

Figure 3.2 : Wind class frequency distribution of winter season.

3.4. Air Environment

206. Prevailing air environment i.e. base line conditions in an area is primarily governed by the different activities going on in that area including industrial, agricultural, domestic and commercial activities. The pollutant concentrations in the atmosphere is also governed by the meteorology, topography, natural settings in terms of plantation, forest cover, vegetation etc. as these factors in combination with each other are responsible for dispersion, diffusion, transportation and assimilation of pollutants in the local air shed.

3.4.1. Reconnaissance Survey

207. The prime objective of the AAQ survey within the study area around the fertilizer plant was to establish the existing background levels for various air pollutants e.g. SO_x, NO_x, SPM, CO, NH₃, etc

3.4.2. Ambient Air Quality (AAQ) Monitoring

208. In order to establish existing status of atmospheric conditions of study area in terms of relevant pollutants namely particulate matter (SPM / RSPM), sulphur dioxide, nitrogen oxides and ammonia, AAQ monitoring was carried out for the three seasons. A network of eleven numbers of AAQ stations were set up to establish the base line conditions of air environment in the study area. The AAQ stations locations were selected keeping in mind the findings of the reconnaissance survey, major settlements, micrometeorology and topography of the study area. The locations and bearings of the AAQ stations have been projected in **Table 3.2** and **Figure -3.3**. The respirable dust sampler and high volume sampler along with the analytical methods prescribed by CPCB were used for carrying out air quality monitoring. The data on pollutants concentrations were processed for different statistical parameters like arithmetic mean, minimum and maximum concentration and various percentile values.

Table 3.2 : Field Monitoring Stations in the Study Area

Sr. No	Location	Direction w.r.t CFCL Plant (clockwise)	Distance from CFCL Plant (Km)
1.	CFCL Plant Laboratory	0.0	0.0
2.	Village Simaliya	274 ⁰	9.9
3.	Village Palaytha	120 ⁰	3.2
4.	Village Khan Ki Jhopadiya	165 ⁰	2.1
5.	Village Dugari	127 ⁰	7.6
6.	Village Darbhiji	315 ⁰	6.7
7.	Village Bhojakhedi	56 ⁰	8.1
8.	Village Bamuliyamataji	149 ⁰	8.4
9.	Village Bamori	313 ⁰	3.6
10.	Village Ballabpura	257 ⁰	3.6
11.	Village Anta	96 ⁰	8.4

3.4.3. Micro - Meteorology

209. The micrometeorological conditions at the site will regulate the transport and diffusion conditions of air pollutants released into the atmosphere. The principal meteorological variables are horizontal convective transport (average wind speed and direction), vertical convective transport, (atmospheric stability and mixing height) and topography of the area. Topography of the study area is flat with little undulations.

3.4.4. Baseline Status

210. The existing baseline levels with respect to SPM, RSPM, SO₂, NO_x, CO, HC and NH₃ are presented in **Table 3.3** along with analysis; represent the cross sectional distribution of baseline air quality status in the study region.

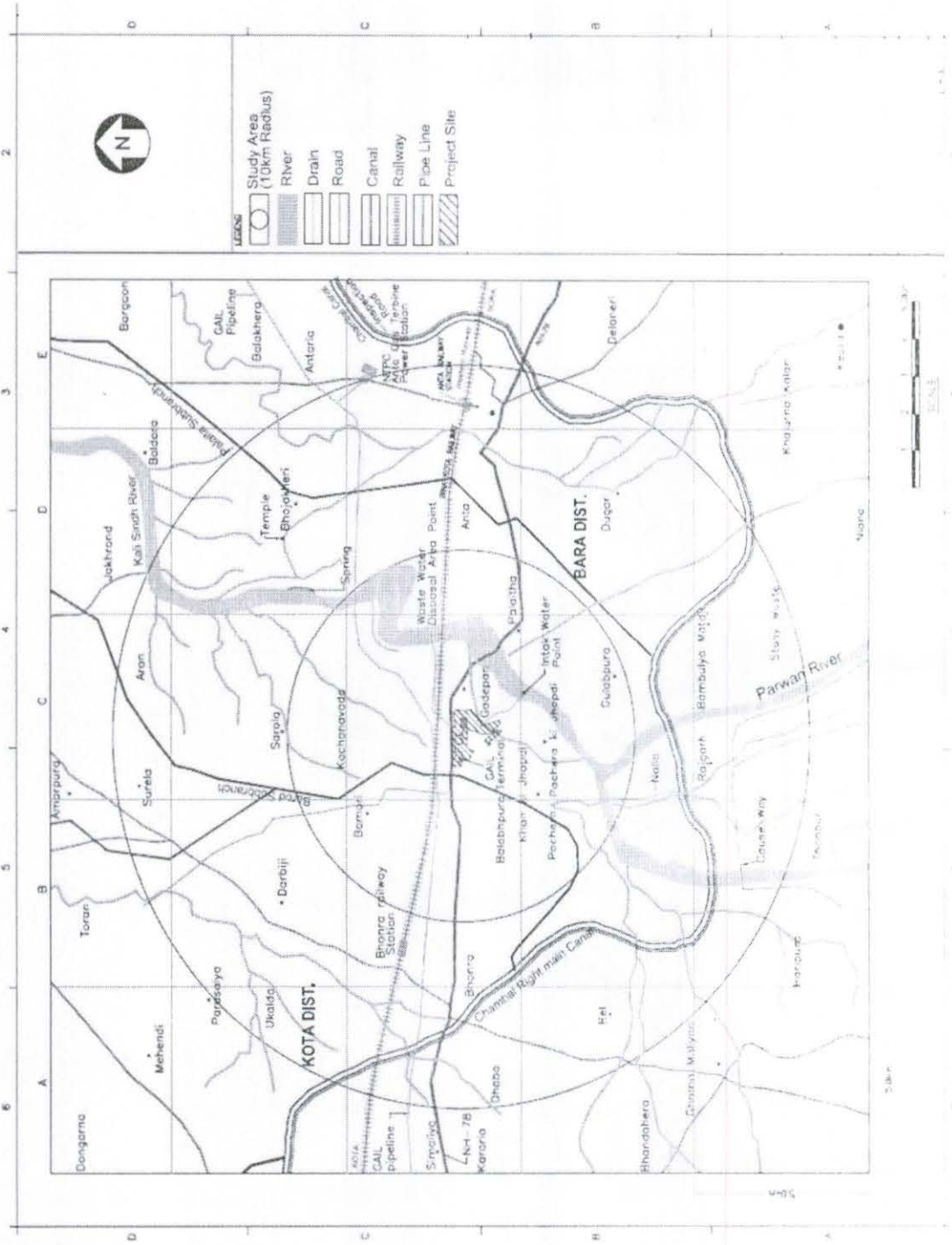


Figure 3.3 : Study area map

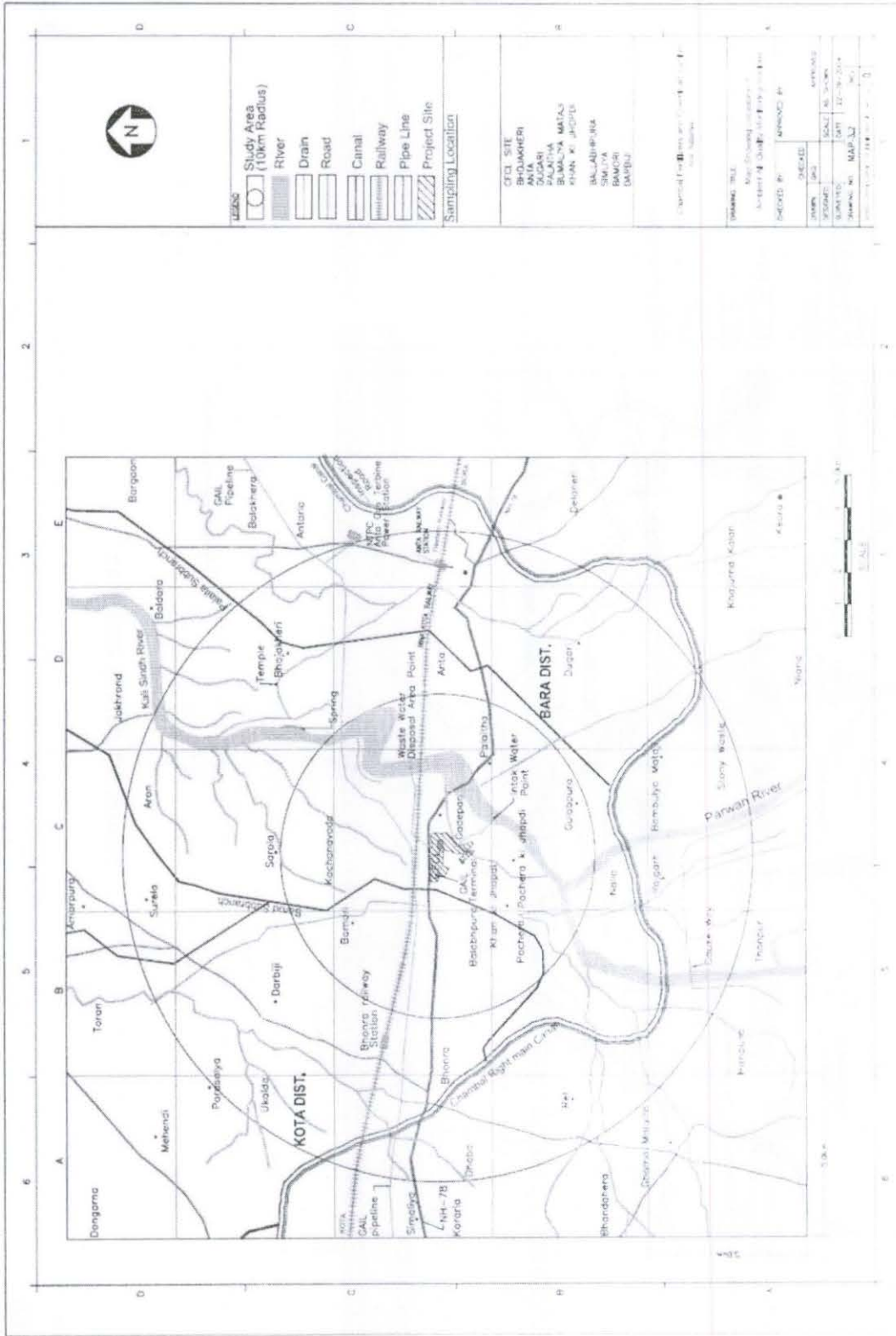


Figure 3.4 : Sampling location Map

211. The ambient Air quality levels at all the sampling locations were within the limits as specified by CPCB for industrial / mixed use and residential / rural use. The existing ambient NH₃, SO₂, NO_x and SPM concentrations (average of the three months) in the above sites described are given in **Table 3.3**. National Ambient Air Quality Standards are given in **Table 3.4**.

3.4.4.2 *Suspended Particulate Matter (SPM)*

212. The ambient air quality status of particulate matters within 10 km of study area is given in **Table 3.3**. The average SPM and RSPM concentrations of all the Air Monitoring sites ranged from 164 to 219 µg/m³ and 63.4 to 92.5 µg/m³ respectively. Maximum concentration of SPM (465 µg/m³) was observed at Anta at a distance of about 8.4 km in East direction may be due to local phenomenon Minimum concentration of SPM (122 µg/m³) was observed at Palaytha at a distance of about 3.2 km in East direction. Higher concentration of SPM at other stations are mostly due to local phenomena including vehicular activities and natural dust getting air borne due to man made activities and wind blowing (including vehicular activities, unmetalled roads, barren land etc.). AAQ quality in study area is slightly exceeding with respect to residential area norms of both SPM (200 µg/m³ for residential and rural area and 500 µg/m³ with respect to industrial area) and RSPM (60 µg/m³ for residential and rural area and 100 µg/m³ with respect to industrial area).

Table 3.3 : Ambient Air Quality Data in and around the CFCL, Gadepan (µg/m³)

Location1: Ambient Air Monitoring for Project Location Lab Tech Building

Distance from project site: 0.0 Km

S.NO	DATE	PARAMETER						
		SPM	RSPM	SO _x	NO _x	NH ₃	HC	VOC
1	4.11.08	218	95.6	1.1	16	19	7	6
2	7.11.08	186	92.5	2.7	19	27	5	7
3	11.11.08	176	89.5	2.3	24	21	6	11
4	14.11.08	188	66.8	1.8	18	25	3	2
5	18.11.08	87	56.9	1.5	13	17	7	3
6	21.11.08	95	66.4	2.7	19	18	5	3
7	25.11.08	168	75.6	2.3	18	19	8	5.5
8	28.11.08	196	84.5	2.7	17	25	9	4.5
9	2.12.08	178	55.8	3.4	22	27	12	5.2
10	5.12.08	184	62.8	3.2	21	28	11	4
11	9.12.08	178	70.2	2.8	21	32	12	5
12	12.12.08	162	61.6	3.2	19	30	14	3

13	16.12.08	144	56.9	2.6	17	24	11	7
14	19.12.08	174	70.4	3.4	21	31	8	5
15	23.12.08	186	71.4	3	20	30	20	3.5
16	26.12.08	164	61.4	2.8	20	29	11	5
17	30.12.08	158	57.4	2.6	19	25	12	4
18	2.01.09	180	56.6	3.2	22	25	12	5
19	6.01.09	162	74.8	3.4	22	22	14	4.5
20	9.01.09	176	66.8	2.2	19	19	15	3.5
21	13.01.09	188	70.2	2.8	19	24	18	5
22	16.01.09	154	68.8	3.6	19	22	20	7
23	20.01.09	168	56.8	3.1	20	24	21	4
24	23.01.09	176	72.4	2.5	20	26	11	12
25	27.01.09	184	70.2	2.9	19	26	10	4
	Max	218	95.6	3.6	23.7	32.2	21	12
	Min	87	55.8	1.1	12.7	16.5	3	2
	Avg	169	69.3	2.7	19.3	24.4	11	5.29

Location 2: Simaliya

Distance from project site : 7.0 Km

Direction : West

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	5.11.08	235	105	5.2	21	4.2	14	2
2	09.11.08	216	106.4	6.3	20	4.8	13	3
3	12.11.08	226	87	5.8	23	5.1	14	5
4	16.11.08	212	87.7	3.6	24	6.2	15	4
5	19.11.08	224	109.6	4	24	5.7	12	3
6	23.11.08	399	110.1	3.4	21	4.7	13	5
7	26.11.08	182	108.3	5.3	21	5.7	12	3
8	30.11.08	178	101.4	3.8	15	4.5	15	4
9	3.12.08	168	117.7	5.6	19	2.2	16	5

10	7.12.08	403	102.5	8.5	39	0	14	2
11	10.12.08	194	103.2	5.3	19	4.5	13	4
12	14.12.08	218	80.8	7.6	19	5.1	14	5
13	17.12.08	189	92.3	2	17	4	12	5
14	21.12.08	198	96.2	4.2	17	5.3	13	7.2
15	24.12.08	207	78.1	3.2	19	4.5	14	3.5
16	28.12.08	181	80.2	4.6	20	4.8	14	4.7
17	31.12.08	153	62.6	6.6	20	4.7	12	5.5
18	4.01.09	197	81.9	3.2	14	4.2	13	4.3
19	7.01.09	204	89.9	1.2	12	4.6	13	3.2
20	11.01.09	174	73.5	5.4	16	4.3	11	5.7
21	14.01.09	197	89.5	3.7	20	4.1	12	8.5
22	18.01.09	195	97.2	2.6	15	4.5	12	7.5
23	21.01.09	186	78.8	4.1	18	4.9	13	4.5
24	25.01.09	172	81.2	3.8	16	4.6	12	3.5
	Max	403	117.7	8.5	38.8	57.3	16	8.5
	Min	153	62.6	1.2	11.8	0	11	2
	Avg	213	92.5	4.5	19.5	7.4	13	4.5

Location 3: Palayatha

Distance from project site: 3.5 Km

Direction: East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	5.11.08	206	86.7	4	19	23	21	6.7
2	9.11.08	212	96.1	3.9	19	27	21	4.5
3	12.11.08	198	80.3	6.1	15	6.8	23	5.2
4	16.11.08	122	82	6.1	19	35	26	7.2
5	26.11.08	210	75.7	5.3	17	2.6	27	3.5
6	19.11.08	216	85.3	2.6	18	4	21	12
7	23.11.08	194	85.7	8.7	42	49	23	12
8	30.11.08	403	82.8	6.1	16	0	22	5

9	3.12.08	206	82.4	6.1	15	56	24	4
10	7.12.08	198	84.4	5.1	13	0	21	5
11	10.12.08	224	99.8	4	18	4.2	12	7.2
12	14.12.08	214	97	3.5	18	3	3	6.5
13	17.12.08	148	55.1	6.1	39	6.8	11	8.2
14	21.12.08	206	74.7	6.1	19	4.7	12	10
15	24.12.08	186	70.4	4.9	16	7.5	13	5.7
16	28.12.08	192	78.5	2.3	17	3.3	14	4.5
17	31.12.08	152	80.8	3.3	19	3.2	15	10
18	4.01.09	162	81.5	3.5	17	4.2	12	4.3
19	7.01.09	196	79.2	1.5	15	56	11	2.5
20	11.01.09	190	57.3	2.3	19	2.8	12	5.5
21	14.01.09	188	83.5	2.8	17	3.8	11	3.5
22	18.01.09	204	88.4	3.2	19	5.6	10	4.5
23	21.01.09	196	78.8	4.2	19	3.7	8	2.1
24	25.01.09	168	74.2	1.8	15	2.6	7	7.2
	Max	403	99.8	8.7	42.3	56.1	27	12
	Min	122	55.1	1.5	12.9	0	3	2.1
	Avg	200	80.9	4.3	19.1	13	16	6.18

Location 4: Khan Ki Jhopadiya

Distance from project site: 2.8 Km

Direction: South-East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	5.11.08	193	70.2	3.3	15	4.2	11	5
2	9.11.08	175	77	2.1	15	4	8	7.5
3	12.11.08	189	65.9	2	13	3.8	12	4
4	16.11.08	180	72.9	2.6	15	55	13	4
5	19.11.08	198	64.7	5.5	15	9.3	5	5
6	23.11.08	162	63.5	6.4	17	8.1	6	6.5
7	26.11.08	207	56.8	6.4	41	7.5	7	6.2

8	30.11.08	188	79.2	4.6	18	38	15	11
9	3.12.08	198	78.7	4.7	19	6.7	7	7
10	7.12.08	189	83.8	3.9	17	6.8	4	8
11	10.12.08	192	123.3	6.1	15	41	21	7.5
12	14.12.08	177	69.4	6.6	13	9.8	12	4.5
13	17.12.08	182	58.9	4.4	17	8	8	10
14	21.12.08	174	76.9	4.9	16	6	5	4.5
15	24.12.08	185	74.7	4.2	18	4	7	12
16	28.12.08	195	63.4	5.5	13	6.8	5	10
17	31.12.08	167	59	3.8	9.6	34	12	8.2
18	4.01.09	184	79	6.4	14	23	12	7.5
19	7.01.09	193	73.3	7.2	10	4.4	3	1.2
20	11.01.09	192	75.9	4.1	16	4.7	5	4.5
21	14.01.09	199	52.4	5.5	12	34	21	6.2
22	18.01.09	184	57.1	3.8	8.8	3.9	22	11
23	21.01.09	166	59.2	5.5	13	8.2	12	11
24	25.01.09	189	62.8	3.2	16	5.6	11	7
	Max	207	123.3	7.2	40.7	55.3	22	12
	Min	162	52.4	2	8.8	3.8	3	1.2
	Avg	186	70.8	4.7	15.6	14	10	7.01

Location 5: Dugari

Distance from project site: 8.0 Km

Direction: South-East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	04.11.08	185	69.7	2.8	12	4.7	5	7
2	08.11.08	181	61	2.7	14	4.8	4	5
3	11.11.08	440	57.2	2.3	17	0	6	5.5
4	15.11.08	181	63.2	2.7	39	0	7	4.8
5	18.11.08	161	58.6	2.2	16	5.2	4	6.4
6	22.11.08	179	55.3	2.2	16	4.6	5	11

7	25.11.08	175	57.3	2.3	13	5.1	6	10
8	29.11.08	177	66	3	16	0	7	1.2
9	2.12.08	176	63.1	3.3	13	4.8	5	1.5
10	6.12.08	172	69.3	2.6	13	5	8	2.5
11	9.12.08	180	60.8	2.9	40	6	12	5.7
12	13.12.08	173	55.8	2.2	17	55	12	4.5
13	16.12.08	172	67.2	1.5	16	6	7	5.5
14	20.12.08	186	51.3	2.8	14	4.7	7	2.2
15	23.12.08	184	75.7	2.4	19	4.8	8	1.5
16	27.12.08	160	76.1	1.5	13	5.3	5	2.5
17	30.12.08	172	74.8	3	12	4.6	5	3.2
18	3.01.09	189	66.8	0	16	5.2	7	4.8
19	6.01.09	160	70.5	0	18	4.6	5	2.1
20	10.01.09	155	43.8	0.6	15	5	5	2.1
21	13.01.09	187	51.8	1.1	15	4.8	3	1.4
22	17.01.08	190	72.6	1.2	18	22	14	1.2
23	20.01.09	168	82.2	1.4	12	5.3	7	1.2
24	24.01.09	164	58.4	0.8	14	4.7	4	0.8
	Max	440	82.2	3.3	40.1	55.2	14	11
	Min	155	43.8	0	11.6	0	3	0.84
	Avg	186	63.7	2	17	7.2	7	4.05

Location 6: Darbhiji

Distance from project site: 7.0 Km

Direction: North-West

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	6.11.08	168	54.3	6.2	16.6	8	5	2
2	10.11.08	172	50.8	4.6	15.3	54	27	5
3	13.11.08	328	62.6	3.4	15.5	5.8	21	7
4	17.11.08	197	65	3.9	13.8	4.7	23	5
5	20.11.08	182	60.4	2.5	11.3	5.1	24	6

6	24.11.08	174	76.9	5	13.2	5.3	12	4
7	27.11.08	198	60.9	4.4	37.9	4.4	17	5
8	1.12.08	181	56.9	3.5	13.7	5	18	3.7
9	4.12.08	193	139.6	3.6	11.6	5.6	20	2.5
10	8.12.08	162	62.8	3.7	13.4	5.2	12	1.5
11	11.12.08	188	59.4	4.3	12.6	4.7	24	2.5
12	15.12.08	136	61	3.2	17.7	4.9	12	6
13	18.12.08	144	57.2	2.5	17	5.1	5	4.5
14	22.12.08	160	46.3	1.5	16.1	4.4	7	3.5
15	25.12.08	141	55.5	1.2	16.8	5.5	24	2.8
16	29.12.08	154	72.7	1.2	16.8	4.8	7	3.4
17	1.01.09	142	67.9	1.2	16.8	4.6	8	4.6
18	5.01.09	171	77.7	1.2	16.8	4.2	6	3.4
19	8.01.09	169	61.5	1.2	16.8	5	5	4.5
20	12.01.09	144	52.2	1.7	15.5	6.1	4	2.5
21	15.01.09	186	124	2.2	17.2	5.2	5	1.8
22	19.01.09	177	72.2	1.2	10.8	4.6	6	7.5
23	22.01.09	182	66.4	0.8	13.4	4.8	7	6.5
24	27.01.09	168	66.8	2.2	15.8	5.3	8	2.8
	Max	328	139.6	6.2	37.9	5.5	27	7.5
	Min	136	46.3	0.8	10.8	4.2	4	1.5
	Avg	176	68	2.8	15.9	9.2	13	4.12

Location 7: Bhojakhedi

Distance from project site: 8.0 Km

Direction: North-East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	04.11.08	172	62.3	2.6	13.1	6.6	7	4.5
2	08.11.08	198	70.2	8.3	16.4	49	24	2.1
3	11.11.08	177	66	3	15.9	36.5	17	1.2
4	15.11.08	192	60.2	7.4	16.1	7.4	8	0.45

5	18.11.08	216	66.2	8.5	18.3	6.8	4	1.2
6	22.11.08	194	55.7	6.1	16.4	6.9	5	2.1
7	25.11.08	185	62.6	8.2	16.6	7	7	2.5
8	29.11.08	161	46.8	7.6	35.5	7.6	5	1.7
9	2.12.08	174	141.1	7.1	17.8	0	4	2.25
10	6.12.08	186	64.2	4.7	15.2	6.8	12	1.7
11	9.12.08	174	66.9	0.6	16.7	7.1	11	1.8
12	13.12.08	170	54.8	5.5	14	6.9	13	1.5
13	16.12.08	155	54.1	1.4	16	6.6	14	2.2
14	20.12.08	172	60.3	1.8	16.6	6.4	15	2.5
15	23.12.08	151	51.2	2.1	17.4	6.5	13	1.7
16	27.12.08	161	53.7	1	17.9	7	12	1.45
17	30.12.08	156	65.8	0.8	18.2	7.2	10	0.85
18	03.01.09	194	67.7	3.6	16.6	7.4	7	1.1
19	6.01.09	151	65.7	4.2	15.2	6.9	8	2.1
20	10.01.09	168	70.2	1.8	17.6	6.8	7	4.6
21	13.01.09	178	78.8	2.8	18.2	6.7	8	3.25
22	17.01.09	152	42.6	0.6	14.2	7	9	4.7
23	20.01.09	182	69.4	1.4	10.8	7.4	5	1.1
24	24.01.09	162	71.2	2.6	11.6	7.3	6	2.5
	Max	216	141.1	8.5	35.5	49	24	4.7
	Min	151	42.6	0.6	10.8	0	4	0.45
	Avg	174	65.3	3.9	16.8	9.7	10	2.16

Location 8: Bamuliya Mataji

Distance from project site: 8.2 Km

Direction: Direction: South-East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	6.11.08	198	62.8	4.6	14.5	3.4	5	6
2	10.11.08	173	60.3	2.3	16.8	3.2	7	4.5
3	13.11.08	194	76.5	7.3	14.5	0	4	2.5

4	17.11.08	187	60.4	3.9	13.6	0	5	3.5
5	20.11.08	164	76.7	3.4	15.5	4	7	1.5
6	24.11.08	136	65.2	2.8	8.2	24.8	6	2.5
7	27.11.08	170	71	2.6	14.2	21.9	3	4.8
8	1.12.08	161	53.2	3.6	10.4	4.1	12	7.2
9	4.12.08	173	73.9	3	14.5	3.9	11	5.5
10	8.12.08	168	63.9	5.4	13.8	3.6	8	4.5
11	11.12.08	156	66	2.8	16.4	8.6	9	2.8
12	15.12.08	167	60.7	3.9	15.2	53.7	21	7.5
13	18.12.08	162	52.5	1.7	17.5	6	13	5.5
14	22.12.08	165	56.3	1.4	14.9	3	10	1.5
15	25.12.08	163	61.9	1.2	39.8	4.2	12	7.2
16	29.12.08	159	58.8	2.7	15.1	3.8	14	5.5
17	1.01.09	150	68.8	3.4	13.8	3.7	12	8.5
18	5.01.09	160	56.5	2.2	17.2	3.8	7	4.5
19	8.01.09	181	71.6	3.2	10.5	4.2	12	2.5
20	12.01.09	174	51.6	2.4	11.6	5.8	8	4.5
21	15.01.09	175	66.8	0.8	13.8	4.2	11	1.1
22	19.01.09	178	59.7	1.2	9.2	4.1	8	2.5
23	22.01.09	176	70.8	2.2	12.2	3.7	8	3.8
24	27.01.09	160	55.8	0.4	7.2	3.2	7	1.1
	Max	198	76.7	7.3	39.8	53.7	21	8.5
	Min	136	51.6	0.4	7.2	0	3	1.1
	Avg	169	63.4	2.9	14.6	7.5	9	4.5

Location 9: Bamori

Distance from project site: 2.9 Km

Direction: North

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	4.11.08	198	70.5	7.5	14.1	31.7	15	4.5
2	8.11.08	168	73.5	7.9	16.6	5.4	7	5.2

3	11.11.08	158	76.5	7.5	19	5.6	3	4.5
4	15.11.08	188	71.6	7.1	13.1	6.4	12	2.4
5	18.11.08	65	19.5	6.4	17.8	5.6	11	4.5
6	22.11.08	182	72.7	8.8	19.4	6.1	14	3.5
7	25.11.08	178	68.7	5.5	37.1	0	13	2.5
8	29.11.08	195	76.2	8.7	19.4	5.2	12	4.5
9	2.12.08	172	62.8	8.4	18.2	46.2	17	7.2
10	6.12.08	192	79.2	6.9	36	5.3	7	2.4
11	9.12.08	178	74.3	5.5	18.4	5.5	6	1.2
12	13.12.08	189	83.8	3.9	16.7	6.4	12	1.5
13	16.12.08	179	55.3	2.2	15.9	5.8	14	3.5
14	20.12.08	188	66.2	8.5	18.3	5.2	5	4.5
15	23.12.08	181	76.7	7.3	16.5	49.8	3	7.2
16	27.12.08	184	77.5	4.3	16.4	7	8	4.5
17	30.12.08	195	70	4.6	15.7	6.2	11	3.2
18	3.01.09	148	66.7	4.9	18.4	5.1	7	4.5
19	6.01.09	161	75.7	6.1	15.5	5.6	12	6.2
20	10.01.09	184	69.2	5.6	16.8	5.3	14	5.5
21	13.01.09	185	71	6.1	15.3	6	7	2.5
22	17.01.09	160	74.6	7.3	19.4	5.7	21	4.5
23	20.01.09	190	45.8	0.6	21.1	5.3	11	6
24	24.01.09	170	61.2	0.8	19.4	5.8	8	7.2
	Max	198	83.8	8.8	37.1	49.8	21	7.2
	Min	65	19.5	0.6	13.1	0	3	1.2
	Avg	175	68.3	5.9	18.9	10.1	11	4.3

Location 10: Ballabpura

Distance from project site: 2.7 Km

Direction: West

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	5.11.08	196	77.9	7.8	18.7	5.8	5	7.2
2	9.11.08	188	78.8	9.1	17	9.3	12	5.6

3	12.11.08	338	148	4.5	15.5	7.5	11	5.5
4	16.11.08	178	73.6	4.9	16.4	33.2	21	6
5	19.11.08	210	67.7	6.5	14.2	7.4	13	7.2
6	23.11.08	166	76.4	7.3	12.3	21.4	14	4.5
7	26.11.08	214	71.3	6.5	18.2	28.2	15	5.5
8	30.11.08	218	69.1	6.6	17.6	34.5	11	2.7
9	3.12.08	194	71.3	9.1	17.8	4.6	12	6.5
10	7.12.08	387	65.7	9.3	15.6	55	14	4.5
11	10.12.08	178	69.2	5.2	15.2	10.7	15	7.5
12	14.12.08	164	76.1	8.1	14.5	6.1	21	2.5
13	17.12.08	194	77.5	6.4	15.3	10.3	21	3.5
14	21.12.08	206	64.6	6.2	16.6	12.6	16	5.2
15	24.12.08	185	66.7	5.4	17.2	52	17	7.2
16	28.12.08	194	71	6.8	15.7	7.4	11	1.1
17	31.12.08	180	66.9	5.1	16.4	10.4	8	2.5
18	4.01.09	189	74.1	7.4	16.1	14.2	9	5
19	7.01.09	187	70.5	6.1	14.5	13.2	11	4.5
20	11.01.09	194	65.5	3.8	12.8	6.3	7	6.2
21	14.01.09	182	83.7	5.9	17.4	7.8	10	7.2
22	18.01.09	183	81	7.2	11.6	9.2	12	3.5
23	21.01.09	198	65.9	8.6	13.7	12.2	13	4.2
24	25.01.09	171	70.9	2.8	14.6	11.8	10	1.1
	Max	387	148	9.3	18.7	55	21	7.5
	Min	164	64.6	2.8	11.6	4.6	5	1.1
	Avg	204	75.1	6.5	15.6	16.3	13	4.8

Location 11: Anta

Distance from project site: 8.7 Km

Direction: East

S.NO	DATE	PARAMETER						
		SPM	RSPM	SOX	NOX	NH3	HC	VOC
1	4.11.08	216	97.5	7.5	18.1	21.8	22	12

2	8.11.08	218	105.8	7	18.4	2.5	24	11
3	11.11.08	328	130	7	21.1	16.8	21	14
4	15.11.08	214	109.5	5.4	16.7	17.8	17	13
5	18.11.08	221	102.8	6.1	11	22.6	18	11
6	22.11.08	206	106.5	7.2	18	15.8	7	2.5
7	25.11.08	204	102.8	7.2	18.5	20.5	8	6.7
8	29.11.08	228	92.4	6.8	15.5	18.7	8	7.5
9	2.12.08	218	93.4	8.7	17	3.1	9	8.2
10	6.12.08	211	107.5	9.1	15.2	8	12	4.5
11	9.12.08	224	96.8	6.3	14.2	2.6	12	5.2
12	13.12.08	465	88	9.8	16.4	2.8	15	4.5
13	16.12.08	195	78.5	5.9	14.8	8	12	3.2
14	20.12.08	236	77.9	6	16.4	7	11	5.2
15	23.12.08	190	76.2	5.1	15.4	5.8	7	7.5
16	27.12.08	180	79.7	7.6	18.2	6.2	8	8.2
17	30.12.08	192	73.7	6.1	17.6	2.4	10	1.5
18	3.01.09	184	79.3	8.5	16.5	5	7	15
19	6.01.09	205	83	7.2	18.5	3.4	8	17
20	10.01.09	203	86	7.1	17.8	4.2	9	12
21	13.01.09	174	89.2	6.2	15.4	2.6	4	11
22	17.01.09	188	98.2	5.2	17.2	3.1	10	10.5
23	20.01.09	186	66.4	8.4	18.6	2.8	4	11.5
24	24.01.09	171	93.5	6.8	15.8	4.2	10	2.8
	Max	465	130	9.8	21.1	22.6	24	17
	Min	171	66.4	5.1	11	2.4	4	1.5
	Avg	219	92.3	7	16.8	8.7	12	8.6

Table 3.4 : National Ambient Air Quality Standards

Pollutants	Time-weighted average	Concentration in ambient air			Method of measurement
		Industrial Areas	Residential, Rural & Other Areas	Sensitive Areas	
SulphurDioxide (SO₂)	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³	- Improved West and Geake Method - Ultraviolet Fluorescence
	24 hours**	120 µg/m ³	80 µg/m ³	30 µg/m ³	
Oxides of Nitrogen as (NO₂)	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³	- Jacob & Hochheiser Modified (Na-Arsenite) Method - Gas Phase Chemiluminescence
	24 hours**	120 µg/m ³	80 µg/m ³	30 µg/m ³	
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m ³	140 µg/m ³	70 µg/m ³	- High Volume Sampling, (Average flow rate not less than 1.1 m ³ /minute).
	24 hours**	500 µg/m ³	200 µg/m ³	100 µg/m ³	
RespirableParticulate Matter (RPM) (size less than 10 microns)	Annual Average*	120 µg/m ³	60 µg/m ³	50 µg/m ³	- Respirable particulate matter sampler
	24 hours**	150 µg/m ³	100 µg/m ³	75 µg/m ³	
Lead (Pb)	Annual Average*	1.0 µg/m ³	0.75 µg/m ³	0.50 µg/m ³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 µg/m ³	1.00 µg/m ³	0.75 µg/m ³	
Ammonia¹	Annual Average*	0.1 mg/m ³	0.1 mg/m ³	0.1 mg/m ³	-
	24 hours**	0.4 mg/m ³	0.4 mg/m ³	0.4 mg/m ³	
CarbonMonoxide (CO)	8 hours**	5.0 mg/m ³	2.0 mg/m ³	1.0 mg/m ³	- Non Dispersive Infra Red (NDIR)

	1 hour	10.0 mg/m ³	4.0 mg/m ³	2.0 mg/m ³	Spectroscopy
*			Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.		
**			24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.		
<p>NOTE:</p> <p>1. National Ambient Air Quality Standard: The levels of air quality with an adequate margin of safety, to protect the public health,, vegetation and property.</p> <p>2. Whenever and wherever two consecutive values exceeds the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.</p> <p>3. The standards for H₂S and CS₂ have been notified seperately vide GSR No. 7, dated December 22, 1998 under Rayon Industry - for details please see Sl. No. 65 of this document. [S.O. 384(E), Air (Prevention & Control of Pollution) Act, 1981, dated April 11, 1994] [EPA Notification: GSR 176 (E), April 02, 1996]</p> <p>1. Included vide Notification SO. 955 (E), Air (Prevention & Control of Pollution) Act, 1981 dated October 14, 1998)</p>					

3.4.4.3 Sulphur Dioxide (SO₂) and Oxides of Nitrogen

213. An analysis of the SO_X and NO_X concentration data in the study area reveals that the SO₂ and NO_X concentration was far below the limits promulgated by CPCB i.e. 120 µg/m³ for industrial area and 80 µg/m³ for residential area at all sites. The average SO_X and NO_X concentrations of all the Air Monitoring sites ranged from 2.0 to 7.0 µg/m³ and 19.5 to 38.9 µg/m³ respectively. Maximum concentration of SO_X (9.8 µg/m³) was observed at Anta at a distance of about 8.4 km in East direction may be due to local phenomenon. Minimum concentration of SO_X (0.0 µg/m³) was observed at Dugari at a distance of about 7.6km in South-East direction. Maximum concentration of NO_X (42.3 µg/m³) was observed at Palaytha at a distance of about 3.2 km in East (but well within the standards). Minimum concentration of NO_X (10.8 µg/m³) was observed at Darbhiji (6.7 km in NW direction) and Bhojakhedi (8.1 km in NE direction).
214. The primary sources of air pollution are the stacks of boiler, the reformer, the power plant (Gas Turbine) and the Prilling tower. Very limited emission can also come as fugitive emission from urea conveyors, bagging plant etc. Monitoring of stacks has been carried out and the findings are given in Table 2.5 and Table 2.6.

3.4.4.4 Ammonia

215. The average NH₃ concentrations of all the Air Monitoring sites ranged from 7.2 to 16.3 µg/m³ respectively. Maximum concentration of NH₃ (57.3 µg/m³) was observed at Simaliya at a distance of about 7.0 km in West direction may be due to local phenomenon. Minimum concentration of NH₃ (0.0 µg/m³) was observed at six locations (Simaliya, Palaytha, Dugari, Bhajakhedi, Bamuliya mataji and Bamori).The ammonia concentration at all site is within the prescribed norms of 100 µg/m³.

3.4.4.5 Hydro Carbons

216. The average hydrocarbons (HC) concentrations at all the Air Monitoring sites ranged from 9.96 to 15.77 $\mu\text{g}/\text{m}^3$ respectively. Maximum concentration of HC (27 $\mu\text{g}/\text{m}^3$) was observed at Palaytha at a distance of about 3.2 km in South-East direction may be due to local phenomenon. Minimum concentration of HC (3.0 $\mu\text{g}/\text{m}^3$) was observed at five locations (Near Laboratory, Palaytha, Dugari, Bamuliya mataji and Bamori).
217. The average Volatile Organic Carbon (VOC) concentrations at all the Air Monitoring sites ranged from 4.12 to 8.6 $\mu\text{g}/\text{m}^3$ respectively. Maximum concentration of VOC (17 $\mu\text{g}/\text{m}^3$) was observed at Anta at a distance of about 8.4 km in East direction may be due to local phenomenon. Minimum concentration of VOC (0.45 $\mu\text{g}/\text{m}^3$) was observed at Bhojakhedi at a distance of 8.1 km in North - East direction.
218. National AAQ norms for residential areas are always met for SOX, NOX, and Ammonia. For SPM /RSPM they could not be met due to local phenomenon. No limit has been specified for HC and VOC in national Ambient Air Quality standards.
219. In addition to the above, as per the TOR conditions, F and HF monitoring was also conducted at work place environments and the ambient air quality monitoring stations in the month of May 2009 and it was observed that the concentrations were observed below the detection limits (BDL). This is because there is no direct source of F and HF emission from the plant and nearby areas.

3.5. Noise Environment

220. Noise can be defined as an unwanted sound. Noise beyond a certain level has an adverse impact on human beings and their environment. If intense enough it can damage hearing or is otherwise annoying. Noise can also disturb natural wild life and Ecological systems. Noise levels arising out of plant machinery in industrial complexes are sometimes too high and harmful to plant personals.
221. Noise survey of the study area was carried out to understand the existing status of the noise level in the area. The noise monitored at 13 locations (both residential as well as at commercial locations) are given in **Table 3.5**. The objective of survey was to assess the impact of noise that is being generated by existing units of Ammonia, Urea, Steam Generation Plant, Power Plant, DM Plant etc and its impact on human settlements in the study area Ministry of Environment and Forests has notified the ambient standards in respect of noise and have been given in **Table 3.6**.
222. Background noise levels (day and night) were monitored in the few selected adjoining villages within the study area.

Table 3.5 : Day and Night Noise Levels in the Study Area

Sr. No.	Location	Noise Level dB(A)		
		26-11-08	23-12-08	16-01-09
1.	Shopping Centre	54.9	53.1	55.0
2.	Colony Guest House	43.5	47.6	47.6

3.	Simaliya NH-76	68.4	80.2	81.0
4.	Ballabpura	43.7	45.6	48.1
5.	Bamori	43.5	47.8	49.6
6.	Darbhiji	43.7	45.8	47.7
7.	Khan Ki Jhopadiya	43.6	44.5	49.0
8.	Anta	42.3	48.5	49.7
9.	Bhojakhedi	41.8	45.6	49.1
10.	Palaytha	41.9	48.9	49.1
11.	Bamuliya Mataji	40.7	45.7	49.3
12.	Dugari	43.0	46.8	45.1
13.	Simaliya	41.5	52.7	53.3

Table 3.6 : Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area	Leq. Limits in dB(A)	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

- Note:-**
1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
 2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
 3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority.
 4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

Source: Pollution Control Acts, Rules and Notifications Issued There under, Central Pollution Control Board, Delhi, May 1998.

223. The noise levels around CFCL plant are given in **Table 3.5**. In the villages (residential areas), the noise were levels observed in the range of 40.7– 49.7

dB (A) and in the commercial area the noise levels were 41.5 – 55.0 dB (A). The noise level was also monitored near the NH-76 (village Simaliya) and was observed 68.4 to 81.0 dB(A). This is mostly due to traffic.

3.6. Water Environment

224. Water environment of an area is broadly classified into the following categories

- Surface water: Rivers, drains, canals, ponds etc.
- Ground Water: Water seepage and accumulations in deeper strata of ground.

225. The only source of recharging for both surface and ground water source is from precipitation (rainfall). The annual rainfall data from forests for Kota is 882.8 mm. The winter rains are uncertain. Light showers may occur during December and January.

3.6.1. Surface Water

3.6.1.1 River System

226. In the Project area, there are basically three River system in the study area i.e. Chambal River, Kalisindh River and Paravati River System. Basically Kalisindh River and Paravati Rivers are tributaries of Chambal River.

3.6.1.2 Hydrology

227. Depth of water in Gadepan area varies in between 20 -15 mtr. Discharge of tube well in districts varies from 3,000 to 12,000 gallon per hours, in the project area is varies in between 3,000 to 5,000 gallons per hours, TDS value is less than 1,000 mg.

3.6.1.3 Sub- Strata Water

228. In Kota, ground water has the season flow, Post – monsoon season it is towards Gadepan (Because of presence of Kalisindh River) and in Post monsoon season it is in opposite direction of Gadepan.

3.6.1.4 Ground water Flow

229. In the Kota district as per technical point of view 169 selected groundwater level study centers are present. Water collected from these samples are tested and analysed at State level labs. It flows towards South direction in monsoon seasons and towards North – East direction in remaining seasons.

230. The water quality assessment (both surface and ground water) was carried out in the study area. Appropriate sampling locations were selected for the surface and ground water bodies for the base line data. The specific sampling point locations have been shown in **Figure – 3.4**. The water quality assessment of surface water sources Kalisindh river (at four locations), canals (two locations) and ponds (three locations) was carried out in the study zone. The samples were examined for various physical, chemicals and demand parameters. The analysis results are given in **Table 3.7**.

Table 3.7 : Surface Water Analysis of CFCL Gadepan

Sampled in November 2008											
Location		1	2	3	4	5	6	7	8	9	10
Parameter		Bamori Pond	Simaliya pond	Gadepan pond	Chambal right Canal Anta	Chambal right Canal Simaliya	Kalisindh River (Intake well)	Kalisindh River (Waste discharge point)	Kalisindh River (upstream) near Haripura	Kalisindh River (Downstream) near Nagda	Kalisindh River(Downstream)near Kachnawda
PH		7.40	7.40	7.25	7.60	7.60	7.70	7.90	7.80	7.80	7.95
Turbidity	NTU	1.8	1.5	2.8	1.2	0.7	1.5	0.5	0.4	0.3	0.4
TDS		557	1437	882	184	185	224	240	199	205	221
TH as	CaCO ₃	159	474	344	129	125	159	141	132	133	142
Ca	as CaCO ₃	112	320	219	73	73	86	57	65	69	60
Mg	as CaCO ₃	47	154	125	56	52	73	84	68	65	82
Talk	as CaCO ₃	222	192	291	108	173	148	158	156	186	291
Cl	as Cl	26	107	216	40	22	22	28	24	20	26
SO ₄	as SO ₄	12.5	909	82.0	16.2	17.9	18.4	16.8	15.7	16.9	19.2
NO ₃ as	NO ₃	1.1	13.3	1.5	1.4	1.2	1.1	1.2	1.2	1.1	1.6
PO ₄	as	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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	PO4										
TAN	as N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TKN	as N	1.73	0.92	2.90	0.67	Traces	0.27	0.52	0.87	0.43	Traces
D.O.		6.7	7.3	6.6	7.3	7.4	7.3	7.2	7.5	7.1	7.4
BOD		8	4	20	4	4	8	12	4	8	4
COD		29	22	42	14	18	16	18	14	19	14
Phytoplankton	(M3)	246	94	872	108	129	256	784	342	988	276
Zooplancton	(M3)	1680	342	178	364	680	142	242	212	140	347

Sampled in January 2009

Location		1	2	3	4	5	6	7	8	9	10
Parameter		Bamori Pond	Simaliya pond	Gadepan pond	Chambal right Canal Anta	Chambal right Canal Simaliya	Kalisindh River (Intake well)	Kalisindh River (Waste discharge point)	Kalisindh River (upstream) near Haripura	Kalisindh River (Downstream) near Nagda	Kalisindh River(Downstream)near Kachnawda
PH		7.40	7.60	7.30	7.80	7.40	7.60	7.60	7.90	7.95	7.95
Turbidity	NTU	2.8	2.1	2.2	1.2	1.8	1.3	0.0	1.8	2.5	2.3
TDS		510	1399	876	199	195	248	228	212	232	250
TH as	CaCO3	150	517	325	120	112	147	125	128	136	161
Ca	as CaCO3	92	342	205	71	60	98	66	71	64	68

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Mg	as CaCO3	58	175	120	49	52	59	59	57	72	93
Talk	as CaCO3	191	182	266	112	117	163	102	140	140	130
Cl	as Cl	33	99	232	23	23	21	24	26	28	23
SO4	as SO4	10.5	932	93.0	19.9	19.3	25.9	23.0	17.2	28.0	21.4
NO3 as	NO3	1.4	12.8	1.7	1.2	1.1	1.2	1.2	1.4	1.2	1.4
PO4	as PO4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TAN	as N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TKN	as N	1.81	1.08	3.12	0.75	Traces	0.31	0.48	0.75	0.47	Traces
D.O.		6.9	7.2	6.8	7.4	7.5	7.5	7.1	7.3	7.2	7.5
BOD		4	8	18	8	4	4	16	8	4	4
COD		24	26	38	10	16	12	22	18	16	19
Phytoplankton	(M3)	232	112	982	162	182	322	988	284	784	378
Zooplankton	(M3)	1970	246	142	298	567	114	182	256	259	268

Note: All values in mg/l, unless specified. NT denotes not traceable (below detectable limit)