detected as 42 ng/m3 for three samples collected. It was also noticed that the arsenic value as reported in the other seven locations were found well within the Ambient Air Quality Standards.

2.4Industries Stack Emission Details

All the industries in the CEPI area SIPCOT Industrial Complex, Meelavittan conducts Ambient Air Quality Monitoring regularly. The details of the emission source and APC measures with respect to Red category industries operated in the CEPI areais as below.

S.No	Company Name M/s.	Emission Sources	APC Measures Provided	Stack Height in m
1.	V.V. Titanium Pigments Private Ltd CPP	Boiler-40 TPH	ESP with Stack	45
		Coal Crusher	Bag Filters with stack	10
2.	V V Titanium Pigments Private Ltd	Calciner	ESP With Stack	30.7
		Boiler -12 TPH	Stack With Cyclone Separator	30
		Digestor 1	Stack	25.9

		Digestor 2	Stack	25.9
		Digestor 3	Stack	25.9
		Digestor 4	Stack	25.9
		Digestor 5	Stack	25.9
		Boiler 3 TPH & 8 TPH	Stack	30
		Ball Mill For Ilmenite Grinding	Bag Filter And Cyclone Separator With Stack	28.5
		Pigment Mill	Bag Filter And Cyclone Separator With Stack	20.5
		Vapour Separator	Stack	22
3.	N.C John	Thermic Fluid Heater	Stack	30
4.	Coco Tufter	Thermic Fluid Heater	Stack	30.5
		Boiler (4 T/H)	Stack	30.5
5.	Adsorbent carbon	Kiln – I	Stack	22
		Kiln – II	Stack	22
		Kiln – III	Stack	22
		Kiln – IV	Stack	22
		Kiln – V	Stack	25
		Boiler – 1.5 TPH	Stack	18

Status of the On-line Continuous Monitoring sensors provided for monitoring:

SIPCOT Industrial Complex, Meelavittan Village, Thoothukudi.

The following industries have provided online monitoring systems

OCEMS					
S. No	Name and address the unit	Online monitoring Sensors			
		Stack sensors		AAQ	
		Source	online monitoring parameters	No of station	online monitoring parameters
1.	V.V. Titanium Pigments Private Ltd	Calciner	SPM, SO_2, NO_2,	03	PM_{10}, $PM_{2.5}$, SO_2, NO_2,
2	V. V .Titanium Pigments Private Ltd CPP	Boiler stack	Not provided		

2.5Quantification of Stack Emission Load

The emission load let out from the following units in CEPI area is tabulated as below

Particulate matter (PM)

Name of Unit	Date and Year	Stack attached to	Concentration (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total (kg/day)
M/s. V.V. Titanium Pigments Private Ltd	2018-2019	Boiler	48	579493	27.82	35.34
		Calciner Unit	36	208932	7.52	
	2018-2019	Boiler	41	567920	23.28	26.83
		Calciner Unit	19	186716	3.55	
	2017-2018	Boiler	44	558937	24.59	29.87
		Calciner	28	188463	5.28	

		Unit				
	2017-2018	Boiler	30	965080	28.95	105.98
		Calciner Unit	44	1750734	77.03	
	2016-2017	Boiler	60	653303	39.20	44.39
		Calciner Unit	27	192346	5.19	
	2016-2017	Boiler	90	783906	70.55	88.14
		Calciner Unit	76	231384	17.59	
	2015-2016	Boiler	82	649828	53.29	68.05
		Calciner Unit	70	210896	14.76	

Sulphur Dioxide (SO_2)

Name of Unit	Date and Year	Stack attached to	Concentrate (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total (kg/day)
M/s. V.V. Titanium Pigments Private Limited	2018-2019	Boiler	133	579493	77.07	114.47
		Calciner Unit	179	208932	37.40	
	2018-2019	Boiler	157	567920	89.16	138.27
		Calciner Unit	263	186716	49.11	
	2017-2018	Boiler	120	558937	67.07	110.98
		Calciner Unit	233	188463	43.91	
	2017-2018	Boiler	252	965080	243.20	887.47
		Calciner Unit	368	1750734	644.27	
	2016-2017	Boiler	262	653303	171.17	207.9
		Calciner Unit	191	192346	36.74	
	2016-2017	Boiler	245	783906	192.06	303.12
		Calciner Unit	480	231384	111.06	

	2015-2016	Boiler	480	649828	311.92	397.33
		Calciner Unit	405	210896	85.41	

Nitrogen dioxide (NO_2)

Name of Unit	Date and Year	Stack attached to	Concentrate (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total load (kg/day)
M/s. V.V. Titanium Pigments Private Limited	2018-2019	Boiler	1.75	579493	1.01	1.33
		Calciner Unit	1.53	208932	0.32	
	2018-2019	Boiler	0.8	567920	0.45	0.46
		Calciner Unit	0.01	186716	0.00	
	2017-2018	Boiler	2	558937	1.12	1.16
		Calciner Unit	0.2	188463	0.04	
	2017-2018	Boiler	1.1	965080	1.06	1.41
		Calciner Unit	0.2	1750734	0.35	
	2016-2017	Boiler	2.3	653303	1.50	1.68
		Calciner Unit	0.9	192346	0.17	
	2016-2017	Boiler	1.76	783906	1.38	1.94
		Calciner Unit	2.43	231384	0.56	
	2015-2016	Boiler	2.43	649828	1.58	1.9
		Calciner Unit	1.5	210896	0.32	

Particulate matter (PM)

Name of Unit	Year	Stack attached to	Concentrate (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total (kg/day)

M/s. Vedanta Ltd	2017-2018	Rock Phosphate dust stack	24	670783	16.10	16.10
	2017-2018	Rock Phosphate dust stack	22	632716	13.92	44.25
		CPP I	11	1306216	14.37	
		CPP II	15	1064217	15.96	
	2016-2017	Rock Phosphate dust stack	72	644690	46.42	46.42
	2015-2016	Rock Phosphate silo	26	640610	16.66	16.66

Sulphur Dioxide (SO_2)

Name of Unit	Year	Stack attached to	Concentrate (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total (kg/day)
M/s. Vedanta Ltd	2017-2018	SAP1	7.8	3577161	27.90	2228.63
		SAP II	87.4	3628835	317.16	
		Scrubber I	118	6878070	811.61	
		Scrubber II	131	3655448	478.86	
		ISA/RH	113	5248590	593.09	
		Rock Phosphate dust stack	0	670783	0.00	
		Phosphoric acid	0	1784007	0.00	
	2017-2018	SAP I	37	3779488	139.84	3474.38
		SAPII	59	3759259	221.80	
		SGSI	53	5574753	295.46	
		SGS-II	59	37799362	2230.16	
		Rock Phosphate	0	632716	0.00	

		dust stack				
		Phosphoric acid	0	1813414	0.00	
		CPP I	85	1306216	111.03	
		CPP II	106	1064217	112.81	
		ISA	69	5264941	363.28	
	2016-2017	Scrubber I	106.6	5776031	615.72	
		SGS-II	64	3947487	252.64	
		Rock Phosphate dust stack	0	644690	0.00	
		Phosphoric acid	0	0	0.00	1754.05
		Sulphuric Acid Plant I	32	3851513	123.25	
		Sulphuric acid Plant II	53.3	4126175	219.93	
		ISA	96	5651147	542.51	
	2015-2016	Rock Phosphate silo		640610	0.00	
		SAPI	53	3526530	186.91	
		SAPII	64	3831690	245.23	1484.53
		ISA	53	5337460	282.89	
		SGSII	85	4138255	351.75	
		SGSII	75	5570151	417.76	

Nitrogen dioxide (NO_2)

Name of Unit	Year	Stack attached to	Concentrate (mg/m3)	Discharge Rate Nm3/ day	Pollution Load of (kg/d)	Total (kg/day)
M/s.	2017-	CPP I	0.4	1306216	0.52	

Vedanta Ltd	2018	CPP II	0.3	1064217	0.32	0.84

2.6Consolidated Stack Emission Load in CEPI Area

Particulate matter (PM)

2018-19

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	35.34
2	M/s.Adsorbent Carbon P Ltd	9.96
	Total	**45.3**

2017-2018

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	105.98
2	M/s.Adsorbent Carbon P Ltd	11.53
3	M/s. Vedanta Ltd	44.25
	Total	**161.76**

2016-2017

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	88.14
2	M/s. Vedanta Ltd	46.42
	Total	**134.56**

2015-2016

S.No	Name of Unit	Pollution Load of (kg/d)

1	M/s. V.V. Titanium Pigments Private Limited	68.05
2	M/s. Vedanta Ltd	16.66
	Total	**84.71**

Sulphur Dioxide (SO_2)

2018-2019

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	138.24
2	M/s.Adsorbent Carbon P Ltd	63.88
	Total	**202.12**

2017-2018

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	887.47
2	M/s.Adsorbent Carbon P Ltd	17.71
3	M/s. Vedanta Ltd	3474.38
	Total	**4379.56**

2016-2017

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	303.12
2	M/s. Vedanta Ltd	1754.05
	Total	**2057.17**

2015-2016

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	397.33
2	M/s. Vedanta Ltd	1484.53
	Total	**1881.86**

Nitrogen dioxide (NO_2)

2018-2019

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	1.33
2	M/s.Adsorbent Carbon P Ltd	0.24
	Total	**1.57**

2017-2018

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	1.41
2	M/s.Adsorbent Carbon P Ltd	1.22
3	M/s. Vedanta	0.84
	Total	**3.47**

2016-2017

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium Pigments Private Limited	1.94
	Total	**1.94**

2015-2016

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium	1.9
	Total	**1.9**

2014-2015

S.No	Name of Unit	Pollution Load of (kg/d)
1	M/s. V.V. Titanium	2.03
	Total	2.03

2.7Status of AAQ during November /December, 2019

The parameter PM_{10}, $PM_{2.5}$, Arsenic (As) was monitored at 8 locations during the month of November'2019. It was noticed that PM10 was found exceeded at one location. Rest of the parameter as monitored was found within limits.

S.No.	AAQ Station Code	Location	PM10 ($\mu g/m^3$)	PM2.5 ($\mu g/m^3$)	Arsenic (ng/m^3)
1.	AAQ - 1	Coastal EnergenPvt Ltd, Tuticorin	84.4	17.7	BDL
2.	AAQ – 2	IND Bharath Power Gencom LTD, Tuticorin	63.5	22.5	BDL
3.	AAQ – 3	Gee Gee Kay PVT LTD, Tuticorin	105.67	23.1	BDL
4.	AAQ – 4	Jolly Metals, Tuticorin	44.6	21.9	BDL
5.	AAQ – 5	TAC Quarters D Block, Tuticorin	37.3	9.2	2.2
6.	AAQ -6	VOC B.ED College, Admin Block, Tuticorin	40.1	13.8	BDL
7.	AAQ – 7	VOC Port School,Tuticorin	62.07	10.06	2.4
8.	AAQ - 8	NTPL Type IV Quarters D Block, Tuticorin	33.8	6.7	BDL

2.8Conclusion.

From the analysis report as conducted by CPCB during February/March'2018,it was noticed that parameter PM10 and Arsenic was found exceeded the limit at one location out of 8 locations namely VOC Port School, Thoothukudi. This location is in the other industrial cluster, Tuticorin. The average value for arsenic was detected as 42 ng/m3 for three samples collected. It was also noticed that the arsenic value as reported in the other seven locations were found well within the Ambient Air Quality Standards. The main source of Arsenic is due to burning of coal by the Thermal power station operated in the area.

The Height of the Stacks of the Thermal power plants existing in that area varies from 120 m to 200 mand themaximum ground level concentration will fall very far away from the VOC Port School, Tuticorin since the VOC port school is just 200m away from

the power plant and dispersion of particulate matter may be more than 2km away from the source of emission and hence high values of arsenic detected should be verified. As per the Gausian plume dispersion modelling with stack height, wind speed, wind direction, plume rise, mixing depth the maximum ground level concentration of particulate matter will be very less proportionally the Arsenic concentration will also to be negligible.

However, the arsenic at ambient air was monitored during November/December 2019 and noticed that the value of Arsenic was found within the standards as prescribed in all stations including the VOC Port School where higher value was detected earlier.

Also from the consolidated stack emission load in CEPI Area calculated for the period of 2017–18 & 2018-19, it could be noticed that the emission load for particulate matter was in the order of 105.98 kg/day and 35.34 kg/day respectively with respect to the stack emissions let out from M/s. V.V Titanium Pigments Pvt Ltd. The decrease in pollution load is due to the installation and efficient operation of ESP provided as Air Pollution Control Measures, which in turn will reduce the concentration of suspended particulate matter in Ambient Air.

WATER ENVIRONMENT

3.0 WATER ENVIRONMENT

A significant major tank is the Kormapallam tank which is located at a distance of 4.3 km from the CEPI area in the south-south west direction and no other surface water bodies is located near to the CEPI area. The capacity of the tank is 229.39 million cubic feet with 61.25-million-meter water spread area and extensive water position. The tank gets bountiful water in the North East monsoon season and is normally fed by the North main channel of Srivaikundam anicut. The tank has 10 stone sluices through which water is released for irrigation of crops. In addition to irrigation, from 1873 onwards, the 'Tuticorin municipality was providing drinking water supply from this tank. In the subsequent period, to provide and enhance storage capacity, the tank was deepened and widened and its bunds were strengthened. The total ayacut the tank irrigates is 2267 acres. The water also passes through its sluices to the lower tanks lying around Kormapallam.

3.1 Primary and Secondary Pollutants considered for SWEPI

The CPCB has considered Total Phosphorus(TP) as Primary Pollutant and Total Kjeldal Nitrogen (TKN), Zinc (Zn)as Secondary Pollutants with respect to Water Environment Pollution Index and the individual score for Water environment is 46.0.

3.2 Surface Water Quality Sampling Locations

S.No.	SWQ Station Code	Location	Latitude	Longitude
1.	SWQ - 1	PeriyaNayagipuramKammai , Tuticorin	8º46’21.00’’ N	78º05’53.00’’E
2.	SWQ – 2	Sea Beach, Spic Marine Disposal, Tuticorin	8º44’50.38’’ N	78º10’38.24’’E

3.3 Details of Effluents generation from major Industries located in CEPI Area

The details of the major trade effluent generating Industries in operation located at SIPCOT- Phase- I &II is tabulated below.

Red	Orange	Total

Large	Medium	Small	Large	Medium	
03	-	-	01	02	06

LIST OF INDUSTRIES

Sl. No.	Name & address of the industries	Category / Classification	Type of industries	Trade effluent quantity (KLD)	Mode of Disposal
1.	NC John Sons Pvt Ltd	Red / Large	Coir	30	Recycling to the Process
2.	Coco Tufters Private Limited	Red / Large	Coir	23	Recycling to the Process
3.	V.V. Titanium Pigments Private Ltd	Red / Large	Pigment	260	On land for Irrigation
4.	Handy Waterbase India P Ltd	Orange/ Large	Sea Foods	06	On land for Irrigation
5.	Phillips Foods India Pvt Ltd	Orange/Medium	Sea Foods	80	On land for Irrigation
6.	Amulya Sea Foods Pvt Ltd	Orange/Medium	Sea Foods	150	On land for Irrigation

3.4 Domestic Waste Water Generation and Disposal in CEPI Area

The sewage generated from the Industries located in SIPCOT Industrial Complex, Meelavittanis treated through septic tank followed by dispersion trench within the premises.

3.5 Industrial and Domestic Waste Water impact on Surface Water bodies

The trade effluent generated from the units located in SIPCOT Industrial Complex, Meelavittan is treated and disposed within the premises and no possibilities to reach the nearby surface water source ie.Korampallam Tank.

3.6 Common Treatment Facilities details

There are no Common Treatment Facilities available in CEPI Area.

3.7 Status of Surface Water Quality in 2018 in CEPI Area

The parameter Total Phosphate, TKN & Zinc was monitored at 2 locations during the month of February and March 2018. One sample was collected from Sea and other from the Kormapallam tank (PeriyaNayagipuramKammai, Tuticorin). It was noticed that parameter TP exceeds the limits at PeriyaNayagipuramKammai and TKN exceeds the limit at sea.

The sample result of the Surface water samples as analysed by CPCB on February' 2018.

Parameter	Total Phosphorus	TKN	Zinc
Standards in mg/L	0.3	3	0.3

From the monitoring report as conducted by CPCB during February/March'2018, it was noticed that parameter Total Phosphorous (TP) exceeds the limits at PeriyaNayagipuramKammai and TKN exceeds the limit at sea.

The higher values of Total Phosphorous (TP)observed at PeriyaNayagipuramKammai (KormapallamTank) where the sample is collected may be due to the bathing activity carried out in the Tank and due to use of soap/detergent and also may be due to the pre monsoon period/due to lean flow or stagnated water the detection of Total Phosphorous would have occurred.

3.8 Status of Surface Water Quality during November /December, 2019 in CEPI Area.

The surface water sample was collected at Kormapallam tank and sea water samples not collected as the sea water cannot be considered as surface water. The

parameters TP, TKN & Zinc was analysed and the values were below detectable limits for all the three parameters analysed in the water sample collected from Korampallam Tank.

SWQ Station Code	**Location**	Total Phosphorus in mg/L	TKN in mg/L	Zinc in mg/L
SWQ - 1	PeriyaNayagipuramKammai, Tuticorin	BDL(DL:0.05)	BDL(DL:1.0)	BLQ(LOQ:0.002)

3.9 Conclusion

From the monitoring report as conducted by CPCB during February/March'2018, it was noticed that parameter Total Phosphorous (TP) exceeds the limits at PeriyaNayagipuramKammai and TKN exceeds the limit at sea.

The higher values of Total Phosphorous (TP)observed at PeriyaNayagipuramKammai (Kormapallam tank)where the sample is collected may be due to the bathing activity carried out in the Tank and due to use of soap/detergent, and also may be due to the pre monsoon period/due to lean flow or stagnated water the detection of TotalPhosphorous would have occurred.

However, the samples as collected during November'/December 2019 at the point reveals that the value of TP was noted as BDL.

LAND ENVIRONMENT

4.0 LAND ENVIRONMENT

Tamil Nadu Pollution Control Board monitors the quality of the Ground Water at eight locations in and around the SIPCOT Industrial Complex, Meelavittan Village, Thoothukudi Taluk and District. The locations of the sample collection points are as below,

S. No	Name of the Village	Direction from th SIPCOT	Distance In Km
1	Meelavittan	East	0.25
2	Madathur (Opp. to Kovil)	South	0.50
3	Madathur (Entrance)	South	0.50
4	TherkuVeerapandiyapuram	West	0.50
5	Pandarampatti	North- East	1.0
6	Kayaloorani	North -North Wes	1.2
7	Sankaraperi	North	1.5
8	Kumareddiapuram	North -West	0.8

The possibility of ground water contamination is by **M/s Vedanta Limited** (Copper Smelter) which handles huge volumes of Gypsum and by **M/s. V.V. Titanium Pigments Private Limited**which handles strong and weak acid streams during the course of process and the filter press sludge generated during the treatment of weak acid effluent is dumped on open lands adjoining the factory premises.

4.1 Primary and Secondary Pollutants considered for GWEPI

The CPCB has considered Total Hardness (TH) as Primary Pollutant and Total Dissolved Solids, Total Kjeldal Nitrogen as Secondary Pollutants with respect to Ground

Water Environment Pollution Index and the individual score for Water environment is 61.0.

4.2 Ground Water Quality Sampling Locations

The ground water was monitored at 8 locations by CPCB and tabulated as below. Also the map showing the location of ground water sampling is detailed below

S. No.	GWQ Station Code	Location	Latitude	Longitude
1.	GWQ - 1	Madathur Open Well Water,Tuticorin	8°47’48.00’’N	78°5’48.00’’E
2.	GWQ – 2	South Veerapandi- NearSchool and Temple Bore Well Water, Tuticorin	8°49’42.00’’N	78°3’52.00’’E
3.	GWQ – 3	Kumar Rettiya Puram-Near Sundram House Bore WellWater, Tuticorin	8°49’58.00’’N	78°3’58.00’’E
4.	GWQ – 4	Meelavittan-Near Cooperative Bank Bore Well Water, Tuticorin.	8°48’57.00’’N	78°6’5.00’’E
5.	GWQ – 5	Silver Puram-Near Lucia Quarters Bore Well Water,Tuticorin	8°48’54.00’’N	78°6’50.00’’E
6.	GWQ – 6	Pandaram Patti-NearTemple Open Well Water	8°49’31.00’’N	78°6’21.00’’E
7.	GWQ – 7	Soosi Nagar-Near Spic Main Gate Open WellWater, Tuticorin	8°44’23.00’’N	78°7’33.00’’E
8.	GWQ – 8	Rajiv Nagar Open Well Water, Tuticorin	8°43’49.00’’N	78°7’25.00’’E

S.NO	LOCATION OF WATER SAMPLING POINTS	DISTANCE FROM CEPI AREA
1	Madathur open well	Within the boundry
2	Therku Veera Pandiyapuram	1.18 km
3	Kumara Rettiyapuram	1.12 km
4	Meelavittan	Within the boundry
5	Silverpuram	1.02 km
6	Pandarampatti	1.13 km
7	Soosai Nagar	6.94 km
8	Rajiv Nagar	7.78 km

4.3 Status of Ground Watersampling locationsin 2018

Ground water samples were analysed for TDS, Total hardness and TKN at 8 locations. From the Report of analysis of the ground water samples as monitored by CPCB during February/March'2018,It was noticed that TDS & Total hardness was found exceeded at 7 locations and TKN exceeded at 5 locations.

The increase in TDS is due to the handling of Gypsum by M/s. Vedanta Ltd. During the year of 1994 the Ground Water Quality around the SIPCOT area as monitored before the operation of M/s. Vedanta Ltd (Formerly M/s. Sterlite Industries), the TDS value was found to be in the range of 640 to 4176 mg/l and whereas the conductivity due to soil leachability was in the range of 204 to 388 mg/l. The trend graph for the concentration of TDS as measured after the commencing of M/s. Sterlite

Industries was in the range of 5000 to 15000 mg/l, which clearly states that the increase in TDS is mainly due to M/s. Vedanta Ltd.

4.4 Status of Ground Water Quality during November/December, 2019 (Post Monsoon)

The ROA of the ground water samples analysed by the Board during November'2019 also reveals that the TDS exceeds in 5 samples out of 8 samples collected for TDS and Total hardness exceeds in 6 samples out of 8 samples collected.

GWQ Station Code	Location	TDS (mg/l)	TH (mg/l)	TKN (mg/l)
GWQ - 1	Madathur Open Well Water,Tuticorin	1728	720	BDL
GWQ – 2	South Veerapandi-NearSchool and Temple Bore Well Water, Tuticorin	535	440	BDL
GWQ – 3	Kumar Rettiya Puram-Near Sundram House Bore WellWater, Tuticorin	2576	1000	BDL
GWQ – 4	Meelavittan-Near Cooperative Bank Bore Well Water, Tuticorin.	6391	4500	BDL
GWQ – 5	Silver Puram-Near Lucia Quarters Bore Well Water,Tuticorin	17632	6860	BDL
GWQ – 6	Pandaram Patti-NearTempleOpen Well Water	2314	1920	BDL
GWQ – 7	Soosi Nagar-Near Spic Main Gate Open WellWater, Tuticorin	2465	1440	BDL
GWQ – 8	Rajiv Nagar Open Well Water, Tuticorin	200	140	BDL

4.5 Management of Hazardous Waste in CEPI Area

The main hazardous solid waste generating industry is M/s. Vedanta Ltd., Copper Smelter plant a major 17 category of industries which is presently closed by

TNPCB on 23/05/2018 and still remain closed due to non- compliance of consent conditions.

The details of hazardous solid waste generated from other industry in SIPCOT, Thoothukudi is tabulated below.

Sl. No	Name of the unit	Type of solid waste generated	Hazardous/non hazardous	Quantity in tons/year	Mode of Disposal
1.	NC John Sons Pvt Ltd	Hazardous	ETP sludge	2	Common Landfill TSDF
2.	Coco Tufters Private Limited	Hazardous	Chemical sludge from waste water treatment	2	Common Landfill TSDF
			Sludge from treatment of waste water arising out of cleaning / disposal of barrels / containers	0.45	Common Landfill TSDF

4.6 Management of Bio-Medical Waste in CEPI Area

There are no health care establishments existing within the SIPCOT Industrial Complex and hence no Bio medical waste is generated in CEPI area.

4.7 Management of Municipal Solid Waste in CEPI Area;

The municipal solid waste generated from the industrial units are disposed through local body.

4.8 Details of STPs/ETPs/CETPs

Sl. No.	Name & address of the industries	Category / Classification	Type of industries	Trade effluent quantity (KLD)	Mode of Disposal
1.	NC John Sons Pvt Ltd	Red / Large	Coir	30	Recycling

					to the Process
2.	Coco Tufters Private Limited	Red / Large	Coir	23	Recycling to the Process
3.	V.V. Titanium Pigments Private Ltd	Red / Large	Pigment	260	On land for Irrigation
4.	Handy Waterbase India P Ltd	Orange/ Large	Sea Foods	06	On land for Irrigation
5.	Phillips Foods India Pvt Ltd	Orange/Medium	Sea Foods	80	On land for Irrigation
6.	Amulya Sea Foods Pvt Ltd	Orange/Medium	Sea Foods	150	On land for Irrigation

4.9 Conclusion.

From the Report of analysis of the ground water samples as monitored by CPCB during February/March'2018,It was noticed that TDS & Total hardness was found exceeded at 7 locations and TKN exceeded at 5 locations.

The increase in TDS is due to the handling of Gypsum by M/s. Vedanta Ltd. During the year of 1994 the Ground Water Quality around the SIPCOT area as monitored before the operation of M/s. Vedanta Ltd (Formerly M/s. Sterlite Industries) the TDS value was found to be in the range of 640 to 4176 mg/l and whereas the conductivity due to soil leachability was in the range of 204 to 388 mg/l. The trend graph for the concentration of TDS as measured after the commencing of M/s. Sterlite Industries was in the range of 5000 to 15000 mg/l, which clearly states that the increase in TDS is mainly due to M/s. Vedanta Ltd. The presence of TDS across the industrial area may be restored during long duration even though M/s. Vedanta Ltd has been closed. It is also suggested that TDS should not be considered as the pollutant parameter for CEPI scoring because of the baseline concentration itself is more than 2000 mg/l.

The ROA of the ground water samples analysed by the Board during November'2019 also reveals that the TDS exceeds in 5 samples out of 8 samples collected for TDS and Total hardness exceeds in 6 samples out of 8 samples collected.

The exceedance of TDS may be due to the handling of huge quantity of gypsum by M/s. Vedanta Limited. However, this unit was closed by the Board on 23/05/2018 and still remain closed due to non- compliance of consent conditions. The value of TDS in the ground water may be reduced in course of time by natural replenishment of ground water.

However, the ground water samples analysed by the Board during November'/December 2019 reveals that the value of TKN is reported within the standards.

HEALTH STATISTICS

5.0 HEALTH STATISTICS

5.1 Hospitals details in CEPI Area

There are no health care establishments existing inside the SIPCOT Industrial Complex.

5.2 Health data of five years

The health data as obtained from the major hospitals located in Thoothukudi is listed below

(a) M/s.Thoothukudi Medical College Hospital, Thoothukudi.

S.No	Air Borne Diseases	No. of patients reported for the years				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	Asthma	18450	18168	19423	17467	18524
2	Acute Respiratory Infection	30751	30280	32372	29111	30873
3	Bronchitis	6150	6056	6475	5822	6174
4	Cancer	4185	4055	4402	4439	3542
	Water Borne Diseases					
5	Gastroenteritis	7244	8681	12786	13495	13616
6	Diarrhea	726	863	559	398	262
7	Renal diseases	3494	5635	6295	6287	7070

(a) M/s AVM Hospitals, Thoothukudi.

S.No	Air Borne Diseases	No. of patients reported for the years				
		2012-13	2013-14	2014-15	2015-16	2016-17
1	Asthma	450	500	450	450	400
2	Acute Respiratory Infection	250	250	200	200	250
3	Bronchitis	170	150	100	60	100
4	Cancer	200	150	170	150	200
	Water Borne Diseases					

5	Gastroenteritis	150	100	100	100	60
7	Renal diseases	500	500	700	500	600

5.3 Analysis of data &Conclusion

From the above Health data as obtained from GH, Tuticorin, it was noted that there is an increase of 3.38 % of Air borne disease and an increase of 1.19 % of Water borne disease.

6.0ACTION TAKEN DURING 2018-2019 & 2019-2020

6.1 Action Taken by the Industries in CEPI Area for the improvement of Pollution Control Measures

From the consolidated stack emission load in CEPI Area calculated for the period of 2017–18 & 2018-19, it could be noticed that the emission load for particulate matter was in the order of 105.98 kg/day and 35.34 kg/day with respect to the stack emissions let out from M/s. V.V Titanium Pigments Pvt Ltd. The decrease in pollution load is due to the installation and efficient operation of ESP provided as Air Pollution Control Measures, which in turn will reduce the concentration of suspended particulate matter in Ambient Air.

6.2 Other Initiatives in CEPI Area

The Board has directed the unit of unit M/s. V.V. Titanium Pigments Private Limited, SIPCOT Industrial Complex, Meelavittan Village, Thoothukudi District to furnish a detailed proposal for reclaiming the contaminated site previously used for storing the strong and weak acid streams during the course of process in consultation with the reputed institution such as Anna University / IIT etc.,.

The Fish Processing Units located inside the SIPCOT Industrial Complex have been instructed to revamp the ETP and to install Electro Magnetic Flow Meters at the Inlet & Outlet of ETP.

ACTION PLAN

7.0 **PROPOSED ACTION PLAN**

7.1 Proposed Short term Action plan

Action Plan for Industries located in SIPCOT Industrial Complex, Meelavittan, Thoothukudi District

S. No	Name of the industry	issues	Short Term Plan
1	Amulya Sea Foods Pvt Ltd	Switch over of refrigerant from Ammonia to Non ODS substance.	To be completed within a period of one year.
2	Ninans Ltd	Switch over of refrigerant from Ammonia to Non ODS substance.	To be completed within a period of one year.
3	Britto Sea Foods Exports P Ltd Frozen Foods	Switch over of refrigerant from Ammonia to Non ODS substance.	To be completed within a period of one year.
4.	Handy Water Base India Pvt Ltd	Switch over of refrigerant from Ammonia to Non ODS substance.	To be completed within a period of one year.
5.	Phillips Foods India Pvt Ltd	Switch over of refrigerant from Ammonia to Non ODS	To be completed within a period of one year.

		substance.	
6.	Adsorbent Carbon Ltd.,	Online connectivity.	To provide PM sensor in the Stack emission and connect to Care Air Centre. (Direction issued by the Board on 28/07/2014)

7.2 Proposed Long term Action plan

Action Plan for Industries located in SIPCOT Industrial Complex, Meelavittan, Thoothukudi District.

S. No	Name of the industry	issues	Long Term Plan
1	M/s. V.V. Titanium Pigments Private Limited, SIPCOT Industrial Complex, Meelavittan Village, Thoothukudi District	Treatment & Disposal of wastewater.	To install Zero Liquid Discharge Plant to maintain zero discharge of trade effluent with in a period of three years.
2	M/s. V.V. Titanium Pigments Private Limited, SIPCOT Industrial Complex, Meelavittan Village, Thoothukudi District	Reclamation of Contaminated Site due to the earlier disposed Unreacted Illmenite and Acidic Effluent.	To conduct study through CES, Anna University/IIT, Madras in the area where ETP sludge (gypsum) was stored on open land and to take reclamation activity based on the outcome of study report. (Direction has been issued to the unit vide Board's Proc. Dated. 12/06/2018 in this regard) with in a period of three years.

8.0 **CEPI SCORE FOR THE POST MONSOON 2019**

Name of thePIA	Air	Water	Land	CEPI Score
Thoothukudi (Tamil Nadu)	13.0	6.875	43.75	44.25

9.0 **CONCLUSION**

Air Environment

From the analysis report as conducted by CPCB during February/March'2018,it was noticed that parameter PM10 and Arsenic was found exceeded the limit at one location out of 8 locations namely VOC Port School, Thoothukudi. This location is in the other industrial cluster, Tuticorin. The average value for arsenic was detected as 42 ng/m3 for three samples collected. It was also noticed that the arsenic value as reported in the other seven locations were found well within the Ambient Air Quality Standards. The main source of Arsenic is due to burning of coal by the Thermal power station operated in the area.

The Height of the Stacks of the Thermal power plants existing in that area varies from 120 m to 200 m and themaximum ground level concentration will fall very far away from the VOC Port School, Tuticorin since the VOC port school is just 200m away from the power plant and dispersion of particulate matter may be more than 2km away from the source of emission and hence high values of arsenic detected should be verified. As per the Gausian plume dispersion modelling with stack height, wind speed, wind

direction, plume rise, mixing depth the maximum ground level concentration of particulate matter will be very less proportionally the Arsenic concentration will also to be negligible.

However, the arsenic at ambient air was monitored during November'2019 and noticed that the value of Arsenic was found within the standards as prescribed in all stations including the VOC Port School where higher value was detected earlier.

Also from the consolidated stack emission load in CEPI Area calculated for the period of 2017–18 & 2018-19, it could be noticed that the emission load for particulate matter was in the order of 105.98 kg/day and 35.34 kg/day respectively with respect to the stack emissions let out from M/s. V.V Titanium Pigments Pvt Ltd. The decrease in pollution load is due to the installation and efficient operation of ESP provided as Air Pollution Control Measures, which in turn will reduce the concentration of suspended particulate matter in Ambient Air.

It is suggested that the Ambient Air Quality Monitoring shall be rearranged based on the Industrial coverage as well as metrological conditions to cover the upwind, down wind and cross wind direction (Map Enclosed).

Surface Water

From the monitoring report as conducted by CPCB during February/March'2018, it was noticed that parameter Total Phosphorous (TP) exceeds the limits at Periya NayagipuramKammai and TKN exceeds the limit at sea.

The higher values of Total Phosphorous (TP)observed at Periya NayagipuramKammai (Kormapallam tank) where the sample is collected may be due to the bathing activity carried out in the tank and due to use of soap/detergent, and also may be due to the pre monsoon period / due to lean flow or stagnated water the detection of Total Phosphorous would have occurred.

However, the samples as collected during November'2019 at the point reveals that the value of TP was noted as BDL.

Ground Water

From the Report of analysis of the ground water samples as monitored by CPCB during February/March'2018,It was noticed that TDS & Total hardness was found exceeded at 7 locations and TKN exceeded at 5 locations.

The increase in TDS is due to the handling of Gypsum by M/s. Vedanta Ltd. During the year of 1994 the Ground Water Quality around the SIPCOT area as monitored before the operation of M/s. Vedanta Ltd (Formerly M/s. Sterlite Industries) the TDS value was found to be in the range of 640 to 4176 mg/l and whereas the conductivity due to soil leachability was in the range of 204 to 388 mg/l. The trend graph for the concentration of TDS as measured after the commencing of M/s. Sterlite Industries was in the range of 5000 to 15000 mg/l, which clearly states that the increase in TDS is mainly due to M/s. Vedanta Ltd. The presence of TDS across the industrial area may be restored during long duration even though M/s. Vedanta Ltd has been closed. It is also suggested that TDS should not be considered as the pollutant parameter for CEPI scoring because of the baseline concentration itself is more than 2000 mg/l.

The ROA of the ground water samples analysed by the Board during November'2019 also reveals that the TDS exceeds in 5 samples out of 8 samples collected for TDS and Total hardness exceeds in 6 samples out of 8 samples collected.

The exceedance of TDS may be due to the handling of huge quantity of gypsum by M/s. Vedanta Limited. However, this unit was closed by the Board on 23/05/2018 and still remain closed due to non- compliance of consent conditions. The value of TDS in the ground water may be reduced in course of time by natural replenishment of ground water.

However, the ground water samples analysed by the Board during November’2019 reveals that the value of TKN is reported within the standards.

Annexure - 1

Details of Industries in CEPI Area

SIPCOT Industrial complex, Meelavittan Village,

Thoothukudi District

The Details of industries located in Phase-I & II of SIPCOT Industrial Complex is as follows.

Sl. No.	Name & address of the industries	Category / Classification	Type of industries	Operational / Not in operation
1.	V V Titanium Pigments Private Ltd CPP	17 Category	Thermal Power Plant	Operational
2.	V V Titanium Pigments Private Ltd CPP	Red / Large	Pigment	Operational
3.	NC John Sons Pvt Ltd	Red / Large	Coir	Operational
4.	Coco Tufters Private Limited	Red / Large	Coir	Operational
5.	Adsorbent Carbons P Ltd	Red / Large	Activated Carbon	Operational
6.	Sri Balamurugan Industries	Red / Small	Plaster of Paris	Operational
7.	Classic Plasters	Red / Small	Plaster of Paris	Operational
8.	V.V. Titanium Pigments Private Limited Gasifier	Red / Small	Producer Gas	Operational
9.	KTV -KOG Food Products India Pvt Ltd	Orange/ Large	Oil Refinery	Operational
10.	Handy Waterbase India P Ltd	Orange/ Large	Sea Foods	Operational
11.	Easternbulk Lime Products Private Limited	Orange/ Large	Lime	Operational
12.	YentopManickavel Sons Edible Oils P Ltd	Orange/Medium	Oil Refinery	Operational
13.	YentopManickam Edible Oils P Ltd	Orange/Medium	Oil Refinery	Operational
14.	Phillips Foods India Pvt Ltd	Orange/Medium	Sea Foods	Operational
15.	Amulya Sea Foods Pvt Ltd	Orange/Medium	Sea Foods	Operational
16.	Ramesh Flowers Pvt Limited	Orange / Small	Dry Flower	Operational
17.	Ninans Ltd	Orange / Small	Sea Foods	Operational

18.	Britto Sea Foods Exports P Ltd Frozen Foods	Orange / Small	Sea Foods	Operational
19.	S K S C Nadarajan and Brothers	Orange / Small	Salt Refinery	Operational
20.	Britto Sea Foods Exports P Ltd Retort Plant	Orange / Small	Sea Foods	Operational
21.	Thim Polybags	Orange / Small	Plastic	Operational
22.	Narmadha Industries	Orange / Small	Lime	Operational
23.	TVS Sundram Iyengar and Sons Ltd	Orange / Small	Automobile	Operational
24.	Maheswari Salt Trading Company	Orange / Small	Salt Refinery	Operational
25.	SGJ Autocare Pvt Ltd	Orange / Small	Automobile	Operational
26.	VVD Package Industries Pvt Ltd	Orange / Small	Plastic	Operational
27.	Raja Retreading Co	Orange / Small	Vulcanising	Operational
28.	MGM Edile Oils Pvt Ltd	Orange / Small	Oil Packing	Operational
29.	Bio Food Co	Orange / Small	Pulverizing	Operational
30.	Raj Salt Industries	Orange / Small	Salt Refinery	Operational
31.	Raj Trading Company	Orange / Small	Salt Refinery	Operational
32.	S.R. Jebin Sea Foods	Orange / Small	Sea Food	Operational
33.	Britto Dry Seafoods	Orange / Small	Sea Food	Operational
34.	Ramamoorthy Industries Unit II	Orange / Small	Melamine	Operational
35.	Anitha Industries	Orange / Small	Fabrication	Operational
36.	Sri Kailash Chemicals	Orange / Small	Plaster of Paris	Operational

Annexure - 2

The photograph showing the green belt in SIPCOT and other industrial cluster

Photographs showing the Green Belt developed in the other industrial clusters

V.V. TITANIUM PIGMENTS PRIVATE LIMITED, THOOTHUKKUDI


SAFFTY
DO IT
DO IT RIGHT
DO IT RIGHT NOW

Tuticorin Alkali Chemicals Private Limited

TAC SITE ENTRACE AREA
2 ACRE

C BLOCK 5 ACRE

Combined Green Belt for M/S. Greenstar Fertilizers Limited & M/s. SPIC Limited

FACTORY ENTRANCE

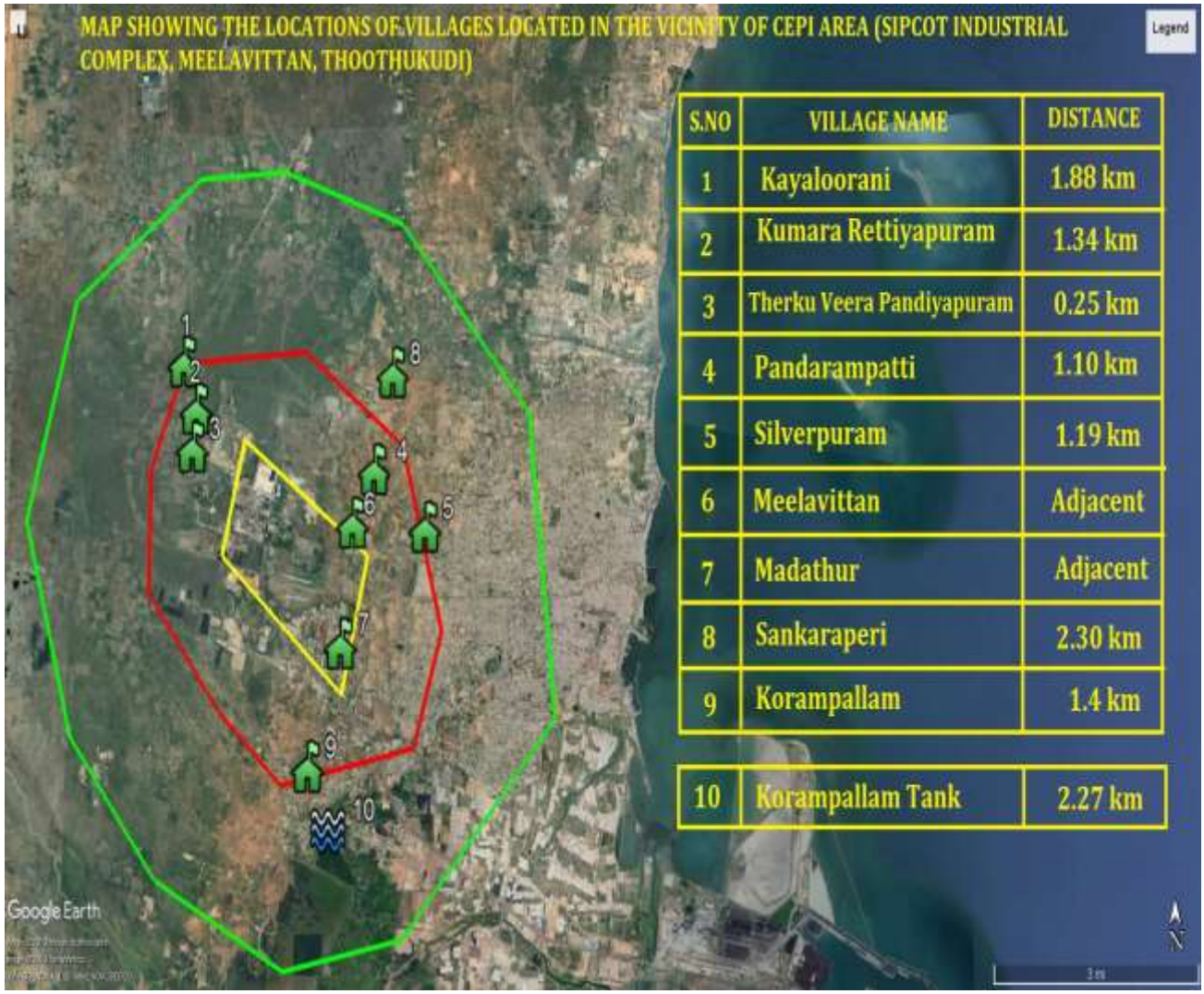
SCRAP YARD

AAQM Station area area

Chromium sludge pond

Annexure - 3

CEPI Boundary Map showing Core zone, Impact zone & Buffer zone



S.NO	VILLAGE NAME	DISTANCE
1	Kayaloorani	1.88 km
2	Kumara Rettiyapuram	1.34 km
3	Therku Veera Pandiyapuram	0.25 km
4	Pandarampatti	1.10 km
5	Silverpuram	1.19 km
6	Meelavittan	Adjacent
7	Madathur	Adjacent
8	Sankaraperi	2.30 km
9	Korampallam	1.4 km
10	Korampallam Tank	2.27 km

Annexure - 4

Boundary Map showing sampling locations of Air, Water, Ground Water in CEPI Area.

S.NO	LOCATION OF WATER SAMPLING POINTS	DISTANCE FROM CEPI AREA
1	Madathur open well	Within the boundry
2	Therku Veera Pandiyapuram	1.18 km
3	Kumara Rettiyapuram	1.12 km
4	Meelavittan	Within the boundry
5	Silverpuram	1.02 km
6	Pandarampatti	1.13 km
7	Soosai Nagar	6.94 km
8	Rajiv Nagar	7.78 km

S.NO	LOCATION OF THE AAQ MONITORING STATIONS	DISTANCE FROM CEPI AREA
1	M/s. Coastal Energen Pvt Ltd	11.82 km
2	M/s. Ind Bharath Power Gencom Ltd	5.34 km
3	M/s. Gee Gee Kay Pvt Ltd	3.29 km
4	M/s. Jolly Metals	0.84 km
5	M/s. TAC Quarters D Block	7.38 km
6	M/s. VOC B.ED Collage Admin Block	3.51 km
7	M/s. VOC Port School	9.86 km
8	M/s. NTPL Type IV Quarters D Block	9.13 km

Annexure - 5

Boundary Map showing the proposed sampling locations of Air Environment in CEPI Area.

S.NO	LOCATION OF THE AAQ MONITORING STATIONS	DISTANCE FROM CEPI AREA
1	M/s. Coastal Energen Pvt Ltd (Existing)	11.82 km
2	M/s. IND Bharath Power Gencom Ltd (Existing)	5.34 km
3	Lucia Quarters, Silverpuram (Proposed)	1.20 km
4	M/s. Jolly Metals (Existing)	0.84 km
5	Vadakkusilukkanpatti (Proposed)	2.38 km
6	Vijayalakshmi warehouses (Proposed)	0.64 km
7	BPCL LPG Bottling Unit (Proposed)	1.11 km
8	Korampallam SIDCO Industrial Estate (Proposed)	2.12 km

Annexure - 6

Health data obtained from Hospitals

NAME OF THE INSTITUTION : THOOTHUKUDI MEDICAL COLLEGE HOSPITAL THOOTHUKUDI

SL.NO.	DISEASES	NO. OF PATIENTS FOR THE YEAR				
		2017	2016	2015	2014	2013
1	ASTHMA	18524	17467	19423	18168	18450
2	ACUTE RESPIRATORY INFECTION	30873	29111	32372	30280	30751
3	BRONCHITIS	6174	5822	6475	6056	6150
4	GASTROENTERIRIS	13616	13496	12786	8681	7244
5	DIARRHEA	262	398	559	863	726
6	RENAL DISEASES	7070	6287	6295	5635	3494
7	CANCER	3542	4439	4402	4055	4185

DEAN 13/3/19

THOOTHUKUDI MEDICAL COLLEGE HOSPITAL

13/3/19 THOOTHUKUDI

9003983911 5
Mr. Arockiaraj.

Annexure-B

INFORMATION ON HEALTH STATISTICS IN PIA

1. Name of the Polluted Industrial Area (PIA): TUTICORIN
2. Name of the major health center/organization: AVM Hospital.
3. Name and designation of the contact person: A. Johnson
4. Address: 135, Palayamkotai Road, AVM Hospital.
5. Year of establishment: 1992.

Health status data received from the Hospital

Sl. No.	Air Borne Diseases	No. of patients reported for the years				
		2017-2016	2016-2015	2015-2014	2014-2013	2013-2012
1.	Asthma	400	450	450	500	450
2.	Acute Respiratory Infection	250	200	200	250	250
3.	Bronchitis	100	60	100	150	170
4.	Cancer	200	150	170	150	200
	Water Borne Diseases					
5.	Gastroenteritis	60	100	100	100	150
6.	Diarrhea					
7.	Renal diseases	600	500	700	500	500
8.	Cancer					

Signature of Hospital Head/Superintend

A.V.M. HOSPITAL
135, Palayamkottai Road,
[illegible] 628 003.

Annexure - 7

Photos of improvements carried out by Industries & other initiative works in CEPI Area

Photographs showing the APC MEASURES provided in the other Industrial Clusters

M/s. Coastal Energen Private Limited

ESP

Source : Boiler

No of fields : 56

Efficiency : 99.9%

TUTICORIN ALKALI CHEMICALS AND FERTILISERS LIMITED

ATMOSPHERIC POLLUTION CONTROL MEASURE

AMMONIUMCHLORIDE DRIER STACK SULPHURISATION SYSTEM

BOILER STACK DE SCRUBBER SYSTEM

BOILER STACK SPM REMOVAL SYSTEM

Photographs showing the APC MEASURES provided in the SIPCOT Industrial Complex Thoothukudi

M/s. V.V Titanium Pigments Private Limited

Photographs showing the ETP provided in the other Industrial clusters

M/s. SPIC FERTILIZERS LIMITED

MIXING POND

GUARD POND – TREATED EFFLUENT STORAGE

M/s.TUTICORIN ALKALI CHEMICALS AND FERTILISERS LIMITED

EFFLUENT TREATMENT PLANT

Photographs showing the STP provided in the other Industrial clusters

Combined STP for M/s. Green Star Fertilizers Limited & M/s. Spic Limited

SEWAGE TREATMENT PLANT

Collection Well

Surface aerator

Sludge return

Sludge Drying beds

M/s. TUTICORIN ALKALI CHEMICALS AND FERTILISERS LIMITED

SEWAGE TREATMENT PLANT

M/s. TUTICORIN THERMAL POWER STATION

M/s. Tuticorin Thermal Power Station.

AIR POLLUTION CONTROL MEASURES DETAILS IN TTPS	
Coal yard	Dust suppression system
Coal Transfer point of conveyers	Dust extraction system & Water sprinklers
Primary coal crushers I & II	Dust extraction system
Transfer point of Coal Jetties	Water sprinkler system
Fly ash Storage silo	Bag filters
Functional Status of APC measures	The Dust Extraction system available in Primary Crusher House-II and Secondary Crusher House-II are put into service whenever dusty coal is received. The Dust suppression system is available in Primary Crusher House-II, Secondary Crusher House-II, Conveyors are put into service as and when needed. Sprinkler systems have been provided in all conveyors at transfer points and in operation to control the fugitive emissions and also the water spraying is done regularly in the ash handling area to control the fugitive emissions. Casuarinas trees have been grown along the Northern side of coal yard with micro irrigation arrangement to act as wind Breaker. Necessary Green belt is also already available on the Eastern and Western side of Coal yard.

M/s. VOC Port Trust

Air Control measures in VOC Port Trust, Tuticorin

S.No	Description	Year of Installation
1	Sweeping Truck mounted Machine (2 Nos)	2017
2	Truck mounted Fogging Machine	2018
3	Continuous Ambient air monitoring station (3 Location)	2019
4	Water Sprinkler Systems	2016
5	Wind barrier	2015

Annexure - 8

Analysis Report for the present CEPI score (Post Monsoon, November, 2019)

CEPI score calculation based on the analysis carried out on post monsoon November/december 2019

Air Pollutant = PM_{10}, $PM_{2.5}$, Arsenic (As)

A- Source:

Factor-A1 - Presence of Toxin

Pollutant	Group	Score
PM10 (Secondary)	B	0.5
PM 2.5 (Secondary	B	0.5
As (Primary)	C	3
Total		4

A1 = 4

Factor-A2 - Scale of Industrial activity

A2 = Moderate = 2.5 (Since R17 = 1 , R54 = 7)

A = A1 x A2 = 4 x 2.5 = 10

B – Pathway:

Pollutant	Average concentration in µg/m^3	Standard in µg/m^3	Exceedance Factor (EF)	No of samples exceeded	Total no of samples	SNLF	Category	value
PM10 (Secondary)	58.93	100	0.589	1	8	0.074	M	3
PM 2.5	15.62	60	0.26	0	8	0	L	0

(Secondary								
As (Primary)	0.56	6	0.09	0	8	0	L	0
Total								3

SNLF = (No of samples exceeded/total no of samples) x Exceedance factor

Range of SNLF = 0.05 to <0.1 Moderate = 3

= 0 (for EF,0.75) Low = 0

B Score - B1+ B2+ B3 = 3 + 0 + 0 = 3.

C- Receptor Impact on human health

Total Population of Thoothukudi = 17,50,176

No of persons affected by air borne diseases (2017-18) - 59113

% persons affected = (59113 / 1750176) x 100 = 3.38 %

C= 0 since increase is < 5 %

D – Additional high risk element

If all the industries have adequate APC measure = 0

Hence D = 0

Air EPI = A+ B+ C+ D = 10 + 3 + 0 + 0 = 13

Water Pollutant = Total Phosphorous (TP), TKN, Zinc (Zn)

A- Source:

Factor-A1 - Presence of Toxin

Pollutant	Group	Score
TP (Primary)	B	2
TKN (Secondary	B	0.50
Zn (Secondary)	A	0.25
Total		2.75

A1 = 2.75

Factor-A2 - Scale of Industrial activity

A2 = Moderate = 2.5 (Since R17 = 1 , R54 = 7)

A = A1 x A2 = 2.7 x 2.5 = 6.875

B – Pathway:

Pollutant	Average concentration in µg/m^3	Standard in µg/m^3	Exceedance Factor (EF)	No of samples exceeded	Total no of samples	SNLF	Category	value
TP (Primary)	BDL	0.3	0	0	1	0	L	0
TKN (Secondary	BDL	3	0.206	0	1	0	L	0
Zn (Secondary)	BDL	0.3	0	0	1	0	L	0
Total								0

SNLF = (No of samples exceeded/total no of samples) x Exceedance factor

Range of SNLF = 0 Low = 0

= 0 (for EF<0.75) Low = 0

B Score - B1+ B2+ B3 = 0

C- Receptor Impact on human health

Total Population of Thoothukudi = 17,50,176

No of persons affected by water borne diseases (2017-18) - 20948

% persons affected = (20948 / 1750176) x 100 = 1.19 %

C= 0 since increase is < 5 %

D – Additional high risk element

If all the industries have adequate ETP measure = 0

Hence D = 0

Water EPI = A+ B+ C+ D = 6.875 + 0 +0 + 0 = 6.875

Ground Water Pollutant = TDS, Total Hardness (TH), TKN

A- Source:

Factor-A1 - Presence of Toxin

Pollutant	Group	Score
TH (Primary)	A	1
TDS (Secondary)	A	0.25
TKN (Secondary)	A	0.25
Total		1.5

A1 = 1.5

Factor-A2 - Scale of Industrial activity

A2 = Moderate = 2.5 (Since R17 = 1 , R54 = 7)

A = A1 x A2 = 1.5 x 2.5 = 3.75

B – Pathway:

Pollutant	Average concentration in µg/m^3	Standard in µg/m^3	Exceedance Factor (EF)	No of samples exceeded	Total no of samples	SNLF	Category	value
TH (Primary)	2128	600	3.55	6	8	2.66	C	30
TDS Secondary)	4231	2000	2.12	5	8	1.325	C	10
TKN (Secondary)	BDL	1	0	0	8	0	L	0
Total								40

SNLF = (No of samples exceeded/total no of samples) x Exceedance factor

Range of SNLF = 0 Low = 0

= 0 (for EF<0.75) Low = 0

B Score - 30+ 10+ 0 = 40

C- Receptor Impact on human health

Total Population of Thoothukudi = 17,50,176

No of persons affected by water borne diseases (2017-18) - 20948

% persons affected = (20948 / 1750176) x 100 = 1.19 %

C= 0 since increase is < 5 %

D – Additional high risk element

If all the industries have adequate ETP measure = 0

Hence D = 0

Land EPI = A+ B+ C+ D = 3.75 +40 +0 + 0 = 43.75

CEPI Score $= i_{max} + \{ (100 - i_{max}) X (i_2/100) x (i_3/100) \}$

$= 43.75 + \{ (100 – 43.75) x (13/100) x (6.875/100) \}$

$= 43.75 + (56.25 x 0.13 x 0.06875)$

CEPI Score = 44.25

001416

MINUTES OF THE COMMITTEE MEETING CONSTITUTED FOR CEPI ACTION PLAN OF TUTICORIN, THOOTHUKUDI DISTRICT LOCATED IN TAMILNADU HELD ON 09.01.2020 IN THE CHAMBER OF PRINCIPAL SECRETARY ENVIRONMENT & FORESTS DEPARTMENT, SECRETARIAT, CHENNAI.

Present:

1. Thiru. Shambhu Kallolikar I.A.S.,
   Principal Secretary to Government,
   Environment & Forests Department, Secretaraiat, Chennai.

2. Thiru. A.V.Venkatachalam, I.F.S,
   Chairman,
   Tamil Nadu Pollution Control Board, Chennai.

3. Dr. S.Selvan
   Chief Environmental Engineer,
   Tamil Nadu Pollution Control Board, Chennai

4. Dr.A.Viswanathan, JD (Acts)
   O/o the Directorate of Medical & Rural Health Services

5. Tmt.H.Prabhavathy, GM (PI) i/c
   Representative of State Industries Promotion Corporation of Tamilnadu (SIPCOT)

6. Thiru.A.Sohail Ahmed,
   Technical Expert (GP), O/o Chief Engineer, PWD, W.R.O.,
   State Ground & Surface Water Resources Data Centre,
   Taramani, Chennai – 600 113.

7. Other TNPCB Officials.

The Chief Environmental Engineer, Tamil Nadu Pollution Control Board welcomed the committee members and officials of TNPCB and briefed about the new CEPI methodology adopted by CPCB.

Dr.S.Suresh Kumar from G lens Innovations Labs Pvt Ltd on behalf of AC Tech, Chennai (hired as third party by TNPCB for analysis and assessment of CEPI – post monsoon 2019) detailed the the concept of CEPI

and briefed about the individual CEPI scores of CPCB in 2018 in Tamilnadu and the present post monsoon scores in 2019 with regard to Air, Water and Land Environment in the 8 industrial clusters of Vellore, Manali, Coimbatore, Erode, Mettur, Tuticorin, Tiruppur, and Cuddalore.

With regard to Tuticorin CEPI area, Dr.S.Suresh Kumar briefed the following

1. The CEPI scores for the last two periods are as follows

Period	CEPI Score
CEPI Score 2019	44.25
CEPI Score 2018	66.34

2. In the aggregated CEPI score of 2018, it has been reported that the Sub Index values for Air is 29.75, Water is 46.0 and Land is 61.0, thus the CEPI score was **66.34**, whereas in the present aggregated CEPI score during 2019 for the Sub Index values for Air is 13.0, Water is 6.88 and Land is 43.75, thus the CEPI score has reduced to **44.25.**
3. It has been distinguished for the high CEPI score in 2018 and for low CEPI score in 2019.

   The main reasons attributed for high CEPI score include,

   a. Out of 8 AAQM locations, in only one location PM10 and Arsenic got exceeded. VOC Port School is the location near to power plant and port area (within 300 M) where PM10 and Arsenic exceeded.
   b. Only one surface water location identified at Periyanayagipuram Kanmai. The Kanmai is being used by the nearby villagers for domestic uses like bathing, cloth washing, etc. Only Total Phosphorous is exceeded in this location due to the use of soap & detergents by villagers.
   c. The health statistics score for water borne disease was 5.
   d. Eight ground water locations were selected around the CEPI area, out of which 7 location samples exceeded TDS & TH. Increase of

TDS and TH in these locations are due to M/s.Vedanta handling Gypsum in open area.

e. Before, M/s.Vedanta the TDS in those areas were around 640 – 1500mg/L and soil conductivity is around 204 to 388 µs/cm. After Vedanta the TDS has been increased around 5000 – 15000mg/L and proportionally TH also increased.

The main reasons for less CEPI score in 2019 include,

i. All industries have provided proper APCD (dust collectors, wet scrubbers etc) and the same are monitored through online monitoring system.
ii. VOC port school samples were collected for PM10 and Arsenic and found well below NAAQM values.
iii. The total quantity of trade effluent generation is 549KLD, which is treated and reused and thus there is no discharge of effluent outside. Also there is no discharge of sewage from industries to nearby water bodies.
iv. Since M/s.Vedanta was closed and restoration of ground water will take place, by this TDS and TH will reduce in course of time.
v. Effective implementation of ZLD systems in few of the industries.
vi. Reclamation of the contaminated site previously used for storing the strong and weak acid streams by M/s.VV Titanium Pigments.
vii. Revamping of ETP's by fish processing industries.

4. To the queries raised by the Principal Secretary, it was clarified that the critical parameters and locations identified by CPCB during 2018 was also followed while sampling during 2019. Representative of Chief Engineer, PWD, W.R.O. wanted to know whether other parameters could be included for CEPI assessment, for which it was replied that the protocol followed by CPCB had to be adopted for harmonious CEPI calculation every year. To the representative of Director of Medical & Rural Health Services, it was clarified that as per the direction issued

by CPCB on 26.04.2016, the air and water borne diseases to be considered in the health data are Asthma, Bronchitis, Cancer, Acute respiratory infections, Gastroenteritis, Diarrhea, renal (kidney) malfunction cancer etc

5. After detailed discussion the committee members decided to approve the CEPI action Plan prepared for Tuticorin, Thoothukudi District in Tamil Nadu and to submit to CPCB, New Delhi

With the above, the meeting came to an end.

S.No.	Members	Signature
1.	Thiru. Shambhu Kallolikar IAS., (Chairman of Committee) Principal Secretary to Government, Environment & Forests Department	
2.	Member Secretary, Tamilnadu Pollution Control Board, Chennai	Dr. S. Selvan CEE For Member Secretary
3.	Director of Medical & Rural Health Services	Dr A. VISWANATHAN. MS JDC(HS)
4.	Representative of State Industries Promotion Corporation of Tamilnadu (SIPCOT)	H. Prabhavathy (H. PRABHAVATHY) G.M (PI) i/c SIPCOT
5.	Chief Engineer, PWD, W.R.O., State Ground & Surface Water Resources Data Centre, Taramani, Chennai – 600 113	(A. SUBRAMANIAN) Technical Expert (Geophysics) O/o the Chief Engineer, PWD SG&SWRDC, Chennai-600113