

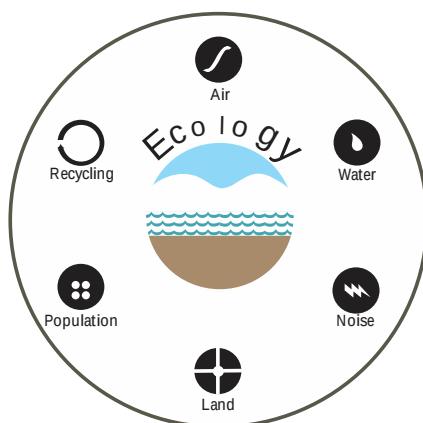


Annual Compiled Monitoring Report Of IB Valley Area For 2012-2013

(Lajkura OCP & Samleswari OCP)

Ib Valley Coalfields

Mahanadi Coalfields Limited



Prepared by:



Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

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CHAPTER-I

INTRODUCTION

1.1 Brief Description of the Mine

Ib-valley Area, Mahanadi Coalfields Limited is located in Ib- Valley Coalfield, Jharsuguda district, Orissa. This area has two OCP under its administrative control. The OCPs are Samleswari OCP and Lajkura OCP.

Samleswari OCP

Samleswari OCP is situated between latitudes $21^{\circ} 47' 00''$ & $20^{\circ} 49' 00''$ N and longitudes $83^{\circ} 53' 00''$ & $83^{\circ} 55' 00''$ E. The block is approachable from sundargarh town, lying at a distance of 40 km by road, the nearest railway station is himgir on Bombay Howrah mail line. It lies at a distance of 36 km by road.

The elevation of the area varies from 245m to 320 m.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

Lajkura OCP

Lajkura OCP is situated between latitudes $21^{\circ} 48' 39''$ & $21^{\circ} 49' 55''$ N and longitudes $83^{\circ} 53' 15''$ and $83^{\circ} 54' 50''$ E. The block is approachable from Brajrajnagar (Tahasil HQ) (about 3km East of the block), the nearest road is 2 km all weather road to Brajrajnagar, the nearest railway station is Brajrajnagar railway station on Howrah- Mumbai line of south Eastern railway at a distance of about 2 km.

The elevation of the area varies from 232 m to 278 m above MSL. The general slope is towards Bagachhopa nalla in the north and towards railway line in south.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

1.2 Frequency of Environmental Monitoring

(i) Ambient air quality monitoring

To assess the pollution level in ambient air of the area located in and around the coal mines/projects and also determine the efficacy of mitigation measures, regular monitoring of the following parameters is being carried out.

Respirable particulate matter (RPM)	:	One sample per fortnight
Suspended particulate matter (SPM)	:	
Sulphur dioxide (SO_2)	:	
Nitrogen oxides (NO_x)	:	

(ii) Drinking water monitoring : Every month.

(iii)	Effluent	quality monitoring
	1/4/5 parameters	: once in a fortnight/monthly i.e July, Aug. & Sept.
	21 parameters	: Once in a year
(iv)	Well water level monitoring	: Quarterly
(v)	Noise level monitoring	: Once in a fortnight

1.3 Environmental Quality Monitoring Stations

The details of various environmental quality monitoring stations are given in are given below:

- Air quality monitoring stations

Sl.No. Name of Stations

Samleswari OCP

1. Roof of new project office
2. Near old sedimentation tank
3. Kudopalli village
4. West of working mine

- Drinking water quality monitoring stations

Sl.No. Name of Stations

1. Water from intake well at IWSS
2. Chingriguda village well water
3. Kudopalli village well water
4. Anapali village well water
5. Samleswari colony tap water
6. Lajkura village well water
7. Treated water from IWSS.

- Effluent quality monitoring station

1. Outlet from sedimentation tank (MDTP)
2. Water from external OB dump
3. Oil and grease Trap outlet
4. Mine sump water
5. Outlet from sedimentation pond.

- **Well water level monitoring station**

1. Chingriguda village well
2. Anapali village well
3. Lajkura village well
4. Kudopali village well

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Roof of new project office
2. Near old sedimentation tank
3. Kudopalli village
4. West of working mine

- **Air quality monitoring stations**

Sl.No. Name of Stations

Lajkura OCP

1. Near project office
2. Lajkura store
3. Near Adarsh nagar colony
4. Dragline yard

- **Drinking water quality monitoring stations**

Sl.No. Name of Stations

1. Madhuban nagar well water
2. Adarsh nagar colony tap water
3. Chauliberna village well water

- **Well water level monitoring stations**

Sl.No. Name of Stations

1. Chhualiberna village well
2. Madhuban nagar well

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Near project office
2. Lajkura store
3. Near Adarsh nagar colony
4. Dragline Yard

CHAPTER-II

AIR ENVIRONMENT

2.1 Details of Air Quality Monitoring Stations

Details are given in Table-1.

Table-1
Details of Air Quality Monitoring Stations
along with Sources of Pollution

Sl.No.	Location	Sources of Pollution
Samleswari OCP		
1	Roof of new project office	Traffic and mining activities,
2	Near old sedimentation tank	Domestic and mining activities
3	Kudopalli village	Mining activities.
4	West of working mine	Mining activities.
Lajkura OCP		
1.	Near project office	Nearby mining activities.
2.	Lajkura store	Nearby mining activities.
3.	Near Adarsh nagar colony	Nearby mining activities
4.	Dragline yard	Nearby mining activities

2.2 Methodology and Instruments used for Air Quality Analysis

These are given in Table-2.

Table-2
Methodology and Instruments used for Air Quality Analysis

Sl.No.	Parameters	Method	Instruments
1	SPM and RPM	IS:5182 (Part-IV) (Gravimetric method)	High volume samplers, Respirable dust samplers & electronic balance, oven, etc.
2	SO ₂	IS:5182 (Part-II) (Sodium tetrachloro-mercurate method, also known as improved West and Gaeke Method) (Photometric method)	Milton-Roy Spectrophotometer.
3	NO _x	IS:5182 (Part-VI) (Jacob & Hoocheiser)	-do-

Sl.No.	Parameters	Method	Instruments
		Modified Method) (Photometric method)	

2.3 Results

The results of analyses of air samples are given in Tables attached .

2.4 Discussions

Examination of the levels of RPM, SPM, SO₂ and NO_x for all the air stations in Ib valley area reveals the following:

- In coal mining area like Roof of new project office, the levels of RPM, SPM, SO₂ and NO_x are observed to be within the limits of the Standards for Coal Mines, barring a few aberated value.
- In residential areas, all the values are found to be within the limits of the National Ambient Air Quality Standards (NAAQS) notified under Schedule-VII.

2.5 Control Measures

The following mitigatory measures are suggested to maintain the air quality within the stipulated standards:

- Water sprinkling on haul roads, coal loading and unloading sites at regular and frequent intervals by adding appropriate wetting agents.
- Provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers at haul roads and siding.
- Cleaning spillage from roads.
- Practice for covered transportation.
- Regular maintenance of all HEMMs and other machinery.
- Provision of gas filters for exhaust fumes.
- No overloading of trucks/dumpers.
- Application of innocuous chemical binders on haul roads.
- Development of thick greenbelts around the mines, infrastructure sites and residential area besides plantation on both sides of the roads on the surface using plant species having leaves of high efficacy dust catching nature.
- Drills with well-designed dust extractors/arrestors.
- Provision of dust extraction system for crusher house.
- Suppression of coal dust at CHP by provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers.

CHAPTER-III

WATER ENVIRONMENT

3.1 Methodology and Instruments used for water & effluent analysis

Details are given in Table-4.

Table-4

Methodology & Instruments used for Water and Effluent Analysis

Sl.No.	Parameters	Method/Instruments
1	pH	Electrometric/pH meter
2	Turbidity	Nephelometric/Nepheloturbidity meter
3	Total suspended solids, total dissolved solids, oil & grease and mineral oil	Gravimetric/oven, electronic balance
4	BOD	BOD test and titration/BOD incubator, pipette, burette, etc.
5	COD	Reactor digestion and titration/reactor digester
6	Coliform	MPN test/LTEK MPN kit.
7	Calcium, chloride, hardness, alkalinity	Titrimetric/pipette, burette, etc.
8	Cadmium, copper, iron, lead, manganese, mercury, nickel, total chromium & zinc	Selective absorption/atomic absorption spectro-photometer.
9	Ammonical nitrogen, arsenic, colour, dissolved phosphate, fluoride, hexavalent chromium, nitrate nitrogen phenolics, selenium, sulphate, sulphide, total residual chlorine, total Kjeldahl nitrogen & boron.	Photometric/DR 2000

3.2 Results

The results of analysis of water samples (Drinking) is given in Tables attached. Ground water level monitoring of various dug-wells are given in Tables attached.

3.3 Discussions

(a) Drinking water sample

The examination of analytical results of drinking water sample reveals the following :

- All physico-chemical parameters are well within the limits of the Indian Drinking Water Standard in the drinking water sample.

CHAPTER-IV

NOISE ENVIRONMENT

4.1 Methodology and Instruments used for Noise Level Measurement

Noise is measured in a weighted sound level i.e. dB(A) using a noise level meter once in day time (6:00 AM-10:00 PM) and once in night time (10:00 PM to 6:00 AM) for one day in each quarter from each station.

4.2 Results

The fortnightly noise level measurements for different stations are given in Tables attached.

4.3 Discussions

The noise level monitoring data reveal the following:

- The noise level monitoring data of various stations are within the limits of the prescribed noise level standards.

4.4 Control Measures

The following control measures are recommended to maintain the noise levels within the permissible limits of the prescribed standards:

- Creation of thick greenbelts around the mines, infrastructure sites and residential colony besides avenue plantation on both sides of the roads on the surface using high noise attenuating plant species.
- Proper designing of plant and machinery by providing in-built mechanisms like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- HEMMs with sound proof cabin.
- Chute linings in CHP
- Personal protective devices to all persons working in high noise areas.

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

Project : ***Lajkura OCP*** (conc. in $\mu\text{g}/\text{cu.m.}$)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
10-Apr-12	Dragline Yard	388	139	36	44	East to west hot & sunny
26-Apr-12	Dragline Yard	378	142	42	54	East to west hot & sunny
08-May-12	Dragline Yard	384	138	38	46	East to west hot & sunny
28-May-12	Dragline Yard	362	148	42	52	East to west hot & sunny
11-Jun-12	Dragline Yard	324	122	36	42	West to east hot & sunny
26-Jun-12	Dragline Yard	304	124	35	42	West to east sunny & cloudy
11-Jul-12	Dragline Yard	305	129	36	44	West to east hot & sunny
26-Jul-12	Dragline Yard	232	96	32	37	East to west & cloudy
03-Aug-12	Dragline Yard	158	69	25	32	West to east ,cloudy & rainfall
18-Aug-12	Dragline Yard	178	72	29	34	West to east ,cloudy & rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

04-Sep-12	Dragline Yard	195	81	24	29	West to east sunny & cloudy evening rain fall
19-Sep-12	Dragline Yard	222	86	32	37	West to east & cloudy
08-Oct-12	Dragline Yard	230	82	30	34	East to west & sunny
25-Oct-12	Dragline Yard	291	120	27	34	East to west & sunny
06-Nov-12	Dragline Yard	284	118	22	29	East to west & sunny
22-Nov-12	Dragline Yard	272	103	23	28	East to west & cloudy
10-Dec-12	Dragline Yard	251	98	24	26	East to west & sunny
25-Dec-12	Dragline Yard	267	104	25	27	East to west & sunny
08-Jan-13	Dragline Yard	286	114	26	29	East to west & sunny
23-Jan-13	Dragline Yard	295	113	27	29	East to west & sunny
08-Feb-13	Dragline Yard	284	134	28	30	West to east & sunny
22-Feb-13	Dragline Yard	272	124	27	29	East to west & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

08-Mar-13	Dragline Yard	249	120	25	28	East to west sunny & cloudy
23-Mar-13	Dragline Yard	267	134	29	33	East to west hot & sunny
10-Apr-12	Lajkura Store	348	127	30	36	East to west hot & sunny
26-Apr-12	Lajkura Store	395	139	38	46	East to west hot & sunny
08-May-12	Lajkura Store	299	126	36	44	East to west hot & sunny
28-May-12	Lajkura Store	372	130	36	42	East to west hot & sunny
11-Jun-12	Lajkura Store	326	116	30	36	West to east hot & sunny
26-Jun-12	Lajkura Store	251	111	34	41	East to west & cloudy
11-Jul-12	Lajkura Store	236	122	34	40	West to east hot & sunny
26-Jul-12	Lajkura Store	211	94	28	34	East to west & cloudy
03-Aug-12	Lajkura Store	160	76	17	25	West to east ,cloudy & rainfall
18-Aug-12	Lajkura Store	190	82	21	29	West to east ,cloudy & rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

04-Sep-12	Lajkura Store	212	87	28	34	West to east sunny & cloudy evening rain fall
19-Sep-12	Lajkura Store	230	80	27	32	West to east & cloudy
08-Oct-12	Lajkura Store	254	79	24	28	East to west & sunny
25-Oct-12	Lajkura Store	243	110	24	39	East to west & sunny
06-Nov-12	Lajkura Store	257	124	27	34	East to west & sunny
22-Nov-12	Lajkura Store	237	119	25	30	East to west & cloudy
10-Dec-12	Lajkura Store	218	113	26	30	East to west & sunny
25-Dec-12	Lajkura Store	239	122	27	30	East to west & sunny
08-Jan-13	Lajkura Store	251	120	25	27	East to west & sunny
23-Jan-13	Lajkura Store	263	110	26	28	East to west & sunny
08-Feb-13	Lajkura Store	253	109	25	27	West to east & sunny
22-Feb-13	Lajkura Store	276	139	28	30	East to west & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Ib Valley**

08-Mar-13	Lajkura Store	263	124	27	30	East to west sunny & cloudy
23-Mar-13	Lajkura Store	271	119	21	25	East to west hot & sunny
08-Jun-12	Near Adarsh Nagar Colony	216	81	24	30	East to west hot & sunny
26-Jun-12	Near Adarsh Nagar Colony	165	72	24	28	West to east sunny & cloudy evening rain fall
08-Jul-12	Near Adarsh Nagar Colony	212	74	24	29	East to west hot & sunny
24-Jul-12	Near Adarsh Nagar Colony	165	60	20	24	East to west & cloudy
03-Aug-12	Near Adarsh Nagar Colony	189	88	22	28	West to east ,cloudy & rainfall
18-Aug-12	Near Adarsh Nagar Colony	201	81	25	31	West to east ,cloudy & rainfall
04-Sep-12	Near Adarsh Nagar Colony	229	85	30	37	West to east sunny & cloudy evening rain fall
19-Sep-12	Near Adarsh Nagar Colony	197	73	21	26	West to east & cloudy
08-Oct-12	Near Adarsh Nagar Colony	212	79	25	29	East to west & sunny
25-Oct-12	Near Adarsh Nagar Colony	210	99	23	28	East to west & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

06-Nov-12	Near Adarsh Nagar Colony	200	103	25	30	East to west & sunny
22-Nov-12	Near Adarsh Nagar Colony	194	92	21	25	East to west & cloudy
10-Dec-12	Near Adarsh Nagar Colony	172	90	22	24	East to west & sunny
25-Dec-12	Near Adarsh Nagar Colony	167	96	24	26	East to west & sunny
08-Jan-13	Near Adarsh Nagar Colony	185	107	23	26	East to west & sunny
23-Jan-13	Near Adarsh Nagar Colony	197	102	22	25	East to west & sunny
08-Feb-13	Near Adarsh Nagar Colony	201	105	23	26	West to east & sunny
22-Feb-13	Near Adarsh Nagar Colony	217	118	25	27	East to west & sunny
08-Mar-13	Near Adarsh Nagar Colony	230	124	24	28	East to west sunny & cloudy
23-Mar-13	Near Adarsh Nagar Colony	242	128	23	27	East to west hot & sunny
09-Apr-12	Near Project Office	283	130	30	37	West to east hot & sunny
25-Apr-12	Near Project Office	339	132	36	47	East to west hot & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

08-May-12	Near Project Office	334	114	34	45	East to west hot & sunny
23-May-12	Near Project Office	384	144	38	44	East to west hot & sunny
11-Jun-12	Near Project Office	345	122	34	41	West to east hot & sunny
26-Jun-12	Near Project Office	257	94	32	38	East to west & cloudy
11-Jul-12	Near Project Office	294	128	35	43	West to east hot & sunny
26-Jul-12	Near Project Office	206	88	26	31	East to west & cloudy
03-Aug-12	Near Project Office	208	83	20	29	West to east ,cloudy & rainfall
18-Aug-12	Near Project Office	255	92	26	35	West to east ,cloudy & rainfall
04-Sep-12	Near Project Office	271	98	33	38	West to east sunny & cloudy evening rain fall
19-Sep-12	Near Project Office	289	92	31	40	West to east & cloudy
08-Oct-12	Near Project Office	274	84	30	35	East to west & sunny
25-Oct-12	Near Project Office	254	117	25	32	East to west & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

06-Nov-12	Near Project Office	238	110	26	31	East to west & sunny
22-Nov-12	Near Project Office	221	109	23	27	East to west & cloudy
10-Dec-12	Near Project Office	217	110	25	28	East to west & sunny
25-Dec-12	Near Project Office	235	118	26	29	East to west & sunny
08-Jan-13	Near Project Office	264	125	28	30	East to west & sunny
23-Jan-13	Near Project Office	276	116	25	27	East to west & sunny
08-Feb-13	Near Project Office	283	124	24	27	West to east & sunny
22-Feb-13	Near Project Office	293	131	26	28	East to west & sunny
08-Mar-13	Near Project Office	252	107	23	25	East to west sunny & cloudy
23-Mar-13	Near Project Office	260	114	19	22	East to west hot & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Ib Valley**

Project : **Samaleswari OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO2</i>	<i>NOx</i>	<i>Remarks</i>
03-Apr-12	Kudopali Village	245	117	24	30	East to west hot & sunny
18-Apr-12	Kudopali Village	308	105	26	32	East to west hot & sunny
07-May-12	Kudopali Village	273	86	28	36	West to east hot & sunny
22-May-12	Kudopali Village	285	106	30	36	West to east hot & sunny
07-Jun-12	Kudopali Village	211	84	24	29	West to east hot & sunny
22-Jun-12	Kudopali Village	196	71	28	33	East to west & cloudy rain fall
07-Jul-12	Kudopali Village	213	71	24	27	West to east hot & sunny
23-Jul-12	Kudopali Village	172	64	23	27	West to east ,cloudy & evening rainfall
02-Aug-12	Kudopali Village	209	79	24	33	East to west ,cloudy & rainfall
17-Aug-12	Kudopali Village	240	91	28	36	East to west ,cloudy & rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

03-Sep-12	Kudopali Village	257	98	31	36	East to west sunny & cloudy
18-Sep-12	Kudopali Village	217	89	30	34	East to west sunny & cloudy
05-Oct-12	Kudopali Village	225	73	24	28	West to east sunny & cloudy
20-Oct-12	Kudopali Village	198	95	23	29	West to east sunny & cloudy
05-Nov-12	Kudopali Village	204	101	25	30	West to east & sunny
21-Nov-12	Kudopali Village	196	97	23	27	West to east sunny & cloudy
07-Dec-12	Kudopali Village	204	103	25	29	West to east sunny & cloudy
22-Dec-12	Kudopali Village	238	112	26	28	West to east & sunny
07-Jan-13	Kudopali Village	268	127	27	30	West to east & sunny
22-Jan-13	Kudopali Village	279	132	28	31	West to east & sunny
07-Feb-13	Kudopali Village	286	127	27	30	West to east & sunny
21-Feb-13	Kudopali Village	297	135	26	28	West to east & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

07-Mar-13	Kudopali Village	304	139	25	27	West to east & sunny
22-Mar-13	Kudopali Village	290	129	20	23	West to east hot & sunny
03-Apr-12	Near Old Sedimentation Tank	330	142	34	42	East to west hot & sunny
18-Apr-12	Near Old Sedimentation Tank	355	155	42	52	East to west hot & sunny
07-May-12	Near Old Sedimentation Tank	333	139	40	48	West to east hot & sunny
22-May-12	Near Old Sedimentation Tank	378	166	42	48	West to east hot & sunny
07-Jun-12	Near Old Sedimentation Tank	324	129	34	40	West to east hot & sunny
22-Jun-12	Near Old Sedimentation Tank	264	87	30	35	East to west & cloudy rain fall
07-Jul-12	Near Old Sedimentation Tank	257	94	32	38	West to east hot & sunny
23-Jul-12	Near Old Sedimentation Tank	224	107	33	38	West to east ,cloudy & evening rainfall
02-Aug-12	Near Old Sedimentation Tank	222	86	27	34	East to west ,cloudy & rainfall
17-Aug-12	Near Old Sedimentation Tank	230	89	31	35	East to west ,cloudy & rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

03-Sep-12	Near Old Sedimentation Tank	249	95	32	39	East to west sunny & cloudy
18-Sep-12	Near Old Sedimentation Tank	199	82	27	32	East to west sunny & cloudy
05-Oct-12	Near Old Sedimentation Tank	263	84	25	30	West to east sunny & cloudy
20-Oct-12	Near Old Sedimentation Tank	254	106	25	32	West to east sunny & cloudy
05-Nov-12	Near Old Sedimentation Tank	245	109	26	35	West to east & sunny
21-Nov-12	Near Old Sedimentation Tank	231	101	24	29	West to east sunny & cloudy
07-Dec-12	Near Old Sedimentation Tank	243	109	26	31	West to east sunny & cloudy
22-Dec-12	Near Old Sedimentation Tank	267	117	25	28	West to east & sunny
07-Jan-13	Near Old Sedimentation Tank	234	107	24	26	West to east & sunny
22-Jan-13	Near Old Sedimentation Tank	245	112	25	27	West to east & sunny
07-Feb-13	Near Old Sedimentation Tank	259	118	26	29	West to east & sunny
21-Feb-13	Near Old Sedimentation Tank	268	124	25	27	West to east & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

07-Mar-13	Near Old Sedimentation Tank	271	128	26	29	West to east & sunny
22-Mar-13	Near Old Sedimentation Tank	280	125	22	26	West to east hot & sunny
03-Apr-12	Roof of New Project office	276	125	30	36	East to west hot & sunny
18-Apr-12	Roof of New Project office	367	142	38	45	East to west hot & sunny
07-May-12	Roof of New Project office	315	125	38	45	West to east hot & sunny
22-May-12	Roof of New Project office	344	136	38	44	West to east hot & sunny
07-Jun-12	Roof of New Project office	311	125	34	40	West to east hot & sunny
22-Jun-12	Roof of New Project office	255	96	31	37	East to west & cloudy rain fall
07-Jul-12	Roof of New Project office	292	115	34	42	West to east hot & sunny
23-Jul-12	Roof of New Project office	218	98	31	36	West to east ,cloudy & evening rainfall
02-Aug-12	Roof of New Project office	212	91	24	30	East to west ,cloudy & rainfall
17-Aug-12	Roof of New Project office	190	85	22	26	East to west ,cloudy & rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Ib Valley**

03-Sep-12	Roof of New Project office	232	91	29	35	East to west sunny & cloudy
18-Sep-12	Roof of New Project office	211	78	19	24	East to west sunny & cloudy
05-Oct-12	Roof of New Project office	229	71	20	24	West to east sunny & cloudy
20-Oct-12	Roof of New Project office	341	127	27	34	West to east sunny & cloudy
05-Nov-12	Roof of New Project office	287	113	28	37	West to east & sunny
21-Nov-12	Roof of New Project office	273	110	25	30	West to east sunny & cloudy
07-Dec-12	Roof of New Project office	283	118	27	32	West to east sunny & cloudy
22-Dec-12	Roof of New Project office	295	126	28	31	West to east & sunny
07-Jan-13	Roof of New Project office	276	115	26	28	West to east & sunny
22-Jan-13	Roof of New Project office	261	108	23	25	West to east & sunny
07-Feb-13	Roof of New Project office	276	110	24	27	West to east & sunny
21-Feb-13	Roof of New Project office	285	119	24	26	West to east & sunny

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

07-Mar-13	Roof of New Project office	290	130	27	30	West to east & sunny
22-Mar-13	Roof of New Project office	298	132	25	28	West to east hot & sunny
03-Apr-12	West of Working Mine	374	151	36	42	East to west hot & sunny
18-Apr-12	West of Working Mine	353	144	44	57	East to west hot & sunny
07-May-12	West of Working Mine	369	136	42	48	West to east hot & sunny
22-May-12	West of Working Mine	397	158	42	48	West to east hot & sunny
07-Jun-12	West of Working Mine	328	136	40	46	West to east hot & sunny
22-Jun-12	West of Working Mine	302	105	32	39	East to west & cloudy rain fall
07-Jul-12	West of Working Mine	297	127	36	44	West to east hot & sunny
23-Jul-12	West of Working Mine	215	109	36	44	West to east ,cloudy & evening rainfall
02-Aug-12	West of Working Mine	199	78	21	26	East to west ,cloudy & rainfall
17-Aug-12	West of Working Mine	215	81	24	30	East to west ,cloudy & rainfall

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

03-Sep-12	West of Working Mine	222	83	27	31	East to west sunny & cloudy
18-Sep-12	West of Working Mine	241	87	33	39	East to west sunny & cloudy
05-Oct-12	West of Working Mine	206	80	29	34	West to east sunny & cloudy
20-Oct-12	West of Working Mine	283	116	22	30	West to east sunny & cloudy
05-Nov-12	West of Working Mine	276	105	21	28	West to east & sunny
21-Nov-12	West of Working Mine	254	97	20	25	West to east sunny & cloudy
07-Dec-12	West of Working Mine	247	96	21	24	West to east sunny & cloudy
22-Dec-12	West of Working Mine	256	106	23	25	West to east & sunny
07-Jan-13	West of Working Mine	282	124	25	27	West to east & sunny
22-Jan-13	West of Working Mine	272	119	24	26	West to east & sunny
07-Feb-13	West of Working Mine	293	137	25	28	West to east & sunny
21-Feb-13	West of Working Mine	276	141	27	29	West to east & sunny

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Ib Valley***

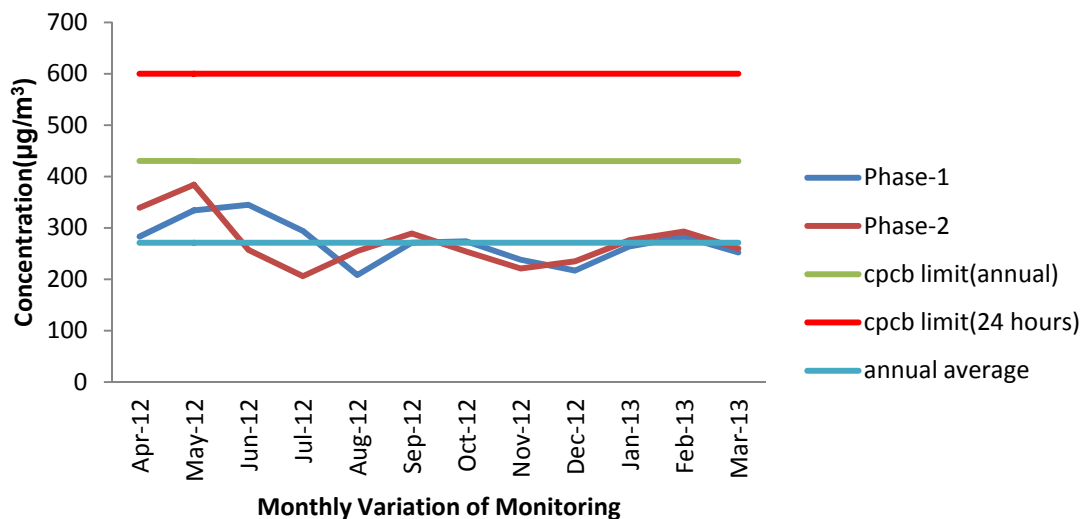
07-Mar-13	West of Working Mine	284	129	24	27	West to east & sunny
22-Mar-13	West of Working Mine	302	136	27	31	West to east hot & sunny

MoEF Standards Notification dated 25th September,2000

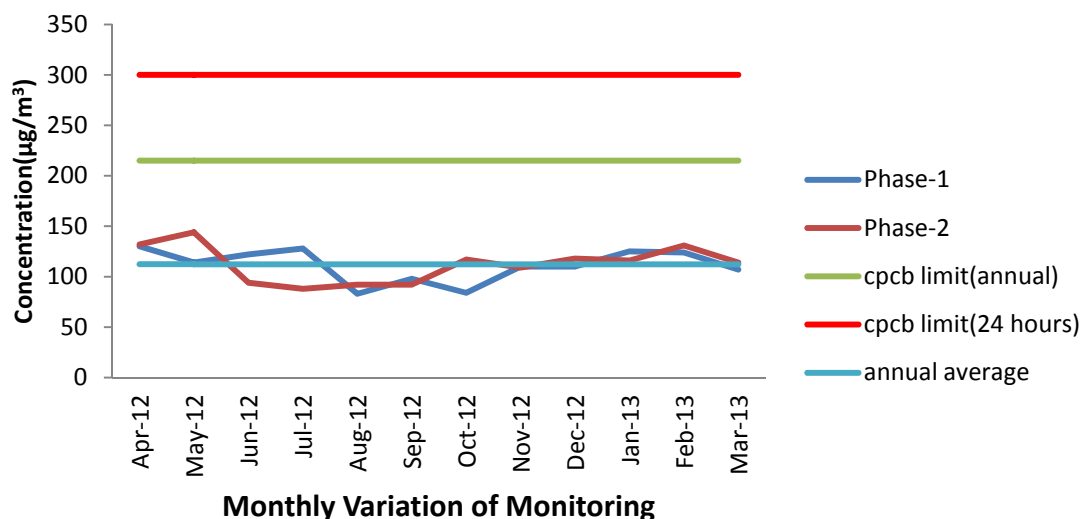
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Air Quality Graph of Ib Valley Area

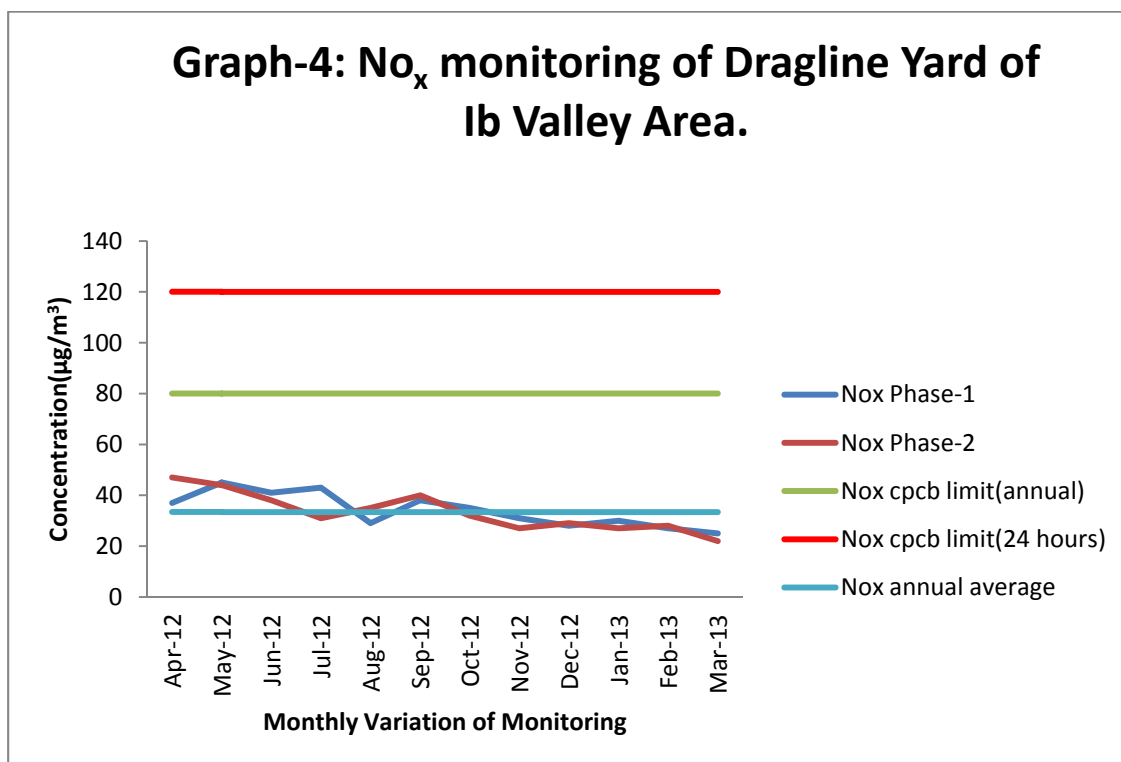
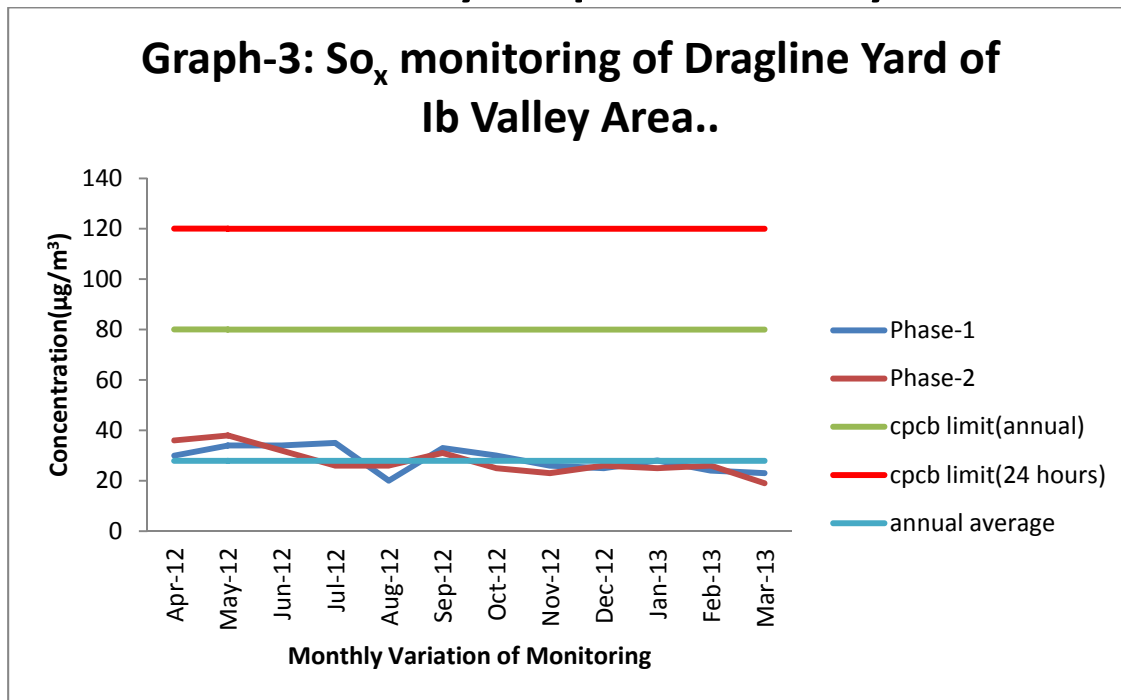
Graph-1: SPM monitoring of Dragline Yard of Ib Valley Area.



Graph-2: RPM monitoring of Dragline Yard of Ib Valley Area.

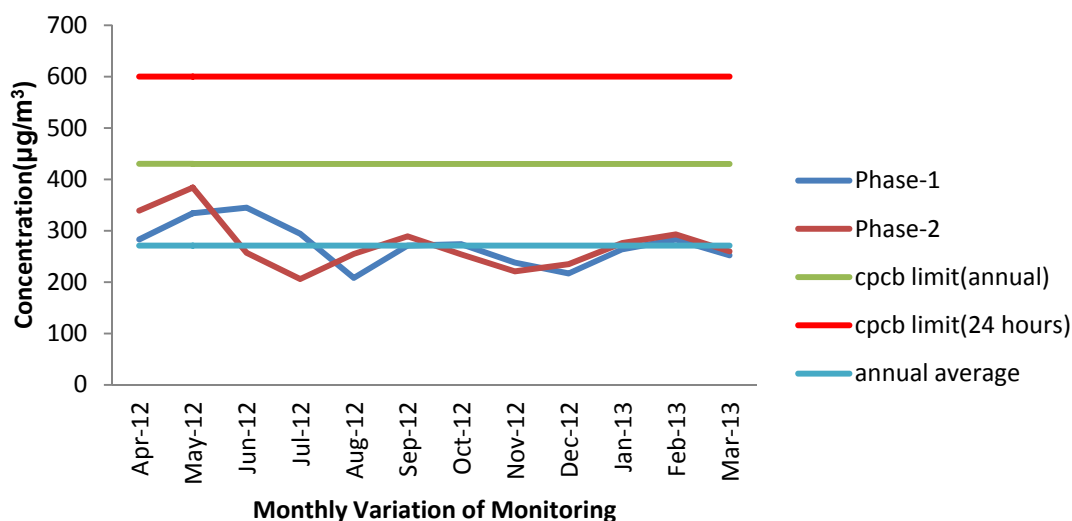


Air Quality Graph of Ib Valley Area

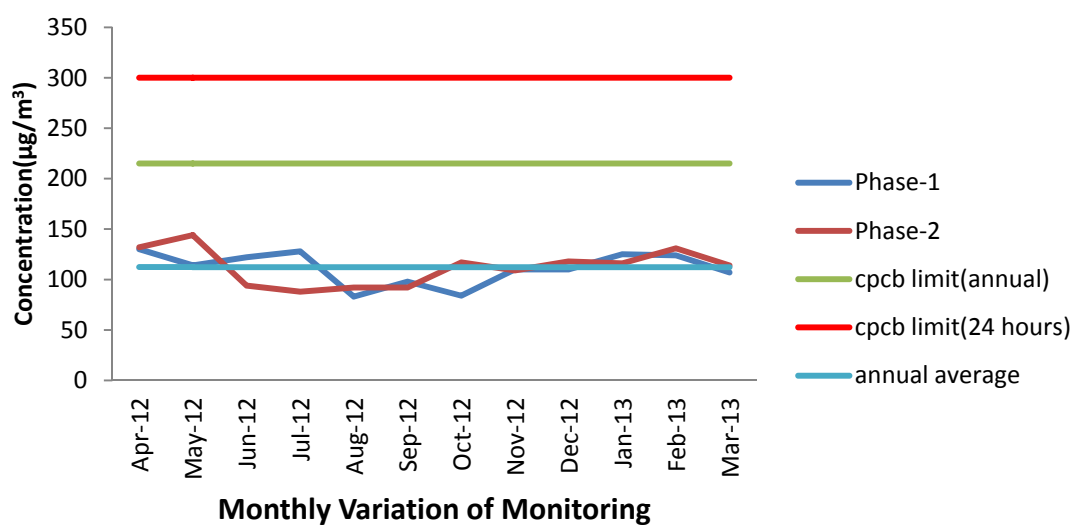


Air Quality Graph of Ib Valley Area

Graph-5: SPM monitoring of Lajkura Store of Ib Valley Area.

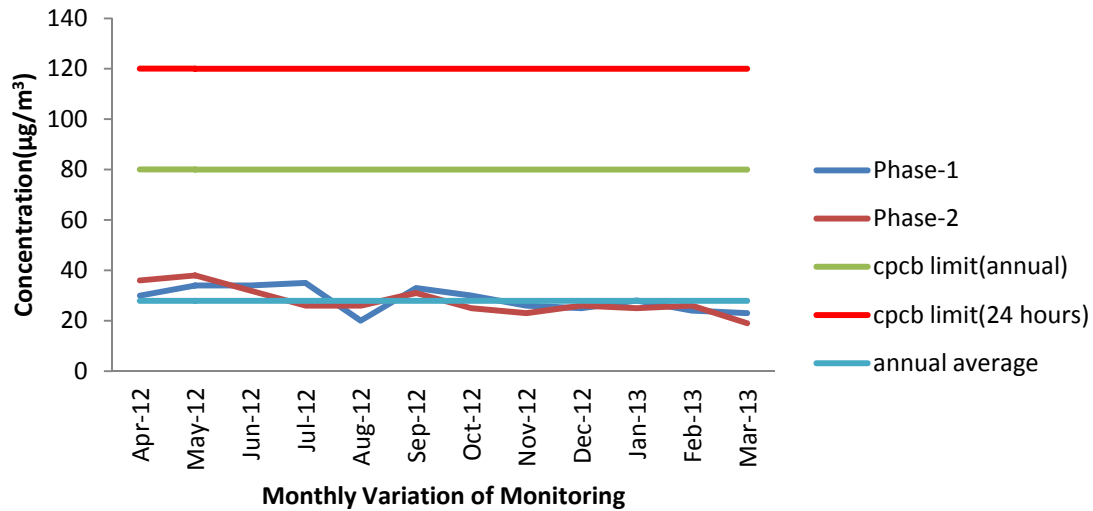


Graph-6: RPM monitoring of Lajkura Store of Ib Valley Area.

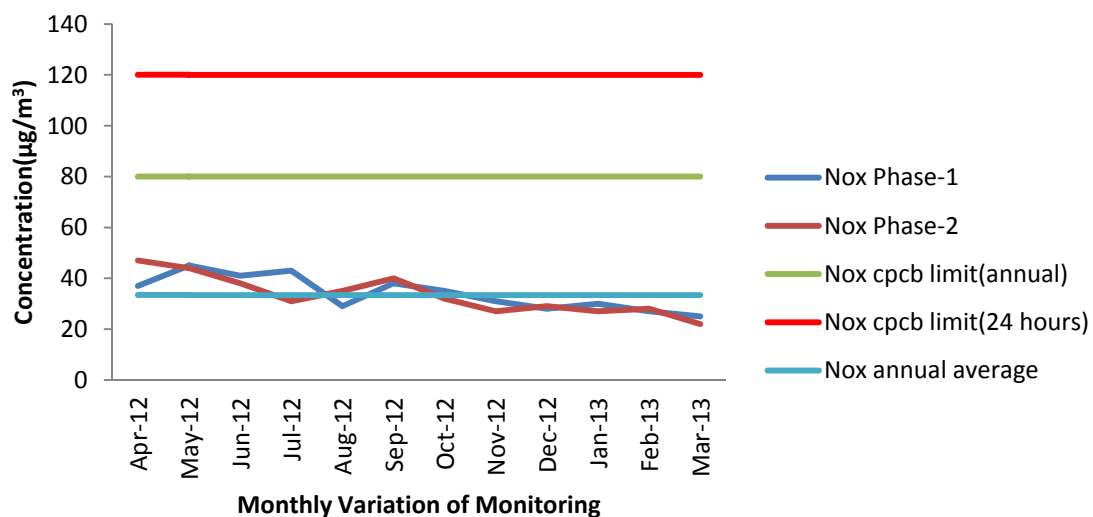


Air Quality Graph of Ib Valley Area

Graph-7: SO_x monitoring of Lajkura Store of Ib Valley Area..

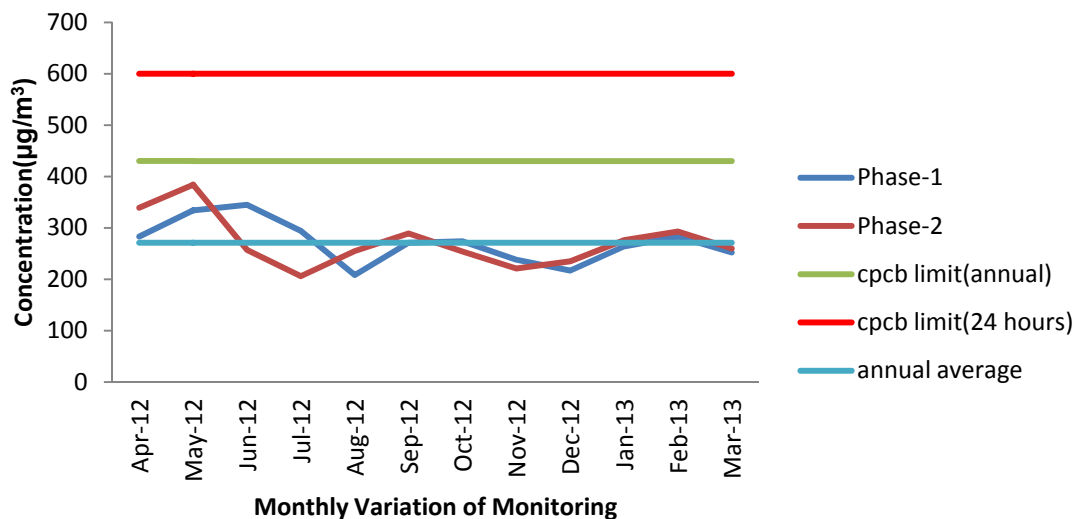


Graph-8: NO_x monitoring of Lajkura Store of Ib Valley Area.

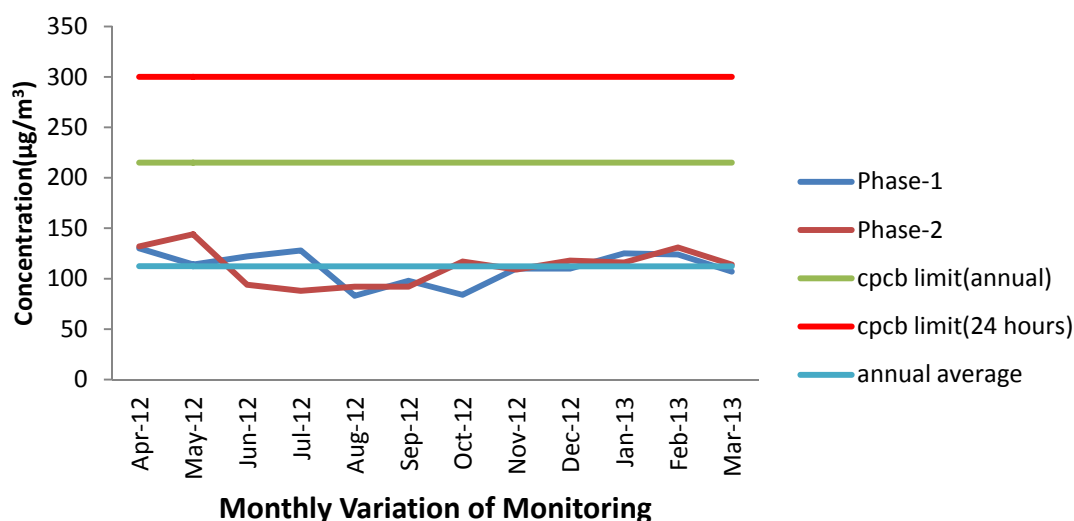


Air Quality Graph of Ib Valley Area

Graph-9: SPM monitoring of Near Adarsh Nagar Colony of Ib Valley Area.

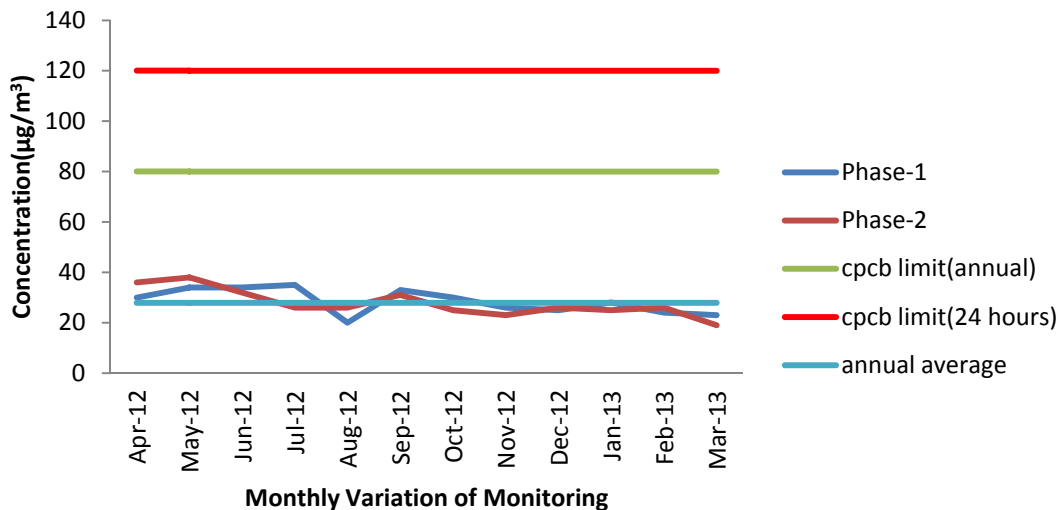


Graph-10: RPM monitoring of Near Adarsh Nagar Colony of Ib Valley Area.

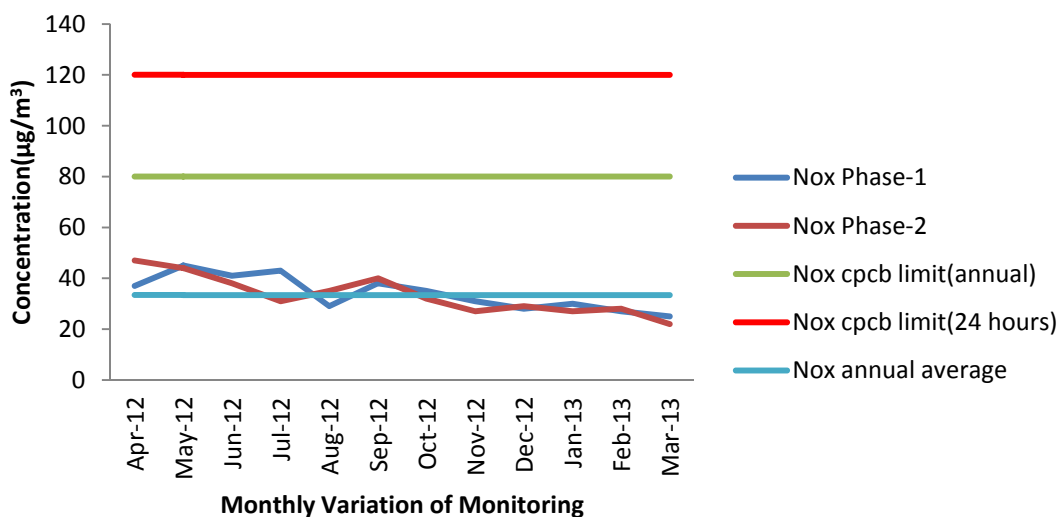


Air Quality Graph of Ib Valley Area

Graph-11: SO_x monitoring of Near Adarsh Nagar Colony of Ib Valley Area..

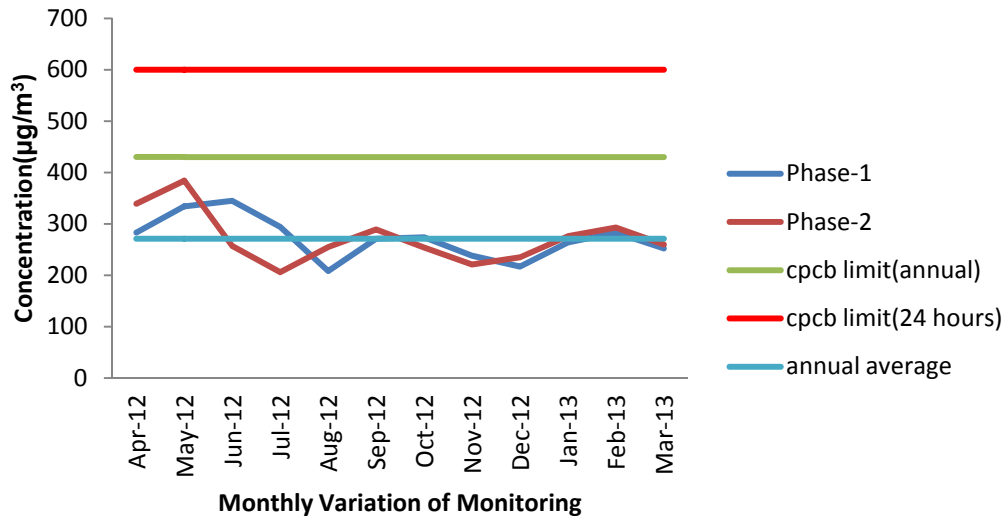


Graph-12: NO_x monitoring of Near Adarsh Nagar Colony of Ib Valley Area.

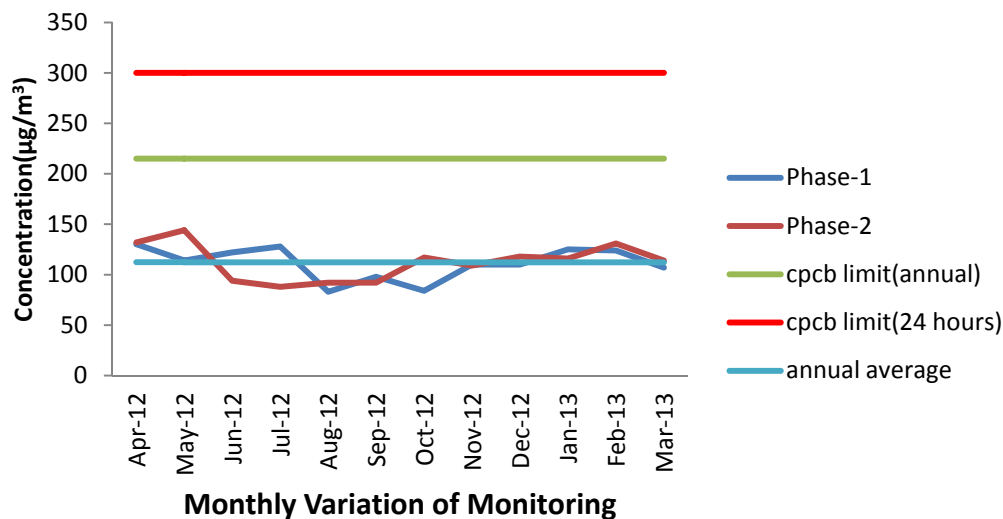


Air Quality Graph of Ib Valley Area

Graph-13: SPM monitoring of Near Project Office of Ib Valley Area.

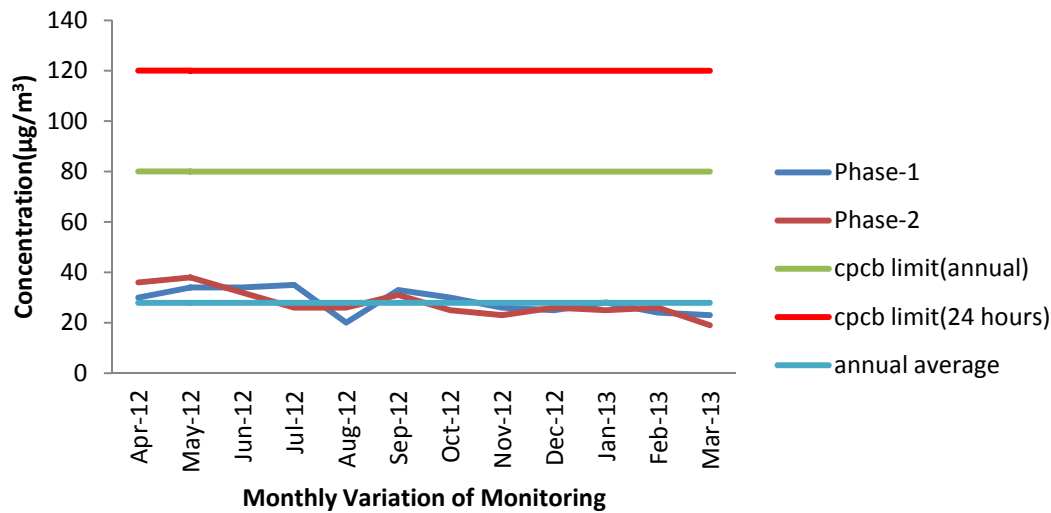


Graph-14: RPM monitoring of Near Project Office of Ib Valley Area.

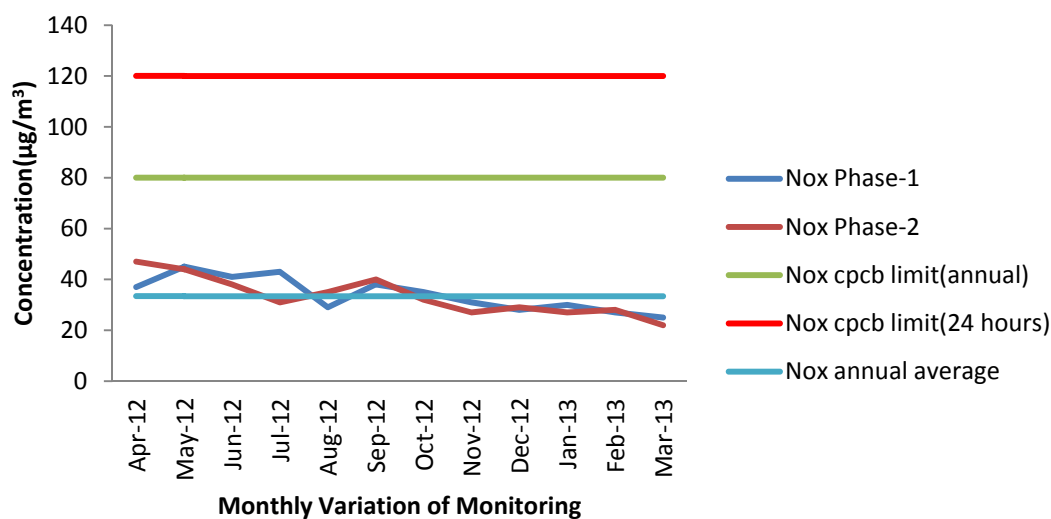


Air Quality Graph of Ib Valley Area

Graph-15: So_x monitoring of Near Project Office of Ib Valley Area..

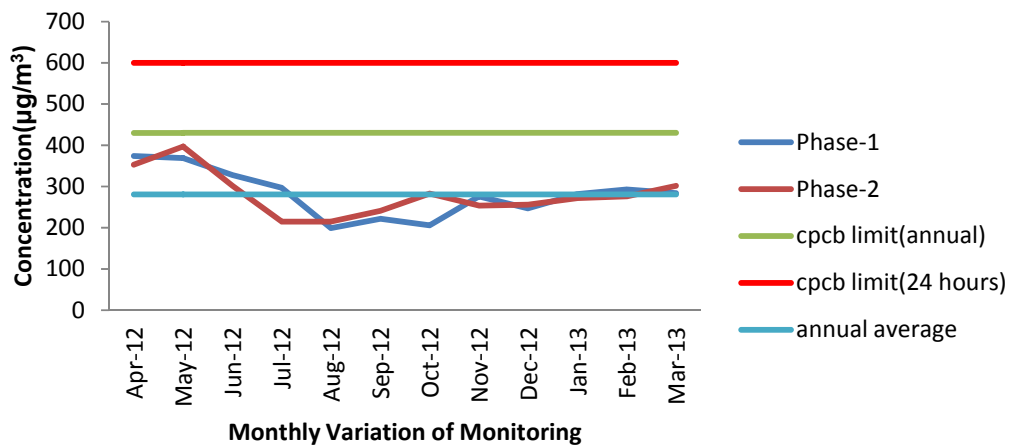


Graph-16: No_x monitoring of Near Project Office of Ib Valley Area.

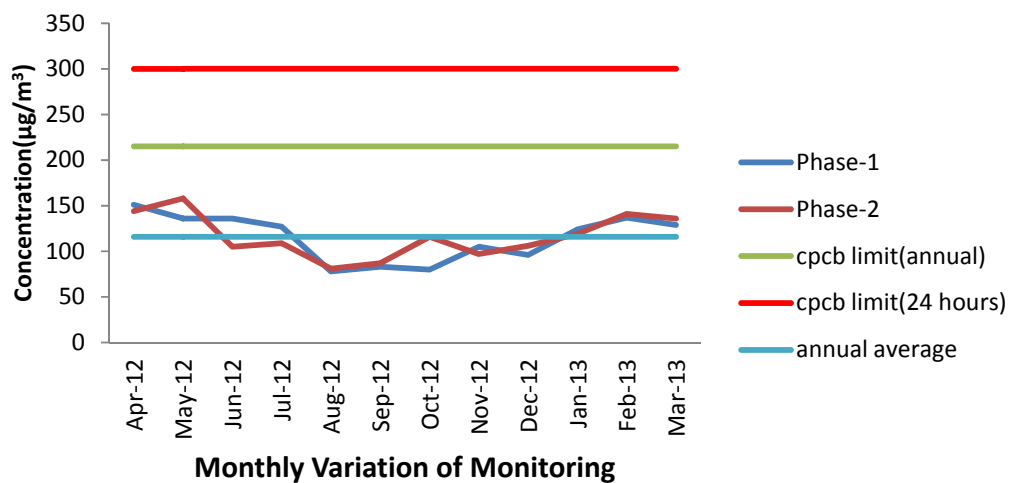


Air Quality Graph of Ib valley Area

Graph-1: SPM monitoring of Near Old Sedimentation Tank of Samleswari OCP.



Graph-2: RPM monitoring of Near Old Sedimentation Tank of Samleswari OCP.

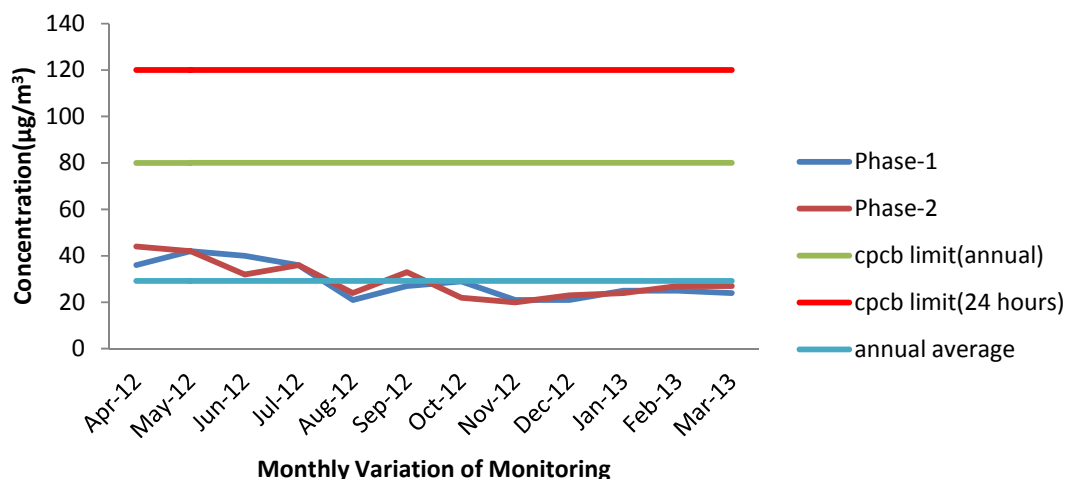


Job no: 750001

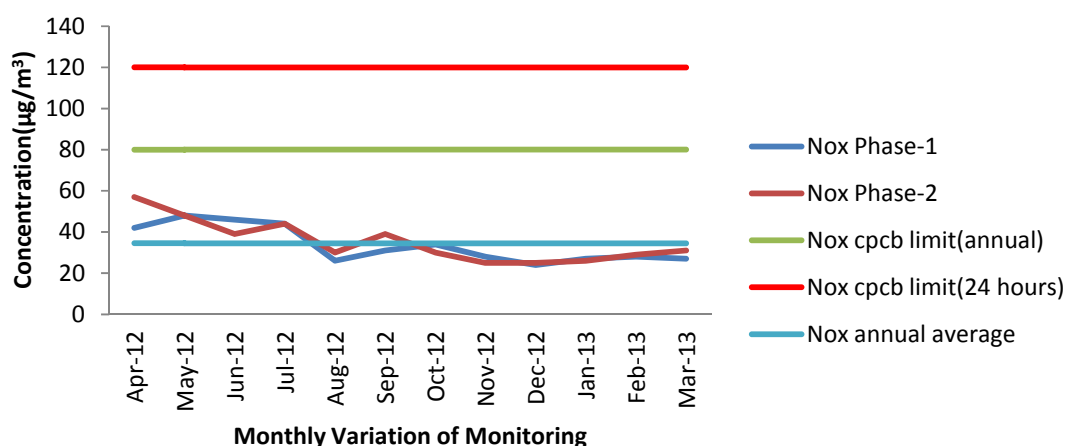
Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area

Graph-3: SO_x monitoring of Near Old Sedimentation Tank of Samleswari OCP..



Graph-4: NO_x monitoring of Near Old Sedimentation Tank of Samleswari OCP.

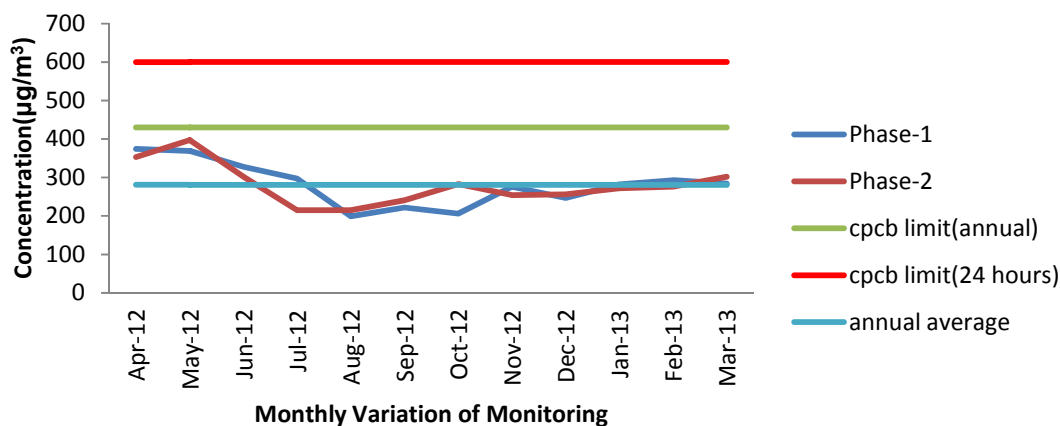


Job no: 750001

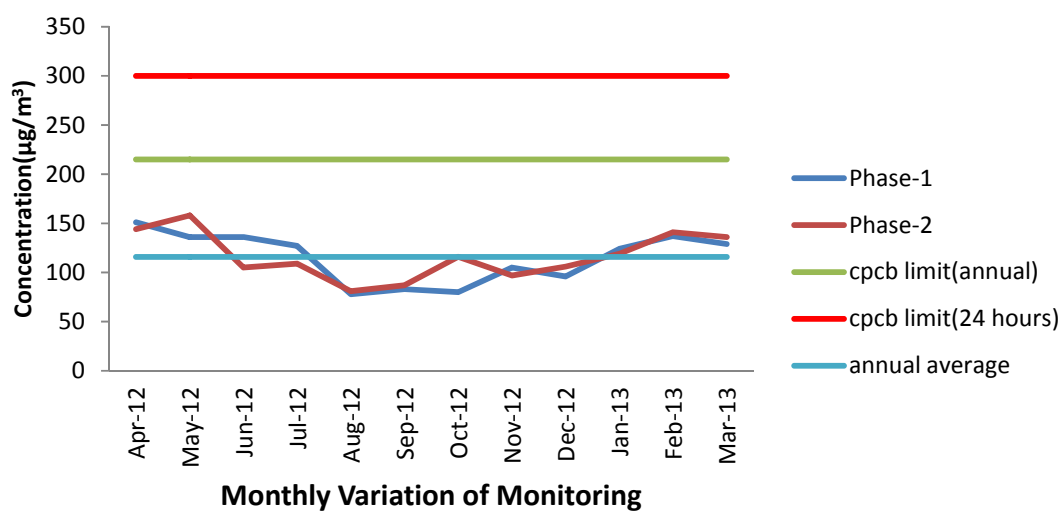
Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area

Graph-5: SPM monitoring of West of Working Mine of Samleswari OCP.



Graph-6: RPM monitoring of West of Working Mine of Samleswari OCP.

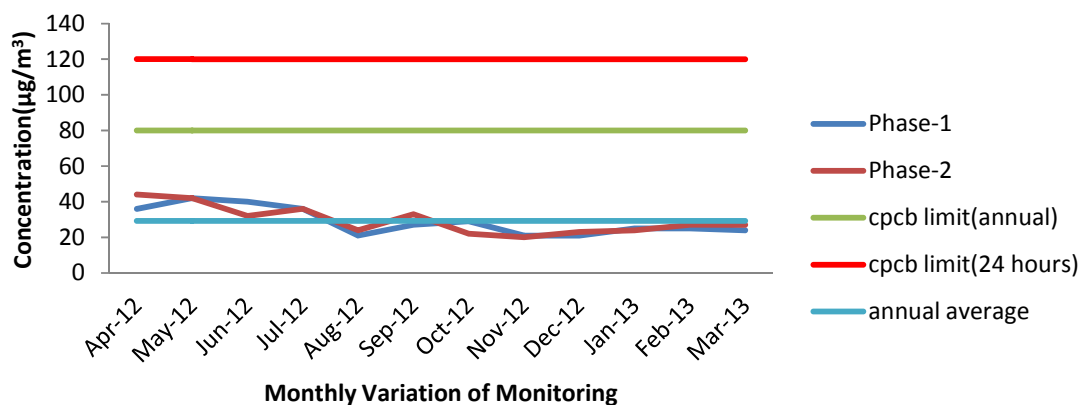


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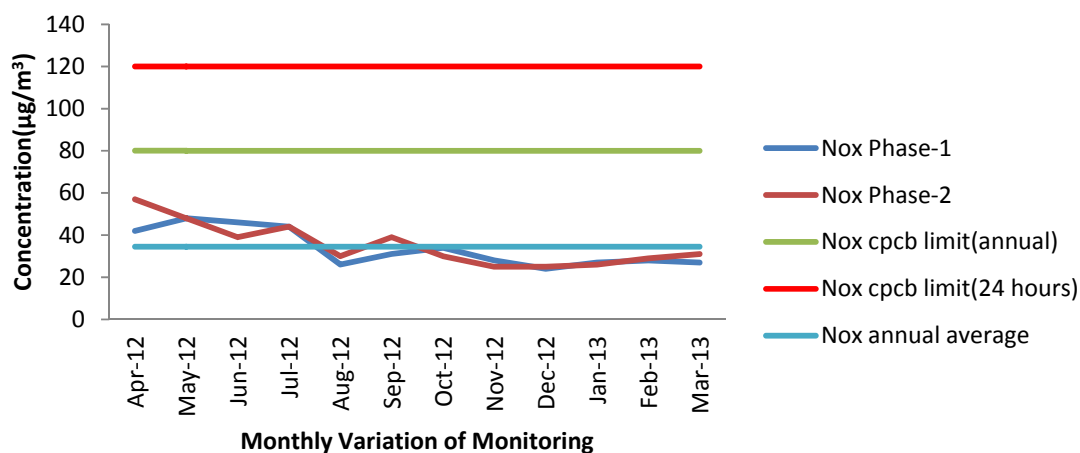
Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area

Graph-7: SO_x monitoring of West of Working Mine of Samleswari OCP..



Graph-8: NO_x monitoring of West of Working Mine of Samleswari OCP.

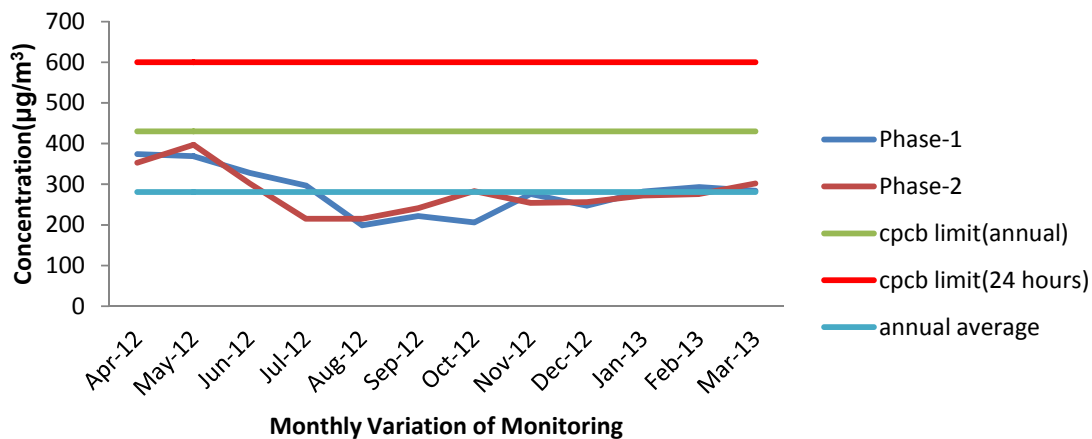


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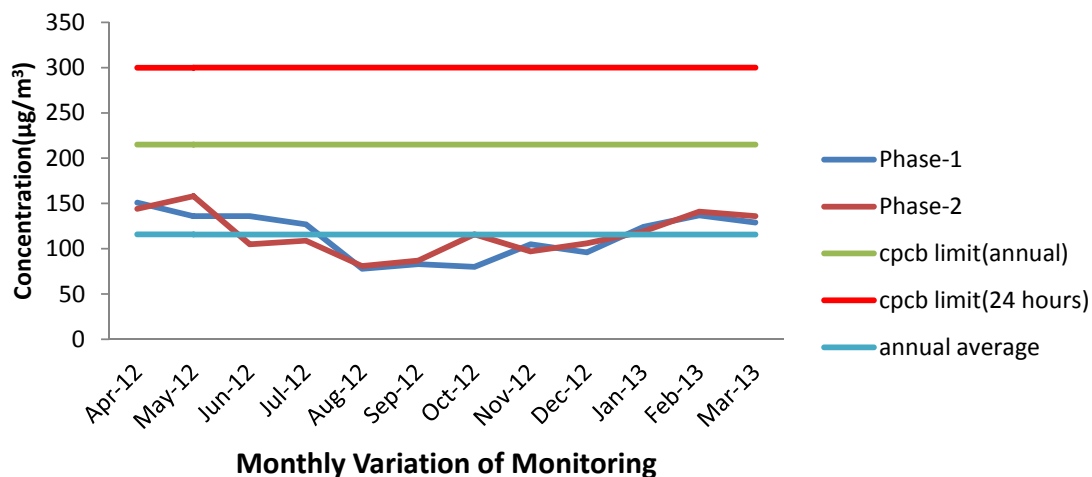
Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area

Graph-9: SPM monitoring of Roof of new Project Office of Samleswari OCP.



Graph-10: RPM monitoring of Roof of new Project Office of Samleswari OCP.

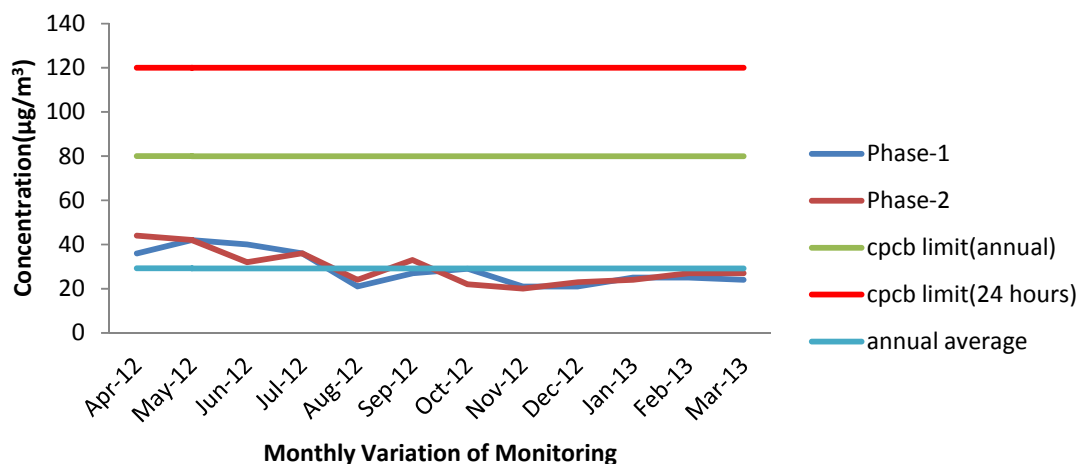


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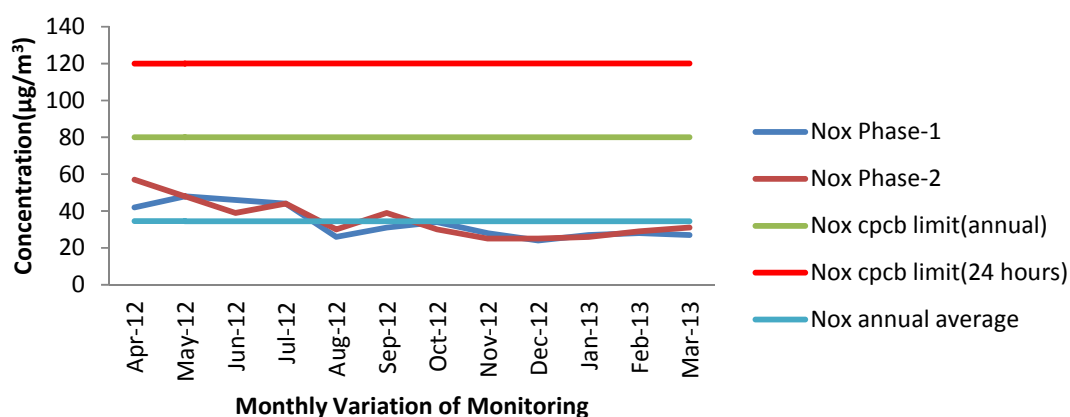
Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area

Graph-11: SO_x monitoring of Roof of new Project Office of Samleswari OCP..



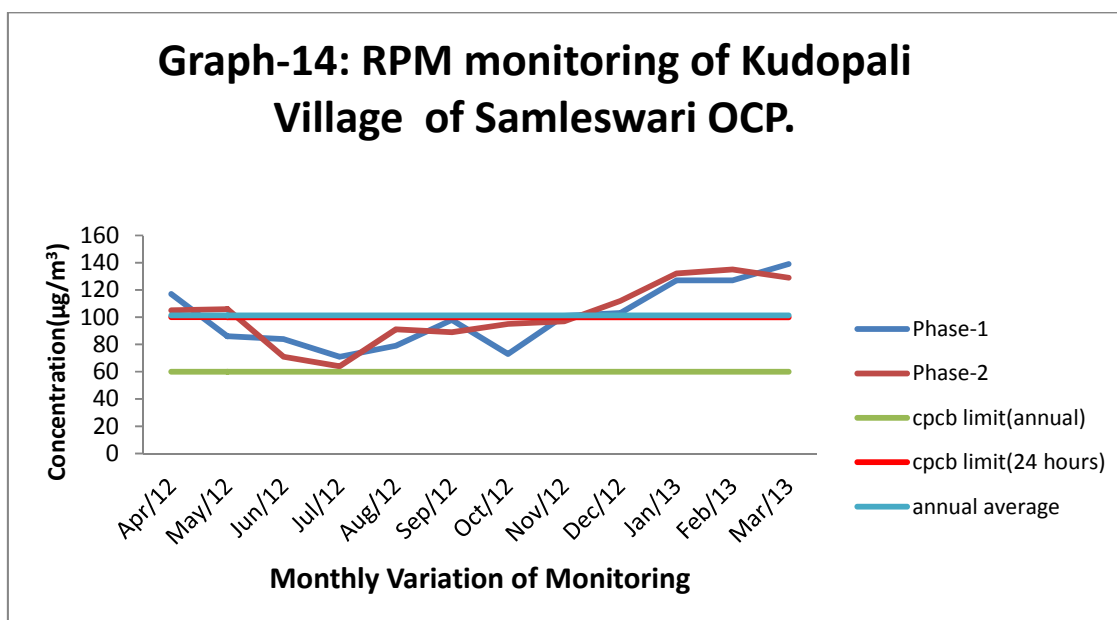
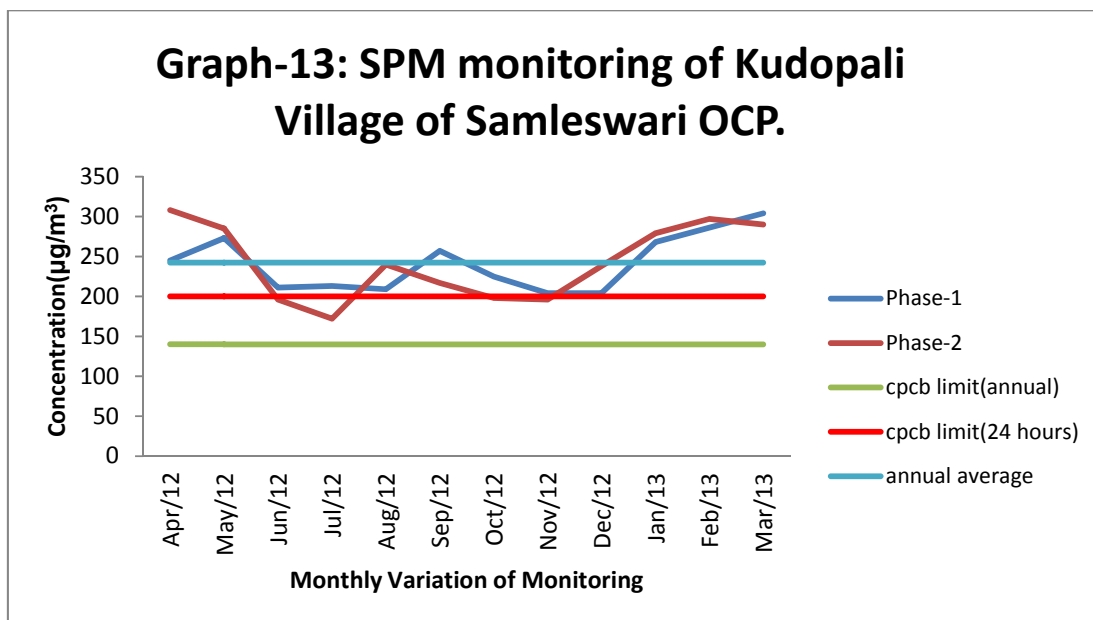
Graph-12: NO_x monitoring of Roof of new Project Office of Samleswari OCP.



Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

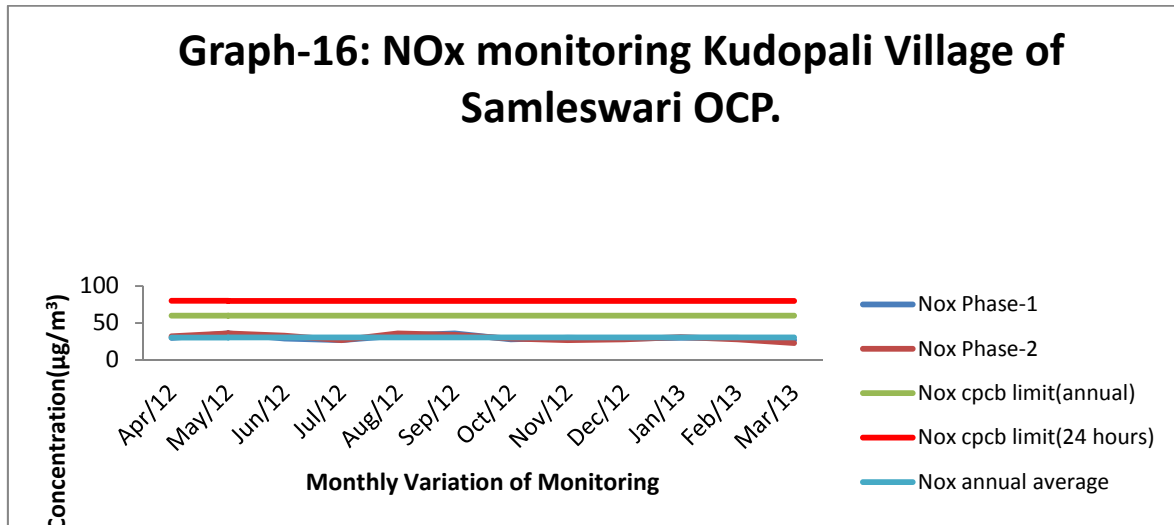
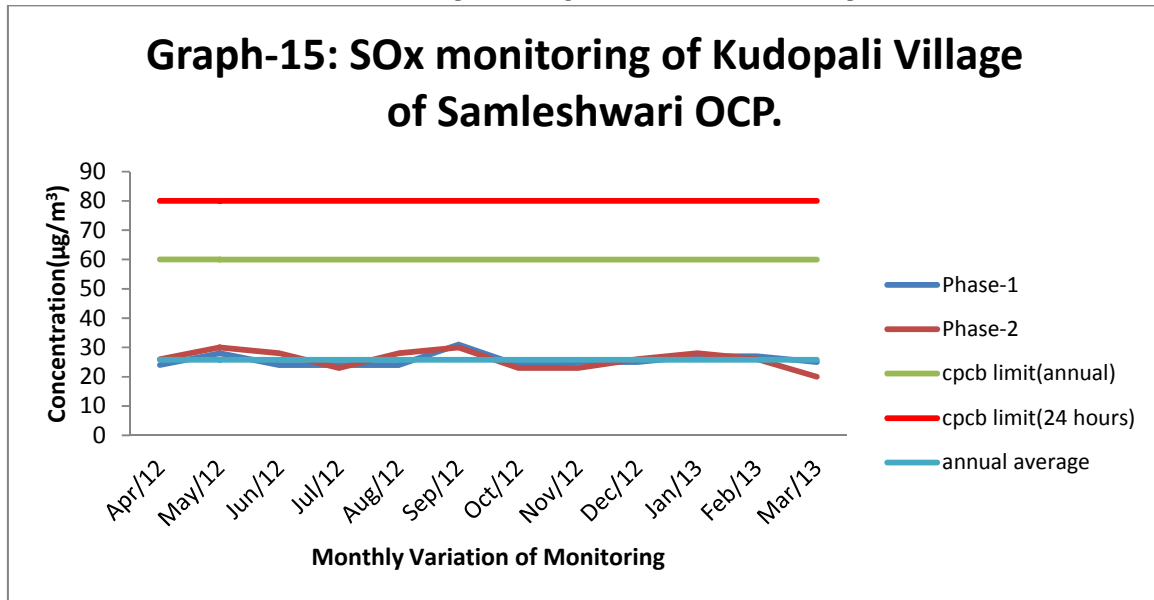
Air Quality Graph of Ib valley Area



Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Air Quality Graph of Ib valley Area



Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

Drinking Water Data Area: IB Valley Project: Lajkura OCP

[illegible]

Drinking Water Data Area: IB Valley Project: Lajkura OCP

Drinking Water Data Area: IB Valley Project: Lajkura OCP

[illegible]

Drinking Water Data Area: IB Valley Project: Lajkura OCP

Date of Sampling	24-Jul-12	09-Aug-12	06-Sep-12	06-Oct-12	13-Dec-12	14-Jan-13	09-Mar-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Treated water at user end Adarsh nagar colony	Treated water at user end Adarsh nagar colony(P.F)	Treated water at user end Adarsh nagar colony(P.F)	Treated water at user end Adarsh nagar colony(P.F)	Treated water at user end Adarsh nagar colony(P.F)	Treated water at user end Adarsh nagar colony(P.F)	Treated water at user end Adarsh nagar colony(P.F)	
Colour, Hazen unit, Max	3	1	2	2	3	3	2	
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	
Turbidity, NTU,Max	4	2	4	3	4	4	3	5
pH value	7.43	7.32	7.34	7.37	7.34	7.37	7.34	6.5-8.5
Total hardness	60	66	72	76	72	76	88	300
Iron (as Fe)	<0.05	0.02	<0.05	<0.05	<0.05	0.06	<0.05	0.3
Chlorides(as Cl)	14	14	14	16	14	16	18	250
Dissolved solids(TDS)	116	118	126	138	126	138	152	500
Calcium(as Ca)	12.8	14.4	16.0	17.6	16.0	19.2	20.8	75
Copper(as Cu)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Manganese(as Mn)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.1
Sulphate(as SO4)	18	19	24	26	24	28	31	200
Nitrate (as NO3)	2.26	4.43	4.21	2.71	3.98	4.43	4.87	45
Flouride (as F)	0.18	0.19	0.23	0.16	0.11	0.12	0.16	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	<0.10	<0.02	<0.02	0.04	0.04	<0.02	5
Hexavalent chromium (Cr6+)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Boron(as B)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C6H5OH)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	36	36	40	44	40	40	48	200
Residual Chlorine	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Drinking Water Data Area: IB Valley Project: Lajkura OCP

Date of Sampling	03-Apr-12	04-May-12	05-Jun-12	
Monitoring Station	Treated water of IWSS at Filter Plant, GM Complex	Treated water of IWSS at Filter Plant, GM Complex	Treated water of IWSS at Filter Plant, GM Complex	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	2	2	2	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	2	3	2	5
pH value	7.44	7.39	7.41	6.5-8.5
Total hardness	96	96	104	300
Iron (as Fe)	<0.05	<0.05	<0.05	0.3
Chlorides (as Cl)	20	22	22	250
Dissolved solids (TDS)	168	176	184	500
Calcium (as Ca)	22.4	22.4	25.6	75
Copper (as Cu)	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	35	33	38	200
Nitrate (as NO ₃)	3.94	4.43	4.43	45
Fluoride (as F)	0.21	0.22	0.25	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.02	<0.02	0.05
Zinc (as Zn)	<0.02	<0.02	<0.02	5
Hexavalent chromium (Cr ⁶⁺)	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	0.001
Alkalinity	52	56	56	200
Residual Chlorine	0.21	0.19	0.20	0.2
MPN	Nil	Nil	Nil	Nil

Drinking Water Data Area: IB Valley Project: Samleswari OCP

[illegible]

Drinking Water Data Area: IB Valley Project: Samleswari OCP

[illegible]

Drinking Water Data Area: IB Valley Project: Samleswari OCP

[illegible]

Drinking Water Data Area: IB Valley Project: Samleswari OCP

[illegible]

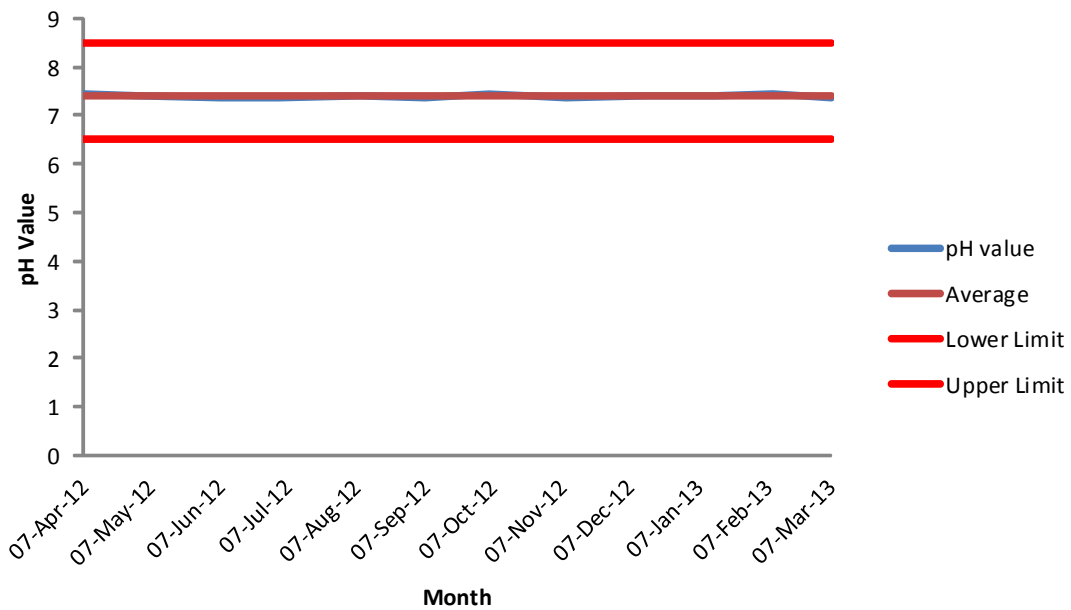
[illegible]

[illegible]

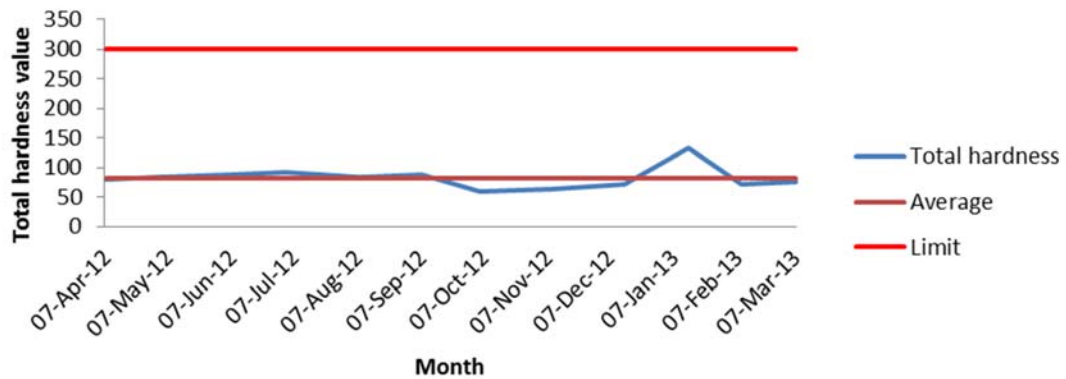
Drinking Water Data Area: IB Valley Project: Samleswari OCP

Date of Sampling	06-Sep-12	05-Mar-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Water from Intake (raw water) at WSS	Water from Intake(raw water) at WSS	
Colour, Hazen unit, Max	3	3	5
Odour	Unobjection able	Unobjection able	Unobjection able
Taste	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	4	4	5
pH value	7.23	7.34	6.5-8.5
Total hardness	88	104	300
Iron (as Fe)	<0.05	<0.05	0.3
Chlorides(as Cl)	18	20	250
Dissolved solids(TDS)	156	178	500
Calcium(as Ca)	20.8	24.0	5
Copper(as Cu)	<0.02	<0.02	0.05
Manganese(as Mn)	<0.05	<0.05	0.1
Sulphate(as SO ₄)	41	33	200
Nitrate (as NO ₃)	3.12	4.87	45
Flouride (as F)	0.32	0.22	1.5
Selenium (as Se)	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	0.05
Zinc (as Zn)	0.39	<0.02	75
Hexavalent chromium(Cr ⁶⁺)	<0.01	<0.01	0.05
Boron(as B)	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	0.001
Alkalinity	44	56	200
Residual Chlorine	Nil	Nil	0.2
MPN	Nil	Nil	Nil

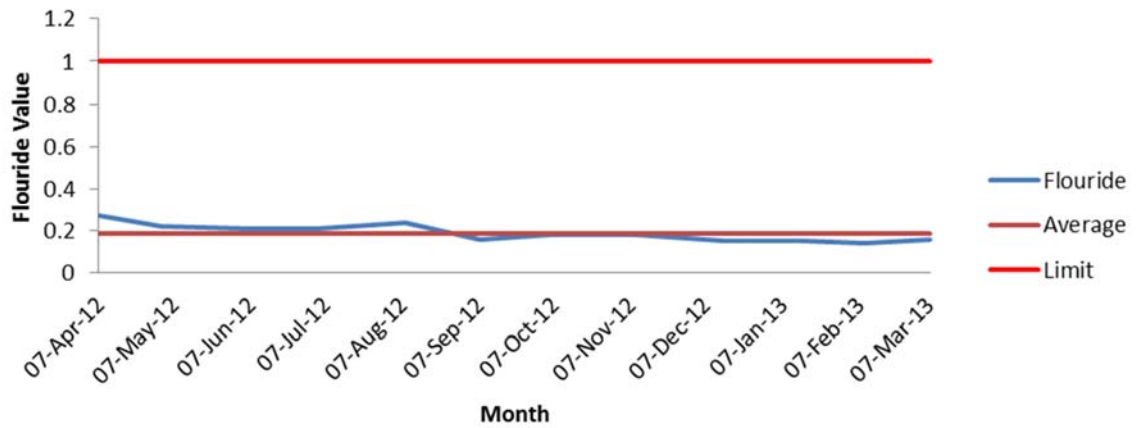
Graph for pH of Adarsha Nagar Colony Tap Water of Lajkura OCP of IB Valley area



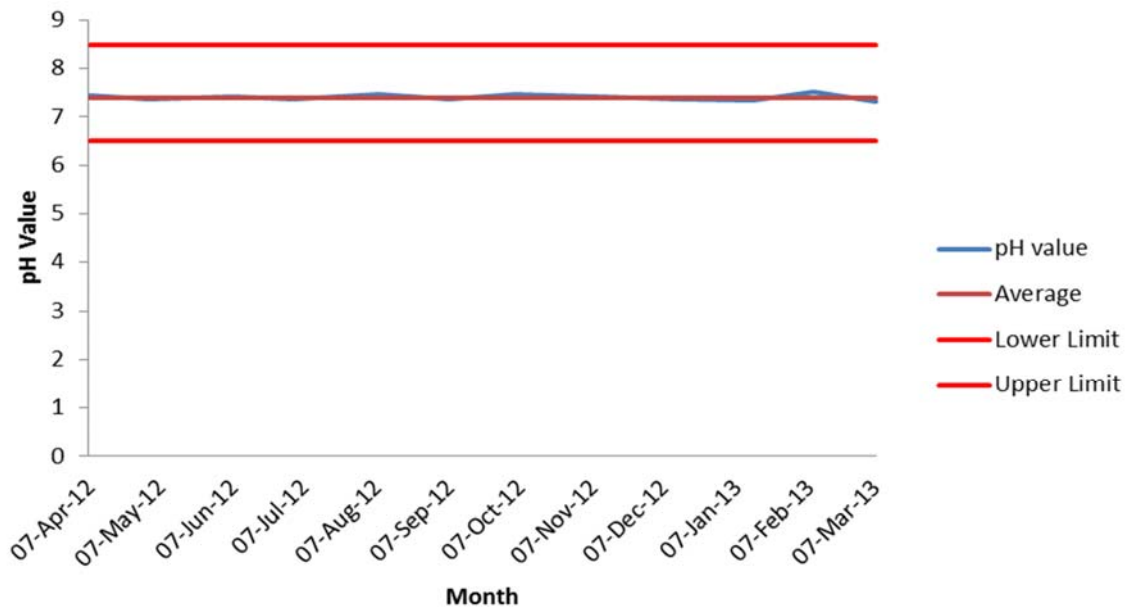
Graph for Total Hardness of Adarsha Nagar Colony Tap Water of Lajkura OCP of IB Valley area



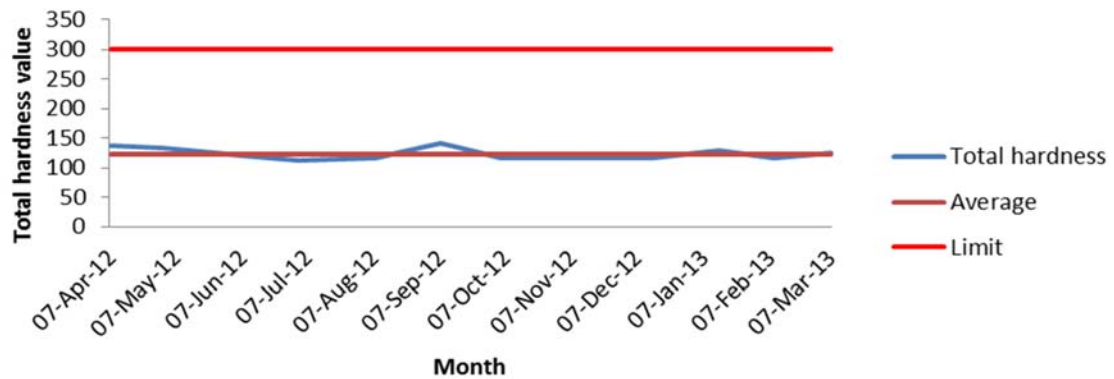
Graph for Flouride of Adarsha Nagar Colony Tap Water of Lajkura OCP of IB Valley area



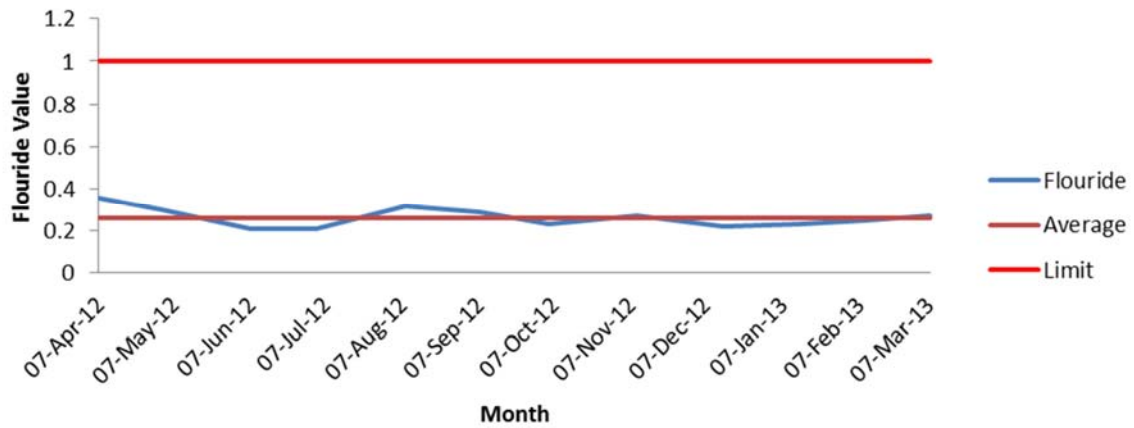
**Graph for pH of Chhauliberena Village Well
Water of Lajkura OCP of IB Valley Area**



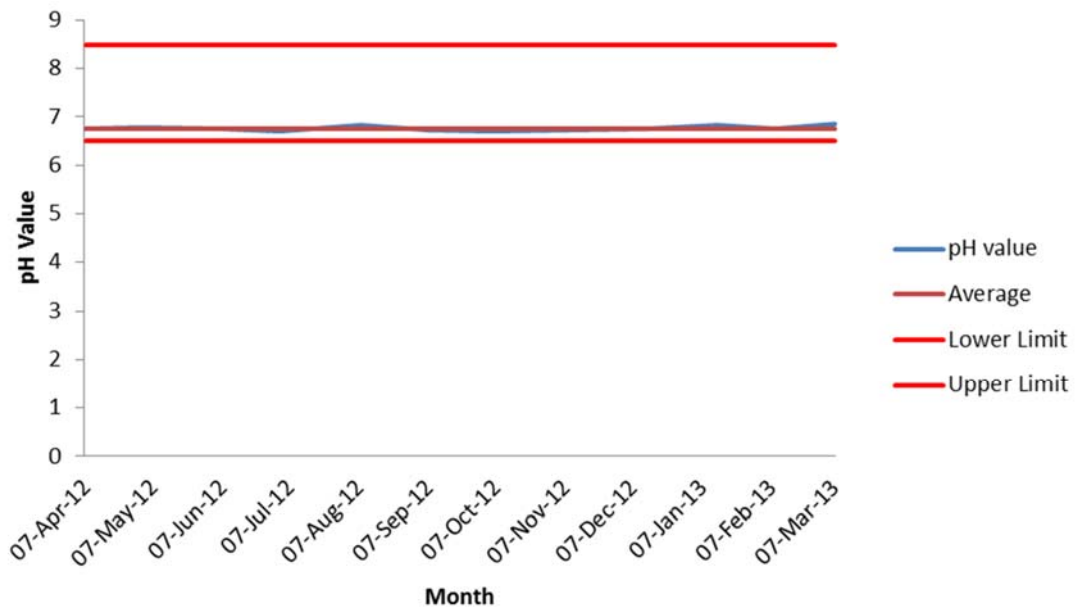
**Graph for Total Hardness of Chhauliberena
Village Well Water of Lajkura OCP of IB Valley
Area**



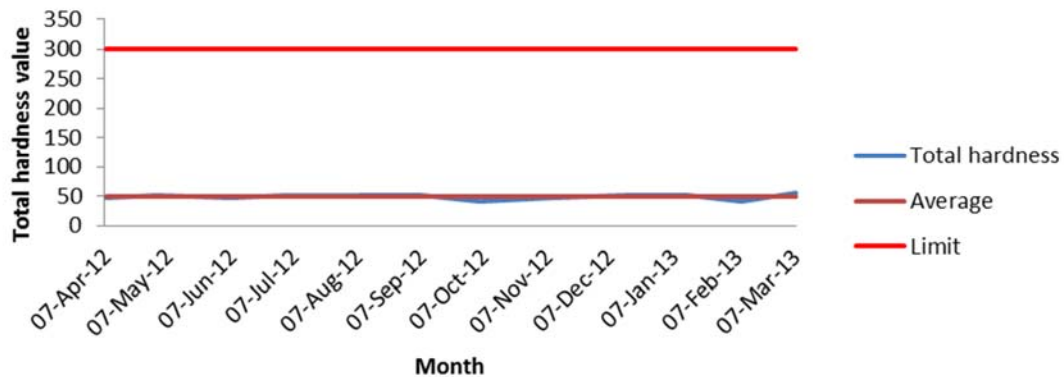
Graph for Flouride of Chhauliberena Village Well Water of Lajkura OCP of IB Valley Area



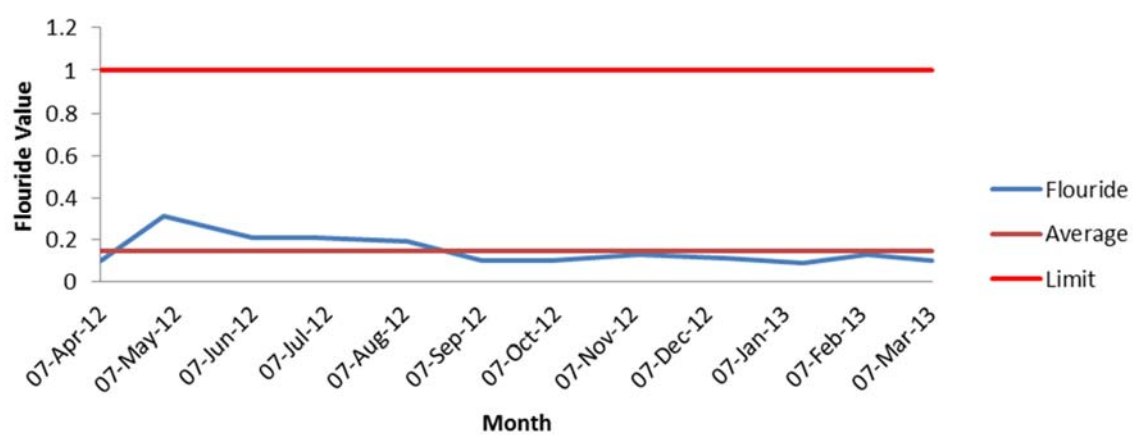
Graph for pH of Anapali Village Well Water of Samaleswari OCP of IB Valley Area



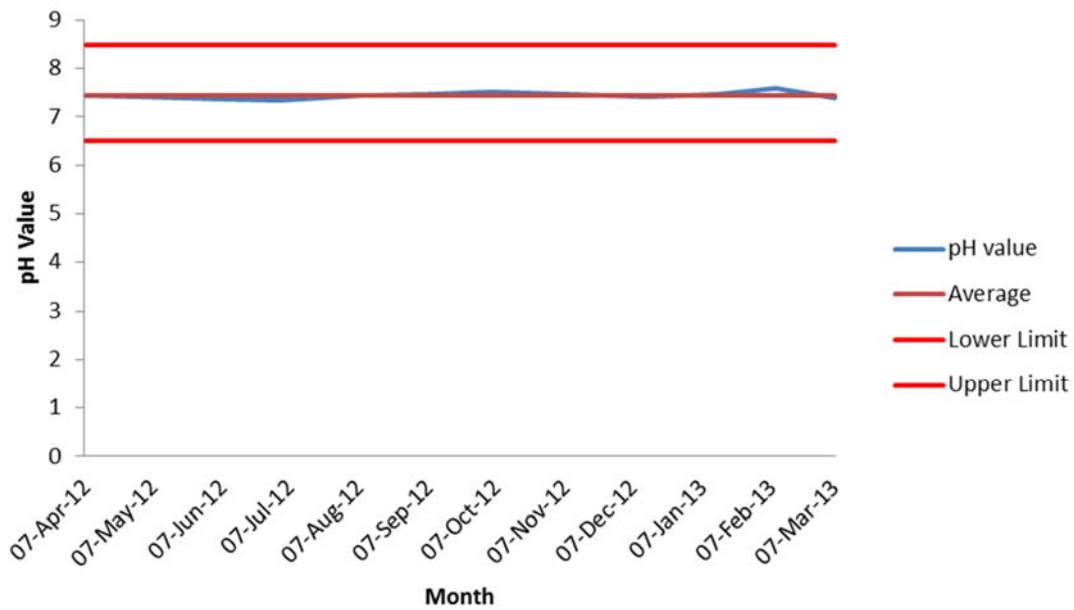
Graph for Total Hardness of Anapali Village Well Water of Samaleswari OCP of IB Valley Area



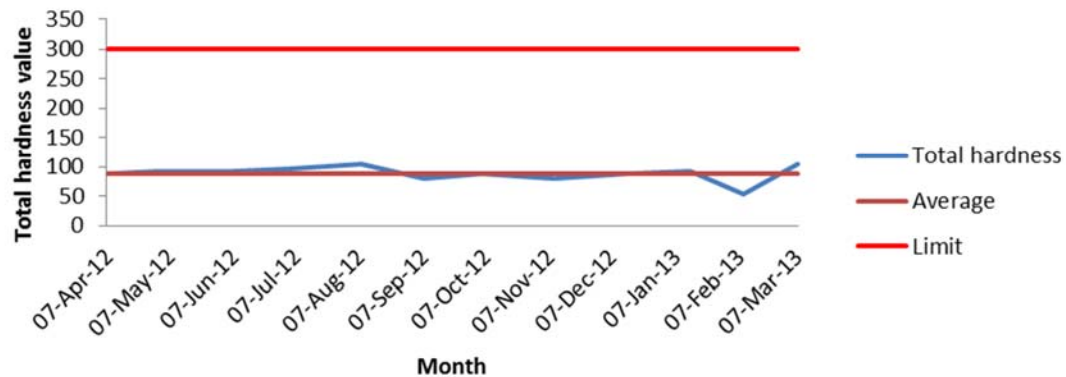
Graph for Flouride of Anapali Village Well Water of Samaleswari OCP of IB Valley Area



Graph for pH of Samleswari Colony Tap Water of Samaleswari OCP of IB Valley Area



Graph for Total Hardness of Samleswari Colony Tap Water of Samaleswari OCP of IB Valley Area



Graph for Flouride of Samleswari Colony Tap Water of Samaleswari OCP of IB Valley Area

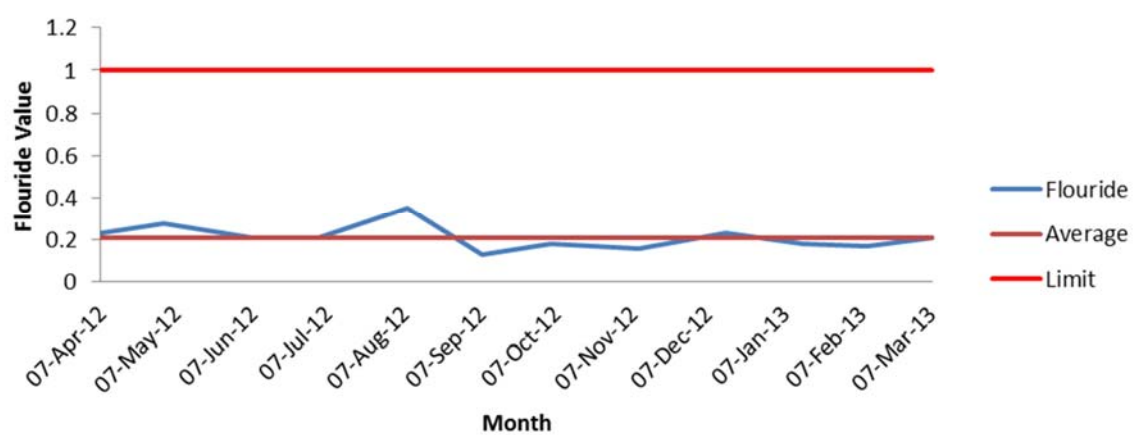


TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

Project : **Central Hospital**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
05-Apr-12	Outlet of Drain	7.92	<1.0	14	60	18	-
03-May-12	Outlet of Drain	7.70	<1.0	36	50	12	-
04-Jun-12	Outlet of Drain	7.02	<1.0	30	45	10	-
25-Jul-12	Outlet of Drain	7.15	<1.0	34	50	8	-
08-Aug-12	Outlet of Drain	7.25	<1.0	38	55	9	-
07-Sep-12	Outlet of Drain	7.32	<1.0	34	50	8	-

Project : **Lajkura OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
05-Apr-12	Mine Sump Water	7.75					
04-May-12	Mine Sump Water	7.68					
04-Jun-12	Mine Sump Water	7.80					
03-Jul-12	Mine Sump Water	7.70					
09-Aug-12	Mine Sump Water	7.65					
06-Sep-12	Mine Sump Water	7.80					
06-Oct-12	Mine Sump Water	7.72					
06-Nov-12	Mine Sump Water	7.80					

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

13-Dec-12	Mine Sump Water	7.65					
12-Jan-13	Mine Sump Water	7.55					
07-Feb-13	Mine Sump Water	7.50					
06-Mar-13	Mine Sump Water	7.42					
05-Apr-12	Oil & Grease Trap Outlet	7.58	<1.0	22	35	-	-
19-Apr-12	Oil & Grease Trap Outlet	7.62	<1.0	24	35	-	-
04-May-12	Oil & Grease Trap Outlet	7.55	<1.0	20	30	-	-
21-May-12	Oil & Grease Trap Outlet	7.60	<1.0	18	25	-	-
04-Jun-12	Oil & Grease Trap Outlet	7.55	<1.0	20	30	-	-
18-Jun-12	Oil & Grease Trap Outlet	7.62	<1.0	22	35	-	-
03-Jul-12	Oil & Grease Trap Outlet	7.55	<1.0	20	30	-	-
19-Jul-12	Oil & Grease Trap Outlet	7.60	<1.0	24	35	-	-
09-Aug-12	Oil & Grease Trap Outlet	7.65	<1.0	26	40	-	-
21-Aug-12	Oil & Grease Trap Outlet	7.55	<1.0	30	45	-	-
06-Sep-12	Oil & Grease Trap Outlet	7.48	<1.0	26	40	-	-
25-Sep-12	Oil & Grease Trap Outlet	7.55	<1.0	22	35	-	-
06-Oct-12	Oil & Grease Trap Outlet	7.50	<1.0	20	30	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

22-Oct-12	Oil & Grease Trap Outlet	7.62	<1.0	26	40	-	-
06-Nov-12	Oil & Grease Trap Outlet	7.48	<1.0	22	35	-	-
22-Nov-12	Oil & Grease Trap Outlet	7.35	<1.0	26	40	-	-
13-Dec-12	Oil & Grease Trap Outlet	7.25	<1.0	24	35	-	-
28-Dec-12	Oil & Grease Trap Outlet	7.38	<1.0	26	40	-	-
12-Jan-13	Oil & Grease Trap Outlet	7.30	<1.0	28	40	-	-
28-Jan-13	Oil & Grease Trap Outlet	7.20	<1.0	24	35	-	-
07-Feb-13	Oil & Grease Trap Outlet	7.25	<1.0	24	35	-	-
25-Feb-13	Oil & Grease Trap Outlet	7.30	<1.0	26	40	-	-
06-Mar-13	Oil & Grease Trap Outlet	7.15	<1.0	20	30	-	-
20-Mar-13	Oil & Grease Trap Outlet	7.20	<1.0	24	35	-	-
05-Apr-12	Outlet from Sedimentation Tank (MDTP)	7.32	<1.0	30	45	-	2.0
19-Apr-12	Outlet from Sedimentation Tank (MDTP)	7.42	<1.0	32	50	-	2.1
04-May-12	Outlet from Sedimentation Tank (MDTP)	7.36	<1.0	28	40	-	2.0
21-May-12	Outlet from Sedimentation Tank (MDTP)	7.40	<1.0	24	35	-	1.9
04-Jun-12	Outlet from Sedimentation Tank (MDTP)	7.45	<1.0	28	40	-	2.0
18-Jun-12	Outlet from Sedimentation Tank (MDTP)	7.50	<1.0	32	45	-	2.1

TABLE--
EFFLUENT QUALITY DATA

Area : *Ib Valley*

03-Jul-12	Outlet from Sedimentation Tank (MDTP)	7.58	<1.0	34	50	-	2.0
19-Jul-12	Outlet from Sedimentation Tank (MDTP)	7.50	<1.0	30	45	-	2.0
09-Aug-12	Outlet from Sedimentation Tank (MDTP)	7.55	<1.0	32	50	-	2.1
21-Aug-12	Outlet from Sedimentation Tank (MDTP)	7.42	<1.0	36	55	-	2.2
06-Sep-12	Outlet from Sedimentation Tank (MDTP)	7.30	<1.0	34	50	-	2.1
25-Sep-12	Outlet from Sedimentation Tank (MDTP)	7.40	<1.0	32	45	-	2.0
06-Oct-12	Outlet from Sedimentation Tank (MDTP)	7.28	<1.0	34	50	-	2.1
22-Oct-12	Outlet from Sedimentation Tank (MDTP)	7.44	<1.0	28	45	-	1.9
06-Nov-12	Outlet from Sedimentation Tank (MDTP)	7.35	<1.0	24	40	-	2.0
22-Nov-12	Outlet from Sedimentation Tank (MDTP)	7.70	<1.0	32	50	-	2.2
13-Dec-12	Outlet from Sedimentation Tank (MDTP)	7.35	<1.0	30	45	-	2.0
28-Dec-12	Outlet from Sedimentation Tank (MDTP)	7.50	<1.0	34	50	-	2.1
12-Jan-13	Outlet from Sedimentation Tank (MDTP)	7.40	<1.0	30	45	-	2.1
28-Jan-13	Outlet from Sedimentation Tank (MDTP)	7.32	<1.0	26	40	-	2.0
07-Feb-13	Outlet from Sedimentation Tank (MDTP)	7.45	<1.0	32	55	-	2.2
25-Feb-13	Outlet from Sedimentation Tank (MDTP)	7.40	<1.0	30	45	-	2.1
06-Mar-13	Outlet from Sedimentation Tank (MDTP)	7.40	<1.0	30	45	-	2.0

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

20-Mar-13	Outlet from Sedimentation Tank (MDTP)	7.45	<1.0	34	50	-	2.1

Project : **Samaleswari OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
05-Apr-12	Outlet of DETP	7.92		14	-	8	-
19-Apr-12	Outlet of DETP	7.75		16	-	10	-
04-May-12	Outlet of DETP	7.88		16	-	10	-
21-May-12	Outlet of DETP	7.90		12	-	8	-
04-Jun-12	Outlet of DETP	7.95		12	-	8	-
18-Jun-12	Outlet of DETP	8.10		14	-	7	-
02-Jul-12	Outlet of DETP	8.00		12	-	8	-
17-Jul-12	Outlet of DETP	7.90		10	-	6	-
08-Aug-12	Outlet of DETP	7.92		14	-	9	-
21-Aug-12	Outlet of DETP	7.75		12	-	7	-
06-Sep-12	Outlet of DETP	7.80		10	-	6	-
21-Sep-12	Outlet of DETP	7.85		12	-	7	-
05-Oct-12	Outlet of DETP	7.80		10	-	6	-
25-Oct-12	Outlet of DETP	7.76		14	-	9	-
08-Nov-12	Outlet of DETP	7.70		12	-	7	-

TABLE--
EFFLUENT QUALITY DATA

Area : ***Ib Valley***

24-Nov-12	Outlet of DETP	7.62		14	-	8	-
13-Dec-12	Outlet of DETP	7.50		12	-	7	-
28-Dec-12	Outlet of DETP	7.44		10	-	6	-
12-Jan-13	Outlet of DETP	7.45		10	-	6	-
28-Jan-13	Outlet of DETP	7.40		12	-	7	-
07-Feb-13	Outlet of DETP	7.52		12	-	7	-
25-Feb-13	Outlet of DETP	7.45		10	-	6	-
05-Mar-13	Outlet of DETP	7.25		10	-	6	-
20-Mar-13	Outlet of DETP	7.30		12	-	8	-
03-Apr-12	Mine Sump Water	7.87					
04-May-12	Mine Sump Water	7.80					
04-Jun-12	Mine Sump Water	7.85					
02-Jul-12	Mine Sump Water	7.70					
08-Aug-12	Mine Sump Water	7.88					
06-Sep-12	Mine Sump Water	7.95					
05-Oct-12	Mine Sump Water	7.15					
05-Nov-12	Mine Sump Water	7.20					

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

13-Dec-12	Mine Sump Water	7.30					
07-Feb-13	Mine Sump Water	7.40					
05-Mar-13	Mine Sump Water	7.30					
03-Apr-12	Oil & Grease Trap Outlet	7.92	<1.0	24	40	-	-
19-Apr-12	Oil & Grease Trap Outlet	7.84	<1.0	20	30	-	-
04-May-12	Oil & Grease Trap Outlet	7.76	<1.0	20	30	-	-
21-May-12	Oil & Grease Trap Outlet	7.80	<1.0	25	25	-	-
04-Jun-12	Oil & Grease Trap Outlet	7.75	<1.0	16	25	-	-
18-Jun-12	Oil & Grease Trap Outlet	7.82	<1.0	20	30	-	-
02-Jul-12	Oil & Grease Trap Outlet	7.75	<1.0	20	30	-	-
18-Jul-12	Oil & Grease Trap Outlet	7.65	<1.0	18	25	-	-
08-Aug-12	Oil & Grease Trap Outlet	7.58	<1.0	20	30	-	-
21-Aug-12	Oil & Grease Trap Outlet	7.48	<1.0	22	35	-	-
06-Sep-12	Oil & Grease Trap Outlet	7.32	<1.0	24	35	-	-
21-Sep-12	Oil & Grease Trap Outlet	7.40	<1.0	26	40	-	-
05-Oct-12	Oil & Grease Trap Outlet	7.35	<1.0	22	35	-	-
25-Oct-12	Oil & Grease Trap Outlet	7.30	<1.0	20	30	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

05-Nov-12	Oil & Grease Trap Outlet	7.25	<1.0	18	25	-	-
21-Nov-12	Oil & Grease Trap Outlet	7.15	<1.0	20	30	-	-
13-Dec-12	Oil & Grease Trap Outlet	7.10	<1.0	24	35	-	-
28-Dec-12	Oil & Grease Trap Outlet	7.22	<1.0	20	30	-	-
12-Jan-13	Oil & Grease Trap Outlet	7.00	<1.0	20	30	-	-
28-Jan-13	Oil & Grease Trap Outlet	6.95	<1.0	22	35	-	-
07-Feb-13	Oil & Grease Trap Outlet	7.00	<1.0	20	30	-	-
25-Feb-13	Oil & Grease Trap Outlet	7.10	<1.0	24	35	-	-
05-Mar-13	Oil & Grease Trap Outlet	7.10	<1.0	22	35	-	-
20-Mar-13	Oil & Grease Trap Outlet	7.00	<1.0	20	30	-	-
03-Apr-12	Outlet from Sedimentation Tank (MDTP)	7.88	<1.0	30	45	-	1.9
19-Apr-12	Outlet from Sedimentation Tank (MDTP)	7.90	<1.0	28	40	-	2.0
04-May-12	Outlet from Sedimentation Tank (MDTP)	7.82	<1.0	26	40	-	2.0
21-May-12	Outlet from Sedimentation Tank (MDTP)	7.78	<1.0	22	35	-	2.0
04-Jun-12	Outlet from Sedimentation Tank (MDTP)	7.70	<1.0	24	35	-	2.1
18-Jun-12	Outlet from Sedimentation Tank (MDTP)	7.78	<1.0	28	40	-	2.2
02-Jul-12	Outlet from Sedimentation Tank (MDTP)	7.65	<1.0	26	40	-	2.0

TABLE--
EFFLUENT QUALITY DATA

Area : **Ib Valley**

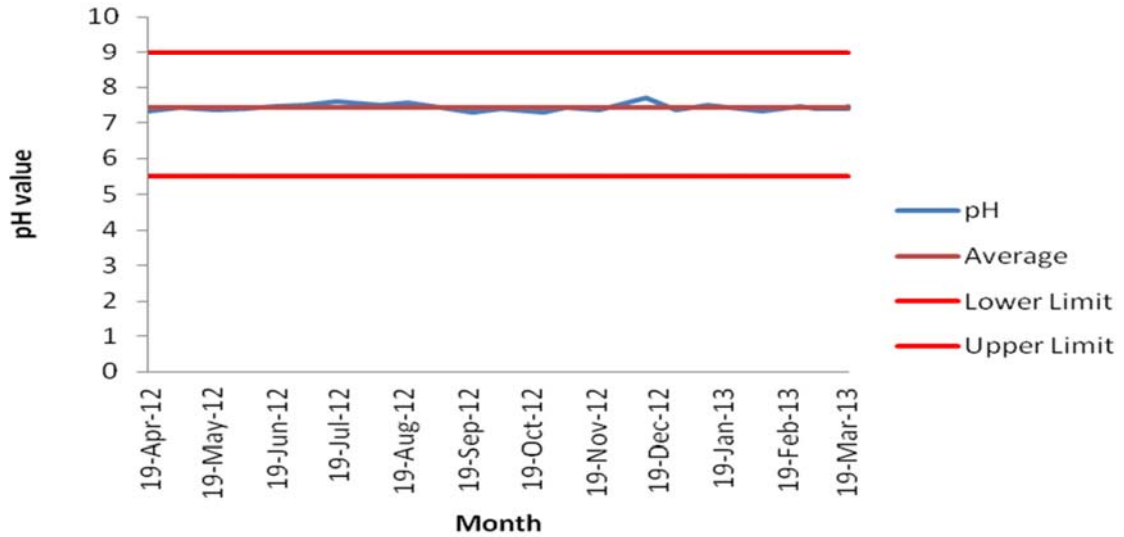
18-Jul-12	Outlet from Sedimentation Tank (MDTP)	7.58	<1.0	22	35	-	1.9
08-Aug-12	Outlet from Sedimentation Tank (MDTP)	7.72	<1.0	26	40	-	1.9
21-Aug-12	Outlet from Sedimentation Tank (MDTP)	7.64	<1.0	30	45	-	2.0
06-Sep-12	Outlet from Sedimentation Tank (MDTP)	7.55	<1.0	28	40	-	1.9
21-Sep-12	Outlet from Sedimentation Tank (MDTP)	7.60	<1.0	24	35	-	1.8
05-Oct-12	Outlet from Sedimentation Tank (MDTP)	7.70	<1.0	26	40	-	1.9
25-Oct-12	Outlet from Sedimentation Tank (MDTP)	7.65	<1.0	26	40	-	1.9
05-Nov-12	Outlet from Sedimentation Tank (MDTP)	7.57	<1.0	24	35	-	2.0
21-Nov-12	Outlet from Sedimentation Tank (MDTP)	7.45	<1.0	28	40	-	2.1
13-Dec-12	Outlet from Sedimentation Tank (MDTP)	7.50	<1.0	26	40	-	2.0
28-Dec-12	Outlet from Sedimentation Tank (MDTP)	7.58	<1.0	24	35	-	1.9
12-Jan-13	Outlet from Sedimentation Tank (MDTP)	7.45	<1.0	24	35	-	1.9
28-Jan-13	Outlet from Sedimentation Tank (MDTP)	7.35	<1.0	26	40	-	2.0
07-Feb-13	Outlet from Sedimentation Tank (MDTP)	7.30	<1.0	26	35	-	1.9
25-Feb-13	Outlet from Sedimentation Tank (MDTP)	7.35	<1.0	28	40	-	1.9
05-Mar-13	Outlet from Sedimentation Tank (MDTP)	7.25	<1.0	26	40	-	2.0
20-Mar-13	Outlet from Sedimentation Tank (MDTP)	7.20	<1.0	24	35	-	1.9

TABLE--
EFFLUENT QUALITY DATA

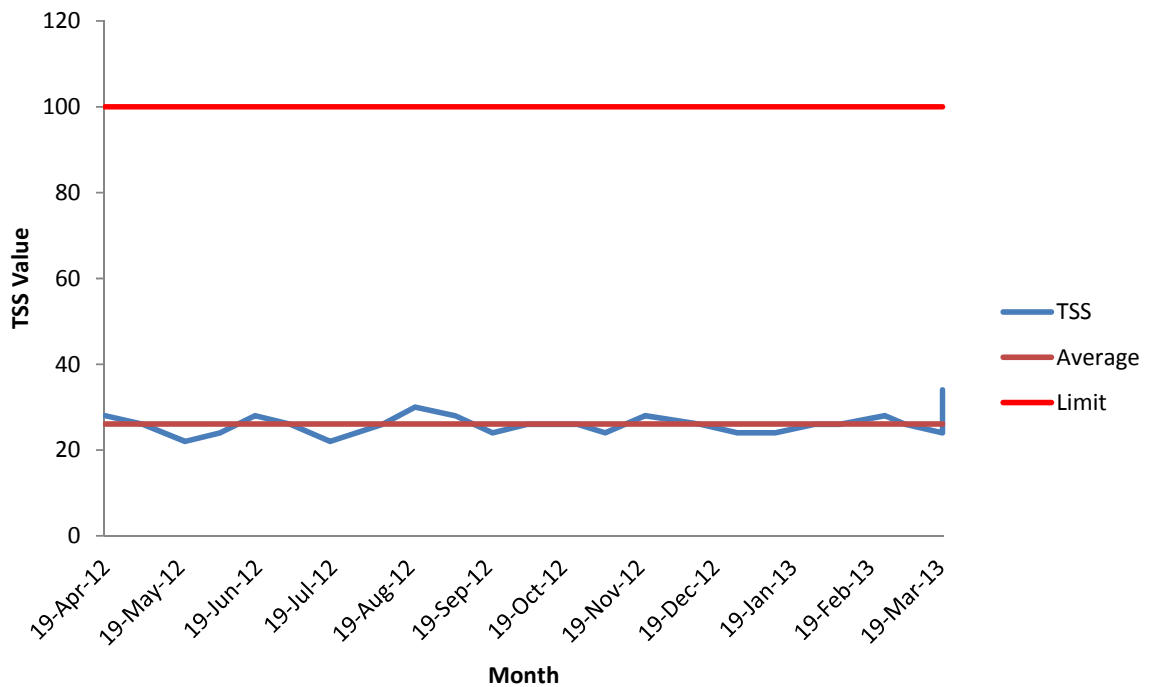
Area : *Ib Valley*

02-Jul-12	Water from External OB dump	6.94	<1.0	32	50		2.1
08-Aug-12	Water from External OB dump	7.10	<1.0	36	55		2.2
06-Sep-12	Water from External OB dump	7.30	<1.0	32	45		2.0
21-Sep-12	Water from External OB dump	7.22	<1.0	34	50		2.1

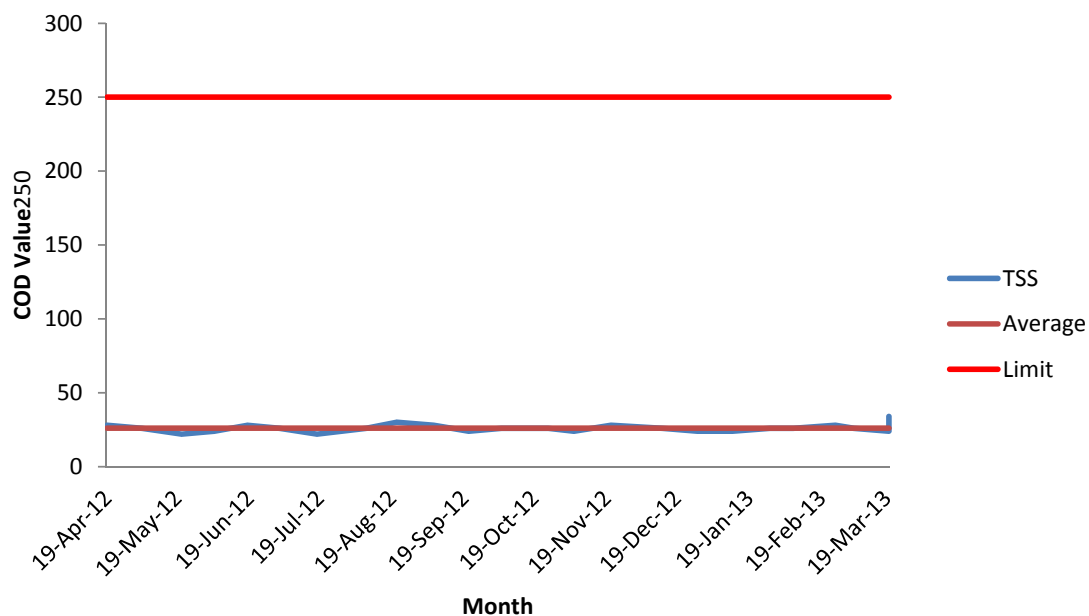
**Graph for pH of outlet of
sedimentation pond of Lajkura OCP of
IB Valley Area**



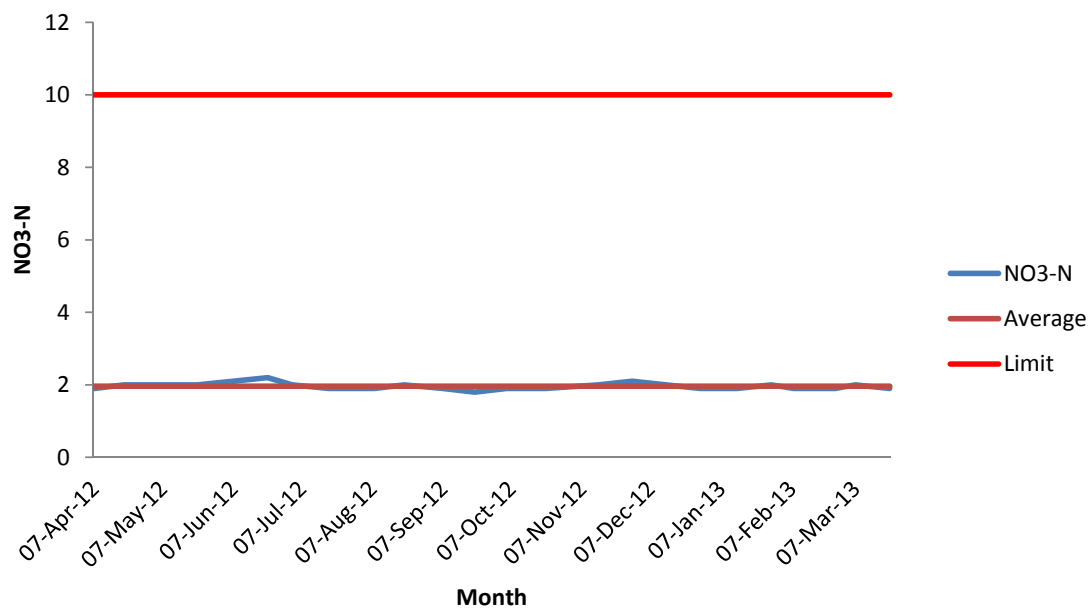
**Graph for TSS of outlet of sedimentation pond of
Lajkura OCP of IB Valley Area**



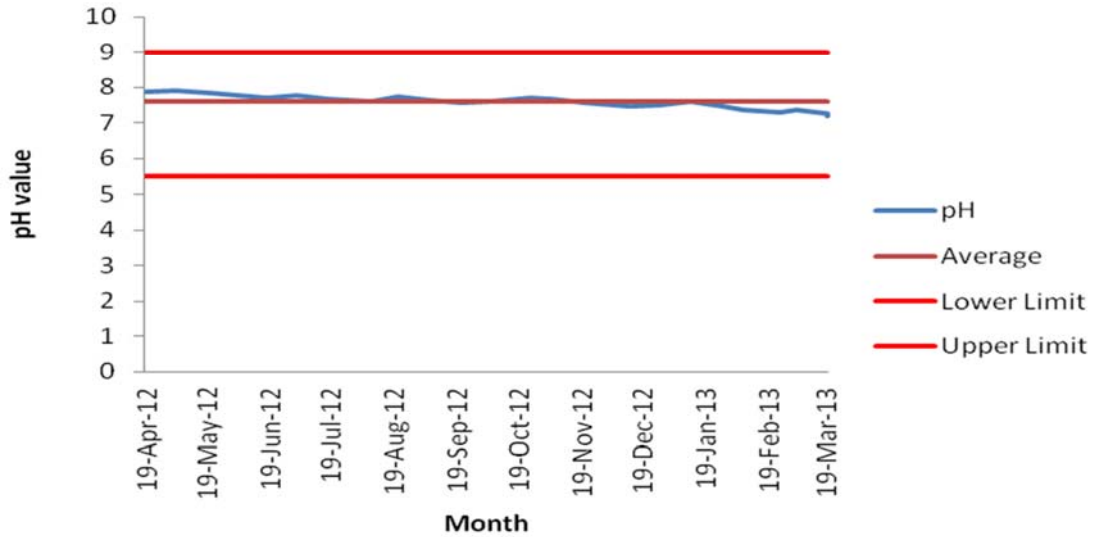
Graph for COD of outlet of sedimentation pond of Lajkura OCP of IB Valley Area



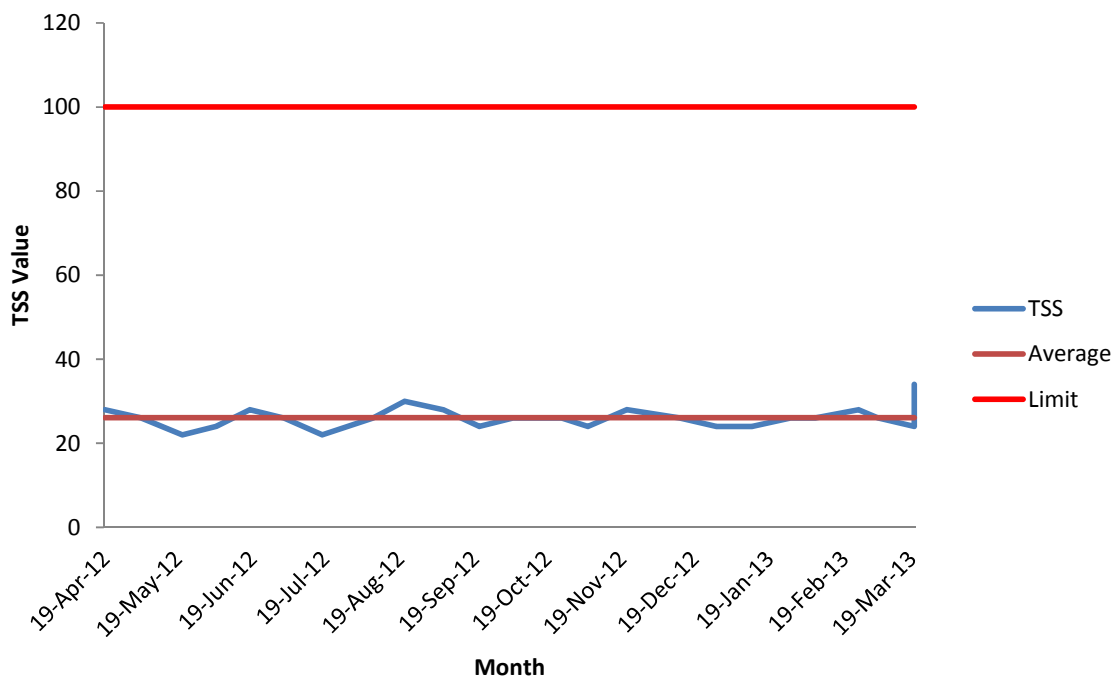
Graph for NO3-N of outlet of sedimentation pond of Lajkura OCP of IB Valley Area



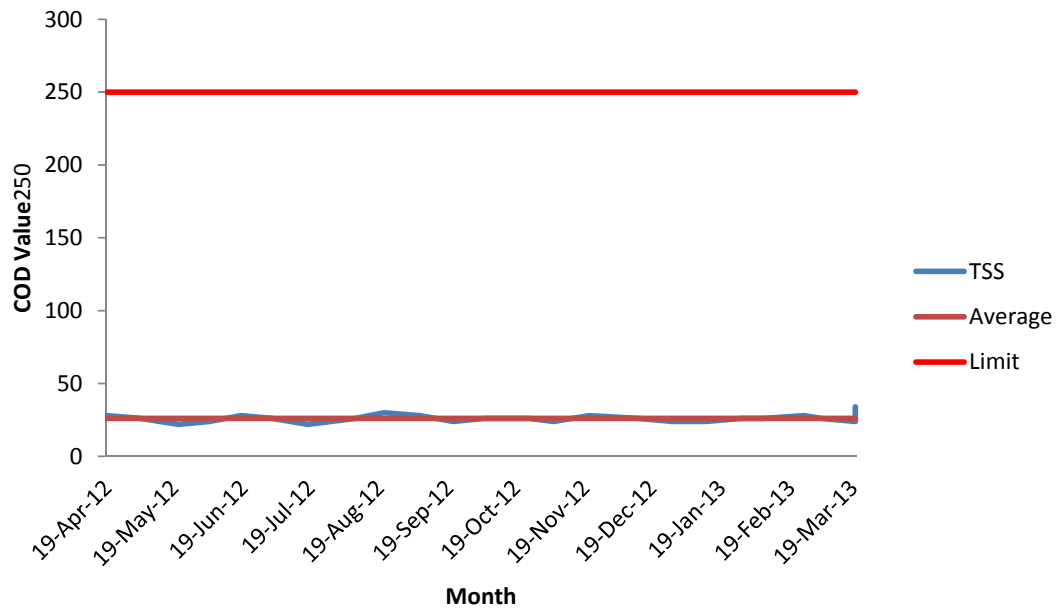
**Graph for pH of outlet of
sedimentation pond of Samaleswari
OCP of IB Valley Area**



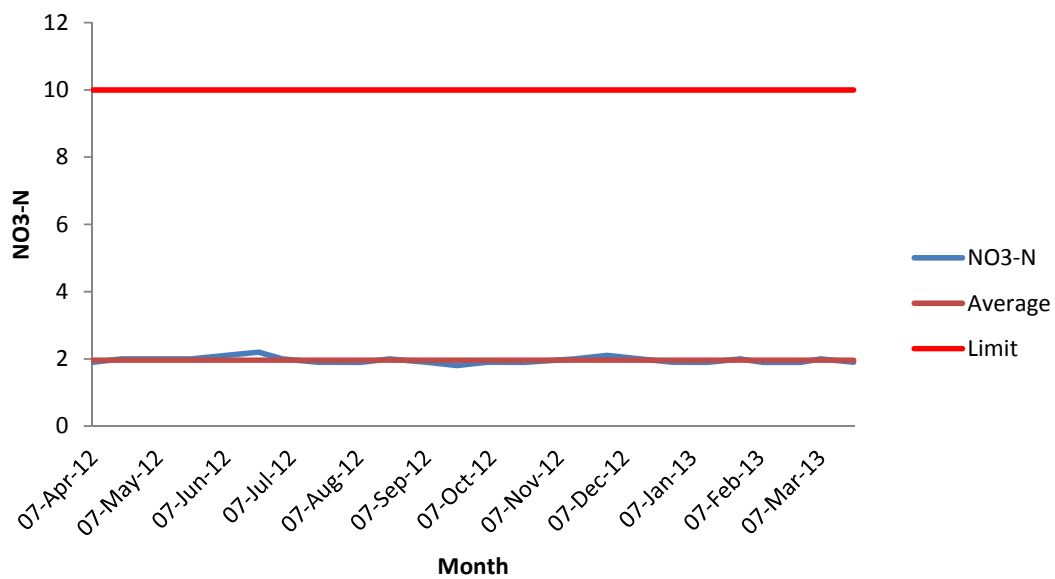
**Graph for TSS of outlet of sedimentation pond of
Samaleswari OCP of IB Valley Area**



Graph for COD of outlet of sedimentation pond of Samaleswari OCP of IB Valley Area



Graph for NO3-N of outlet of sedimentation pond of Samaleswari OCP of IB Valley Area



Yearly Effluent Data

Area: IB Valley

Area	<i>IB VALLEY</i>	<i>IB VALLEY</i>
Project	<i>Lajkura OCP</i>	<i>Samaleswari OCP</i>
Date of sampling	27-Nov-12	27-Nov-12
Name of the station	Outlet from Sedimentation Tank (MDTP)	Outlet from Sedimentation Pond
Colour	Acceptable	Acceptable
Odour	Agreeable	Agreeable
Temperature, °C	17.5	17.6
Amonical Nitrogen	0.25	0.23
TKN	2.11	1.30
BOD	13	12
Arsenic	<0.01	<0.01
Mercury	-	-
Lead	<0.05	<0.05
Cadmium	<0.01	<0.01
Hexavalent chromium	<0.01	<0.01
Total chromium	<0.1	<0.1
Copper	<0.02	<0.02
Zinc	0.14	0.10
Selenium	<0.01	<0.01
Nickel	<0.1	<0.1
Fluoride	0.15	0.18
Dissolved phosphate	0.20	0.17
Sulphide	0.005	0.004
Phenolics	<0.001	<0.001
Manganese	<0.05	<0.05
Iron	0.12	0.12

Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

TABLE--
NOISE LEVEL MONITORING DATA

AREA : **Ib Valley**

PROJECT : **Lajkura OCP**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
11-Apr-12	Dragline Yard	59.4	53.5
28-Apr-12	Dragline Yard	57.9	51.9
08-May-12	Dragline Yard	58.4	52.8
30-May-12	Dragline Yard	57.5	51.6
08-Jun-12	Dragline Yard	59.6	53.8
29-Jun-12	Dragline Yard	58.3	52.1
07-Jul-12	Dragline Yard	57.2	50.1
30-Jul-12	Dragline Yard	56.3	50.5
11-Aug-12	Dragline Yard	55.8	52.6
27-Aug-12	Dragline Yard	54.5	51.3
11-Sep-12	Dragline Yard	55.9	50.6
28-Sep-12	Dragline Yard	54.8	51.4
12-Oct-12	Dragline Yard	55.6	52.7
30-Oct-12	Dragline Yard	54.4	51.1
09-Nov-12	Dragline Yard	53.2	50.8
26-Nov-12	Dragline Yard	52.1	50.6
13-Dec-12	Dragline Yard	53.2	50.1
29-Dec-12	Dragline Yard	54.8	51.6
14-Jan-13	Dragline Yard	53.7	50.8
30-Jan-13	Dragline Yard	52.8	49.0
11-Feb-13	Dragline Yard	51.4	48.6
27-Feb-13	Dragline Yard	50.2	47.8
13-Mar-13	Dragline Yard	51.3	48.7
29-Mar-13	Dragline Yard	52.3	47.6
11-Apr-12	Lajkura Store	56.3	48.5
28-Apr-12	Lajkura Store	54.3	47.4
08-May-12	Lajkura Store	55.6	48.7
30-May-12	Lajkura Store	54.3	47.8
08-Jun-12	Lajkura Store	56.5	49.8
29-Jun-12	Lajkura Store	55.3	48.0

07-Jul-12	Lajkura Store	54.1	47.3
30-Jul-12	Lajkura Store	53.5	46.5
11-Aug-12	Lajkura Store	54.6	47.1
27-Aug-12	Lajkura Store	53.3	46.2
11-Sep-12	Lajkura Store	54.1	47.3
28-Sep-12	Lajkura Store	53.7	46.7
12-Oct-12	Lajkura Store	54.7	47.3
30-Oct-12	Lajkura Store	53.6	46.4
09-Nov-12	Lajkura Store	52.7	47.5
26-Nov-12	Lajkura Store	51.5	46.7
13-Dec-12	Lajkura Store	52.3	45.9
29-Dec-12	Lajkura Store	51.6	46.7
14-Jan-13	Lajkura Store	52.4	47.8
30-Jan-13	Lajkura Store	53.2	48.5
11-Feb-13	Lajkura Store	54.3	47.6
27-Feb-13	Lajkura Store	53.3	48.4
13-Mar-13	Lajkura Store	52.4	47.9
29-Mar-13	Lajkura Store	53.1	46.7
11-Apr-12	Near Adarsh Nagar Colony	56.7	48.9
28-Apr-12	Near Adarsh Nagar Colony	55.1	47.2
08-May-12	Near Adarsh Nagar Colony	56.3	48.9
30-May-12	Near Adarsh Nagar Colony	55.1	47.0
08-Jun-12	Near Adarsh Nagar Colony	57.3	49.7
29-Jun-12	Near Adarsh Nagar Colony	56.7	48.5
07-Jul-12	Near Adarsh Nagar Colony	55.3	47.0
30-Jul-12	Near Adarsh Nagar Colony	54.7	46.7
11-Aug-12	Near Adarsh Nagar Colony	55.3	48.9
27-Aug-12	Near Adarsh Nagar Colony	54.4	47.6
11-Sep-12	Near Adarsh Nagar Colony	55.3	48.6
28-Sep-12	Near Adarsh Nagar Colony	54.3	47.1
12-Oct-12	Near Adarsh Nagar Colony	55.1	48.4
30-Oct-12	Near Adarsh Nagar Colony	54.5	47.3
09-Nov-12	Near Adarsh Nagar Colony	52.9	46.8
26-Nov-12	Near Adarsh Nagar Colony	51.9	45.6
13-Dec-12	Near Adarsh Nagar Colony	52.5	46.4
29-Dec-12	Near Adarsh Nagar Colony	53.2	47.5
14-Jan-13	Near Adarsh Nagar Colony	54.1	48.5

30-Jan-13	Near Adarsh Nagar Colony	53.6	47.6
11-Feb-13	Near Adarsh Nagar Colony	54.1	48.8
27-Feb-13	Near Adarsh Nagar Colony	53.1	47.6
13-Mar-13	Near Adarsh Nagar Colony	52.8	46.7
29-Mar-13	Near Adarsh Nagar Colony	51.9	45.6
11-Apr-12	Near Project Office	53.4	47.8
28-Apr-12	Near Project Office	52.5	46.7
08-May-12	Near Project Office	53.3	47.8
30-May-12	Near Project Office	52.9	46.5
08-Jun-12	Near Project Office	54.5	48.7
29-Jun-12	Near Project Office	53.4	47.8
07-Jul-12	Near Project Office	52.1	46.4
30-Jul-12	Near Project Office	53.1	45.8
11-Aug-12	Near Project Office	52.9	47.5
27-Aug-12	Near Project Office	51.5	46.7
11-Sep-12	Near Project Office	52.3	47.8
28-Sep-12	Near Project Office	51.6	46.0
12-Oct-12	Near Project Office	52.3	47.5
30-Oct-12	Near Project Office	51.2	48.6
09-Nov-12	Near Project Office	52.4	49.8
26-Nov-12	Near Project Office	51.4	48.5
13-Dec-12	Near Project Office	52.2	47.0
29-Dec-12	Near Project Office	53.2	46.9
14-Jan-13	Near Project Office	54.3	48.7
30-Jan-13	Near Project Office	53.1	47.6
11-Feb-13	Near Project Office	52.1	48.9
27-Feb-13	Near Project Office	51.7	47.5
13-Mar-13	Near Project Office	50.3	46.7
29-Mar-13	Near Project Office	51.2	47.6

PROJECT : **Samaleswari OCP**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
11-Apr-12	Kudopali Village	54.3	44.1
28-Apr-12	Kudopali Village	53.2	43.6
08-May-12	Kudopali Village	54.3	44.1
30-May-12	Kudopali Village	55.2	43.9
08-Jun-12	Kudopali Village	56.1	44.2

29-Jun-12	Kudopali Village	55.1	43.9
07-Jul-12	Kudopali Village	54.6	42.9
30-Jul-12	Kudopali Village	52.3	43.7
11-Aug-12	Kudopali Village	53.4	44.6
27-Aug-12	Kudopali Village	52.1	43.2
11-Sep-12	Kudopali Village	51.6	44.3
28-Sep-12	Kudopali Village	50.5	43.4
12-Oct-12	Kudopali Village	51.6	44.1
30-Oct-12	Kudopali Village	50.9	43.6
09-Nov-12	Kudopali Village	51.4	44.0
26-Nov-12	Kudopali Village	50.2	43.4
13-Dec-12	Kudopali Village	51.4	44.2
29-Dec-12	Kudopali Village	52.7	43.9
14-Jan-13	Kudopali Village	51.9	44.6
30-Jan-13	Kudopali Village	52.8	43.5
11-Feb-13	Kudopali Village	51.3	44.8
27-Feb-13	Kudopali Village	52.4	43.8
13-Mar-13	Kudopali Village	51.5	44.1
29-Mar-13	Kudopali Village	52.3	43.6
11-Apr-12	Near Old Sedimentation Tank	52.4	44.0
28-Apr-12	Near Old Sedimentation Tank	51.1	43.8
08-May-12	Near Old Sedimentation Tank	52.1	44.0
30-May-12	Near Old Sedimentation Tank	52.3	43.5
08-Jun-12	Near Old Sedimentation Tank	53.8	44.7
29-Jun-12	Near Old Sedimentation Tank	52.6	43.5
07-Jul-12	Near Old Sedimentation Tank	51.3	42.8
30-Jul-12	Near Old Sedimentation Tank	50.1	43.5
11-Aug-12	Near Old Sedimentation Tank	53.3	44.3
27-Aug-12	Near Old Sedimentation Tank	52.5	43.9
11-Sep-12	Near Old Sedimentation Tank	51.8	44.7
28-Sep-12	Near Old Sedimentation Tank	50.1	43.5
12-Oct-12	Near Old Sedimentation Tank	51.5	44.3
30-Oct-12	Near Old Sedimentation Tank	50.4	43.5
09-Nov-12	Near Old Sedimentation Tank	51.6	44.3
26-Nov-12	Near Old Sedimentation Tank	50.1	43.6
13-Dec-12	Near Old Sedimentation Tank	51.2	44.1
29-Dec-12	Near Old Sedimentation Tank	52.1	43.6

14-Jan-13	Near Old Sedimentation Tank	53.1	44.9
30-Jan-13	Near Old Sedimentation Tank	52.4	43.6
11-Feb-13	Near Old Sedimentation Tank	51.6	44.5
27-Feb-13	Near Old Sedimentation Tank	50.6	43.9
13-Mar-13	Near Old Sedimentation Tank	51.2	44.1
29-Mar-13	Near Old Sedimentation Tank	50.1	45.3
11-Apr-12	Roof of New Project office	52.4	46.8
28-Apr-12	Roof of New Project office	51.2	45.9
08-May-12	Roof of New Project office	52.4	46.9
30-May-12	Roof of New Project office	51.8	45.7
08-Jun-12	Roof of New Project office	52.9	46.5
29-Jun-12	Roof of New Project office	51.7	45.8
07-Jul-12	Roof of New Project office	52.5	46.8
30-Jul-12	Roof of New Project office	50.8	45.7
11-Aug-12	Roof of New Project office	52.7	47.0
27-Aug-12	Roof of New Project office	50.9	46.7
11-Sep-12	Roof of New Project office	51.7	47.5
28-Sep-12	Roof of New Project office	50.9	46.7
12-Oct-12	Roof of New Project office	51.8	47.0
30-Oct-12	Roof of New Project office	50.8	46.7
09-Nov-12	Roof of New Project office	51.7	47.8
26-Nov-12	Roof of New Project office	50.8	46.7
13-Dec-12	Roof of New Project office	52.4	48.8
29-Dec-12	Roof of New Project office	51.2	47.8
14-Jan-13	Roof of New Project office	52.4	48.8
30-Jan-13	Roof of New Project office	51.8	47.0
11-Feb-13	Roof of New Project office	50.9	48.3
27-Feb-13	Roof of New Project office	51.8	47.0
13-Mar-13	Roof of New Project office	50.6	46.8
29-Mar-13	Roof of New Project office	51.2	47.5
11-Apr-12	West of Working Mine	55.7	48.2
28-Apr-12	West of Working Mine	54.6	47.5
08-May-12	West of Working Mine	55.2	48.2
30-May-12	West of Working Mine	54.1	47.8
08-Jun-12	West of Working Mine	57.8	49.3
29-Jun-12	West of Working Mine	56.7	48.3
07-Jul-12	West of Working Mine	55.5	47.3

30-Jul-12	West of Working Mine	54.6	48.9
11-Aug-12	West of Working Mine	55.8	49.8
27-Aug-12	West of Working Mine	54.3	48.4
11-Sep-12	West of Working Mine	55.7	49.0
28-Sep-12	West of Working Mine	54.4	48.9
12-Oct-12	West of Working Mine	55.1	49.3
30-Oct-12	West of Working Mine	54.7	48.0
09-Nov-12	West of Working Mine	53.9	47.6
26-Nov-12	West of Working Mine	54.1	46.6
13-Dec-12	West of Working Mine	53.6	47.4
29-Dec-12	West of Working Mine	54.1	48.2
14-Jan-13	West of Working Mine	55.6	47.8
30-Jan-13	West of Working Mine	54.5	46.7
11-Feb-13	West of Working Mine	55.8	47.0
27-Feb-13	West of Working Mine	54.6	48.7
13-Mar-13	West of Working Mine	53.6	47.8
29-Mar-13	West of Working Mine	54.8	48.7

TABLE--
WELL WATER LEVEL MONITORING DATA

Area : *Ib Valley*

<i>Date of sampling</i>	<i>Project</i>	<i>Name of the Station</i>	<i>Depth from GL (in m)</i>
12-Apr-12	Samaleswari OCP	Chingriguda Village Well	3.73
12-Apr-12	Lajkura OCP	Madhuban Nagar Well	4.47
12-Apr-12	Lajkura OCP	Chhauliberna Village Well	3.89
12-Apr-12	Samaleswari OCP	Kudopali Village Well	2.84
12-Apr-12	Samaleswari OCP	Lajkura Village Well	5.99
12-Apr-12	Samaleswari OCP	Anapali Village Well	6.02
14-Aug-12	Samaleswari OCP	Lajkura Village Well	4.47
14-Aug-12	Samaleswari OCP	Kudopali Village Well	1.75
14-Aug-12	Lajkura OCP	Chhauliberna Village Well	3.15
14-Aug-12	Lajkura OCP	Madhuban Nagar Well	3.81
14-Aug-12	Samaleswari OCP	Chingriguda Village Well	3.28
14-Aug-12	Samaleswari OCP	Anapali Village Well	4.70
12-Nov-12	Samaleswari OCP	Chingriguda Village Well	3.27
12-Nov-12	Samaleswari OCP	Anapali Village Well	4.86
12-Nov-12	Samaleswari OCP	Lajkura Village Well	4.32
12-Nov-12	Samaleswari OCP	Kudopali Village Well	1.14
12-Nov-12	Lajkura OCP	Chhauliberna Village Well	3.27
12-Nov-12	Lajkura OCP	Madhuban Nagar Well	3.66
10-Jan-13	Samaleswari OCP	Chingriguda Village Well	3.17
10-Jan-13	Samaleswari OCP	Lajkura Village Well	3.20
10-Jan-13	Samaleswari OCP	Kudopali Village Well	1.45
10-Jan-13	Lajkura OCP	Chhauliberna Village Well	3.20

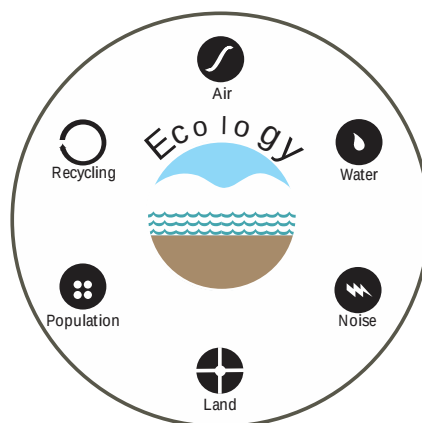
10-Jan-13	Lajkura OCP	Madhuban Nagar Well	3.86
10-Jan-13	Samaleswari OCP	Anapali Village Well	4.17



**Annual Compiled Monitoring Report
Of
Lakhanpur Area
For
2012-2013
(Belpahar OCP, Lilari OCP & Lakhanpur OCP)**

Ib Valley Coalfields

Mahanadi Coalfields Limited



Prepared by:



Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

Regional Institute-VII, OSHB Building, Bhubaneswar – 751 001 (Orissa)

[Assistance from Environment Division, CMPDI(HQs), Ranchi]

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3	Water Environment	III	
4	Noise Environment	IV	

CHAPTER-I

INTRODUCTION

1.1 Brief Description of the Mine

Lakhanpur Area, Mahanadi Coalfields Limited is located in Ib- Valley Coalfield, Jharsuguda district, Orissa (Plate No.I). This area has three OCP under its administrative control. The OCPs are Lilari OCP, Lakhanpur OCP and Belpahar OCP.

Lilari OCP

Lilari OCP is situated between latitudes $21^{\circ} 42' 15''$ & $21^{\circ} 47' 10''$ N and longitudes $83^{\circ} 48' 11''$ & $83^{\circ} 52' 38''$ E. The block is approachable from Belpahar town, lying at a distance of 2 km by road, the nearest railway station is Belpahar railway station which is 11 km away from the area by all weather road.

The elevation of the area varies from 198m to 212 m.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

Lakhanpur OCP

Lakhanpur OCP is situated between latitudes $21^{\circ} 42' 15''$ & $21^{\circ} 47' 10''$ N and longitudes $83^{\circ} 48' 11''$ & $83^{\circ} 52' 88''$ E. The block is approachable from Belpahar town, lying at a distance of 11 km by road, the nearest railway station is Belpahar railway station on Howrah-Mumbai line of South Eastern Railway at a distance of about 11 km.

The elevation of the area varies from 198 m to 250 m. The topography of area is gently sloping towards east.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

Belpahar OCP

Belpahar OCP is situated between latitudes $21^{\circ} 42' 20''$ – $21^{\circ} 47' 00''$ N and longitudes $83^{\circ} 49' 35''$ – $83^{\circ} 53' 00''$ E. The block is approachable from Belpahar town, lying at a distance of 8 km by road, the nearest railway station is Belpahar.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

1.2 Frequency of Environmental Monitoring

(i) Ambient air quality monitoring

To assess the pollution level in ambient air of the area located in and around the coal mines/projects and also determine the efficacy of mitigation measures, regular monitoring of the following parameters is being carried out.

Respirable particulate matter (RPM)	:	One sample per fortnight
Suspended particulate matter (SPM)	:	
Sulphur dioxide (SO ₂)	:	
Nitrogen oxides (NO _x)	:	

(ii) Drinking water monitoring : Every month.

(iii) Effluent quality monitoring

1/4/5 parameters : once in a fortnight/monthly i.e July, Aug. & Sept.

21 parameters : Once in a year

(iv) Well water level monitoring : Quarterly

(v) Noise level monitoring : Once in a fortnight

1.3 Environmental Quality Monitoring Stations

The details of various environmental quality monitoring stations are given in are given below:

- Air quality monitoring stations

Sl.No. Name of Stations

Lilari OCP

1. Near magazine house
2. Near old coal stock yard
3. Near Lilari pump house

- Drinking water quality monitoring stations

Sl.No. Name of Stations

1. Jurabaga village well

- **Effluent quality monitoring station**

1. Oil and grease Trap outlet
2. Mine sump water
3. Outlet from O&G trap

- **Well water level monitoring station**

1. Darlipali village well
2. Ubuda village well
3. Jurabaga village well

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Near magazine house
2. Near old coal stock yard
3. Near Lilari pump house

- **Air quality monitoring stations**

Sl.No. Name of Stations

Lakhanpur OCP

1. Near OB dump no 1
2. Towards NW side of Quarry no 1.
3. Quarry no 2
4. Ubuda/Khairkurni village
5. Tingismal village

- **Drinking water quality monitoring stations**

Sl.No. Name of Stations

1. Ubuda/Khairkurni village tubewell water
2. Bandbahal/LKP canteen tap water

- **Well water level monitoring stations**

Sl.No. Name of Stations

1. Darlipali Village well
2. Ubuda village well
3. Jurabaga village well

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Near OB dump no 1
2. Towards NW side of Quarry no 1.
3. Quarry no 3
4. Ubuda/Khairkurni village
5. Tingismal village

- **Siltation study by TSS monitoring**

1. 100 m. u/s of the pt of Conflu. Of mine discharge water with Lilari nallah
2. 100 m. d/s of the pt of Conflu. Of mine discharge water with Lilari nallah

Air quality monitoring stations

Sl.No. Name of Stations

Belpahar OCP

1. Near MDTP
2. Bandbahal township/BIT
3. Near Quarry no 5

- **Drinking water quality monitoring stations**

Sl.No. Name of Stations

1. Belpahar colony tap / Excavation workshop/ CHP tap water
2. Intake water of IWSS
3. Darlipali village well water
4. Belpahar Integrated Township-Mousi Maa Mansir outlet
5. Belpahar Integrated Township-Indradhanush club outlet

- **Well water level monitoring stations**

Sl.No. Name of Stations

1. Darlipali Village well
2. Ubuda village well
3. Jurabaga village well

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Near MDTP
2. Bandbahal township/BIT
3. Near Quarry no 5

- **Siltation study by TSS monitoring**

1. 100 m. u/s of the pt of Conflu. Of mine discharge water with Lilari
2. 100 m. d/s of the pt of Conflu. Of mine discharge water with Lilari

CHAPTER-II

AIR ENVIRONMENT

2.1 Details of Air Quality Monitoring Stations

Details are given in Table-1.

Table-1

**Details of Air Quality Monitoring Stations
along with Sources of Pollution**

Sl.No.	Location	Sources of Pollution
Lilari OCP		
1	Near magazine house	Traffic and mining activities,
2	Near old coal stock yard	Domestic and mining activities
3	Near Lilari pump house	Mining activities.
Lakhanpur OCP		
1.	Near OB dump no 1	Nearby mining activities.
2.	Towards NW side of Quarry no 1.	Nearby mining activities.
3.	Quarry no 2	Nearby mining activities
4.	Ubuda/Khairkurni village	Nearby mining activities
5.	Tingismal village	Nearby mining activities
Belpahar OCP		
1.	Near MDTP	Nearby mining activities
2.	Bandbahal township/BIT	Nearby mining activities
3.	Near Quarry no 5	Nearby mining activities

2.2 Methodology and Instruments used for Air Quality Analysis

These are given in Table-2.

Table-2

Methodology and Instruments used for Air Quality Analysis

Sl.No.	Parameters	Method	Instruments
1	SPM and RPM	IS:5182 (Part-IV) (Gravimetric method)	High volume samplers, Respirable dust samplers & electronic balance, oven, etc.
2	SO ₂	IS:5182 (Part-II) (Sodium tetrachloro-mercurate method, also known as improved West and Gaeke Method) (Photometric	Milton-Roy Spectrophotometer.

Sl.No.	Parameters	Method	Instruments
		method)	
3	NO _x	IS:5182 (Part-VI) (Jacob & Hoccheiser Modified Method) (Photometric method)	-do-

2.3 Results

The results of analyses of air samples are given in Tables attached

2.4 Discussions

Examination of the levels of RPM, SPM, SO₂ and NO_x for all the air stations in Lakhanpur area reveals the following:

- In coal mining area like near magazine house, the levels of RPM, SPM, SO₂ and NO_x are observed to be within the limits of the Standards for Coal Mines, barring a few berated value.
- In residential areas, all the values are found to be within the limits of the National Ambient Air Quality Standards (NAAQS) notified under Schedule-VII.

2.5 Control Measures

The following mitigatory measures are suggested to maintain the air quality within the stipulated standards:

- Water sprinkling on haul roads, coal loading and unloading sites at regular and frequent intervals by adding appropriate wetting agents.
- Provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers at haul roads and siding.
- Cleaning spillage from roads.
- Practice for covered transportation.
- Regular maintenance of all HEMMs and other machinery.
- Provision of gas filters for exhaust fumes.
- No overloading of trucks/dumpers.
- Application of innocuous chemical binders on haul roads.
- Development of thick greenbelts around the mines, infrastructure sites and residential area besides plantation on both sides of the roads on the surface using plant species having leaves of high efficacy dust catching nature.
- Drills with well-designed dust extractors/arrestors.
- Provision of dust extraction system for crusher house.
- Suppression of coal dust at CHP by provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers.

CHAPTER-III

WATER ENVIRONMENT

3.1 Methodology and Instruments used for water & effluent analysis

Details are given in Table-4.

Table-4

Methodology & Instruments used for Water and Effluent Analysis

Sl.No.	Parameters	Method/Instruments
1	PH	Electrometric/pH meter
2	Turbidity	Nephelometric/Nepheloturbidity meter
3	Total suspended solids, total dissolved solids, oil & grease and mineral oil	Gravimetric/oven, electronic balance
4	BOD	BOD test and titration/BOD incubator, pipette, burette, etc.
5	COD	Reactor digestion and titration/reactor digester
6	Coliform	MPN test/LTEK MPN kit.
7	Calcium, chloride, hardness, alkalinity	Titrimetric/pipette, burette, etc.
8	Cadmium, copper, iron, lead, manganese, mercury, nickel, total chromium & zinc	Selective absorption/atomic absorption spectro-photometer.
9	Ammonical nitrogen, arsenic, colour, dissolved phosphate, fluoride, hexavalent chromium, nitrate nitrogen phenolics, selenium, sulphate, sulphide, total residual chlorine, total Kjeldahl nitrogen & boron.	Photometric/DR 2000

3.2 Results

The results of analysis of water samples (Drinking) is given in Tables attached . Ground water level monitoring of various dug-wells are given in Tables attached

3.3 Discussions

(a) Drinking water sample

The examination of analytical results of drinking water sample reveals the following :

- All physico-chemical parameters are well within the limits of the Indian Drinking Water Standard in the drinking water sample.

CHAPTER-IV

NOISE ENVIRONMENT

4.1 Methodology and Instruments used for Noise Level Measurement

Noise is measured in a weighted sound level i.e. dB(A) using a noise level meter once in day time (6:00 AM-10:00 PM) and once in night time (10:00 PM to 6:00 AM) for one day in each quarter from each station.

4.2 Results

The fortnightly noise level measurements for different stations are given in Tables attached

4.3 Discussions

The noise level monitoring data reveal the following:

- The noise level monitoring data of various stations are within the limits of the prescribed noise level standards.

4.4 Control Measures

The following control measures are recommended to maintain the noise levels within the permissible limits of the prescribed standards:

- Creation of thick greenbelts around the mines, infrastructure sites and residential colony besides avenue plantation on both sides of the roads on the surface using high noise attenuating plant species.
- Proper designing of plant and machinery by providing in-built mechanisms like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- HEMMs with sound proof cabin.
- Chute linings in CHP
- Personal protective devices to all persons working in high noise areas.

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

Project : **Belpahar OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
12-Apr-12	Bandabahal Township / BIT	217	86	22	27	East to west hot & sunny evening rain fall
27-Apr-12	Bandabahal Township / BIT	317	102	26	34	East to west hot & sunny
11-May-12	Bandabahal Township / BIT	280	112	28	36	West to east hot & sunny
30-May-12	Bandabahal Township / BIT	288	125	32	38	East to west hot & sunny
13-Jun-12	Bandabahal Township / BIT	221	87	28	35	West to east hot & sunny
28-Jun-12	Bandabahal Township / BIT	152	75	26	32	East to west & cloudy
13-Jul-12	Bandabahal Township / BIT	214	78	26	33	West to east hot & sunny
30-Jul-12	Bandabahal Township / BIT	106	63	22	27	East to west ,cloudy & rainfall
09-Aug-12	Bandabahal Township / BIT	222	86	31	39	East to west sunny &,cloudy evening rainfall
24-Aug-12	Bandabahal Township / BIT	241	92	37	41	West to east ,cloudy & rainfall

MoEF Standards Notification dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

11-Sep-12	Bandabahal Township / BIT	233	74	29	34	West to east sunny & cloudy
26-Sep-12	Bandabahal Township / BIT	190	70	19	24	West to east cloudy & rainfall
10-Oct-12	Bandabahal Township / BIT	260	87	25	30	East to west & cloudy
26-Oct-12	Bandabahal Township / BIT	185	92	23	29	East to west sunny & cloudy
08-Nov-12	Bandabahal Township / BIT	197	90	24	31	East to west sunny & cloudy
23-Nov-12	Bandabahal Township / BIT	182	96	22	27	East to west sunny & cloudy
10-Dec-12	Bandabahal Township / BIT	167	103	23	26	East to west sunny & cloudy
25-Dec-12	Bandabahal Township / BIT	183	110	24	26	East to west sunny & cloudy
10-Jan-13	Bandabahal Township / BIT	151	104	22	25	East to west & sunny
25-Jan-13	Bandabahal Township / BIT	168	109	21	24	East to west & sunny
12-Feb-13	Bandabahal Township / BIT	178	117	23	26	West to east & sunny
26-Feb-13	Bandabahal Township / BIT	186	111	24	26	East to west & sunny

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

12-Mar-13	Bandabahal Township / BIT	181	105	25	27	East to west sunny
27-Mar-13	Bandabahal Township / BIT	230	119	25	28	East to west hot & sunny
12-Apr-12	Near MDTP	361	122	34	40	East to west hot & sunny evening rain fall
27-Apr-12	Near MDTP	287	132	38	47	East to west hot & sunny
10-May-12	Near MDTP	323	132	40	47	East to west hot & sunny
30-May-12	Near MDTP	388	146	42	49	East to west hot & sunny
13-Jun-12	Near MDTP	326	115	38	49	West to east hot & sunny
28-Jun-12	Near MDTP	264	98	35	41	East to west sunny & cloudy evening rain fall
13-Jul-12	Near MDTP	268	124	35	43	West to east hot & sunny
30-Jul-12	Near MDTP	143	81	26	31	East to west ,cloudy & rainfall
08-Aug-12	Near MDTP	199	82	32	41	West to east ,cloudy & rainfall
23-Aug-12	Near MDTP	212	89	34	39	East to west cloudy & rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

07-Sep-12	Near MDTP	201	91	30	36	East to west cloudy & evening rainfall
22-Sep-12	Near MDTP	212	84	25	31	East to west sunny & cloudy
10-Oct-12	Near MDTP	244	81	23	28	East to west & cloudy
26-Oct-12	Near MDTP	215	110	24	31	East to west sunny & cloudy
08-Nov-12	Near MDTP	224	118	23	30	East to west sunny & cloudy
23-Nov-12	Near MDTP	212	109	20	24	East to west sunny & cloudy
10-Dec-12	Near MDTP	204	101	22	25	East to west sunny & cloudy
25-Dec-12	Near MDTP	234	109	24	28	East to west sunny & cloudy
10-Jan-13	Near MDTP	265	112	23	26	East to west & sunny
25-Jan-13	Near MDTP	295	132	25	29	East to west & sunny
12-Feb-13	Near MDTP	298	135	26	29	West to east & sunny
26-Feb-13	Near MDTP	284	127	25	27	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

12-Mar-13	Near MDTP	254	112	22	26	East to west sunny
27-Mar-13	Near MDTP	274	124	25	28	East to west hot & sunny
11-Apr-12	Near Quarry No.5	372	143	36	42	West to east hot & sunny
26-Apr-12	Near Quarry No.5	365	133	44	51	East to west hot & sunny
11-May-12	Near Quarry No.5	337	142	44	51	West to east hot & sunny
30-May-12	Near Quarry No.5	399	140	44	52	East to west hot & sunny
13-Jun-12	Near Quarry No.5	305	124	40	46	West to east hot & sunny
28-Jun-12	Near Quarry No.5	287	108	35	44	East to west & cloudy
13-Jul-12	Near Quarry No.5	309	130	38	45	West to east hot & sunny
30-Jul-12	Near Quarry No.5	190	94	31	36	East to west ,cloudy & rainfall
09-Aug-12	Near Quarry No.5	209	85	29	31	East to west sunny &,cloudy evening rainfall
24-Aug-12	Near Quarry No.5	225	85	32	40	West to east ,cloudy & rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

11-Sep-12	Near Quarry No.5	246	83	31	37	West to east sunny & cloudy
26-Sep-12	Near Quarry No.5	178	66	16	21	West to east cloudy & rainfal
10-Oct-12	Near Quarry No.5	271	84	27	32	East to west & cloudy
26-Oct-12	Near Quarry No.5	262	134	32	39	East to west sunny & cloudy
08-Nov-12	Near Quarry No.5	256	129	28	35	East to west sunny & cloudy
23-Nov-12	Near Quarry No.5	237	116	26	29	East to west sunny & cloudy
10-Dec-12	Near Quarry No.5	227	107	24	27	East to west sunny & cloudy
25-Dec-12	Near Quarry No.5	249	103	25	29	East to west sunny & cloudy
10-Jan-13	Near Quarry No.5	286	134	27	30	East to west & sunny
25-Jan-13	Near Quarry No.5	272	121	23	26	East to west & sunny
12-Feb-13	Near Quarry No.5	286	128	24	27	West to east & sunny
26-Feb-13	Near Quarry No.5	262	135	26	28	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

12-Mar-13	Near Quarry No.5	246	127	27	29	East to west sunny
27-Mar-13	Near Quarry No.5	270	131	24	27	East to west hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

Project : **Lakhanpur OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
11-Apr-12	Ubuda Village	240	112	22	28	West to east hot & sunny
26-Apr-12	Ubuda Village	257	118	26	34	West to east hot & sunny
12-Jun-12	Ubuda Village	198	87	26	34	East to west hot & sunny
27-Jun-12	Ubuda Village	208	77	26	32	West to east sunny & cloudy
09-Aug-12	Ubuda Village	181	81	30	38	East to west sunny &,cloudy evening rainfall
24-Aug-12	Ubuda Village	185	79	23	29	West to east ,cloudy & rainfall
11-Oct-12	Ubuda Village	239	80	25	30	West to east & sunny
26-Oct-12	Ubuda Village	158	94	23	30	West to east & cloudy
26-Dec-12	Ubuda Village	137	107	23	26	West to east & sunny
11-Jan-13	Ubuda Village	167	116	25	28	West to east & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

26-Jan-13	Ubuda Village	189	97	22	25	West to east & sunny
13-Mar-13	Ubuda Village	220	115	26	29	West to east sunny & cloudy
27-Mar-13	Ubuda Village	241	120	25	28	West to east hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

Project : **Lakhanpur OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
09-May-12	Khairakuni Village	257	95	28	34	West to east hot & sunny
29-May-12	Khairakuni Village	287	114	32	38	West to east hot & sunny
12-Jul-12	Khairakuni Village	216	81	26	32	East to west hot & sunny
28-Jul-12	Khairakuni Village	68	36	14	16	West to east ,cloudy & evening heavy rainfall
11-Sep-12	Khairakuni Village	190	84	30	38	West to east sunny & cloudy
26-Sep-12	Khairakuni Village	168	74	21	26	West to east cloudy & rainfal
09-Nov-12	Khairakuni Village	145	91	21	29	West to east & cloudy
24-Nov-12	Khairakuni Village	134	96	20	25	West to east & sunny
10-Dec-12	Khairakuni Village	124	99	21	24	West to east & cloudy
13-Feb-13	Khairakuni Village	194	99	23	26	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

27-Feb-13	Khairakuni Village	210	107	24	26	West to east & sunny
10-Apr-12	Near OB dump No.1	416	170	38	46	East to west hot & sunny
25-Apr-12	Near OB dump No.1	349	146	44	56	West to east hot & sunny
09-May-12	Near OB dump No.1	329	131	42	46	West to east hot & sunny
29-May-12	Near OB dump No.1	344	140	42	51	West to east hot & sunny
12-Jun-12	Near OB dump No.1	305	128	38	46	West to east hot & sunny
27-Jun-12	Near OB dump No.1	310	119	34	42	East to west sunny & cloudy evening rain fall
12-Jul-12	Near OB dump No.1	317	129	36	45	West to east hot & sunny
28-Jul-12	Near OB dump No.1	110	62	20	22	East to west ,cloudy & evening heavy rainfall
08-Aug-12	Near OB dump No.1	152	72	22	30	West to east ,cloudy & rainfall
23-Aug-12	Near OB dump No.1	190	78	26	32	East to west cloudy & rainfall
07-Sep-12	Near OB dump No.1	160	65	20	26	East to west cloudy & evening rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

22-Sep-12	Near OB dump No.1	190	78	24	30	East to west sunny & cloudy
09-Oct-12	Near OB dump No.1	225	83	26	30	West to east & sunny
25-Oct-12	Near OB dump No.1	201	101	24	29	West to east & cloudy
07-Nov-12	Near OB dump No.1	215	113	26	31	West to east sunny & cloudy
23-Nov-12	Near OB dump No.1	208	117	21	27	West to east & sunny
08-Dec-12	Near OB dump No.1	218	108	22	25	West to east & sunny
24-Dec-12	Near OB dump No.1	238	114	25	28	West to east & sunny
09-Jan-13	Near OB dump No.1	276	137	28	30	West to east & sunny
24-Jan-13	Near OB dump No.1	276	123	24	27	West to east & sunny
11-Feb-13	Near OB dump No.1	284	134	25	27	East to west & sunny
25-Feb-13	Near OB dump No.1	297	142	26	28	West to east & sunny
11-Mar-13	Near OB dump No.1	306	140	25	28	West to east & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

26-Mar-13	Near OB dump No.1	295	130	24	28	West to east hot & sunny
11-Apr-12	Quarry No.2	424	173	38	44	West to east hot & sunny
26-Apr-12	Quarry No.2	456	163	48	54	East to west hot & sunny
10-May-12	Quarry No.2	389	138	44	48	East to west hot & sunny
29-May-12	Quarry No.2	411	145	44	52	West to east hot & sunny
14-Jun-12	Quarry No.2	353	132	42	50	West to east hot & sunny
29-Jun-12	Quarry No.2	255	108	35	43	West to east sunny & cloudy
14-Jul-12	Quarry No.2	288	113	35	44	West to east hot & sunny
30-Jul-12	Quarry No.2	105	52	21	24	West to east ,cloudy & evening heavy rainfall
08-Aug-12	Quarry No.2	148	69	28	35	West to east ,cloudy & rainfall
23-Aug-12	Quarry No.2	146	71	17	23	East to west cloudy & rainfall
07-Sep-12	Quarry No.2	138	69	27	33	East to west cloudy & evening rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

22-Sep-12	Quarry No.2	189	83	31	35	East to west sunny & cloudy
10-Oct-12	Quarry No.2	209	78	28	32	East to west & cloudy
26-Oct-12	Quarry No.2	243	125	21	28	East to west sunny & cloudy
07-Nov-12	Quarry No.2	237	118	23	28	West to east sunny & cloudy
22-Nov-12	Quarry No.2	228	119	24	28	East to west sunny & cloudy
10-Dec-12	Quarry No.2	238	108	25	27	East to west & cloudy
25-Dec-12	Quarry No.2	257	124	27	30	East to west sunny & cloudy
10-Jan-13	Quarry No.2	294	131	29	31	East to west & sunny
25-Jan-13	Quarry No.2	290	124	28	31	East to west & sunny
12-Feb-13	Quarry No.2	287	131	28	30	West to east & sunny
26-Feb-13	Quarry No.2	291	138	27	30	East to west & sunny
12-Mar-13	Quarry No.2	240	107	22	25	East to west sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

27-Mar-13	Quarry No.2	299	140	29	32	East to west hot & sunny
11-Apr-12	Tingismal Village	224	97	22	27	West to east hot & sunny
26-Apr-12	Tingismal Village	225	80	24	30	West to east hot & sunny
10-May-12	Tingismal Village	295	117	26	32	East to west hot & sunny
30-May-12	Tingismal Village	310	108	30	34	East to west hot & sunny
12-Jun-12	Tingismal Village	229	72	24	30	East to west hot & sunny
27-Jun-12	Tingismal Village	207	67	22	26	West to east sunny & cloudy
12-Jul-12	Tingismal Village	219	78	26	31	East to west hot & sunny
28-Jul-12	Tingismal Village	56	34	13	15	West to east ,cloudy & evening heavy rainfall
09-Aug-12	Tingismal Village	201	81	32	40	East to west sunny & ,cloudy evening rainfall
24-Aug-12	Tingismal Village	198	83	26	31	West to east ,cloudy & rainfall
11-Sep-12	Tingismal Village	154	75	25	31	West to east sunny & cloudy

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

26-Sep-12	Tingismal Village	146	67	17	22	West to east cloudy & rainfal
11-Oct-12	Tingismal Village	218	77	22	27	West to east & sunny
26-Oct-12	Tingismal Village	164	85	20	26	West to east & cloudy
09-Nov-12	Tingismal Village	172	95	24	29	West to east & cloudy
24-Nov-12	Tingismal Village	195	103	25	30	West to east & sunny
10-Dec-12	Tingismal Village	184	101	24	28	West to east & cloudy
26-Dec-12	Tingismal Village	196	105	22	25	West to east & sunny
11-Jan-13	Tingismal Village	217	113	24	27	West to east & sunny
26-Jan-13	Tingismal Village	257	110	25	28	West to east & sunny
13-Feb-13	Tingismal Village	267	117	26	29	East to west & sunny
27-Feb-13	Tingismal Village	279	127	27	30	West to east & sunny
13-Mar-13	Tingismal Village	262	120	24	28	West to east sunny & cloudy

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

27-Mar-13	Tingismal Village	271	123	26	31	West to east hot & sunny
10-Apr-12	Towards NW Side of Quarry No.1	339	125	32	40	East to west hot & sunny
25-Apr-12	Towards NW Side of Quarry No.1	346	126	42	50	West to east hot & sunny
10-May-12	Towards NW Side of Quarry No.1	392	146	42	48	East to west hot & sunny
29-May-12	Towards NW Side of Quarry No.1	322	128	40	50	West to east hot & sunny
13-Jun-12	Towards NW Side of Quarry No.1	277	119	32	40	West to east hot & sunny
13-Jul-12	Towards NW Side of Quarry No.1	302	122	36	44	West to east hot & sunny
28-Jul-12	Towards NW Side of Quarry No.1	115	58	20	23	West to east ,cloudy & evening heavy rainfall
08-Aug-12	Towards NW Side of Quarry No.1	169	78	29	36	West to east ,cloudy & rainfall
23-Aug-12	Towards NW Side of Quarry No.1	154	67	19	24	East to west cloudy & rainfall
09-Oct-12	Towards NW Side of Quarry No.1	241	87	22	26	West to east & sunny
25-Oct-12	Towards NW Side of Quarry No.1	237	117	25	31	West to east & cloudy

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

08-Dec-12	Towards NW Side of Quarry No.1	246	111	23	26	West to east & sunny
24-Dec-12	Towards NW Side of Quarry No.1	232	108	24	27	West to east & sunny
24-Jan-13	Towards NW Side of Quarry No.1	243	137	27	30	West to east & sunny
11-Feb-13	Towards NW Side of Quarry No.1	234	127	26	29	East to west & sunny
25-Feb-13	Towards NW Side of Quarry No.1	248	131	25	27	West to east & sunny
26-Mar-13	Towards NW Side of Quarry No.1	268	125	22	26	West to east hot & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

Project : **Lilari OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO2</i>	<i>NOx</i>	<i>Remarks</i>
13-Apr-12	Near Magazine House	217	102	22	28	East to west hot & sunny evening rain fall
28-Apr-12	Near Magazine House	373	122	28	35	East to west hot & sunny
09-May-12	Near Magazine House	313	128	32	38	West to east hot & sunny
28-May-12	Near Magazine House	288	115	30	36	East to west hot & sunny
11-Jun-12	Near Magazine House	272	96	28	33	West to east hot & sunny
26-Jun-12	Near Magazine House	235	96	26	32	East to west sunny & cloudy evening rain fall
11-Jul-12	Near Magazine House	248	98	32	38	West to east hot & sunny
27-Jul-12	Near Magazine House	143	61	22	26	West to east ,cloudy & evening rainfall
07-Aug-12	Near Magazine House	143	65	26	35	West to east ,cloudy & rainfall
22-Aug-12	Near Magazine House	268	92	32	40	West to east & cloudy

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

06-Sep-12	Near Magazine House	254	85	34	40	West to east sunny & cloudy
21-Sep-12	Near Magazine House	204	82	20	25	West to east sunny & cloudy
09-Oct-12	Near Magazine House	219	84	22	26	West to east & sunny
25-Oct-12	Near Magazine House	214	117	24	30	West to east & cloudy
07-Nov-12	Near Magazine House	226	106	25	32	West to east sunny & cloudy
23-Nov-12	Near Magazine House	216	101	24	29	West to east & sunny
08-Dec-12	Near Magazine House	207	97	20	25	West to east & sunny
24-Dec-12	Near Magazine House	227	105	22	24	West to east & sunny
09-Jan-13	Near Magazine House	254	117	24	27	West to east & sunny
24-Jan-13	Near Magazine House	276	124	26	29	West to east & sunny
11-Feb-13	Near Magazine House	284	129	27	30	East to west & sunny
25-Feb-13	Near Magazine House	295	137	26	29	West to east & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

11-Mar-13	Near Magazine House	310	141	28	30	West to east & sunny
26-Mar-13	Near Magazine House	318	143	29	32	West to east hot & sunny
13-Apr-12	Near Old Coal Stock Yard	289	114	30	34	East to west hot & sunny evening rain fall
28-Apr-12	Near Old Coal Stock Yard	390	147	38	47	East to west hot & sunny
09-May-12	Near Old Coal Stock Yard	391	144	42	48	West to east hot & sunny
28-May-12	Near Old Coal Stock Yard	386	133	38	46	East to west hot & sunny
12-Jun-12	Near Old Coal Stock Yard	335	119	32	37	West to east hot & sunny
27-Jun-12	Near Old Coal Stock Yard	318	106	32	37	East to west sunny & cloudy evening rain fall
12-Jul-12	Near Old Coal Stock Yard	312	119	34	41	West to east hot & sunny
27-Jul-12	Near Old Coal Stock Yard	178	75	24	29	West to east ,cloudy & evening rainfall
07-Aug-12	Near Old Coal Stock Yard	163	88	29	37	West to east ,cloudy & rainfall
22-Aug-12	Near Old Coal Stock Yard	274	94	35	41	West to east & cloudy

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

06-Sep-12	Near Old Coal Stock Yard	241	79	24	29	West to east sunny & cloudy
21-Sep-12	Near Old Coal Stock Yard	230	72	23	27	West to east sunny & cloudy
09-Oct-12	Near Old Coal Stock Yard	208	70	21	25	West to east & sunny
25-Oct-12	Near Old Coal Stock Yard	251	126	26	32	West to east & cloudy
08-Nov-12	Near Old Coal Stock Yard	267	134	27	34	West to east sunny & cloudy
23-Nov-12	Near Old Coal Stock Yard	259	124	26	30	West to east & sunny
11-Dec-12	Near Old Coal Stock Yard	235	115	24	27	West to east & sunny
24-Dec-12	Near Old Coal Stock Yard	247	124	25	28	West to east & sunny
09-Jan-13	Near Old Coal Stock Yard	243	129	26	29	West to east & sunny
24-Jan-13	Near Old Coal Stock Yard	234	116	24	26	West to east & sunny
11-Feb-13	Near Old Coal Stock Yard	247	118	25	27	East to west & sunny
25-Feb-13	Near Old Coal Stock Yard	257	124	27	30	West to east & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Lakhanpur**

11-Mar-13	Near Old Coal Stock Yard	270	127	24	28	West to east & sunny
26-Mar-13	Near Old Coal Stock Yard	282	130	24	27	West to east hot & sunny

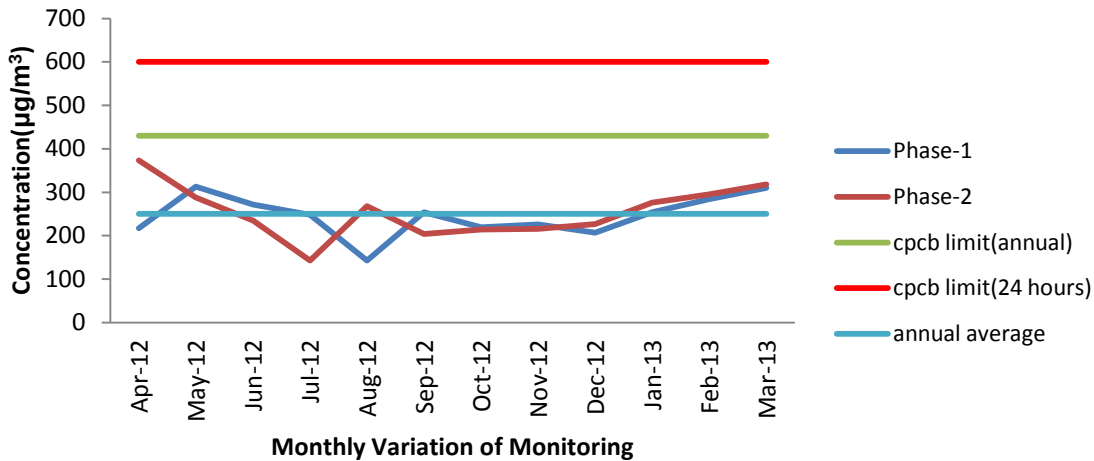
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600	300	120	120

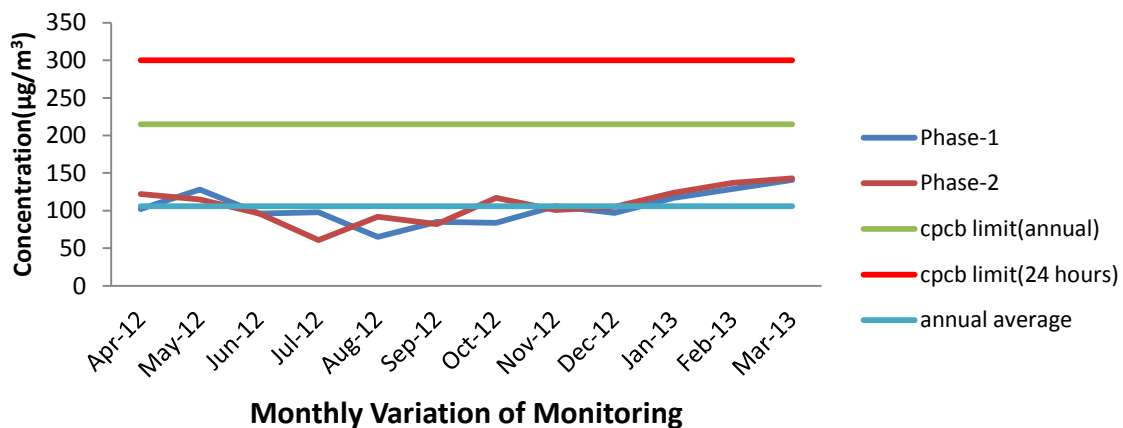


Air Quality Graph of Lakhanpur Area

Graph-1: SPM monitoring of Near Quarry No.5 of Belpahar OCP.



Graph-2: RPM monitoring of Near Quarry No.5 of Belpahar OCP.



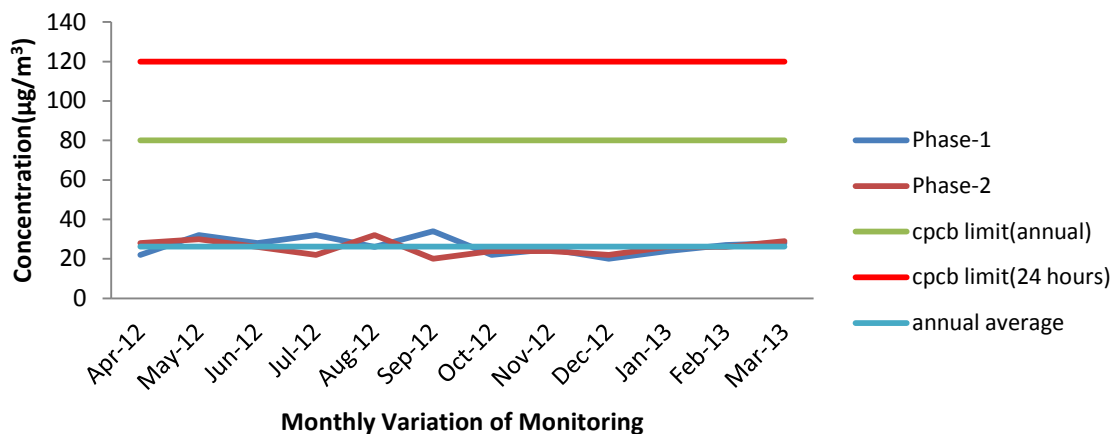
Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

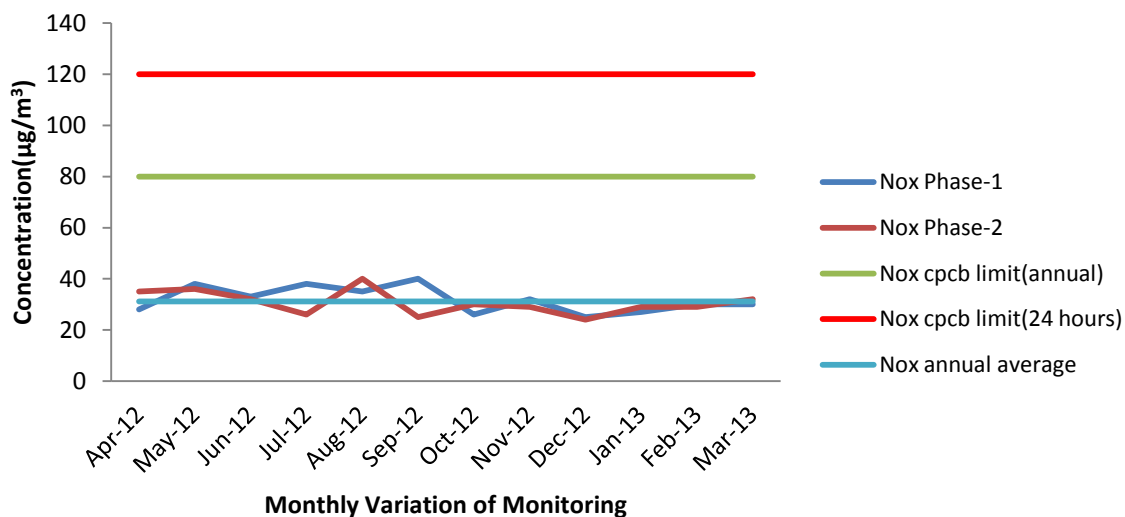


Air Quality Graph of Lakhanpur Area

Graph-3: SO_x monitoring of Near Quarry No.5 of Belpahar OCP.



Graph-4: NO_x monitoring of Near Quarry No.5 of Belpahar OCP.



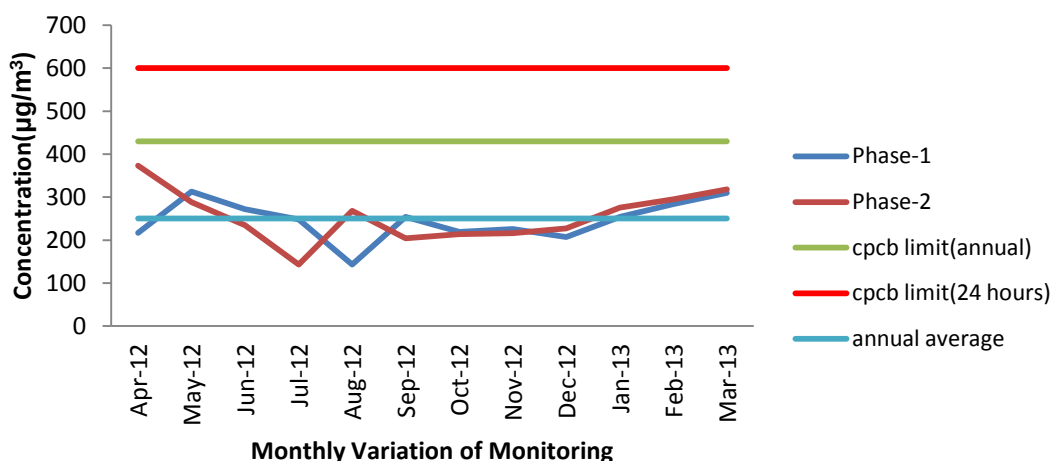
Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

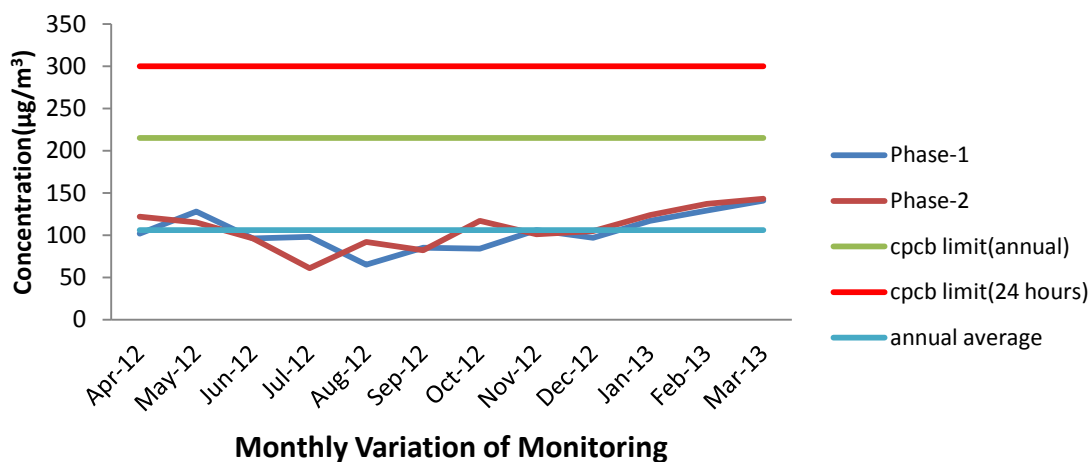


Air Quality Graph of Lakhanpur Area

Graph-5: SPM monitoring of Near MDTP of Belpahar OCP.



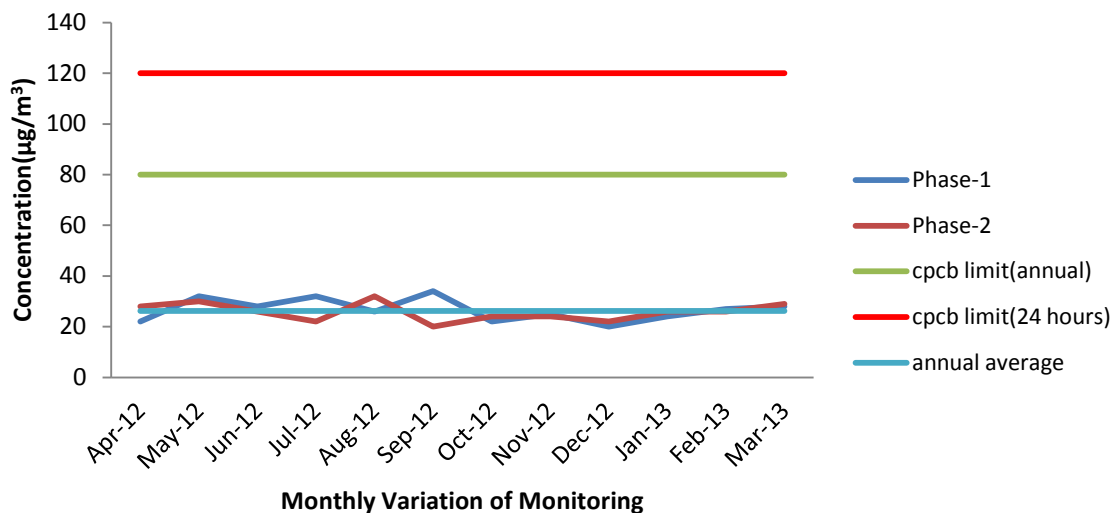
Graph-6: RPM monitoring of Near MDTP of Belpahar OCP.



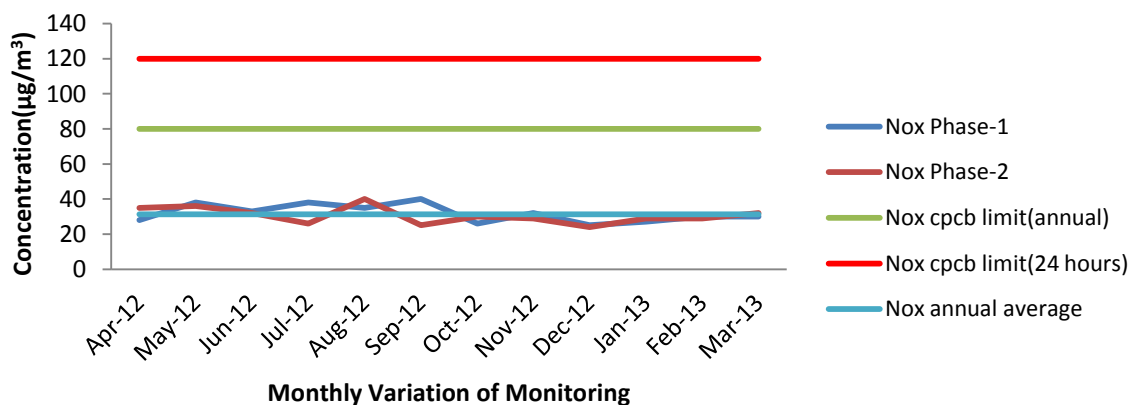


Air Quality Graph of Lakhanpur Area

Graph-7: SO_x monitoring of Near MDTP of Belpahar OCP.



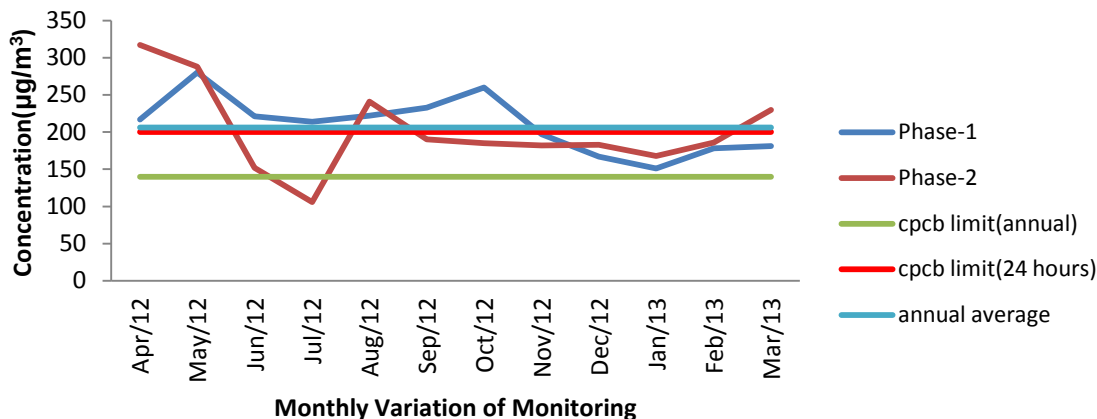
Graph-8: NO_x monitoring of Near MDTP of Belpahar OCP.



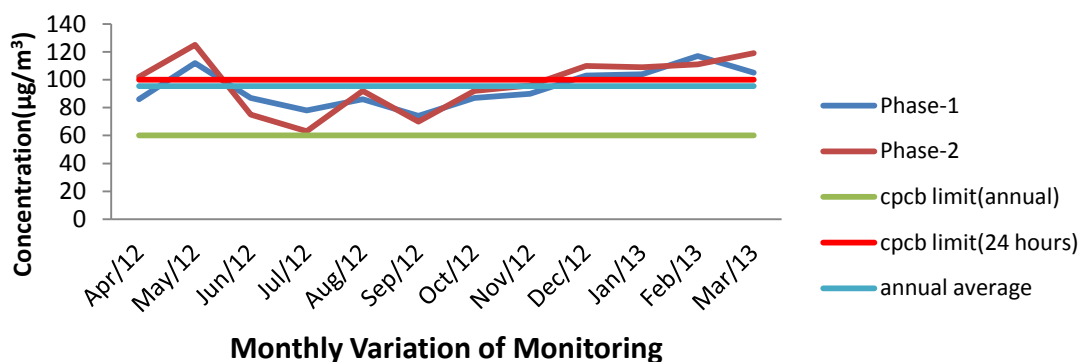


Air Quality Graph of Lakhanpur Area

Graph-9: SPM monitoring of Bandabahal Township / BIT of Belpahar OCP.



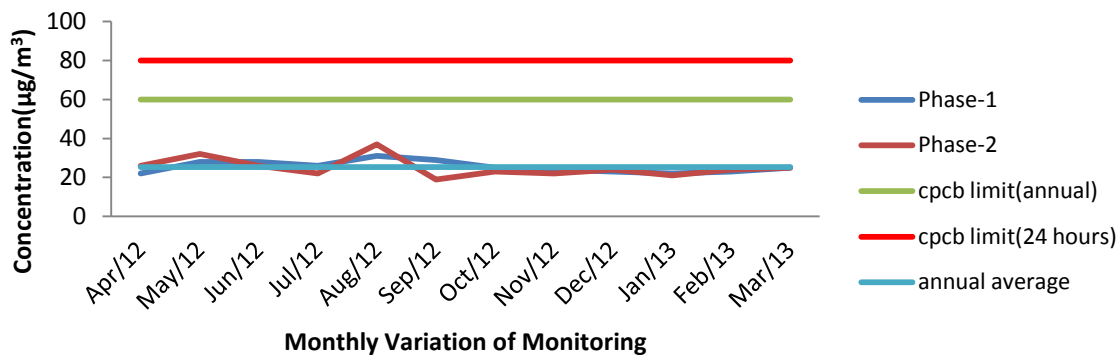
Graph-10: RPM monitoring of Bandabahal Township / BIT of Belpahar OCP.



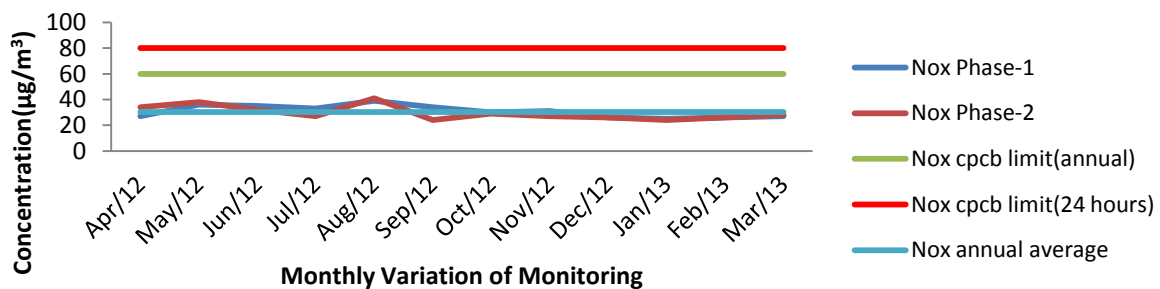


Air Quality Graph of Lakhanpur Area

Graph-11: SO_x monitoring of Bandabahal Township / BIT of Belpahar OCP.

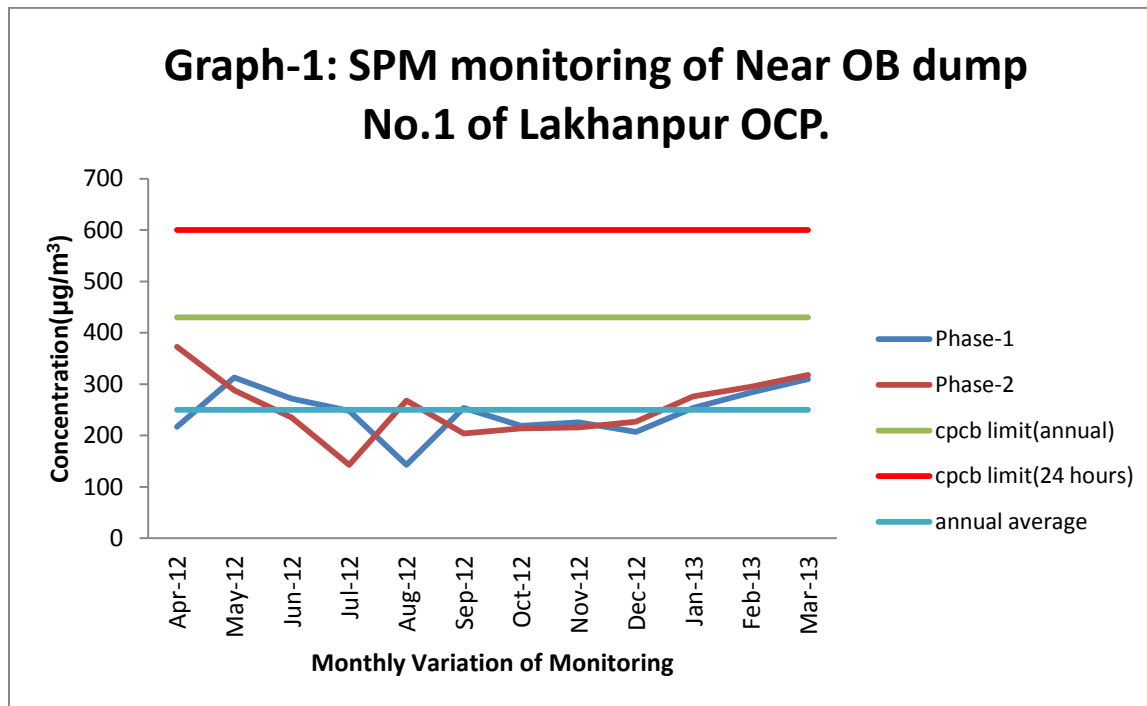


Graph-12: NO_x monitoring Bandabahal Township / BIT of Belpahar OCP.





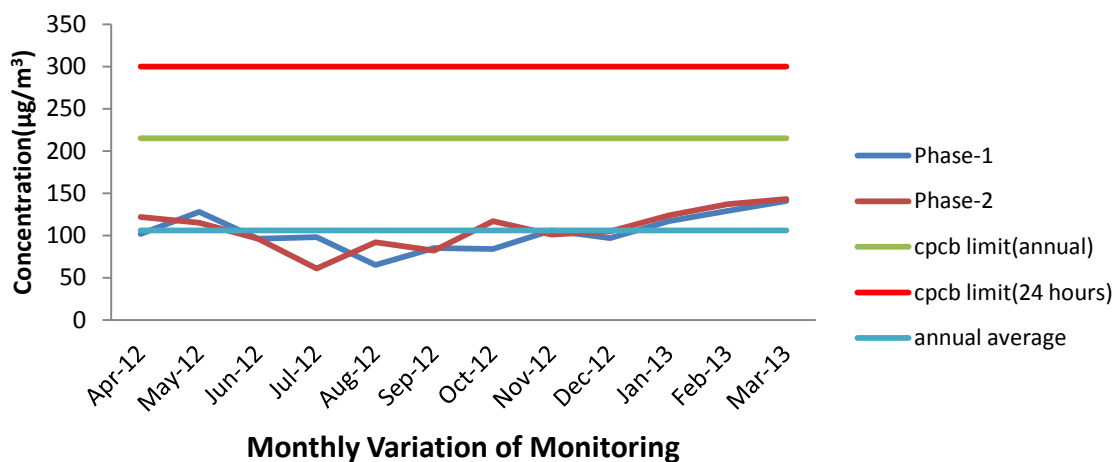
Air Quality Graph of Lakhanpur Area



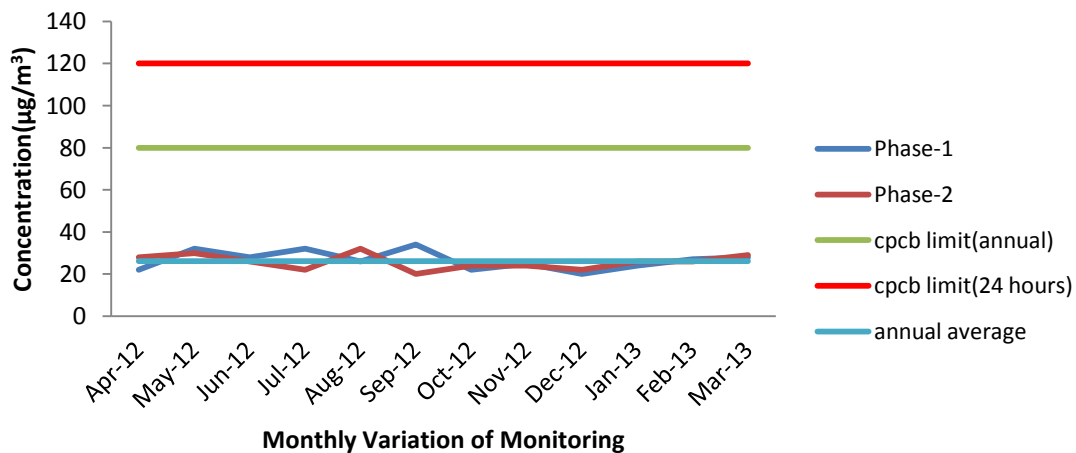


Air Quality Graph of Lakhanpur Area

Graph-2: RPM monitoring of Near OB dump No.1 of Lakhanpur OCP.

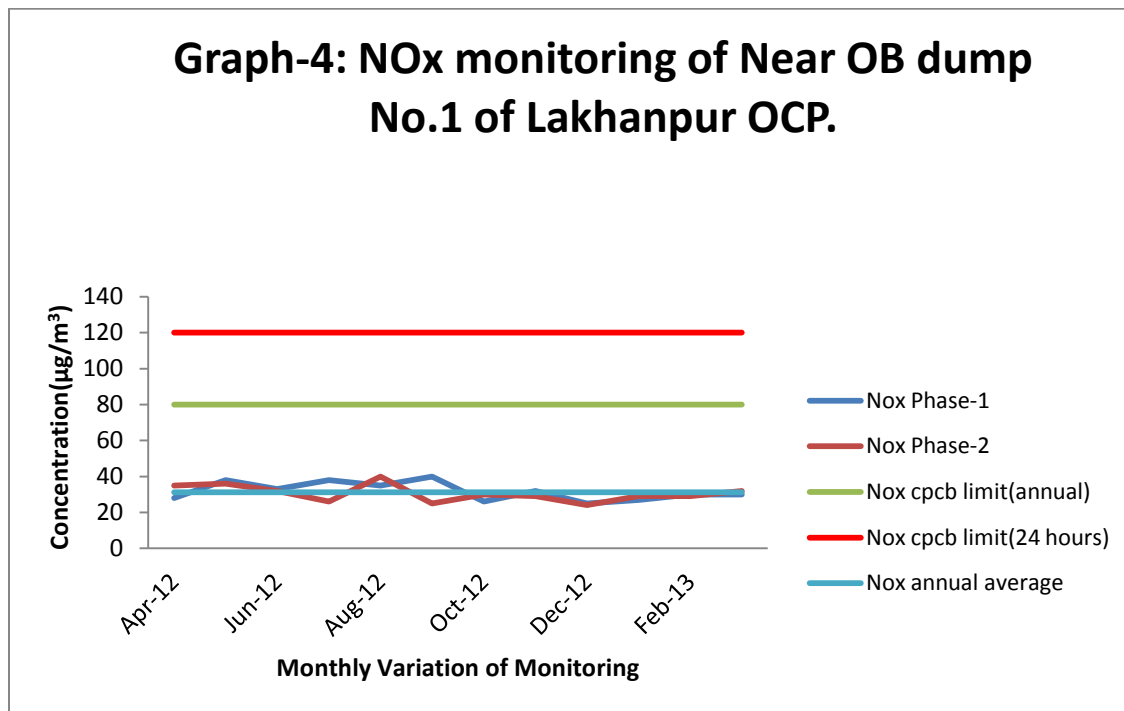


Graph-3: SO_x monitoring of Near OB dump No.1 of Lakhanpur OCP.



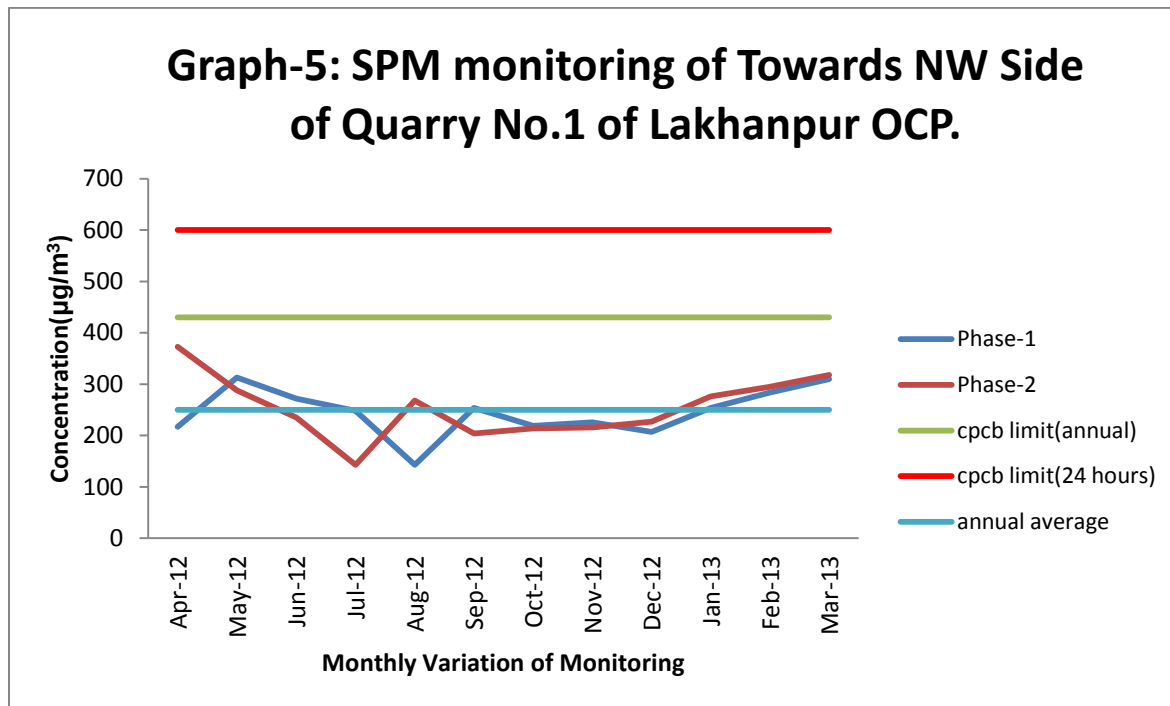


Air Quality Graph of Lakhanpur Area





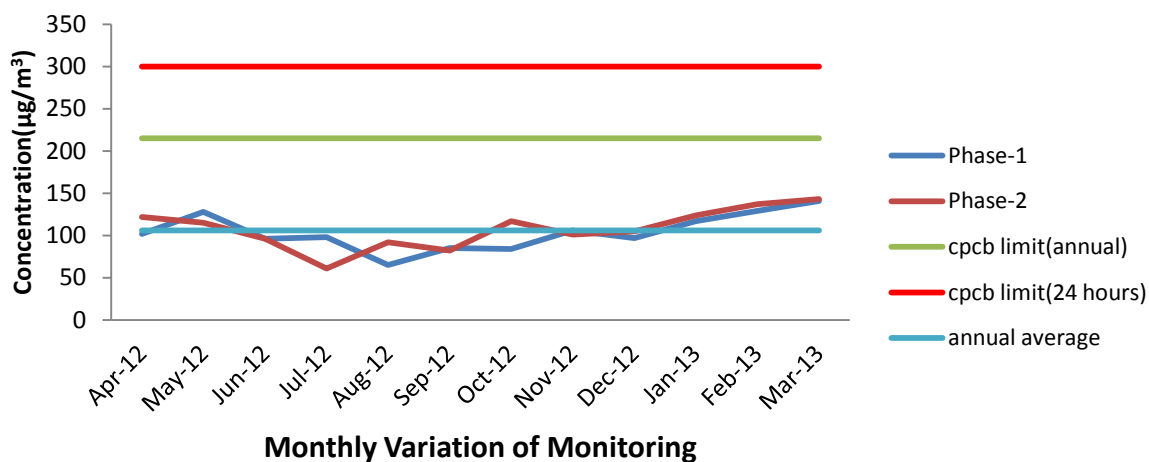
Air Quality Graph of Lakhanpur Area



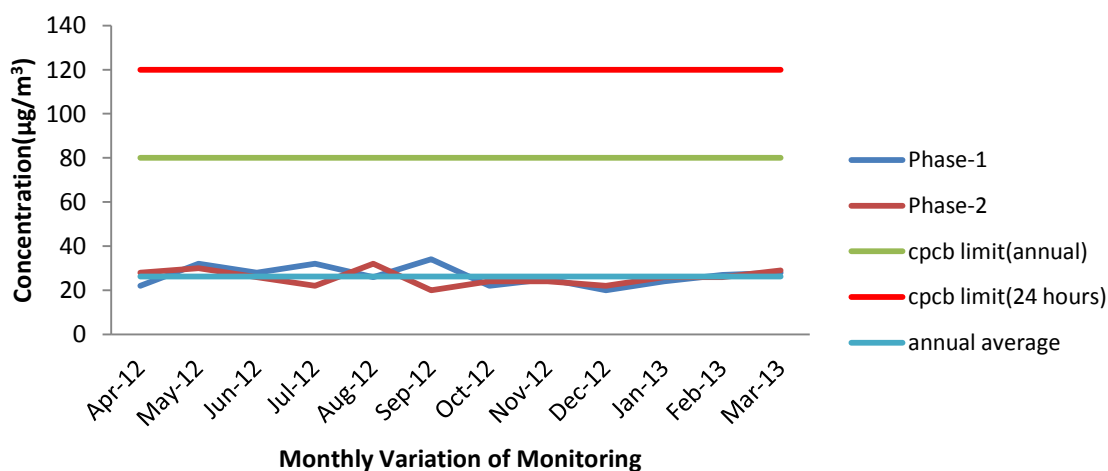


Air Quality Graph of Lakhanpur Area

Graph-6: RPM monitoring of Towards NW Side of Quarry No.1 of Lakhanpur OCP.



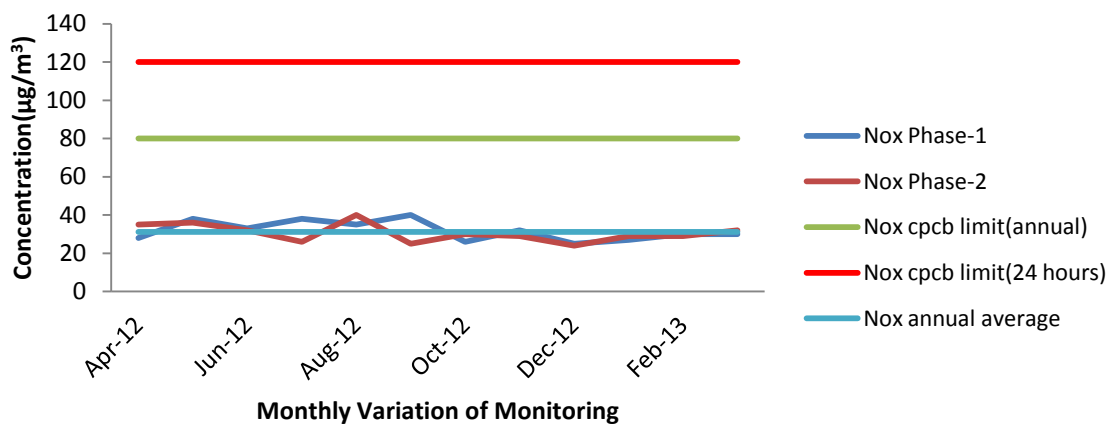
Graph-7: SO_x monitoring of Towards NW Side of Quarry No.1 of Lakhanpur OCP.





Air Quality Graph of Lakhanpur Area

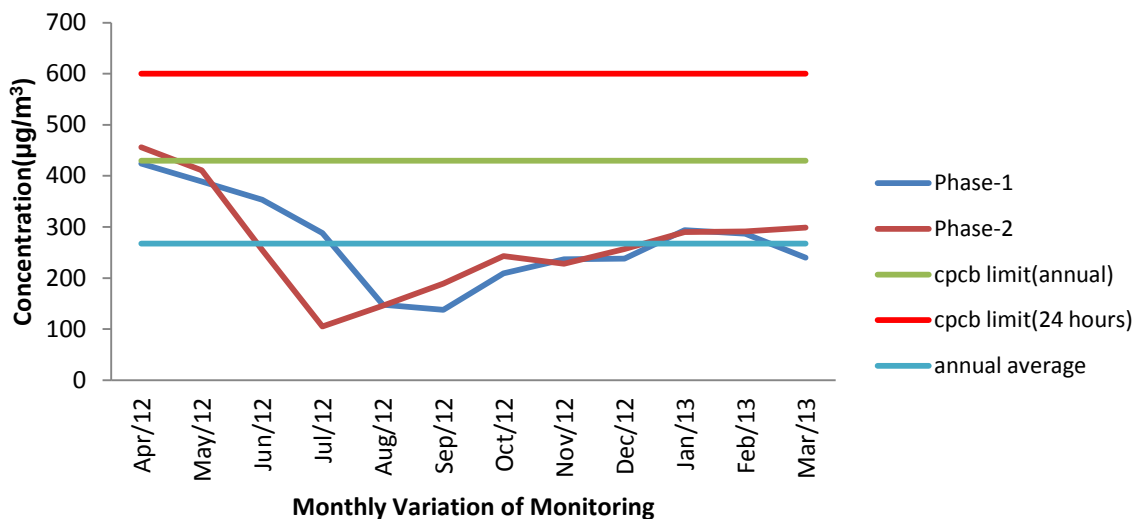
Graph-8: NO_x monitoring of Towards NW Side of Quarry No.1 of Lakhanpur OCP.



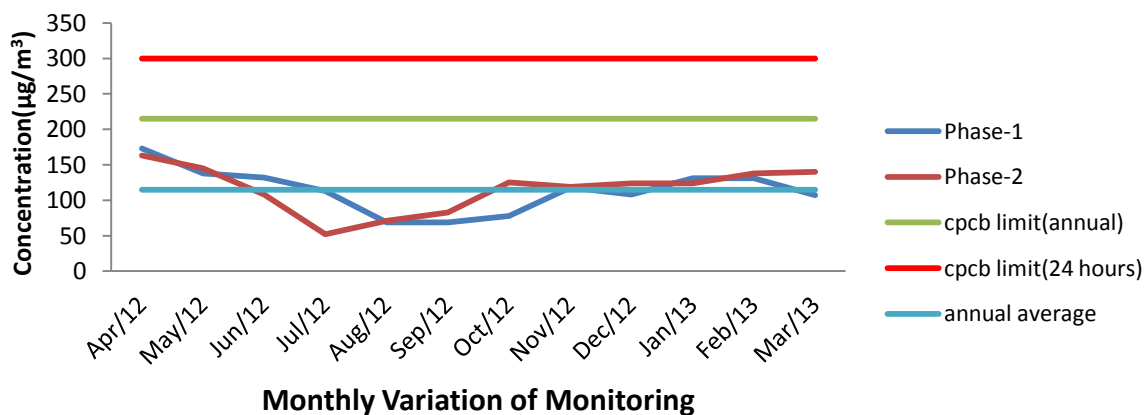


Air Quality Graph of Lakhanpur Area

Graph-9: SPM monitoring of Quarry No.2 of Lakhanpur OCP.



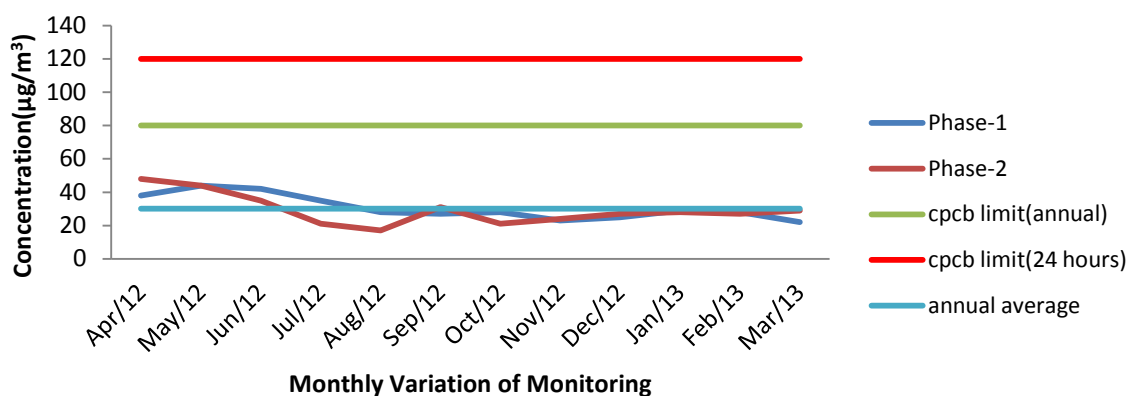
Graph-10: RPM monitoring of Quarry No.2 of Lakhanpur OCP.



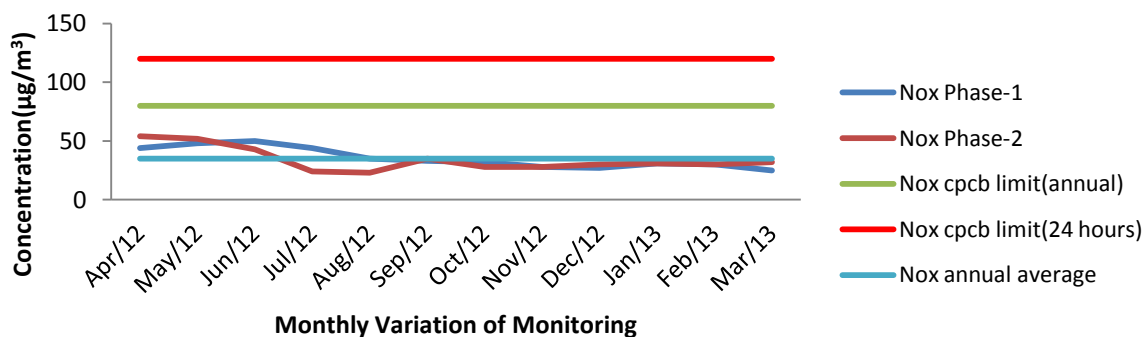


Air Quality Graph of Lakhanpur Area

Graph-11: SO_x monitoring Quarry No.2 of Lakhanpur OCP.

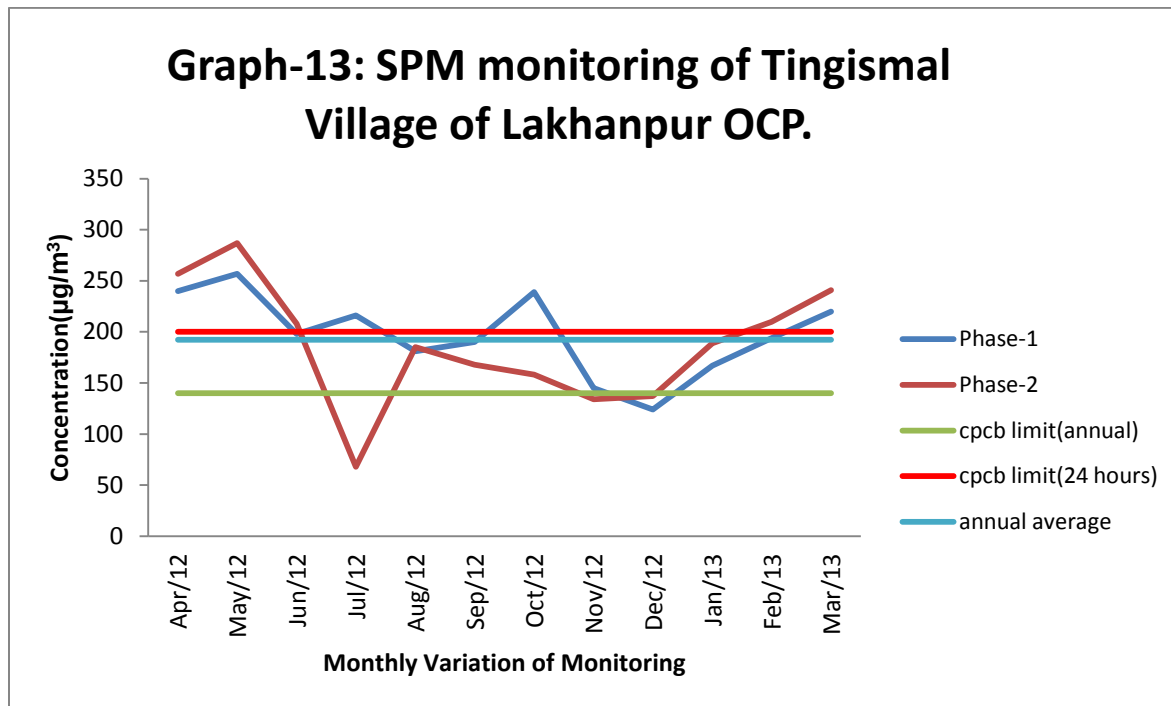


Graph-12: NO_x monitoring of Quarry No.2 of Lakhanpur OCP.





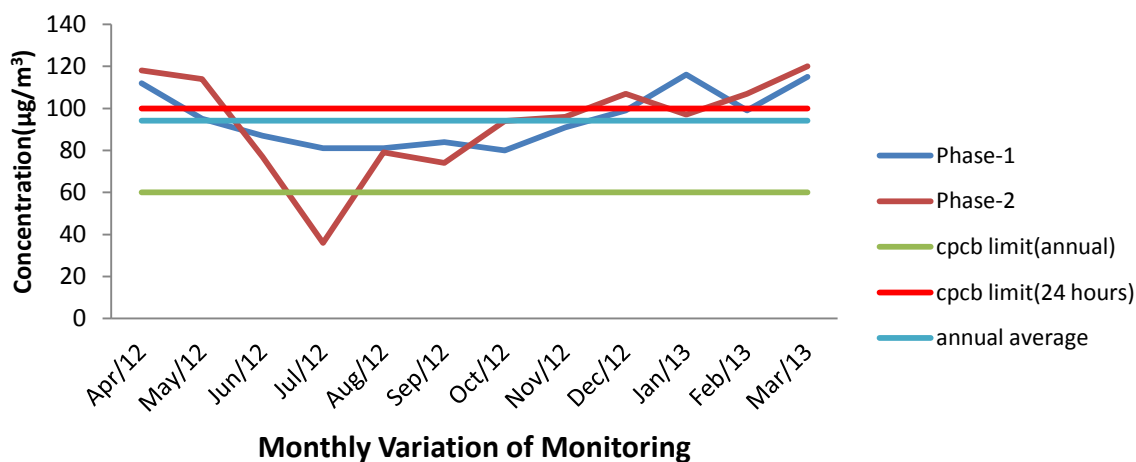
Air Quality Graph of Lakhanpur Area



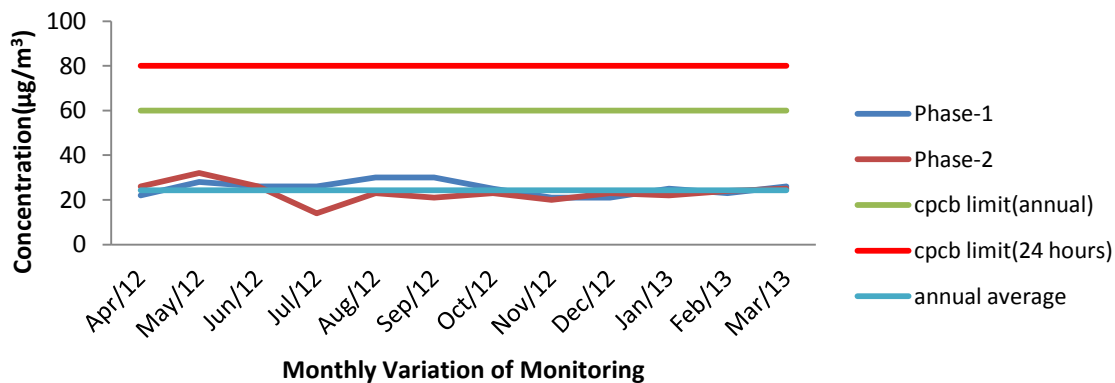


Air Quality Graph of Lakhanpur Area

Graph-14: RPM monitoring of Tingismal Village of Lakhanpur OCP.



Graph-15: SO_x monitoring of Tingismal Village of Lakhanpur OCP.



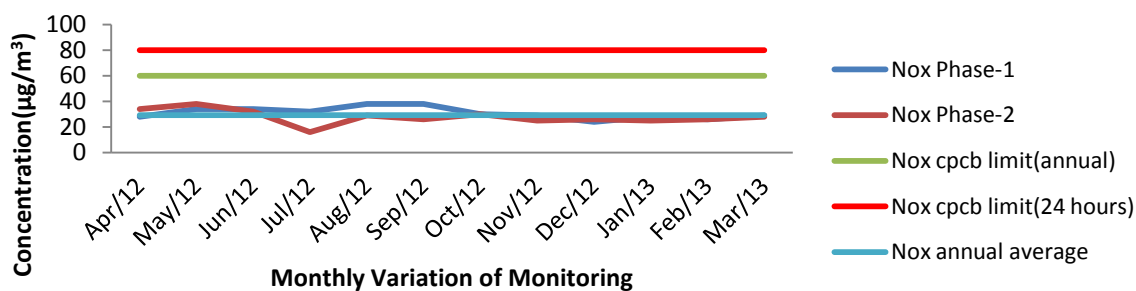
Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

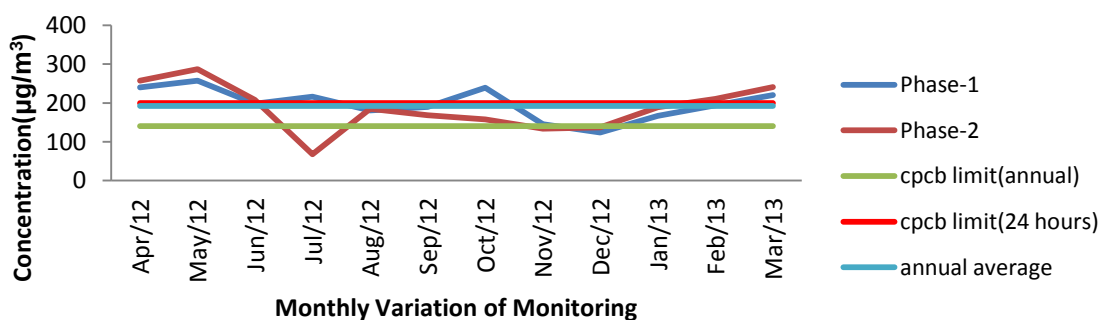


Air Quality Graph of Lakhanpur Area

Graph-16: NO_x monitoring Tingismal Village of Lakhanpur OCP.



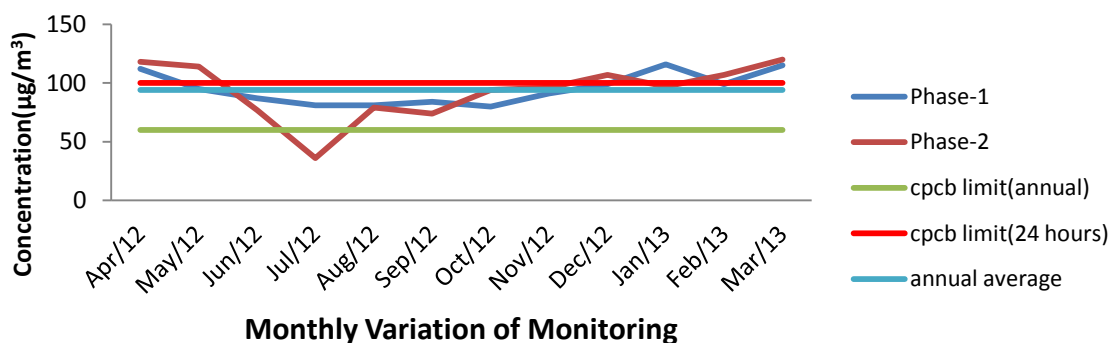
Graph-17: SPM monitoring of Ubuda / Khairakuni Village of Lakhanpur OCP.



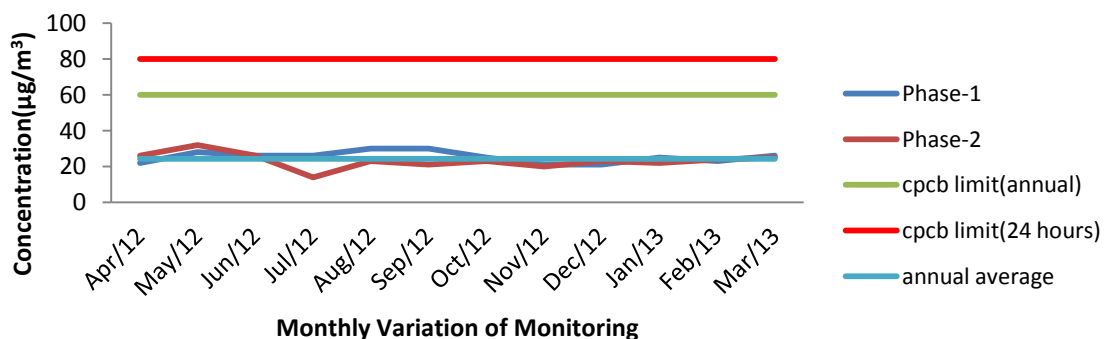


Air Quality Graph of Lakhanpur Area

**Graph-18: RPM monitoring of Ubuda /
Khairakuni Village of Lakhanpur OCP.**



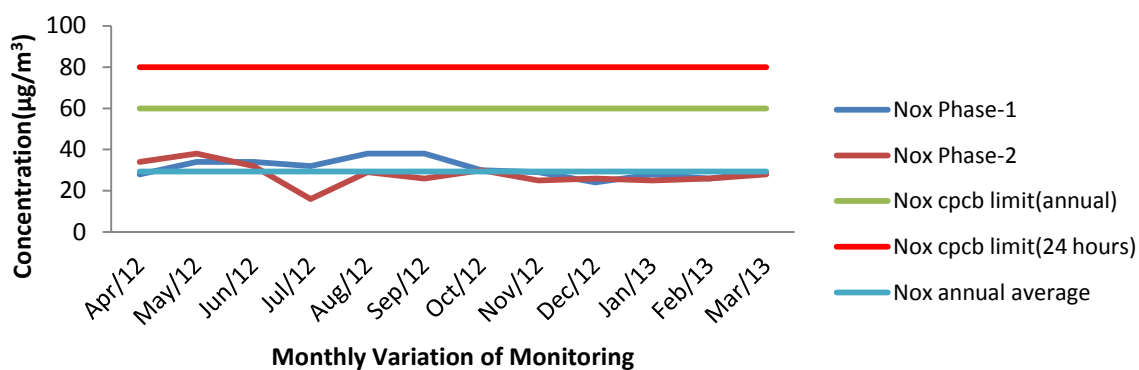
**Graph-19: SO_x monitoring of Ubuda /
Khairakuni Village of Lakhanpur OCP.**





Air Quality Graph of Lakhanpur Area

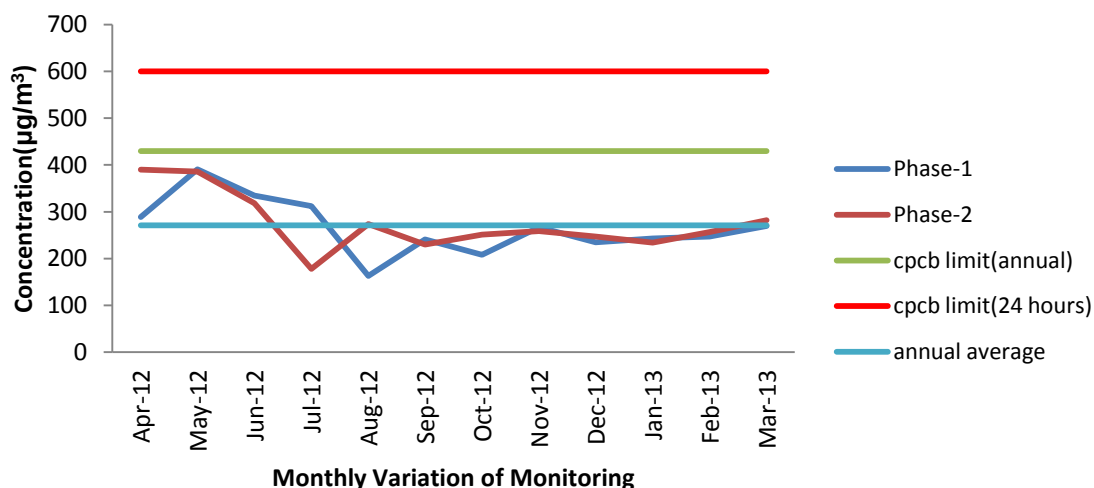
Graph-20: NO_x monitoring Ubuda / Khairakuni Village of Lakhanpur OCP.



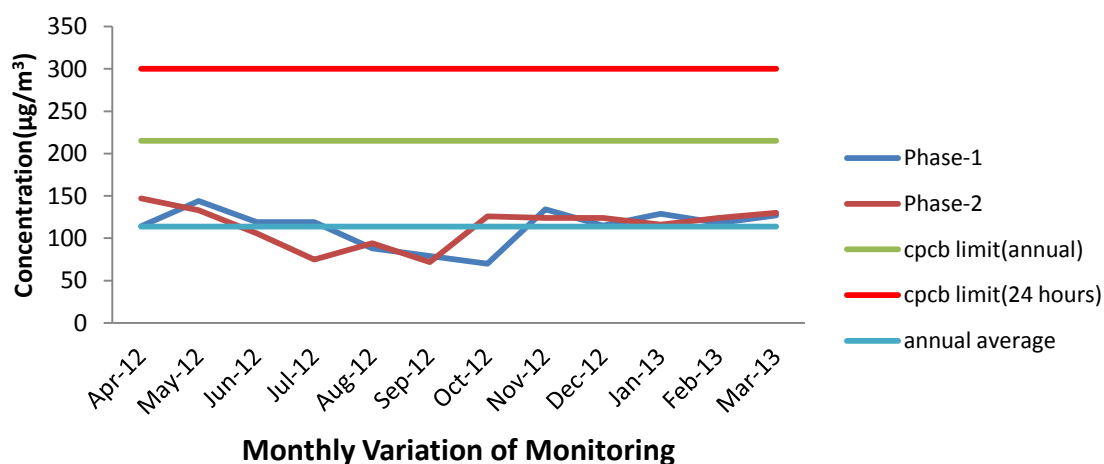


Air Quality Graph of Lakhanpur Area

Graph-1: SPM monitoring of Near Magazine House of Lilari OCP.



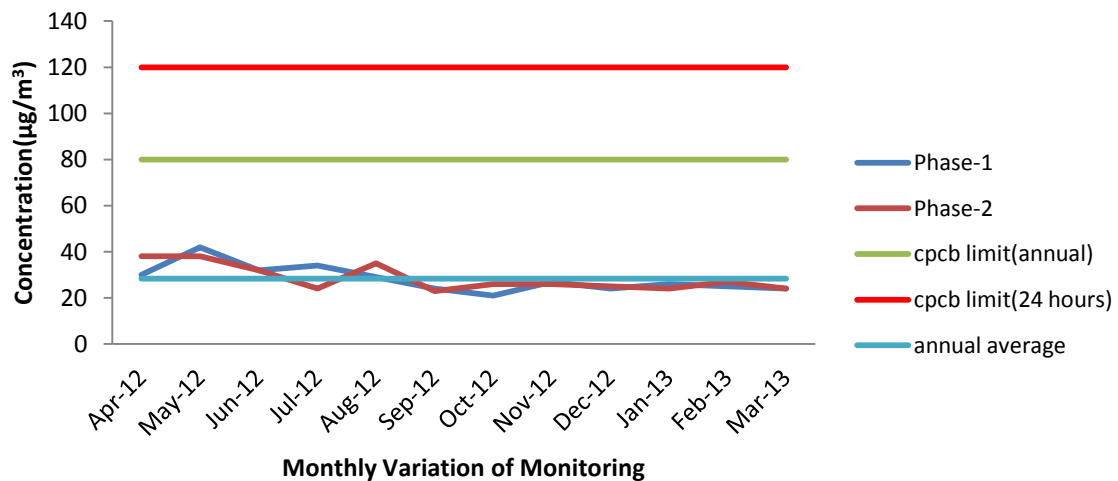
Graph-2: RPM monitoring of Near Magazine House of Lilari OCP.



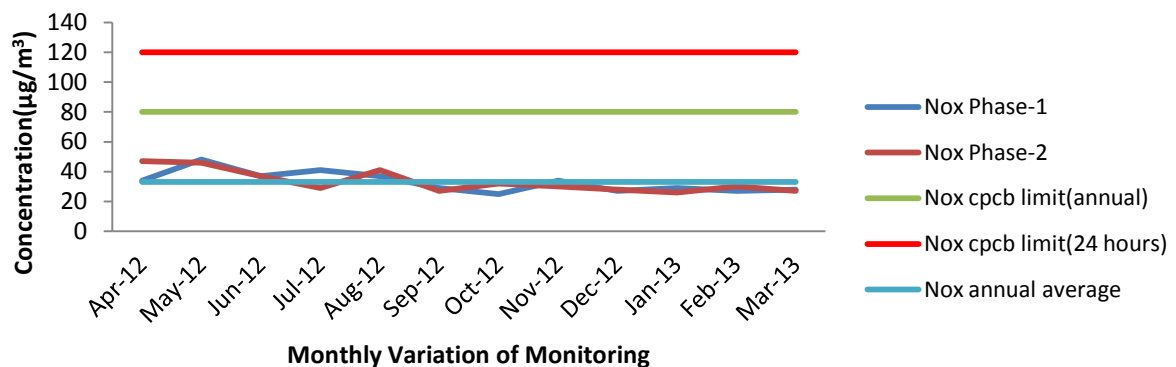


Air Quality Graph of Lakhanpur Area

Graph-3: SO_x monitoring of Near Magazine House of Lilari OCP.



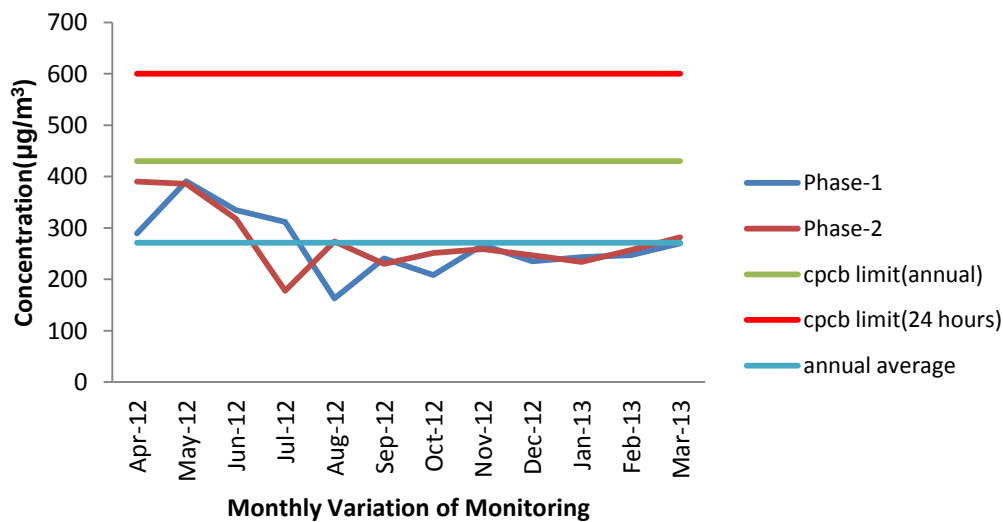
Graph-4: NO_x monitoring of Near Magazine House of Lilari OCP.



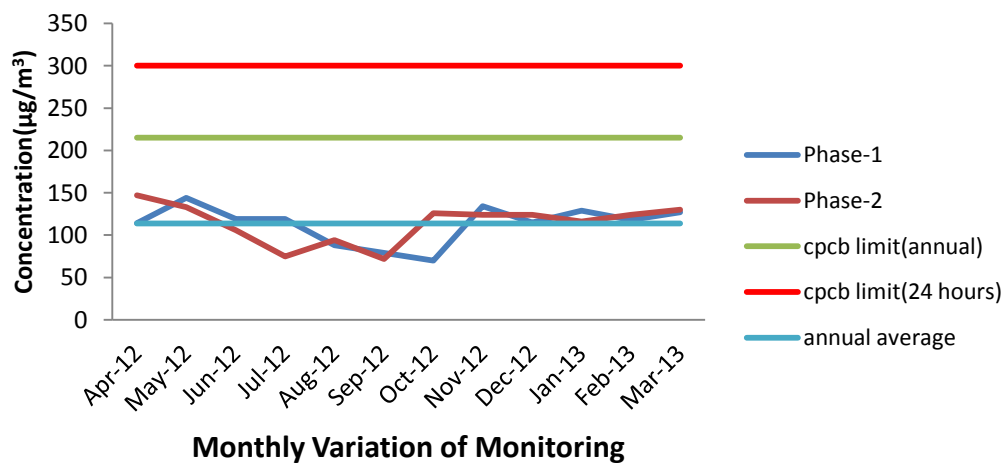


Air Quality Graph of Lakhanpur Area

Graph-5: SPM monitoring of Near Old Coal Stock Yard of Lilari OCP



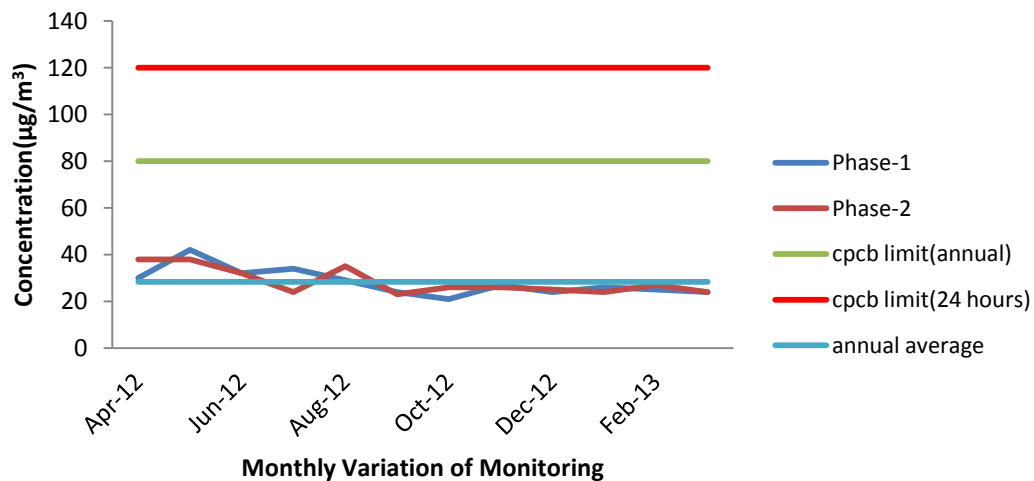
Graph-6: RPM monitoring of Near Old Coal Stock Yard of Lilari OCP



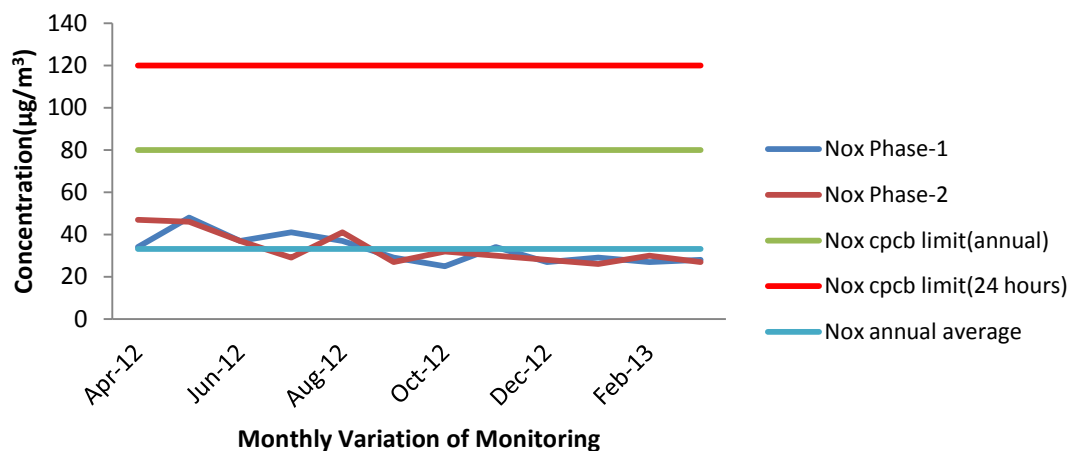


Air Quality Graph of Lakhanpur Area

Graph-7: SO_x monitoring of Near Old Coal Stock Yard of Lilari OCP



Graph-8: NO_x monitoring of Near Old Coal Stock Yard of Lilari OCP



Drinking Water Data Area: Lakhanpur Project: Belpahar OCP

Date of Sampling	06-Apr-12	05-May-12	04-Jul-12	06-Oct-12	14-Jan-13	
Monitoring Station	Belpahar Colony Tap Water	Belpahar Colony Tap Water	Belpahar Colony Tap Water	Belpahar Colony Tap Water	Belpahar Colony Tap Water	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	2	4	2	2	3	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	3	5	2	2	4	5
pH value	7.42	7.46	7.46	7.43	7.38	6.5-8.5
Total hardness	96	96	84	92	92	300
Iron (as Fe)	<0.05	<0.05	<0.05	<0.05	0.07	0.3
Chlorides (as Cl)	22	18	18	20	20	250
Dissolved solids (TD S)	174	166	158	164	164	500
Calcium (as Ca)	24.0	22.4	19.2	22.4	20.8	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	36	31	31	29	30	200
Nitrate (as NO ₃)	3.68	3.54	4.43	5.32	4.87	45
Fluoride (as F)	0.28	0.15	0.19	0.21	0.18	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	0.02	<0.02	1.04	0.04	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	52	56	52	52	56	200
Residual Chlorine	Nil	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil	Nil

[illegible]

[illegible]

Drinking Water Data Area: Lakhanpur Project: Belpahar OCP

Date of Sampling	06-Jun-12	06-Sep-12	13-Dec-12	06-Mar-13	
Monitoring Station	CHP Tap Water	CHP Tap Water	CHP Tap Water	CHP Tap Water	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	3	2	2	2	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	4	4	2	3	5
pH value	7.35	7.39	7.42	7.38	6.5-8.5
Total hardness	68	76	80	92	300
Iron (as Fe)	<0.05	<0.05	<0.05	<0.05	0.3
Chlorides (as Cl)	14	16	16	18	250
Dissolved solids (TD S)	122	134	148	156	500
Calcium (as Ca)	17.6	17.6	19.2	22.4	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	26	28	32	49	200
Nitrate (as NO ₃)	4.43	4.43	3.98	6.20	45
Fluoride (as F)	0.18	0.17	0.13	0.32	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	0.04	<0.02	0.02	<0.02	5
Hexavalent chromium (Cr ⁶⁺)	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	36	44	48	52	200
Residual Chlorine	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil

[illegible]

Drinking Water Data Area: Lakhanpur Project: Belpahar OCP

Date of Sampling	08-Aug-12	01-Nov-12	08-Feb-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Excavation Workshop Tap Water	Excavation Workshop Tap Water	Excavation Workshop Tap Water	
Colour, Hazen unit, Max	5	4	3	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	5	5	4	5
pH value	7.36	7.38	7.36	6.5-8.5
Total hardness	104	112	104	300
Iron (as Fe)	<0.05	<0.05	<0.05	0.3
Chlorides (as Cl)	22	24	22	250
Dissolved solids (TDS)	184	192	178	500
Calcium (as Ca)	24.0	25.6	24.0	75
Copper (as Cu)	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	35	36	33	200
Nitrate (as NO ₃)	4.43	4.68	4.87	45
Fluoride (as F)	0.43	0.23	0.25	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.10	0.03	0.04	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	0.001
Alkalinity	56	64	56	200
Residual Chlorine	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil

Drinking Water Data Area: Lakhanpur Project: Belpahar OCP

Date of Sampling	06-Sep-12	07-Mar-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Intake Water of IWSS	Intake Water of IWSS	
Colour, Hazen unit, Max	3	2	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	4	4	5
pH value	7.34	7.38	6.5-8.5
Total hardness	36	42	300
Iron (as Fe)	<0.05	<0.05	0.3
Chlorides (as Cl)	6	8	250
Dissolved solids (TDS)	64	72	500
Calcium (as Ca)	8.00	9.6	75
Copper (as Cu)	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	0.1
Sulphate (as SO ₄)	12	15	200
Nitrate (as NO ₃)	3.99	3.54	45
Fluoride (as F)	0.10	0.10	1.5
Selenium (as Se)	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	0.06	5
Hexavalent chromium (Cr ⁶⁺)	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	0.001
Alkalinity	20	24	200
Residual Chlorine	Nil	Nil	0.2
MPN	Nil	Nil	Nil

Drinking Water Data Area: Lakhanpur Project: Lakhanpur OCP

Date of Sampling	05-May-12	04-Jul-12	06-Sep-12	08-Nov-12	14-Jan-13	06-Mar-13	
Monitoring Station	Bandbahal Tap Water	Bandbahal Tap Water	Bandbahal Colony Tap Water	Bandbahal colony Tap Water	Bandbahal Tap Water	Bandbahal Tap Water	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	2	2	2	2	2	2	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	3	3	3	3	3	3	5
pH value	7.47	7.41	7.38	7.36	7.45	7.47	6.5-8.5
Total hardness	72	76	88	84	80	88	300
Iron (as Fe)	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.3
Chlorides (as Cl)	14	16	18	18	18	18	250
Dissolved solids (TD S)	132	148	156	148	142	152	500
Calcium (as Ca)	16	17.6	20.8	19.2	19.2	20.8	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	27	23	29	26	28	29	200
Nitrate (as NO ₃)	3.54	4.43	4.87	4.57	3.99	4.43	45
Fluoride (as F)	0.14	0.18	0.24	0.23	0.13	0.19	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	0.04	<0.02	<0.02	0.12	0.07	<0.02	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	40	44	48	44	44	48	200
Residual Chlorine	Nil	Nil	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Drinking Water Data Area: Lakhanpur Project: Lakhanpur OCP

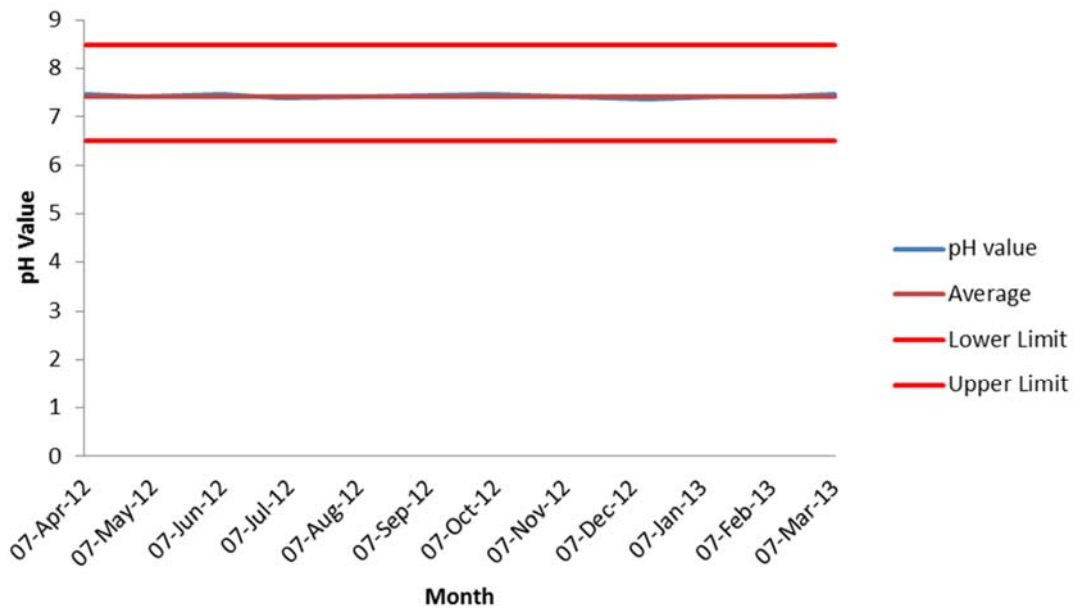
Date of Sampling	05-Apr-12	06-Jun-12	09-Aug-12	06-Oct-12	13-Dec-12	07-Feb-13	Indian Drinking Standards (IS-10500)
Monitoring Station	LKP Canteen Tap Water	LKP Canteen Tap Water	LKP Canteen Tap Water	LKP Canteen Tap Water	LKP Canteen Tap Water	LKP Canteen Tap Water	
Colour, Hazen unit, Max	2	2	2	2	2	3	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	3	3	3	3	3	4	5
pH value	7.43	7.44	7.46	7.58	7.41	7.53	6.5-8.5
Total hardness	84	88	92	72	84	80	300
Iron (as Fe)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.3
Chlorides (as Cl)	16	18	20	16	18	16	250
Dissolved solids (TDS)	144	156	164	134	152	142	500
Calcium (as Ca)	19.2	20.8	22.4	16.0	20.8	19.2	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	27	31	29	25	28	25	200
Nitrate (as NO ₃)	3.98	3.99	4.32	3.12	3.98	3.54	45
Fluoride (as F)	0.21	0.28	0.24	0.21	0.14	0.19	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.06	0.05	<0.10	0.75	0.05	<0.02	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	48	48	56	44	52	48	200
Residual Chlorine	Nil	Nil	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil	Nil	Nil

[illegible]

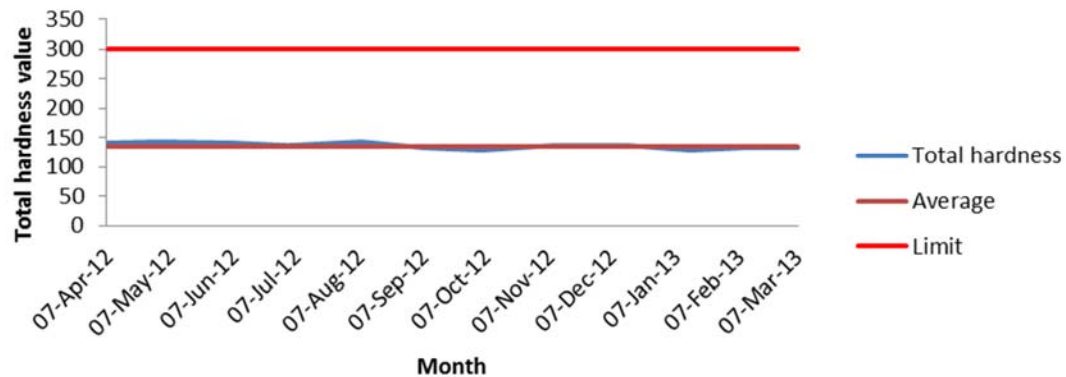
Drinking Water Data Area: Lakhanpur Project: Lilari OCP

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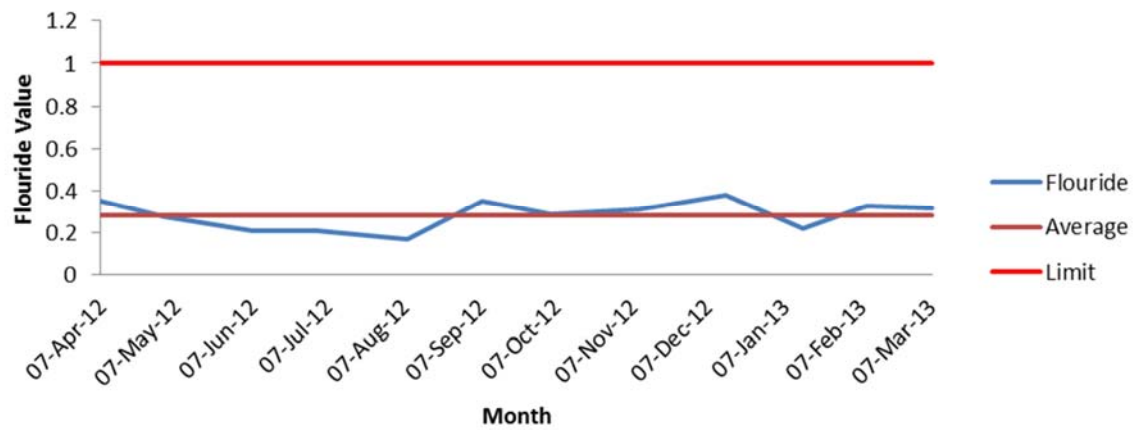
Graph for pH of Darlipali Village Well Waterof Belpahar OCP of Lakhanpur Area



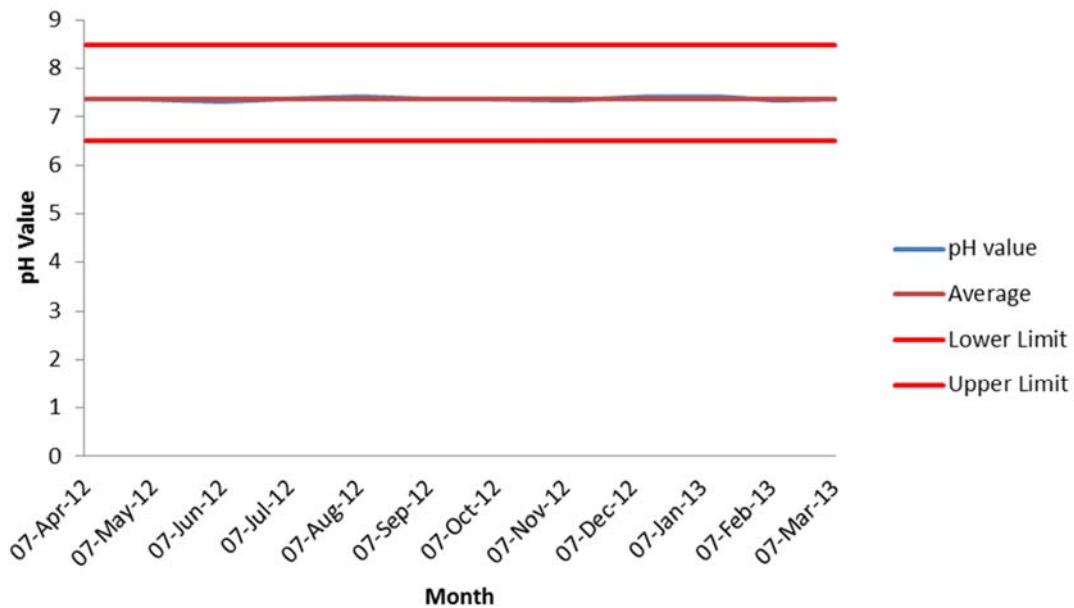
Graph for Total Hardness of Darlipali Village Well Waterof Belpahar OCP of Lakhanpur Area



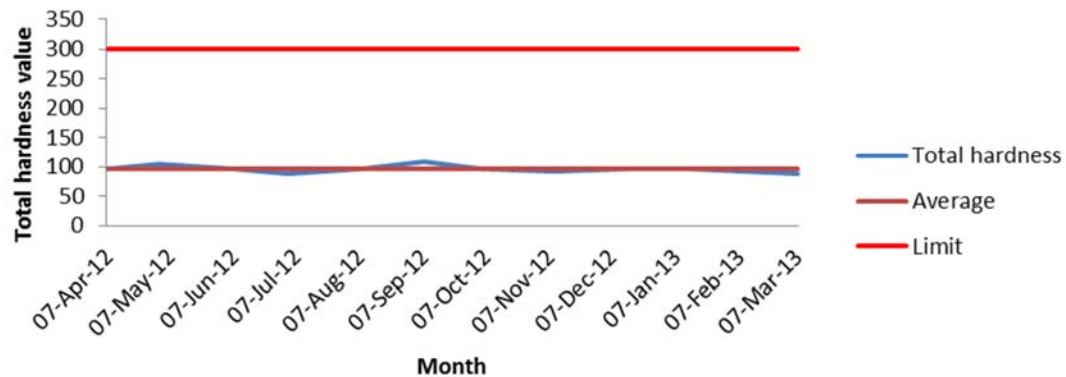
Graph for Flouride of Darlipali Village Well Waterof Belpahar OCP of Lakhanpur Area



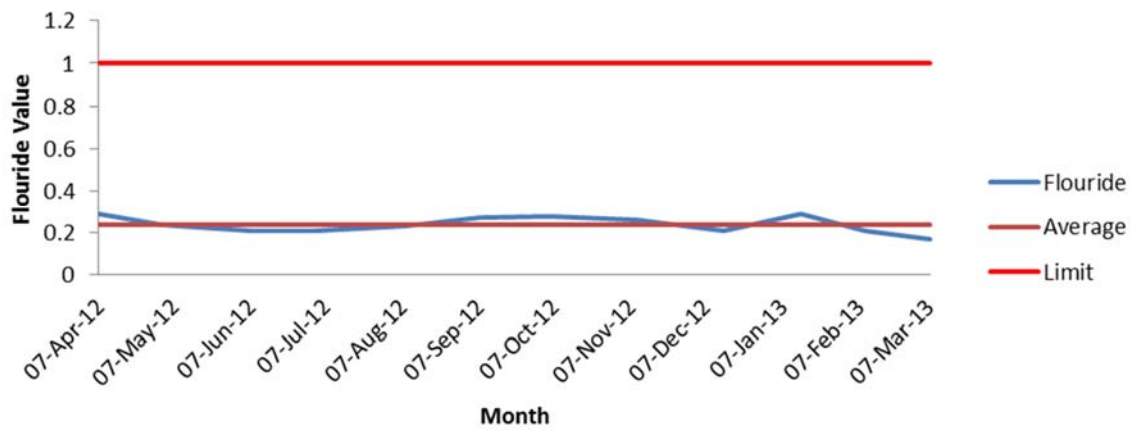
Graph for pH of Ubuda/Khairkuni Village Well Water of Lakhanpur OCP of Lakhanpur Area



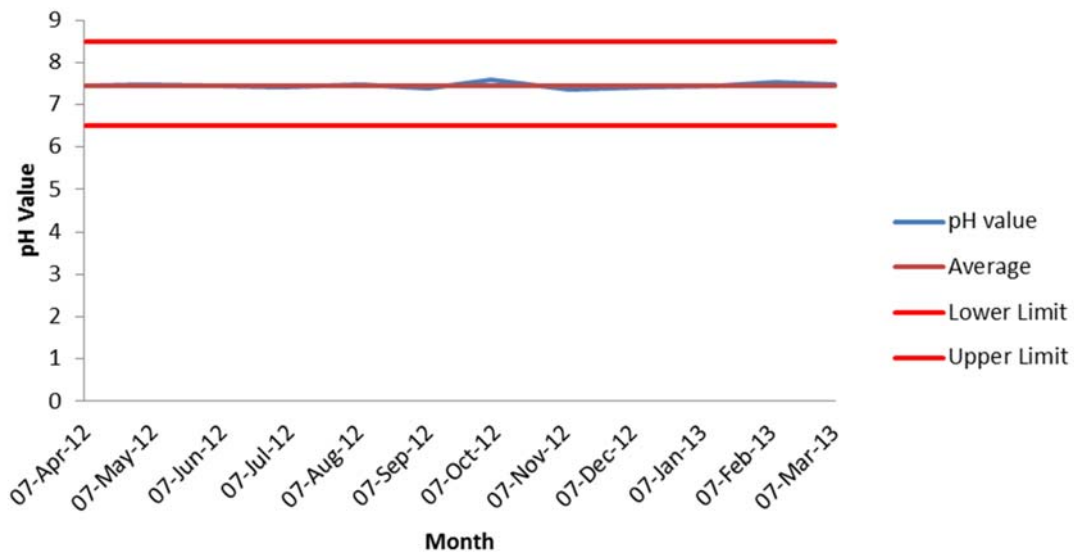
Graph for Total Hardness of Ubuda/Khairkuni Village Well Water of Lakhanpur OCP of Lakhanpur Area



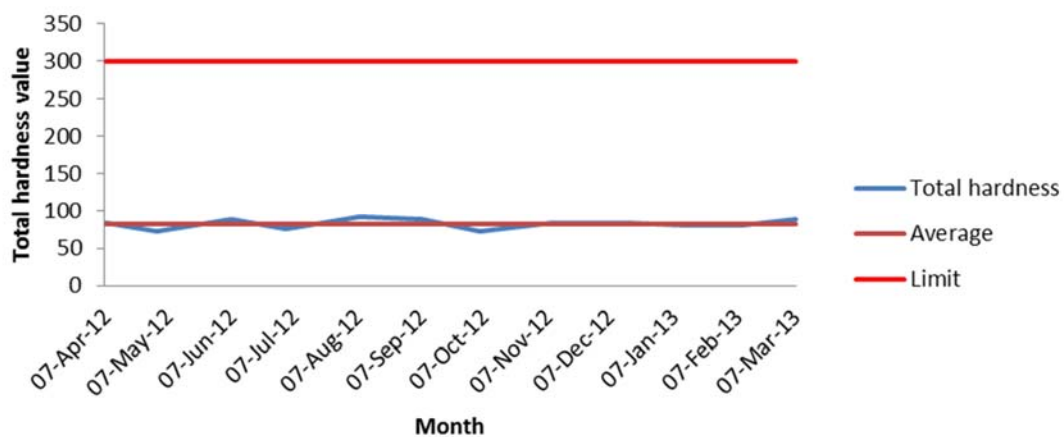
Graph for Flouride of Ubuda/Khairkuni Village Well Waterof Lakhanpur OCP of Lakhanpur Area



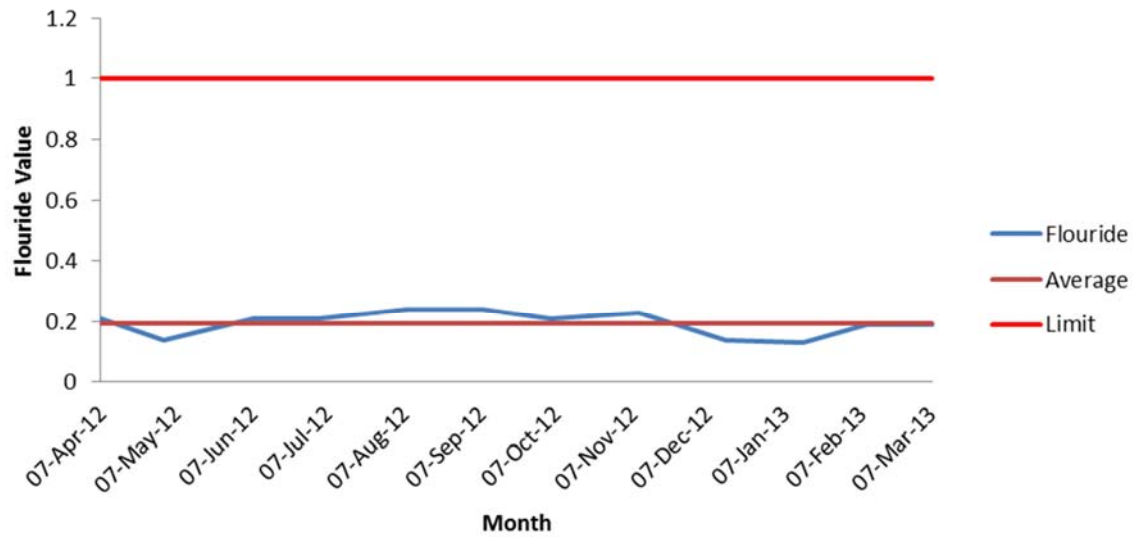
Graph for pH of LKP Canteen/Bandhbahal Tap Water of Lakhanpur OCP of Lakhanpur Area



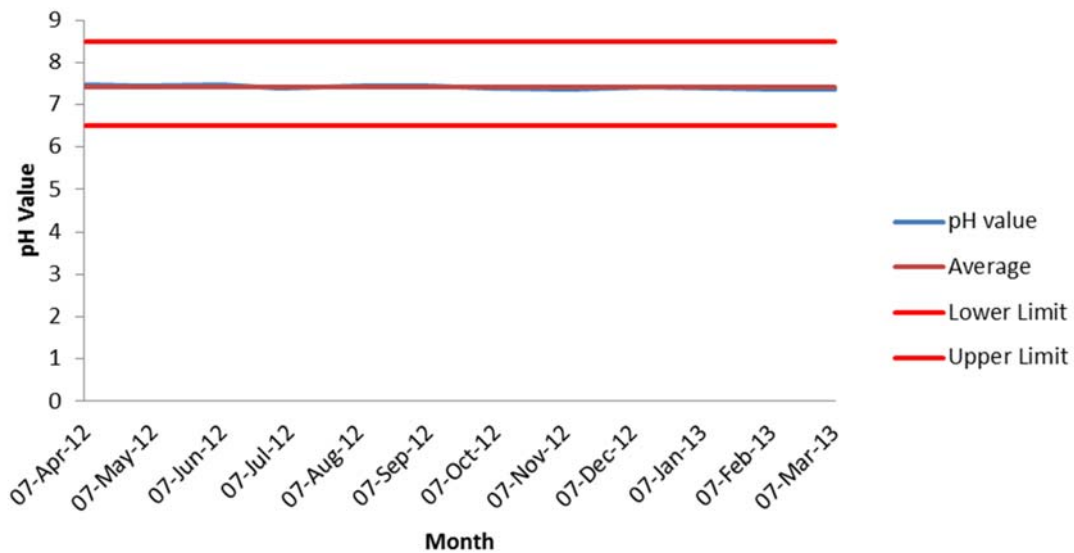
Graph for Total Hardness of LKP Canteen/Bandhbahal Tap Water of Lakhanpur OCP of Lakhanpur Area



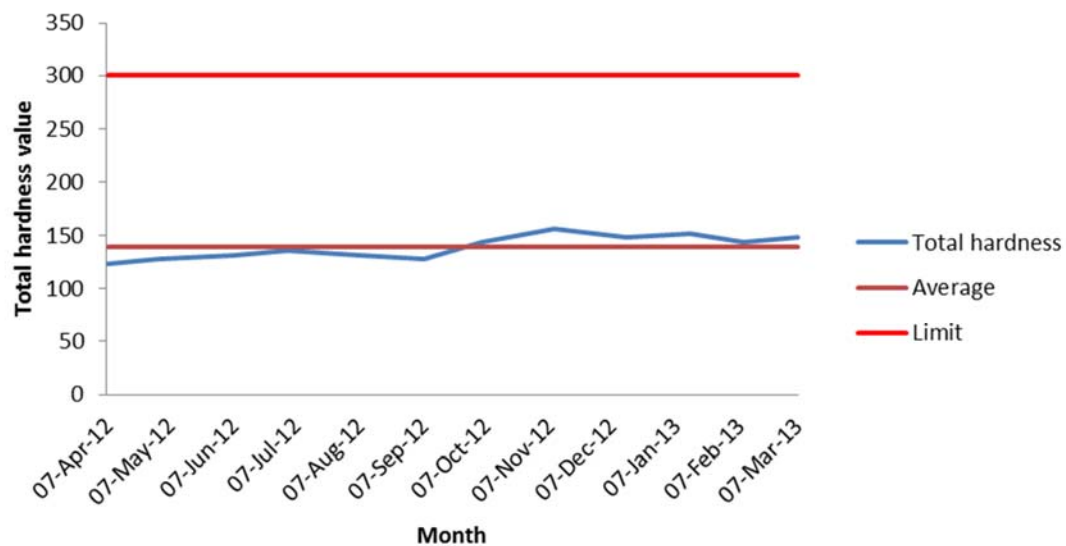
**Graph for Flouride of LKP Canteen/Bandhbahal
Tap Waterof Lakhanpur OCP of Lakhanpur Area**



Graph for pH of Jurabaga Village Well Water of Lilari OCP of Lakhanpur Area



Graph for Total Hardness of Jurabaga Village Well Water of Lilari OCP of Lakhanpur Area



**Graph for Flouride of Jurabaga Village Well Water
of Lilari OCP of Lakhanpur Area**

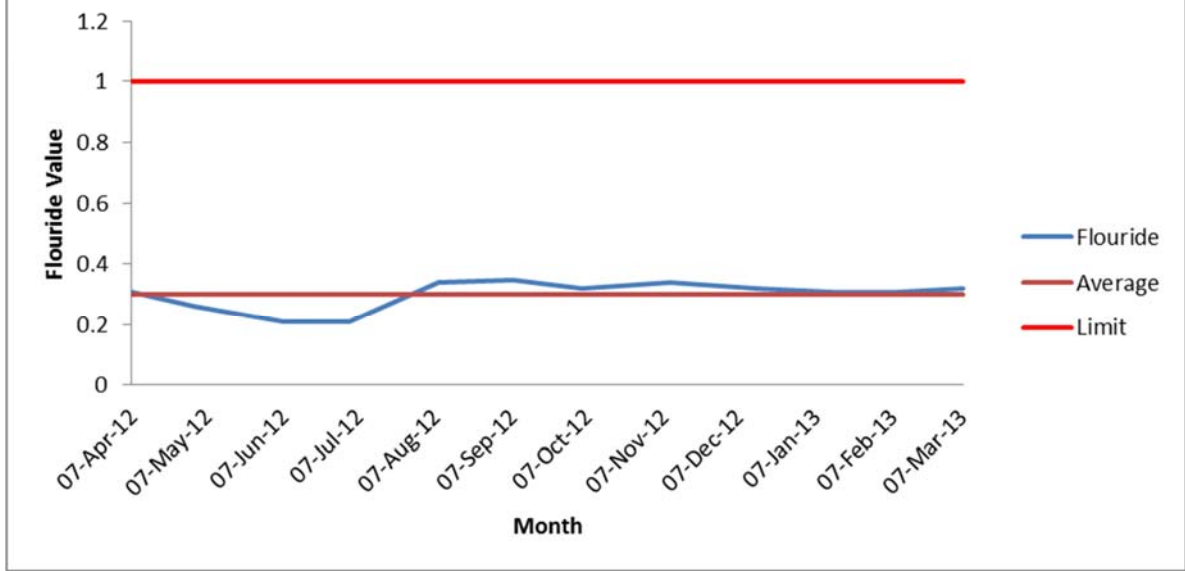


TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

Project : **Belpahar OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
06-Apr-12	Mine Sump Water	7.90					
05-May-12	Mine Sump Water	7.84					
06-Jun-12	Mine Sump Water	7.85					
04-Jul-12	Mine Sump Water	6.84					
08-Aug-12	Mine Sump Water	6.90					
06-Sep-12	Mine Sump Water	7.10					
06-Oct-12	Mine Sump Water	7.15					
08-Nov-12	Mine Sump Water	7.25					
13-Dec-12	Mine Sump Water	7.30					
14-Jan-13	Mine Sump Water	7.35					
08-Feb-13	Mine Sump Water	7.40					
06-Mar-13	Mine Sump Water	7.30					
06-Apr-12	Oil & Grease Trap Outlet	7.73	<1.0	22	35	-	-
20-Apr-12	Oil & Grease Trap Outlet	7.68	<1.0	20	30	-	-
05-May-12	Oil & Grease Trap Outlet	7.72	<1.0	22	35	-	-
21-May-12	Oil & Grease Trap Outlet	7.30	<1.0	26	40	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

06-Jun-12	Oil & Grease Trap Outlet	7.32	<1.0	22	35	-	-
18-Jun-12	Oil & Grease Trap Outlet	7.40	<1.0	24	40	-	-
04-Jul-12	Oil & Grease Trap Outlet	7.45	<1.0	20	30	-	-
19-Jul-12	Oil & Grease Trap Outlet	7.48	<1.0	24	35	-	-
08-Aug-12	Oil & Grease Trap Outlet	7.32	<1.0	28	40	-	-
22-Aug-12	Oil & Grease Trap Outlet	7.25	<1.0	30	45	-	-
06-Sep-12	Oil & Grease Trap Outlet	7.15	<1.0	24	35	-	-
22-Sep-12	Oil & Grease Trap Outlet	7.25	<1.0	26	40	-	-
06-Oct-12	Oil & Grease Trap Outlet	7.22	<1.0	26	40	-	-
22-Oct-12	Oil & Grease Trap Outlet	7.38	<1.0	24	35	-	-
08-Nov-12	Oil & Grease Trap Outlet	7.45	<1.0	26	40	-	-
24-Nov-12	Oil & Grease Trap Outlet	7.34	<1.0	24	35	-	-
13-Dec-12	Oil & Grease Trap Outlet	7.22	<1.0	20	30	-	-
28-Dec-12	Oil & Grease Trap Outlet	7.30	<1.0	24	40	-	-
14-Jan-13	Oil & Grease Trap Outlet	7.25	<1.0	22	35	-	-
29-Jan-13	Oil & Grease Trap Outlet	7.40	<1.0	26	40	-	-
08-Feb-13	Oil & Grease Trap Outlet	7.20	<1.0	20	30	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

26-Feb-13	Oil & Grease Trap Outlet	7.25	<1.0	24	40	-	-
06-Mar-13	Oil & Grease Trap Outlet	7.10	<1.0	24	35	-	-
21-Mar-13	Oil & Grease Trap Outlet	7.15	<1.0	20	30	-	-
06-Apr-12	Outlet from Sedimentation Pond	7.62	<1.0	30	45	-	1.9
20-Apr-12	Outlet from Sedimentation Pond	7.79	<1.0	28	40	-	2.1
05-May-12	Outlet from Sedimentation Pond	7.66	<1.0	30	45	-	1.9
21-May-12	Outlet from Sedimentation Pond	7.70	<1.0	32	50	-	2.0
06-Jun-12	Outlet from Sedimentation Pond	7.68	<1.0	28	40	-	2.1
18-Jun-12	Outlet from Sedimentation Pond	7.75	<1.0	30	45	-	2.0
04-Jul-12	Outlet from Sedimentation Pond	7.80	<1.0	32	50	-	2.1
19-Jul-12	Outlet from Sedimentation Pond	7.74	<1.0	30	45	-	2.0
08-Aug-12	Outlet from Sedimentation Pond	7.65	<1.0	32	45	-	2.1
22-Aug-12	Outlet from Sedimentation Pond	7.45	<1.0	28	40	-	2.0
06-Sep-12	Outlet from Sedimentation Pond	7.62	<1.0	34	50	-	2.1
22-Sep-12	Outlet from Sedimentation Pond	7.70	<1.0	34	50	-	2.2
06-Oct-12	Outlet from Sedimentation Pond	7.55	<1.0	32	45	-	2.0
22-Oct-12	Outlet from Sedimentation Pond	7.62	<1.0	32	45	-	2.0

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

08-Nov-12	Outlet from Sedimentation Pond	7.70	<1.0	30	45	-	1.9
24-Nov-12	Outlet from Sedimentation Pond	7.65	<1.0	28	40	-	2.0
13-Dec-12	Outlet from Sedimentation Pond	7.55	<1.0	30	45	-	2.1
28-Dec-12	Outlet from Sedimentation Pond	7.62	<1.0	34	50	-	2.2
14-Jan-13	Outlet from Sedimentation Pond	7.55	<1.0	30	45	-	2.1
29-Jan-13	Outlet from Sedimentation Pond	7.52	<1.0	34	50	-	2.2
08-Feb-13	Outlet from Sedimentation Pond	7.58	<1.0	55	32	-	2.1
26-Feb-13	Outlet from Sedimentation Pond	8.0	<1.0	36	55	-	
06-Mar-13	Outlet from Sedimentation Pond	7.48	<1.0	36	55	-	2.3
21-Mar-13	Outlet from Sedimentation Pond	7.42	<1.0	32	50	-	2.2

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

Project : **Lakhanpur OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
05-Apr-12	Mine Sump Water	7.55					
04-May-12	Mine Sump Water	7.46					
05-Jun-12	Mine Sump Water	7.60					
04-Jul-12	Mine Sump Water	7.65					
09-Aug-12	Mine Sump Water	7.70					
06-Sep-12	Mine Sump Water	7.64					
06-Oct-12	Mine Sump Water	7.65					
07-Nov-12	Mine Sump Water	7.73					
13-Dec-12	Mine Sump Water	7.65					
12-Jan-13	Mine Sump Water	7.50					
07-Feb-13	Mine Sump Water	7.45					
06-Mar-13	Mine Sump Water	7.35					
05-Apr-12	Oil & Grease Trap Outlet No.1	7.45	<1.0	20	30	-	-
19-Apr-12	Oil & Grease Trap Outlet No.1	7.52	<1.0	18	25	-	-
04-May-12	Oil & Grease Trap Outlet No.1	7.50	<1.0	20	30	-	-
21-May-12	Oil & Grease Trap Outlet No.1	7.55	<1.0	18	25	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

05-Jun-12	Oil & Grease Trap Outlet No.1	7.58	<1.0	16	25	-	-
18-Jun-12	Oil & Grease Trap Outlet No.1	7.66	<1.0	18	30	-	-
04-Jul-12	Oil & Grease Trap Outlet No.1	7.58	<1.0	22	35	-	-
19-Jul-12	Oil & Grease Trap Outlet No.1	7.52	<1.0	20	30	-	-
09-Aug-12	Oil & Grease Trap Outlet No.1	7.45	<1.0	22	35	-	-
22-Aug-12	Oil & Grease Trap Outlet No.1	7.35	<1.0	20	30	-	-
06-Sep-12	Oil & Grease Trap Outlet No.1	7.40	<1.0	24	40	-	-
22-Sep-12	Oil & Grease Trap Outlet No.1	7.35	<1.0	20	30	-	-
06-Oct-12	Oil & Grease Trap Outlet No.1	7.34	<1.0	20	30	-	-
22-Oct-12	Oil & Grease Trap Outlet No.1	7.42	<1.0	22	35	-	-
07-Nov-12	Oil & Grease Trap Outlet No.1	7.48	<1.0	20	30	-	-
22-Nov-12	Oil & Grease Trap Outlet No.1	7.40	<1.0	24	35	-	-
13-Dec-12	Oil & Grease Trap Outlet No.1	7.38	<1.0	24	35	-	-
28-Dec-12	Oil & Grease Trap Outlet No.1	7.45	<1.0	20	30	-	-
12-Jan-13	Oil & Grease Trap Outlet No.1	7.40	<1.0	24	35	-	-
28-Jan-13	Oil & Grease Trap Outlet No.1	7.30	<1.0	20	30	-	-
07-Feb-13	Oil & Grease Trap Outlet No.1	7.25	<1.0	22	35	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

25-Feb-13	Oil & Grease Trap Outlet No.1	7.20	<1.0	20	30	-	-
06-Mar-13	Oil & Grease Trap Outlet No.1	7.15	<1.0	24	40	-	-
21-Mar-13	Oil & Grease Trap Outlet No.1	7.10	<1.0	26	40	-	-
05-Apr-12	Oil & Grease Trap Outlet No.2	7.68	<1.0	32	45	-	-
19-Apr-12	Oil & Grease Trap Outlet No.2	7.72	<1.0	24	35	-	-
04-May-12	Oil & Grease Trap Outlet No.2	7.68	<1.0	26	40	-	-
21-May-12	Oil & Grease Trap Outlet No.2	7.62	<1.0	24	40	-	-
05-Jun-12	Oil & Grease Trap Outlet No.2	7.66	<1.0	20	30	-	-
18-Jun-12	Oil & Grease Trap Outlet No.2	7.75	<1.0	22	35	-	-
04-Jul-12	Oil & Grease Trap Outlet No.2	7.70	<1.0	26	40	-	-
19-Jul-12	Oil & Grease Trap Outlet No.2	7.67	<1.0	24	35	-	-
09-Aug-12	Oil & Grease Trap Outlet No.2	7.60	<1.0	26	40	-	-
22-Aug-12	Oil & Grease Trap Outlet No.2	7.44	<1.0	24	35	-	-
06-Sep-12	Oil & Grease Trap Outlet No.2	7.50	<1.0	26	45	-	-
22-Sep-12	Oil & Grease Trap Outlet No.2	7.45	<1.0	22	35	-	-
06-Oct-12	Oil & Grease Trap Outlet No.2	7.45	<1.0	22	35	-	-
22-Oct-12	Oil & Grease Trap Outlet No.2	7.52	<1.0	26	40	-	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

07-Nov-12	Oil & Grease Trap Outlet No.2	7.60	<1.0	24	35	-	-
22-Nov-12	Oil & Grease Trap Outlet No.2	7.55	<1.0	28	40	-	-
13-Dec-12	Oil & Grease Trap Outlet No.2	7.55	<1.0	26	40	-	-
28-Dec-12	Oil & Grease Trap Outlet No.2	7.43	<1.0	24	35	-	-
12-Jan-13	Oil & Grease Trap Outlet No.2	7.35	<1.0	28	40	-	-
28-Jan-13	Oil & Grease Trap Outlet No.2	7.25	<1.0	24	35	-	-
07-Feb-13	Oil & Grease Trap Outlet No.2	7.30	<1.0	26	40	-	-
25-Feb-13	Oil & Grease Trap Outlet No.2	7.35	<1.0	22	35	-	-
06-Mar-13	Oil & Grease Trap Outlet No.2	7.22	<1.0	22	35	-	-
21-Mar-13	Oil & Grease Trap Outlet No.2	7.15	<1.0	24	35	-	-
05-Apr-12	Outlet from Sedimentation Pond	7.32	<1.0	36	55	-	2.1
19-Apr-12	Outlet from Sedimentation Pond	7.45	<1.0	34	55	-	2.0
04-May-12	Outlet from Sedimentation Pond	7.35	<1.0	32	50	-	2.1
21-May-12	Outlet from Sedimentation Pond	7.40	<1.0	28	40	-	2.0
05-Jun-12	Outlet from Sedimentation Pond	7.44	<1.0	24	35	-	1.9
18-Jun-12	Outlet from Sedimentation Pond	7.55	<1.0	28	40	-	2.0
04-Jul-12	Outlet from Sedimentation Pond	7.64	<1.0	32	45	-	2.1

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

19-Jul-12	Outlet from Sedimentation Pond	7.55	<1.0	28	40	-	1.9
09-Aug-12	Outlet from Sedimentation Pond	7.62	<1.0	32	45	-	2.0
22-Aug-12	Outlet from Sedimentation Pond	7.50	<1.0	28	40	-	1.8
06-Sep-12	Outlet from Sedimentation Pond	7.38	<1.0	32	45	-	1.9
22-Sep-12	Outlet from Sedimentation Pond	7.50	<1.0	34	50	-	2.0
06-Oct-12	Outlet from Sedimentation Pond	7.32	<1.0	28	40	-	2.0
22-Oct-12	Outlet from Sedimentation Pond	7.55	<1.0	36	55	-	2.2
07-Nov-12	Outlet from Sedimentation Pond	7.60	<1.0	32	50	-	2.0
22-Nov-12	Outlet from Sedimentation Pond	7.50	<1.0	30	45	-	1.9
13-Dec-12	Outlet from Sedimentation Pond	7.65	<1.0	30	45	-	2.1
28-Dec-12	Outlet from Sedimentation Pond	7.60	<1.0	32	50	-	2.2
12-Jan-13	Outlet from Sedimentation Pond	7.52	<1.0	36	55	-	2.3
28-Jan-13	Outlet from Sedimentation Pond	7.45	<1.0	34	50	-	2.2
07-Feb-13	Outlet from Sedimentation Pond	7.48	<1.0	32	50	-	2.2
25-Feb-13	Outlet from Sedimentation Pond	7.44	<1.0	34	50	-	2.3
06-Mar-13	Outlet from Sedimentation Pond	7.40	<1.0	34	50	-	2.1
21-Mar-13	Outlet from Sedimentation Pond	7.50	<1.0	32	45	-	2.0

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

05-Apr-12	Outlet of DETP	7.85		12	-	8	-
19-Apr-12	Outlet of DETP	8.35		16	-	10	-
04-May-12	Outlet of DETP	7.80		14	-	10	-
21-May-12	Outlet of DETP	7.92		12	-	8	-
05-Jun-12	Outlet of DETP	7.90		14	-	10	-
18-Jun-12	Outlet of DETP	7.95		12	-	8	-
04-Jul-12	Outlet of DETP	7.85		14	-	7	-
19-Jul-12	Outlet of DETP	7.78		12	-	6	-
09-Aug-12	Outlet of DETP	7.64		14	-	7	-
22-Aug-12	Outlet of DETP	7.50		12	-	6	-
06-Sep-12	Outlet of DETP	7.75		16	-	9	-
22-Sep-12	Outlet of DETP	7.80		14	-	8	-
06-Oct-12	Outlet of DETP	7.60		14	-	8	-
22-Oct-12	Outlet of DETP	7.90		16	-	10	-
07-Nov-12	Outlet of DETP	7.65		10	-	6	-
22-Nov-12	Outlet of DETP	7.65		30	-	7	-
13-Dec-12	Outlet of DETP	7.52		14	-	8	-

TABLE--
EFFLUENT QUALITY DATA

Area : **Lakhanpur**

28-Dec-12	Outlet of DETP	7.60		16	-	9	-
12-Jan-13	Outlet of DETP	7.45		12	-	7	-
28-Jan-13	Outlet of DETP	7.58		14	-	8	-
07-Feb-13	Outlet of DETP	7.38		14	-	8	-
25-Feb-13	Outlet of DETP	7.40		12	-	7	-
06-Mar-13	Outlet of DETP	7.44		16	-	10	-
21-Mar-13	Outlet of DETP	7.50		14	-	8	-

TABLE--
EFFLUENT QUALITY DATA

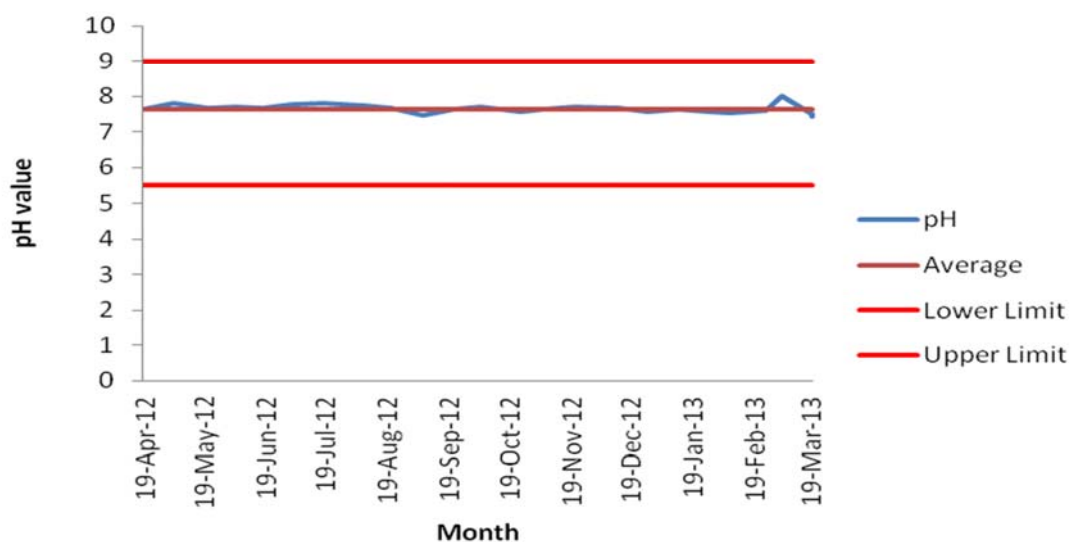
Area : **Lakhanpur**

Project : **Lilari OCP**

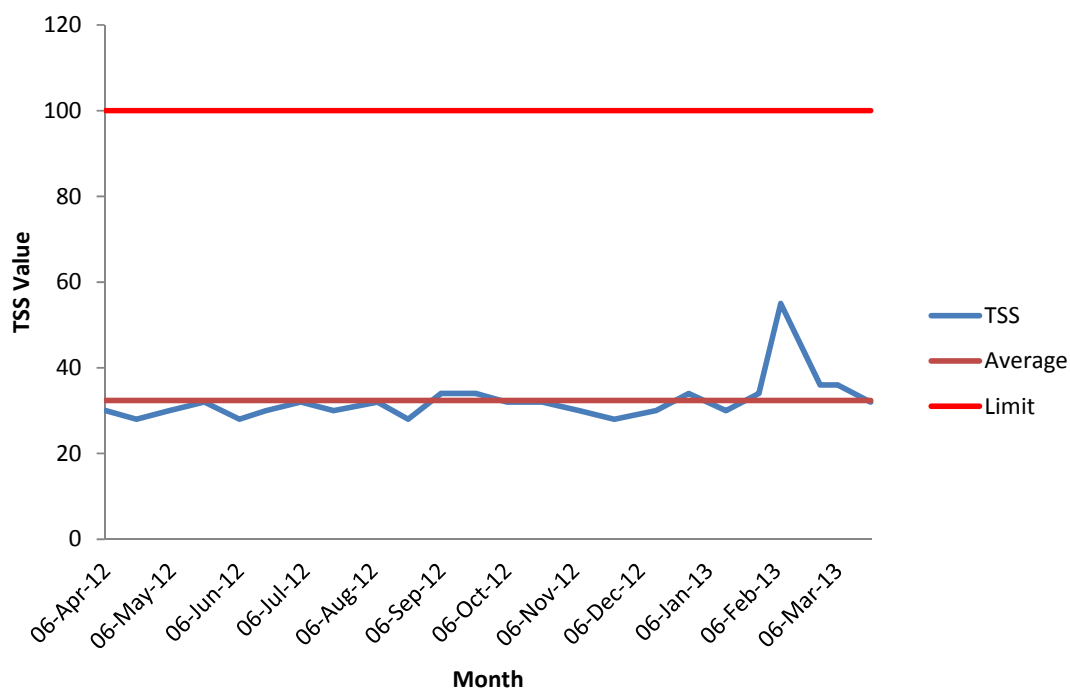
(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
05-Apr-12	Mine Sump Water	7.67					
04-May-12	Mine Sump Water	7.62					
05-Jun-12	Mine Sump Water	7.60					
03-Jul-12	Mine Sump Water	7.55					
09-Aug-12	Mine Sump Water	7.65					
06-Sep-12	Mine Sump Water	7.82					
06-Oct-12	Mine Sump Water	7.75					
06-Nov-12	Mine Sump Water	7.30					
13-Dec-12	Mine Sump Water	7.70					
14-Jan-13	Mine Sump Water	7.64					
07-Feb-13	Mine Sump Water	7.60					
06-Mar-13	Mine Sump Water	7.55					

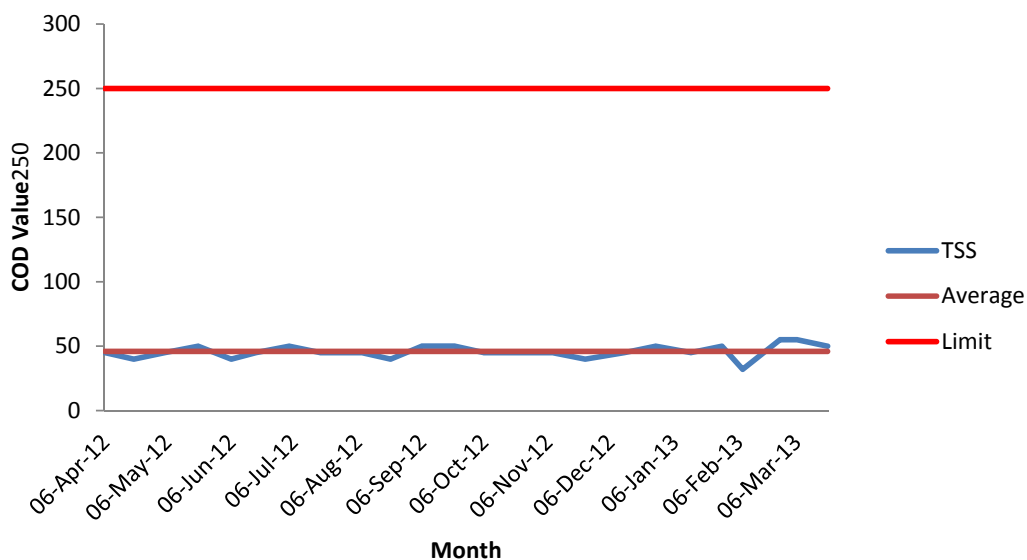
Graph for pH of outlet of sedimentation pond of Belpahar OCP of Lakhanpur area



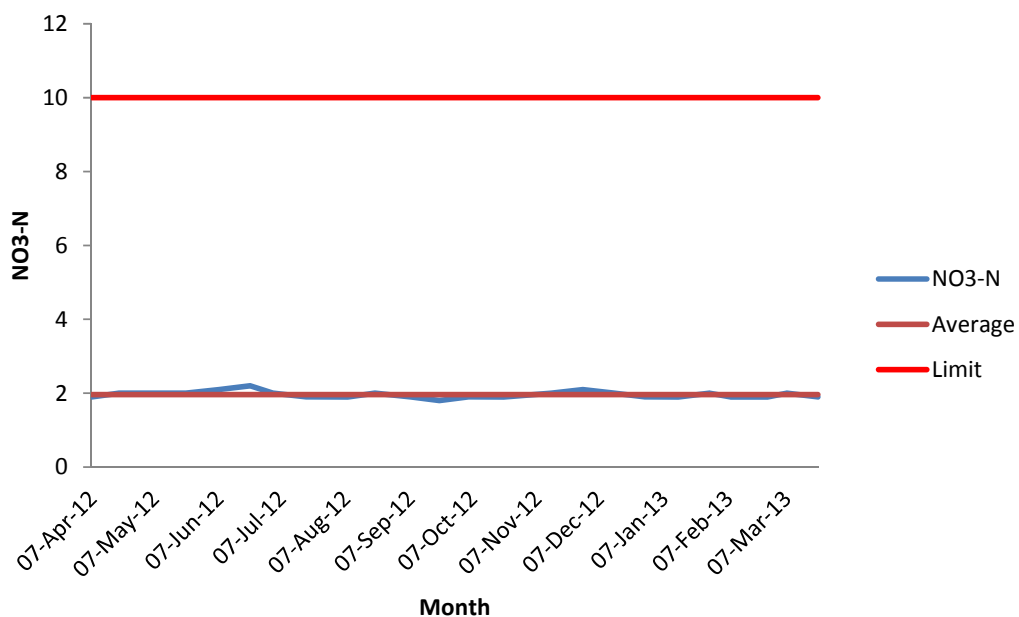
Graph for TSS of outlet of sedimentation pond of Belpahar OCP of Lakhanpur Area



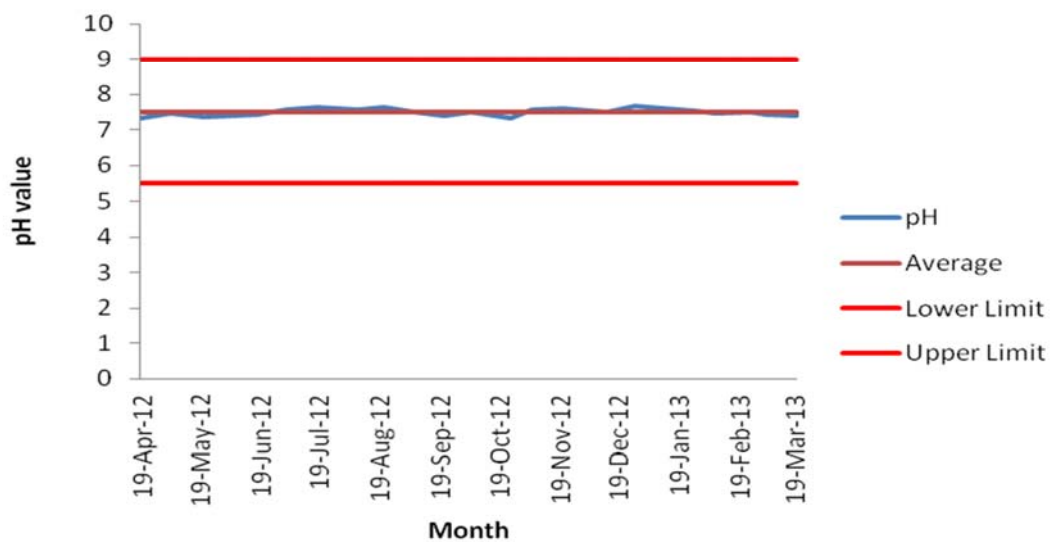
Graph for COD of outlet of sedimentation pond of Belpahar OCP of Lakhanpur Area



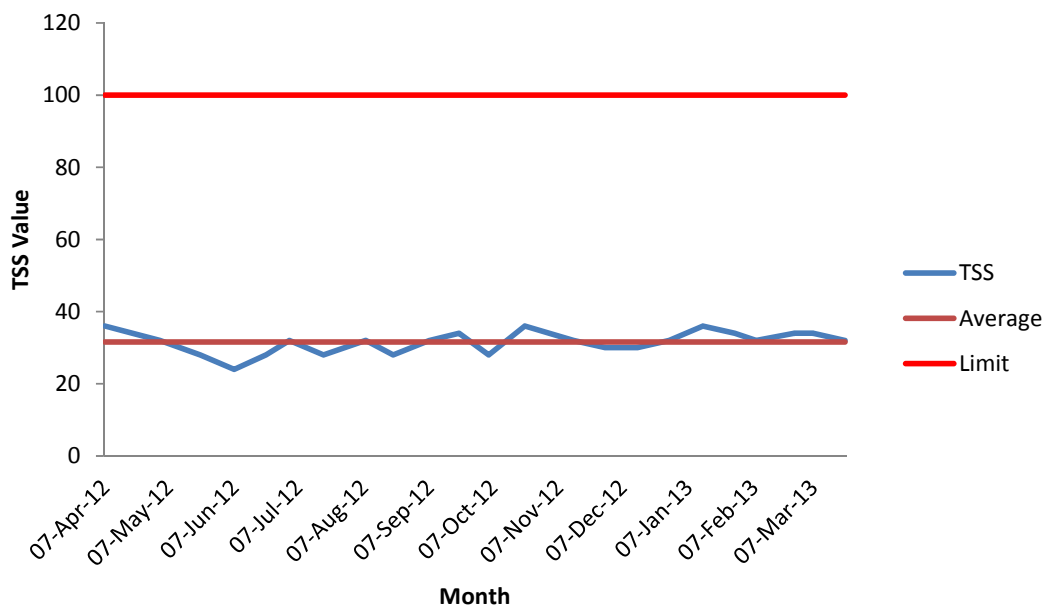
Graph for NO3-N of outlet of sedimentation pond of Belpahar OCP of Lakhanpur Area



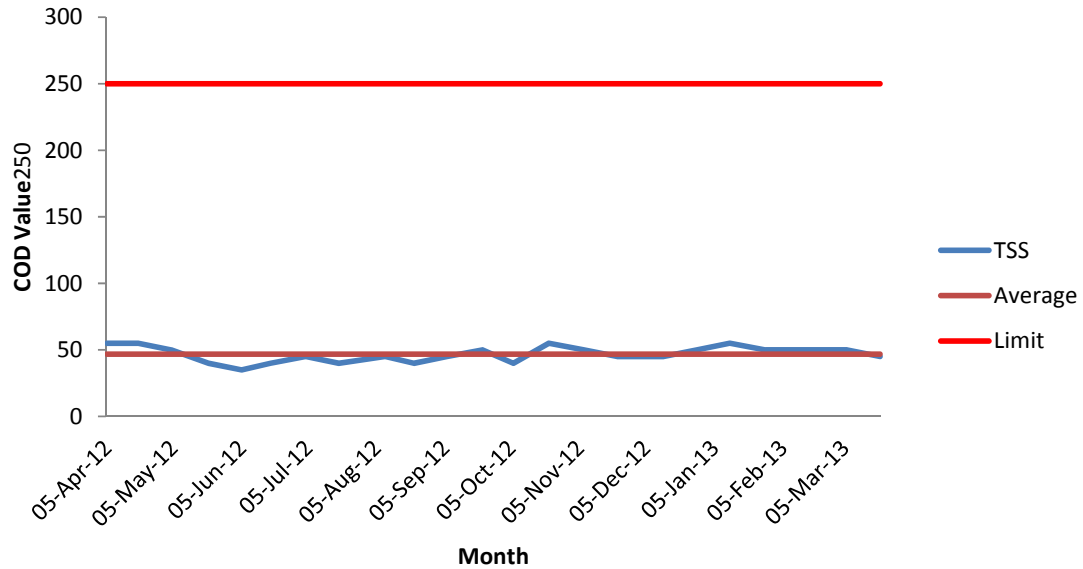
Graph for pH of outlet of sedimentation pond of Lakhanpur OCP of Lakhanpur Area



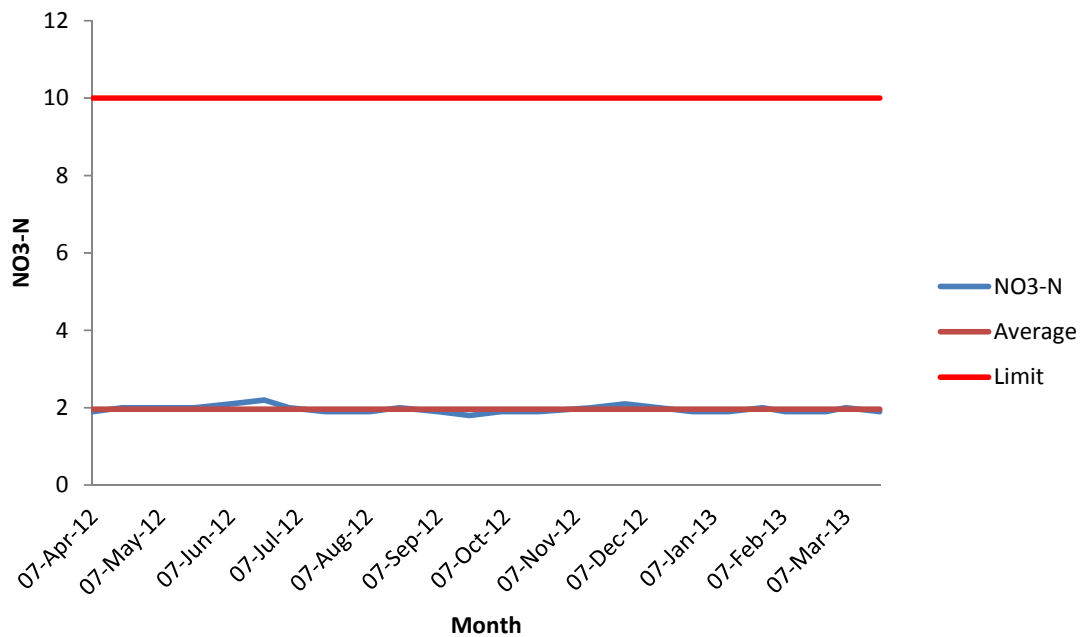
Graph for TSS of Outlet of Sedimentation pond of Lakhanpur OCP of Lakhanpur Area



Graph for COD of outlet of sedimentation pond of Lakhanpur OCP of Lakhanpur Area



Graph for NO₃-N of outlet of sedimentation pond of Lakhanpur OCP of Lakhanpur Area



Yearly Effluent Data

Area: Lakhanpur

Area	<i>Lakanpur</i>	<i>Lakhanpur</i>
Project	<i>Belpahar OCP</i>	<i>Lakhanpur OCP</i>
Date of sampling	27-Nov-12	27-Nov-12
Name of the station	Outlet from Sedimentation Pond	Outlet from Sedimentation Pond
Colour	Acceptable	Acceptable
Odour	Agreeable	Agreeable
Temperature, °C	17.3	17.5
Amonical Nitrogen	0.20	0.30
TKN	2.10	2.35
BOD	11	8
Arsenic	<0.01	<0.01
Mercury	-	-
Lead	<0.05	<0.05
Cadmium	<0.01	<0.01
Hexavalent chromium	<0.01	<0.01
Total chromium	<0.1	<0.1
Copper	<0.02	<0.02
Zinc	0.14	0.14
Selenium	<0.01	<0.01
Nickel	<0.1	<0.1
Fluoride	0.36	0.32
Dissolved phosphate	0.16	0.12
Sulphide	0.005	0.003
Phenolics	<0.001	<0.001
Manganese	<0.05	<0.05
Iron	0.16	0.11

TABLE--
NOISE LEVEL MONITORING DATA

AREA : **Lakhanpur**

PROJECT : **Belpahar OCP**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
11-Apr-12	Bandabahal Township / BIT	53.8	47.6
28-Apr-12	Bandabahal Township / BIT	52.5	46.7
08-May-12	Bandabahal Township / BIT	53.5	47.4
30-May-12	Bandabahal Township / BIT	52.5	46.4
08-Jun-12	Bandabahal Township / BIT	53.7	48.5
29-Jun-12	Bandabahal Township / BIT	52.6	47.7
07-Jul-12	Bandabahal Township / BIT	53.2	46.1
30-Jul-12	Bandabahal Township / BIT	52.3	47.4
11-Aug-12	Bandabahal Township / BIT	53.5	48.9
27-Aug-12	Bandabahal Township / BIT	52.1	47.2
11-Sep-12	Bandabahal Township / BIT	51.7	48.3
28-Sep-12	Bandabahal Township / BIT	52.8	47.8
12-Oct-12	Bandabahal Township / BIT	53.1	48.5
30-Oct-12	Bandabahal Township / BIT	52.4	47.6
09-Nov-12	Bandabahal Township / BIT	53.4	48.6
26-Nov-12	Bandabahal Township / BIT	52.3	47.6
13-Dec-12	Bandabahal Township / BIT	51.8	46.3
29-Dec-12	Bandabahal Township / BIT	52.3	47.8
14-Jan-13	Bandabahal Township / BIT	51.9	48.6
30-Jan-13	Bandabahal Township / BIT	52.4	49.0
11-Feb-13	Bandabahal Township / BIT	54.1	49.7
27-Feb-13	Bandabahal Township / BIT	53.1	48.6
13-Mar-13	Bandabahal Township / BIT	52.6	47.4
29-Mar-13	Bandabahal Township / BIT	53.4	48.2
29-Mar-13	Bandabahal Township / BIT	53.4	48.2
11-Apr-12	Near MDTP	53.4	49.0
28-Apr-12	Near MDTP	52.6	48.5
08-May-12	Near MDTP	54.3	49.0
30-May-12	Near MDTP	53.8	48.7
08-Jun-12	Near MDTP	54.5	49.0

29-Jun-12	Near MDTP	53.4	48.9
07-Jul-12	Near MDTP	52.5	47.9
30-Jul-12	Near MDTP	51.1	46.5
11-Aug-12	Near MDTP	53.6	47.5
27-Aug-12	Near MDTP	52.3	46.7
11-Sep-12	Near MDTP	51.8	47.5
28-Sep-12	Near MDTP	52.3	48.1
12-Oct-12	Near MDTP	53.3	49.8
30-Oct-12	Near MDTP	54.2	48.0
09-Nov-12	Near MDTP	53.6	47.9
26-Nov-12	Near MDTP	54.1	48.8
13-Dec-12	Near MDTP	53.3	47.4
29-Dec-12	Near MDTP	54.5	46.9
14-Jan-13	Near MDTP	52.6	45.9
30-Jan-13	Near MDTP	53.3	46.6
11-Feb-13	Near MDTP	53.4	47.9
27-Feb-13	Near MDTP	52.2	48.3
13-Mar-13	Near MDTP	51.9	47.5
29-Mar-13	Near MDTP	52.8	48.1
29-Mar-13	Near MDTP	52.8	48.1
11-Apr-12	Near Quarry No.5	55.4	50.2
28-Apr-12	Near Quarry No.5	54.5	51.2
08-May-12	Near Quarry No.5	55.1	52.3
30-May-12	Near Quarry No.5	54.2	51.0
08-Jun-12	Near Quarry No.5	56.3	50.4
29-Jun-12	Near Quarry No.5	55.4	51.1
07-Jul-12	Near Quarry No.5	54.5	50.9
30-Jul-12	Near Quarry No.5	53.2	50.1
11-Aug-12	Near Quarry No.5	52.1	50.8
27-Aug-12	Near Quarry No.5	53.4	50.2
11-Sep-12	Near Quarry No.5	54.1	51.1
28-Sep-12	Near Quarry No.5	53.2	51.7
12-Oct-12	Near Quarry No.5	54.2	50.9
30-Oct-12	Near Quarry No.5	53.5	51.2
09-Nov-12	Near Quarry No.5	54.5	52.3
28-Nov-12	Near Quarry No.5	53.4	50.1
13-Dec-12	Near Quarry No.5	54.2	50.4

29-Dec-12	Near Quarry No.5	55.8	51.3
14-Jan-13	Near Quarry No.5	54.5	52.1
30-Jan-13	Near Quarry No.5	53.1	49.2
11-Feb-13	Near Quarry No.5	53.9	50.1
27-Feb-13	Near Quarry No.5	52.3	50.1
13-Mar-13	Near Quarry No.5	51.2	49.7
29-Mar-13	Near Quarry No.5	50.9	48.5
29-Mar-13	Near Quarry No.5	50.9	48.5

TABLE--
NOISE LEVEL MONITORING DATA

AREA : *Lakhanpur*

PROJECT : *Lakhanpur OCP*

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
08-May-12	Khairakuni Village	53.2	44.8
30-May-12	Khairakuni Village	52.3	43.8
07-Jul-12	Khairakuni Village	51.2	42.3
30-Jul-12	Khairakuni Village	50.2	43.2
11-Sep-12	Khairakuni Village	51.6	44.1
28-Sep-12	Khairakuni Village	50.1	43.2
12-Oct-12	Khairakuni Village	51.4	44.3
30-Oct-12	Khairakuni Village	50.8	43.2
09-Nov-12	Khairakuni Village	51.4	44.5
26-Nov-12	Khairakuni Village	52.8	43.9
13-Dec-12	Khairakuni Village	50.6	44.1
14-Jan-13	Khairakuni Village	52.3	43.6
30-Jan-13	Khairakuni Village	53.6	44.7
11-Feb-13	Khairakuni Village	53.7	44.1
27-Feb-13	Khairakuni Village	52.1	43.2
11-Apr-12	Near OB dump No.1	63.2	57.5
28-Apr-12	Near OB dump No.1	62.1	55.4
08-May-12	Near OB dump No.1	63.2	56.5
30-May-12	Near OB dump No.1	62.3	55.2
08-Jun-12	Near OB dump No.1	63.5	56.7
29-Jun-12	Near OB dump No.1	62.8	55.3
07-Jul-12	Near OB dump No.1	61.1	54.5
30-Jul-12	Near OB dump No.1	60.3	53.4
11-Aug-12	Near OB dump No.1	61.3	55.7
27-Aug-12	Near OB dump No.1	52.3	44.7
11-Sep-12	Near OB dump No.1	53.7	45.3
28-Sep-12	Near OB dump No.1	52.8	47.6
12-Oct-12	Near OB dump No.1	53.5	48.1
30-Oct-12	Near OB dump No.1	52.3	47.5
09-Nov-12	Near OB dump No.1	51.7	46.5

26-Nov-12	Near OB dump No.1	50.3	45.7
13-Dec-12	Near OB dump No.1	52.4	46.8
29-Dec-12	Near OB dump No.1	53.2	47.6
14-Jan-13	Near OB dump No.1	52.3	46.6
30-Jan-13	Near OB dump No.1	54.1	47.6
11-Feb-13	Near OB dump No.1	52.2	47.5
27-Feb-13	Near OB dump No.1	51.5	48.7
13-Mar-13	Near OB dump No.1	50.5	47.6
29-Mar-13	Near OB dump No.1	51.2	45.9
29-Mar-13	Near OB dump No.1	51.2	45.9
27-Aug-12	Quarry No.3	51.4	46.5
11-Sep-12	Quarry No.3	52.3	47.6
28-Sep-12	Quarry No.3	51.6	48.3
12-Oct-12	Quarry No.3	52.8	49.7
30-Oct-12	Quarry No.3	51.8	48.6
09-Nov-12	Quarry No.3	52.4	47.8
26-Nov-12	Quarry No.3	51.7	46.5
13-Dec-12	Quarry No.3	52.5	47.8
29-Dec-12	Quarry No.3	53.3	48.1
14-Jan-13	Quarry No.3	54.4	47.8
30-Jan-13	Quarry No.3	53.9	48.2
11-Feb-13	Quarry No.3	51.6	48.4
27-Feb-13	Quarry No.3	52.1	47.2
13-Mar-13	Quarry No.3	51.5	46.3
29-Mar-13	Quarry No.3	52.4	47.3
29-Mar-13	Quarry No.3	52.4	47.3
11-Apr-12	Tingismal Village	52.3	44.5
28-Apr-12	Tingismal Village	51.2	43.8
08-May-12	Tingismal Village	53.3	44.6
30-May-12	Tingismal Village	52.3	43.6
08-Jun-12	Tingismal Village	53.8	44.5
29-Jun-12	Tingismal Village	52.1	43.2
07-Jul-12	Tingismal Village	52.4	42.5
30-Jul-12	Tingismal Village	51.8	43.5
11-Aug-12	Tingismal Village	50.8	44.6
27-Aug-12	Tingismal Village	51.2	43.5
11-Sep-12	Tingismal Village	50.4	44.2

28-Sep-12	Tingismal Village	51.2	43.6
12-Oct-12	Tingismal Village	52.1	44.4
30-Oct-12	Tingismal Village	51.8	43.1
09-Nov-12	Tingismal Village	52.3	44.6
26-Nov-12	Tingismal Village	51.4	43.5
13-Dec-12	Tingismal Village	50.3	42.7
29-Dec-12	Tingismal Village	51.2	43.8
14-Jan-13	Tingismal Village	50.2	44.1
30-Jan-13	Tingismal Village	51.2	43.9
11-Feb-13	Tingismal Village	52.6	43.7
27-Feb-13	Tingismal Village	51.5	44.1
13-Mar-13	Tingismal Village	50.2	43.5
29-Mar-13	Tingismal Village	51.4	44.1
29-Mar-13	Tingismal Village	51.4	44.1
11-Apr-12	Towards NW Side of Quarry No.1	56.7	49.8
28-Apr-12	Towards NW Side of Quarry No.1	55.3	48.4
08-May-12	Towards NW Side of Quarry No.1	54.8	49.8
30-May-12	Towards NW Side of Quarry No.1	53.9	48.6
08-Jun-12	Towards NW Side of Quarry No.1	55.1	51.4
29-Jun-12	Towards NW Side of Quarry No.1	54.7	50.3
07-Jul-12	Towards NW Side of Quarry No.1	53.3	51.8
30-Jul-12	Towards NW Side of Quarry No.1	52.3	50.5
11-Aug-12	Towards NW Side of Quarry No.1	53.3	50.6
27-Aug-12	Towards NW Side of Quarry No.1	54.3	48.6
11-Sep-12	Towards NW Side of Quarry No.1	55.1	49.8
28-Sep-12	Towards NW Side of Quarry No.1	54.5	48.4
12-Oct-12	Towards NW Side of Quarry No.1	55.3	49.8
30-Oct-12	Towards NW Side of Quarry No.1	54.4	47.9
09-Nov-12	Towards NW Side of Quarry No.1	53.6	46.5
26-Nov-12	Towards NW Side of Quarry No.1	54.2	45.8
13-Dec-12	Towards NW Side of Quarry No.1	53.2	46.7
29-Dec-12	Towards NW Side of Quarry No.1	54.2	47.8
14-Jan-13	Towards NW Side of Quarry No.1	53.5	46.7
30-Jan-13	Towards NW Side of Quarry No.1	54.3	48.1
11-Feb-13	Towards NW Side of Quarry No.1	54.3	49.7
27-Feb-13	Towards NW Side of Quarry No.1	53.4	48.5
13-Mar-13	Towards NW Side of Quarry No.1	52.9	47.6

29-Mar-13	Towards NW Side of Quarry No.1	53.3	48.1
11-Apr-12	Ubuda Village	53.2	46.8
28-Apr-12	Ubuda Village	52.3	45.4
08-Jun-12	Ubuda Village	51.9	44.5
29-Jun-12	Ubuda Village	50.7	43.3
11-Aug-12	Ubuda Village	51.3	44.2
27-Aug-12	Ubuda Village	50.8	43.4
29-Dec-12	Ubuda Village	51.6	44.3
13-Mar-13	Ubuda Village	51.5	44.1
29-Mar-13	Ubuda Village	52.2	43.5
29-Mar-13	Ubuda Village	52.2	43.5

TABLE--
NOISE LEVEL MONITORING DATA

AREA : *Lakhanpur*

PROJECT : *Lilari OCP*

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
11-Apr-12	Near Magazine House	56.3	50.2
28-Apr-12	Near Magazine House	55.3	51.2
08-May-12	Near Magazine House	56.7	52.6
30-May-12	Near Magazine House	55.5	51.2
08-Jun-12	Near Magazine House	56.8	53.7
29-Jun-12	Near Magazine House	55.2	50.8
07-Jul-12	Near Magazine House	54.3	50.1
30-Jul-12	Near Magazine House	53.4	51.8
11-Aug-12	Near Magazine House	54.5	52.1
27-Aug-12	Near Magazine House	50.8	46.7
11-Sep-12	Near Magazine House	51.8	47.5
28-Sep-12	Near Magazine House	52.3	46.7
12-Oct-12	Near Magazine House	53.1	47.0
30-Oct-12	Near Magazine House	52.3	46.1
09-Nov-12	Near Magazine House	51.4	45.9
26-Nov-12	Near Magazine House	52.4	46.7
13-Dec-12	Near Magazine House	51.2	45.9
29-Dec-12	Near Magazine House	52.3	46.7
14-Jan-13	Near Magazine House	53.8	47.6
30-Jan-13	Near Magazine House	52.5	48.3
11-Feb-13	Near Magazine House	53.5	50.1
27-Feb-13	Near Magazine House	52.1	49.0
13-Mar-13	Near Magazine House	51.4	48.7
29-Mar-13	Near Magazine House	52.2	44.0
29-Mar-13	Near Magazine House	52.2	44.0
11-Apr-12	Near Old Coal Stock Yard	53.1	48.5
28-Apr-12	Near Old Coal Stock Yard	52.1	47.0
08-May-12	Near Old Coal Stock Yard	53.5	48.9
30-May-12	Near Old Coal Stock Yard	52.1	47.6
08-Jun-12	Near Old Coal Stock Yard	54.5	49.4

29-Jun-12	Near Old Coal Stock Yard	53.3	48.5
07-Jul-12	Near Old Coal Stock Yard	52.2	47.6
30-Jul-12	Near Old Coal Stock Yard	51.1	46.7
11-Aug-12	Near Old Coal Stock Yard	52.7	47.5
27-Aug-12	Near Old Coal Stock Yard	61.6	54.5
11-Sep-12	Near Old Coal Stock Yard	60.5	53.4
28-Sep-12	Near Old Coal Stock Yard	61.2	54.3
12-Oct-12	Near Old Coal Stock Yard	60.9	55.8
30-Oct-12	Near Old Coal Stock Yard	61.1	56.3
09-Nov-12	Near Old Coal Stock Yard	56.7	51.4
26-Nov-12	Near Old Coal Stock Yard	57.2	50.1
13-Dec-12	Near Old Coal Stock Yard	60.2	53.1
29-Dec-12	Near Old Coal Stock Yard	61.1	54.5
14-Jan-13	Near Old Coal Stock Yard	60.1	53.7
30-Jan-13	Near Old Coal Stock Yard	59.8	49.8
11-Feb-13	Near Old Coal Stock Yard	54.3	48.4
27-Feb-13	Near Old Coal Stock Yard	53.6	48.5
13-Mar-13	Near Old Coal Stock Yard	52.3	47.5
29-Mar-13	Near Old Coal Stock Yard	51.6	45.5
29-Mar-13	Near Old Coal Stock Yard	51.6	45.5

TABLE--
WELL WATER LEVEL MONITORING DATA

Area : Lakhanpur

<i>Date of sampling</i>	<i>Project</i>	<i>Name of the Station</i>	<i>Depth from GL (in m)</i>
12-Apr-12	Lilari OCP	Ubuda Village Well	6.02.
12-Apr-12	Lakhanpur OCP	Ubuda Village Well	6.02
12-Apr-12	Belpahar OCP	Ubuda Village Well	6.02
12-Apr-12	Belpahar OCP	Jurabaga Village Well	3.86
12-Apr-12	Lakhanpur OCP	Jurabaga Village Well	3.86
12-Apr-12	Belpahar OCP	Darlipali Village Well	4.78
12-Apr-12	Lakhanpur OCP	Darlipali Village Well	4.78
12-Apr-12	Lilari OCP	Jurabaga Village Well	3.86
12-Apr-12	Lilari OCP	Darlipali Village Well	4.78
14-Aug-12	Belpahar OCP	Jurabaga Village Well	3.23
14-Aug-12	Lilari OCP	Jurabaga Village Well	3.23
14-Aug-12	Lakhanpur OCP	Darlipali Village Well	3.78
14-Aug-12	Lilari OCP	Darlipali Village Well	3.78
14-Aug-12	Lakhanpur OCP	Jurabaga Village Well	3.23
14-Aug-12	Lakhanpur OCP	Ubuda Village Well	5.33
14-Aug-12	Lilari OCP	Ubuda Village Well	5.33
14-Aug-12	Belpahar OCP	Ubuda Village Well	5.33
14-Aug-12	Belpahar OCP	Darlipali Village Well	3.78
12-Nov-12	Belpahar OCP	Ubuda Village Well	4.60
12-Nov-12	Lakhanpur OCP	Darlipali Village Well	3.89
12-Nov-12	Lilari OCP	Jurabaga Village Well	3.29
12-Nov-12	Lakhanpur OCP	Ubuda Village Well	4.60

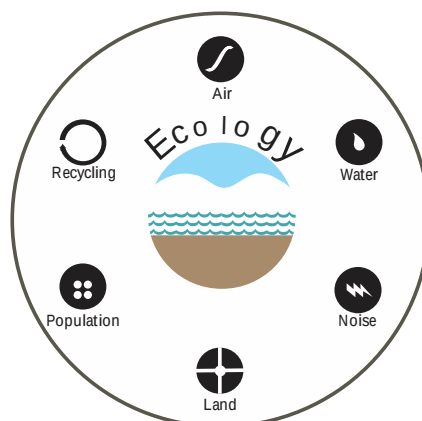
12-Nov-12	Lilari OCP	Ubuda Village Well	4.60
12-Nov-12	Belpahar OCP	Jurabaga Village Well	3.29
12-Nov-12	Lakhanpur OCP	Jurabaga Village Well	3.29
12-Nov-12	Belpahar OCP	Darlipali Village Well	3.89
12-Nov-12	Lilari OCP	Darlipali Village Well	3.89
10-Jan-13	Lakhanpur OCP	Darlipali Village Well	3.23
10-Jan-13	Lakhanpur OCP	Ubuda Village Well	3.86
10-Jan-13	Lilari OCP	Ubuda Village Well	3.86
10-Jan-13	Belpahar OCP	Ubuda Village Well	3.86
10-Jan-13	Belpahar OCP	Jurabaga Village Well	3.12
10-Jan-13	Lakhanpur OCP	Jurabaga Village Well	3.12
10-Jan-13	Belpahar OCP	Darlipali Village Well	3.23
10-Jan-13	Lilari OCP	Darlipali Village Well	3.23
10-Jan-13	Lilari OCP	Jurabaga Village Well	3.12



**Annual Compiled Monitoring Report
Of
Basundhara Area
For
2012-2013
(Basundhara (W) OCP & Kulda OCP)**

Ib Valley Coalfields

Mahanadi Coalfields Limited



Prepared by:



Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

Regional Institute-VII, OSHB Building, Bhubaneswar – 751 001 (Orissa)
[Assistance from Environment Division, CMPDI(HQs), Ranchi]

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CHAPTER-I

INTRODUCTION

1.1 Brief Description of the Mine

Basundhara Area, Mahanadi Coalfields Limited is located in Ib- Valley Coalfield, Sundargarh district, Orissa. This area has two OCP under its administrative control. The OCPs are Kulda OCP and Basundhara (W) OCP.

Kulda OCP

Kulda OCP is situated between latitudes $22^{\circ} 01' 02''$ & $22^{\circ} 03' 03''$ N and longitudes $83^{\circ} 43' 28''$ and $83^{\circ} 45' 35''$ E. The block is approachable from sundargarh town, lying at a distance of 40 km by road, the nearest railway station is himgir on Bombay Howrah mail line. It lies at a distance of 36 km by road.

The elevation of the area varies from 245m to 320 m.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

Basundhara OCP

Basundhara OCP is situated between latitudes $22^{\circ} 03' 32''$ & $22^{\circ} 04' 11''$ N and longitudes $83^{\circ} 42' 18''$ and $83^{\circ} 44' 08''$ E. The block is approachable from sundargarh town, lying at a distance of 48 km by road, the nearest railway station is Jharsuguda in south eastern side. It lies at a distance of 82 km by road.

The elevation of the area varies from 262m to 288 m. The topography of area is generally flat with general slope towards south.

The mean temperature ranges from 8° C (winter season) to 44.7° C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 1.5 to 7.0 kmph during the year against 1.1 to 8.3 kmph at 17:30 hr.

1.2 Frequency of Environmental Monitoring

(i) Ambient air quality monitoring

To assess the pollution level in ambient air of the area located in and around the coal mines/projects and also determine the efficacy of mitigation measures, regular monitoring of the following parameters is being carried out.

Respirable particulate matter (RPM)	:	One sample per fortnight
Suspended particulate matter (SPM)	:	
Sulphur dioxide (SO_2)	:	
Nitrogen oxides (NO_x)	:	

(ii) Drinking water monitoring : Every month.

(iii) **Effluent quality monitoring**

1/4/5 parameters : once in a fortnight/monthly i.e July, Aug. & Sept.

21 parameters : Once in a year

(iv) Well water level monitoring : Quarterly

(v) Noise level monitoring : Once in a fortnight

1.3 Environmental Quality Monitoring Stations

The details of various environmental quality monitoring stations are given in are given below:

- **Air quality monitoring stations**

Sl.No. Name of Stations

Kulda OCP

1. Baripali village
2. Karlikachhar village
3. Tikilipara village
4. Siarmal village
5. Near Kulda P.O.

- **Effluent quality monitoring station**

1. Final discharge point of mine
2. Inlet to settling pond
3. Outlet to settling pond
4. Final discharge point of mine

- **Well water level monitoring station**

1. Well at balinga
2. Well at kulda

-

Noise level monitoring stations

Sl.No. Name of Stations

1. Near P.O.
2. Karlikachhar village

- **Air quality monitoring stations**

Sl.No. Name of Stations

Basundhara(W) OCP

1. Kulapara hamlet of Gopalpur village
2. Excavation work-shop

- **Drinking water quality monitoring stations**

Sl.No. Name of Stations

1. Basundhra colony tap water
2. Water at intake well at Basundhra nullah
3. Treated water of treatment plant, Basundhara

- **Well water level monitoring stations**

Sl.No. Name of Stations

1. Tiklipada village well
2. Sardega village well
3. Well at Bankibahal

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Kulapara hamlet of Gopalpur village
2. Excavation workshop

CHAPTER-II

AIR ENVIRONMENT

2.1 Details of Air Quality Monitoring Stations

Details are given in Table-1.

Table-1

**Details of Air Quality Monitoring Stations
along with Sources of Pollution**

Sl.No.	Location	Sources of Pollution
KuldaOCP		
1	Baripali village	Traffic and mining activities, siding 1 & 2.
2	Karlikachhar village	Domestic and mining activities, CHP.
3	Tikilipara village	Traffic and mining activities.
4	Siarmal village	Domestic and mining activities.
5	Near kulda P.O.	Traffic and mining activities.
Basundhara (W) OCP		
1.	Kulapara hamlet of Gopalpur village	Nearby mining activities.
2.	Excavation work-shop	Nearby mining activities.

2.2 Methodology and Instruments used for Air Quality Analysis

These are given in Table-2.

Table-2

Methodology and Instruments used for Air Quality Analysis

Sl.No.	Parameters	Method	Instruments
1	SPM and RPM	IS:5182 (Part-IV) (Gravimetric method)	High volume samplers, Respirable dust samplers & electronic balance, oven, etc.
2	SO ₂	IS:5182 (Part-II) (Sodium tetrachloro-mercurate method, also known as improved West and Gaeke Method) (Photometric method)	Milton-Roy Spectrophotometer.
3	NO _x	IS:5182 (Part-VI) (Jacob & Hoccheiser	-do-

Sl.No.	Parameters	Method	Instruments
		Modified Method) (Photometric method)	

2.3 Results

The results of analyses of air samples are given in Tables attached

2.4 Discussions

Examination of the levels of RPM, SPM, SO₂ and NO_x for all the air stations in Lingaraj Area reveals the following:

- In coal mining area like Excavation work-shop, the levels of RPM, SPM, SO₂ and NO_x are observed to be within the limits of the Standards for Coal Mines, barring a few aberrated value.
- In residential areas, all the values are found to be within the limits of the National Ambient Air Quality Standards (NAAQS) notified under Schedule-VII.

2.5 Control Measures

The following mitigatory measures are suggested to maintain the air quality within the stipulated standards:

- Water sprinkling on haul roads, coal loading and unloading sites at regular and frequent intervals by adding appropriate wetting agents.
- Provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers at haul roads and siding.
- Cleaning spillage from roads.
- Practice for covered transportation.
- Regular maintenance of all HEMMs and other machinery.
- Provision of gas filters for exhaust fumes.
- No overloading of trucks/dumpers.
- Application of innocuous chemical binders on haul roads.
- Development of thick greenbelts around the mines, infrastructure sites and residential area besides plantation on both sides of the roads on the surface using plant species having leaves of high efficacy dust catching nature.
- Drills with well-designed dust extractors/arrestors.
- Provision of dust extraction system for crusher house.
- Suppression of coal dust at CHP by provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers.

CHAPTER-III

WATER ENVIRONMENT

3.1 Methodology and Instruments used for water & effluent analysis

Details are given in Table-4.

Table-4

Methodology & Instruments used for Water and Effluent Analysis

Sl.No.	Parameters	Method/Instruments
1	PH	Electrometric/pH meter
2	Turbidity	Nephelometric/Nepheloturbidity meter
3	Total suspended solids, total dissolved solids, oil & grease and mineral oil	Gravimetric/oven, electronic balance
4	BOD	BOD test and titration/BOD incubator, pipette, burette, etc.
5	COD	Reactor digestion and titration/reactor digester
6	Coliform	MPN test/LTEK MPN kit.
7	Calcium, chloride, hardness, alkalinity	Titrimetric/pipette, burette, etc.
8	Cadmium, copper, iron, lead, manganese, mercury, nickel, total chromium & zinc	Selective absorption/atomic absorption spectro-photometer.
9	Ammonical nitrogen, arsenic, colour, dissolved phosphate, fluoride, hexavalent chromium, nitrate nitrogen phenolics, selenium, sulphate, sulphide, total residual chlorine, total Kjeldahl nitrogen & boron.	Photometric/DR 2000

3.2 Results

The results of analysis of water samples (Drinking) is given in Tables attached .
Ground water level monitoring of various dug-wells are given in Tables attached .

3.3 Discussions

(a) Drinking water sample

The examination of analytical results of drinking water sample reveals the following :

- All physico-chemical parameters are well within the limits of the Indian Drinking Water Standard in the drinking water sample.

CHAPTER-IV

NOISE ENVIRONMENT

4.1 Methodology and Instruments used for Noise Level Measurement

Noise is measured in a weighted sound level i.e. dB(A) using a noise level meter once in day time (6:00 AM-10:00 PM) and once in night time (10:00 PM to 6:00 AM) for one day in each quarter from each station.

4.2 Results

The fortnightly noise level measurements for different stations are given in Tables attached

4.3 Discussions

The noise level monitoring data reveal the following:

- The noise level monitoring data of various stations are within the limits of the prescribed noise level standards.

4.4 Control Measures

The following control measures are recommended to maintain the noise levels within the permissible limits of the prescribed standards:

- Creation of thick greenbelts around the mines, infrastructure sites and residential colony besides avenue plantation on both sides of the roads on the surface using high noise attenuating plant species.
- Proper designing of plant and machinery by providing in-built mechanisms like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- HEMMs with sound proof cabin.
- Chute linings in CHP
- Personal protective devices to all persons working in high noise areas.

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

Project : **Basundhara (W) OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO2</i>	<i>NOx</i>	<i>Remarks</i>
05-Apr-12	Excavation Workshop	347	130	32	38	East to west hot & sunny
26-Apr-12	Excavation Workshop	374	135	36	44	West to east hot & sunny
03-May-12	Excavation Workshop	315	126	36	44	East to west hot & sunny
24-May-12	Excavation Workshop	344	132	38	44	West to east hot & sunny
04-Jun-12	Excavation Workshop	302	127	36	44	East to west hot & sunny
19-Jun-12	Excavation Workshop	231	95	33	38	West to east sunny & cloudy evening rain fall
04-Jul-12	Excavation Workshop	276	112	32	40	East to west hot & sunny
19-Jul-12	Excavation Workshop	130	62	22	27	East to west, cloudy & rainfall
10-Aug-12	Excavation Work-shop	115	59	17	25	West to east ,cloudy & heavy rainfall
27-Aug-12	Excavation Work-shop	147	83	30	34	East to west ,cloudy & heavy rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

13-Sep-12	Excavation Work-shop	192	91	24	29	East to west sunny & cloudy evening rainfall
29-Sep-12	Excavation Work-shop	221	94	31	36	East to west sunny & cloudy
03-Oct-12	Excavation Work-shop	258	92	32	37	East to west & sunny
18-Oct-12	Excavation Work-shop	255	117	27	35	East to west & sunny
01-Nov-12	Excavation Work-shop	264	110	29	37	East to west & sunny
16-Nov-12	Excavation Work-shop	278	125	25	31	East to west & sunny
04-Dec-12	Excavation Work-shop	248	115	23	27	East to west & sunny
19-Dec-12	Excavation Work-shop	258	127	25	28	East to west & sunny
03-Jan-13	Excavation Work-shop	223	114	21	25	East to west & sunny
18-Jan-13	Excavation Work-shop	276	113	25	29	East to west & sunny
04-Feb-13	Excavation Work-shop	286	127	26	29	East to west & sunny
18-Feb-13	Excavation Work-shop	297	136	28	31	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

04-Mar-13	Excavation Work-shop	315	140	27	31	East to west & sunny
19-Mar-13	Excavation Work-shop	319	129	25	29	East to west hot & sunny
06-Apr-12	Kulapara Hamlet of Gopalpur Village	216	103	24	30	East to west hot & sunny
27-Apr-12	Kulapara Hamlet of Gopalpur Village	240	103	24	30	West to east hot & sunny
04-May-12	Kulapara Hamlet of Gopalpur Village	228	108	26	32	East to west hot & sunny
25-May-12	Kulapara Hamlet of Gopalpur Village	266	109	30	35	West to east hot & sunny
05-Jun-12	Kulapara Hamlet of Gopalpur Village	210	82	24	29	East to west hot & sunny
20-Jun-12	Kulapara Hamlet of Gopalpur Village	140	65	20	24	West to east sunny & cloudy evening rain fall
05-Jul-12	Kulapara Hamlet of Gopalpur Village	216	76	26	30	East to west hot & sunny
20-Jul-12	Kulapara Hamlet of Gopalpur Village	84	55	18	21	East to west, cloudy & rainfall
13-Aug-12	Kulapara Hamlet of Gopalpur Village	135	65	19	28	West to east ,cloudy & heavy rainfall
28-Aug-12	Kulapara Hamlet of Gopalpur Village	128	71	27	32	East to west ,cloudy & heavy rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

14-Sep-12	Kulapara Hamlet of Gopalpur Village	168	84	31	36	East to west sunny & cloudy evening rainfall
28-Sep-12	Kulapara Hamlet of Gopalpur Village	199	89	35	40	East to west sunny & cloudy
04-Oct-12	Kulapara Hamlet of Gopalpur Village	234	87	32	36	East to west & sunny
19-Oct-12	Kulapara Hamlet of Gopalpur Village	175	91	25	32	East to west & sunny
02-Nov-12	Kulapara Hamlet of Gopalpur Village	170	99	24	30	East to west & sunny
17-Nov-12	Kulapara Hamlet of Gopalpur Village	159	92	20	26	East to west & sunny
05-Dec-12	Kulapara Hamlet of Gopalpur Village	142	96	21	24	East to west & sunny
20-Dec-12	Kulapara Hamlet of Gopalpur Village	157	104	26	29	East to west & sunny
04-Jan-13	Kulapara Hamlet of Gopalpur Village	164	101	23	26	East to west & sunny
19-Jan-13	Kulapara Hamlet of Gopalpur Village	176	94	20	23	East to west & sunny
05-Feb-13	Kulapara Hamlet of Gopalpur Village	184	97	22	25	East to west & sunny
19-Feb-13	Kulapara Hamlet of Gopalpur Village	195	107	23	26	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

05-Mar-13	Kulapara Hamlet of Gopalpur Village	199	112	23	27	East to west & sunny
20-Mar-13	Kulapara Hamlet of Gopalpur Village	210	119	23	26	East to west hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

Project : **Kulda OCP** (conc. in $\mu\text{g}/\text{cu.m.}$)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
05-Apr-12	Barapali Village	191	86	22	28	East to west hot & sunny
26-Apr-12	Barapali Village	260	98	24	30	West to east hot & sunny
03-May-12	Barapali Village	257	82	28	32	East to west hot & sunny
24-May-12	Barapali Village	228	74	26	31	West to east hot & sunny
04-Jun-12	Barapali Village	199	69	24	28	East to west hot & sunny
21-Jun-12	Barapali Village	172	60	21	25	West to east sunny & cloudy evening rain fall
04-Jul-12	Barapali Village	176	75	24	28	East to west hot & sunny
19-Jul-12	Barapali Village	102	54	17	20	East to west, cloudy & rainfall
10-Aug-12	Barapali Village	113	76	28	32	West to east ,cloudy & heavy rainfall
27-Aug-12	Barapali Village	97	66	15	24	East to west ,cloudy & heavy rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

13-Sep-12	Barapali Village	189	94	32	39	East to west sunny & cloudy evening rainfall
28-Sep-12	Barapali Village	240	85	30	37	East to west sunny & cloudy
03-Oct-12	Barapali Village	228	78	29	33	East to west & sunny
18-Oct-12	Barapali Village	151	78	21	26	East to west & sunny
01-Nov-12	Barapali Village	145	96	23	29	East to west & sunny
17-Nov-12	Barapali Village	135	99	24	31	East to west & sunny
04-Dec-12	Barapali Village	128	89	21	26	East to west & sunny
19-Dec-12	Barapali Village	134	98	26	28	East to west & sunny
03-Jan-13	Barapali Village	142	108	23	25	East to west & sunny
18-Jan-13	Barapali Village	195	113	25	28	East to west & sunny
04-Feb-13	Barapali Village	210	121	25	28	East to west & sunny
18-Feb-13	Barapali Village	226	130	26	29	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

04-Mar-13	Barapali Village	232	127	22	26	East to west & sunny
19-Mar-13	Barapali Village	251	132	24	28	East to west hot & sunny
06-Apr-12	Karlikachhar Village	220	96	22	26	East to west hot & sunny
27-Apr-12	Karlikachhar Village	274	95	26	30	West to east hot & sunny
04-May-12	Karlikachhar Village	201	74	28	32	East to west hot & sunny
25-May-12	Karlikachhar Village	246	88	30	34	West to east hot & sunny
05-Jun-12	Karlikachhar Village	206	84	26	31	East to west hot & sunny
22-Jun-12	Karlikachhar Village	145	54	19	24	West to east sunny & cloudy evening rain fall
05-Jul-12	Karlikachhar Village	245	87	28	33	East to west hot & sunny
20-Jul-12	Karlikachhar Village	96	49	16	18	East to west, cloudy & rainfall
13-Aug-12	Karlikachhar Village	99	65	18	25	West to east ,cloudy & heavy rainfall
28-Aug-12	Karlikachhar Village	130	81	23	29	East to west ,cloudy & heavy rainfall

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

14-Sep-12	Karlikachhar Village	201	89	27	34	East to west sunny & cloudy evening rainfall
29-Sep-12	Karlikachhar Village	262	94	36	40	East to west sunny & cloudy
04-Oct-12	Karlikachhar Village	274	90	32	37	East to west & sunny
19-Oct-12	Karlikachhar Village	154	82	21	27	East to west & sunny
02-Nov-12	Karlikachhar Village	162	98	26	32	East to west & sunny
17-Nov-12	Karlikachhar Village	156	101	23	29	East to west & sunny
05-Dec-12	Karlikachhar Village	146	97	24	29	East to west & sunny
20-Dec-12	Karlikachhar Village	167	103	23	25	East to west & sunny
04-Jan-13	Karlikachhar Village	186	117	24	26	East to west & sunny
19-Jan-13	Karlikachhar Village	243	124	23	27	East to west & sunny
05-Feb-13	Karlikachhar Village	257	137	27	30	East to west & sunny
19-Feb-13	Karlikachhar Village	262	147	28	31	East to west & sunny

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

05-Mar-13	Karlikachhar Village	250	133	26	29	East to west & sunny
20-Mar-13	Karlikachhar Village	282	135	21	24	East to west hot & sunny
05-Apr-12	Near Kulda P.O	339	126	30	36	East to west hot & sunny
26-Apr-12	Near Kulda P.O	349	133	39	48	East to west hot & sunny
03-May-12	Near Kulda P.O	355	144	42	48	East to west hot & sunny
24-May-12	Near Kulda P.O	387	155	44	52	West to east hot & sunny
04-Jun-12	Near Kulda P.O	327	124	34	42	East to west hot & sunny
21-Jun-12	Near Kulda P.O	215	88	30	36	West to east sunny & cloudy evening rain fall
04-Jul-12	Near Kulda P.O	309	116	34	42	East to west hot & sunny
19-Jul-12	Near Kulda P.O	119	63	23	27	East to west, cloudy & rainfall
10-Aug-12	Near Kulda P.O	108	73	28	32	West to east ,cloudy & heavy rainfall
27-Aug-12	Near Kulda P.O	141	85	32	38	East to west ,cloudy & heavy rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

13-Sep-12	Near Kulda P.O	211	85	34	40	East to west sunny & cloudy evening rainfall
28-Sep-12	Near Kulda P.O	233	78	22	28	East to west sunny & cloudy
03-Oct-12	Near Kulda P.O	225	76	21	25	East to west & sunny
18-Oct-12	Near Kulda P.O	269	125	32	41	East to west & sunny
01-Nov-12	Near Kulda P.O	172	127	31	39	East to west & sunny
16-Nov-12	Near Kulda P.O	253	118	29	35	East to west & sunny
04-Dec-12	Near Kulda P.O	245	107	25	28	East to west & sunny
19-Dec-12	Near Kulda P.O	259	110	27	31	East to west & sunny
03-Jan-13	Near Kulda P.O	279	124	28	31	East to west & sunny
17-Jan-13	Near Kulda P.O	295	131	27	30	East to west & sunny
04-Feb-13	Near Kulda P.O	287	129	26	29	East to west & sunny
18-Feb-13	Near Kulda P.O	293	138	27	30	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

04-Mar-13	Near Kulda P.O	308	143	29	31	East to west & sunny
19-Mar-13	Near Kulda P.O	329	145	30	34	East to west hot & sunny
06-Apr-12	Siarmal Village	203	91	22	28	East to west hot & sunny
27-Apr-12	Siarmal Village	244	80	24	28	West to east hot & sunny
04-May-12	Siarmal Village	241	88	28	36	East to west hot & sunny
25-May-12	Siarmal Village	253	91	28	33	West to east hot & sunny
05-Jun-12	Siarmal Village	219	92	28	33	East to west hot & sunny
22-Jun-12	Siarmal Village	131	63	22	25	West to east sunny & cloudy evening rain fall
05-Jul-12	Siarmal Village	226	82	26	31	East to west hot & sunny
20-Jul-12	Siarmal Village	70	46	15	18	East to west, cloudy & rainfall
13-Aug-12	Siarmal Village	93	67	28	33	West to east ,cloudy & heavy rainfall
28-Aug-12	Siarmal Village	105	74	29	36	East to west ,cloudy & heavy rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

14-Sep-12	Siarmal Village	176	77	25	32	East to west sunny & cloudy evening rainfall
29-Sep-12	Siarmal Village	201	90	24	32	East to west sunny & cloudy
04-Oct-12	Siarmal Village	219	84	26	30	East to west & sunny
19-Oct-12	Siarmal Village	164	82	24	29	East to west & sunny
02-Nov-12	Siarmal Village	155	92	25	30	East to west & sunny
17-Nov-12	Siarmal Village	167	106	27	32	East to west & sunny
05-Dec-12	Siarmal Village	176	112	26	30	East to west & sunny
20-Dec-12	Siarmal Village	196	115	24	28	East to west & sunny
04-Jan-13	Siarmal Village	257	131	26	29	East to west & sunny
19-Jan-13	Siarmal Village	241	105	23	25	East to west & sunny
05-Feb-13	Siarmal Village	258	115	24	27	East to west & sunny
19-Feb-13	Siarmal Village	267	124	25	27	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

Project : **Kulda OCP** (conc. in µg/cu.m.)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO2</i>	<i>NOx</i>	<i>Remarks</i>
05-Mar-13	Siarmal Village	274	130	26	30	East to west & sunny
20-Mar-13	Siarmal Village	298	134	23	26	East to west hot & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

Project : **Kulda OCP** (conc. in $\mu\text{g}/\text{cu.m.}$)

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
05-Apr-12	Tikilipara Village	210	72	20	24	East to west hot & sunny
26-Apr-12	Tikilipara Village	225	68	22	26	West to east hot & sunny
03-May-12	Tikilipara Village	330	94	30	34	East to west hot & sunny
24-May-12	Tikilipara Village	283	102	30	35	West to east hot & sunny
04-Jun-12	Tikilipara Village	202	86	26	30	East to west hot & sunny
21-Jun-12	Tikilipara Village	199	76	24	29	West to east sunny & cloudy evening rain fall
04-Jul-12	Tikilipara Village	240	91	28	34	East to west hot & sunny
19-Jul-12	Tikilipara Village	80	42	17	19	East to west, cloudy & rainfall
10-Aug-12	Tikilipara Village	120	78	26	31	West to east ,cloudy & heavy rainfall
27-Aug-12	Tikilipara Village	110	69	26	31	East to west ,cloudy & heavy rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

13-Sep-12	Tikilipara Village	224	90	31	37	East to west sunny & cloudy evening rainfall
28-Sep-12	Tikilipara Village	249	81	27	33	East to west sunny & cloudy
03-Oct-12	Tikilipara Village	252	84	30	34	East to west & sunny
18-Oct-12	Tikilipara Village	168	84	24	31	East to west & sunny
01-Nov-12	Tikilipara Village	173	101	24	31	East to west & sunny
17-Nov-12	Tikilipara Village	161	104	25	33	East to west & sunny
04-Dec-12	Tikilipara Village	179	114	26	31	East to west & sunny
19-Dec-12	Tikilipara Village	186	117	28	30	East to west & sunny
03-Jan-13	Tikilipara Village	167	103	27	30	East to west & sunny
18-Jan-13	Tikilipara Village	182	109	24	26	East to west & sunny
04-Feb-13	Tikilipara Village	194	110	24	27	East to west & sunny
18-Feb-13	Tikilipara Village	201	107	23	25	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Basundhara**

04-Mar-13	Tikilipara Village	213	111	24	27	East to west & sunny
19-Mar-13	Tikilipara Village	232	122	20	24	East to west hot & sunny

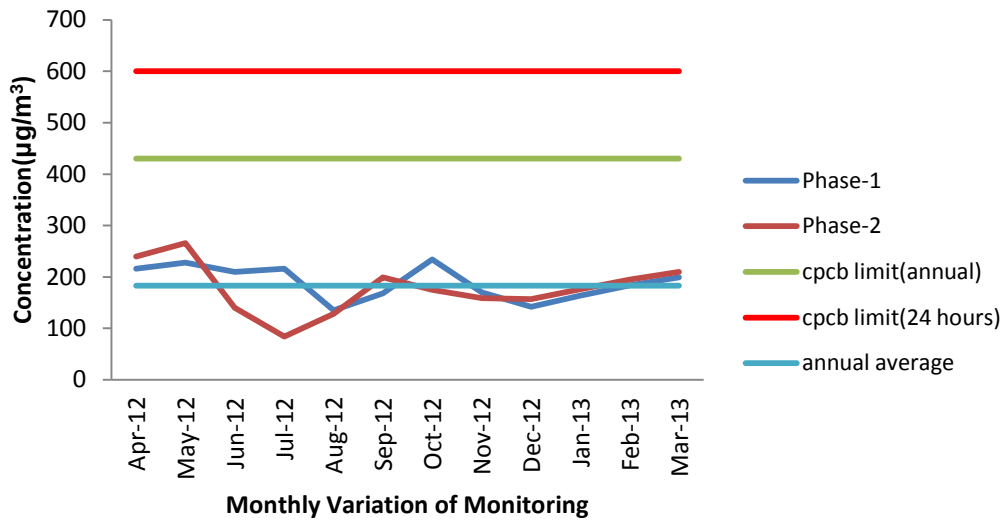
MoEF Standards Notification dated 25th September,2000

600	300	120	120

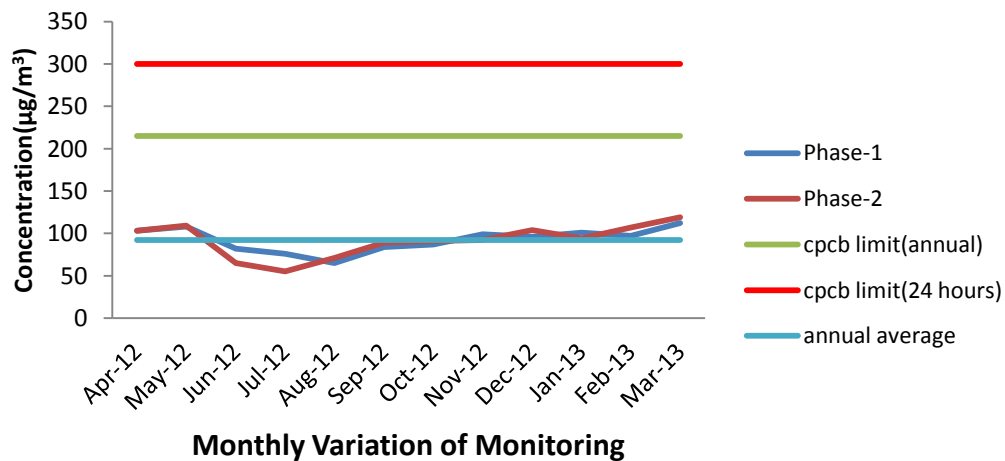


Air Quality Graph of Basundhara Area

Graph-1: SPM monitoring of Excavation Workshop of Basundhara OCP.



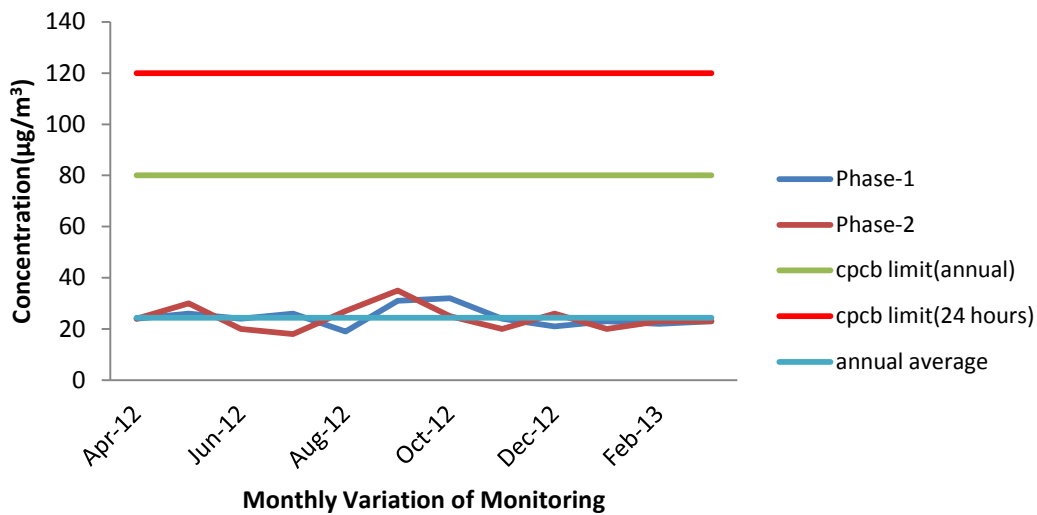
Graph-2: RPM monitoring of Excavation Workshop of Basundhara OCP.



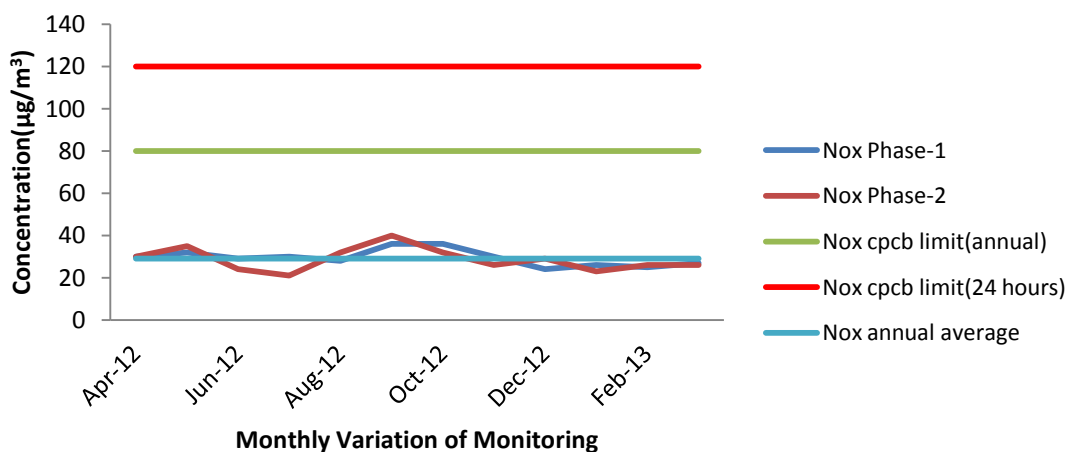


Air Quality Graph of Basundhara Area

Graph-3: SO_x monitoring of Excavation Workshop of Basundhara OCP.



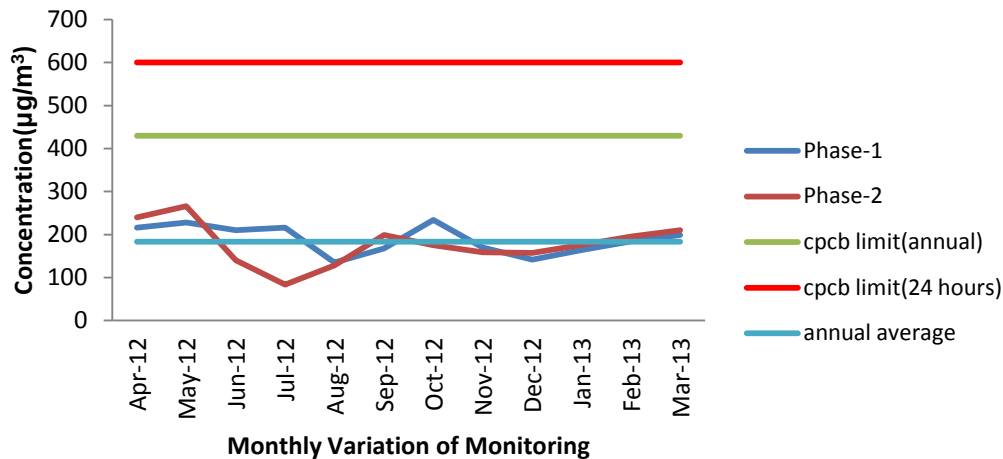
Graph-4: NO_x monitoring of Excavation Workshop of Basundhara OCP.



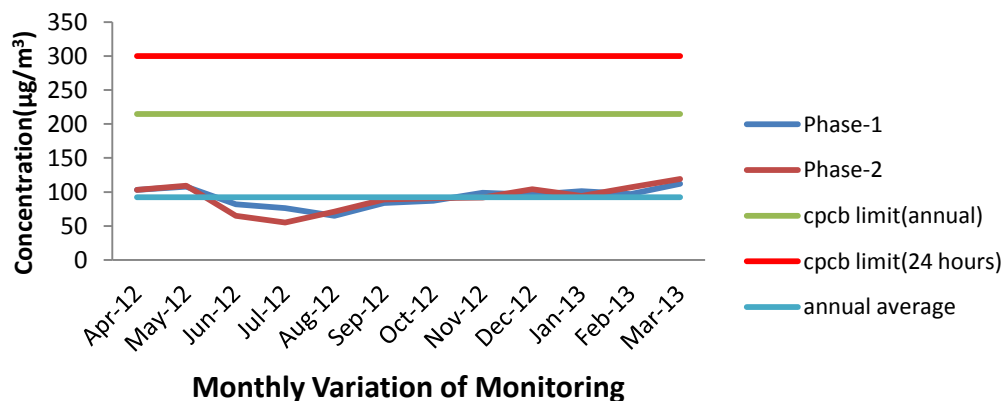


Air Quality Graph of Basundhara Area

Graph-5: SPM monitoring of Kulapara Hemlet of Gopalpur Village of Basundhara OCP.



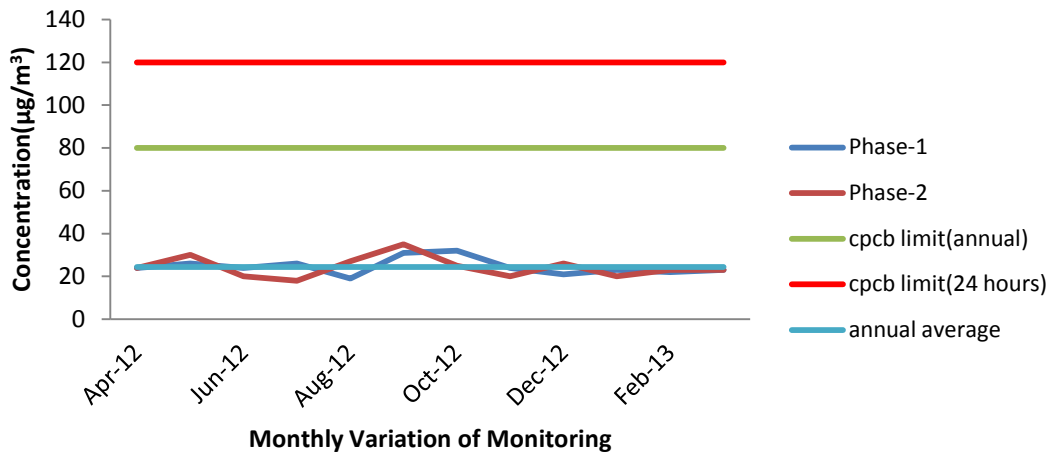
Graph-6: RPM monitoring of Kulapara Hemlet of Gopalpur Village of Basundhara OCP.



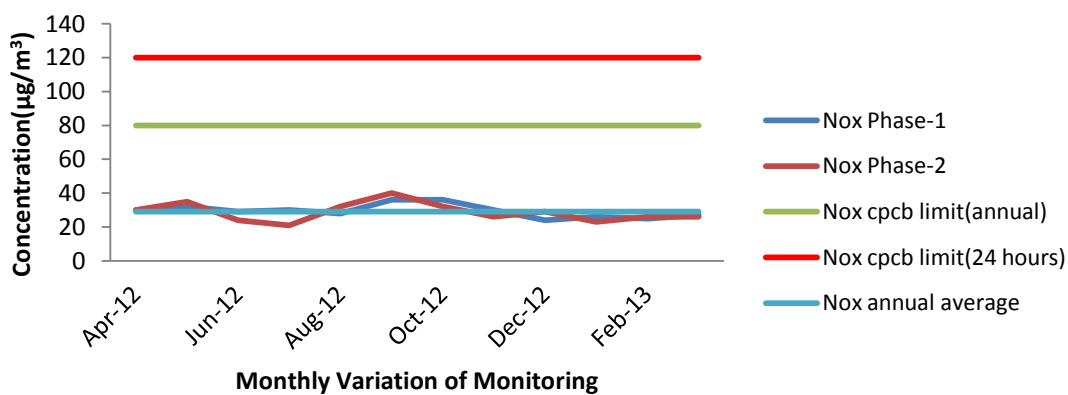


Air Quality Graph of Basundhara Area

Graph-7: SO_x monitoring of Kulapara Hemlet of Gopalpur Village of Basundhara OCP.



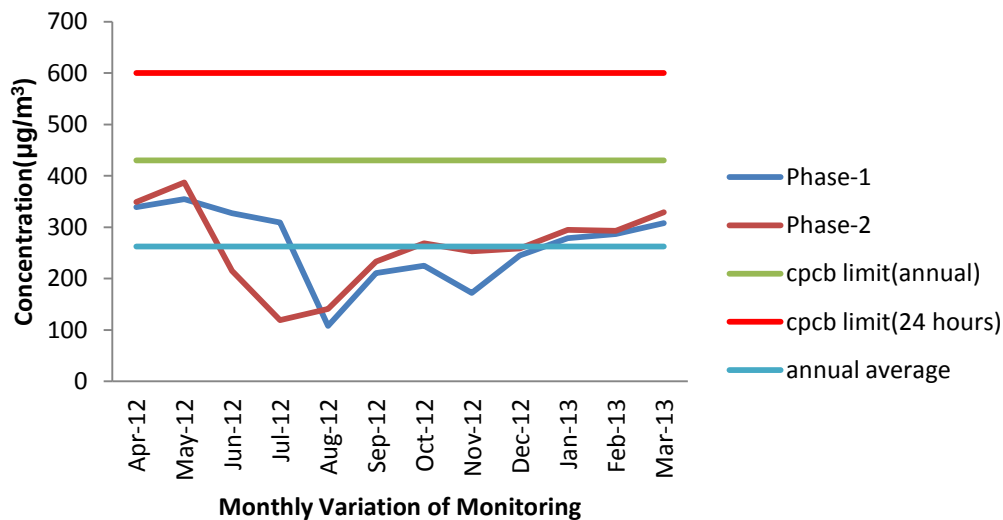
Graph-8: NO_x monitoring of Kulapara Hemlet of Gopalpur Village of Basundhara OCP.



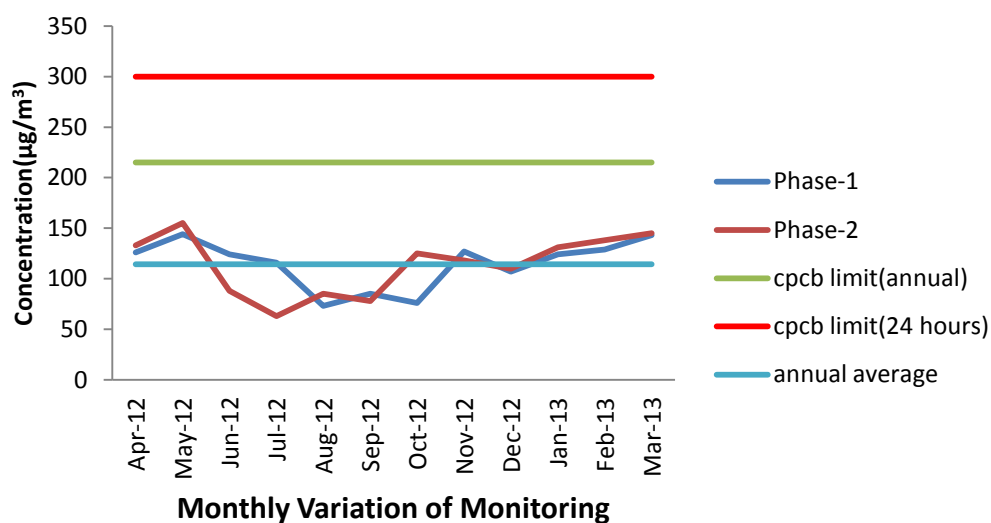


Air Quality Graph of Basundhara Area

**Graph-1: SPM monitoring of Near Kulda
PO of Kulda OCP.**



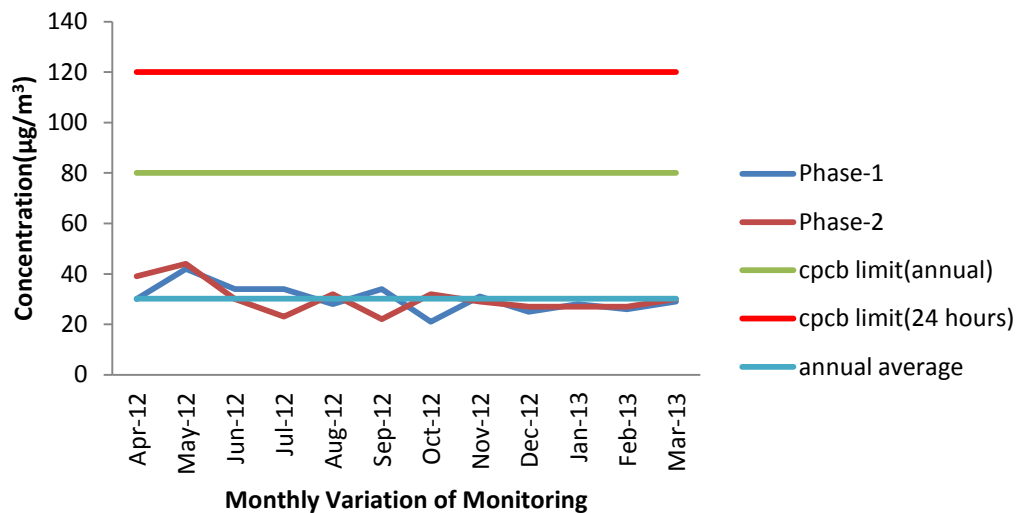
**Graph-2: RPM monitoring of Near Kulda
PO of Kulda OCP.**



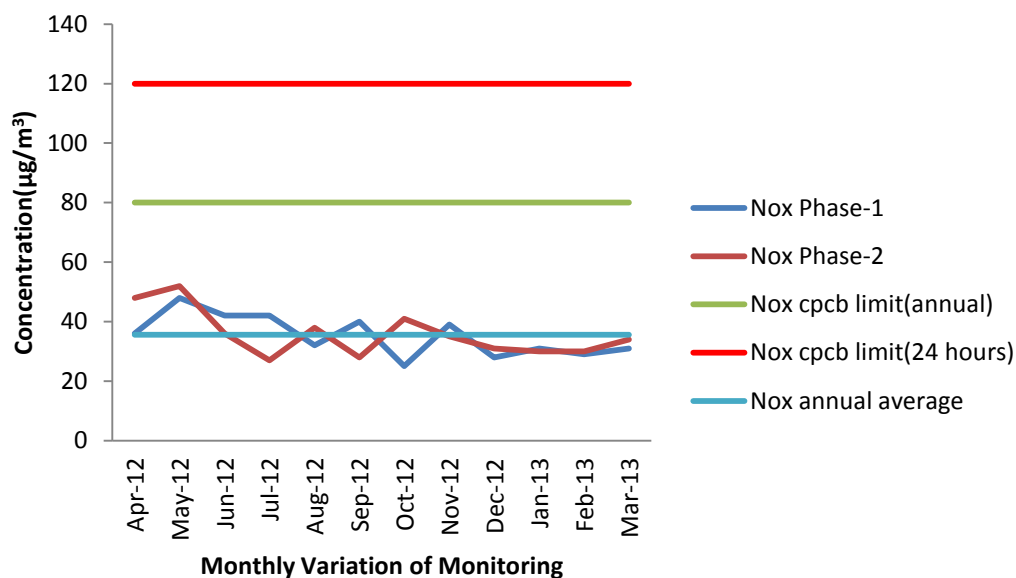


Air Quality Graph of Basundhara Area

Graph-3: SO_x monitoring of Near Kulda PO of Kulda OCP



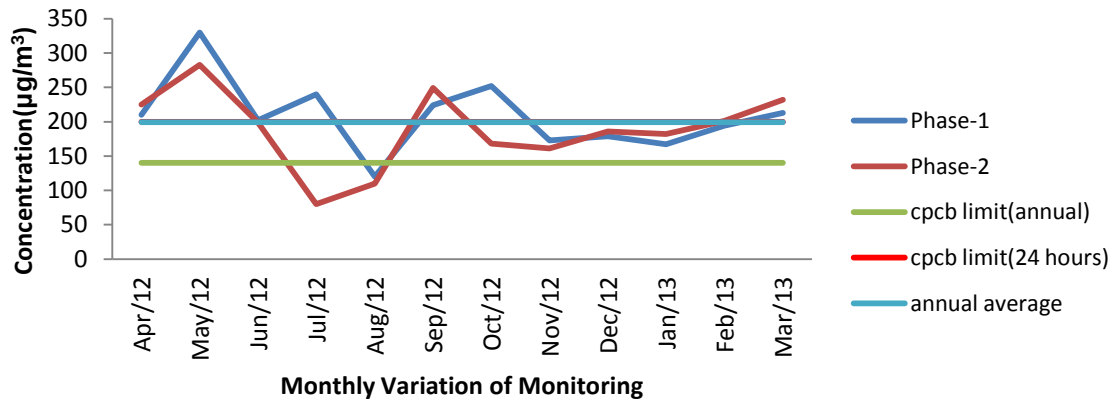
Graph-4: NO_x monitoring of Near Kulda PO of Kulda OCP



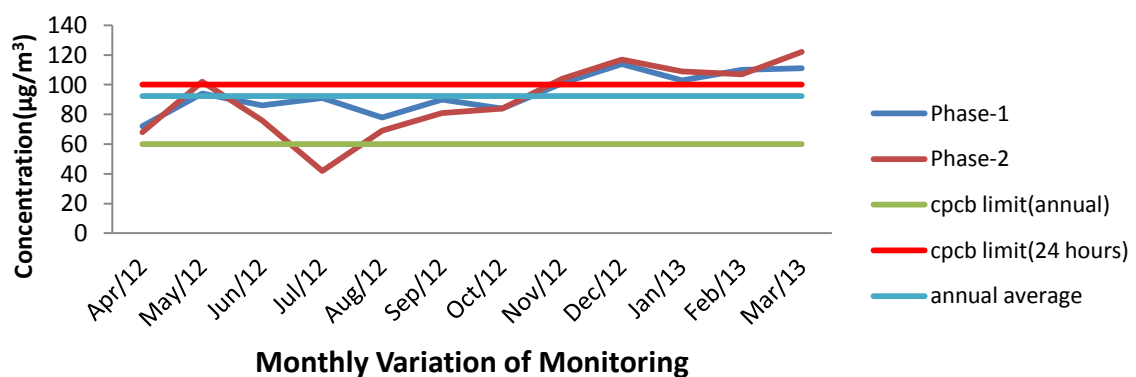


Air Quality Graph of Basundhara Area

Graph-5: SPM monitoring of Barpali Village of Kulda OCP.



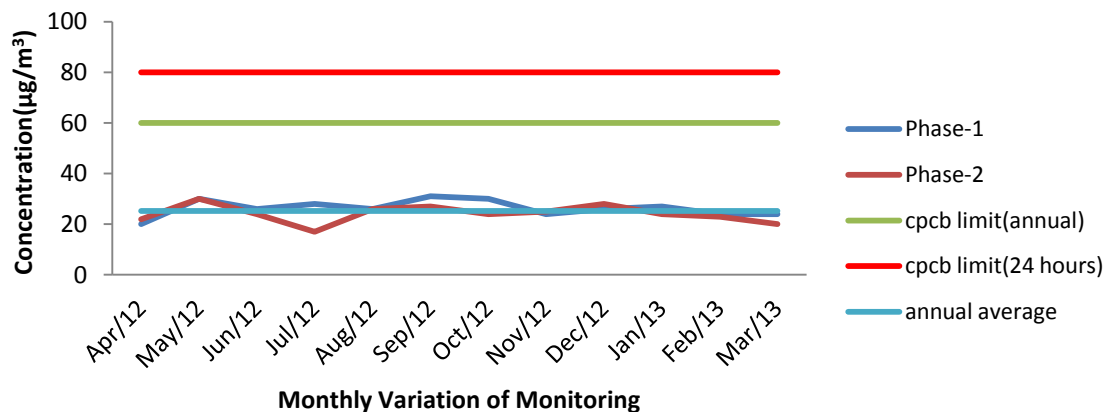
Graph-6: RPM monitoring of Barpali Village of Kulda OCP.



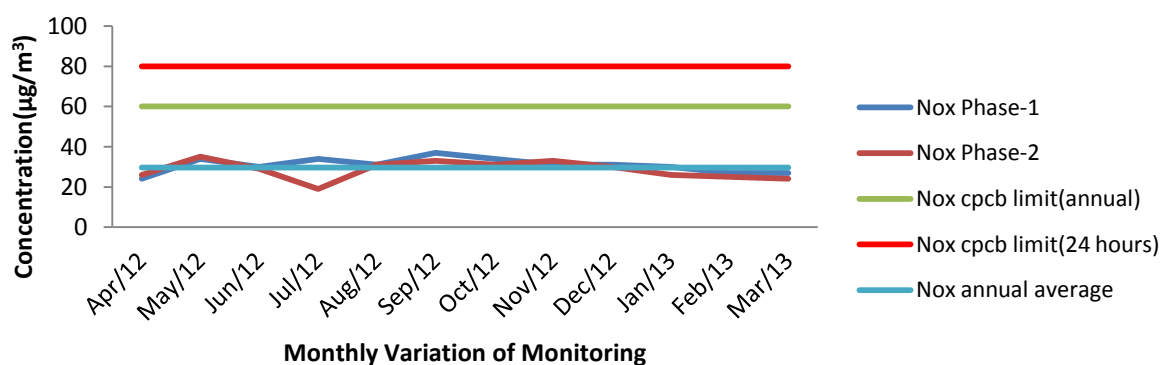


Air Quality Graph of Basundhara Area

Graph-7: SO_x monitoring of Barpali Village of Kulda OCP.



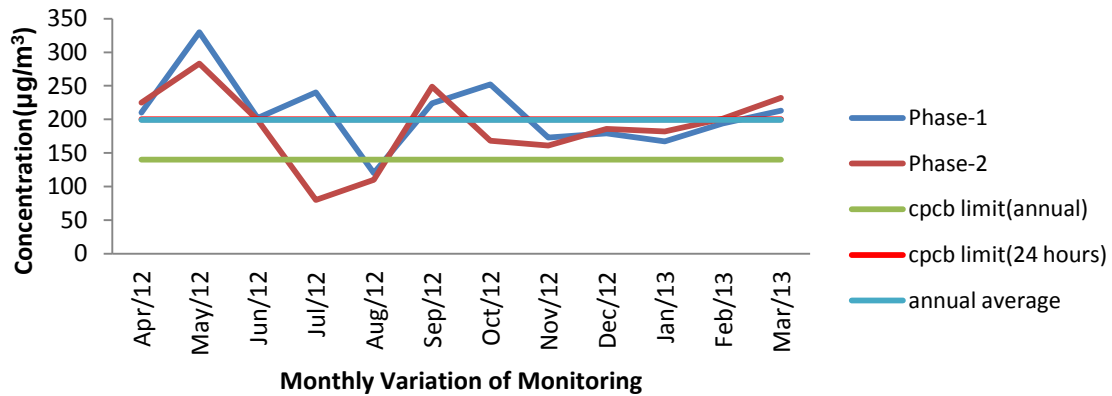
Graph-8: NO_x monitoring of Barpali Village of Kulda OCP.



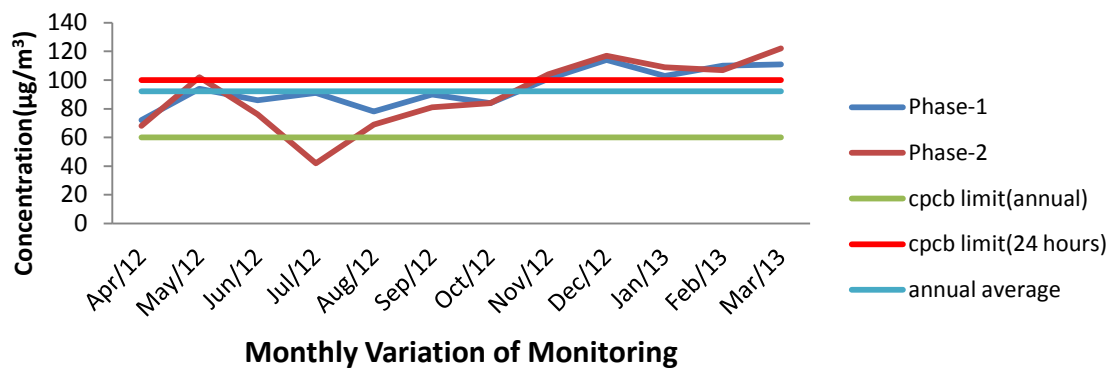


Air Quality Graph of Basundhara Area

Graph-9: SPM monitoring of Karlikachhar Village of Kulda OCP.



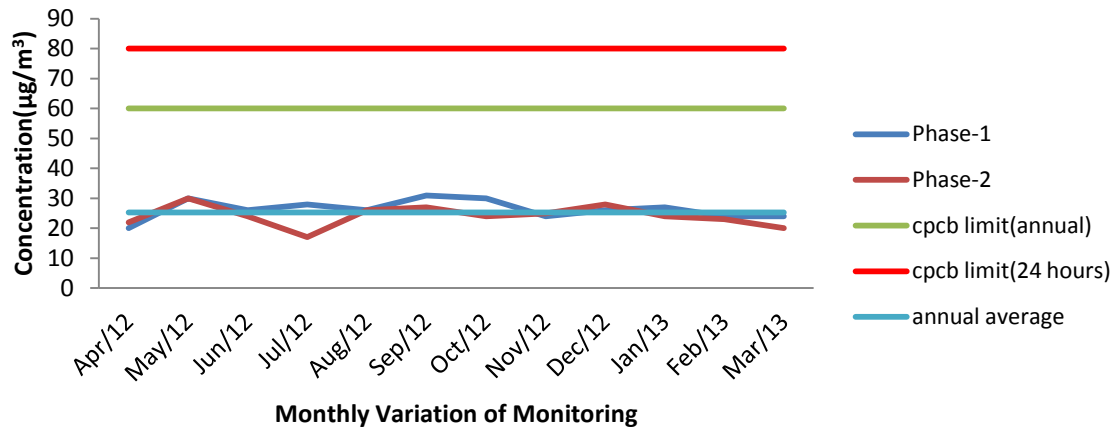
Graph-10: RPM monitoring of Karlikachhar Village of Kulda OCP.



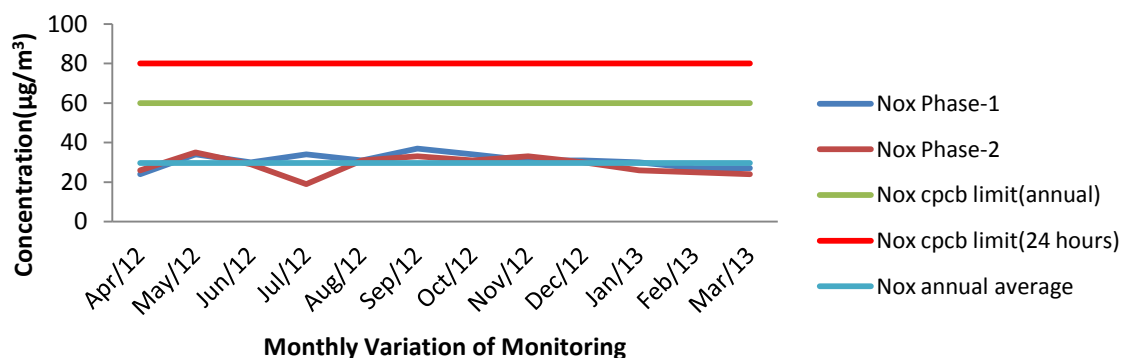


Air Quality Graph of Basundhara Area

Graph-11: SO_x monitoring of Karlikachhar Village of Kulda OCP.



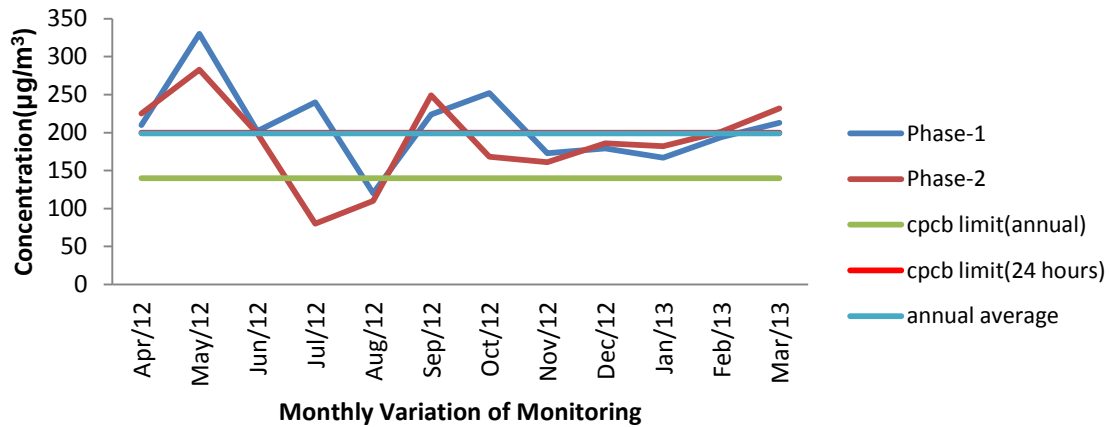
Graph-12: NO_x monitoring Karlikachhar Village of Kulda OCP.



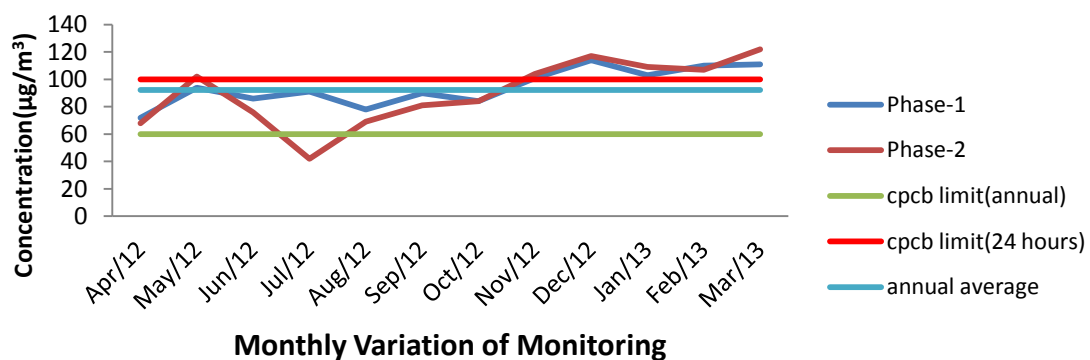


Air Quality Graph of Basundhara Area

Graph-13: SPM monitoring of Siarmal Village of Kulda OCP .



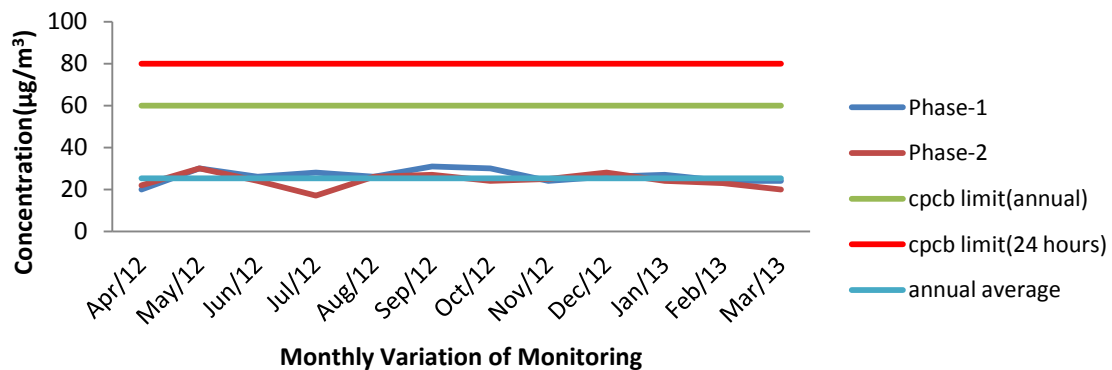
Graph-14: RPM monitoring of Siarmal Village of Kulda OCP .



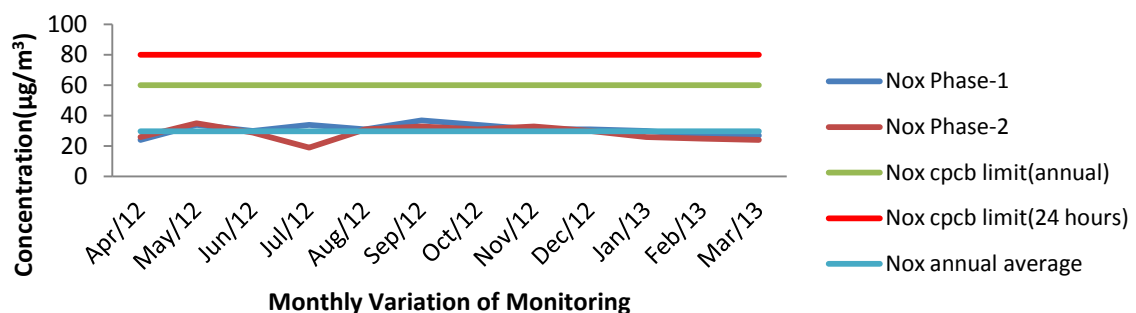


Air Quality Graph of Basundhara Area

Graph-15: SO_x monitoring of Siarmal Village of Kulda OCP .



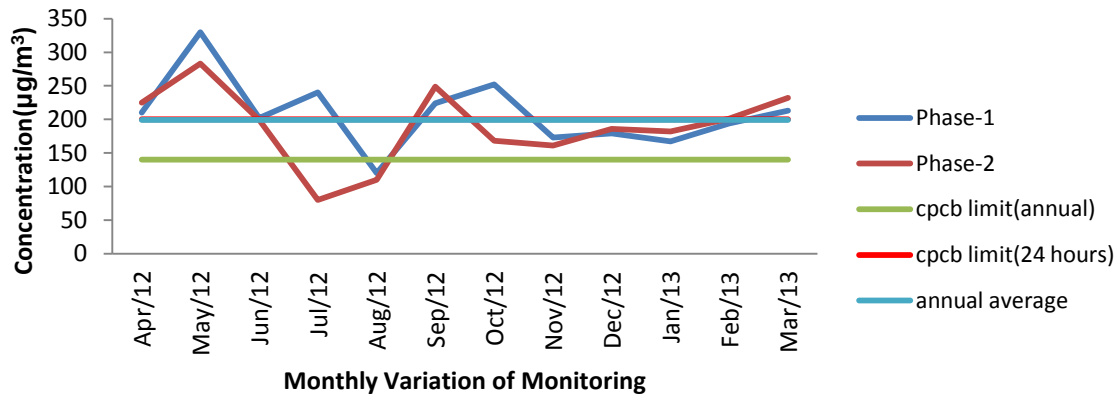
Graph-16: NO_x monitoring Siarmal Village of Kulda OCP .



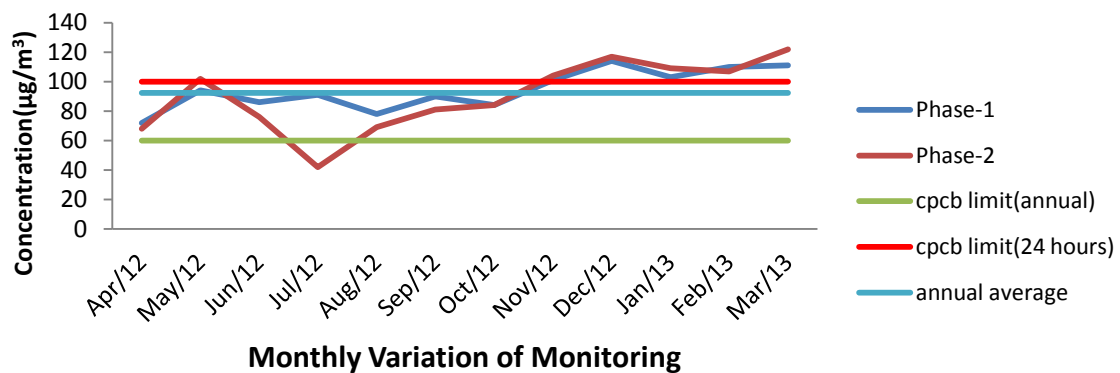


Air Quality Graph of Basundhara Area

Graph-17: SPM monitoring of Tikilipara Village of Kulda OCP .



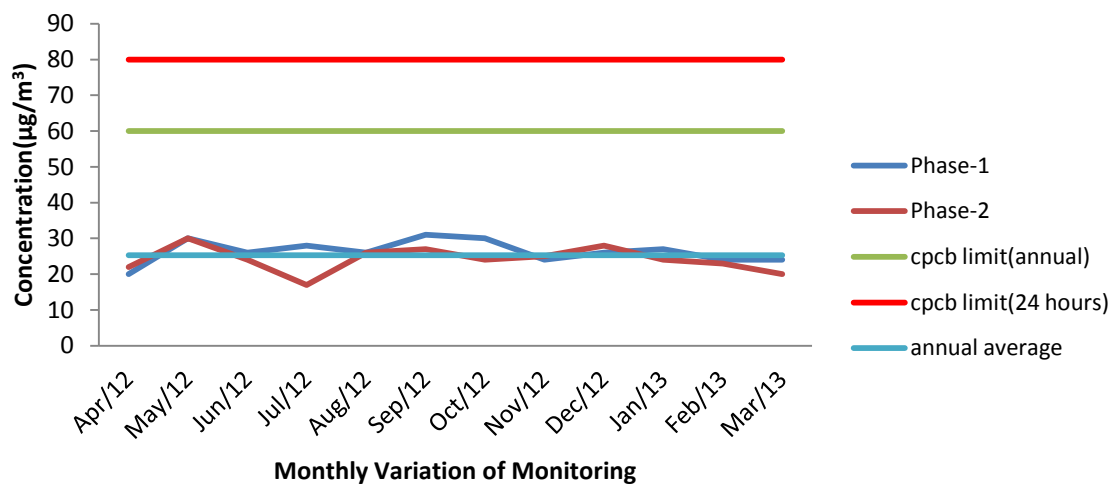
Graph-18: RPM monitoring of Tikilipara Village of Kulda OCP .



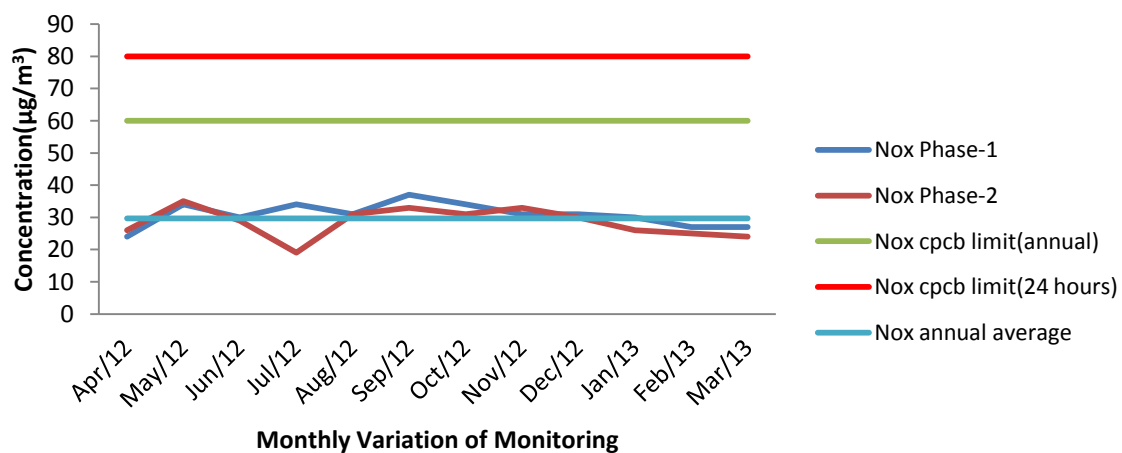


Air Quality Graph of Basundhara Area

Graph-19: SO_x monitoring of Tikilipara Village of Kulda OCP .



Graph-20: NO_x monitoring Tikilipara Village of Kulda OCP .



Drinking Water Data Area: Basundhara Project:
Basundhara (W) OCP

[illegible]

Basundhara (W) OCP

[illegible]

Drinking Water Data Area: Basundhara Project:

Basundhara (W) OCP

Date of Sampling	08-Sep-12	08-Mar-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Water at Intake Well at Basundhara Nullah	Water at Intake Well at Basundhara Nullah	
Colour, Hazen unit, Max	3	4	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	4	4	5
pH value	7.37	7.41	6.5-8.5
Total hardness	68	72	300
Iron (as Fe)	<0.05	<0.05	0.3
Chlorides (as Cl)	14	14	250
Dissolved solids (TDS)	118	126	500
Calcium (as Ca)	16.0	16.0	75
Copper (as Cu)	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	0.1
Sulphate (as SO ₄)	25	24	200
Nitrate (as NO ₃)	4.43	4.43	45
Fluoride (as F)	0.25	0.13	1.5
Selenium (as Se)	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	<0.02	5
Hexavalent chromium (Cr ⁶⁺)	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	0.001
Alkalinity	40	44	200
Residual Chlorine	Nil	Nil	0.2
MPN	Nil	Nil	Nil

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

Project : **Basundhara (W) OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
02-Apr-12	Oil & Grease Trap Outlet	7.63	<1.0	20	30	-	
21-Apr-12	Oil & Grease Trap Outlet	7.56	<1.0	22	35	-	
02-May-12	Oil & Grease Trap Outlet	7.69	<1.0	28	45	-	
19-May-12	Oil & Grease Trap Outlet	7.76	<1.0	24	40	-	
02-Jun-12	Oil & Grease Trap Outlet	7.80	<1.0	22	35	-	
20-Jun-12	Oil & Grease Trap Outlet	7.90	<1.0	26	40	-	
07-Jul-12	Oil & Grease Trap Outlet	7.85	<1.0	22	35	-	
22-Jul-12	Oil & Grease Trap Outlet	7.78	<1.0	20	30	-	
11-Aug-12	Oil & Grease Trap Outlet	7.70	<1.0	24	35	-	
25-Aug-12	Oil & Grease Trap Outlet	7.62	<1.0	26	40	-	
08-Sep-12	Oil & Grease Trap Outlet	7.70	<1.0	28	45	-	
25-Sep-12	Oil & Grease Trap Outlet	7.65	<1.0	24	40	-	
03-Oct-12	Oil & Grease Trap Outlet	7.60	<1.0	22	35	-	
16-Oct-12	Oil & Grease Trap Outlet	7.90	<1.0	22	35	-	
02-Nov-12	Oil & Grease Trap Outlet	7.25	<1.0	26	40	-	
17-Nov-12	Oil & Grease Trap Outlet	7.45	<1.0	24	38	-	

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

14-Dec-12	Oil & Grease Trap Outlet	7.95	<1.0	28	45	-	
29-Dec-12	Oil & Grease Trap Outlet	8.00	<1.0	26	40	-	
10-Jan-13	Oil & Grease Trap Outlet	7.80	<1.0	30	45	-	
25-Jan-13	Oil & Grease Trap Outlet	7.70	<1.0	32	50	-	
09-Feb-13	Oil & Grease Trap Outlet	7.85	<1.0	28	40	-	
23-Feb-13	Oil & Grease Trap Outlet	7.9	<1.0	26	40	-	
08-Mar-13	Oil & Grease Trap Outlet	7.80	<1.0	30	45	-	
23-Mar-13	Oil & Grease Trap Outlet	7.75	<1.0	28	40	-	
02-Apr-12	Outlet from Settling Pond Near Kanika Rly. Siding	7.85	<1.0	32	50		2.0
21-Apr-12	Outlet from Settling Pond Near Kanika Rly. Siding	7.90	<1.0	30	45		1.9
02-May-12	Outlet from Settling Pond Near Kanika Rly. Siding	7.90	<1.0	26	40		2.0
19-May-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	30	45		2.1
02-Jun-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	28	40		2.0
20-Jun-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.25	<1.0	30	45		2.1
07-Jul-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	28	40		1.9
22-Jul-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.10	<1.0	30	45		2.1
11-Aug-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	34	50		2.0

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

25-Aug-12	Outlet from Settling Pond Near Kanika Rly. Siding	7.90	<1.0	32	45		1.9
08-Sep-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.50	<1.0	34	50		2.1
25-Sep-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.10	<1.0	36	55		2.2
03-Oct-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	34	50		2.0
16-Oct-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	32	50		2.1
02-Nov-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.10	<1.0	36	50		2.2
17-Nov-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	32	45		2.1
14-Dec-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	34	50		2.2
29-Dec-12	Outlet from Settling Pond Near Kanika Rly. Siding	8.22	<1.0	36	55		2.1
10-Jan-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	38	60		2.2
25-Jan-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	34	55		2.1
09-Feb-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.20	<1.0	40	60		2.3
23-Feb-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.10	<1.0	34	50		2.1
08-Mar-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.15	<1.0	38	55		2.1
23-Mar-13	Outlet from Settling Pond Near Kanika Rly. Siding	8.00	<1.0	36	50		2.0
02-Apr-12	Settling tank / abandoned quarry of Basundhara-E	8.52	<1.0	38	60		2.2
07-Jul-12	Settling tank / abandoned quarry of Basundhara-E	8.17	<1.0	32	50		2.1

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

03-Oct-12	Settling tank / abandoned quarry of Basundhara-E	8.35	<1.0	32	45		2.1
12-Jan-13	Settling tank / abandoned quarry of Basundhara-E	8.50	<1.0	34	55		2.3

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

Project : **Kulda OCP**

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
02-Apr-12	Final Disch. Point of Mine	8.42	<1.0	40	60	-	2.2
21-Apr-12	Final Disch. Point of Mine	8.34	<1.0	36	55	-	2.0
02-May-12	Final Disch. Point of Mine	8.27	<1.0	32	50	-	2.1
19-May-12	Final Disch. Point of Mine	8.35	<1.0	36	55	-	2.2
02-Jun-12	Final Disch. Point of Mine	8.25	<1.0	32	50	-	2.1
20-Jun-12	Final Disch. Point of Mine	8.34	<1.0	34	55	-	2.2
07-Jul-12	Final Disch. Point of Mine	8.45	<1.0	32	50	-	2.0
22-Jul-12	Final Disch. Point of Mine	8.38	<1.0	36	55	-	2.2
11-Aug-12	Final Disch. Point of Mine	8.45	<1.0	40	60	-	2.3
25-Aug-12	Final Disch. Point of Mine	8.25	<1.0	36	55	-	2.2
08-Sep-12	Final Disch. Point of Mine	8.12	<1.0	40	60	-	2.3
25-Sep-12	Final Disch. Point of Mine	8.20	<1.0	38	55	-	2.2
03-Oct-12	Final Disch. Point of Mine	8.00	<1.0	34	50	-	2.1
16-Oct-12	Final Disch. Point of Mine	8.10	<1.0	40	60	-	2.3
02-Nov-12	Final Disch. Point of Mine	8.15	<1.0	36	55	-	2.2
17-Nov-12	Final Disch. Point of Mine	8.25	<1.0	40	60	-	2.3

TABLE--
EFFLUENT QUALITY DATA

Area : **Basundhara**

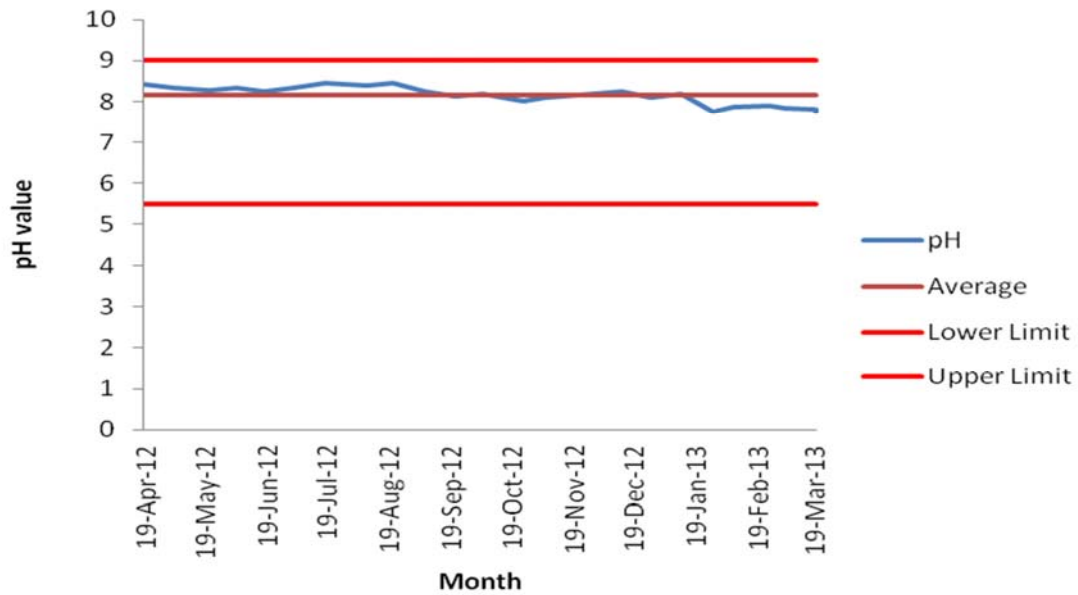
14-Dec-12	Final Disch. Point of Mine	8.10	<1.0	36	55	-	2.2
29-Dec-12	Final Disch. Point of Mine	8.20	<1.0	40	60	-	2.3
10-Jan-13	Final Disch. Point of Mine	7.75	<1.0	34	55	-	2.2
25-Jan-13	Final Disch. Point of Mine	7.86	<1.0	34	50	-	2.1
09-Feb-13	Final Disch. Point of Mine	7.90	<1.0	32	45	-	1.9
23-Feb-13	Final Disch. Point of Mine	7.85	<1.0	30	45	-	2.1
08-Mar-13	Final Disch. Point of Mine	7.82	<1.0	34	50	-	2.0
23-Mar-13	Final Disch. Point of Mine	7.75	<1.0	36	65	-	2.1
02-Apr-12	Inlet to Settling Pond	7.85	<1.0	32	50		2.1
07-Jul-12	Inlet to Settling Pond	7.20	<1.0	30	46		1.9
03-Oct-12	Inlet to Settling Pond	8.20	<1.0	32	45	-	2.2
12-Jan-13	Inlet to Settling Pond	8.10	<1.0	30	45	-	2.1
02-Apr-12	Outlet to Settling Pond	7.90	<1.0	26	40	-	1.9
02-May-12	Outlet to Settling Pond	7.82	<1.0	30	45	-	2.0
02-Jun-12	Outlet to Settling Pond	7.95	<1.0	30	45	-	2.0
07-Jul-12	Outlet to Settling Pond	7.80	<1.0	28	40	-	1.8
11-Aug-12	Outlet to Settling Pond	7.95	<1.0	30	45	-	2.0

TABLE--
EFFLUENT QUALITY DATA

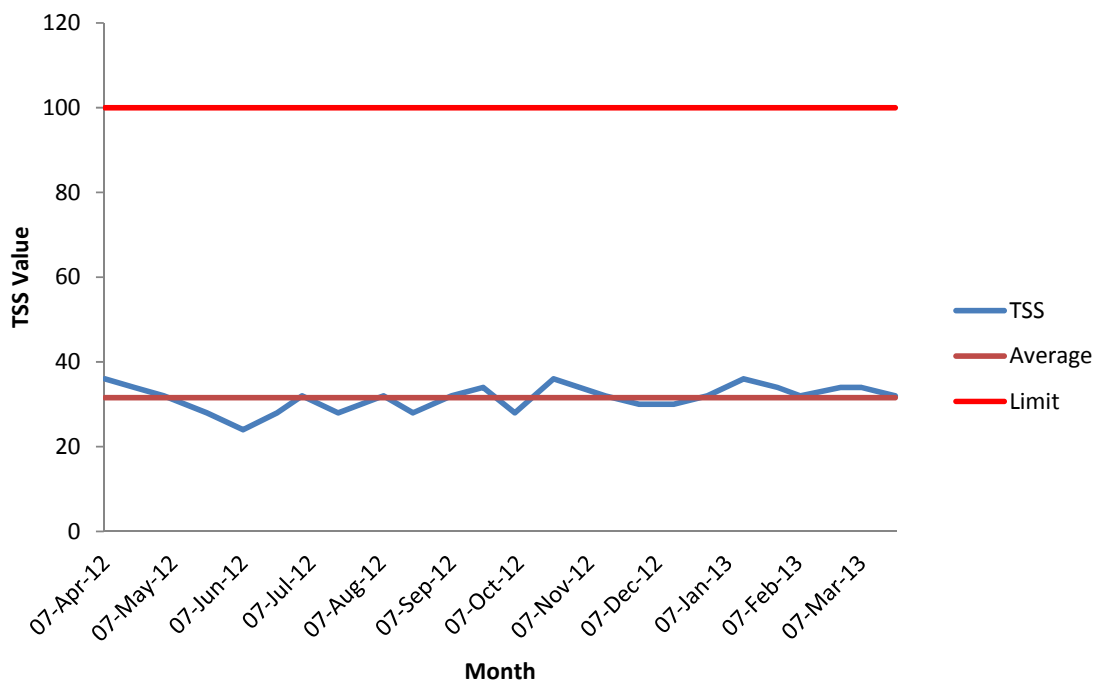
Area : **Basundhara**

08-Sep-12	Outlet to Settling Pond	8.14	<1.0	32	50	-	2.1
02-Nov-12	Outlet to Settling Pond	8.15	<1.0	28	40	-	2.1
14-Dec-12	Outlet to Settling Pond	8.20	<1.0	30	45	-	1.9
12-Jan-13	Outlet to Settling Pond	8.20	<1.0	34	50	-	2.0
09-Feb-13	Outlet to Settling Pond	8.10	<1.0	36	55	-	2.2
08-Mar-13	Outlet to Settling Pond	8.00	<1.0	32	45	-	1.8

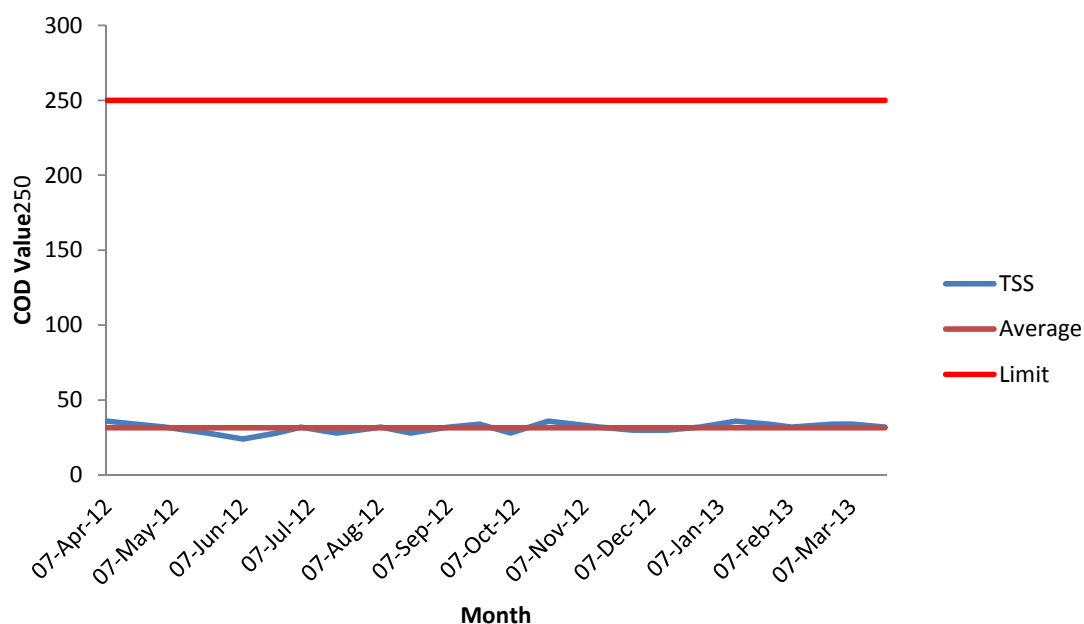
Graph for pH of Final Discharge point of Mine of Kulda OCP of Basundhara Area



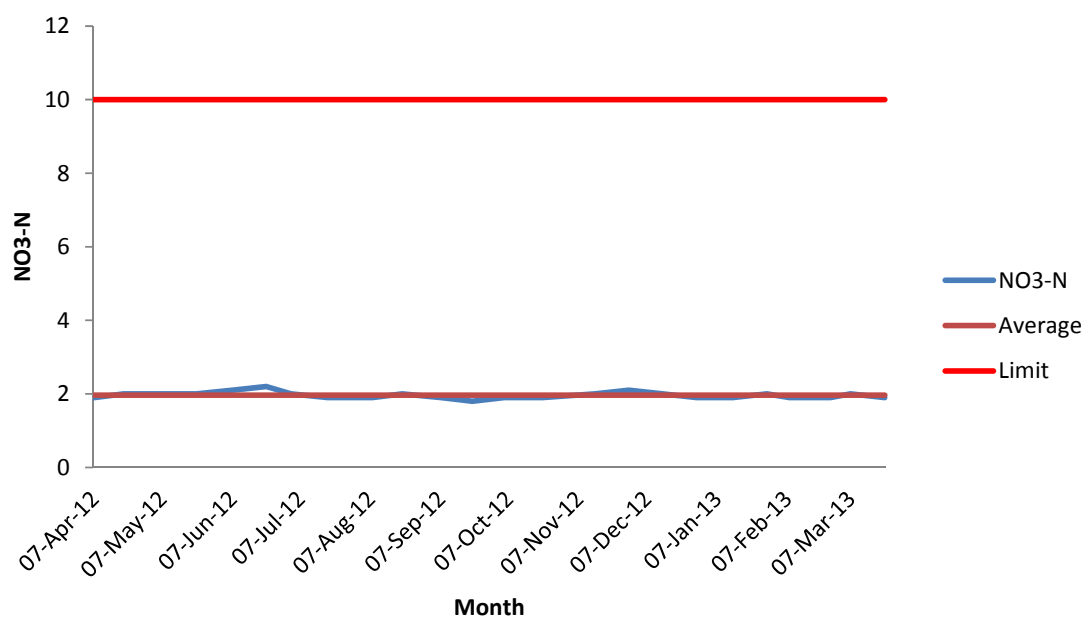
Graph for TSS of outlet of Final Discharge point of Mine of Kulda OCP of Basundhara Area



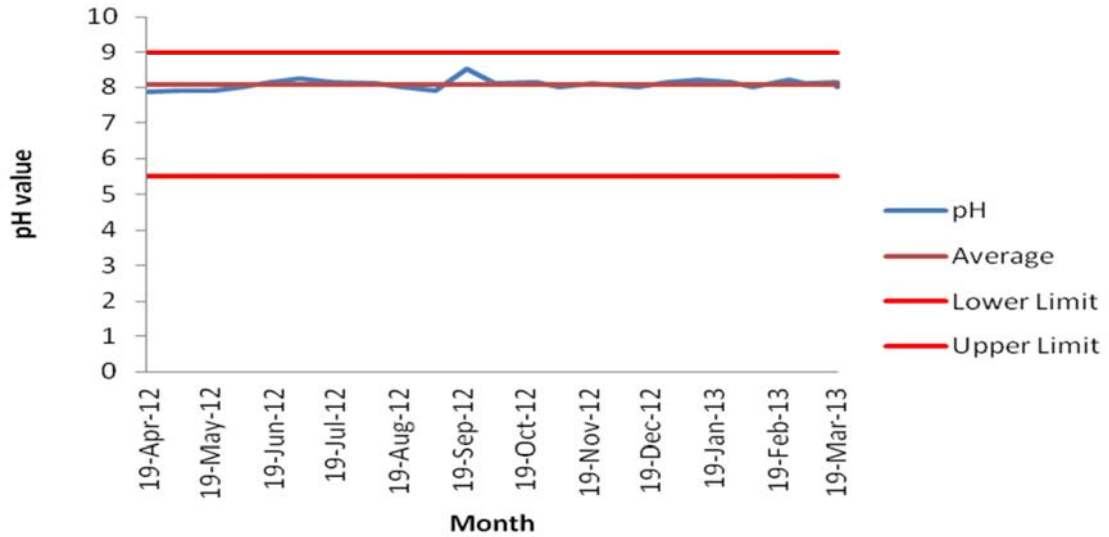
**Graph for COD of outlet of Final Discharge point
of Mine of Kulda OCP of Basundhara Area**



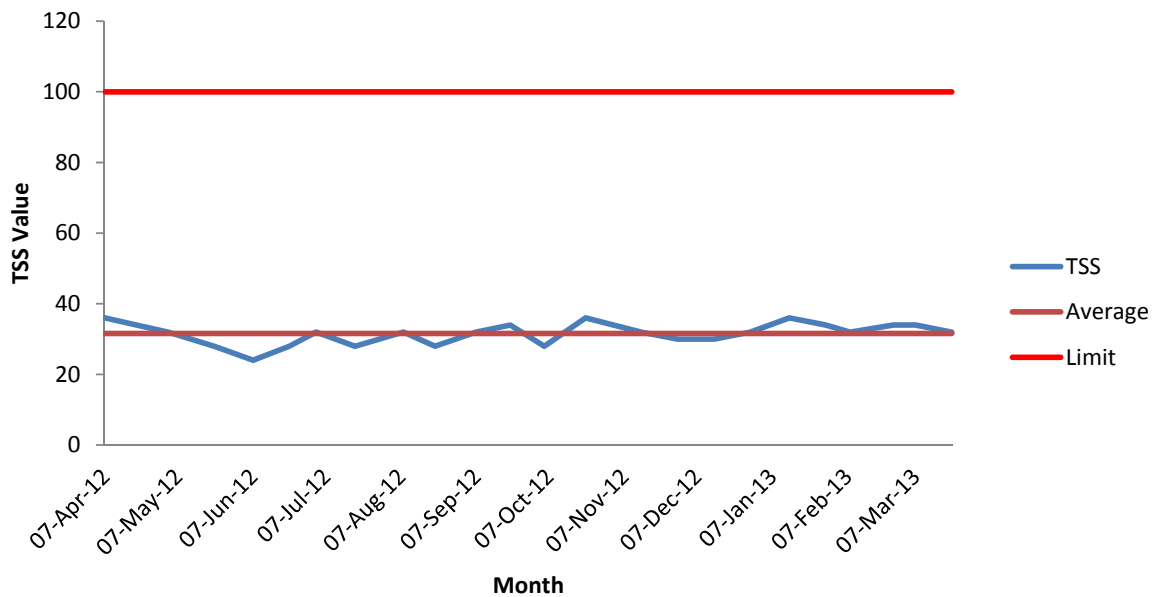
**Graph for NO₃-N of Final Discharge point of
Mine of Kulda OCP of Basundhara Area**



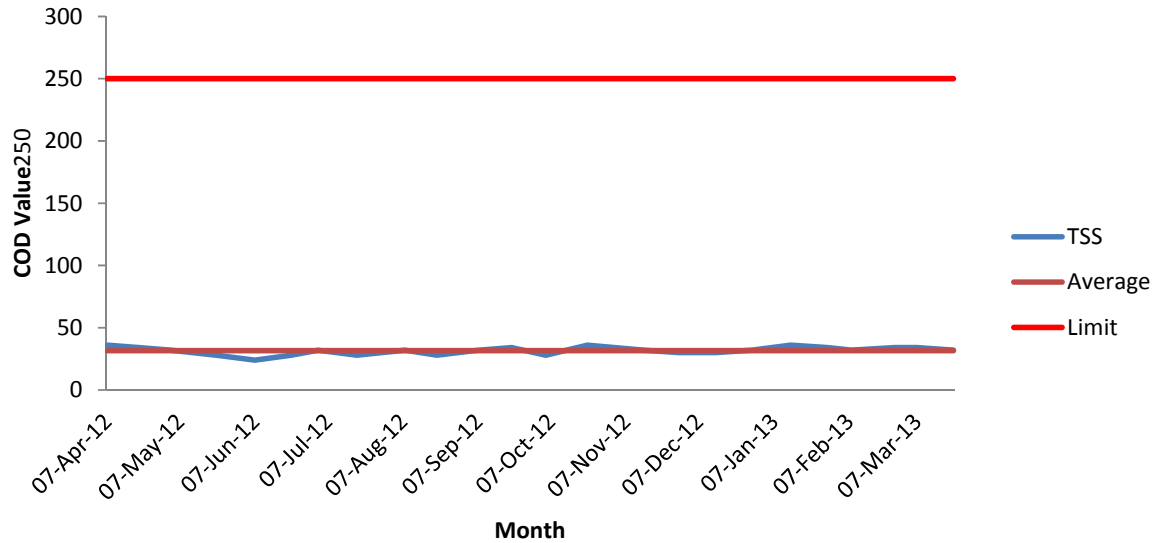
Graph for pH of Outlet from Settling Pond Near Kanika Rly. Siding of Basundhara OCP of Basundhara Area



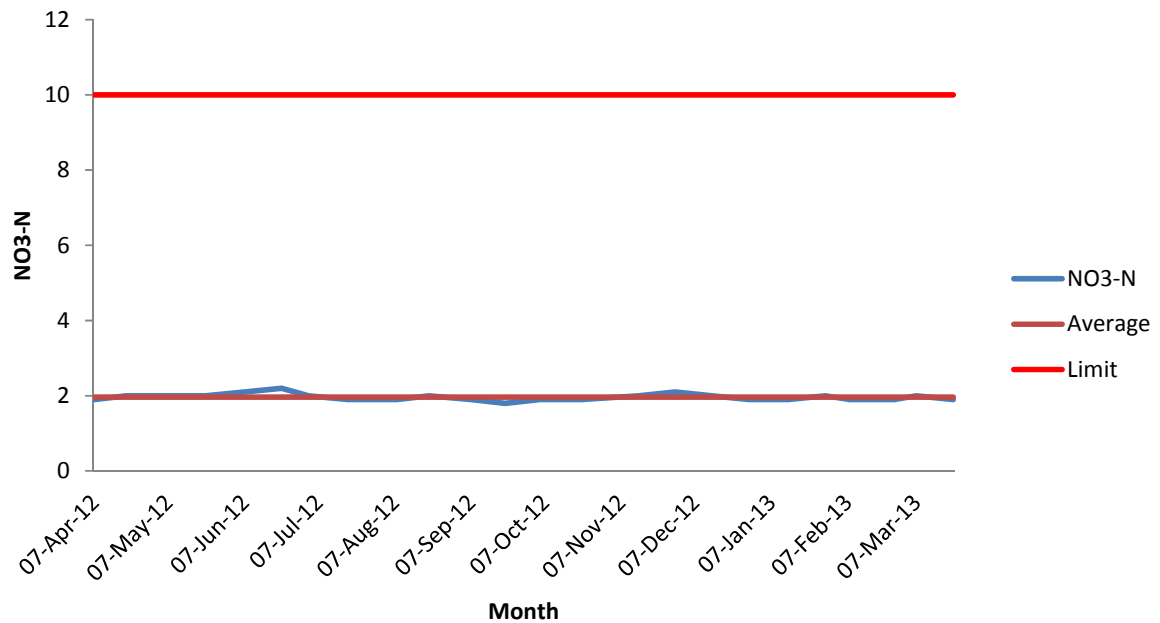
Graph for TSS of Outlet from Settling Pond Near Kanika Rly. Siding of Basundhara OCP of Basundhara Area



Graph for COD of Outlet from Settling Pond Near Kanika Rly. Siding of Basundhara OCP of Basundhara Area



Graph for NO3-N of Outlet from Settling Pond Near Kanika Rly. Siding of Basundhara OCP of Basundhara Area



Yearly Effluent Data

Area: Basundhara

Area	<i>Basundhara</i>	<i>Basundhara</i>
Project	<i>Basundhara (W) OCP</i>	<i>Kulda OCP</i>
Date of sampling	26-Nov-12	26-Nov-12
Name of the station	Outlet to Settling Pond Near Kanika Rly. Siding	Final Disch. Point of Mine
Colour	Acceptable	Acceptable
Odour	Agreeable	Agreeable
Temperature, °C	17.3	17.4
Amonical Nitrogen	0.13	0.28
TKN	2.16	2.20
BOD	10	8
Arsenic	<0.01	<0.01
Mercury	-	-
Lead	<0.05	<0.05
Cadmium	<0.01	<0.01
Hexavalent chromium	<0.01	<0.01
Total chromium	<0.1	<0.1
Copper	<0.02	<0.02
Zinc	0.10	0.10
Selenium	<0.01	<0.01
Nickel	<0.1	<0.1
Fluoride	0.23	0.55
Dissolved phosphate	0.20	0.30
Sulphide	0.004	0.004
Phenolics	<0.001	<0.001
Manganese	<0.05	<0.05
Iron	0.16	0.12

Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

TABLE--
NOISE LEVEL MONITORING DATA

AREA : **Basundhara**

PROJECT : **Basundhara (W) OCP**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
12-Apr-12	Excavation Workshop	53.4	47.8
30-Apr-12	Excavation Workshop	52.1	46.9
09-May-12	Excavation Workshop	54.9	49.8
31-May-12	Excavation Workshop	53.3	48.6
09-Jun-12	Excavation Workshop	55.2	49.8
30-Jun-12	Excavation Workshop	54.7	48.6
09-Jul-12	Excavation Workshop	55.1	49.1
31-Jul-12	Excavation Workshop	54.6	48.1
14-Aug-12	Excavation Workshop	55.5	49.0
31-Aug-12	Excavation Workshop	54.4	48.1
12-Sep-12	Excavation Workshop	55.3	49.8
29-Sep-12	Excavation Workshop	54.9	48.6
13-Oct-12	Excavation Workshop	55.5	49.8
31-Oct-12	Excavation Workshop	54.5	48.7
10-Nov-12	Excavation Workshop	55.1	49.2
27-Nov-12	Excavation Workshop	54.3	48.4
14-Dec-12	Excavation Workshop	53.8	47.5
31-Dec-12	Excavation Workshop	54.8	46.7
15-Jan-13	Excavation Workshop	55.1	47.7
31-Jan-13	Excavation Workshop	54.9	49.8
12-Feb-13	Excavation Workshop	53.2	48.9
28-Feb-13	Excavation Workshop	52.2	47.5
14-Mar-13	Excavation Workshop	51.4	48.6
30-Mar-13	Excavation Workshop	50.3	47.7
12-Apr-12	Kulapara Hamlet of Gopalpur Village	53.9	45.1
30-Apr-12	Kulapara Hamlet of Gopalpur Village	52.1	46.5
09-May-12	Kulapara Hamlet of Gopalpur Village	53.2	47.7
31-May-12	Kulapara Hamlet of Gopalpur Village	54.1	46.8
09-Jun-12	Kulapara Hamlet of Gopalpur Village	55.3	45.3
30-Jun-12	Kulapara Hamlet of Gopalpur Village	54.8	44.7

09-Jul-12	Kulapara Hamlet of Gopalpur Village	53.5	43.8
31-Jul-12	Kulapara Hamlet of Gopalpur Village	52.1	44.5
14-Aug-12	Kulapara Hamlet of Gopalpur Village	53.6	43.5
31-Aug-12	Kulapara Hamlet of Gopalpur Village	52.1	44.9
12-Sep-12	Kulapara Hamlet of Gopalpur Village	51.1	43.8
29-Sep-12	Kulapara Hamlet of Gopalpur Village	52.1	44.7
13-Oct-12	Kulapara Hamlet of Gopalpur Village	53.4	43.8
31-Oct-12	Kulapara Hamlet of Gopalpur Village	52.1	42.5
10-Nov-12	Kulapara Hamlet of Gopalpur Village	51.0	43.8
27-Nov-12	Kulapara Hamlet of Gopalpur Village	50.1	44.5
14-Dec-12	Kulapara Hamlet of Gopalpur Village	51.1	43.9
31-Dec-12	Kulapara Hamlet of Gopalpur Village	52.3	44.7
15-Jan-13	Kulapara Hamlet of Gopalpur Village	51.9	43.6
31-Jan-13	Kulapara Hamlet of Gopalpur Village	50.6	44.5
12-Feb-13	Kulapara Hamlet of Gopalpur Village	51.3	43.6
28-Feb-13	Kulapara Hamlet of Gopalpur Village	50.6	44.8
14-Mar-13	Kulapara Hamlet of Gopalpur Village	51.1	43.9
30-Mar-13	Kulapara Hamlet of Gopalpur Village	50.4	44.6

PROJECT : **Kulda OCP**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
12-Apr-12	Karlikachhar Village	53.8	44.1
30-Apr-12	Karlikachhar Village	52.1	43.8
09-May-12	Karlikachhar Village	53.1	44.2
31-May-12	Karlikachhar Village	52.5	43.9
09-Jun-12	Karlikachhar Village	53.8	44.1
30-Jun-12	Karlikachhar Village	52.1	43.8
09-Jul-12	Karlikachhar Village	51.6	42.5
31-Jul-12	Karlikachhar Village	50.3	43.5
14-Aug-12	Karlikachhar Village	51.1	44.3
31-Aug-12	Karlikachhar Village	50.6	43.3
12-Sep-12	Karlikachhar Village	51.4	44.3
29-Sep-12	Karlikachhar Village	52.6	43.7
13-Oct-12	Karlikachhar Village	53.5	44.1
31-Oct-12	Karlikachhar Village	52.1	43.9
10-Nov-12	Karlikachhar Village	51.4	44.7
27-Nov-12	Karlikachhar Village	52.3	43.2

14-Dec-12	Karlikachhar Village	51.4	42.8
31-Dec-12	Karlikachhar Village	52.3	43.9
15-Jan-13	Karlikachhar Village	51.4	44.6
31-Jan-13	Karlikachhar Village	50.8	43.5
12-Feb-13	Karlikachhar Village	51.3	44.1
28-Feb-13	Karlikachhar Village	50.3	43.4
14-Mar-13	Karlikachhar Village	51.2	44.1
30-Mar-13	Karlikachhar Village	50.6	43.9
12-Apr-12	Near Kulda P.O	62.3	55.2
30-Apr-12	Near Kulda P.O	61.3	54.7
09-May-12	Near Kulda P.O	62.3	58.8
31-May-12	Near Kulda P.O	61.3	54.5
09-Jun-12	Near Kulda P.O	62.7	55.5
30-Jun-12	Near Kulda P.O	61.6	56.3
09-Jul-12	Near Kulda P.O	60.1	55.3
31-Jul-12	Near Kulda P.O	61.3	54.8
14-Aug-12	Near Kulda P.O	60.9	53.7
31-Aug-12	Near Kulda P.O	61.3	52.8
12-Sep-12	Near Kulda P.O	60.8	53.4
29-Sep-12	Near Kulda P.O	61.2	54.3
13-Oct-12	Near Kulda P.O	60.1	53.5
31-Oct-12	Near Kulda P.O	61.6	54.2
10-Nov-12	Near Kulda P.O	60.4	53.4
27-Nov-12	Near Kulda P.O	61.4	54.6
14-Dec-12	Near Kulda P.O	60.7	55.4
31-Dec-12	Near Kulda P.O	61.1	54.8
15-Jan-13	Near Kulda P.O	60.8	53.2
31-Jan-13	Near Kulda P.O	61.4	55.2
12-Feb-13	Near Kulda P.O	62.1	54.6
28-Feb-13	Near Kulda P.O	60.8	52.1
14-Mar-13	Near Kulda P.O	59.9	50.4
30-Mar-13	Near Kulda P.O	58.7	49.0

TABLE--
WELL WATER LEVEL MONITORING DATA

Area : Basundhara

<i>Date of sampling</i>	<i>Project</i>	<i>Name of the Station</i>	<i>Depth from GL (in m)</i>
12-Apr-12	Basundhara (W) OCP	Well at Bankibahal	4.14
12-Apr-12	Basundhara (W) OCP	Sardega Village Well	4.70
12-Apr-12	Basundhara (W) OCP	Tikilipara Village Well	3.84
12-Apr-12	Kulda OCP	Well at Kulda	3.25
12-Apr-12	Kulda OCP	Well at Balinga	4.06
14-Aug-12	Kulda OCP	Well at Kulda	2.92
14-Aug-12	Basundhara (W) OCP	Tikilipara Village Well	2.95
14-Aug-12	Basundhara (W) OCP	Sardega Village Well	3.45
14-Aug-12	Basundhara (W) OCP	Well at Bankibahal	3.84
14-Aug-12	Kulda OCP	Well at Balinga	2.90
12-Nov-12	Basundhara (W) OCP	Well at Bankibahal	3.89
12-Nov-12	Kulda OCP	Well at Balinga	2.93
12-Nov-12	Kulda OCP	Well at Kulda	2.84
12-Nov-12	Basundhara (W) OCP	Tikilipara Village Well	2.53
12-Nov-12	Basundhara (W) OCP	Sardega Village Well	3.64
10-Jan-13	Kulda OCP	Well at Balinga	2.36
10-Jan-13	Basundhara (W) OCP	Tikilipara Village Well	2.67
10-Jan-13	Basundhara (W) OCP	Sardega Village Well	3.84
10-Jan-13	Basundhara (W) OCP	Well at Bankibahal	2.90
10-Jan-13	Kulda OCP	Well at Kulda	3.25

SILTATION STUDY AT IB VALLEY COALFIELD

BASUNDHARA AREA

MONTH : July 2012

1st PHASE

Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	07.07.12	18
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	07.07.12	24

2ND PHASE

Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	21.07.12	24
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	21.07.12	28

SILTATION STUDY AT IB VALLEY COALFIELD

BASUNDHARA AREA

MONTH : August 2012

1st PHASE

Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	11.08.12	28
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	11.08.12	32

2ND PHASE

Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	25.08.12	30
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	25.08.12	34

SILTATION STUDY AT IB VALLEY COALFIELD

BASUNDHARA AREA

MONTH : September 2012

1st PHASE

Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	06.09.12	34
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	06.09.12	38

2ND PHASE

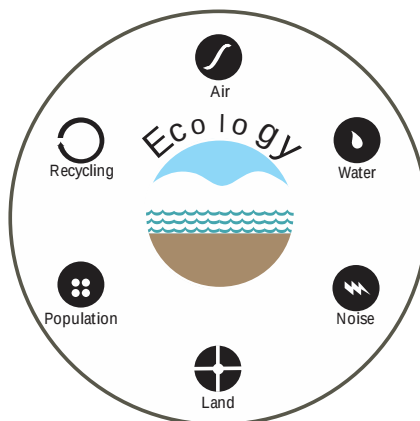
Area	Project	Monitoring Station	Date of Sampling	TSS
Basundhara	Basundhara (w)OCP	100m U/S of Basundhara Nallah from discharge point of Basundhara (w)	22.09.12	36
		100m D/S of Basundhara Nallah from discharge point of Basundhara (w)	22.09.12	40



Annual Compiled Monitoring Report Of Orient Area For 2012-2013

Ib Valley Coalfields

Mahanadi Coalfields Limited



Prepared by:



Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

Regional Institute-VII, OSHB Building, Bhubaneswar – 751 001 (Orissa)
[Assistance from Environment Division, CMPDI(HQs), Ranchi]

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CHAPTER-I

INTRODUCTION

1.1 Brief Description of the Mine

Orient Area, Mahanadi Coalfields Limited is located in Rampur tract of Ib Valley Coalfield in Jharsuguda district of Orissa. This area has three projects under its administrative control. The projects are Orient mine no 1 & 2, Orient mine no 3, Orient mine no 4.

Orient Area

Orient mine no 1 & 2 is situated between latitudes 21° 49' 30" to 21° 52' 00" (N) and longitudes 83° 52' 30" to 83° 54' 50" (E). Orient U/G Mine No.1&2 is located at a distance of about 2.5 km from Brajrajnagar Railway station on Howrah – Mumbai railway line. Jharsuguda – Raigarh road is at distance about 3.5 km from the mine. The area is approached by rail and road. The mine is situated at a distance 75 km from MCL(HQ), Sambalpur and 15 km from Jharsuguda district HQ.

The highest and lowest elevations of the area are 274 m and 230 m above mean sea level respectively.

The area is characterized by plain and gently sloping towards east.

The mean temperature ranges from 6.7° C (winter season) to 44.1°C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 2.0 to 3.0 kmph during the year against 2.0 to 8.0 kmph at 17:30 hr.

Orient Area

Orient mine no 3 project is located in Rampur tract of Ib Valley Coalfield in Jharsuguda district of Orissa. It is situated to the north-west of Lajkura OC Project. It is under administrative control of Orient area, MCL. It is bounded by latitudes 21° 49' 30" to 21° 52' 00" (N) and longitudes 83° 52' 30" to 83° 54' 50" (E).

Orient U/G Mine No.3 is situated west of Ib river and is about 2.5 km north of Brajarajnagar Railway station on Howrah Mumbai main line of the SE railway, which passes through the center of the coalfield. It is also well connected with Sambalpur and Jharsuguda by all weather motorable roads.

The area is characterized by plain and gently sloping towards east.

The highest and lowest elevations of the area are 236 m and 283 m above mean sea level respectively.

The mean temperature ranges from 6.7° C (winter season) to 44.1°C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 2.0 to 3.0 kmph during the year against 2.0 to 8.0 kmph at 17:30 hr

Orient Area

Orient mine no 4 is situated between latitudes 21° 51' 00" to 21° 54' 10" (N) and longitudes 83° 53' 16" to 83° 54' 22" (E). Orient U/G Mine No.4 is located at Gandghora village adjacent Jharsuguda- Raigarh Highway. It is 1km from Gandhi chowk towards raigarh. It is 15 km from Jharsuguda railway station and 6 km from Brajrajnagar railway station.

The highest and lowest elevations of the area are 239 m and 206 m above mean sea level respectively.

The area is characterized by undulating and rolling topography with an overall slope towards the IB river which flows from north to south.

The mean temperature ranges from 6.7° C (winter season) to 44.1°C (pre-monsoon cyclone season). The monthly mean wind speed at 8:30 hr. varies from 2.0 to 3.0 kmph during the year against 2.0 to 8.0 kmph at 17:30 hr

1.2 Frequency of Environmental Monitoring

(i) Ambient air quality monitoring

To assess the pollution level in ambient air of the area located in and around the coal mines/projects and also determine the efficacy of mitigation measures, regular monitoring of the following parameters is being carried out.

Respirable particulate matter (RPM)	:	One sample per fortnight
Suspended particulate matter (SPM)	:	
Sulphur dioxide (SO ₂)	:	
Nitrogen oxides (NO _x)	:	

(ii) Drinking water monitoring : Every month.

(iii) Effluent quality monitoring

1/4/5 parameters	: once in a fortnight/monthly i.e July, Aug. & Sept.
21 parameters	: Once in a year

(iv) Noise level monitoring : Once in a fortnight

1.3 Environmental Quality Monitoring Stations

The details of various environmental quality monitoring stations are given in are given below:

- **Air quality monitoring stations**

Sl.No. Name of Stations

Orient area

1. Orient mine no.2
2. Orient mine no.3
3. Orient mine no.4
4. HBI mine
5. HRC mine
6. Rampur colony
7. Near Adarsh Nagar Colony

- **Drinking water quality monitoring stations**

Sl.No. Name of Stations

1. Tap water at Budhijam Colony
2. Tap water at Rampur colony

- **Effluent quality monitoring station**

1. Mine discharge of Mine no 2
2. Mine discharge of Mine no 3
3. Mine discharge of Mine no 4
4. Mine discharge of HBI Mine
5. Mine discharge of HRC mine

- **Noise level monitoring stations**

Sl.No. Name of Stations

1. Orient mine no.2
2. Orient mine no.3
3. Orient mine no.4
4. HBI mine
5. HRC mine
6. Rampur colony
7. Near Adarsh Colony

CHAPTER-II

AIR ENVIRONMENT

2.1 Details of Air Quality Monitoring Stations

Details are given in Table-1.

Table-1

**Details of Air Quality Monitoring Stations
along with Sources of Pollution**

Sl.No.	Location	Sources of Pollution
Orient area		
1.	Orient mine no.2	Nearby mining activities.
2.	Orient mine no.3	Nearby mining activities.
3.	Orient mine no.4	Nearby mining activities.
4.	HBI mine	Nearby mining activities.
5.	HRC mine	Nearby mining activities.
6.	Rampur colony	Nearby mining activities.
7.	Near Adarsh Colony	Nearby mining activities.

2.2 Methodology and Instruments used for Air Quality Analysis

These are given in Table-2.

Table-2

Methodology and Instruments used for Air Quality Analysis

Sl.No.	Parameters	Method	Instruments
1	SPM and RPM	IS:5182 (Part-IV) (Gravimetric method)	High volume samplers, Respirable dust samplers & electronic balance, oven, etc.
2	SO ₂	IS:5182 (Part-II) (Sodium tetrachloro-mercurate method, also known as improved West and Gaeke Method) (Photometric method)	Milton-Roy Spectrophotometer.
3	NO _x	IS:5182 (Part-VI) (Jacob & Hoccheiser	-do-

Sl.No.	Parameters	Method	Instruments
		Modified Method) (Photometric method)	

2.3 Results

The results of analyses of air samples are given in Tables attached

2.4 Discussions

Examination of the levels of RPM, SPM, SO₂ and NO_x for all the air stations in Ib valley area reveals the following:

- In coal mining area like Orient mine no.2, the levels of RPM, SPM, SO₂ and NO_x are observed to be within the limits of the Standards for Coal Mines, barring a few aberrated value.
- In residential areas, all the values are found to be within the limits of the National Ambient Air Quality Standards (NAAQS) notified under Schedule-VII.

2.5 Control Measures

The following mitigatory measures are suggested to maintain the air quality within the stipulated standards:

- Water sprinkling on haul roads, coal loading and unloading sites at regular and frequent intervals by adding appropriate wetting agents.
- Provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers at haul roads and siding.
- Cleaning spillage from roads.
- Practice for covered transportation.
- Regular maintenance of all HEMMs and other machinery.
- Provision of gas filters for exhaust fumes.
- No overloading of trucks/dumpers.
- Application of innocuous chemical binders on haul roads.
- Development of thick greenbelts around the mines, infrastructure sites and residential area besides plantation on both sides of the roads on the surface using plant species having leaves of high efficacy dust catching nature.
- Drills with well-designed dust extractors/arrestors.
- Provision of dust extraction system for crusher house.
- Suppression of coal dust at CHP by provision of auto-start, time cycle controlled, fine nozzle mounted fixed sprinklers.

CHAPTER-III

WATER ENVIRONMENT

3.1 Methodology and Instruments used for water & effluent analysis

Details are given in Table-4.

Table-4

Methodology & Instruments used for Water and Effluent Analysis

Sl.No.	Parameters	Method/Instruments
1	PH	Electrometric/pH meter
2	Turbidity	Nephelometric/Nepheloturbidity meter
3	Total suspended solids, total dissolved solids, oil & grease and mineral oil	Gravimetric/oven, electronic balance
4	BOD	BOD test and titration/BOD incubator, pipette, burette, etc.
5	COD	Reactor digestion and titration/reactor digester
6	Coliform	MPN test/LTEK MPN kit.
7	Calcium, chloride, hardness, alkalinity	Titrimetric/pipette, burette, etc.
8	Cadmium, copper, iron, lead, manganese, mercury, nickel, total chromium & zinc	Selective absorption/atomic absorption spectro-photometer.
9	Ammonical nitrogen, arsenic, colour, dissolved phosphate, fluoride, hexavalent chromium, nitrate nitrogen phenolics, selenium, sulphate, sulphide, total residual chlorine, total Kjeldahl nitrogen & boron.	Photometric/DR 2000

3.2 Results

The results of analysis of water samples (Drinking) is given in Tables attached. Ground water level monitoring of various dug-wells are given in Tables attached.

3.3 Discussions

(a) Drinking water sample

The examination of analytical results of drinking water sample reveals the following :

- All physico-chemical parameters are well within the limits of the Indian Drinking Water Standard in the drinking water sample.

CHAPTER-IV

NOISE ENVIRONMENT

4.1 Methodology and Instruments used for Noise Level Measurement

Noise is measured in a weighted sound level i.e. dB(A) using a noise level meter once in day time (6:00 AM-10:00 PM) and once in night time (10:00 PM to 6:00 AM) for one day in each quarter from each station.

4.2 Results

The fortnightly noise level measurements for different stations are given in Tables attached

4.3 Discussions

The noise level monitoring data reveal the following:

- The noise level monitoring data of various stations are within the limits of the prescribed noise level standards.

4.4 Control Measures

The following control measures are recommended to maintain the noise levels within the permissible limits of the prescribed standards:

- Creation of thick greenbelts around the mines, infrastructure sites and residential colony besides avenue plantation on both sides of the roads on the surface using high noise attenuating plant species.
- Proper designing of plant and machinery by providing in-built mechanisms like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- HEMMs with sound proof cabin.
- Chute linings in CHP
- Personal protective devices to all persons working in high noise areas.

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

Project : **Orient Area** **(conc. in µg/cu.m.)**

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
04-Apr-12	HBI Mine	333	132	36	42	West to east & sunny
19-Apr-12	HBI Mine	355	148	42	48	West to east & sunny
11-May-12	HBI Mine	358	122	40	47	West to east hot & sunny
29-May-12	HBI Mine	334	128	36	44	West to east hot & sunny
06-Jun-12	HBI Mine	259	106	32	38	East to west hot & sunny
27-Jun-12	HBI Mine	218	92	33	38	East to west & cloudy rain fall
06-Jul-12	HBI Mine	307	114	34	41	East to west hot & sunny
21-Jul-12	HBI Mine	151	92	30	35	West to east ,cloudy & evening rainfall
07-Aug-12	HBI Mine	176	81	24	32	West to east ,cloudy & rainfall
21-Aug-12	HBI Mine	191	88	27	35	West to east & cloudy

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

06-Sep-12	HBI Mine	240	93	32	40	West to east sunny & cloudy
22-Sep-12	HBI Mine	251	87	29	33	West to east sunny & cloudy
12-Oct-12	HBI Mine	263	83	30	34	East to west sunny & cloudy
27-Oct-12	HBI Mine	208	103	26	33	East to west sunny & cloudy
14-Nov-12	HBI Mine	219	110	24	31	East to west sunny & cloudy
29-Nov-12	HBI Mine	204	106	25	30	East to west & sunny
14-Dec-12	HBI Mine	227	113	24	38	East to west & sunny
27-Dec-12	HBI Mine	235	115	24	27	East to west & sunny
14-Jan-13	HBI Mine	213	108	21	24	East to west & sunny
29-Jan-13	HBI Mine	282	119	25	27	East to west & sunny
14-Feb-13	HBI Mine	221	107	23	25	West to east cloudy & rainfall
28-Feb-13	HBI Mine	231	112	24	26	East to west & sunny

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : Orient

14-Mar-13	HBI Mine	243	109	26	29	East to west & sunny
29-Mar-13	HBI Mine	270	122	25	29	East to west hot & sunny
04-Apr-12	HRC Mine	288	136	34	40	West to east & sunny
19-Apr-12	HRC Mine	375	151	42	50	West to east & sunny
14-May-12	HRC Mine	288	105	34	40	East to west hot & sunny
29-May-12	HRC Mine	305	114	36	45	West to east hot & sunny
06-Jun-12	HRC Mine	287	122	34	40	East to west hot & sunny
27-Jun-12	HRC Mine	236	91	32	38	East to west & cloudy rain fall
06-Jul-12	HRC Mine	286	110	30	36	East to west hot & sunny
21-Jul-12	HRC Mine	182	98	32	36	East to west ,cloudy & evening rainfall
06-Aug-12	HRC Mine	175	76	27	35	East to west ,cloudy & heavy rainfall
21-Aug-12	HRC Mine	232	90	30	37	East to west cloudy & evening rainfall

MoEF Standards Notification
dated 25th September,2000

600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

05-Sep-12	HRC Mine	258	89	27	35	East to west cloudy & rainfall
21-Sep-12	HRC Mine	278	99	39	43	East to west & sunny
11-Oct-12	HRC Mine	283	96	31	36	West to east & sunny
26-Oct-12	HRC Mine	280	119	28	36	West to east & cloudy
09-Nov-12	HRC Mine	264	103	23	30	West to east cloudy & evening rainfall
24-Nov-12	HRC Mine	252	98	21	27	West to east & sunny
13-Dec-12	HRC Mine	234	102	23	26	West to east & cloudy
26-Dec-12	HRC Mine	264	108	25	28	West to east & sunny
11-Jan-13	HRC Mine	283	127	26	29	West to east & sunny
26-Jan-13	HRC Mine	297	131	28	31	West to east & sunny
13-Feb-13	HRC Mine	256	124	26	28	East to west sunny & evening rainfall
27-Feb-13	HRC Mine	264	131	28	30	West to east & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : Orient

13-Mar-13	HRC Mine	285	139	28	31	West to east sunny & cloudy
29-Mar-13	HRC Mine	314	136	29	31	West to east hot & sunny
04-Apr-12	Near Adarsh Nagar Colony	245	117	24	30	West to east hot & sunny
20-Apr-12	Near Adarsh Nagar Colony	222	99	24	30	East to west hot & sunny
08-May-12	Near Adarsh Nagar Colony	236	89	28	34	East to west hot & sunny
23-May-12	Near Adarsh Nagar Colony	277	108	30	35	East to west hot & sunny
08-Jun-12	Near Adarsh Nagar Colony	216	81	24	30	East to west hot & sunny
26-Jun-12	Near Adarsh Nagar Colony	165	72	24	28	East to west sunny & cloudy
08-Jul-12	Near Adarsh Nagar Colony	212	74	24	29	East to west hot & sunny
24-Jul-12	Near Adarsh Nagar Colony	165	60	20	24	East to west & cloudy
03-Aug-12	Near Adarsh Nagar Colony	189	88	22	28	West to east ,cloudy & rainfall
18-Aug-12	Near Adarsh Nagar Colony	201	81	25	31	West to east ,cloudy & rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : Orient

04-Sep-12	Near Adarsh Nagar Colony	229	85	30	37	West to east sunny & cloudy evening rain fall
19-Sep-12	Near Adarsh Nagar Colony	197	73	21	26	West to east & cloudy
08-Oct-12	Near Adarsh Nagar Colony	212	79	25	29	East to west & sunny
25-Oct-12	Near Adarsh Nagar Colony	210	99	23	28	East to west & sunny
06-Nov-12	Near Adarsh Nagar Colony	200	103	25	30	East to west & sunny
22-Nov-12	Near Adarsh Nagar Colony	194	92	21	25	East to west & cloudy
10-Dec-12	Near Adarsh Nagar Colony	172	90	22	24	East to west & sunny
25-Dec-12	Near Adarsh Nagar Colony	167	96	24	26	East to west & sunny
08-Jan-13	Near Adarsh Nagar Colony	185	107	23	26	East to west & sunny
23-Jan-13	Near Adarsh Nagar Colony	197	102	22	25	East to west & sunny
08-Feb-13	Near Adarsh Nagar Colony	201	105	23	26	West to east & sunny
22-Feb-13	Near Adarsh Nagar Colony	217	118	25	27	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : Orient

08-Mar-13	Near Adarsh Nagar Colony	230	124	24	28	East to west sunny & cloudy
23-Mar-13	Near Adarsh Nagar Colony	242	128	23	27	East to west hot & sunny
09-Apr-12	Orient Mine No.2	356	125	30	36	West to east & sunny
25-Apr-12	Orient Mine No.2	374	139	38	44	West to east & sunny
14-May-12	Orient Mine No.2	364	126	38	44	East to west hot & sunny
29-May-12	Orient Mine No.2	322	136	38	44	West to east hot & sunny
14-Jun-12	Orient Mine No.2	326	117	34	39	West to east hot & sunny
29-Jun-12	Orient Mine No.2	206	84	31	37	East to west & cloudy rain fall
14-Jul-12	Orient Mine No.2	284	116	36	42	East to west hot & sunny
30-Jul-12	Orient Mine No.2	132	74	24	28	East to west ,cloudy & rainfall
06-Aug-12	Orient Mine No.2	152	79	29	34	East to west cloudy & heavy rainfall
21-Aug-12	Orient Mine No.2	222	97	28	35	East to west cloudy & evening rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

05-Sep-12	Orient Mine No.2	204	87	23	30	East to west cloudy & rainfall
21-Sep-12	Orient Mine No.2	236	91	28	33	East to west & sunny
12-Oct-12	Orient Mine No.2	272	94	30	34	East to west sunny & cloudy
27-Oct-12	Orient Mine No.2	232	109	28	35	East to west sunny & cloudy
14-Nov-12	Orient Mine No.2	227	102	24	30	East to west sunny & cloudy
29-Nov-12	Orient Mine No.2	214	96	22	28	East to west & sunny
14-Dec-12	Orient Mine No.2	221	105	24	29	East to west & sunny
27-Dec-12	Orient Mine No.2	237	105	23	28	East to west & sunny
14-Jan-13	Orient Mine No.2	251	109	24	28	East to west & sunny
29-Jan-13	Orient Mine No.2	262	110	26	29	West to east & sunny
14-Feb-13	Orient Mine No.2	241	115	24	26	West to east cloudy & rainfall
28-Feb-13	Orient Mine No.2	252	129	26	29	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Orient***

14-Mar-13	Orient Mine No.2	270	133	27	30	East to west & sunny
29-Mar-13	Orient Mine No.2	284	137	23	25	East to west hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Orient***

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>(conc. in µg/cu.m.)</i>				<i>Remarks</i>
09-Apr-12	Orient Mine No.3	SPM	RPM	SO ₂	NO _x	West to east & sunny
25-Apr-12	Orient Mine No.3	286	144	36	40	West to east & sunny
14-May-12	Orient Mine No.3	395	166	40	48	East to west hot & sunny
30-May-12	Orient Mine No.3	308	127	40	45	East to west hot & sunny
14-Jun-12	Orient Mine No.3	326	117	36	44	East to west hot & sunny
29-Jun-12	Orient Mine No.3	308	105	34	40	East to west hot & sunny
14-Jul-12	Orient Mine No.3	218	92	34	39	West to east sunny & cloudy
30-Jul-12	Orient Mine No.3	328	129	38	46	East to west hot & sunny
06-Aug-12	Orient Mine No.3	111	68	24	27	East to west ,cloudy & rainfall
21-Aug-12	Orient Mine No.3	169	86	28	38	East to west cloudy & heavy rainfall
		208	87	25	32	East to west cloudy & evening rainfall

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

05-Sep-12	Orient Mine No.3	230	93	29	36	East to west cloudy & rainfall
21-Sep-12	Orient Mine No.3	264	83	24	28	East to west & sunny
12-Oct-12	Orient Mine No.3	251	80	22	27	East to west sunny & cloudy
27-Oct-12	Orient Mine No.3	224	105	25	31	East to west sunny & cloudy
14-Nov-12	Orient Mine No.3	243	114	27	36	East to west sunny & cloudy
29-Nov-12	Orient Mine No.3	237	109	26	31	East to west & sunny
14-Dec-12	Orient Mine No.3	249	117	27	32	East to west & sunny
28-Dec-12	Orient Mine No.3	228	110	21	27	East to west & sunny
14-Jan-13	Orient Mine No.3	215	114	23	27	East to west & sunny
29-Jan-13	Orient Mine No.3	208	101	21	23	West to east & sunny
14-Feb-13	Orient Mine No.3	198	97	20	23	West to east cloudy & rainfall
28-Feb-13	Orient Mine No.3	210	110	22	24	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Orient***

14-Mar-13	Orient Mine No.3	227	118	25	27	East to west & sunny
29-Mar-13	Orient Mine No.3	241	124	22	26	East to west hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : ***Orient***

<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO₂</i>	<i>NO_x</i>	<i>Remarks</i>
09-Apr-12	Orient Mine No.4	322	131	36	40	West to east & sunny
25-Apr-12	Orient Mine No.4	354	124	36	40	West to east & sunny
14-May-12	Orient Mine No.4	245	86	32	36	East to west hot & sunny
30-May-12	Orient Mine No.4	305	122	36	41	East to west hot & sunny
14-Jun-12	Orient Mine No.4	314	119	35	42	East to west hot & sunny
29-Jun-12	Orient Mine No.4	221	102	33	40	West to east sunny & cloudy
14-Jul-12	Orient Mine No.4	316	134	38	45	East to west hot & sunny
30-Jul-12	Orient Mine No.4	114	70	25	29	East to west ,cloudy & rainfall
06-Aug-12	Orient Mine No.4	133	69	25	32	East to west cloudy & heavy rainfall
21-Aug-12	Orient Mine No.4	189	74	31	36	East to west cloudy & evening rainfall

MoEF Standards Notification dated 25th September,2000	600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

05-Sep-12	Orient Mine No.4	225	82	26	32	East to west cloudy & rainfall
21-Sep-12	Orient Mine No.4	247	78	30	37	East to west & sunny
12-Oct-12	Orient Mine No.4	258	83	32	36	East to west sunny & cloudy
27-Oct-12	Orient Mine No.4	216	97	26	34	East to west sunny & cloudy
14-Nov-12	Orient Mine No.4	224	107	25	35	East to west sunny & cloudy
29-Nov-12	Orient Mine No.4	216	101	27	32	East to west & sunny
14-Dec-12	Orient Mine No.4	235	109	25	30	East to west & sunny
28-Dec-12	Orient Mine No.4	254	102	27	30	East to west & sunny
14-Jan-13	Orient Mine No.4	209	101	24	26	East to west & sunny
29-Jan-13	Orient Mine No.4	224	108	23	25	East to west & sunny
14-Feb-13	Orient Mine No.4	210	101	22	24	West to east cloudy & rainfall
28-Feb-13	Orient Mine No.4	245	127	25	27	East to west & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : Orient

14-Mar-13	Orient Mine No.4	261	131	24	28	East to west & sunny
29-Mar-13	Orient Mine No.4	269	134	24	27	East to west hot & sunny

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600	300	120	120

TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

<i>Project :</i>	<i>Orient Area</i>	<i>(conc. in µg/cu.m.)</i>				
<i>Date of Sampling</i>	<i>Monitoring Station</i>	<i>SPM</i>	<i>RPM</i>	<i>SO2</i>	<i>NOx</i>	<i>Remarks</i>
04-Apr-12	Rampur Colony	265	114	26	32	West to east & sunny
19-Apr-12	Rampur Colony	313	124	28	33	West to east & sunny
11-May-12	Rampur Colony	231	94	30	36	West to east hot & sunny
29-May-12	Rampur Colony	302	104	32	36	West to east hot & sunny
06-Jun-12	Rampur Colony	201	82	24	30	East to west hot & sunny
27-Jun-12	Rampur Colony	203	67	23	28	East to west & cloudy rain fall
06-Jul-12	Rampur Colony	207	76	25	30	East to west hot & sunny
21-Jul-12	Rampur Colony	118	66	22	25	West to east ,cloudy & evening rainfall
07-Aug-12	Rampur Colony	199	91	28	39	West to east ,cloudy & rainfall
22-Aug-12	Rampur Colony	242	87	22	31	West to east & cloudy

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TABLE--
AMBIENT AIR QUALITY DATA

Area : **Orient**

06-Sep-12	Rampur Colony	199	82	25	33	West to east sunny & cloudy
22-Sep-12	Rampur Colony	212	76	20	25	West to east sunny & cloudy
11-Oct-12	Rampur Colony	240	81	27	31	West to east & sunny
26-Oct-12	Rampur Colony	221	114	24	28	West to east & cloudy
09-Nov-12	Rampur Colony	201	109	20	27	West to east cloudy & evening rainfall
24-Nov-12	Rampur Colony	194	113	23	29	West to east & sunny
13-Dec-12	Rampur Colony	185	108	21	25	West to east & cloudy
27-Dec-12	Rampur Colony	198	112	23	26	West to east & sunny
11-Jan-13	Rampur Colony	217	109	21	25	West to east & sunny
26-Jan-13	Rampur Colony	256	114	23	27	East to west & sunny
13-Feb-13	Rampur Colony	210	107	21	23	East to west sunny & evening rainfall
27-Feb-13	Rampur Colony	237	114	23	25	West to east & sunny

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600 300 120 120

TABLE--
AMBIENT AIR QUALITY DATA

Area : *Orient*

13-Mar-13	Rampur Colony	247	120	24	28	West to east sunny & cloudy
29-Mar-13	Rampur Colony	284	127	26	29	West to east hot & sunny

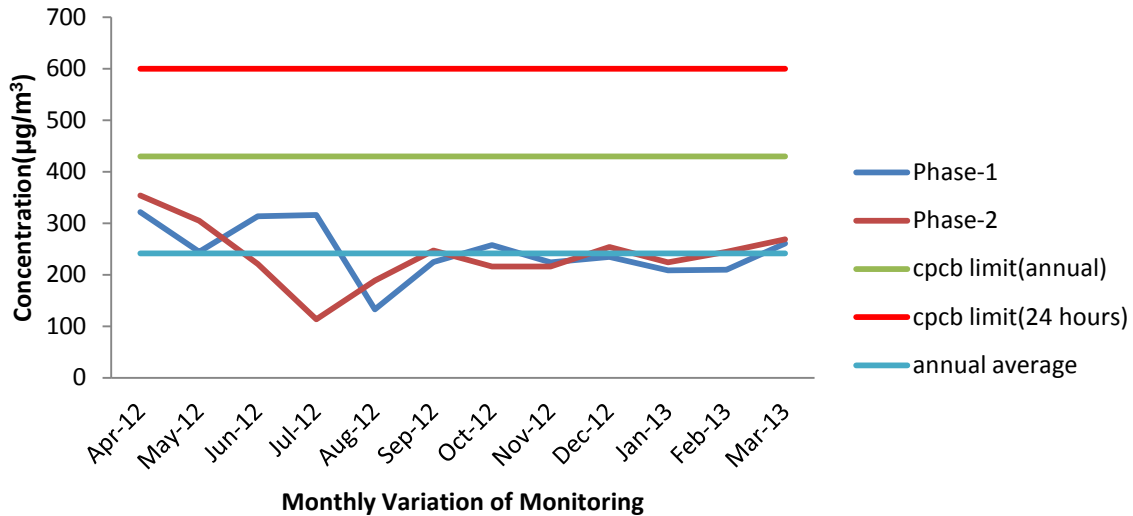
MoEF Standards Notification dated 25th September,2000

600	300	120	120

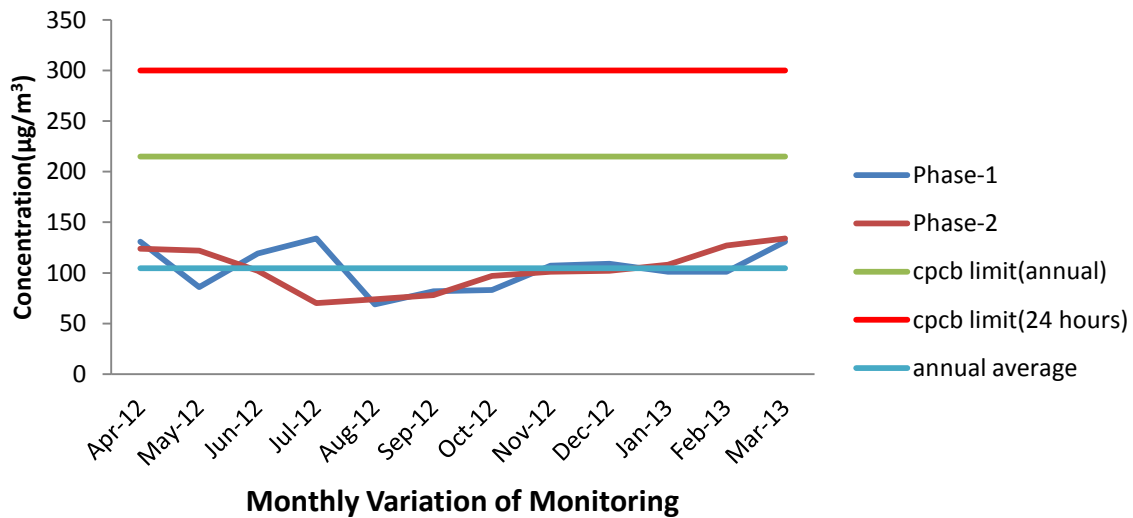


Air Quality Graph of Orient Area

Graph-1: SPM monitoring of HBI Mine of Orient Area.



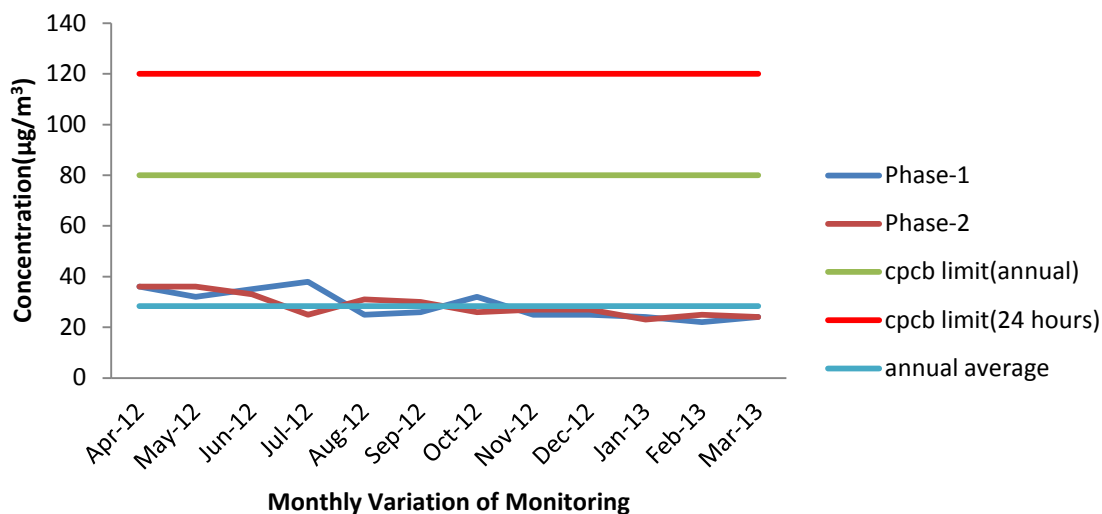
Graph-2: RPM monitoring of HBI Mine of Orient Area.



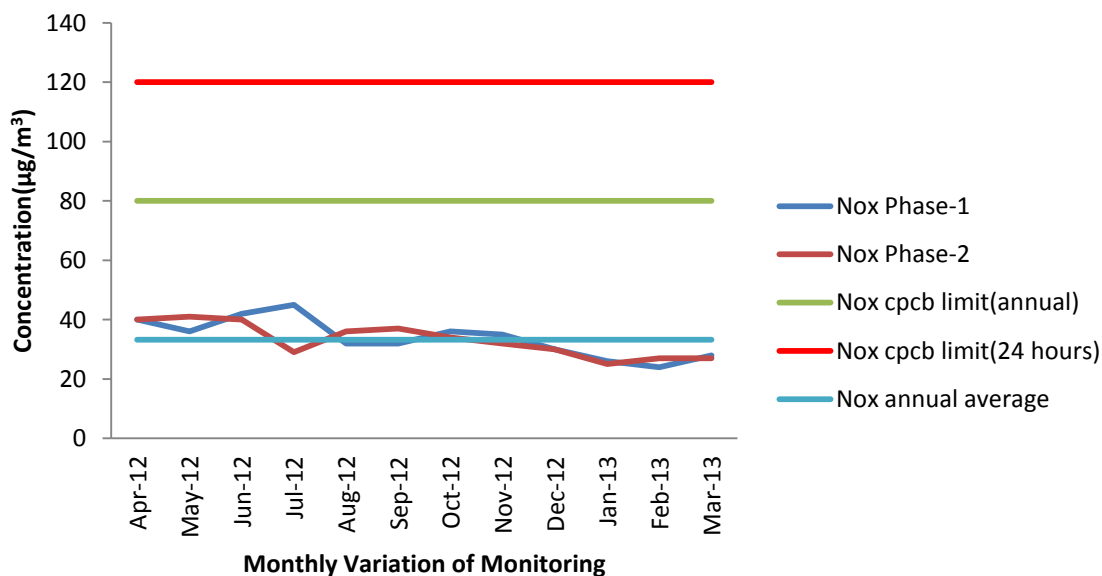


Air Quality Graph of Orient Area

Graph-3: So_x monitoring of HBI Mine of Orient Area.



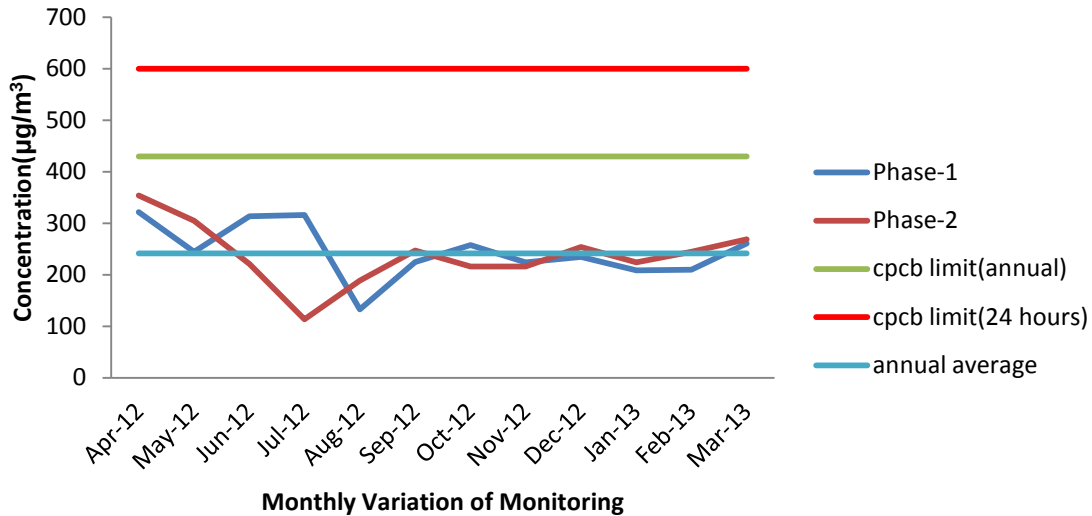
Graph-4: No_x monitoring of HBI Mine of Orient Area.



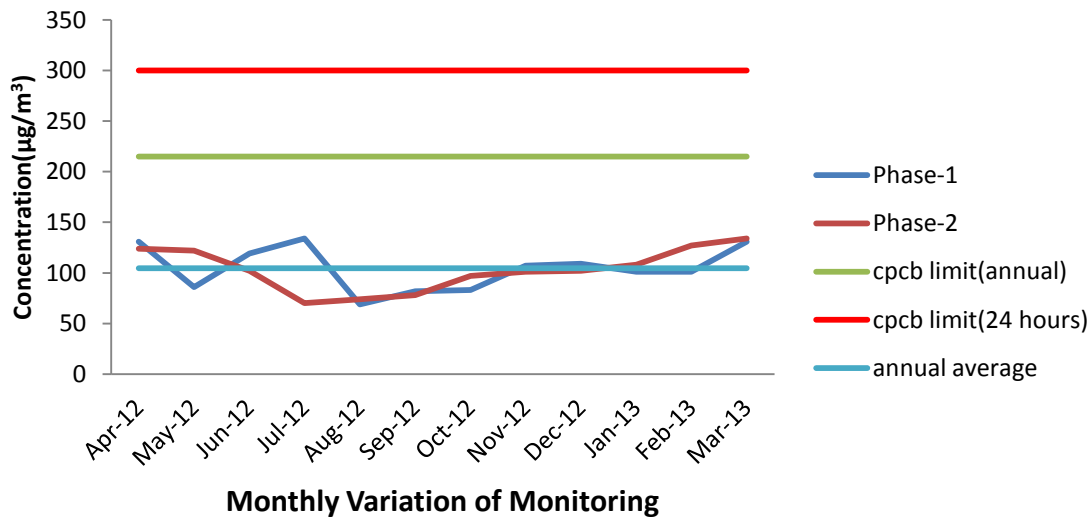


Air Quality Graph of Orient Area

Graph-5: SPM monitoring of HRC Mine of Orient Area.



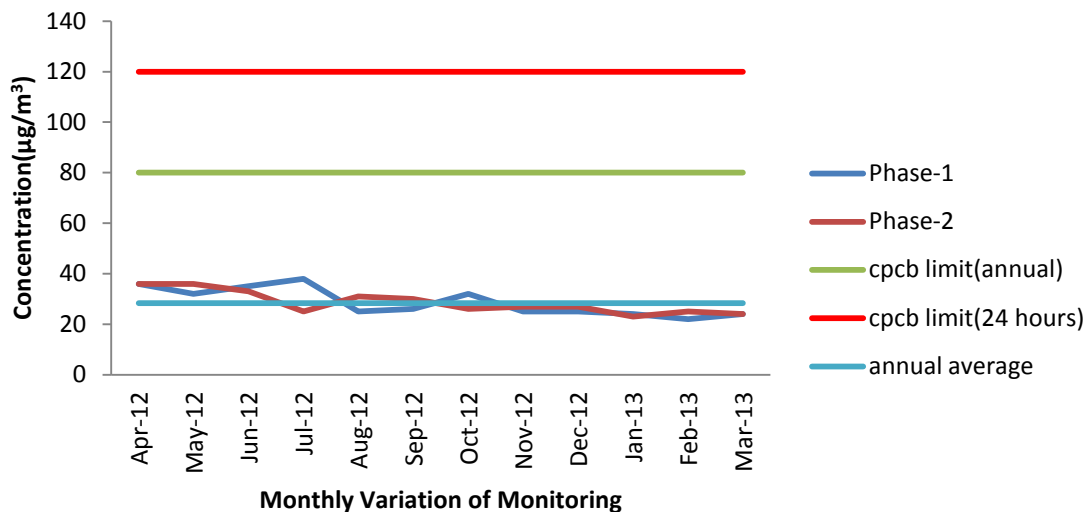
Graph-6: RPM monitoring of HRC Mine of Orient Area.



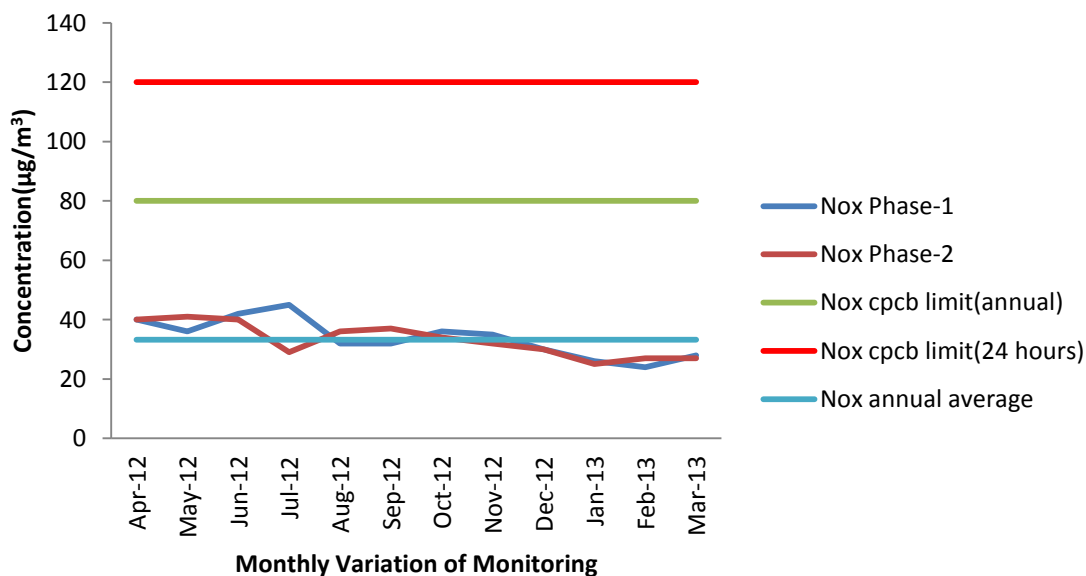


Air Quality Graph of Orient Area

Graph-7: So_x monitoring of HRC Mine of Orient Area.



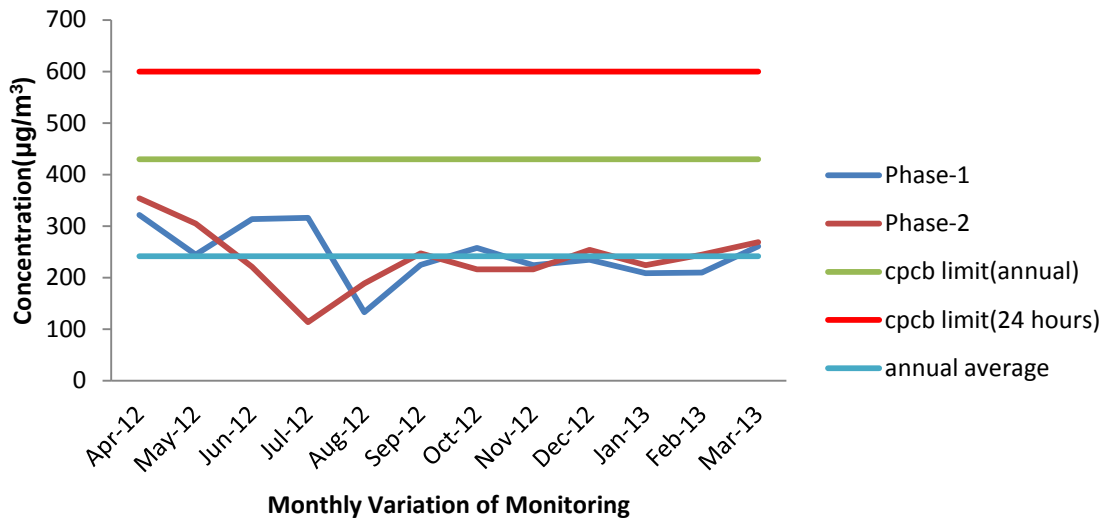
Graph-8: No_x monitoring of HRC Mine of Orient Area.



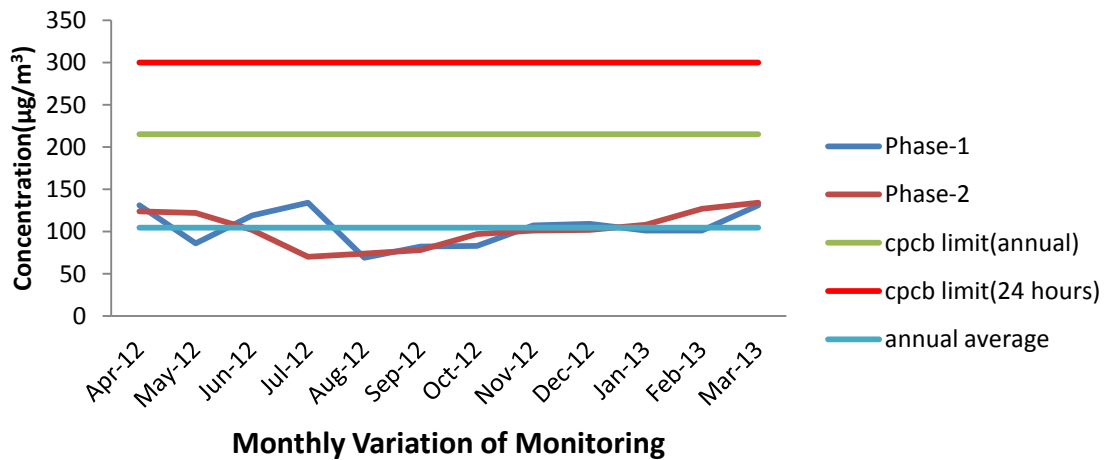


Air Quality Graph of Orient Area

Graph-9: SPM monitoring of Orient Mine No.3 of Orient Area.



Graph-10: RPM monitoring of Orient Mine No.3 of Orient Area.



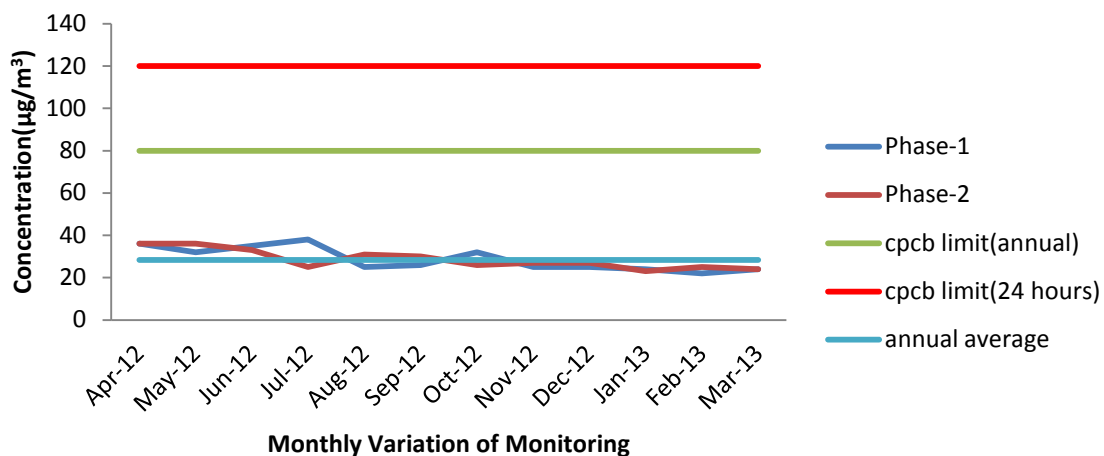
Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

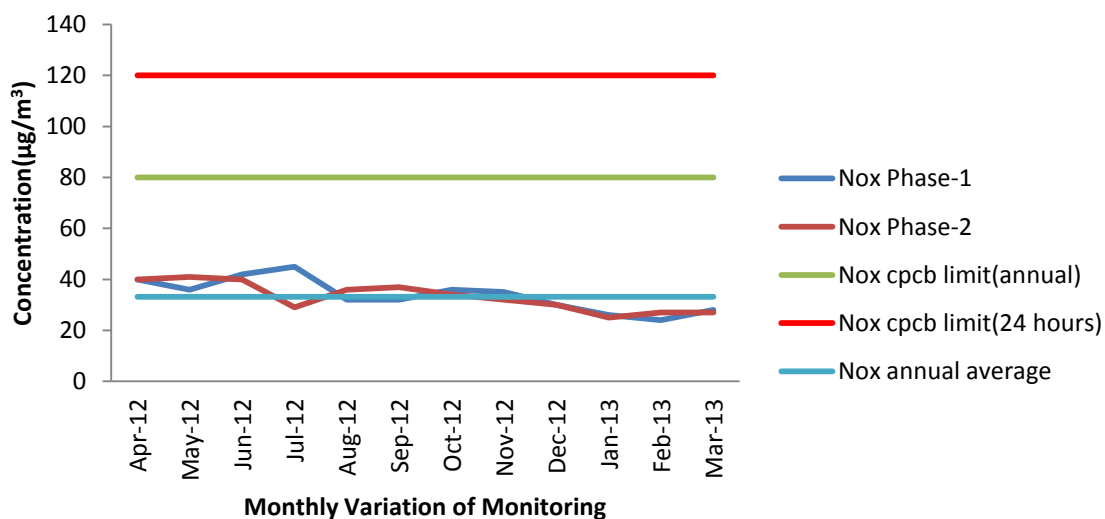


Air Quality Graph of Orient Area

Graph-11: SO_x monitoring of Orient Mine No.3 of Orient Area.



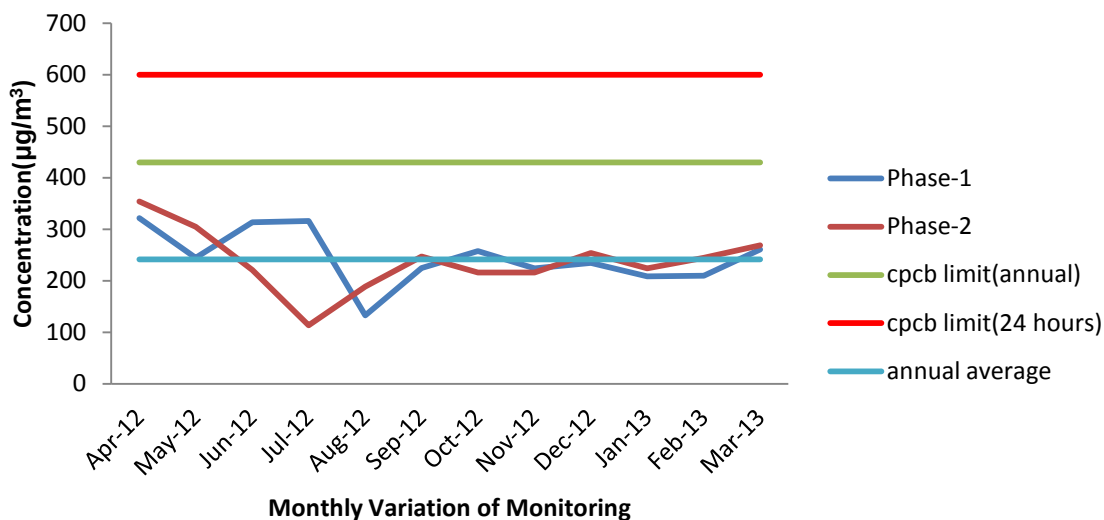
Graph-12: NO_x monitoring of Orient Mine No. 3 of Orient Area.



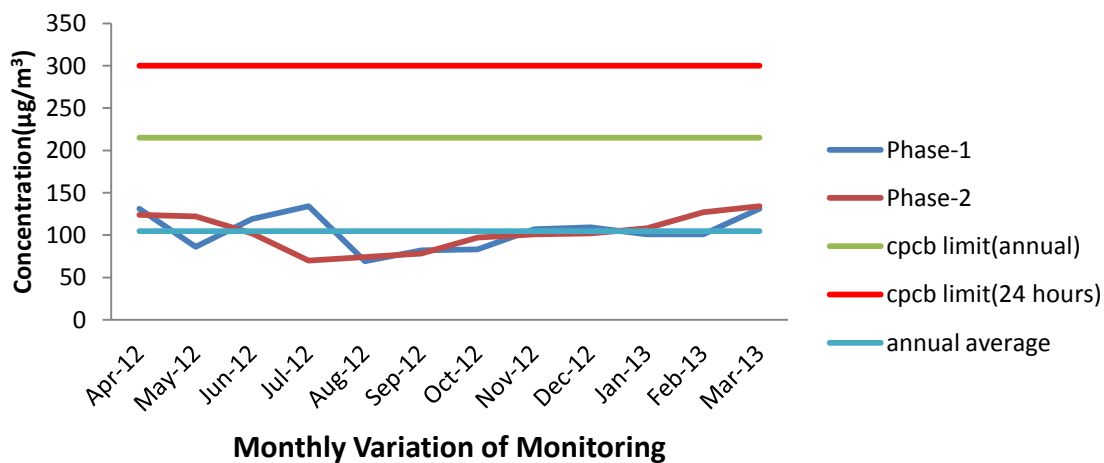


Air Quality Graph of Orient Area

Graph-13: SPM monitoring of Orient Mine No.2 of Orient Area.



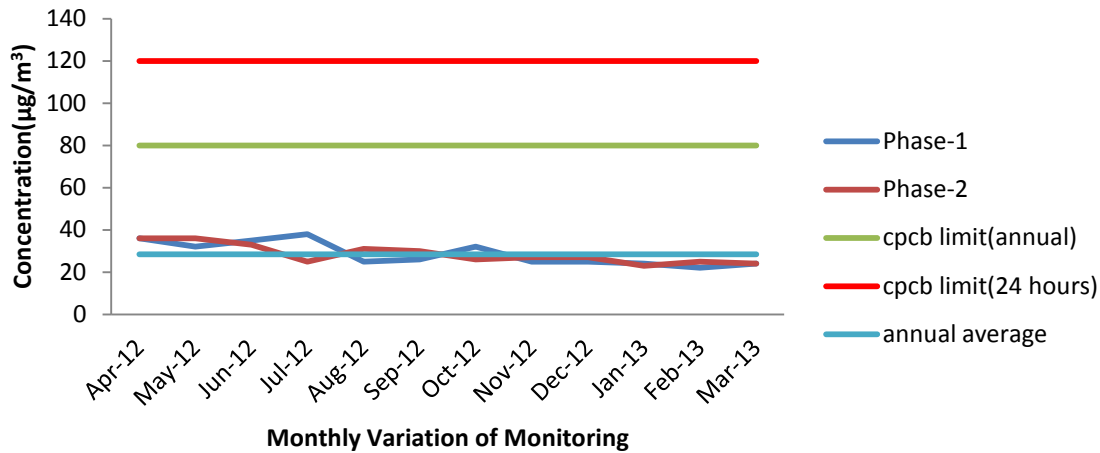
Graph-14: RPM monitoring of Orient Mine No.2 of Orient Area.



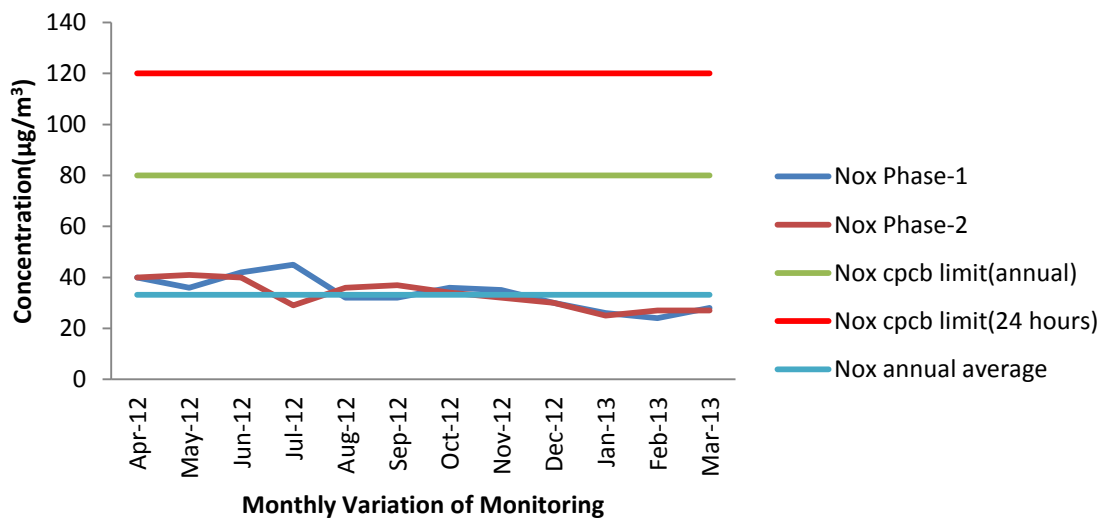


Air Quality Graph of Orient Area

Graph-15: So_x monitoring of Orient Mine No.2 of Orient Area.



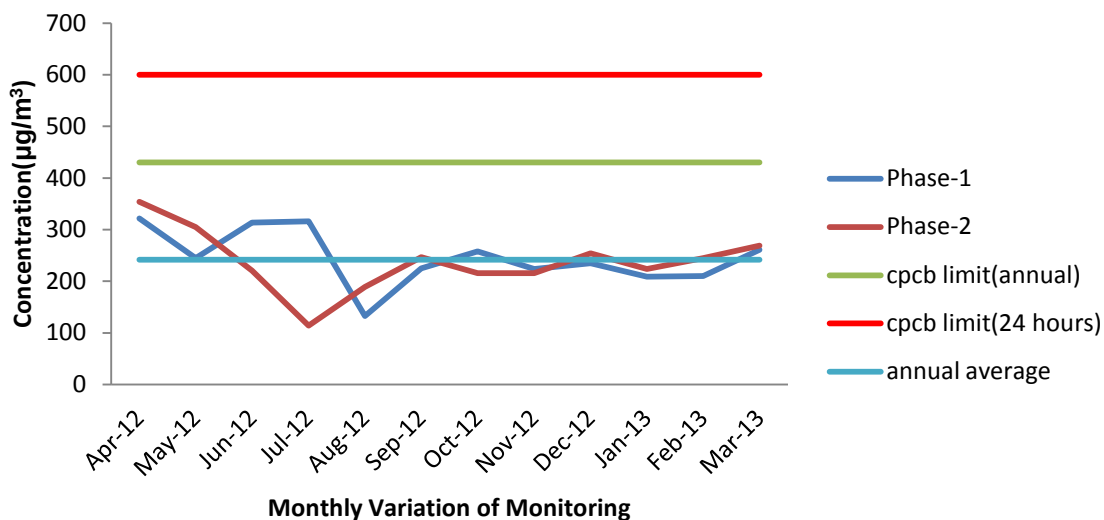
Graph-16: No_x monitoring of Orient Mine No.2 of Orient Area.



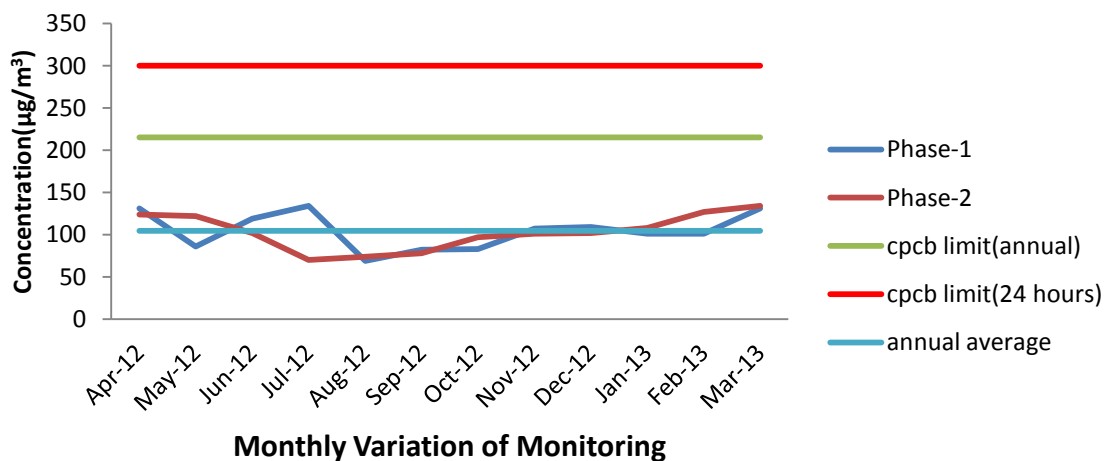


Air Quality Graph of Orient Area

**Graph-17: SPM monitoring of Orient mine
No. 4 of Orient Area.**



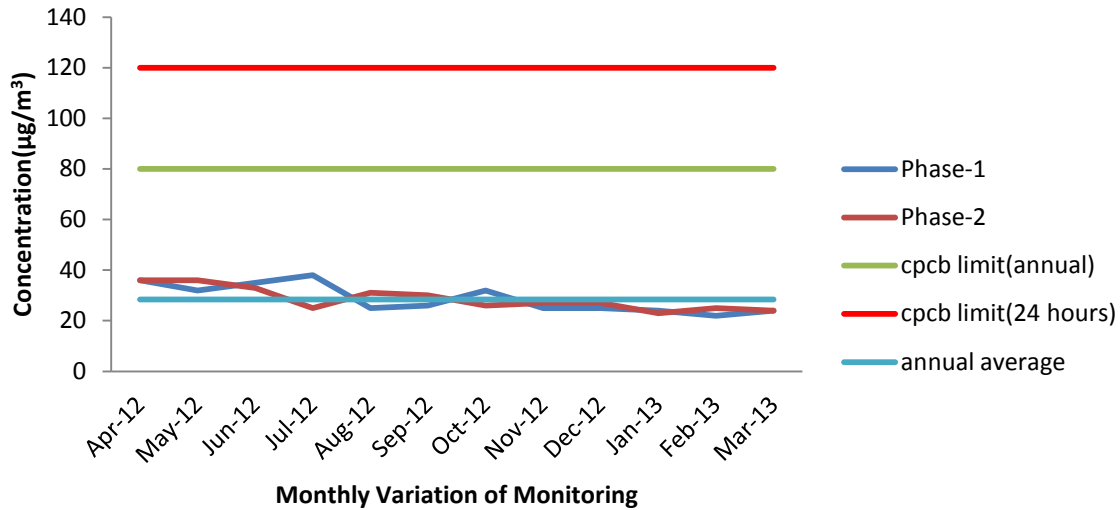
**Graph-18: RPM monitoring of Orient mine
No. 4 of Orient Area.**



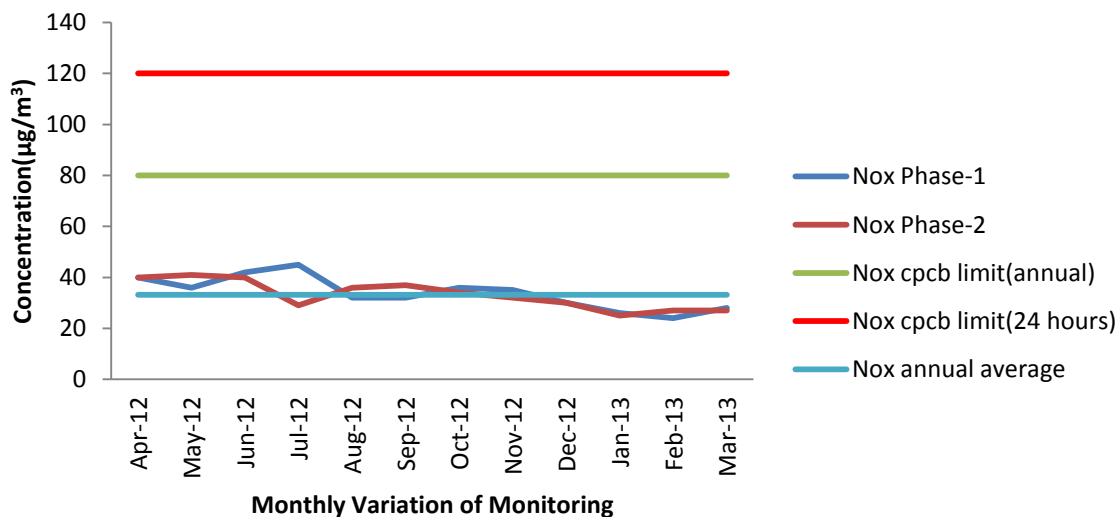


Air Quality Graph of Orient Area

Graph-19: So_x monitoring of Orient mine No. 4 of Orient Area.



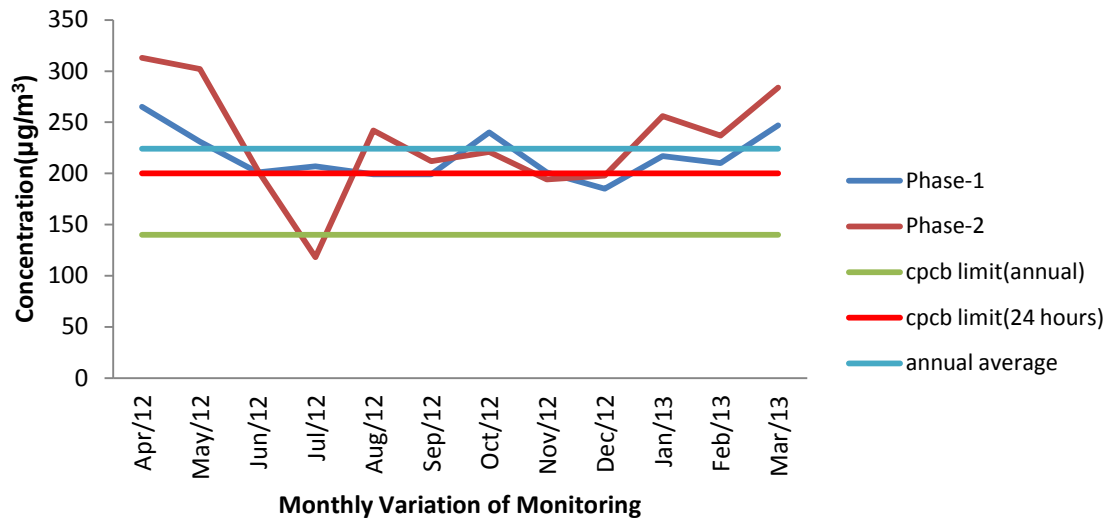
Graph-20: No_x monitoring of Orient mine No. 4 of Orient Area.



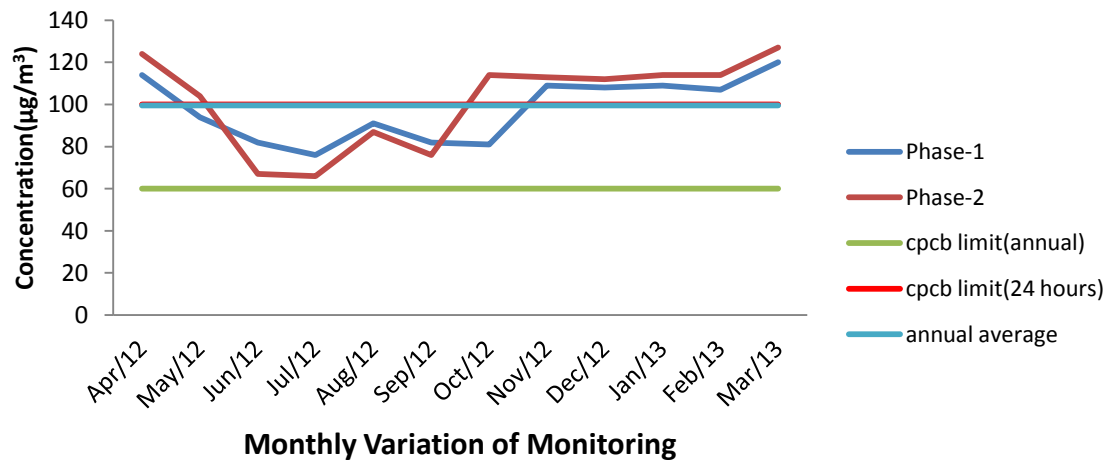


Air Quality Graph of Orient Area

Graph-21: SPM monitoring of Rampur Colony of Orient Area.



Graph-22: RPM monitoring of Rampur Colony of Orient Area.



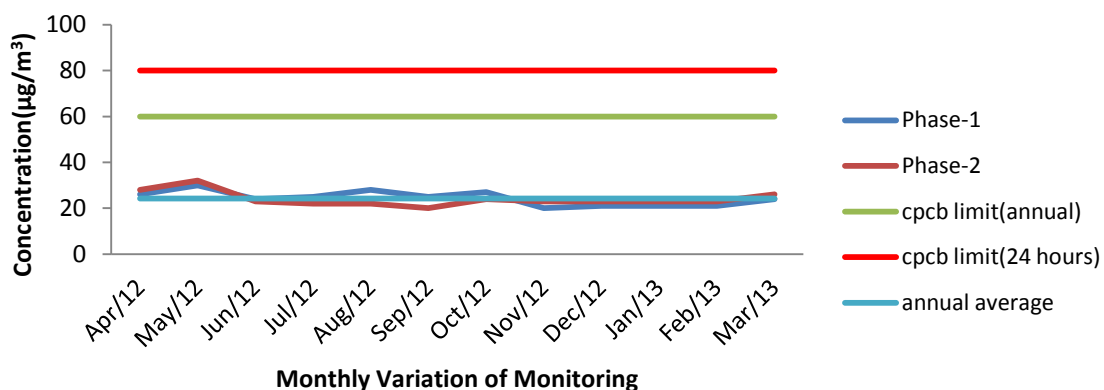
Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

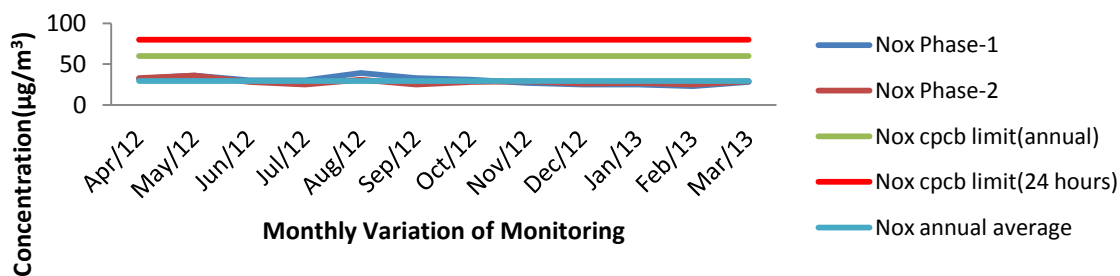


Air Quality Graph of Orient Area

Graph-23: SO_x monitoring of Rampur Colony of Orient Area.



Graph-24: NO_x monitoring Rampur Colony of Orient Area.



Job no: 750001

Report prepared at CMPDI, RI-VII, Bhubaneswar for MCL.

[illegible]

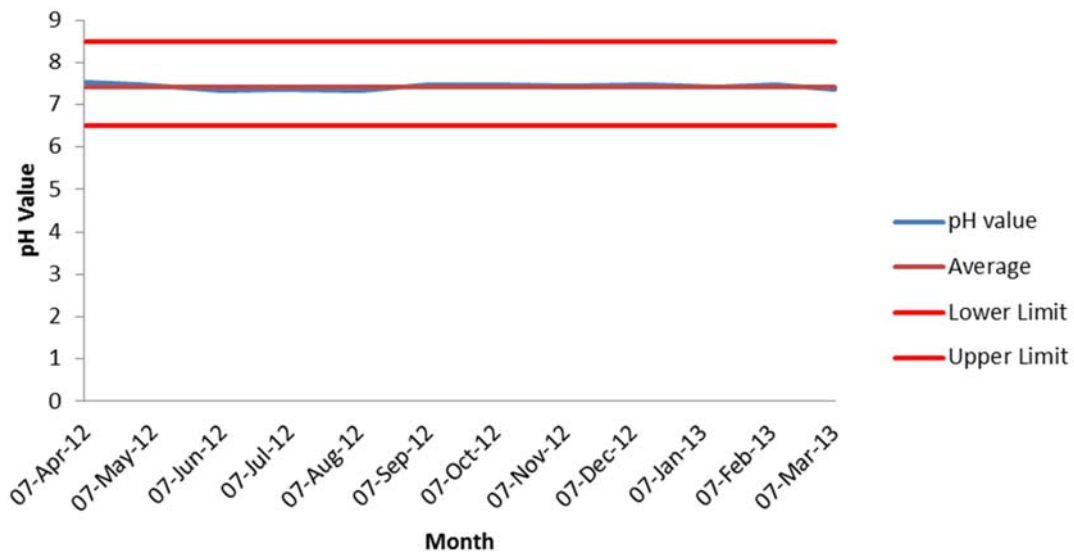
Drinking Water Data Area: Orient Project: Orient

[illegible]

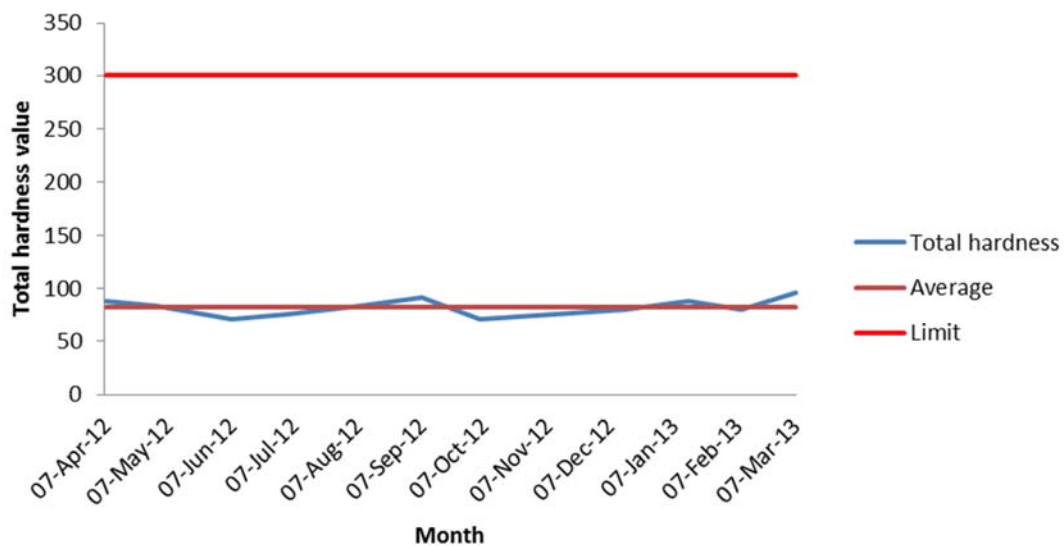
Drinking Water Data Area: Orient Project: Orient

Date of Sampling	27-Mar-13		Date of Sampling	27-Mar-13	
Monitoring Station	Filteration plant of Rampur sub-area	Indian Drinking Standards (IS-10500)	Monitoring Station	Four pit filteration of Orient sub-area	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	2	5	Colour, Hazen unit, Max	3	5
Odour	Unobjectionable	Unobjectionable	Odour	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Taste	Agreeable	Agreeable
Turbidity, NTU, Max	2	5	Turbidity, NTU, Max	4	5
pH value	7.68	6.5-8.5	pH value	8.12	6.5-8.5
Total hardness	116	300	Total hardness	104	300
Iron (as Fe)	<0.05	0.3	Iron (as Fe)	<0.05	0.3
Chlorides(as Cl)	24	250	Chlorides(as Cl)	20	250
Dissolved solids(TDS)	202	500	Dissolved solids(TDS)	174	500
Calcium(as Ca)	27.2	75	Calcium(as Ca)	24.0	75
Copper(as Cu)	<0.02	0.05	Copper(as Cu)	<0.02	0.05
Manganese(as Mn)	<0.05	0.1	Manganese(as Mn)	<0.05	0.1
Sulphate(as SO ₄)	41	200	Sulphate(as SO ₄)	35	200
Nitrate (as NO ₃)	5.32	45	Nitrate (as NO ₃)	4.87	45
Flouride (as F)	0.23	1.5	Flouride (as F)	0.18	1.5
Selenium (as Se)	<0.01	0.01	Selenium (as Se)	<0.01	0.01
Arsenic (as As)	<0.01	0.05	Arsenic (as As)	<0.01	0.05
Lead (as Pb)	<0.05	0.05	Lead (as Pb)	<0.05	0.05
Zinc (as Zn)	<0.02	5	Zinc (as Zn)	<0.02	5
Hexavalent chromium(Cr ₆₊)	<0.01	0.05	Hexavalent chromium(Cr ₆₊)	<0.01	0.05
Boron(as B)	<0.20	1	Boron(as B)	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	0.001	Phenolics (as C ₆ H ₅ OH)	<0.001	0.001
Alkalinity	68	200	Alkalinity	72	200
Residual Chlorine	0.16	0.2	Residual Chlorine	0.19	0.2
MPN	Nil	Nil	MPN	Nil	Nil

**Graph for pH of Tap Water at Budhijam Colony
of Orient Area**



**Graph for Total Hardness of Tap Water at
Budhijam Colony of Orient Area**



Graph for Flouride of Tap Water at Budhijam Colony of Orient Area

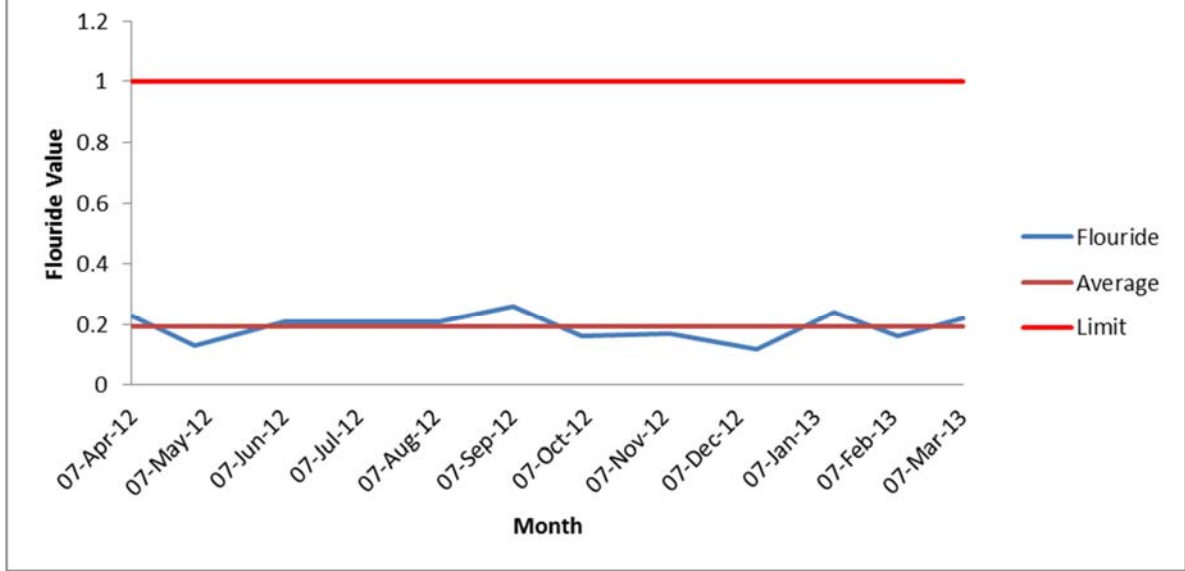


TABLE--
EFFLUENT QUALITY DATA

Area : Orient

Project : Orient Area

(All dimensions are in mg/l unless otherwise stated except pH)

Date of Sampling	Sampling Station	pH	OG	TSS	COD	BOD	NO3N
07-Apr-12	Mine Discharge of HBI Mine	7.90	<1.0	32	50	-	2.0
20-Apr-12	Mine Discharge of HBI Mine	8.00	<1.0	36	55	-	2.1
03-May-12	Mine Discharge of HBI Mine	8.10	<1.0	34	50	-	2.1
22-May-12	Mine Discharge of HBI Mine	8.15	<1.0	32	45	-	2.0
07-Jun-12	Mine Discharge of HBI Mine	7.84	<1.0	28	40	-	2.0
22-Jun-12	Mine Discharge of HBI Mine	7.92	<1.0	30	45	-	1.9
03-Jul-12	Mine Discharge of HBI Mine	7.87	<1.0	32	50	-	2.0
19-Jul-12	Mine Discharge of HBI Mine	7.75	<1.0	30	45	-	1.9
08-Aug-12	Mine Discharge of HBI Mine	7.80	<1.0	34	50	-	2.0
21-Aug-12	Mine Discharge of HBI Mine	7.74	<1.0	32	45	-	1.9
07-Sep-12	Mine Discharge of HBI Mine	7.65	<1.0	34	50	-	2.1
21-Sep-12	Mine Discharge of HBI Mine	7.74	<1.0	32	45	-	2.0
05-Oct-12	Mine Discharge of HBI Mine	7.68	<1.0	34	50	-	2.1
22-Oct-12	Mine Discharge of HBI Mine	7.68	<1.0	36	55	-	2.1
14-Nov-12	Mine Discharge of HBI Mine	7.75	<1.0	34	55	-	2.2
29-Nov-12	Mine Discharge of HBI Mine	7.70	<1.0	32	50	-	2.1

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

14-Dec-12	Mine Discharge of HBI Mine	7.76	<1.0	30	45	-	2.0
29-Dec-12	Mine Discharge of HBI Mine	7.65	<1.0	34	55	-	2.2
14-Jan-13	Mine Discharge of HBI Mine	7.70	<1.0	34	50	-	2.1
29-Jan-13	Mine Discharge of HBI Mine	7.75	<1.0	32	45	-	2.2
08-Feb-13	Mine Discharge of HBI Mine	7.65	<1.0	32	45	-	2.2
26-Feb-13	Mine Discharge of HBI Mine	7.70	<1.0	30	45	-	1.9
07-Mar-13	Mine Discharge of HBI Mine	7.60	<1.0	34	50	-	2.1
22-Mar-13	Mine Discharge of HBI Mine	7.55	<1.0	32	45	-	2.0
07-Apr-12	Mine Discharge of HRC Mine	7.49	<1.0	30	45	-	1.9
20-Apr-12	Mine Discharge of HRC Mine	7.58	<1.0	34	50	-	2.0
03-May-12	Mine Discharge of HRC Mine	7.55	<1.0	30	45	-	2.0
22-May-12	Mine Discharge of HRC Mine	7.60	<1.0	28	40	-	1.9
07-Jun-12	Mine Discharge of HRC Mine	7.60	<1.0	32	50	-	2.1
22-Jun-12	Mine Discharge of HRC Mine	7.67	<1.0	34	50	-	2.0
03-Jul-12	Mine Discharge of HRC Mine	7.75	<1.0	36	55	-	2.1
19-Jul-12	Mine Discharge of HRC Mine	7.70	<1.0	34	40	-	2.1
08-Aug-12	Mine Discharge of HRC Mine	7.62	<1.0	36	55	-	2.2

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

21-Aug-12	Mine Discharge of HRC Mine	7.50	<1.0	34	50	-	2.1
07-Sep-12	Mine Discharge of HRC Mine	7.55	<1.0	33	55	-	2.2
21-Sep-12	Mine Discharge of HRC Mine	7.62	<1.0	36	50	-	2.1
05-Oct-12	Mine Discharge of HRC Mine	7.55	<1.0	38	50	-	2.2
22-Oct-12	Mine Discharge of HRC Mine	7.75	<1.0	40	60	-	2.2
14-Nov-12	Mine Discharge of HRC Mine	7.84	<1.0	38	60	-	2.3
29-Nov-12	Mine Discharge of HRC Mine	7.90	<1.0	36	55	-	2.2
14-Dec-12	Mine Discharge of HRC Mine	7.85	<1.0	34	50	-	2.1
29-Dec-12	Mine Discharge of HRC Mine	7.80	<1.0	38	60	-	2.3
14-Jan-13	Mine Discharge of HRC Mine	7.80	<1.0	32	45	-	1.9
29-Jan-13	Mine Discharge of HRC Mine	7.84	<1.0	36	50	-	2.3
08-Feb-13	Mine Discharge of HRC Mine	7.9	<1.0	34	50	-	2.1
26-Feb-13	Mine Discharge of HRC Mine	7.85	<1.0	38	55	-	2.3
07-Mar-13	Mine Discharge of HRC Mine	7.82	<1.0	36	55	-	2.2
22-Mar-13	Mine Discharge of HRC Mine	7.65	<1.0	34	50	-	2.1
07-Apr-12	Mine Discharge of Mine No.2	8.22	<1.0	36	60		2.1
20-Apr-12	Mine Discharge of Mine No.2	8.30	<1.0	34	50		2.2

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

03-May-12	Mine Discharge of Mine No.2	8.20	<1.0	32	45		1.9
22-May-12	Mine Discharge of Mine No.2	8.15	<1.0	34	50		2.0
07-Jun-12	Mine Discharge of Mine No.2	8.20	<1.0	36	55		2.1
22-Jun-12	Mine Discharge of Mine No.2	8.30	<1.0	32	45		2.0
03-Jul-12	Mine Discharge of Mine No.2	8.25	<1.0	28	40		1.8
19-Jul-12	Mine Discharge of Mine No.2	8.18	<1.0	32	45		1.9
08-Aug-12	Mine Discharge of Mine No.2	8.10	<1.0	30	50		2.0
21-Aug-12	Mine Discharge of Mine No.2	8.00	<1.0	30	45		1.8
07-Sep-12	Mine Discharge of Mine No.2	8.15	<1.0	34	50		1.9
21-Sep-12	Mine Discharge of Mine No.2	8.10	<1.0	32	46		1.8
05-Oct-12	Mine Discharge of Mine No.2	8.00	<1.0	34	50		1.9
20-Oct-12	Mine Discharge of Mine No.2	8.20	<1.0	34	50		2.0
14-Nov-12	Mine Discharge of Mine No.2	8.24	<1.0	32	45		1.9
29-Nov-12	Mine Discharge of Mine No.2	8.15	<1.0	34	50		2.0
14-Dec-12	Mine Discharge of Mine No.2	8.10	<1.0	36	50		2.1
29-Dec-12	Mine Discharge of Mine No.2	8.15	<1.0	34	50		2.1
14-Jan-13	Mine Discharge of Mine No.2	8.00	<1.0	32	45		1.9

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

29-Jan-13	Mine Discharge of Mine No.2	8.10	<1.0	34	50		2.1
08-Feb-13	Mine Discharge of Mine No.2	8.10	<1.0	34	50		2.0
26-Feb-13	Mine Discharge of Mine No.2	8.00	<1.0	36	55		2.2
07-Mar-13	Mine Discharge of Mine No.2	7.90	<1.0	32	45		1.9
22-Mar-13	Mine Discharge of Mine No.2	7.80	<1.0	34	50		2.0
07-Apr-12	Mine Discharge of Mine No.3	7.77	<1.0	32	55		1.9
20-Apr-12	Mine Discharge of Mine No.3	7.82	<1.0	38	60		2.0
03-May-12	Mine Discharge of Mine No.3	7.90	<1.0	36	55		2.1
22-May-12	Mine Discharge of Mine No.3	7.80	<1.0	30	45		1.9
07-Jun-12	Mine Discharge of Mine No.3	7.90	<1.0	32	50		2.0
22-Jun-12	Mine Discharge of Mine No.3	8.00	<1.0	36	55		2.2
03-Jul-12	Mine Discharge of Mine No.3	8.10	<1.0	30	45		2.0
19-Jul-12	Mine Discharge of Mine No.3	8.20	<1.0	36	50		2.1
08-Aug-12	Mine Discharge of Mine No.3	8.25	<1.0	40	60		2.2
21-Aug-12	Mine Discharge of Mine No.3	8.15	<1.0	36	55		2.1
07-Sep-12	Mine Discharge of Mine No.3	8.25	<1.0	40	60		2.2
21-Sep-12	Mine Discharge of Mine No.3	8.15	<1.0	36	55		2.1

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

05-Oct-12	Mine Discharge of Mine No.3	8.20	<1.0	30	45		2.2
22-Oct-12	Mine Discharge of Mine No.3	8.30	<1.0	38	60		2.2
14-Nov-12	Mine Discharge of Mine No.3	8.35	<1.0	36	50		2.1
29-Nov-12	Mine Discharge of Mine No.3	8.40	<1.0	40	60		2.2
14-Dec-12	Mine Discharge of Mine No.3	8.30	<1.0	38	60		2.3
28-Dec-12	Mine Discharge of Mine No.3	8.35	<1.0	32	45		2.0
14-Jan-13	Mine Discharge of Mine No.3	8.20	<1.0	36	55		2.2
29-Jan-13	Mine Discharge of Mine No.3	8.22	<1.0	40	60		2.0
08-Feb-13	Mine Discharge of Mine No.3	8.00	<1.0	30	45		2.1
26-Feb-13	Mine Discharge of Mine No.3	8.10	<1.0	28	40		2.0
07-Mar-13	Mine Discharge of Mine No.3	7.80	<1.0	38	50		2.1
22-Mar-13	Mine Discharge of Mine No.3	7.70	<1.0	36	55		2.2
07-Apr-12	Mine Discharge of Mine No.4	8.25	<1.0	34	50	-	2.0
20-Apr-12	Mine Discharge of Mine No.4	8.22	<1.0	30	45	-	1.9
03-May-12	Mine Discharge of Mine No.4	8.12	<1.0	34	50	-	2.0
22-May-12	Mine Discharge of Mine No.4	8.20	<1.0	36	55	-	2.1
07-Jun-12	Mine Discharge of Mine No.4	8.10	<1.0	30	45	-	1.9

TABLE--
EFFLUENT QUALITY DATA

Area : *Orient*

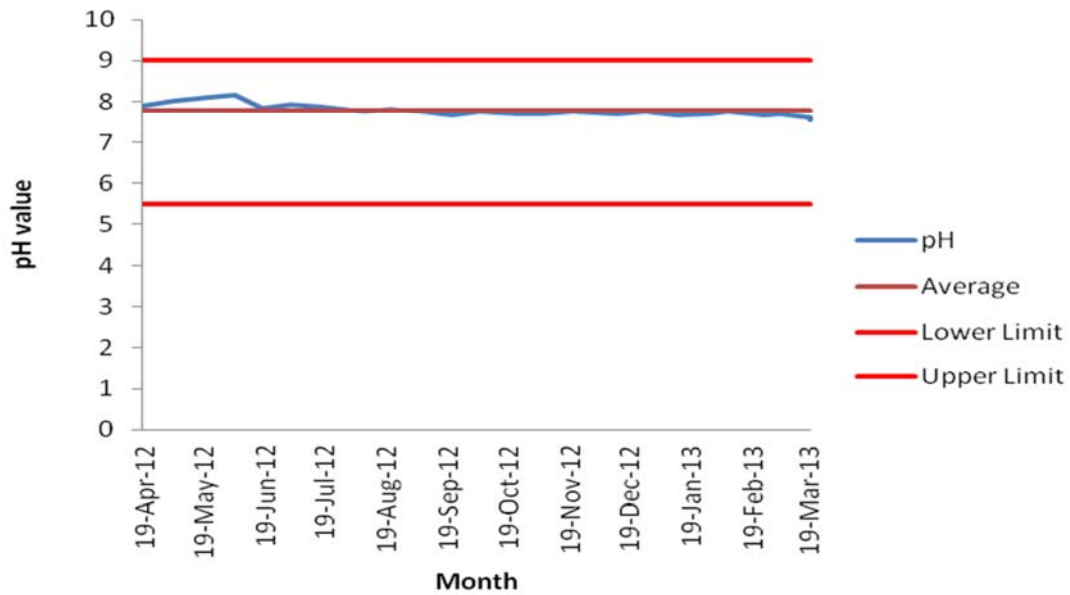
22-Jun-12	Mine Discharge of Mine No.4	8.20	<1.0	28	40	-	1.8
03-Jul-12	Mine Discharge of Mine No.4	8.30	<1.0	34	50	-	2.2
19-Jul-12	Mine Discharge of Mine No.4	8.25	<1.0	38	55	-	2.2
08-Aug-12	Mine Discharge of Mine No.4	8.30	<1.0	32	45	-	1.9
21-Aug-12	Mine Discharge of Mine No.4	8.20	<1.0	34	50	-	2.0
07-Sep-12	Mine Discharge of Mine No.4	8.30	<1.0	30	45	-	2.1
21-Sep-12	Mine Discharge of Mine No.4	8.40	<1.0	34	50	-	2.0
05-Oct-12	Mine Discharge of Mine No.4	8.35	<1.0	36	55	-	2.3
22-Oct-12	Mine Discharge of Mine No.4	8.45	<1.0	32	45	-	1.9
14-Nov-12	Mine Discharge of Mine No.4	8.42	<1.0	38	55	-	2.2
29-Nov-12	Mine Discharge of Mine No.4	8.50	<1.0	36	55	-	2.1
14-Dec-12	Mine Discharge of Mine No.4	8.00	<1.0	32	45	-	2.0
29-Dec-12	Mine Discharge of Mine No.4	8.10	<1.0	36	55	-	2.2
14-Jan-13	Mine Discharge of Mine No.4	7.90	<1.0	34	50	-	2.1
29-Jan-13	Mine Discharge of Mine No.4	7.95	<1.0	36	55	-	2.2
08-Feb-13	Mine Discharge of Mine No.4	7.85	<1.0	36	55	-	2.2
26-Feb-13	Mine Discharge of Mine No.4	7.80	<1.0	32	50	-	2.1

TABLE--
EFFLUENT QUALITY DATA

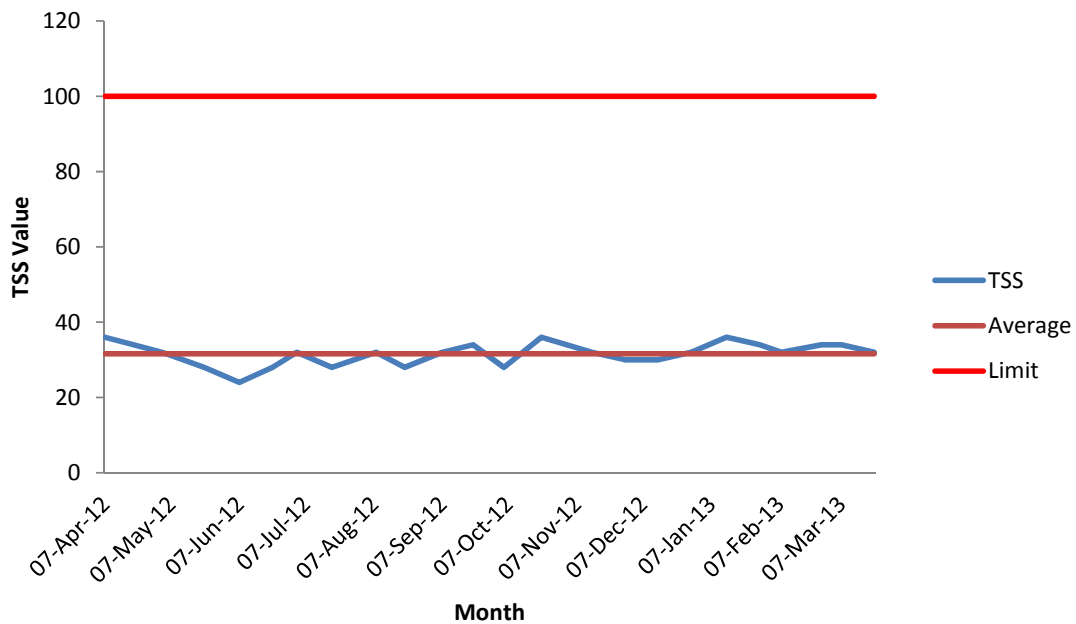
Area : *Orient*

07-Mar-13	Mine Discharge of Mine No.4	7.75	<1.0	36	55	-	2.0
22-Mar-13	Mine Discharge of Mine No.4	7.65	<1.0	40	60	-	2.3

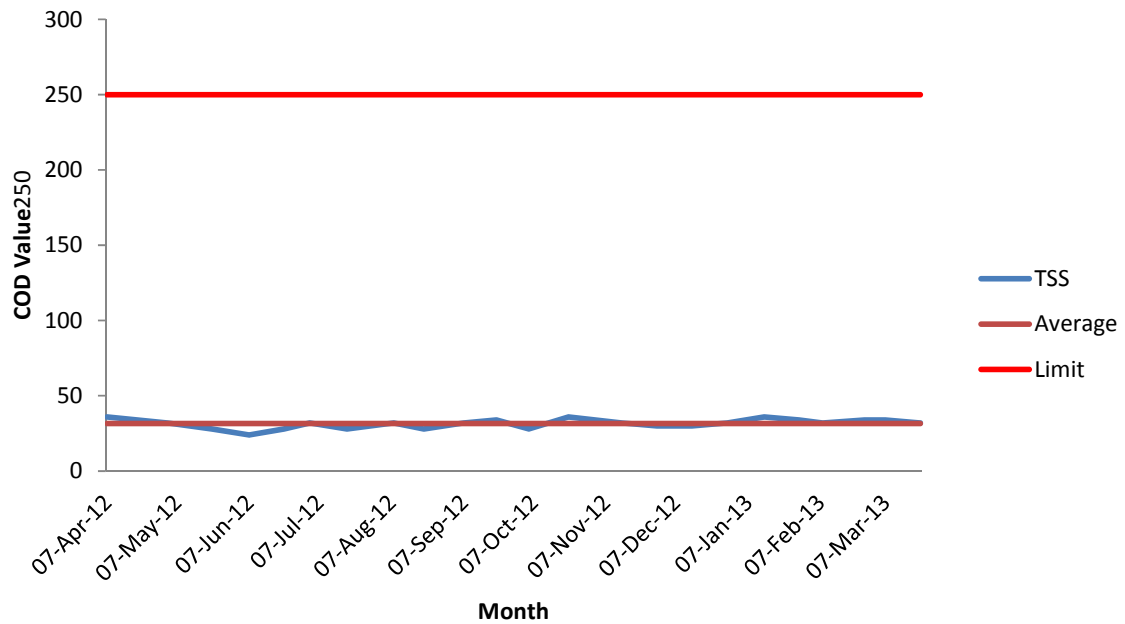
Graph for pH of Mine Discharge of HBI Mine of Orient Area



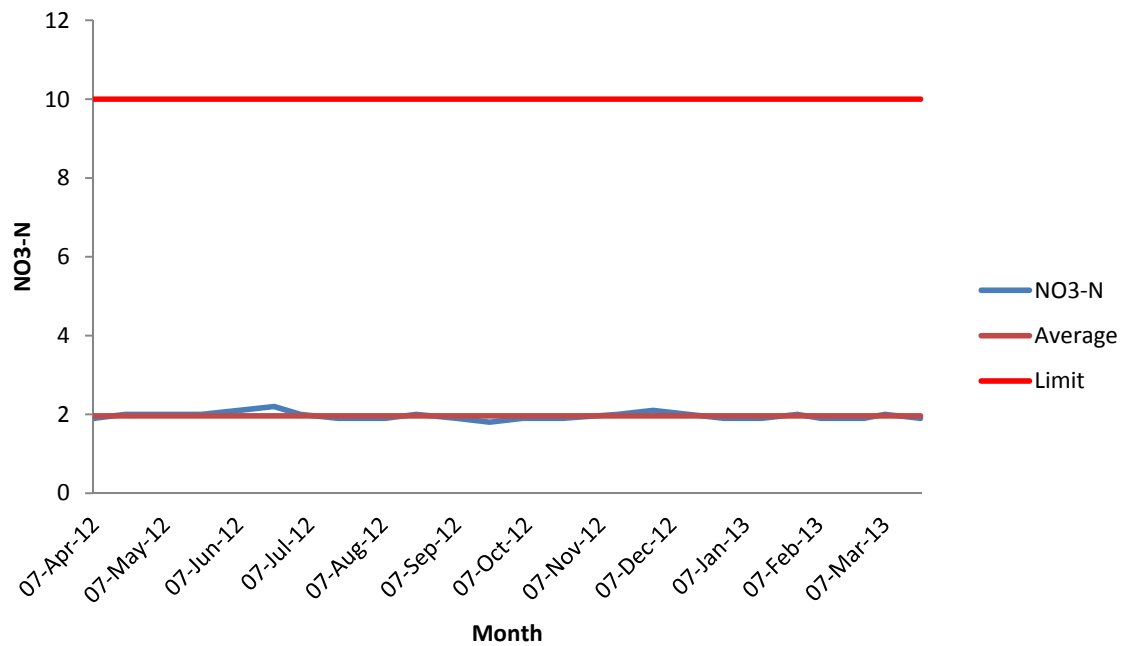
Graph for TSS of Mine Discharge of HBI Mine of Orient Area



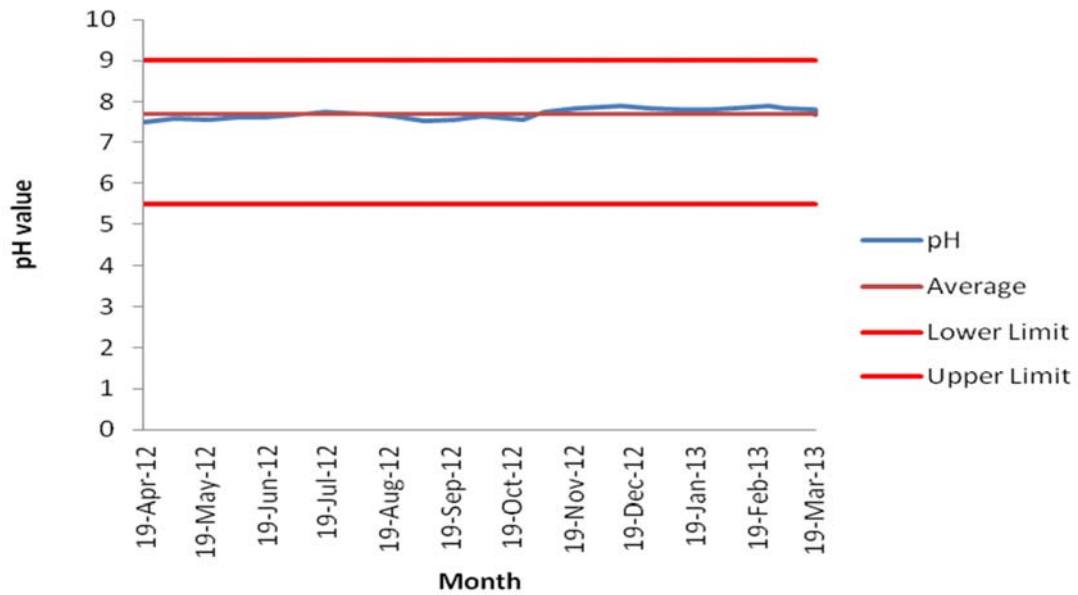
Graph for COD of Mine Discharge of HBI Mine of Orient Area



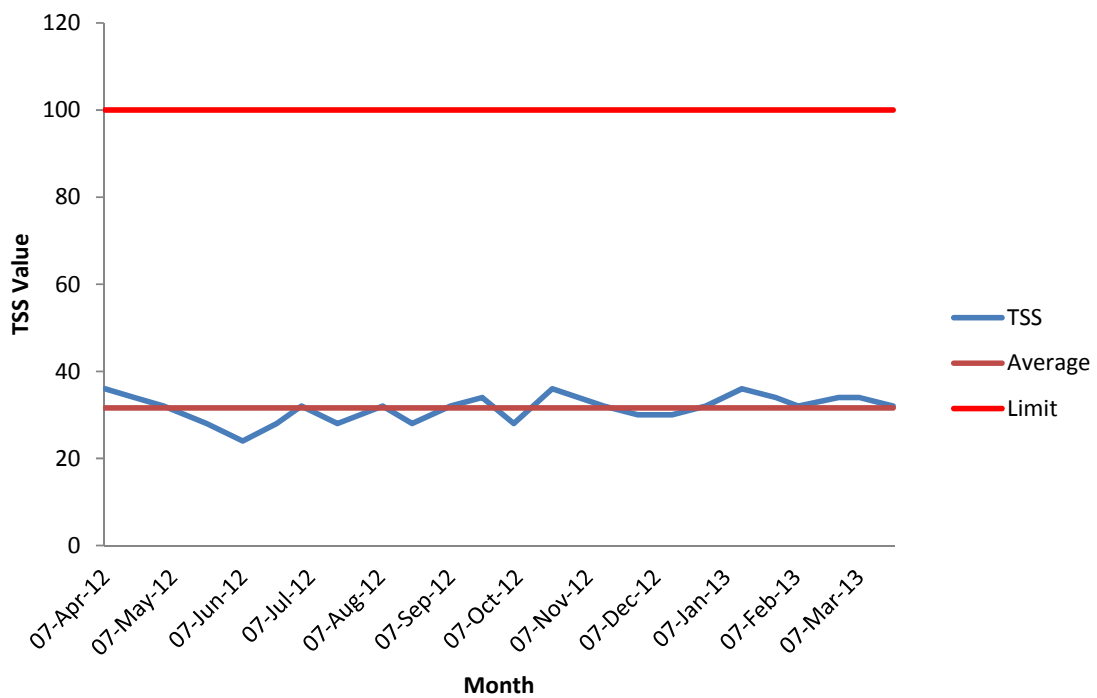
Graph for NO3-N of Mine Discharge of HBI Mine of Orient Area



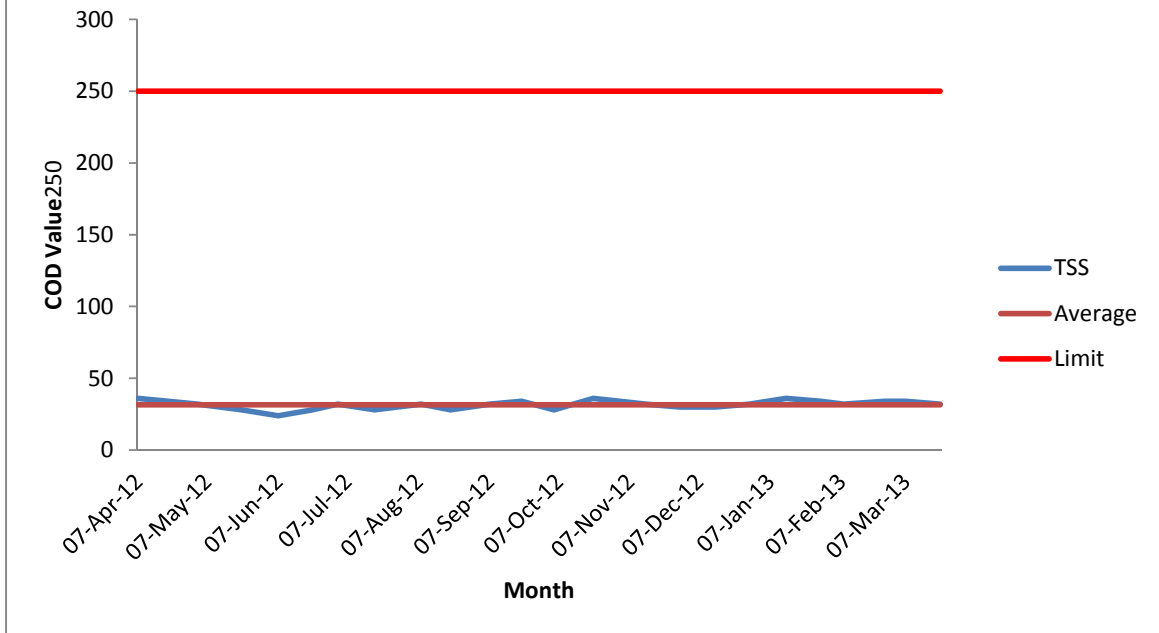
Graph for pH of Mine Discharge of HRC Mine of Orient Area



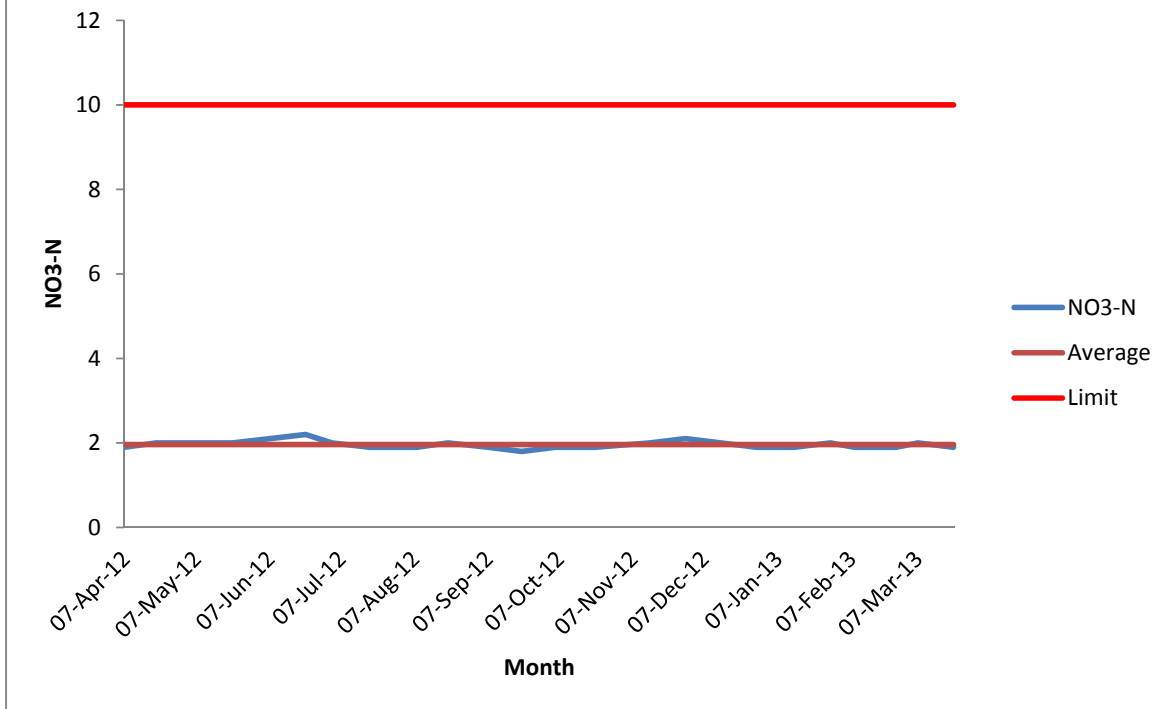
Graph for TSS of Mine Discharge of HRC Mine of Orient Area



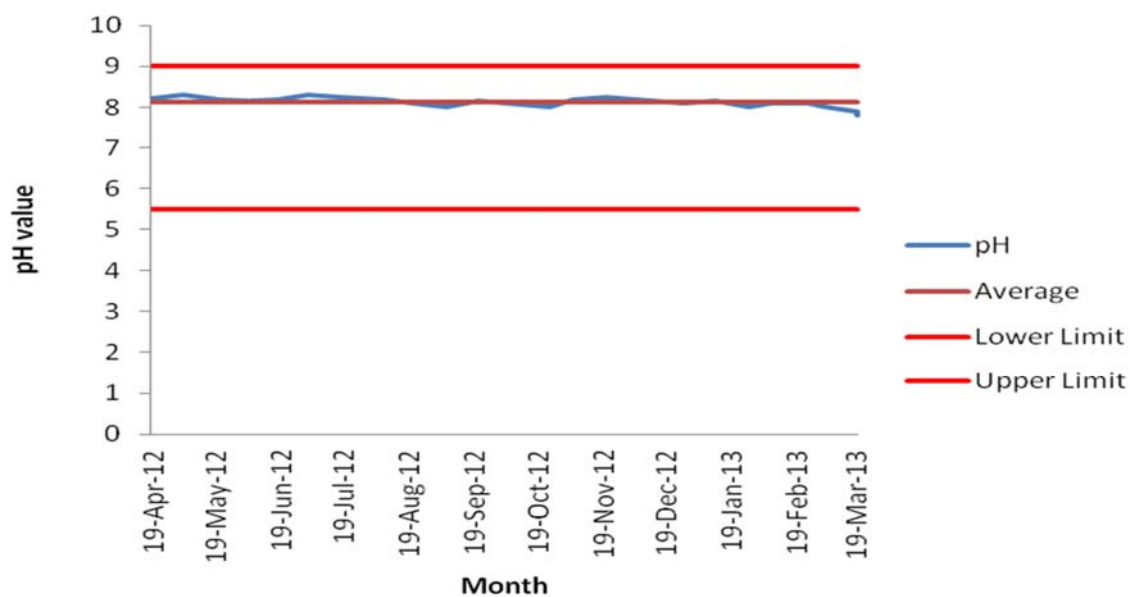
Graph for COD of Mine Discharge of HRC Mine of Orient Area



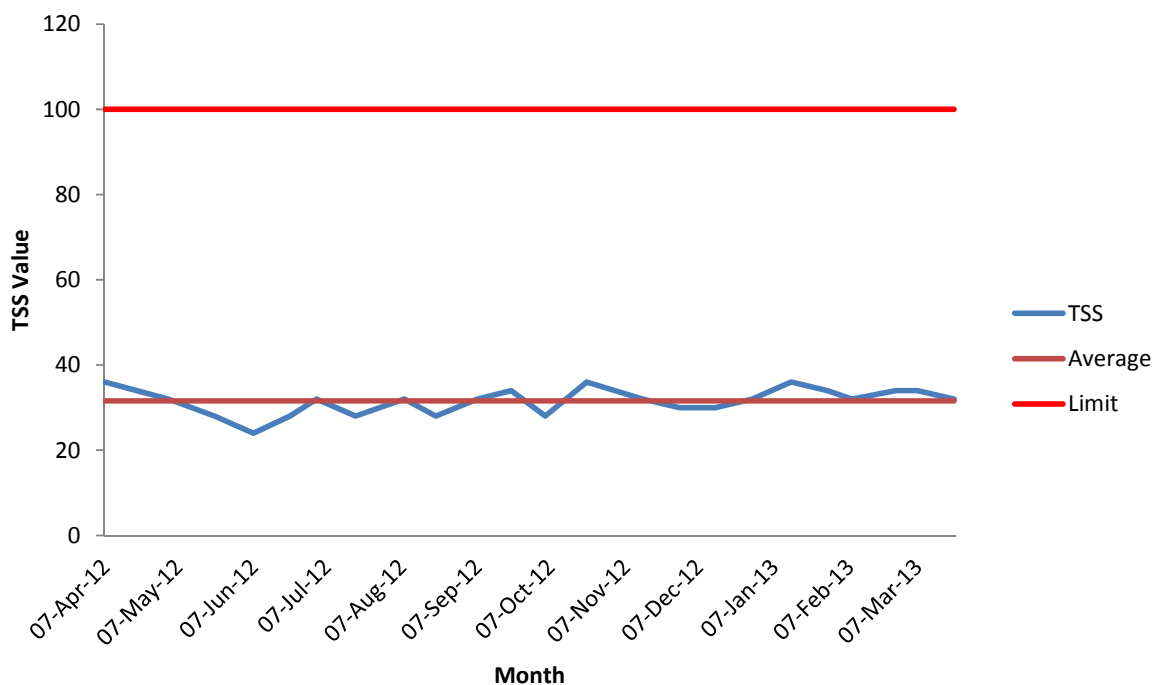
Graph for NO3-N of Mine Discharge of HRC Mine of Orient Area



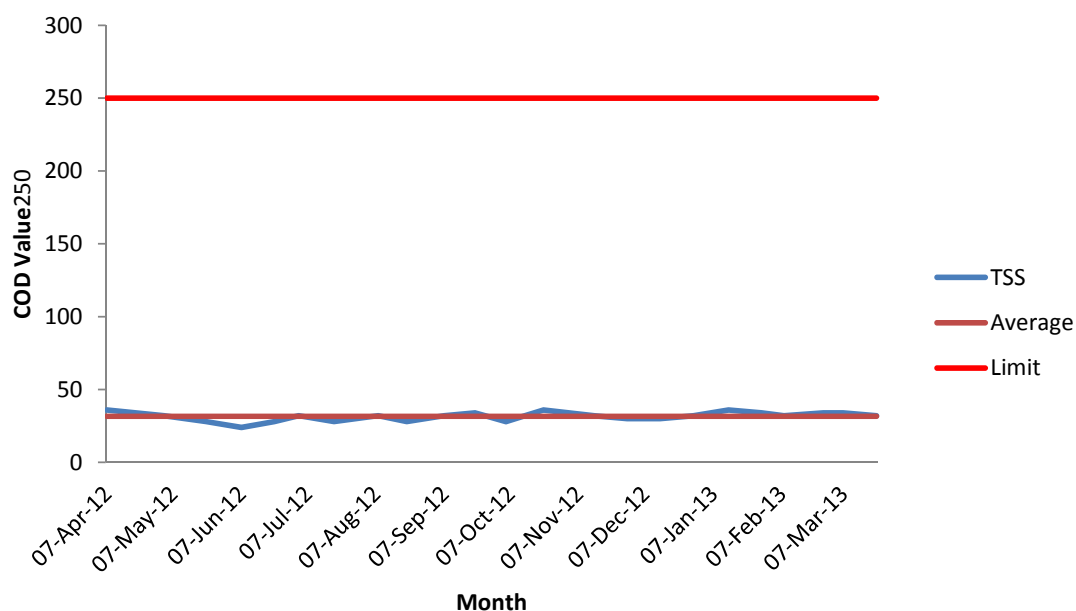
Graph for pH of Mine Discharge of Mine no 2 of Orient Area



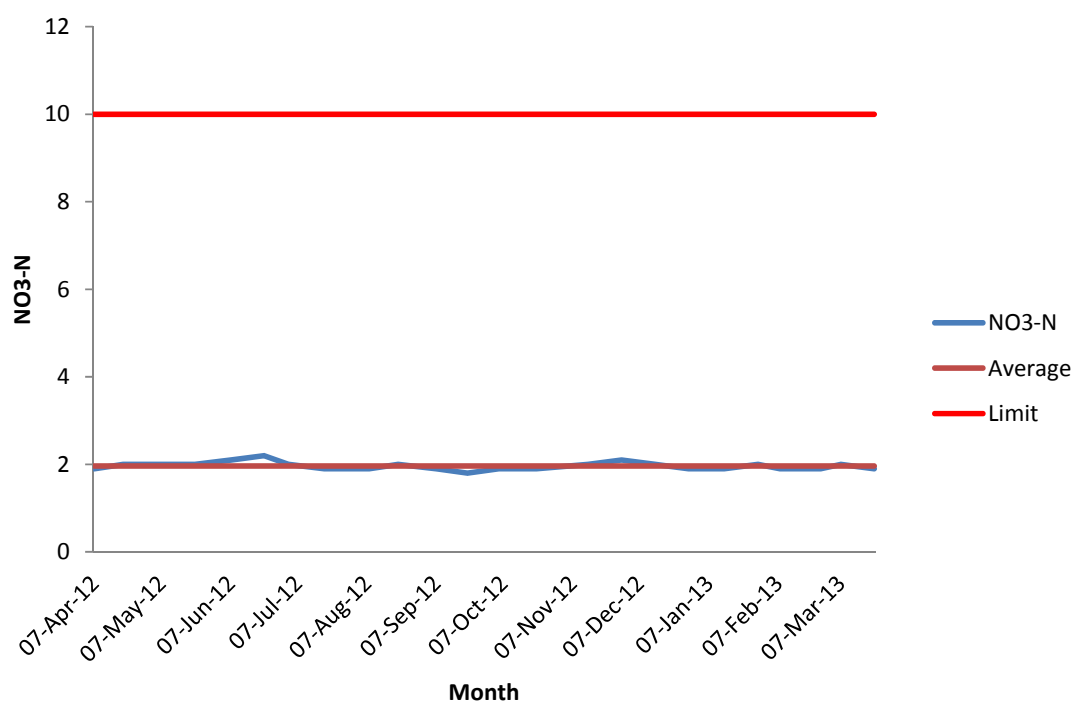
Graph for TSS of Mine Discharge of Mine No.2 of Orient Area



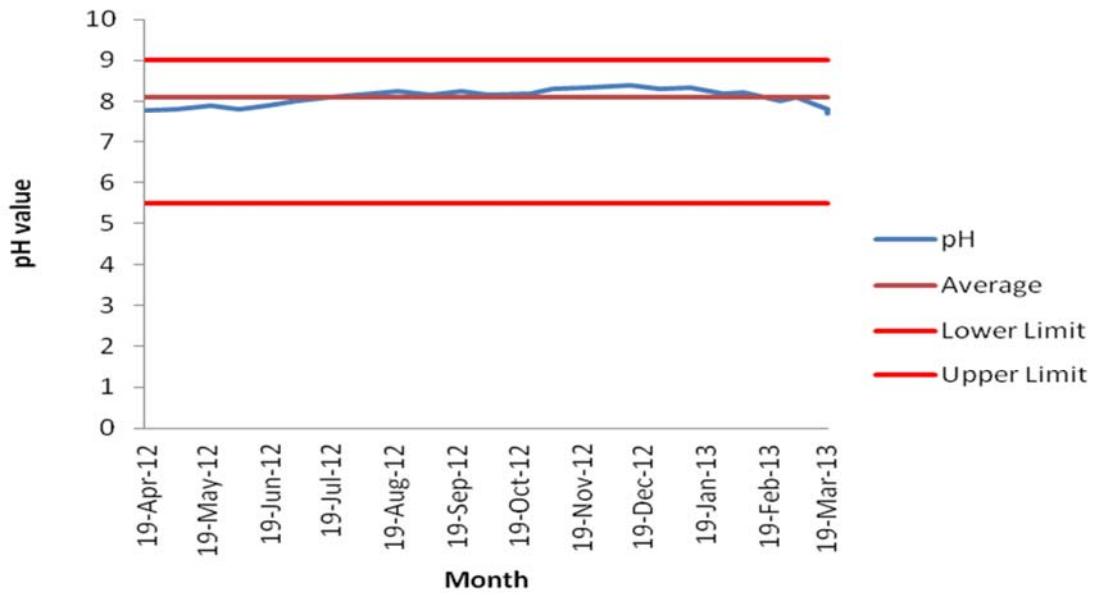
**Graph for COD of Mine Discharge of Mine No.2
of Orient Area**



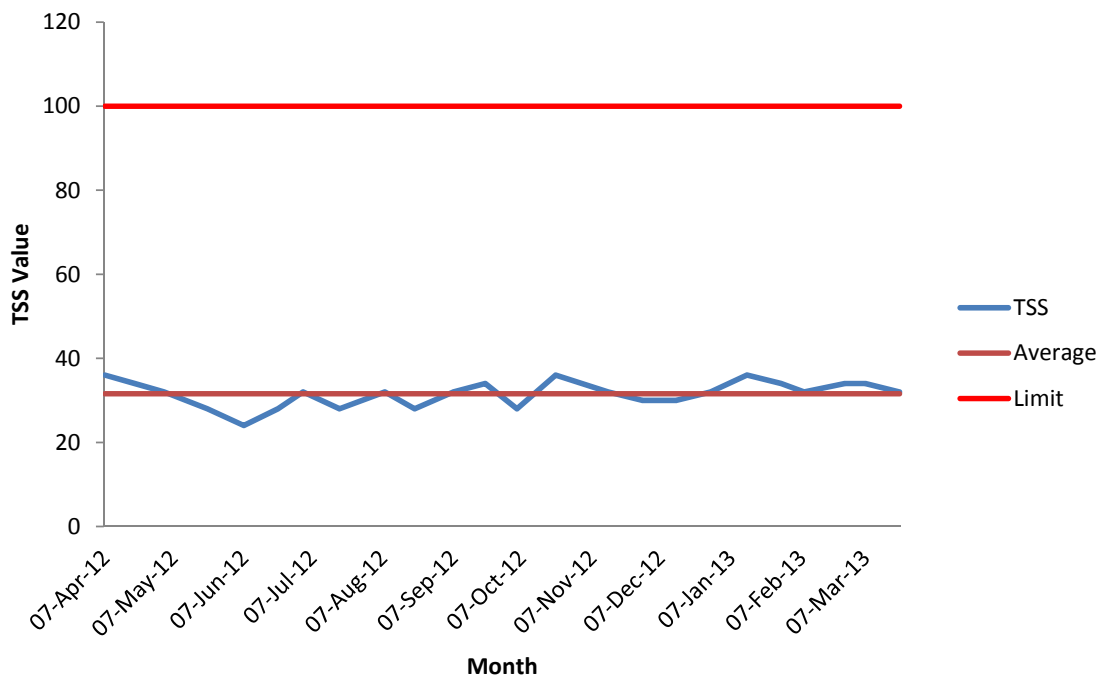
**Graph for NO3-N of Mine Discharge of Mine
No.2 of Orient Area**



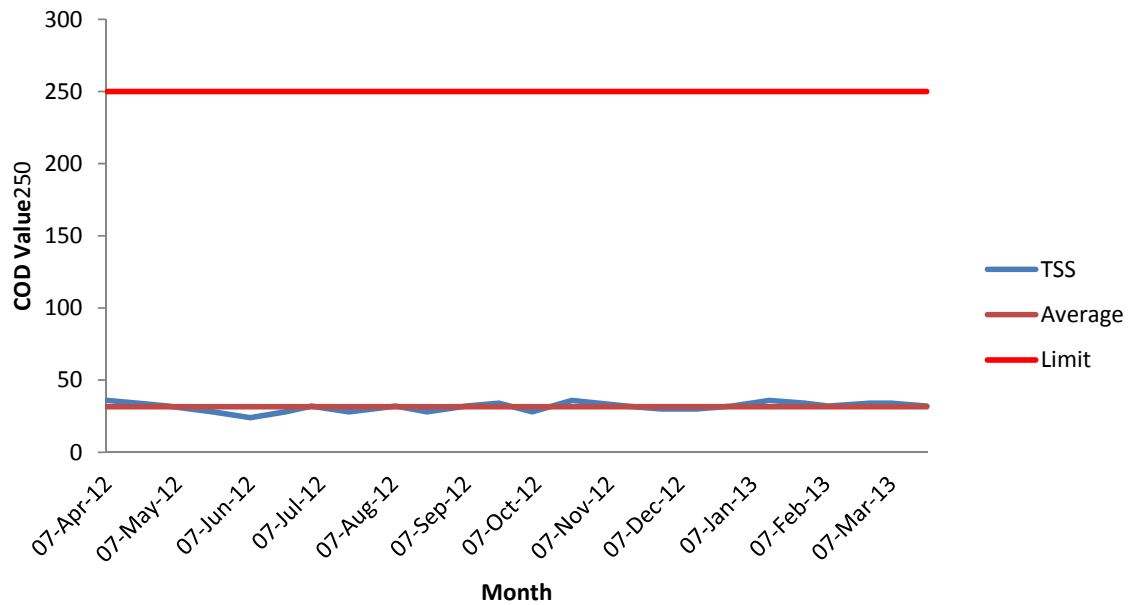
Graph for pH of Mine Discharge of Mine no 3 of Orient Area



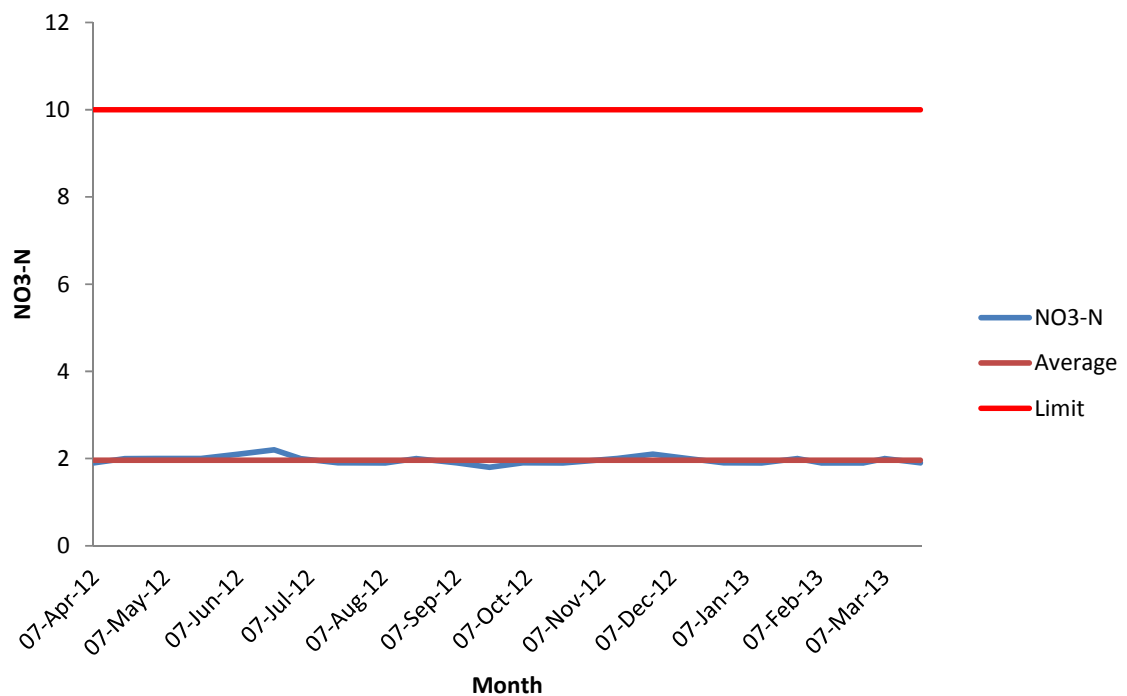
Graph for TSS of Mine Discharge of Mine No.3 of Orient Area



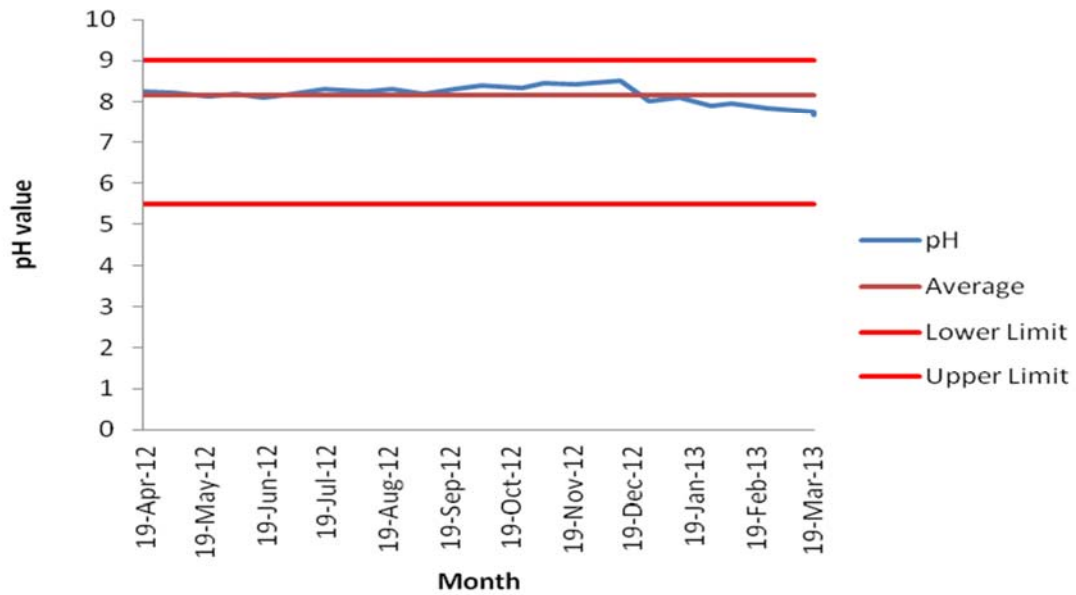
**Graph for COD of Mine Discharge of Mine No.3
of Orient Area**



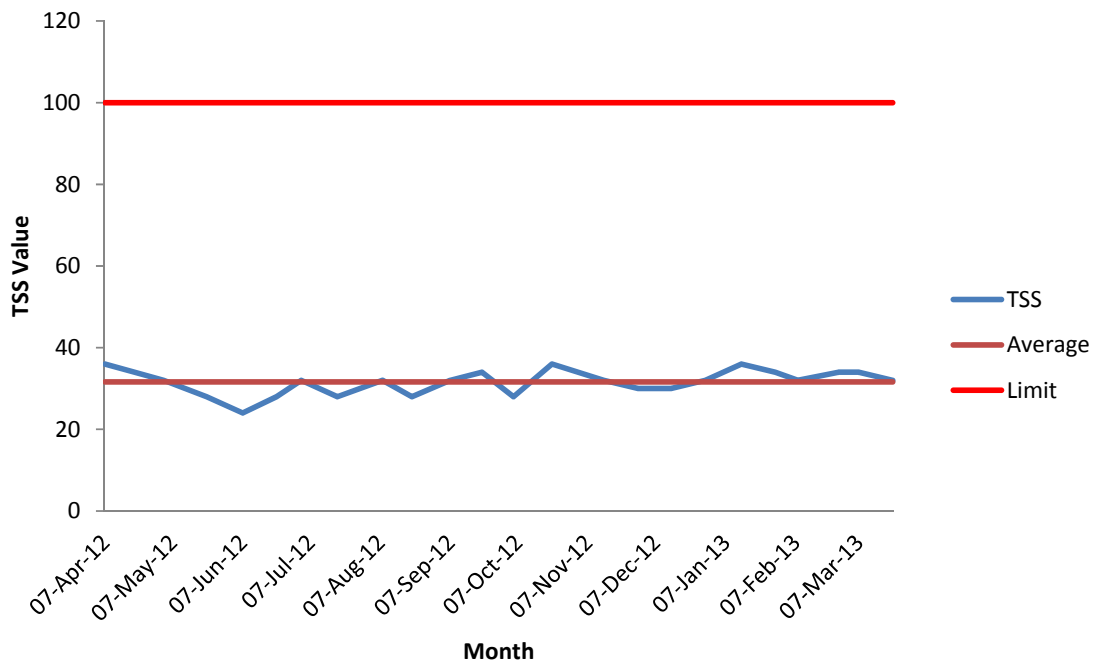
**Graph for NO3-N of Mine Discharge of Mine
No.3 of Orient Area**



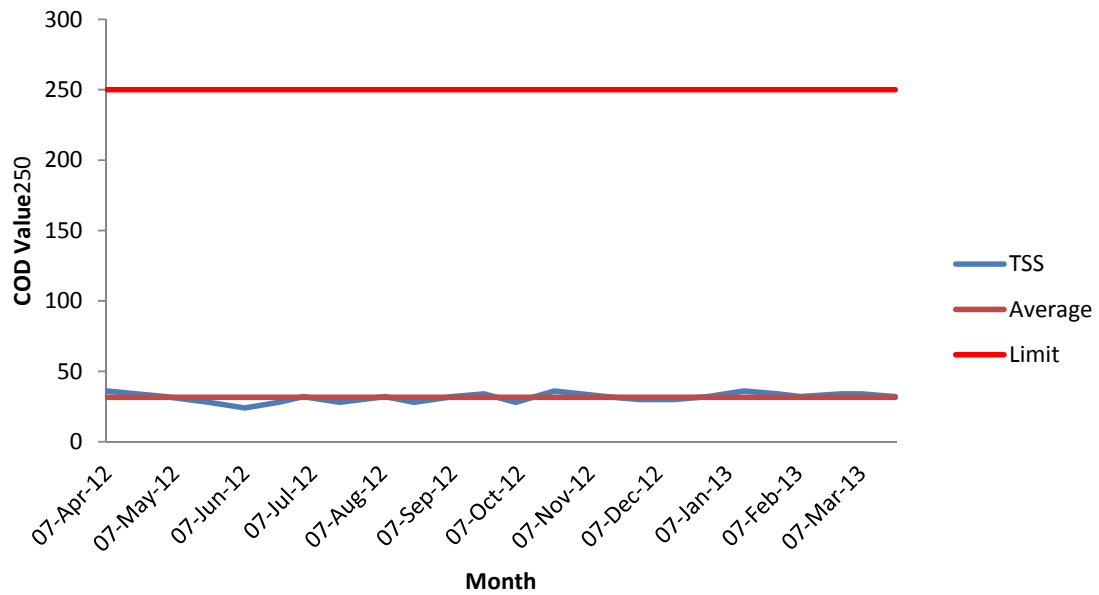
Graph for pH of Mine Discharge of Mine no 4 of Orient Area



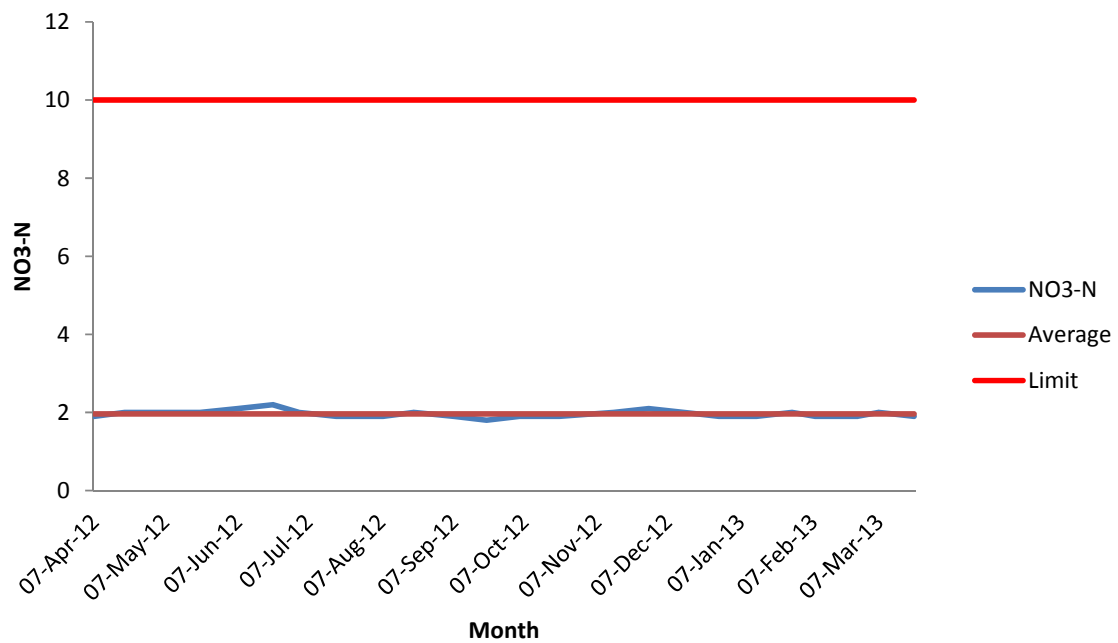
Graph for TSS of Mine Discharge of Mine No.4 of Orient Area



Graph for COD of Mine Discharge of Mine No.4 of Orient Area



Graph for NO3-N of Mine Discharge of Mine No.4 of Orient Area



Yearly Effluent Data

Area: Orient

Area	<i>Orient Area</i>	<i>Orient Area</i>	<i>Orient Area</i>
Project	<i>Orient Area</i>	<i>Orient Area</i>	<i>Orient Area</i>
Date of sampling	29-Nov-12	29-Nov-12	29-Nov-12
Name of the station	Mine Discharge of HBI Mine	Mine Discharge of HRC Mine	Mine Discharge of Mine No.4
Colour	Acceptable	Acceptable	Acceptable
Odour	Agreeable	Agreeable	Agreeable
Temperature, °C	17.4	17.3	17.3
Amonical Nitrogen	0.14	0.16	0.16
TKN	1.82	2.12	1.60
BOD	14	11	10
Arsenic	<0.01	<0.01	<0.01
Mercury	-	-	-
Lead	<0.05	<0.05	<0.05
Cadmium	<0.01	<0.01	<0.01
Hexavalent chromium	<0.01	<0.01	<0.01
Total chromium	<0.1	<0.1	<0.1
Copper	<0.02	<0.02	<0.02
Zinc	0.18	0.14	0.10
Selenium	<0.01	<0.01	<0.01
Nickel	<0.1	<0.1	<0.1
Fluoride	0.65	0.74	0.70
Dissolved phosphate	0.28	0.22	0.18
Sulphide	<0.004	<0.003	0.05
Phenolics	<0.001	<0.001	<0.001
Manganese	<0.05	<0.05	<0.05
Iron	0.13	0.15	0.13

Yearly Effluent Data

Area: Orient

Area	<i>Orient Area</i>	<i>Orient Area</i>
Project	<i>Orient Area</i>	<i>Orient Area</i>
Date of sampling	29-Nov-12	29-Nov-12
Name of the station	Mine Discharge of Mine No.2	Mine Discharge of Mine No.3
Colour	Acceptable	Acceptable
Odour	Agreeable	Agreeable
Temperature, °C	17.3	17.4
Amonical Nitrogen	0.20	0.25
TKN	2.25	2.14
BOD	9	12
Arsenic	<0.01	<0.01
Mercury	-	-
Lead	<0.05	<0.05
Cadmium	<0.01	<0.01
Hexavalent chromium	<0.01	<0.01
Total chromium	<0.1	<0.1
Copper	<0.02	<0.02
Zinc	0.12	0.13
Selenium	<0.01	<0.01
Nickel	<0.1	<0.1
Fluoride	0.77	0.54
Dissolved phosphate	0.85	0.22
Sulphide	0.03	0.04
Phenolics	<0.001	<0.001
Manganese	<0.05	<0.05
Iron	0.11	0.15

TABLE--
NOISE LEVEL MONITORING DATA

AREA : **Orient**

PROJECT : **Orient Area**

DATE OF SAMPLING	STATION	Noise Level Measurement in dB(A)	
		DAY	NIGHT
11-Apr-12	HBI Mine	53.2	47.8
28-Apr-12	HBI Mine	52.3	46.2
08-May-12	HBI Mine	53.5	47.7
30-May-12	HBI Mine	52.1	46.0
08-Jun-12	HBI Mine	53.2	47.1
29-Jun-12	HBI Mine	52.9	46.1
07-Jul-12	HBI Mine	51.8	45.3
30-Jul-12	HBI Mine	52.3	46.8
11-Aug-12	HBI Mine	51.7	45.3
27-Aug-12	HBI Mine	52.5	44.3
11-Sep-12	HBI Mine	51.9	45.5
28-Sep-12	HBI Mine	50.8	46.7
12-Oct-12	HBI Mine	51.1	47.3
30-Oct-12	HBI Mine	52.3	46.9
09-Nov-12	HBI Mine	51.9	47.8
26-Nov-12	HBI Mine	50.4	46.5
13-Dec-12	HBI Mine	51.2	47.8
29-Dec-12	HBI Mine	52.2	48.1
14-Jan-13	HBI Mine	53.4	47.8
30-Jan-13	HBI Mine	54.1	48.5
11-Feb-13	HBI Mine	53.5	47.4
27-Feb-13	HBI Mine	52.3	46.8
13-Mar-13	HBI Mine	51.1	45.6
29-Mar-13	HBI Mine	52.3	46.7
29-Mar-13	HBI Mine	52.3	46.7
11-Apr-12	HRC Mine	53.2	47.1
28-Apr-12	HRC Mine	53.1	46.3
08-May-12	HRC Mine	54.5	74.0
30-May-12	HRC Mine	53.8	48.1
08-Jun-12	HRC Mine	54.3	49.1

29-Jun-12	HRC Mine	53.8	48.5
07-Jul-12	HRC Mine	52.7	47.8
30-Jul-12	HRC Mine	51.8	46.9
11-Aug-12	HRC Mine	52.5	47.4
27-Aug-12	HRC Mine	51.8	46.3
11-Sep-12	HRC Mine	52.4	45.7
28-Sep-12	HRC Mine	53.3	46.6
12-Oct-12	HRC Mine	54.2	47.7
30-Oct-12	HRC Mine	53.1	46.5
09-Nov-12	HRC Mine	52.6	47.7
26-Nov-12	HRC Mine	53.1	46.8
13-Dec-12	HRC Mine	54.3	47.6
29-Dec-12	HRC Mine	55.6	48.8
14-Jan-13	HRC Mine	54.1	49.0
30-Jan-13	HRC Mine	53.6	48.5
11-Feb-13	HRC Mine	54.1	49.0
27-Feb-13	HRC Mine	53.1	48.9
13-Mar-13	HRC Mine	52.3	47.0
29-Mar-13	HRC Mine	53.2	48.1
29-Mar-13	HRC Mine	53.2	48.1
11-Apr-12	Orient Mine No.2	54.7	47.5
28-Apr-12	Orient Mine No.2	53.5	46.3
08-May-12	Orient Mine No.2	54.1	47.5
30-May-12	Orient Mine No.2	55.3	48.1
08-Jun-12	Orient Mine No.2	54.2	49.1
29-Jun-12	Orient Mine No.2	53.3	48.5
07-Jul-12	Orient Mine No.2	52.5	47.0
30-Jul-12	Orient Mine No.2	53.2	46.1
11-Aug-12	Orient Mine No.2	52.1	47.6
27-Aug-12	Orient Mine No.2	51.3	46.8
11-Sep-12	Orient Mine No.2	52.1	47.7
28-Sep-12	Orient Mine No.2	53.4	48.7
12-Oct-12	Orient Mine No.2	54.3	49.8
30-Oct-12	Orient Mine No.2	53.2	48.5
09-Nov-12	Orient Mine No.2	54.1	47.9
26-Nov-12	Orient Mine No.2	53.4	46.4
13-Dec-12	Orient Mine No.2	52.3	45.6

29-Dec-12	Orient Mine No.2	53.2	46.6
14-Jan-13	Orient Mine No.2	52.4	45.6
30-Jan-13	Orient Mine No.2	53.5	46.8
11-Feb-13	Orient Mine No.2	54.1	47.5
27-Feb-13	Orient Mine No.2	52.9	46.7
13-Mar-13	Orient Mine No.2	51.7	45.9
29-Mar-13	Orient Mine No.2	50.2	46.3
11-Apr-12	Orient Mine No.3	53.5	47.8
28-Apr-12	Orient Mine No.3	55.3	46.3
08-May-12	Orient Mine No.3	56.3	47.8
30-May-12	Orient Mine No.3	55.8	46.7
08-Jun-12	Orient Mine No.3	56.1	47.8
29-Jun-12	Orient Mine No.3	55.4	46.1
07-Jul-12	Orient Mine No.3	54.2	45.3
30-Jul-12	Orient Mine No.3	53.2	46.1
11-Aug-12	Orient Mine No.3	54.3	45.8
27-Aug-12	Orient Mine No.3	53.7	44.5
11-Sep-12	Orient Mine No.3	54.7	46.5
28-Sep-12	Orient Mine No.3	53.2	47.9
12-Oct-12	Orient Mine No.3	54.5	48.6
30-Oct-12	Orient Mine No.3	53.6	47.4
09-Nov-12	Orient Mine No.3	52.6	46.6
26-Nov-12	Orient Mine No.3	53.2	47.5
13-Dec-12	Orient Mine No.3	54.4	46.4
29-Dec-12	Orient Mine No.3	53.1	47.5
14-Jan-13	Orient Mine No.3	54.1	48.7
30-Jan-13	Orient Mine No.3	55.1	49.0
11-Feb-13	Orient Mine No.3	54.2	48.6
27-Feb-13	Orient Mine No.3	53.1	47.1
13-Mar-13	Orient Mine No.3	52.3	46.6
29-Mar-13	Orient Mine No.3	53.1	47.4
29-Mar-13	Orient Mine No.3	53.1	47.4
11-Apr-12	Orient Mine No.4	56.5	48.3
28-Apr-12	Orient Mine No.4	55.1	46.7
08-May-12	Orient Mine No.4	56.3	47.9
30-May-12	Orient Mine No.4	55.3	46.4
08-Jun-12	Orient Mine No.4	54.8	48.3

29-Jun-12	Orient Mine No.4	53.2	47.0
07-Jul-12	Orient Mine No.4	52.5	46.1
30-Jul-12	Orient Mine No.4	51.8	47.0
11-Aug-12	Orient Mine No.4	53.2	49.8
27-Aug-12	Orient Mine No.4	52.3	48.1
11-Sep-12	Orient Mine No.4	53.5	46.7
28-Sep-12	Orient Mine No.4	52.4	48.5
12-Oct-12	Orient Mine No.4	53.6	49.5
30-Oct-12	Orient Mine No.4	54.3	48.5
09-Nov-12	Orient Mine No.4	53.2	47.5
26-Nov-12	Orient Mine No.4	52.1	46.9
13-Dec-12	Orient Mine No.4	51.2	45.7
29-Dec-12	Orient Mine No.4	52.4	46.7
14-Jan-13	Orient Mine No.4	53.2	47.1
30-Jan-13	Orient Mine No.4	54.2	48.3
11-Feb-13	Orient Mine No.4	53.3	47.5
27-Feb-13	Orient Mine No.4	52.2	46.3
13-Mar-13	Orient Mine No.4	51.8	47.5
29-Mar-13	Orient Mine No.4	50.9	46.8
29-Mar-13	Orient Mine No.4	50.9	46.8
11-Apr-12	Rampur Colony	56.3	49.5
28-Apr-12	Rampur Colony	55.2	48.1
08-May-12	Rampur Colony	56.5	49.8
30-May-12	Rampur Colony	55.3	48.9
08-Jun-12	Rampur Colony	54.3	47.0
29-Jun-12	Rampur Colony	53.5	46.8
07-Jul-12	Rampur Colony	54.5	47.4
30-Jul-12	Rampur Colony	55.3	48.1
11-Aug-12	Rampur Colony	52.6	47.8
27-Aug-12	Rampur Colony	51.5	46.8
11-Sep-12	Rampur Colony	53.8	47.5
28-Sep-12	Rampur Colony	52.4	48.1
12-Oct-12	Rampur Colony	51.9	47.0
30-Oct-12	Rampur Colony	50.2	46.8
09-Nov-12	Rampur Colony	51.3	47.0
26-Nov-12	Rampur Colony	50.1	46.9
13-Dec-12	Rampur Colony	51.2	47.0

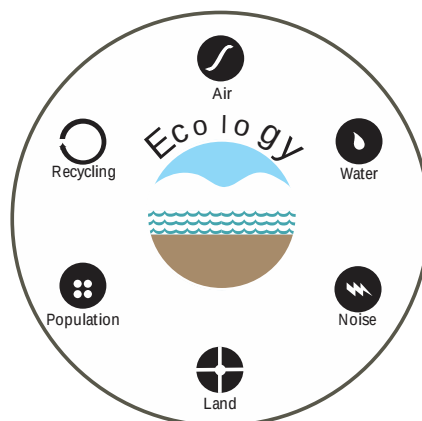
29-Dec-12	Rampur Colony	50.3	46.5
14-Jan-13	Rampur Colony	51.2	47.6
30-Jan-13	Rampur Colony	50.3	48.3
11-Feb-13	Rampur Colony	51.2	47.6
27-Feb-13	Rampur Colony	50.1	46.2
13-Mar-13	Rampur Colony	51.3	47.5
29-Mar-13	Rampur Colony	52.4	48.1
29-Mar-13	Rampur Colony	52.4	48.1



Annual Compiled Monitoring Report Of MCL HQ For 2012-2013

Ib Valley Coalfields

Mahanadi Coalfields Limited



Prepared by:



Central Mine Planning & Design Institute Ltd.

(A Subsidiary of Coal India Ltd.)

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[Assistance from Environment Division, CMPDI(HQs), Ranchi]

Drinking Water Data Area: MCL HQ

Date of Sampling	04-Apr-12	09-Jul-12	01-Oct-12	15-Jan-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Inlet to Water Treatment Plant at Anand Vihar	Inlet to Water Treatment Plant at Anand Vihar	Inlet to Water Treatment Plant at Anand Vihar	Inlet to Water Treatment Plant at Anand Vihar	
Colour, Hazen unit, Max	4	4	4	5	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	3	4	5	5	5
pH value	7.38	7.34	7.38	7.51	6.5-8.5
Total hardness	56	52	56	120	300
Iron (as Fe)	<0.05	<0.05	<0.05	<0.05	0.3
Chlorides (as Cl)	10	10	12	26	250
Dissolved solids (TD S)	98	92	98	218	500
Calcium (as Ca)	12.8	11.2	12.8	27.2	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	17	16	16	42	200
Nitrate (as NO ₃)	2.16	4.43	4.43	5.76	45
Fluoride (as F)	0.23	0.10	0.21	0.28	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	0.05	0.08	0.02	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	32	28	32	72	200
Residual Chlorine	Nil	Nil	Nil	Nil	0.2
MPN	Nil	Nil	Nil	Nil	Nil

Drinking Water Data Area: MCL HQ

Date of Sampling	04-Apr-12	09-Jul-12	01-Oct-12	15-Jan-13	Indian Drinking Standards (IS-10500)
Monitoring Station	Outlet of Water Treatment Plant at Anand Vihar	Outlet of Water Treatment Plant at Anand Vihar	Outlet of Water Treatment Plant at Anand Vihar	Outlet of Water Treatment Plant at Anand Vihar	
Colour, Hazen unit, Max	2	3	2	2	5
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	3	4	3	3	5
pH value	7.42	7.39	7.43	7.53	6.5-8.5
Total hardness	60	56	64	128	300
Iron (as Fe)	<0.05	<0.05	0.07	<0.05	0.3
Chlorides (as Cl)	12	12	14	28	250
Dissolved solids (TD S)	106	104	112	232	500
Calcium (as Ca)	14.4	11.8	14.4	28.8	75
Copper (as Cu)	<0.02	<0.02	<0.02	<0.02	0.05
Manganese (as Mn)	<0.05	<0.05	<0.05	<0.05	0.1
Sulphate (as SO ₄)	22	17	18	43	200
Nitrate (as NO ₃)	2.23	2.66	3.16	4.43	45
Fluoride (as F)	0.12	0.09	0.15	0.21	1.5
Selenium (as Se)	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic (as As)	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb)	<0.05	<0.05	<0.05	<0.05	0.05
Zinc (as Zn)	<0.02	<0.02	<0.02	0.04	5
Hexavalent chromium (Cr ₆₊)	<0.01	<0.01	<0.01	<0.01	0.05
Boron (as B)	<0.20	<0.20	<0.20	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	<0.001	0.001
Alkalinity	36	32	36	76	200
Residual Chlorine	0.21	0.19	0.22	0.20	0.2
MPN	Nil	Nil	Nil	Nil	Nil

Drinking Water Data Area: MCL HQ

[illegible]

Drinking Water Data Area: MCL HQ

[illegible]

Drinking Water Data Area: MCL HQ

Date of Sampling	08-Feb-13	
Monitoring Station	Adarsha Nagar Colony pump house water	Indian Drinking Standards (IS-10500)
Colour, Hazen unit, Max	3	5
Odour	Unobjectionable	Unobjectionable
Taste	Agreeable	Agreeable
Turbidity, NTU, Max	4	5
pH value	7.35	6.5-8.5
Total hardness	72	300
Iron (as Fe)	<0.05	0.3
Chlorides (as Cl)	14	250
Dissolved solids (TDS)	126	500
Calcium (as Ca)	16	75
Copper (as Cu)	<0.02	0.05
Manganese (as Mn)	<0.05	0.1
Sulphate (as SO ₄)	23	200
Nitrate (as NO ₃)	4.43	45
Fluoride (as F)	0.14	1.5
Selenium (as Se)	<0.01	0.01
Arsenic (as As)	<0.01	0.05
Lead (as Pb)	<0.05	0.05
Zinc (as Zn)	<0.02	5
Hexavalent chromium (Cr ⁶⁺)	<0.01	0.05
Boron (as B)	<0.20	1
Phenolics (as C ₆ H ₅ OH)	<0.001	0.001
Alkalinity	40	200
Residual Chlorine	Nil	0.2
MPN	Nil	Nil