ENVIRONMENTAL QUALITY MONITORING OF CRITICALLY POLLUTED AREA – CHANDRAPUR, MAHARASHTRA

1.0 OBJECTIVE OF THE VISIT

This office is in receipt of letter No. B-29012/ESS (CPA)/2015-16 dated 17.02.2016 for Environmental Quality monitoring in CPA – Chandrapur, Maharashtra from Central Pollution Control Board (CPCB) Head Office. Wherein, it was requested to undertake the environmental quality monitoring for Ambient Air, Surface Water and Ground water in CPA- Chandrapur, Maharashtra jointly with Maharashtra Pollution Control Board.

Accordingly a proposed plan regarding the environmental quality monitoring was communicated to CPCB, HO on 23.02.2016, subsequent to the receipt of acceptance of proposal from the Competent Authority, the following officials from this office has visited CPA – Chandrapur during 28.02.2016 to 02.03.2016 and carried-out environmental quality monitoring i.e. ambient air quality, surface water and ground water quality monitoring.

i. Sh. Amit Thakkar, Sc. 'C'
ii. Sh. Nishchal C., Sc. 'C'
iii. Sh. Hemendra Roat, SSA
iv. Sh. Manoj Sharma, SSA

The joint monitoring programme was also communicated to Maharashtra Pollution Control Board (MPCB), in this regard MPCB has assigned the task to a team of MPCB officials from other Regional Offices of MPCB in addition to officials of Regional office Chandrapur to coordinate the said visit for carrying-out environmental quality monitoring. The officials comprising of;

i. Sh. S.D. Patil, Sub Regional Officer – Dhule
ii. Sh. Gajanan Khadkikar, Field Officer – Nagpur
iii. Sh. Gajanan Nagre, JSA – Nagpur

On the second day of visit, following officials from MPCB, Regional Office – Chandrapur also joined the inspecting team;

i. Sh. Wankhade, Sub Regional Officer
ii. Sh. P. N. Dhumal, Field Officer
iii. Dr. Susheel Kr. Shinde, Filed Officer

Sh. P. M. Joshi, Regional Officer – Chandrapur also reviewed the status of progress of environmental quality monitoring on second day of visit.

2.0 ABOUT THE AREA

Chandrapur, the easternmost district located in the eastern edge of Maharashtra in Nagpur Division and forms the eastern part of 'Vidharbha' region. It is located between 19^0.30' N to 20^0.45' N Latitude and 78^0.46' E Longitude. The district is bounded by Nagpur, Bhandara and Wardha on the northern side whereas, Yavatmal on the western side, Gadchiroli on the eastern side and Adilabad district of Telangana on the southern side. Physio-graphically, the district is situated within the Wainganga and Wardha river basins respectively on the eastern and western boundaries of the district which are the tributaries of Godavari River. Wardha River is the main and the largest river, Rivers Erai, Andhari, Wainganga and the Painganga are its tributaries. Chimur and Mul are the main water sheds between Wardha and Wainganga rivers.

The CEPI region of CPA – Chandrapur comprises of 04 areas viz. MIDC Chandrapur, MIDC Tadali, Ghuggus and Ballarpur. The categorization of different types of industries in CEPI region of CPA – Chandrapur is summarized in the below table.

Table-2.1.1: Break-up of different categories of industries in CEPI region of CPA – Chandrapur

Name of the area/ CEPI region in CPA – Chandrapur	Categorization of industries, Numbers (Nos.)			
	Red category industries		Orange category industries	Green category industries
	17-Category of highly polluting industries	Grossly polluting industries		
MIDC Chandrapur	02	48	48	77
MIDC Tadali	05	11	02	05
Ghuggus	02	03	01	03
Ballarpur	01	04	10	12
Total	**10**	**66**	**61**	**97**

Source: MPCB, RO-Chandrapur

It is envisaged from the above table that the majority of industries under 17 categories of highly polluting industry in this area are iron & steel, thermal power plant and cement industries. Whereas, majority of grossly polluting red category of industries in this area are coal mines, coal washeries, chemical & allied, formulation industries and steel rolling mills etc. It is observed from the types of industries in this area that majority of industries are air polluting industries except few water polluting industries in MIDC Chandrapur and Ballarpur.

3.0 ENVIRONMENTAL MONITORING APPROACH

3.1 WATER ENVIRONMENT

The main River Wardha, originates from upper Wardha dam near Morshi District in Amravati and enters into Chandrapur District at Vill- Hivra, Tal-Warora, the Wardha River is an important source of water supply to Warora, Bhadrawati, Ballarpur and Rajura Municipal Councils. The Erai

River and Zarpat River are tributaries of Wardha River. The Erai River is having self-origination nearby Chimur and meets Wardha River near Ballarpur and the Zarpat River originates from Chandrapur town and flows through small distance and meets Erai River.

04 locations of water bodies/drains receiving effluent/wastewater in the CEPI region of CPA – Chandrapur were considered for water quality monitoring during CEPI assessment in 2010, 2011 and 2013. As suggested, to assess the present environmental quality the two sets of sampling of surface water at the earlier identified locations are to be carried-out.

During visit, two sets of grab samples of surface water from Wardha and Erai Rivers in CEPI region of CPA – Chandrapur were collected and analyzed for various parameters. The first set of grab samples of surface water was collected by CPCB on 01.03.2016 and second set of grab samples was collected by MPCB on 02.03.2016 respectively. The surface water quality monitoring locations are depicted in the below table.

Table-3.1.1: Surface water quality monitoring locations in CEPI region of CPA – Chandrapur

Surface water quality monitoring location	Latitude	Longitude
Wardha River – Intake point for M/s ACC Cements, Near Mungoli open cast mines, Ghuggus **(SW-1)**	N19^0 54'19.7"	E79^0 6'53.9"
Wardha River, Near High flood level observation office, Ghuggus – Wani bridge, Niagoan **(SW-2)**	N19^0 57'21.4"	E79^0 05'53.1"
Erai River, Near Nagpur – Chandrapur bridge, Chnadrapur **(SW-3)**	N19^0 59'32.1"	E79^0 15'47.7"
Wardha River at Ballarpur Fort, Near Intake Well of M/s BILT, Ballarpur **(SW-4)**	N19^0 51'9"	E79^0 20'20"
Wardha River at Rajura Bridge, Rajura – Downstream of domestic & industrial discharges **(SW-5)**	N19^0 52'35.55"	E79^0 17'08.97"

3.2 GROUND WATER

04 locations of ground water sources in the CEPI region of CPA – Chandrapur were identified and considered for ground water quality monitoring during CEPI assessment in 2010, 2011 and 2013. As suggested, to assess the present environmental quality the two sets of sampling of ground water at the earlier identified locations are to be carried out.

During visit, two sets of grab samples of ground water at 04 locations of CEPI region of CPA – Chandrapur were collected and analyzed for various parameters. The first set of grab samples of ground water was collected by CPCB during 29.02.2016 to 01.03.2016 and second set of grab

samples was collected by MPCB on 02.03.2016 respectively. The ground water quality monitoring locations are depicted in the below table.

Table-3.2.1: Ground water quality monitoring locations in CEPI region of CPA – Chandrapur

Ground water quality monitoring location	Latitude	Longitude
Hand-pump no. 76 near Grampanchayat Office, Ghuggus **(GW-1)**	N20^0 01'04.3"	E79^0 11'34.6"
Hand-pump near Hanuman Mandir Opp. Grampanchayat Office, MIDC Tadali **(GW-2)**	N20^0 01'0.192"	E79^{0}06'53.242"
Hand-pump near Grampanchayat Office, Datala, Chandrapur **(GW-3)**	N19^0 57'53.6"	E79^0 15'46.1"
Bore well near Fire station, Ballarpur **(GW-4)**	N19^0 51'18.6"	E79^0 20'23.9"

3.3 AIR ENVIRONMENT

04 locations (MIDC Chandrapur, MIDC Tadali, Ghuggus and Ballarpur) in CEPI region of CPA – Chandrapur were identified for ambient air quality monitoring during CEPI assessment in 2010, 2011 and 2013. As suggested, to assess the present environmental quality the three rounds of sampling of Ambient Air Quality are to be carried out at the earlier identified locations.

03 rounds of sampling and analysis of ambient air quality at 04 locations was outsourced to M/s Anacon Laboratories, Nagpur, Maharashtra an E(P)A approved laboratory for all 12 notified parameters viz. Particulate Matter (PM_{10}), Particulate Matter ($PM_{2.5}$), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ozone (O_3), Lead (Pb), Carbon Monoxide (CO), Amonia (NH_3), Benzene (C_6H_6), Benzo (a) Pyrene, Arsenic (As) and Nickel (Ni).

During visit, first round of the ambient air quality monitoring for 24 hours was started on 29.02.2016, however due to sudden rain the monitoring was stopped approximately after 08 hours of operation. Therefore the monitoring of 29.02.2016 was cancelled. The Round 01 of AAQM was restarted on 01.03.2016 under the supervision of CPCB and MPCB officials. Simultaneously the second and third round of monitoring was carried out under the supervision of MPCB officials. The ambient air quality monitoring locations are depicted in the below table.

Table-3.3.1: Ambient air quality monitoring locations in CEPI region of CPA – Chandrapur

Location	AAQM location description	Latitude	Longitude
AAQ-1	MIDC Chandrapur (at M/s Multi Organics Ltd.,)	N19^0 58'51.8"	E079^0 13'54.7"
AAQ-2	Ghuggus (at Grampanchayat Office)	N20^0 01'04.3"	E079^0 11'34.6"
AAQ-3	MIDC Tadali (at M/s Grace Industries Ltd.,)	N20^0 00'21.91"	E79^{0}11'05.64"
AAQ-4	Ballarpur (at Nagarparishad Office)	N19^0 51'10.66"	E79^{0}20'50.96"

4.0 PHYSICAL OBSERVATIONS

4.1 SURFACE WATER QUALITY MONITORING LOCATIONS

During monitoring of surface water quality in CEPI regions of CPA – Chandrapur following observation are made:

- SWQM loctation-1 (at Wardha River – Intake point for M/s ACC Cements, Near Mungoli open cast mines, Ghuggus) there were visual evidences of growth of aquatic plants like grass & sedges at river banks and growth of macroalgae attached to rocks, gravel of river bed at shallow depths of stagnant water. Apart from this fishing and cloth washing activities were observed at river banks **(Photographs-1 & 2, Annexure-I).**

- SWQM location-2 (Wardha River, Near High flood level observation office, Ghuggus – Wani bridge, Niagoan) there were visual evidences of growth of aquatic plants like grass & sedges at river banks and no human interference activities was observed during sampling **(Photographs-3 & 4, Annexure-I).**

- SWQM location-3 (Erai River, Near Nagpur – Chandrapur bridge, Chnadrapur) there were visual evidences of abundance growth of aquatic plants like grass & sedges at river banks and growth of macroalgae attached to rocks, gravel of river bed at shallow depths of stagnant water. Apart from this fishing, bathing and cloth washing activities were observed at river banks. Also, livestock grazing at river banks and across the river was observed. There was haphazard dumping of solid wastes like poultry wastes and floral wastes i.e. religious offerings were observed near river banks. Reportedly, the untreated sewage generated from Urja Nagar, Chandrapur is also discharged through drains/outfall into Erai River u/s of SWQM location-3 **(Photographs-5 & 6, Annexure-I).**

- SWQM location-4 (Wardha River at Ballarpur Fort, Near Intake Well of M/s BILT, Ballarpur) there were visual evidences of abundance growth of vegetation at river banks and across the river. Also, dumping of plastic wastes and floral wastes i.e. religious wastes were observed near river banks. Apart from this fishing and cloth washing activities were observed at river banks **(Photographs-7 & 8, Annexure-I).**

- SWQM location-5 (Wardha River at Rajura Bridge, Rajura –Downstream of domestic & industrial discharges) there were visual evidences of growth of macrophytes (submerged & floating vegetation) at river banks. Apart from this, fishing activities were observed at river banks **(Photographs-9 & 10, Annexure-I).**

4.2 AMBIENT AIR QUALITY MONITORING LOCATIONS

During monitoring of ambient air quality in CEPI regions of CPA – Chandrapur following observation are made:

- AAQM location-01: located at MIDC Chandrapur, the location is surrounded by industries, MIDC road where movements of commercial vehicles are common in the area.

- AAQM Location-02: Located at MIDC Tadali, the location is surrounded by industries like TPPs and Sponge Iron etc. apart from this, MIDC road connecting to Chandrapur - Nagpur Highway, railway level crossing. Movement of commercial vehicles and railway wagons is common in the area.

- AAQM Location-03: located at Grampanchayat Office, Ghuggus, the location is surrounded by sponge iron unit, cement industry and WCL over burden in one side and local commercial and residential establishment at other side. Movement of commercial vehicles, emissions attributed from burning of coal in domestic chullahs/shegadis in villages especially during evening hours is common in the area.

- AAQM location-4: located at Nagar Parishad Office, Ballarpur, at the location surrounded by commercial and residential establishment, main road connecting from Ballarpur to Adilabad, Telangana. Continuous movement of commercial vehicles is common in the area.

5.0 ENVIRONMENTAL QUALITY MONITORING RESULTS

5.1 SURFACE WATER QUALITY MONITORING

SET 01: The analysis results of grab samples of surface water quality collected by CPCB on 01.03.2016 in CEPI region of CPA – Chandrapur is depicted in the below table.

Table-5.1.1: Surface water quality monitoring results in CEPI region of CPA – Chandrapur

S. No.	SURFACE WATER ANALYSIS REPORT					
	Parameters	Monitoring locations				
		SW-1	SW-2	SW-3	SW-4	SW-5
1.	pH	8.01	8.31	8.24	8.05	8.34
2.	Conductivity	500	459	529	500	590
3.	Turbidity	7.9	6.7	8.6	3.6	13
4.	Colour	BDL#	BDL#	10	BDL#	10
5.	TSS	9.2	10	13.0	12	43
6.	TDS	305	279	300	296	362
7.	COD	14.2	15.2	22.7	13.4	17.4
8.	BOD	1.0	0.7	1.3	2.4	3.7
9.	NH_3-N	0.28	0.27	0.35	0.33	0.45

S. No.	SURFACE WATER ANALYSIS REPORT					
	Parameters	Monitoring locations				
		SW-1	SW-2	SW-3	SW-4	SW-5
10.	TKN	0.40	0.39	1.46	0.64	2.23
11.	NO_2-N	BDL#	BDL#	BDL#	BDL#	BDL#
12.	NO_3-N	2.4	2.07	3.61	1.99	2.23
13.	Total Ammonia Nitrogen (NH_4 + NH_3-N)	0.562	0.550	0.703	0.663	0.904
14.	Total Nitrogen (TKN+ NO_2-N+ NO_3-N)	2.8	2.42	5.07	2.63	4.46
15.	Free NH_3	0.014	0.027	0.021	0.0132	0.045
16.	Total Hardness	177	166	129	173	183
17.	Chloride	20.5	19.5	50.8	26.4	40
18.	Sulphate	48.5	46.4	56.6	57.9	69.3
19.	Fluoride	0.14	0.66	0.8	0.23	0.15
20.	Phosphate	0.0073	0.0052	BDL#	BDL#	0.0315
21.	Residual chlorine	BDL#	BDL#	BDL#	BDL#	BDL#
22.	Sodium	36.9	35.7	62.9	45.2	58
23.	SAR	1.21	1.2	2.41	1.5	1.87
24.	Total phosphorous	0.362	0.326	0.39	0.435	0.481
25.	Sulphide	BDL#	BDL#	BDL#	BDL#	BDL#
26.	Cyanide	BDL#	BDL#	BDL#	BDL#	BDL#
27.	Phenols	0.057	0.074	BDL#	0.065	0.106
28.	Oil & Grease	0.24	0.33	5.5	0.87	3.4
29.	PAH*	ND##	ND##	ND##	ND##	ND##
30.	Organo Chlorine Pesticides	Absent	Absent	Absent	Absent	Absent
31.	Zinc	0.0281	0.3177	0.022	0.0553	0.1412
32.	Nickel	0.011	BDL#	BDL#	BDL#	BDL#
33.	Copper	BDL#	0.01	BDL#	BDL#	0.0195
34.	Cr^{+6}	BDL#	BDL#	BDL#	BDL#	BDL#
35.	Lead	0.02	0.01	0.02	0.01	0.015
36.	Cadmium	BDL#	BDL#	BDL#	BDL#	BDL#
37.	Mercury	BDL#	2.0	BDL#	BDL#	0.5
38.	Manganese	0.116	0.0485	0.114	0.0425	0.1475
39.	Iron	0.557	0.552	0.464	0.413	6.863
40.	Boron	0.16	0.173	0.093	0.219	0.113
41.	Bio-assay**	100	100	100	100	100
42.	Dissolved Oxygen**	6.84	6.66	7.03	6.20	6.39
43.	Total Coliform **	34	27	22	26	60
44.	Fecal Coliform**	11	08	07	06	12

Note: All the parameters are expressed in mg/l, except pH, SAR, Turbidity (NTU), Conductivity (µ mhos/cm), Color (Hazen Unit), Mercury (µg/l), Bio-assay (% survival in 96 hours at room temperature) and TC & FC (MPN/100 ml)

SW-1 Wardha River – Intake point for M/s ACC Cements, Near Mungoli open cast mines, Ghuggus
SW-2 Wardha River, Near High flood level observation office, Ghuggus – Wani bridge, Niagoan
SW-3 Erai River, Near Nagpur – Chandrapur bridge, Chnadrapur
SW-4 Wardha River at Ballarpur Fort, Near Intake Well of M/s BILT, Ballarpur
SW-5 Wardha River at Rajura Bridge, Rajura –Downstream of domestic & industrial discharges
* The analysis was outsourced to E(P)A approved laboratory i.e. M/s Polucon Laboratories, Surat
** The analysis was carried-out by MPCB, Regional Office Laboratory, Nagpur
\# Below Detection Limit (BDL) for color: 5.0 , NO_2-N: 0.02, PO_4-P: 0.005, Cr^{+6}: 0.0005, Residual Chlorine: 0.04 , S^{-2}: 0.1, CN^-: 0.05, Phenols: 0.001, Hg: 0.2, Cd: 0.01, Cu: 0.01, Ni: 0.01, Mn: 0.01
Not Detected (ND), Minimum Detection Limit: <0.01 mg/l

SET 02: The analysis results of grab samples of surface water quality collected by MPCB on 02.03.2016 in CEPI region of CPA – Chandrapur is depicted in the below table.

Table-5.1.2: Surface water quality monitoring results in CEPI region of CPA – Chandrapur

S. No.	SURFACE WATER ANALYSIS REPORT					
	Parameters	Monitoring locations				
		SW-1	SW-2	SW-3	SW-4	SW-5
1.	pH	7.61	8.37	8.29	8.22	8.16
2.	Conductivity	612	608	755	462	488
3.	Turbidity	1	1	1	1	1
4.	TSS	26	10	10	14	12
5.	TDS	392	362	452	382	484
6.	COD	18	10	17	12	22
7.	BOD					
8.	NH_3-N	0.26	0.41	0.53	0.42	0.46
9.	TKN	3.9	3.0	3.3	3.3	3.0
10.	NO_2-N	0.019	0.027	0.079	0.79	0.077
11.	NO_3-N	0.62	0.59	0.81	0.07	1.11
12.	Total Nitrogen (TKN+ NO_2-N+ NO_3-N)	4.539	3.617	4.189	4.16	4.187
13.	Total Hardness	202	178	186	200	234
14.	Chloride	35	32.0	60	34	51
15.	Sulphate	249	145	287	328	364
16.	Fluoride	0.569	BDL	BDL	BDL	BDL
17.	Dissolved Phosphate	1.57	1.27	0.725	1.28	1.09
18.	Residual chlorine	1.15	Nil	Nil	0.75	1.63
19.	Sulphide	0.04	0.1	0.6	0.08	Nil
20.	Cyanide	BDL	BDL	BDL	BDL	BDL
21.	Phenols	BDL	BDL	BDL	BDL	BDL
22.	Oil & Grease	Nil	Nil	Nil	Nil	Nil
23.	Zinc	BDL	0.039	0.028	BDL	BDL
24.	Nickel	BDL	BDL	BDL	BDL	BDL
25.	Copper	0.004	0.005	BDL	BDL	0.004

S. No.	SURFACE WATER ANALYSIS REPORT					
	Parameters	Monitoring locations				
		SW-1	SW-2	SW-3	SW-4	SW-5
26.	Cr^{+6}	BDL	BDL	BDL	BDL	BDL
27.	Total chromium	BDL	BDL	BDL	BDL	BDL
28.	Lead	BDL	BDL	BDL	BDL	BDL
29.	Cadmium	BDL	BDL	BDL	BDL	BDL
30.	Manganese	BDL	BDL	BDL	BDL	BDL
31.	Iron	BDL	BDL	0.151	BDL	BDL
32.	Boron	0.3718	0.3418	0.7198	0.2724	0.3504
33.	Bio-assay	100	100	100	100	100
34.	Dissolved Oxygen	6.65	6.2	5.10	5.75	5.71
35.	Total Coliform	17	12	21	06	26
36.	Fecal Coliform	08	04	08	02	11
37.	Detergent	0.6756	0.7899	0.7739	0.3636	0.4666

Note: All the parameters are expressed in mg/l, except pH, Turbidity (NTU), Conductivity (µ mhos/cm), Bio-assay (% survival in 96 hours at room temperature) and TC & FC (MPN/100 ml).

SW-1 Wardha River – Intake point for M/s ACC Cements, Near Mungoli open cast mines, Ghuggus

SW-2 Wardha River, Near High flood level observation office, Ghuggus – Wani bridge, Niagoan

SW-3 Erai River, Near Nagpur – Chandrapur bridge, Chnadrapur

SW-4 Wardha River at Ballarpur Fort, Near Intake Well of M/s BILT, Ballarpur

SW-5 Wardha River at Rajura Bridge, Rajura –Downstream of domestic & industrial discharges

5.2 GROUND WATER QUALITY MONITORING

SET 01: The analysis results of grab samples of ground water quality collected by CPCB during 29.02.2016 - 01.03.2016 in CEPI region of CPA – Chandrapur is depicted in the below table.

Table-5.2.1: Ground water quality monitoring results in CEPI region of CPA – Chandrapur

S. No.	GROUND WATER ANALYSIS REPORT				
	Parameters	Monitoring locations			
		GW-1	GW-2	GW-3	GW-4
1.	pH	7.22	7.47	7.43	6.76
2.	Conductivity	1195	1203	1367	945
3.	Colour	BDL#	BDL#	BDL#	BDL#
4.	TDS	714	736	844	611
5.	COD	3.4	2.4	1.8	4.6
6.	NH_3-N	0.23	0.10	0.26	0.29
7.	TKN	0.35	0.21	0.37	0.40
8.	NO_2-N	BDL#	BDL#	0.13	0.28
9.	NO_3-N	18.3	4.15	25.3	34.2
10.	Total Ammonia Nitrogen (NH_4 + NH_3-N)	0.462	0.201	0.522	0.582
11.	Total Nitrogen (TKN+	18.65	4.36	25.8	34.88

S. No.	GROUND WATER ANALYSIS REPORT				
	Parameters	Monitoring locations			
		GW-1	GW-2	GW-3	GW-4
	NO_2-N+ NO_3-N)				
12.	Free NH_3	0.0023	0.001	0.0052	BDL#
13.	Total Hardness	414	237	241	345
14.	Chloride	90.9	62.5	110.4	74.3
15.	Sulphate	51.8	84.7	97.9	83.1
16.	Fluoride	0.96	0.83	1.13	1.05
17.	Phosphate	BDL#	0.0052	BDL#	0.0325
18.	Residual chlorine	BDL#	BDL#	BDL#	BDL#
19.	Sodium	124.7	221.9	238.0	68.6
20.	SAR	2.67	6.27	6.67	1.61
21.	Total phosphorous	0.26	0.27	0.2	0.28
22.	Phenols	BDL#	BDL#	BDL#	BDL#
23.	Organo Chlorine Pesticides	Absent	Absent	Absent	Absent
24.	Zinc	0.2838	0.134	0.4898	0.1232
25.	Nickel	BDL#	0.0125	BDL#	BDL#
26.	Copper	0.018	0.01	BDL#	BDL#
27.	Cr^{+6}	BDL#	BDL#	BDL#	BDL#
28.	Lead	0.03	0.025	0.03	0.035
29.	Cadmium	BDL#	BDL#	BDL#	BDL#
30.	Mercury	BDL#	BDL#	0.75	0.5
31.	Manganese	0.0315	BDL#	0.0875	0.0225
32.	Iron	0.461	0.334	0.175	0.651
33.	Boron	0.153	0.405	0.61	0.591

Note: All the parameters are expressed in mg/l, except pH, Turbidity (NTU), Conductivity (μ mhos/cm), Color (Hazen Unit), SAR and Mercury (μg/l)

GW-1 Hand-pump no. 76 near Grampanchayat Office, Ghuggus

GW-1 Hand-pump near Hanuman Mandir Opp. Grampanchayat Office, MIDC Tadali

GW-1 Hand-pump near Grampanchayat Office, Datala, Chandrapur

GW-1 Bore well near Fire station, Ballarpur

Below Detection Limit (BDL) for color: 5.0 , NO_2-N: 0.02, PO_4-P: 0.005, Cr^{+6}: 0.0005, Residual Chlorine: 0.04 , S^{-2}: 0.1, CN^-: 0.05, Phenols: 0.001, Hg: 0.2, Cd: 0.01, Cu: 0.01, Ni: 0.01, Mn: 0.01

SET 02: The analysis results of grab samples of ground water quality collected by MPCB on 02.03.2016 in CEPI region of CPA – Chandrapur is depicted in the below table.

Table-5.2.2: Ground water quality monitoring results in CEPI region of CPA – Chandrapur

S. No.	GROUND WATER ANALYSIS REPORT				
	Parameters	Monitoring locations			
		GW-1	GW-2	GW-3	GW-4
1.	pH	7.79	8.17	8.05	7.72
2.	Conductivity	543	620	503	1150

S. No.	GROUND WATER ANALYSIS REPORT				
	Parameters	Monitoring locations			
		GW-1	GW-2	GW-3	GW-4
3.	Turbidity	1	1	1	1
4.	TDS	898	1186	1052	788
5.	COD	10	12	08	10
6.	NH_3-N	0.22	0.21	0.19	0.21
7.	TKN	3.0	2.5	1.6	1.5
8.	NO_2-N	10.19	1.09	9.72	10.15
9.	NO_3-N	0.39	0.003	BDL	BDL
10.	Total Nitrogen (TKN+ NO_2-N+ NO_3-N)	13.58	3.593	11.32	11.65
11.	Total Hardness	550	390	266	280
12.	Chloride	81	124	91	63
13.	Sulphate	229	796	652	343
14.	Fluoride	BDL	1.51	1.33	0.8
15.	Dissolved Phosphate	0.655	1.085	1.5	1.91
16.	Residual chlorine	Nil	Nil	Nil	Nil
17.	Phenols	BDL	BDL	BDL	BDL
18.	Zinc	0.099	0.096	BDL	0.147
19.	Nickel	BDL	BDL	BDL	BDL
20.	Copper	0.007	0.004	0.005	0.008
21.	Cr^{+6}	BDL	BDL	BDL	BDL
22.	Total chromium	BDL	BDL	BDL	BDL
23.	Lead	BDL	BDL	BDL	BDL
24.	Cadmium	BDL	BDL	BDL	BDL
25.	Manganese	0.01	0.013	BDL	0.039
26.	Iron	BDL	BDL	BDL	BDL
27.	Boron	0.4783	0.6196	0.4298	0.0281

Note: All the parameters are expressed in mg/l, except pH, Turbidity (NTU), Conductivity (µ mhos/cm)

GW-1 Hand-pump no. 76 near Grampanchayat Office, Ghuggus

GW-1 Hand-pump near Hanuman Mandir Opp. Grampanchayat Office, MIDC Tadali

GW-1 Hand-pump near Grampanchayat Office, Datala, Chandrapur

GW-1 Bore well near Fire station, Ballarpur

5.5 AMBIENT AIR QUALITY MONITORING

The three rounds of ambient air quality monitoring of all notified 12 parameters were monitored for 24 hours during 29.02.216 to 06.03.2016 in CEPI region of CPA – Chandrapur is depicted in the below table.

Table-5.5.1: Ambient air quality monitoring results in CEPI region of CPA – Chandrapur

Parameters	24 hr. average concentration of pollutants											
	AAQ-1*			AAQ-2*			AAQ-3*			AAQ-4*		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
PM_{10} (µg/m^3)	94.9	90.0	87.8	102.2	101.1	93.3	70.33	72.8	74.5	103.46	119.1	100.03
$PM_{2.5}$ (µg/m^3)	38.7	42.9	45.7	54.1	45.3	41.6	31.7	33.3	32.5	60.1	56.3	45.7
SO_2 (µg/m^3)	24.9	22.8	19.3	33.5	35.7	31.2	13.1	12.3	10.6	38.13	36.54	27.51
NO_2 (µg/m^3)	19.07	19.21	15.35	29.3	32.5	27.9	11.23	9.25	5.27	36.53	33.49	29.23
O_3 (µg/m^3)	31.7	26.9	28.4	19.5	20.3	19.69	22.5	21.3	22.6	41.1	39.1	33.2
Pb (µg/m^3)	0.009	0.008	0.007	0.012	0.015	0.011	0.0094	0.0081	0.0078	0.025	0.0044	0.001
CO (mg/m^3)	0.73	0.69	0.78	0.56	0.49	0.42	0.65	0.58	0.61	0.81	0.76	0.73
NH_3 (µg/m^3)	21.6	19.3	23.8	21.53	19.12	17.89	18.5	19.6	16.2	26.5	21.5	22.3
C_6H_6 (µg/m^3)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BaP (ng/m^3)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As (ng/m^3)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ni (ng/m^3)	0.0011	0.0001	0.0001	0.004	ND	0.0003	0.001	ND	ND	0.003	0.001	0.001

Note*

AAQ-1 : MIDC Chandrapur (at M/s Multi Organics Ltd.,)
AAQ-2 : Ghuggus (at Grampanchayat Office)
AAQ-3 : MIDC Tadali (at M/s Grace Industries Ltd.,)
AAQ-4 : Ballarpur (at Nagarparishad Office)
R-1 : Round-1, 01.03.2016 to 02.03.2016
R-2 : Round-2, 03.03.2016 to 04.03.2016
R-3 : Round-3, 05.03.2016 to 06.03.2016
ND : Not Detected

Annexure-I

Photographs-1 & 2: SWQM location-1

Photographs-3 &4: SWQM location-2

Photographs-5 & 6: SWQM location-3

Photographs-7 & 8: SWQM location-4

Photographs-9 & 10: SWQM location-5

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