Environmental Status Report
For
Tatijharia Bauxite Mine
at
Post & Teh.: Samri,(Kusmi)
Dist: Balrampur–Ramanujganj(C.G.)

Duration: April-May-June-2021

Name of Industry:-

ADITYA BIRLA
HINDALCO

M/s. Hindalco Industries Limited.,

Name of Laboratory:-

ANACON LABS

QCI-NABET, MoEF & CC (GOI)
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1.1 Introduction

Hindalco Industries Limited (Hindalco) is one among the flag ship companies of the Aditya Birla Group of Industries and is one of the largest corporate groups in India. This group is a leading manufacturer of Aluminum in India, having integrated facilities encompassing bauxite, mining, refining and smelting to achieve Aluminum.

Various processing units of Hindalco are strategically located in different parts of the nation to achieve optimum benefits. Over the past few decades the group has grown multifold in its production capacities, product mix and diversification in mining. The Chhattisgarh Environment Conservation Board (CECB) granted permission for establishing the Bauxite mine to Hindalco at block Tatijharia, Kudag and Samri mines in Balrampur District of Chhattisgarh State.

HINDALCO INDUSTRIES LTD. awarded the work to M/s ANACON LABORATORIES PVT. LTD. NAGPUR (ALPL) for carrying out monitoring of parameters for assessing pollution levels and preparation of monthly report (April-May-June-2021) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment Forest and climate change (MoEF & CC) for Tatijharia mining lease in Balrampur District, Chhattisgarh State.

1.2 Background Information of Tatijharia Mine

Hindalco was granted Tatijharia Bauxite mining lease over an area of 1218.762hec.inTatijharia, Post Jamira, Tehsil Samri of Balrampur district, Chhattisgarh on 25/06/1998 for a period of 20 years. As per the Mines and Mineral (Development and Regulation) Amendment Act, 2015, Tatijharia lease has been extended up to 30 years i.e 24/06/2048. The mining operations were started on 01/04/2004. The production capacity of Tatijharia bauxite mine is 4.0 Lakh Tone/Year.

1.3 Salient Features of Tatijharia Bauxite Mine

The deposits occur in Tatijharia block, Post Jamira Tehsil Samri of Balrampur district. This deposit has been identified as one of the resources to cater the raw material requirements of the Hindalco Alumina refinery at Renukoot, Uttar Pradesh. The salient features of the project are presented below :(**Table-1**)

Table-1

Salient Features of Tatijharia Bauxite Mines

S.No.	Particulars	Details
1.	Survey of India Toposheet No.	64 M /15
2.	Latitude	23° 21′ 02″N to 23° 24′ 15″N
3.	Longitude	83° 54′ 50″E to 83° 56′ 30″E
4.	Elevation	1282-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3°C Annual minimum temperature : 17.7°C Average annual rainfall : 1401.1 mm
6.	Mining lease area	1218.762hec.
7.	Method of mining	Open cast (Semi-Mechanized)
8.	Mode of transportation	Trucks
9.	Land use	Agricultural and Barren land
10.	Nearest Road	Samri to Kusmi (17 km)
11.	Nearest Airport	Ranchi (143.56 km, E)
12.	Nearest Town	Ambikapur (127 km, SW)

1.4 Environmental Monitoring

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during mining operation. With the knowledge of baseline conditions, the monitoring program will serve as an indicator for any deterioration in environment conditions due to mining operation of the project. Suitable mitigation steps will be taken in time to safeguard the environment, based on monitoring reports. Monitoring is important in the control of pollution since the efficiency of control measures can only be determined by monitoring.

In order to find out impact of mining activity on sensitive receptors, it is necessary to monitor Environmental Quality to know ground level lconcentrations of pollutants within and around the mining lease area, accordingly Hindalco Industries through ALPL has been monitoring at the following locations air, water and Noise quality on monthly basis during these months **(Table 2)**.

1.5 Air Environment

1.5.1 'Ambient Air Quality Monitoring

Ambient Air Quality monitored at 8 locations in the core zone and buffer zone with reference to Tatijharia mine lease area shown in **(Fig. 1)**.

Table 2

Locations of Ambient Air Quality Monitoring (AAQM)

(1218.762 hec.)

Sl. No.	(Core Zone)	Sl. No.	Buffer Zone
1	Piprapat/Nr.Mining Area	5	Kutku Village/Nr.V.T.Center
2	Betpani	6	Sairaidh Campus
3	Virhorepat	7	Rajendrapur/Nr.Mining Area
4	Tatijharia Village/Nr.Weigh Bridge	8	Dumerkholi/Nr.Mining Area

The sampling stations are selected at the above mentioned locations, in downwind and upwind directions of the mining site in the core zone and buffer zone. ALPL is carrying out regular monitoring for PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO and, Pb, Hg, As and Cr above Ambient Air Quality Monitoring (AAQM) locations. The AAQM sampling sites are selected considering seasonal variation in wind speed and wind direction.

1.5.2 Sampling Duration and Frequency

Ambient air quality monitoring was carried out for the parameters PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO and Pb, Hg, As and Cr from April-2021 to June-2021 as per CPCB norms.

Data is compared with the present revised standards mentioned in the latest Gazette Notification of the Central Pollution Control Board (CPCB) (November-18, 2009), and as per consent conditions mentioned in consent letter.

1.5.3 MONITORED PARAMETERS AND FREQUENCY Of SAMPLING

Methods and Instruments used for Sampling

The air samples were analyzed as per methods specified by Central Pollution Control Board (CPCB).

The levels of Particulate Matter (PM_{10}), Sulphur Dioxide (SO_2), Oxides of Nitrogen (NO_2),CO, Pb, Hg, As and Cr were monitored for establishing the baseline status. PM_{10} was collected with the help of Respirable particulate sampler operating 24 hours by drawing air which passes through the cyclone at the rate of 1.0 -1.3 m^3/min which collects the particles less than 10 µm diameter over glass fiber filter paper. **(Table3)**.

Table 3

MONITORED PARAMETERS AND FREQUENCY OF SAMPLING

Parameters	Sampling frequency
Particulate Matter (PM_{10})	24 hourly sample twice a week for Three months
Particulate Matter ($PM_{2.5}$)	24 hourly sample twice a week for Three months
Particulate Matter 2.5	24 hourly sample twice a week for Three months
Sulphur dioxide (SO_2)	24 hourly sample twice a week for Three months
Oxides of Nitrogen (NO_2)	24 hourly sample twice a week for Three months
CO, Pb, Hg, As, Cr	8 hourly samples for 24 hour twice a week for three months

Table 4.0

Measurement Techniques for various pollutants

Sr. No.	Parameter	Technique	Technical Protocol	Minimum Reportable Value($\mu g/m^3$)
1.	Particulate Matter PM_{10}	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part-23)	5
2.	Particulate Matter $PM_{2.5}$	Respirable Dust Sampler (Gravimetric Method)	USEPA-40 (Part-50)	5
3.	Sulphur Dioxide	Modified West and Gaeke	IS-5182 (Part – II)	4
4.	Oxide of Nitrogen	Jacob &Hochheiser Method	IS-5182 (Part – VI)	4
5.	Carbon Monoxide	NDIR Spectroscopy	IS-5182 (Part – X)	2
6.	Pb, As, Hg, Cr	Acid Digestion Method	EPA Method	0.1

1.6 Meteorology: Wind Pattern

The data of wind pattern collected during the study period (April-May-June-2021) indicates that the wind was blowing predominately from (WSW and W) directions, during study period.

Wind Frequency Distribution Data

Sr. No.	Directions / Wind Classes (m/s)	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total (%)
1	348.75 - 11.25	0.025195	0.036189	0.011452	0.015117	0.000458	0.000000	0.088410
2	11.25 - 33.75	0.013743	0.009162	0.003665	0.003207	0.000458	0.000000	0.030234
3	33.75 - 56.25	0.011910	0.009620	0.003207	0.000000	0.000000	0.000000	0.024737
4	56.25 - 78.75	0.007787	0.009162	0.000000	0.000000	0.000000	0.000000	0.016949
5	78.75 - 101.25	0.006413	0.012826	0.000458	0.000000	0.000000	0.000000	0.019698
6	101.25 - 123.75	0.006413	0.006871	0.000000	0.000000	0.000000	0.000000	0.013284
7	123.75 - 146.25	0.010078	0.005955	0.000916	0.000000	0.000000	0.000000	0.016949
8	146.25 - 168.75	0.009162	0.015575	0.002290	0.000000	0.000000	0.000000	0.027027
9	168.75 - 191.25	0.016949	0.018323	0.013743	0.002749	0.000000	0.000000	0.051764
10	191.25 - 213.75	0.012368	0.033898	0.009620	0.004581	0.000000	0.000000	0.060467
11	213.75 - 236.25	0.018323	0.031608	0.032982	0.008704	0.000000	0.000000	0.091617
12	236.25 - 258.75	0.017407	0.050847	0.041686	0.016949	0.000000	0.000000	0.126890
13	258.75 - 281.25	0.017865	0.032982	0.035731	0.014659	0.000000	0.000000	0.101237
14	281.25 - 303.75	0.016949	0.027943	0.041686	0.011910	0.000916	0.000000	0.099404
15	303.75 - 326.25	0.018781	0.035273	0.029776	0.005955	0.000916	0.000458	0.091159
16	326.25 - 348.75	0.023362	0.063674	0.033898	0.005497	0.002290	0.004123	0.132845
	Sub-Total	**0.232707**	**0.399908**	**0.261109**	**0.089327**	**0.005039**	**0.004581**	**0.992216**
	Calms							0.007326
	Missing/Incomplete							0.000458
	Total							1.000000

Summary of Wind Pattern

Season	First Pre-Dominant Wind Direction	Second Pre-Dominant Wind Direction	Calm Condition	Average Wind Speed
April-May-June-2021	WSW (12.7%)	W (10.1%)	0.73	3.29 m/s

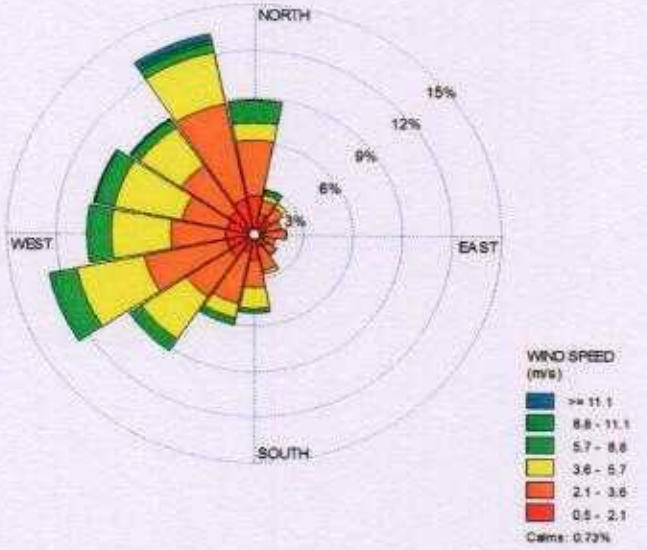


Figure.01: Wind Rose Diagram (April-May-June-2021)

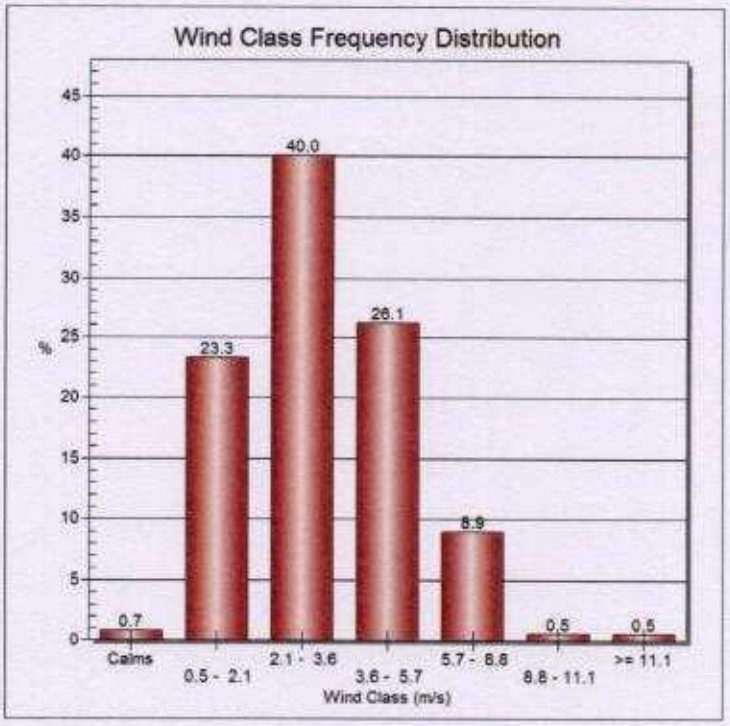


Figure.02: Wind Class Frequency Distribution (April-May-June-2021).

Table 6

Statistical Analysis

Location	Month & Year	PM-10 (µg /m^3)	PM-2.5 (µg/m^3)	SO_2 (µg /m^3)	NO_2 (µg /m^3)	CO (mg /m^3)	Pb (µg /m^3)	Hg (µg /m^3)	As (ng/m^3)	Cr (µg /m^3)
Core Zone										
Tatijharia Vllage/ Nr.Weigh Bridge	April-2021	59.2	20.9	9.0	20.3	0.240	0.019	ND	ND	ND
	May-2021	52.9	20.5	7.3	21.2	0.246	0.018	ND	ND	ND
	June-2021	50.8	19.7	7.2	20.6	0.182	0.015	ND	ND	ND
Piprapat/ Nr. Mining Area	April-2021	58.4	20.7	9.5	17.9	0.224	0.020	ND	ND	ND
	May-2021	60.1	24.4	8.6	22.6	0.218	0.017	ND	ND	ND
	June-2021	55.5	25.3	8.9	23.7	0.212	0.016	ND	ND	ND
Virhorepat	April-2021	57.8	21.3	8.1	19.3	0.215	0.017	ND	ND	ND
	May-2021	58.3	25.6	9.2	23.7	0.165	0.017	ND	ND	ND
	June-2021	49.5	21.1	7.8	21.6	0.154	ND	ND	ND	ND
Betpani	April-2021	52.9	20.5	7.3	21.2	0.189	0.016	ND	ND	ND
	May-2021	52.0	22.2	8.2	23.0	0.206	ND	ND	ND	ND
	June-2021	50.2	18.4	7.1	19.1	0.187	ND	ND	ND	ND
CPCB Standards		100 (24 hrs)	60 (24 hrs)	80 (24 hrs)	80 (24 hrs)	2 (8 hrs)	1.0 (24 hrs)	---	6.0 (annual)	---
Minimum		49.5	18.4	7.1	17.9	0.154	0.015	---	---	---
Maximum		60.1	25.6	9.5	23.7	0.246	0.020	---	---	---
Average		54.8	21.7	8.2	21.2	0.203	0.017	---	---	---
98% le		59.9	25.5	9.4	23.7	0.245	0.020	---	---	---

- The Average Concentration of PM_{10} within the Core Zone of Tatijharia Lease is 54.8 µg/m^3.
- The Average Concentration of $PM_{2.5}$ within the Core Zone of Tatijharia Lease is 21.7µg/m^3.
- The Average Concentration of SO_2 within the Core Zone of Tatijharia Lease is 8.2 µg/m^3.
- The Average Concentration of NO_2 within the Core Zone of Tatijharia Lease is 21.2 µg/m^3.
- The Average Concentration of CO within the Core Zone of Tatijharia Lease is 0.203 mg/m^3.
- The Average Concentration of Pb within the Core Zone of Tatijharia Lease is 0.017µg/m^3.

Conclusion: -The Average Concentration within the Core Zone of Tatijharia Lease during this period (**April-May-June-2021**). It is within permissible limits as per CPCB Standards.

Location	Month & Year	PM-10 ($\mu g/m^3$)	PM-2.5 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	CO (mg/m^3)	Pb ($\mu g/m^3$)	Hg ($\mu g/m^3$)	As (ng/m^3)	Cr ($\mu g/m^3$)
Buffer Zone										
KutkuVillage /Nr.V.T.Center	April-2021	63.4	31.7	9.6	19.2	0.195	ND	ND	ND	ND
	May-2021	59.3	20.1	9.0	18.6	0.285	0.017	ND	ND	ND
	June-2021	50.5	21.3	8.0	15.6	0.209	ND	ND	ND	ND
Sairaidh Campus	April-2021	60.9	25.9	7.5	17.5	0.307	0.017	ND	ND	ND
	May-2021	51.0	18.3	7.6	16.8	0.198	0.014	ND	ND	ND
	June-2021	50.8	19.7	7.2	20.6	0.199	ND	ND	ND	ND
Rajendrapur/ Nr.Mining Area	April-2021	62.2	33.5	9.1	18.3	0.298	0.017	ND	ND	ND
	May-2021	61.3	22.5	9.2	16.2	0.300	0.017	ND	ND	ND
	June-2021	50.6	20.1	8.2	15.5	0.240	0.015	ND	ND	ND
Dumerkholi/ Nr.Mining Area	April-2021	68.5	41.2	10.5	19.1	0.263	0.017	ND	ND	ND
	May-2021	60.9	20.4	9.0	18.7	0.284	0.017	ND	ND	ND
	June-2021	53.1	22.2	7.8	16.6	0.215	0.015	ND	ND	ND
CPCB Standards		100 (24 hrs)	60 (24 hrs)	80 (24 hrs)	80 (24 hrs)	2 (8 hrs)	1.0 (24 hrs)	---	6.0 (annual)	---
Minimum		50.5	18.3	7.2	15.5	0.195	0.014	---	---	---
Maximum		68.5	41.2	10.5	20.6	0.307	0.017	---	---	---
Average		57.7	24.7	8.6	17.7	0.249	0.016	---	---	---
98% le		67.4	39.5	10.3	20.3	0.305	0.017	---	---	---

- The Average Concentration of PM_{10} within the Buffer Zone of Tatijharia Lease is 57.7 $\mu g/m^3$.
- The Average Concentration of $PM_{2.5}$ within the Buffer Zone of Tatijharia Lease is 24.7 $\mu g/m^3$.
- The Average Concentration of SO_2 within the Buffer Zone of Tatijharia Lease is 8.6 $\mu g/m^3$.
- The Average Concentration of NO_2 within the Buffer Zone of Tatijharia Lease is 17.7 $\mu g/m^3$.
- The Average Concentration of CO within the Buffer Zone of Tatijharia Lease is 0.249 mg/m^3
- The Average Concentration of Pb within the Buffer Zone of Tatijharia Lease is 0.016 $\mu g/m^3$.

Conclusion: -The Average Concentration within the Buffer Zone of Tatijharia Lease during this period (**April-May-June-2021**). It is within permissible limits as per CPCB Standards.

Month-wise Summary of Statistical Analysis

Tatijharia Lease (Core Zone):-

1.7 Ambient Air Quality:

Ambient air quality has been generated as per NAAQS 2009 for the month of April-May-June-2021. PM_{10}, $PM_{2.5}$, SO_2 , NO_2 & CO, The values obtained were then compared vis-a-vis the standards prescribed by CPCB for Industrial/ Rural / Residential uses.

1.7.1 Presentation of Results:

The summary of Ambient Air Quality monitoring results from April-2021 to June- 2021 are presented in detail in Table 4.0. 98th percentile, maximum and minimum values etc. have been computed from the collected raw data for all the AAQ monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQS for residential and rural zone.

A. Particulate Matter-PM_{10}:

The minimum and maximum concentrations for Particulate Matter-PM_{10} were recorded as 49.5 µg/m^3 and 60.1 µg/m^3 at Virhorepat and Piprapat/Nr. Mining area respectively. The average concentration of PM_{10} was 54.8µg/m^3.

B. Particulate Matter-$PM_{2.5}$:

The minimum and maximum concentrations for Particulate Matter-$PM_{2.5}$ were recorded as 18.4 µg/m^3 & 25.6 µg/m^3 at Betpani and Virhorepat respectively. The average concentration of $PM_{2.5}$ was 21.7 µg/m^3.

C. Sulphur Dioxide (SO_2):

The minimum and maximum for SO_2 concentrations were recorded as 7.1 µg/m^3 and 9.5 µg/m^3 respectively. The minimum concentration was recorded at Betpani and maximum concentration was also recorded at Piprapat/Nr. Mining area location. The average concentration SO_2 was 8.2 µg/m^3.

D. Nitrogen Dioxide (NO_2):

The minimum and maximum for NO_2 concentrations were recorded as 17.9 µg/m^3 and 23.7 µg/m^3. The maximum concentration was recorded at Virhorepat & Piprapat/Nr. Mining area and the minimum concentration was also recorded at Virhorepat location. The average concentration of NO_2 was 21.2µg/m^3.

E. Carbon Monoxide (CO):

The minimum and maximum for CO concentrations were recorded as 0.154 mg/m^3 and 0.246 mg/m^3. The maximum concentration was recorded at Tatijharia Village/ Nr.Weigh Bridge and the minimum concentration was also recorded at Virhorepat location. The average concentration of CO was 0.203 mg/m^3.

F. Lead (Pb):

Maximum Lead detected in PM_{10} samples was 0.020 µg/m^3 at Piprapat/Nr. Mining area. No lead could be detected in $PM_{2.5}$ samples at any of the Ambient Air samples at any of the locations.

G. Mercury(Hg):

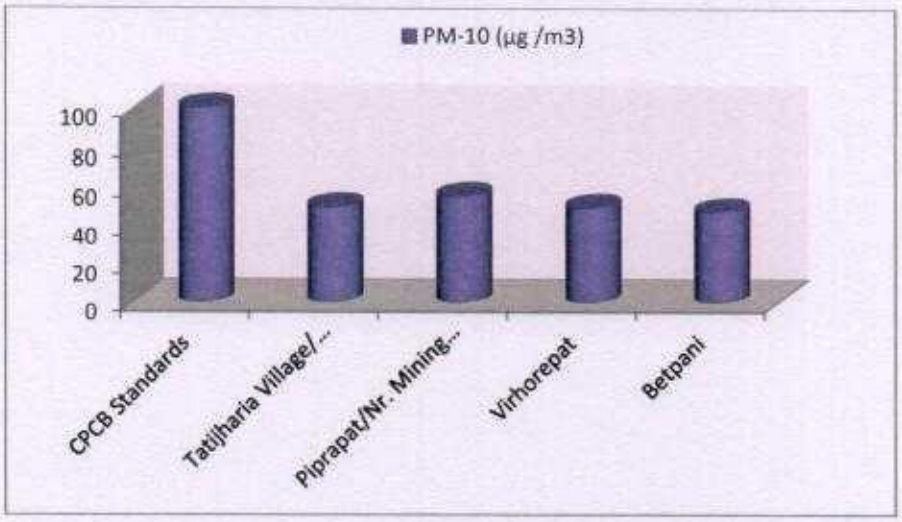
Mercury was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

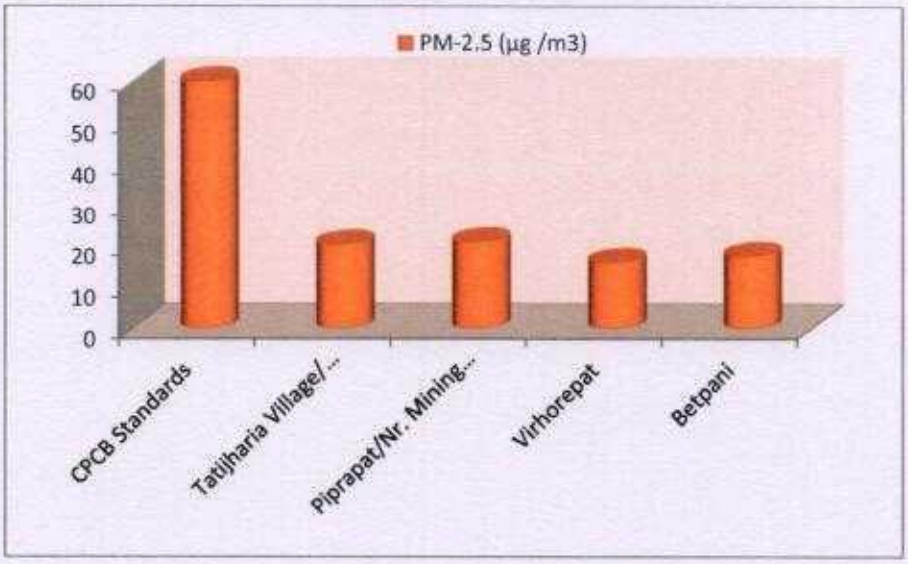
H. Arsenic (As):

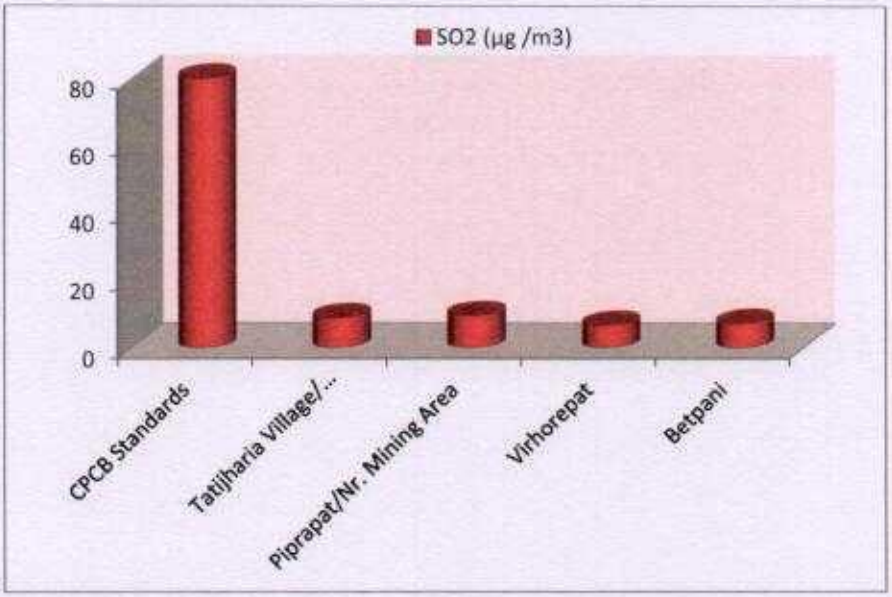
Arsenic was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

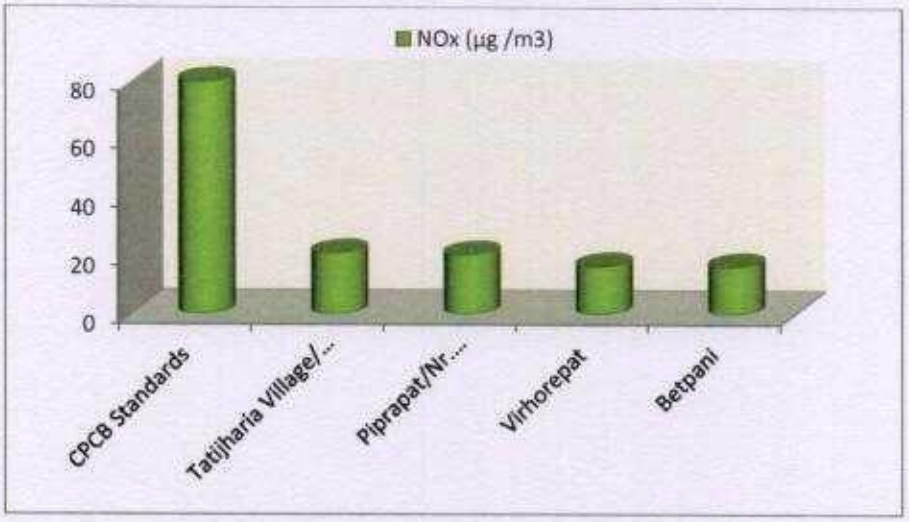
I. Chromium(Cr):

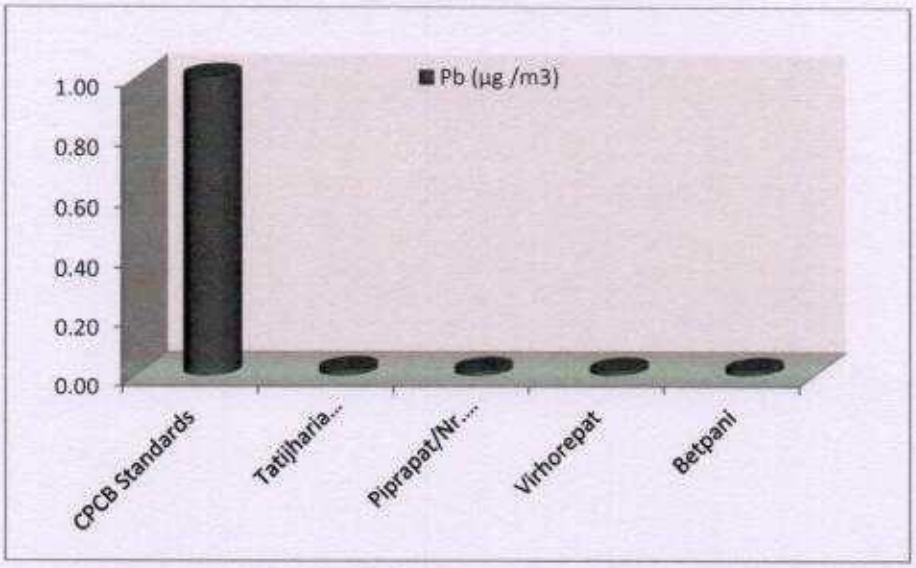
Chromium was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

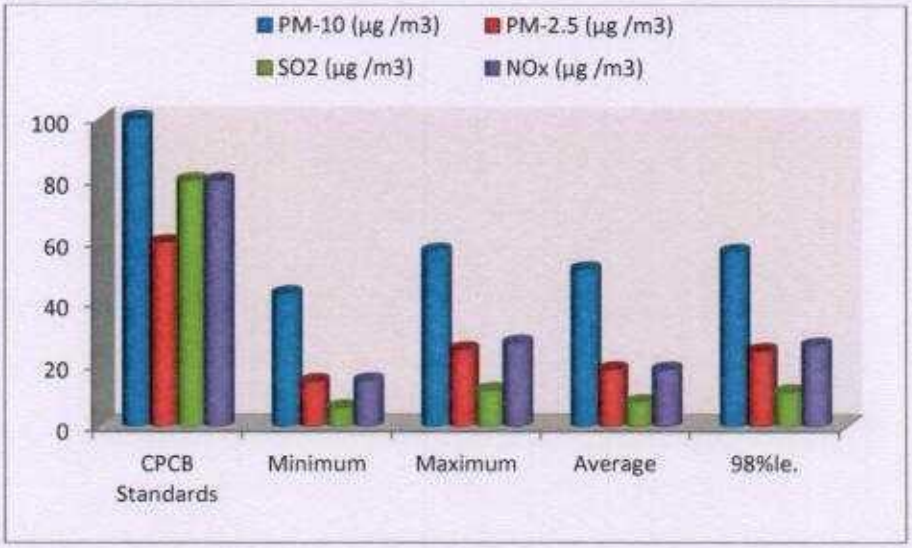

PM-10 (µg /m3)
100
80
60
40
20
0
CPCB Standards
Tatijharia Village/...
Piprapat/Nr. Mining...
Virhorepat
Betpani


PM-2.5 (µg /m3)
60
50
40
30
20
10
0
CPCB Standards
Tatijharia Village/...
Piprapat/Nr. Mining...
Virhorepat
Betpani


SO2 (µg /m3)
80
60
40
20
0
CPCB Standards
Tatijharia Village/...
Piprapat/Nr. Mining Area
Virhorepat
Betpani


NOx (µg /m3)
80
60
40
20
0
CPCB Standards
Tatijharia Village/...
Piprapat/Nr....
Virhorepat
Betpani


Pb (µg /m3)
1.00
0.80
0.60
0.40
0.20
0.00
CPCB Standards
Tatijharia...
Piprapat/Nr....
Virhorepat
Betpani


PM-10 (µg /m3)
PM-2.5 (µg /m3)
SO2 (µg /m3)
NOx (µg /m3)
100
80
60
40
20
0
CPCB Standards
Minimum
Maximum
Average
98%le.

Tatijharia Lease (Buffer Zone):-

1.8 Ambient Air Quality:

Ambient air quality has been generated as per NAAQS 2009 for the month of April-May-June-2021. PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO, the values obtained were then compared vis-a-vis the standards prescribed by CPCB for Industrial/ Rural / Residential uses.

1.8.1 Presentation of Results:

The summary of Ambient Air Quality monitoring results from April-2021 to June- 2021 are presented in detail in Table 4.0. 98th percentile, maximum and minimum values etc. have been computed from the collected raw data for all the AAQ monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQS for residential and rural zone.

A. Particulate Matter-PM_{10}:

The minimum and maximum concentrations for Particulate Matter-PM_{10} were recorded as 50.5 µg/m^3 and 68.5 µg/m^3 at Kutku Village location & Dumerkholir/Nr. Mining area location respectively. The average concentration of PM_{10} was 57.7 µg/m^3.

B. Particulate Matter-$PM_{2.5}$:

The minimum and maximum both concentrations for Particulate Matter-$PM_{2.5}$ were recorded as 18.3 µg/m^3 & 41.2 µg/m^3 at Sairaidh Campus and Dumerkholir/Nr. Mining area location. The average concentration of $PM_{2.5}$ was 24.7 µg/m^3.

C. Sulphur Dioxide (SO_2):

The minimum and maximum for SO_2 concentrations were recorded as 7.2µg/m^{3}and 10.5µg/m^3 respectively. The minimum concentration was recorded at Sairaidh Campus location and maximum concentration was also recorded at Dumerkholir/Nr. Mining area. The average concentration of SO_2 was 8.6µg/m^3.

D. Nitrogen Dioxide (NO_2):

The minimum and maximum for NO_2 concentrations were recorded as 15.5µg/m^3 and 20.6µg/m^3 at Rajendrapur/Nr. Mining location & Sairaidh Campus respectively. The average concentration of NO_2 was 17.7 µg/m^3.

E. Carbon Monoxide (CO):

The minimum and maximum for CO concentrations were recorded as 0.195 mg/m^3 and 0.307 mg/m^3 at Kutku Village location & Sairaidh Campus respectively. The average concentration of CO was 0.249 mg/m^3.

F. Lead (Pb):

Maximum Lead detected in PM_{10} samples was 0.017µg/m^3 at Rajendrapur/Nr. Mining location No lead could be detected in $PM_{2.5}$ samples at any of the Ambient Air samples at any of the locations.

G. Mercury (Hg):

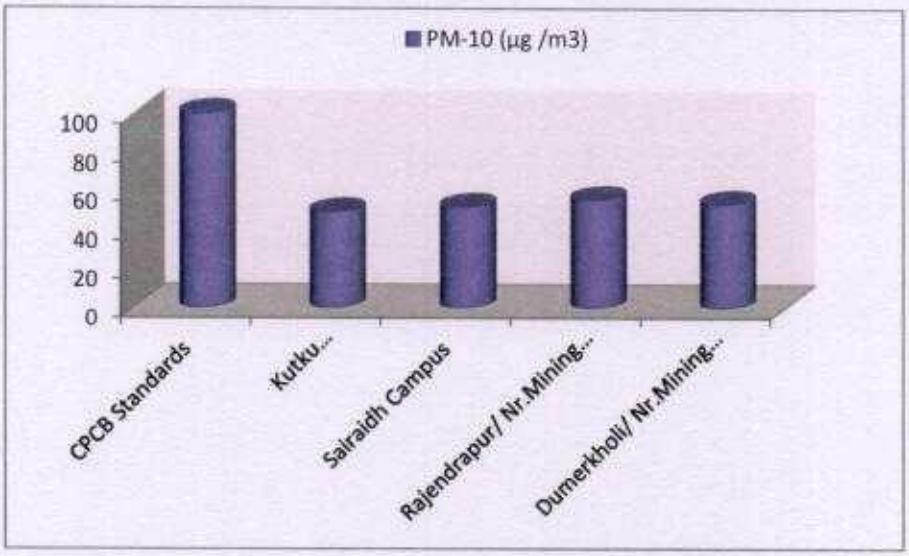
Mercury was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

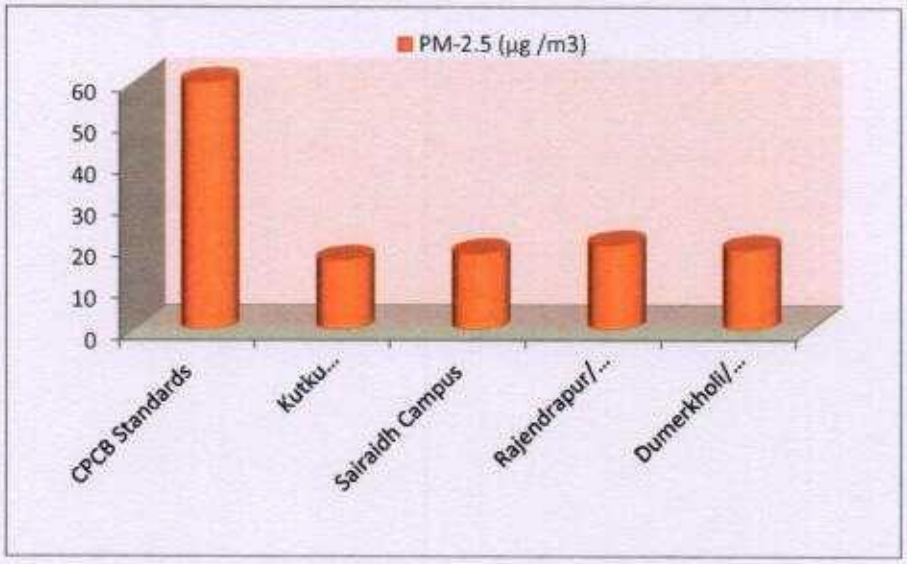
H. Arsenic (As):

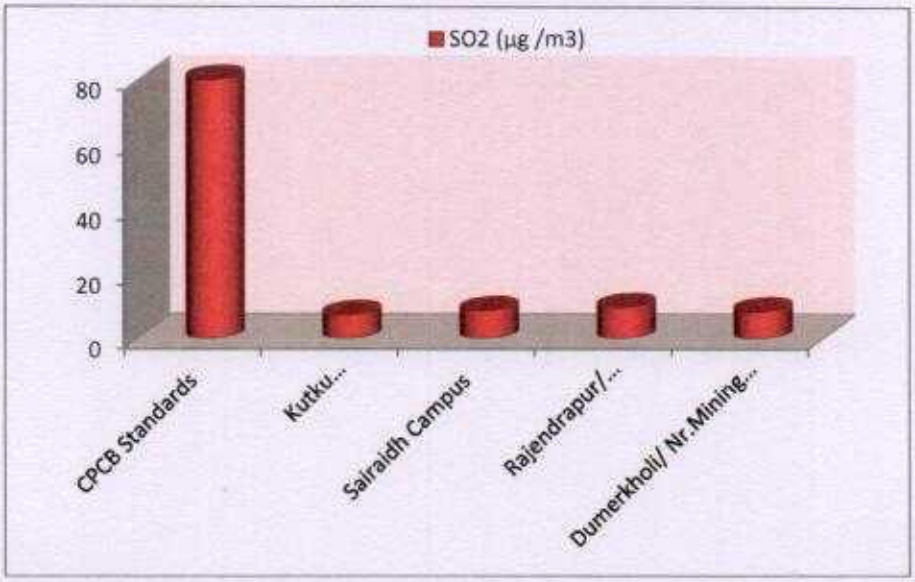
Arsenic was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

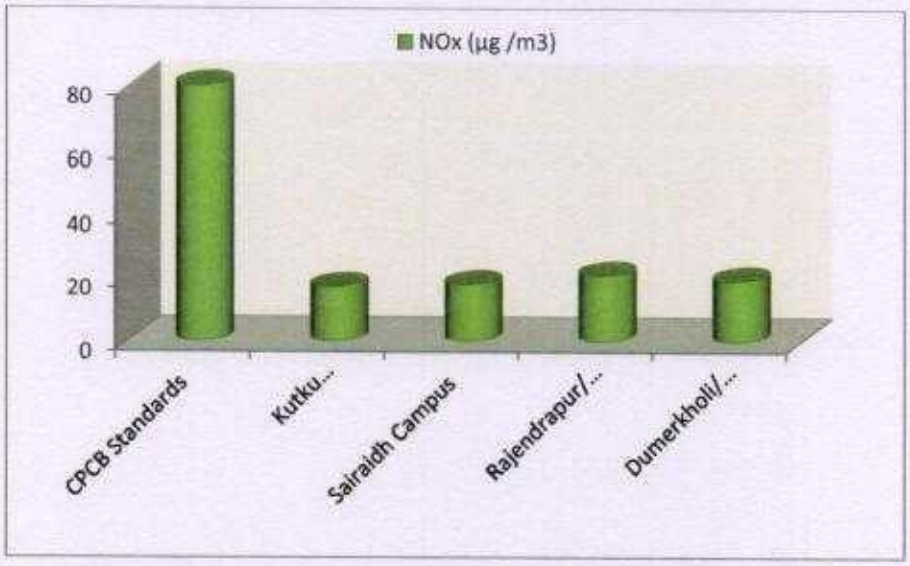
I. Chromium (Cr):

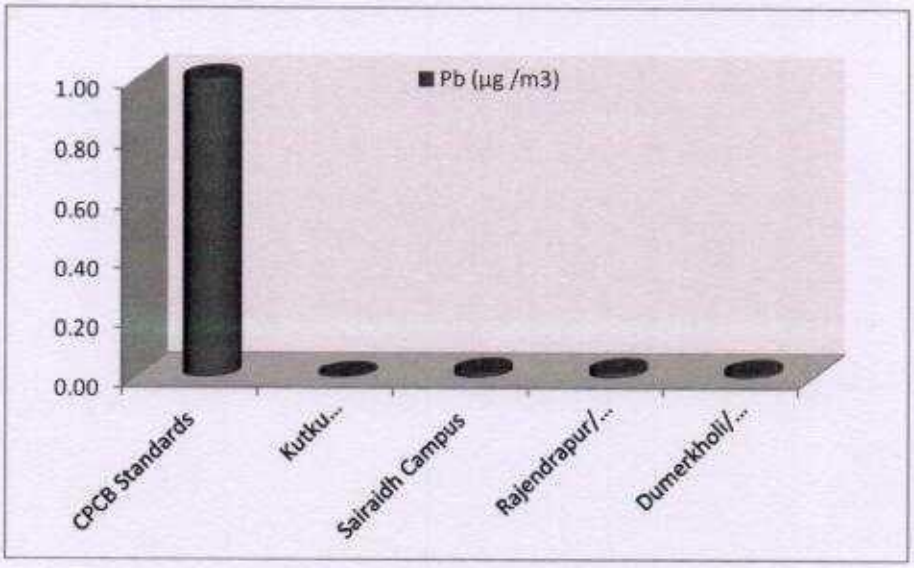
Chromium was not detected at any of the locations in PM_{10} samples as well as $PM_{2.5}$ Samples.

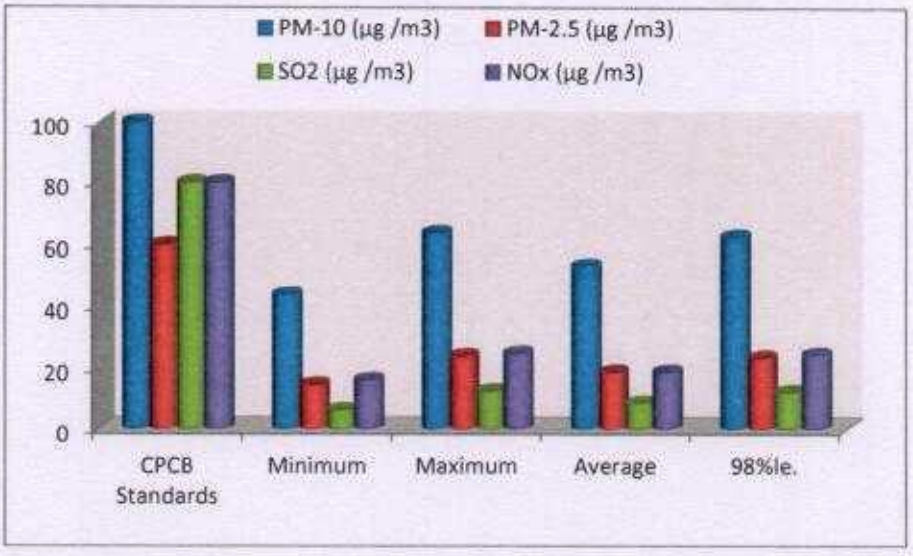

PM-10 (µg /m3)
100
80
60
40
20
0
CPCB Standards
Kutku...
Sairaidh Campus
Rajendrapur/ Nr.Mining...
Dumerkholi/ Nr.Mining...


PM-2.5 (µg /m3)
60
50
40
30
20
10
0
CPCB Standards
Kutku...
Sairaidh Campus
Rajendrapur/...
Dumerkholi/...


SO2 (µg /m3)
80
60
40
20
0
CPCB Standards
Kutku...
Sairaidh Campus
Rajendrapur/...
Dumerkholi/ Nr.Mining...


NOx (µg /m3)
80
60
40
20
0
CPCB Standards
Kutku...
Sairaidh Campus
Rajendrapur/...
Dumerkholi/...


Pb (µg /m3)
1.00
0.80
0.60
0.40
0.20
0.00
CPCB Standards
Kutku...
Sairaidh Campus
Rajendrapur/...
Dumerkholi/...


PM-10 (µg /m3)
PM-2.5 (µg /m3)
SO2 (µg /m3)
NOx (µg /m3)
100
80
60
40
20
0
CPCB Standards
Minimum
Maximum
Average
98%le.

1.9 Noise Environment

The Director General of Mines Safety in its circular No. DG (Tech)/18 of 1975, has prescribed the noise level in mining occupations (TLV) for workers, in an 8 hour shift period with unprotected ear as 90 dB(A) or less. There will be some noise sources in mines, which produce noise levels above 90 dB(A), however, the workers are not expected to be exposed continuously for 8 hours. In order to maintain this statutory requirement Noise monitoring has been carried out in and around the mining lease area.

Work zone noise level in the mining area shall increase due to blasting excavation and transportation. The impacts due to the mining activities on the noise levels shall be negligible if all the precautions for the elimination of the noise are taken. The mining activities will be undertaken during day time only. The daytime equivalent noise levels, when all the machineries are in operation, shall be minimized as the machineries have been provided with noise control equipment. Noise monitoring carried out on monthly basis at eight locations namely core and buffer zone.

Identification of sampling locations

Noise at different noise generating sources has been identified based on the activities in the village area and ambient noise due to traffic.

The noise monitoring has been conducted for determination of ambient noise levels in the mining area and villages. The noise levels at each location were recorded for 24 hours.

Method of Monitoring

Sound Pressure Level (SPL) measurements were monitored at eight locations. The readings were taken for every hour for 24 hours. The day noise levels have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at eight locations within 10-km radius of the study area.

Noise level monitoring was carried out continuously for 24 hours with one hour interval starting at 06.00 hrs to 06.00 hrs next day.

Noise levels monitored during day and night at 8 locations are found to be below the stipulated standard of CPCB as for Industrial area as 75dB(A) and 70dB(A) for day and night respectively as given in **(Table7)**.

Instrument used for monitoring

Noise levels were measured using integrated sound level meter Model no. HTC-SL-1352. This instrument is capable of measuring the Sound Pressure Level (SPL), Leq.

Table 7

Noise Emission Monitoring Report

SR. NO.	LOCATION	Month	Noise-dB(A)	
			Day Time	Night Time
Core Zone				
1.	Tatijharia Village/Nr.Weigh Bridge	April-2021	51.7	48.3
		May-2021	54.7	49.2
		June-2021	53.1	47.6
2.	Piprapat/Nr. Mining Area	April-2021	62.4	53.6
		May-2021	61.8	51.9
		June-2021	58.3	52.7
Buffer Zone				
1.	Samri-Gopatu/ Near Weigh bridge	April-2021	62.9	57.6
		May-2021	63.1	56.4
		June-2021	56.8	43.9
2.	Rajendrapur/Nr.Mining Area	April-2021	58.1	46.2
		May-2021	56.3	51.6
		June-2021	52.1	38.7
CPCB Standards				
Industrial Area			**75**	**70**
Residential area			**55**	**45**

Conclusion: -The Noise Monitoring Results at Tatijharia Lease during this period (**April-May-June-2021**), it is within permissible limits as per CPCB Standards.

Table 8

HEMM Spot Noise Level Monitoring

Unit: dB(A)

Sl. No.	Location	April-2021		May-2021		June-2021	
		Min.	Max.	Min.	Max.	Min.	Max.
1.	Piprapat/Nr.Mining Area	56.1	62.9	58.7	64.8	54.3	61.2
2.	Tatijharia Village/ Nr.Weigh Bridge	61.4	68.3	63.9	68.1	56.9	62.7

2.0 Water Quality

The existing status of water quality for ground water and surface water was assessed by collecting the water samples from underground wells from the piprapat/Nr.mining area.

The purpose of the study is to assess the water quality characteristics for critical parameters, evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity and identification of impact on water quality by this project and related activities.

The physico-chemical analysis of water samples collected during the study period is given in **(Table-10 and Fig.5)**. The overall water quality found to be below the stipulated standards of IS 10500-2012 for ground water & found to be fit for drinking purpose for tested parameters. Thus the impacts due to mining activities have been found to be insignificant.

The drinking water is supplied by the tankers from for-away sources. Hence, additional care now be taken to chlorinate the tankers before leaving the supply source.

Table-10 : Report on Chemical Examination of Ground Water (May - 2021)

Location Name: Piprapat/Near Mining Area

TEST RESULTS

S.N.	Test Parameter	Measurement Unit	Test Method	Requirement as per IS 10500 : 2012 (Drinking Water Specifications) Including Amendment No. 2		Test Result
				Acceptable Limit	Permissible Limit #	
I	**Biological Testing 1. Water**					
1	Total coliform	Per 100 ml	IS 15185 : 2016	Absent	Absent	Absent
2	*Escherichia coli*	Per 100 ml	IS 15185 : 2016	Absent	Absent	Absent
II	**Chemical Testing 1. Water**					
3	Alkalinity (as $CaCO_3$)	mg/l	IS 3025 (Part 23) : 1986	200	600	127
4	Ammonia (as N)	mg/l	IS 3025 (Part 34) : 1988	0.5	No relaxation	BDL (DL – 0.1)
5	Anionic surface active agents (as MBAS)	mg/l	IS 13428 : 2005 Annex K	0.2	1.0	BDL (DL – 0.01)
6	Colour	Hazen units	IS 3025 (Part 4) : 1983	5	15	1
7	Cyanide (as CN)	mg/l	IS 3025 (Part 27) : 1986	0.05	No relaxation	BDL (DL – 0.005)
8	Chloride (as Cl)	mg/l	IS 3025 (Part 32) :1988	250	1000	42.52
9	Calcium (as Ca)	mg/l	IS 3025 (Part 40) : 1991	75	200	38.94
10	Chloramines (as Cl_2)	mg/l	IS 3025 (Part 26) : 1986	4.0	No relaxation	BDL (DL – 0.1)
11	Free residual chlorine	mg/l	IS 3025 (Part 26) : 1986	Min. 0.2	1	BDL (DL – 0.1)
12	Fluoride (as F)	mg/l	IS 3025 (Part 60) : 2008	1.0	1.5	0.24
13	Magnesium (as Mg)	mg/l	IS 3025 (Part 46) : 1994	30	100	12.56
14	Nitrate (as NO_3)	mg/l	APHA 23rd Edition	45	No relaxation	BDL (DL – 2)
15	Odour	-	IS 3025 (Part 5) : 2018	Agreeable	Agreeable	Agreeable
16	pH	-	IS 3025 (Part 11) : 1983	6.5 to 8.5	No relaxation	7.27 at 25°C
17	Phenolic compounds (as C_6H_5OH)	mg/l	IS 3025 (Part 43) : 1992	0.001	0.002	BDL (DL – 0.001)
18	Sulphate (as SO_4)	mg/l	IS 3025 (Part 24) : 1986	200	400	18.24
19	Sulphide (as H_2S)	mg/l	IS 3025 (Part 29) : 1986	0.05	No relaxation	BDL (DL – 0.03)
20	Taste	-	IS 3025 (Part 8) : 1984	Agreeable	Agreeable	Agreeable
21	Total dissolved solids	mg/l	IS 3025 (Part 16) : 1984	500	2000	306
22	Turbidity	NTU	IS 3025 (Part 10) : 1984	1	5	0.4
23	Total hardness (as $CaCO_3$)	mg/l	IS 3025 (Part 21) : 2009	200	600	148.93
24	Mineral Oil	mg/l	ANqr RES-40	0.5	No relaxation	BDL (DL – 0.001)
II	**Chemical Testing 2. Residues In Water**					
25	Arsenic (as As)	mg/l	IS 3025 (Part 37) : 1988	0.01	No relaxation	BDL (DL - 0.01)
26	Aluminium (as Al)	mg/l	IS 3025 (Part 2) : 2019	0.03	0.2	BDL (DL - 0.01)
27	Barium (as Ba)	mg/l	IS 3025 (Part 2) : 2019	0.7	No relaxation	BDL (DL - 0.01)
28	Boron (as B)	mg/l	IS 3025 (Part 2) : 2019	0.5	2.4	BDL (DL - 0.1)
29	Copper (as Cu)	mg/l	IS 3025 (Part 2) : 2019	0.05	1.5	BDL (DL - 0.03)
30	Cadmium (as Cd)	mg/l	IS 3025 (Part 2) : 2019	0.003	No relaxation	BDL (DL - 0.001)
31	Iron (as Fe)	mg/l	IS 3025 (Part 2) : 2019	1.0	No relaxation	0.08
32	Lead (as Pb)	mg/l	IS 3025 (Part 2) : 2019	0.01	No relaxation	BDL (DL - 0.001)
33	Manganese (as Mn)	mg/l	IS 3025 (Part 2) : 2019	0.1	0.3	BDL (DL – 0.05)
34	Mercury (as Hg)	mg/l	IS 3025 (Part 48) : 1994	0.001	No relaxation	BDL (DL - 0.0005)
35	Molybdenum (as Mo)	mg/l	IS 3025 (Part 2) : 2019	0.07	No relaxation	BDL (DL - 0.01)
36	Nickel (as Ni)	mg/l	IS 3025 (Part 2) : 2019	0.02	No relaxation	BDL (DL - 0.01)
37	Selenium (as Se)	mg/l	IS 3025 (Part 56) : 2003	0.01	No relaxation	BDL (DL- 0.001)
38	Silver (as Ag)	mg/l	IS 13428 : 2005	0.1	No relaxation	BDL (DL - 0.001)
39	Total Chromium (as Cr)	mg/l	IS 3025 (Part 2) : 2019	0.05	No relaxation	BDL (DL - 0.03)
40	Zinc (as Zn)	mg/l	IS 3025 (Part 2) : 2019	5	15	0.16

S.N.	Test Parameter	Measurement Unit	Test Method	Requirement as per IS 10500 : 2012 (Drinking Water Specifications) Including Amendment No. 2		Test Result
				Acceptable Limit	Permissible Limit #	
II	**Chemical Testing 2. Residues In Water**					
41	**Polychlorinated biphenyls**					
	2,2',5-trichlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,4,4'-trichlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,2',5,5'-tetrachlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,2',4,5,5'-pentachlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,2',3,4,4',5'-hexachlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,2',4,4',5,5'-hexachlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
	2,2',3,4,4',5,5'-heptachlorobiphenyl	µg/l	Anqr RES - 31	0.5	No relaxation	BDL (DL – 0.03)
42	**Polynuclear aromatic hydrocarbons**					
	Naphthalene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Acenaphthylene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Acenaphthene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Fluorene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Anthracene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Phenanthrene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Fluoranthene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Pyrene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Benzo(a)anthracene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Chrysene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Benzo(a)pyrene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Benzo(b)fluoranthene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Benzo(k)fluoranthene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Indeno(123,cd)pyrene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Dibenzo(a,h)anthracene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
	Benzo(ghi)perylene	µg/l	ANqr RES - 30	0.1	No relaxation	BDL (DL – 0.03)
43	**Trihalomethanes**					
i	Bromoform	mg/l	APHA 6232 23rd Edition	0.1	No relaxation	BDL (DL -0.05)
ii	Dibromochloromethane	mg/l		0.1	No relaxation	BDL (DL -0.05)
iii	Bromodichloromethane	mg/l		0.06	No relaxation	BDL (DL -0.05)
iv	Chloroform	mg/l		0.2	No relaxation	BDL (DL -0.05)
44	**Pesticide Residues Organochlorine**					
i	Alpha-HCH	µg/l	ANqr RES-28	0.01	No relaxation	BDL (DL - 0.01)
ii	Beta HCH	µg/l	ANqr RES-28	0.04	No relaxation	BDL (DL - 0.03)
iii	Gamma - HCH (Lindane)	µg/l	ANqr RES-28	2	No relaxation	BDL (DL - 0.03)
iv	Delta- HCH	µg/l	ANqr RES-28	0.04	No relaxation	BDL (DL - 0.03)
v	Alachlor	µg/l	ANqr RES-29	20	No relaxation	BDL (DL - 0.03)
vi	Aldrin	µg/l	ANqr RES-28	0.03	No relaxation	BDL (DL - 0.03)
vii	Dieldrin	µg/l	ANqr RES-28	0.03	No relaxation	BDL (DL - 0.03)
viii	Butachlor	µg/l	ANqr RES-29	125	No relaxation	BDL (DL - 0.03)
ix	p,p'-DDE	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
x	o,p'-DDE	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
xi	p,p'-DDD	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
xii	o,p'-DDD	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
xiii	o,p'- DDT	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
xiv	p,p'- DDT	µg/l	ANqr RES-28	1	No relaxation	BDL (DL - 0.03)
xv	Endosulphan					
	Alpha-Endosulphan Beta-Endosulphan Endosulphan sulphate	µg/l	ANqr RES-28	0. 4	No relaxation	BDL (DL - 0.03)

NOTES: ● Please see watermark "Original Test Report" to confirm the authenticity of this report ● Results shall be referred to tested sample(s) and applicable to tested parameters only. ● Test report shall not be reproduced except in full without prior written approval of Anacon Labs. ● Liability of Anacon Labs is limited to invoiced amount only. ● Non-perishable and perishable sample(s) shall be disposed off after 30 days and 15 days respectively from the date of issue of Test Report, unless specified otherwise. ● #Permissible limit in absence of an alternate source for drinking water. ● 'mg/l' is equivalent to 'ppm'. ● 'µg/l' is equivalent to 'ppb'. ● **BDL- Below detection limit. ● DL- DL Indicates detection limit of instrument /method and shall be considered as 'absent'.** ● Result for test no. 11 is not relevant. ● **ANqr RES-28, 29, 30, 31 & 40 : Inhouse validated method.**

REMARKS: As requested by the client, sample was tested for above parameters only. **Sample complies with IS:10500:2012, for tests conducted, indicating that it is fit for drinking purpose with respect to tested parameters.**

Table 11

Report on Soil Analysis, Tatijharia
Month: May-2021
Sample Location: (Tatijharia)

TEST RESULTS

S.N.	Test Parameter	Measurement Unit	Test Method	Test Result
1	Infiltration rate	mm/hr	Lab/SOP	15.83
2	Bulk density	g/cm^3	Lab/SOP	1.517
3	Water holding capacity	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	28.46
4	Particle size distribution			
	Sand	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India	41.62
	Silt	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India	23.43
	Clay	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India	34.95
5	Texture	-	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India	Clay Loam
6	pH (1:2.5 Aq. Extract) at 25°C	-	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	7.92 at 25°C
7	Electrical Conductivity (1:2.5 Aq. Extract)	µs/cm	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	346.52
8	Water soluble Calcium (as Ca)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	416.27
9	Water soluble Magnesium (as Mg)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	116.32
10	Water soluble Sodium (as Na)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	204.94
11	Water soluble Potassium (as K)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	23.62
12	Water soluble Chloride (as Cl)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	237.19
13	Water soluble Sulphate (as SO_4)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	317.24

S.N.	Test Parameter	Measurement Unit	Test Method	Test Result
14	Exchangeable Sodium (as Na)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	121.46
15	Exchangeable Potassium (as K)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	17.32
16	Exchangeable Calcium (as Ca)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	216.54
17	Exchangeable Magnesium (as Mg)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	52.91
18	Sodium adsorption ratio	-	By Calculation	13.28
19	Total Organic matter	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	2.17
20	Total Organic Carbon	%	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	1.16
21	Available Nitrogen (as N)	Kg/hec	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	237.31
22	Available Phosphorous (as P)	Kg/hec	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	18.52
23	Available Potassium (as K)	Kg/hec	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	472.91
24	CEC	meq/100g	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	8
25	Arsenic (As)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent
26	Boron (B)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	0.21
27	Cadmium (Cd)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent
28	Chromium (Cr)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent
29	Copper (Cu)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	1.54
30	Lead (Pb)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent
31	Nickel (Ni)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent
32	Cobalt (Co)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	0.21
33	Iron (Fe)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	6.81
34	Manganese (Mn)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	17.24
35	Zinc (Zn)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	1.19
36	Selenium (Se)	mg/Kg	Method Manual, Soil testing in India (Department of agriculture & corporation, Govt of India)	Absent

NOTES:●Please see watermark "Original Test Report" to confirm the authenticity of this report. ● Results shall be referred to tested sample(s) and applicable to tested parameters only. ● Test report shall not be reproduced except in full without prior written approval of Anacon Labs. ● Liability of Anacon Labs is limited to invoiced amount only. ● Non-perishable and perishable sample(s) shall be disposed off after 30 days and 15 days respectively from the date of issue of Test Report, unless specified otherwise ● 'g/100 g' is equivalent to '%w/w'.● 'mg/kg' is equivalent to 'ppm'.●ND indicates not detectable.

Remarks: As requested by the client, sample was tested for above parameters only.

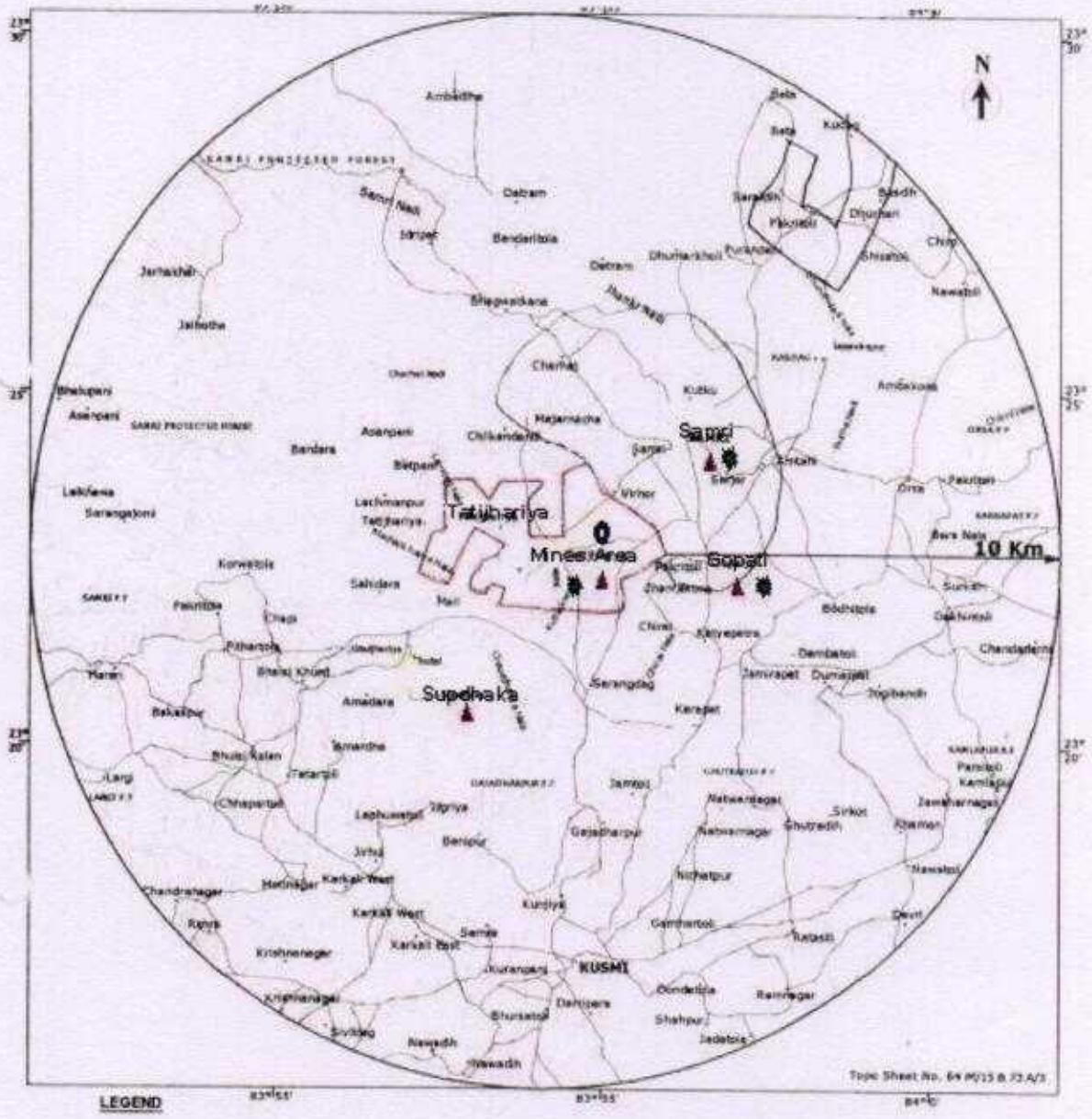


FIG 3: SAMPLING LOCATIONS FOR AIR, NOISE & SOIL

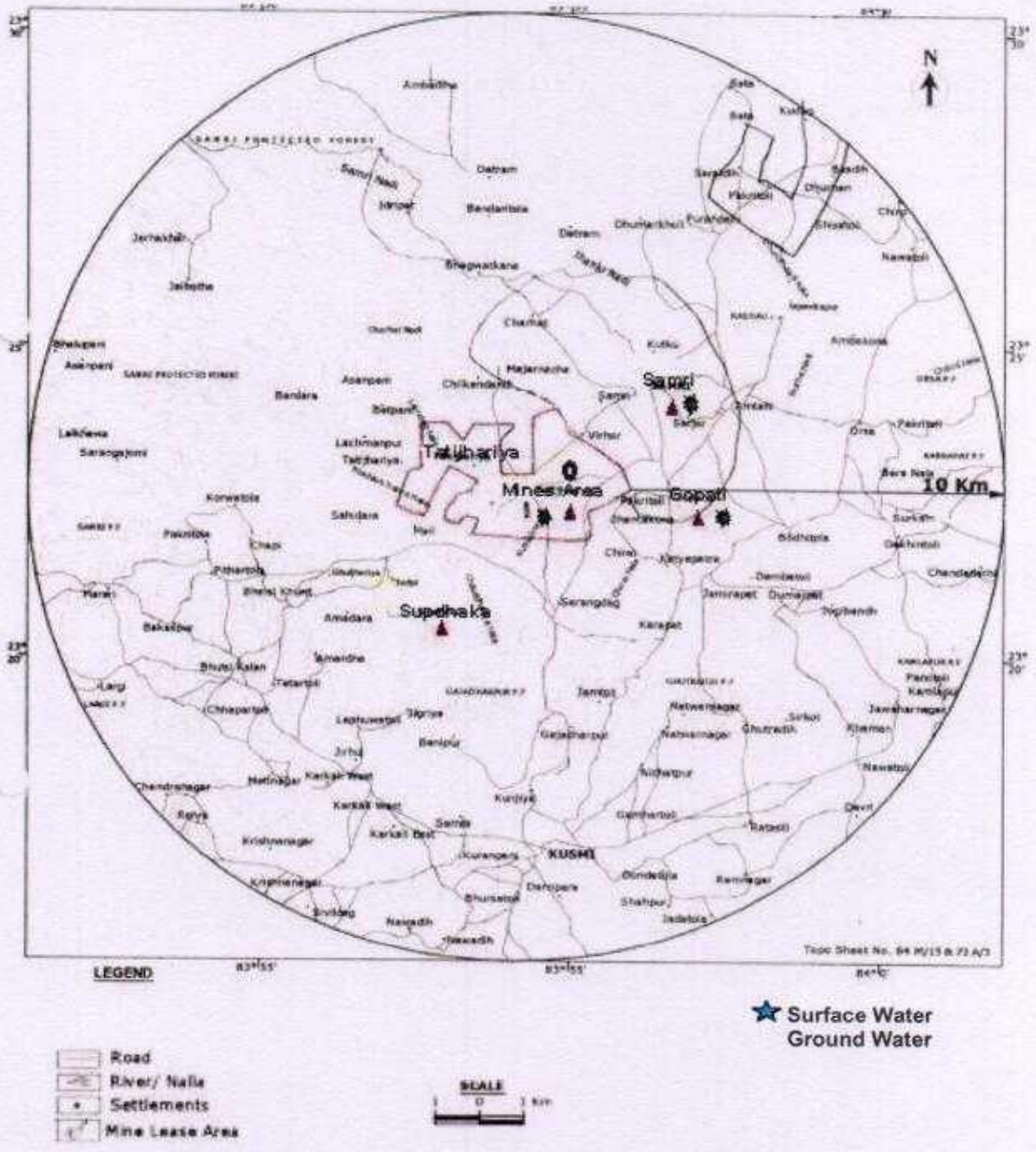


FIG 4: SAMPLING LOCATIONS FOR WATER

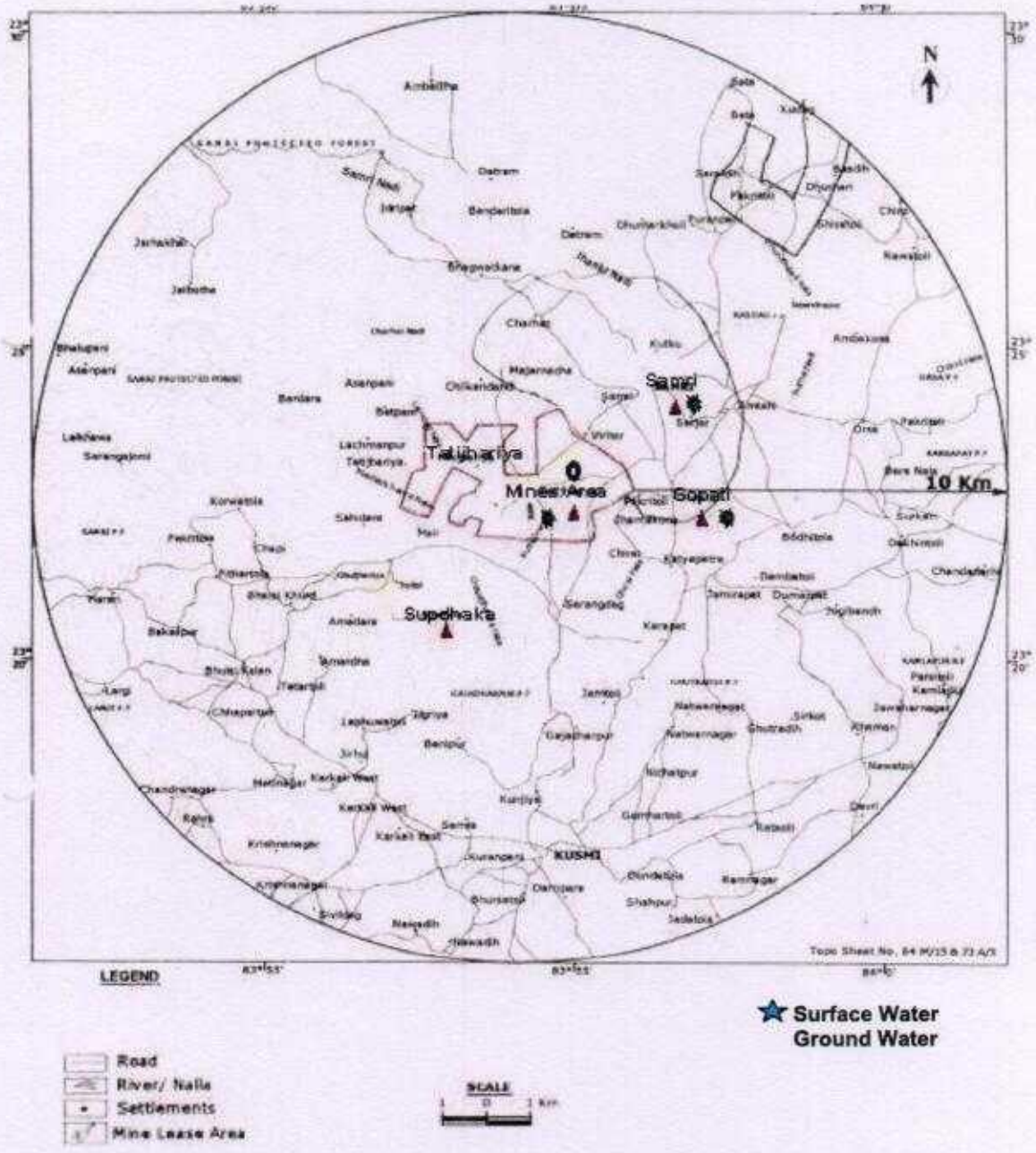


FIG 4: SAMPLING LOCATIONS FOR WATER

Agent of Mines
Samri Mines Division