

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

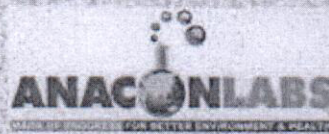
Duration: October-November-December-2018

Name of Industry:-



M/s. Hindalco Industries Limited.,

Name of Laboratory:-



QCI-NABET Accredited EIA Consultant
MoEF&CC (GOI) and NABL Recognized Laboratory
ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007
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Foreword

The protection of environment plays a crucial role in maintaining the local environment quality for any mining industry. Hence compliance of the statutory requirements becomes very important to conserve the ecological balance within and surrounding the mine area. Therefore, environment protection is becoming a prerequisite for sustainable development. In line with this requirement, the management of **M/s Hindalco Industries Ltd.** has adopted a corporate responsibility of environment protection.

In order to comply with the Environment protection act, to fulfill statutory requirement and to be in tune with Environmental Preservation and sustainable development, **M/s Hindalco Industries Ltd.** has retained **ANACON LABORATORIES PVT. LTD.,** Nagpur as Environment Consultants and for various Environmental issues related to their mines.

This report presents the Environmental Status for the period **October-2018 to December-2018.** as compliance to the statutory requirements.

The co-operation extended by the Staff and Management of **M/s Hindalco Industries Ltd.** during the work execution period is gratefully acknowledged.

for ANACON LABORATORIES PVT. LTD.

Place : Nagpur

Date : 26 December, 2018



Stawp
Authorized Signatory



1.1 Introduction

Hindalco Industries Limited (Hindalco) is one among the flagship 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 (October-November-December-2018) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment Forest and climate change (MoEFCC) 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 bauxite is 4.0 Lakh Tonnes Per Annum (LTPA).

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 ^o 21' 02"N to 23 ^o 24' 15"N
3.	Longitude	83 ^o 54' 50"E to 83 ^o 56' 30"E
4.	Elevation	1282-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3 ^o C Annual minimum temperature : 17.7 ^o 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 concentrations 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.)

S.No.	(Core Zone)	S.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 PM₁₀, PM_{2.5}, SO₂, NO_x and, Pb, Hg, As and Cr above Ambient Air Quality Monitoring (AAQM) locations. The dust fall rate was measured in the mining area (BKB campus) and Tatijharia village during October-2018 to December-2018. 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 PM₁₀, PM_{2.5}, SO₂, NO_x and Pb, Hg, As and Cr from October-2018 to December-2018 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.

Table 3.0

Measurement Techniques for various pollutants

Sr. No.	Parameter	Technique	Technical Protocol	Minimum Reportabl Value($\mu\text{g}/\text{m}^3$)
1.	Suspended Particulate Matter	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part - 23)	5
2.	Respirable Particulate Matter	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part-23)	5
3.	Particulate Matter 2.5	Respirable Dust Sampler (Gravimetric Method)	Gravimetric Method	5
4.	Sulphur Dioxide	Modified West and Gaeke	IS-5182 (Part - II)	4
5.	Oxide of Nitrogen	Jacob & Hochheiser Method	IS-5182 (Part - VI)	4
6.	Pb, As, Hg, Cr	Acid Digestion Method	EPA Method	0.1
7.	Dust Full	Gravimetric	IS-5182 (Part-I)	—



1.6 Meteorology: Wind Pattern

Meteorology: Wind Pattern

The data of wind pattern collected during the study period (Oct-Nov-Dec 2018) indicates that the wind was blowing predominately from (SSW and SW) directions, during study period, for 0.46% wind was found to be calm.

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	0.25445	1.01781	0.35623	0.15267	0	0	1.78117
2	11.25 - 33.75	0.30534	1.01781	0.20356	0	0	0	1.52672
3	33.75 - 56.25	1.42494	2.44275	0.91603	0	0	0	4.78372
4	56.25 - 78.75	1.57761	3.46056	0.91603	0	0	0	5.9542
5	78.75 - 101.25	1.42494	2.34097	0.25445	0	0	0	4.02036
6	101.25 - 123.75	2.03562	2.44275	0.20356	0	0	0	4.68193
7	123.75 - 146.25	2.59542	2.1883	0.61069	0.10178	0	0	5.49618
8	146.25 - 168.75	3.10433	2.90076	0.66158	0	0	0	6.66667
9	168.75 - 191.25	5.64885	3.96947	0.20356	0	0	0	9.82188
10	191.25 - 213.75	8.85496	5.54707	0.30534	0	0	0	14.7074
11	213.75 - 236.25	6.31043	6.87023	0.81425	0.05089	0	0	14.0458
12	236.25 - 258.75	2.6972	3.71501	0.86514	0	0	0	7.27735
13	258.75 - 281.25	1.17048	3.66412	1.52672	0	0	0	6.36132
14	281.25 - 303.75	0.76336	3.10433	1.17048	0	0	0	5.03817
15	303.75 - 326.25	0.71247	1.88295	1.11959	0.30534	0	0	4.02036
16	326.25 - 348.75	0.61069	2.03562	0.66158	0.05089	0	0	3.35878
	Sub-Total	39.4911	48.6005	10.7888	0.6615	0	0	99.542
	Calms							0.45802
	Missing/Incomplete							0
	Total							100

Summary of Wind Pattern

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Condition
Oct-Nov-Dec 2018	SSW (14.7%)	SW (14.0%)	0.46%

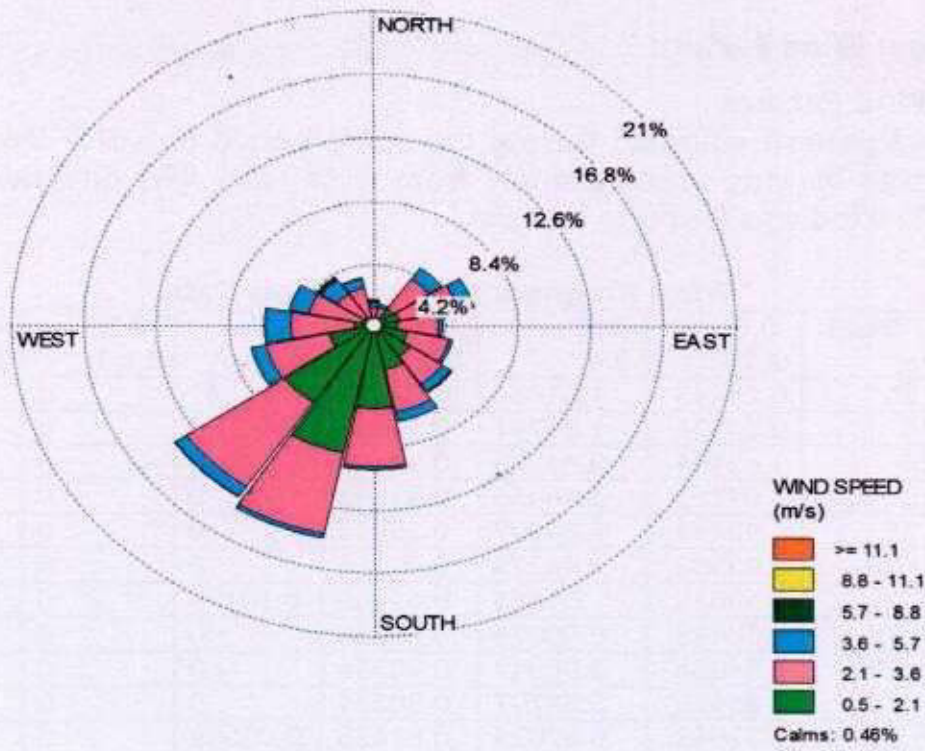


Figure.01: Wind Rose Diagram (Oct-Nov-Dec-2018)

Table 6
Statistical Analysis

Location	Month & Year	PM-10 ($\mu\text{g}/\text{m}^3$)	PM-2.5 ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Hg ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	Cr ($\mu\text{g}/\text{m}^3$)
Core Zone									
Piprapat/Nr. Mining Area	October-2018	68.2	29.6	12.8	27.1	0.049	ND	ND	ND
	November-2018	61.9	27.3	9.4	23.8	0.034	ND	ND	ND
	December-2018	68.3	31.6	12.8	27.9	0.042	ND	ND	ND
Betpani	October-2018	57.3	24.9	8.1	18.6	0.028	ND	ND	ND
	November-2018	54.1	18.6	6.8	17.9	0.024	ND	ND	ND
	December-2018	56.3	21.9	8.4	21.7	0.026	ND	ND	ND
Virhorepat	October-2018	61.7	26.1	9.3	21.8	0.041	ND	ND	ND
	November-2018	57.3	21.8	8.7	21.6	0.031	ND	ND	ND
	December-2018	64.1	27.3	9.2	24.1	0.037	ND	ND	ND
Tatijharia Village/Nr. Weigh Bridge	October-2018	73.8	32.7	14.7	31.9	0.062	ND	ND	ND
	November-2018	64.7	31.6	12.8	26.1	0.048	ND	ND	ND
	December-2018	76.1	34.7	14.9	32.8	0.053	ND	ND	ND
CPCB Standards		100 (24 hrs)	60 (24 hrs)	80 (24 hrs)	80 (24 hrs)	1.0 (24 hrs)	---	6.0 (annual)	---
Minimum		54.1	18.6	6.8	17.9	0.024	---	---	---
Maximum		76.1	34.7	14.9	32.8	0.062	---	---	---
Average		63.7	27.3	10.7	24.6	0.040	---	---	---
98% le		75.6	34.3	14.9	32.6	0.060	---	---	---

- The Average Concentration of PM₁₀ within the Core Zone of Tatijharia Lease is 63.7 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of PM_{2.5} within the Core Zone of Tatijharia Lease is 27.3 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of SO₂ within the Core Zone of Tatijharia Lease is 10.7 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of NO_x within the Core Zone of Tatijharia Lease is 32.6 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of Pb within the Core Zone of Tatijharia Lease is 0.040 $\mu\text{g}/\text{m}^3$.

Conclusion :- The Average Concentration within the Core Zone of Tatijharia Lease during this period (Oct-Nov-Dec-2018) it is within permissible limits as per CPCB Standards.



Location	Month & Year	PM-10 ($\mu\text{g}/\text{m}^3$)	PM-2.5 ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Hg ($\mu\text{g}/\text{m}^3$)	As (ng/m^3)	Cr ($\mu\text{g}/\text{m}^3$)
Buffer Zone									
Kutku Village/Nr.V.T.Center	October-2018	56.3	21.7	8.2	23.6	0.026	ND	ND	ND
	November-2018	61.7	24.6	9.7	21.8	0.031	ND	ND	ND
	December-2018	53.7	16.4	6.9	18.3	0.024	ND	ND	ND
Sairaidh Campus	October-2018	61.9	27.4	9.3	21.8	0.018	ND	ND	ND
	November-2018	57.3	26.4	11.6	23.9	0.029	ND	ND	ND
	December-2018	61.8	23.6	11.7	26.1	0.027	ND	ND	ND
Rajendrapur/Nr. Mining Area	October-2018	62.9	28.4	9.4	24.7	0.037	ND	ND	ND
	November-2018	68.3	27.4	11.3	26.9	0.047	ND	ND	ND
	December-2018	57.1	18.6	8.2	24.9	0.027	ND	ND	ND
Dumerkholi/Nr. Mining Area	October-2018	61.7	24.6	9.1	24.3	0.031	ND	ND	ND
	November-2018	71.9	28.1	11.4	23.6	0.036	ND	ND	ND
	December-2018	61.3	23.4	9.1	26.7	0.026	ND	ND	ND
CPCB Standards		100 (24 hrs)	60 (24 hrs)	80 (24 hrs)	80 (24 hrs)	1.0 (24 hrs)	---	6.0 (annual)	---
Minimum		53.7	16.4	6.9	18.3	0.018	---	---	---
Maximum		71.9	28.4	11.7	26.9	0.047	---	---	---
Average		61.3	24.2	9.7	23.9	0.030	---	---	---
98% le		71.1	28.3	11.7	26.9	0.045	---	---	---

- The Average Concentration of PM₁₀ within the Buffer Zone of Tatijharia Lease is 61.3 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of PM_{2.5} within the Buffer Zone of Tatijharia Lease is 24.2 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of SO₂ within the Buffer Zone of Tatijharia Lease is 9.7 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of NO_x within the Buffer Zone of Tatijharia Lease is 23.9 $\mu\text{g}/\text{m}^3$.
- The Average Concentration of Pb within the Buffer Zone of Tatijharia Lease is 0.030 $\mu\text{g}/\text{m}^3$.

Conclusion :- The Average Concentration within the Buffer Zone of Tatijharia Lease during this period (Oct-Nov-Dec-2018) it is within permissible limits as per CPCB Standards.

Monthwise Summary of Statistical Analysis

Tatijharia Lease (Core Zone):-

1.6 Ambient Air Quality:

Ambient air quality has been generated as per NAAQS 2009 for the month of October-2018 to December-2018. PM₁₀, PM_{2.5}, SO₂ & NO_x, The values obtained were then compared vis-a-vis the standards prescribed by CPCB for Industrial/ Rural / Residential uses.

1.6.1 Presentation of Results:

The summary of Ambient Air Quality monitoring results from October-2018 to December-2018 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-PM₁₀:

The Minimum and maximum concentrations for Particulate Matter-PM₁₀ were recorded as 54.1 µg/m³ and 76.1 µg/m³ at Betpani and Tatijharia Village/Nr. Weigh Bridge respectively. The average concentrations 63.7 µg/m³.

B. Particulate Matter-PM_{2.5}:

The Minimum and maximum concentrations for Particulate Matter-PM_{2.5} were recorded as 18.6 µg/m³ & 34.7 µg/m³ at Betpani and Tatijharia Village/Nr. Weigh Bridge respectively. The average concentrations 27.3 µg/m³.

C. Sulphur Dioxide (SO₂):

The minimum and maximum for SO₂ concentrations were recorded as 6.8 µg/m³ and 14.9 µg/m³ respectively. The minimum concentration was recorded at Betpani and maximum concentration was also recorded at Tatijharia Village/Nr. Weigh Bridge. The average concentrations 10.7 µg/m³.

D. Nitrogen Oxide (NO_x):

The minimum and maximum for NO_x concentrations were recorded as 17.9 µg/m³ and 32.8 µg/m³. The maximum concentration was recorded at Tatijharia Village/Nr. Weigh Bridge and the minimum concentration was recorded at Betpani. The average concentrations 24.6 µg/m³.

E. Lead (Pb):

Maximum Lead detected in PM₁₀ samples was 0.062µg/m³ Tatijharia Village/Nr. Weigh Bridge and the minimum lead in PM₁₀ sample was 0.024/m³ detected at Betpani location.

No lead could be detected in PM_{2.5} samples at any of the Ambient Air samples at any of the locations.

F. Mercury (Hg):

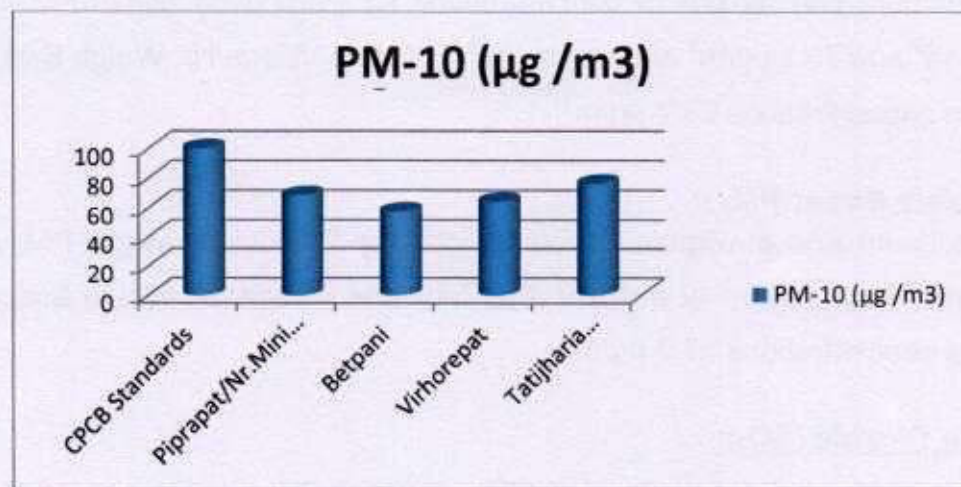
Mercury was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.

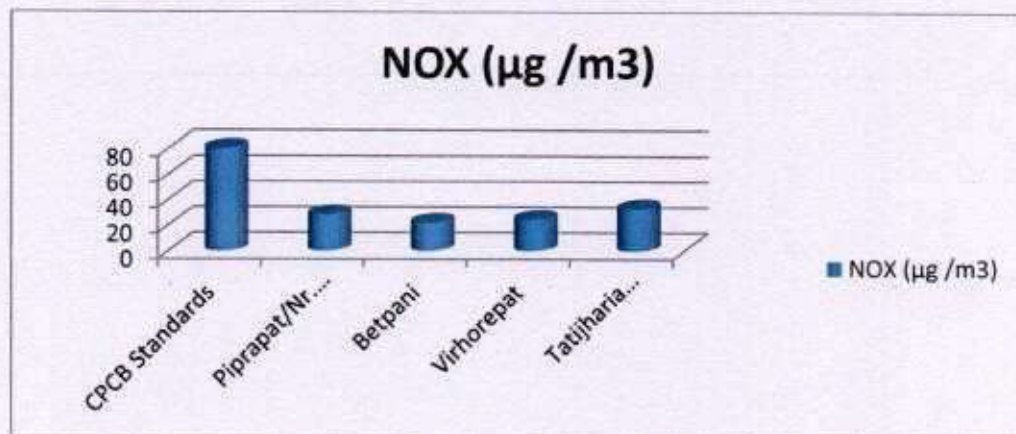
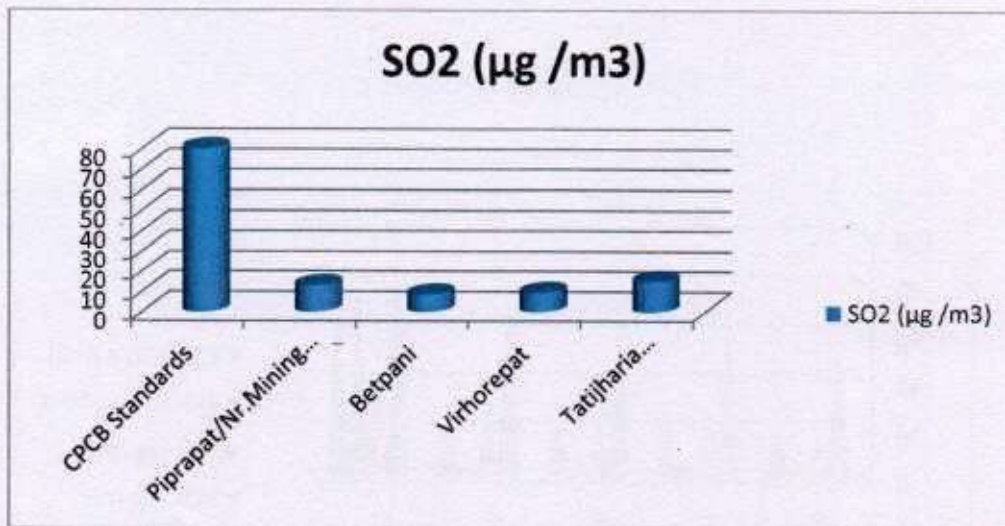
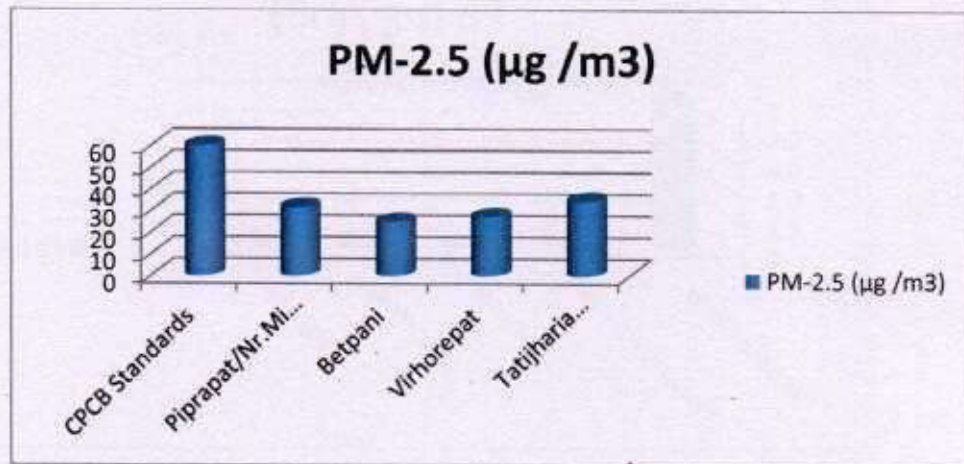
G. Arsenic (As):

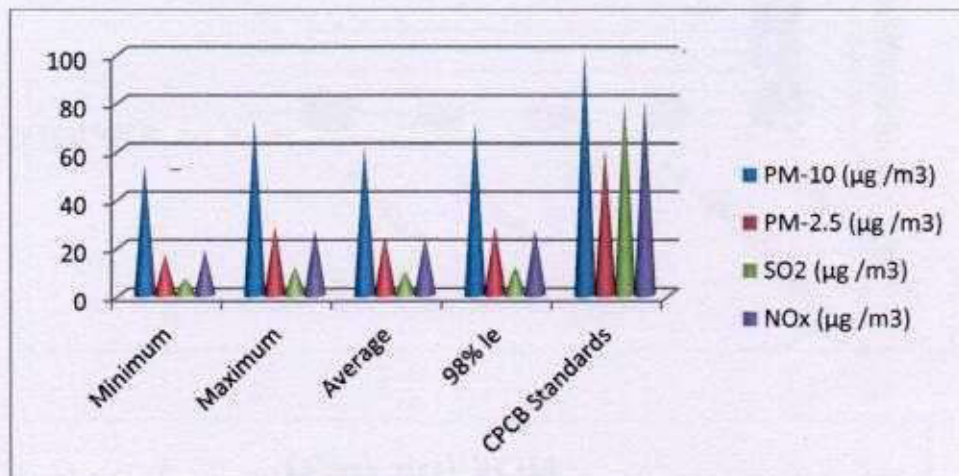
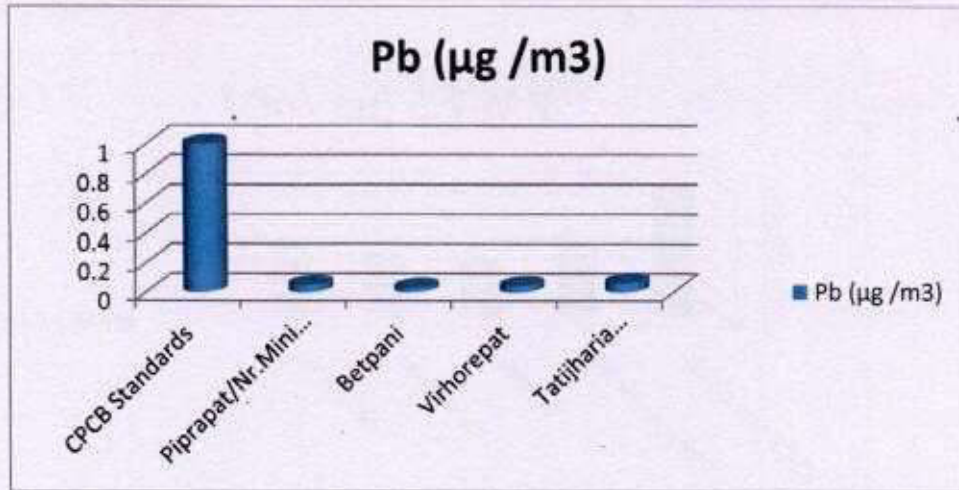
Arsenic was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.

H. Chromium (Cr):

Chromium was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.







Tatijharia Lease (Buffer Zone):-

1.7 Ambient Air Quality:

Ambient air quality has been generated as per NAAQS 2009 for the month of October-2018 to December-2018. PM₁₀, PM_{2.5}, SO₂ & NO_x, 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 October-2018 to December-2018 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.

I. Particulate Matter-PM₁₀:

The Minimum and maximum concentrations for Particulate Matter-PM₁₀ were recorded as 53.7µg/m³ and 71.9 µg/m³ at Kutku Village and Tatijharia Village/Nr. Weigh Bridge respectively. The average concentrations 61.3 µg/m³.

J. Particulate Matter-PM_{2.5}:

The Minimum and maximum concentrations for Particulate Matter-PM_{2.5} were recorded as 16.4µg/m³ & 28.4µg/m³ at Kutku Village and Rajendrapur/Nr. Mining Area respectively. The average concentrations 24.2 µg/m³.

K. Sulphur Dioxide (SO₂):

The minimum and maximum for SO₂ concentrations were recorded as 6.9µg/m³ and 11.7µg/m³ respectively. The minimum concentration was recorded at Kutku Village and maximum concentration was also recorded at Sairaidih Campus. The average concentrations 9.7 µg/m³.

Nitrogen Oxide (NO_x):

The minimum and maximum for NO_x concentrations were recorded as 18.3µg/m³ and 26.9µg/m³. The maximum concentration was recorded at Rajendrapur/Nr. Mining Area and the minimum concentration was recorded at Kutku Village. The average concentrations 23.9µg/m³.

L. Lead (Pb):

Maximum Lead detected in PM₁₀ samples was 0.047µg/m³ Rajendrapur/Nr. Mining Area and the minimum lead in PM₁₀ sample was 0.018/m³ detected at Sairaidh Campus location.

No lead could be detected in PM_{2.5} samples at any of the Ambient Air samples at any of the locations.

M. Mercury (Hg):

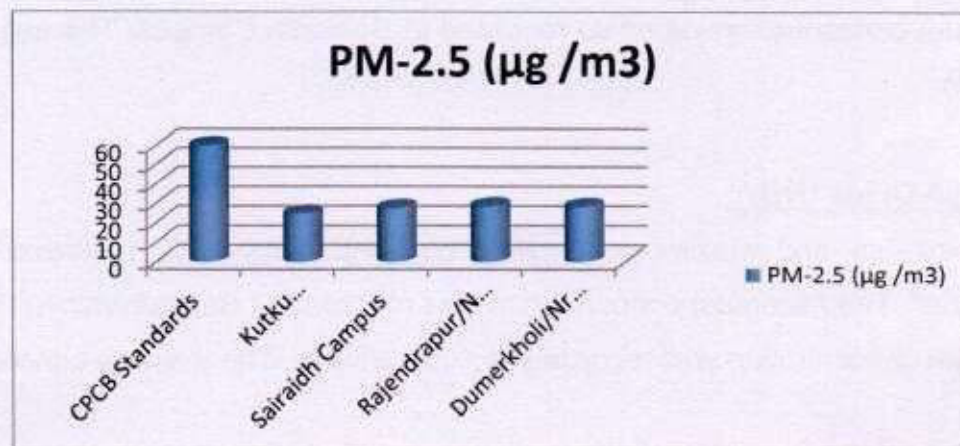
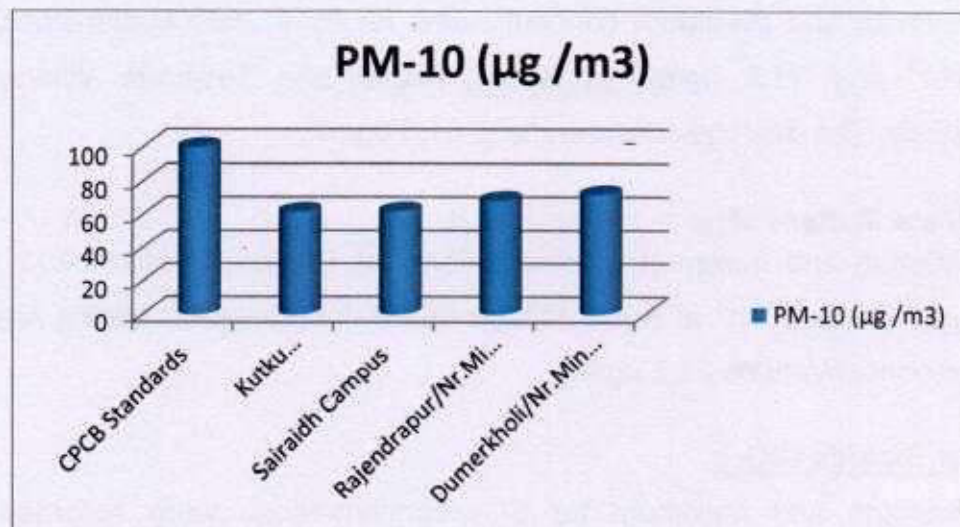
Mercury was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.

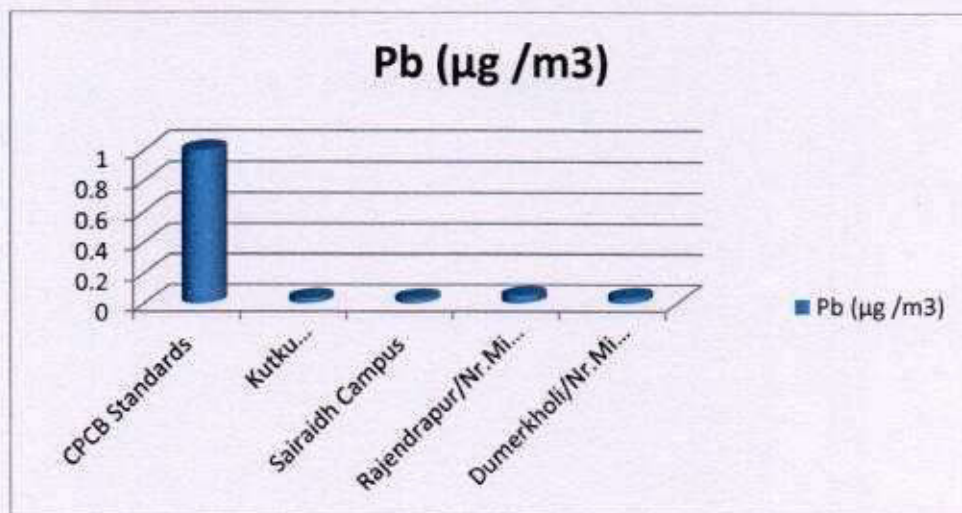
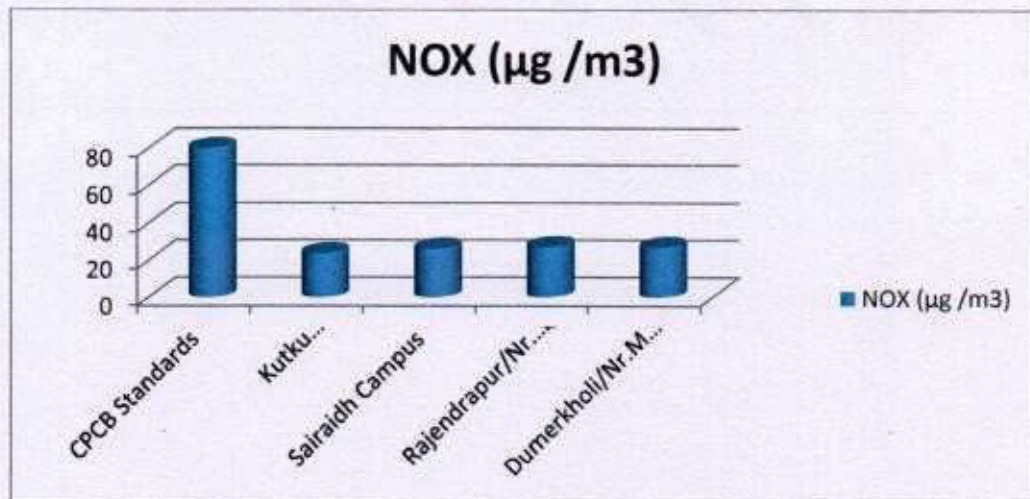
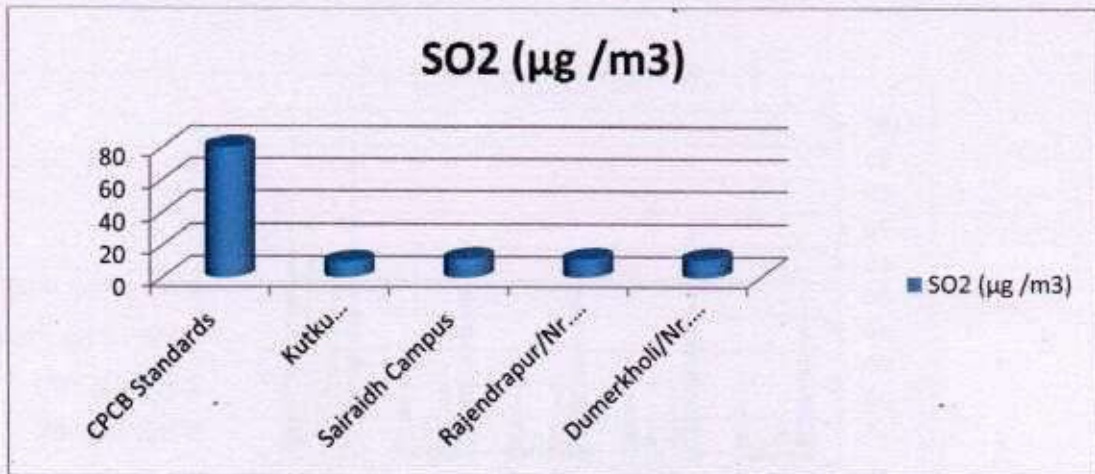
N. Arsenic (As):

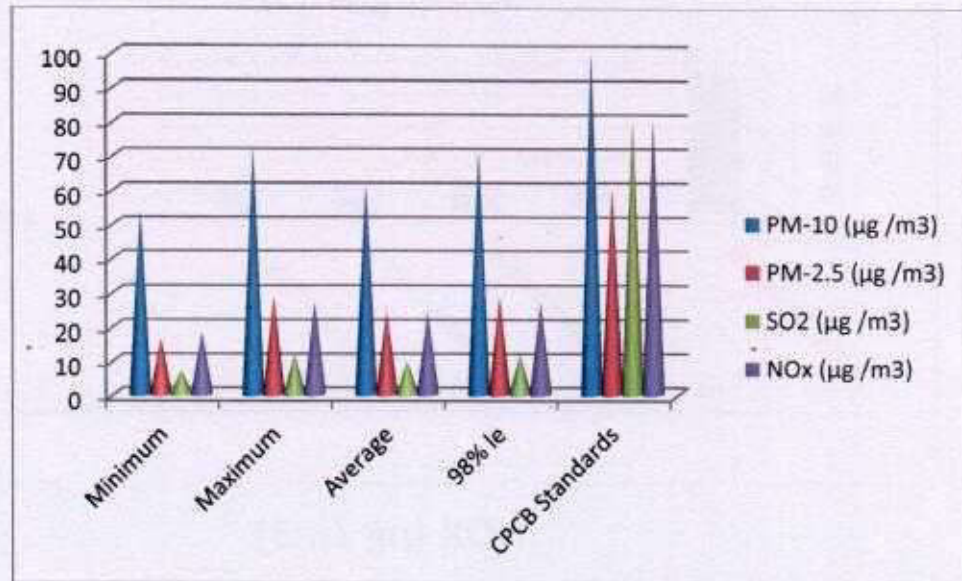
Arsenic was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.

O. Chromium (Cr):

Chromium was not detected at any of the locations in PM₁₀ samples as well as PM_{2.5} Samples.







1.8 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 daytime 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 75 dB(A) and 70dB(A) for day and night respectively as given in **(Table 7)**.

Instrument used for monitoring

Noise levels were measured using integrated sound level meter manufactured by Envirotech made in India (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	October-2018	72.1	62.9
		November-2018	64.7	51.9
		December-2018	68.1	57.2
2.	Piprapat/Nr. Mining Area	October-2018	64.3	58.1
		November-2018	58.3	46.2
		December-2018	63.8	52.7
3.	Virhorepat	October-2018	61.9	52.7
		November-2018	51.6	43.8
		December-2018	59.3	46.1
4.	Betpani	October-2018	57.1	46.3
		November-2018	47.3	38.1
		December-2018	53.8	41.6
Buffer Zone				
1.	Kutku Village/Nr.V.T.Center	October-2018	61.8	46.7
		November-2018	52.8	41.6
		December-2018	52.7	42.6
2.	Sairaidh Campus	October-2018	64.7	56.1
		November-2018	58.2	46.1
		December-2018	54.7	46.2
3.	Rajendrapur/Nr.Mining Area	October-2018	67.3	56.1
		November-2018	56.9	52.7
		December-2018	56.4	48.3
4.	Dumerkholi/Nr.Mining Area	October-2018	63.9	51.6
		November-2018	62.4	51.9
		December-2018	61.2	51.7
CPCB Standards				
Industrial Area			75	70
Residential area			55	45

Conclusion :- The Noise Monitoring Results Tatijharia Lease during this period (Oct-Nov-Dec-2018) it is within permissible limits as per CPCB Standards.



Table 8
HEMM Spot Noise Level Monitoring

Unit: dB(A)

Sl. No.	Location	October 2018			November 2018			December 2018		
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
1.	Piprapat/Nr.Mining Area	64.7	73.9	69.3	68.2	79.4	73.8	72.8	81.6	77.2

1.9 Water Quality

The existing status of water quality for groundwater and surface water was assessed by collecting the water samples from underground wells from the piprapat/Nr.mining area and surface water sample from nallahs nearby mining area. The physico-chemical analysis of ground and surface water samples collected during study period reported as average of three month given in (Table 9). The overall water quality found to be below the stipulated standards of IS 10500-2012 for ground water and found to be fit for drinking purpose for tested parameters. Surface water quality is satisfactory as per IS 10500-2012 for surface water. Thus the impacts due to mining activities in each month have been found to be insignificant.

Table 9
Report on Chemical Examination of Ground Water
(Average of Three Months October-November-December-2018)

Location:	GW1) Piprapat/Near Mining Area Sample Source:- Borewell Water
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TEST RESULTS

Sr. No.	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)		Test Result
				Acceptable Limit	*Permissible Limit	
1.	pH value	-	IS 3025 (Part 11)	6.5 to 8.5	No relaxation	7.16 at 25°C
2.	Turbidity	NTU	IS 3025 (Part 10)	1	5	0.6
3.	Colour	Hazen units	IS 3025 (Part 4)	5	15	1
4.	Odour	-	IS 3025 (Part 5)	Agreeable	Agreeable	Agreeable
5.	Taste	-	IS 3025 (Part 8)	Agreeable	Agreeable	Agreeable
6.	Iron (as Fe)	mg/l	IS 3025 (Part 2)	1.0	No relaxation	0.21
7.	Free residual chlorine	mg/l	IS 3025 (Part 26)	Min. 0.2	1	< 0.1
8.	Total dissolved solids	mg/l	IS 3025 (Part 16)	500	2000	463
9.	Fluoride (as F)	mg/l	IS 3025 (Part 60)	1.0	1.5	0.34
10.	Cyanide (as CN)	mg/l	IS 3025 (Part 27)	0.05	No relaxation	< 0.005
11.	Chloride (as Cl)	mg/l	IS 3025 (Part 32)	250	1000	38.4
12.	Total Alkalinity (as CaCO ₃)	mg/l	IS 3025 (Part 23)	200	600	131.9
13.	Total hardness (as CaCO ₃)	mg/l	IS 3025 (Part 21)	200	600	177.09
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	57.2
15.	Magnesium (as Mg)	mg/l	IS 3025 (Part 46)	30	100	8.3
16.	Sulphate (as SO ₄)	mg/l	IS 3025 (Part 24)	200	400	28.56
17.	Nitrate (as NO ₃)	mg/l	APHA Method	45	No relaxation	16.84
18.	Copper (as Cu)	mg/l	IS 3025 (Part 2)	0.05	1.5	< 0.03
19.	Manganese (as Mn)	mg/l	IS 3025 (Part 2)	0.1	0.3	< 0.05
20.	Mercury (as Hg)	mg/l	IS : 3025 (Part 48)	0.001	No relaxation	< 0.0005
21.	Cadmium (as Cd)	mg/l	IS : 3025 (Part 41)	0.003	No relaxation	< 0.001
22.	Selenium (as Se)	mg/l	IS : 3025 (Part 56)	0.01	No relaxation	< 0.001
23.	Arsenic (as As)	mg/l	IS : 3025 (Part 37)	0.01	No relaxation	< 0.01
24.	Aluminium (as Al)	mg/l	IS : 15302	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS : 3025 (Part 47)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	1.1



Sr. No	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)		Test Result
				Acceptable Limit	*Permissible Limit	
27.	Nickel (as Ni)	mg/l	IS 3025 (Part 2)	0.02	No relaxation	< 0.01
28.	Total Chromium (as Cr)	mg/l	IS 3025 (Part 2)	0.05	No relaxation	< 0.03
29.	Barium (as Ba)	mg/l	Annexure F of IS 13428	0.7	No relaxation	< 0.01
30.	Ammonia (as N)	mg/l	IS 3025 (Part 34)	0.5	No relaxation	< 0.1
31.	Sulphide (as H ₂ S)	mg/l	IS 3025 (Part 29)	0.05	No relaxation	< 0.03
32.	Chloramines (as Cl ₂)	mg/l	APHA 4500-Cl ₂ G	4.0	No relaxation	< 0.05
33.	Molybdenum (as Mo)	mg/l	IS 3025 (Part 2)	0.07	No relaxation	< 0.001
34.	Silver (as Ag)	mg/l	Annexure J of IS 13428	0.1	No relaxation	< 0.001
35.	Polychlorinated Biphenyls (PCB)	µg/l	USEPA 508	0.5	No relaxation	< 0.03
36.	Boron (as B)	mg/l	IS 3025 (Part 2)	0.5	2.4	< 0.1
37.	Mineral Oil	mg/l	IS 3025 (Part 39)	0.5	No relaxation	< 0.001
38.	Tri Halo Methane					
	a. Bromoform	mg/l	APHA 6232	0.1	No relaxation	Absent
	b. Dibromochloromethane			0.1	No relaxation	Absent
	c. Bromodichloromethane			0.06	No relaxation	Absent
	d. Chloroform			0.2	No relaxation	Absent
39.	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	IS 3025 (Part 43) :1001	0.001	0.002	< 0.001
40.	Anionic detergents (as MBAS)	mg/l	IS 13428:2005 (Annex K)	0.2	1.0	< 0.01
41.	Polynuclear aromatic hydrocarbon (PAH)	µg/l	USEPA : 550	0.1	No relaxation	< 0.03
42.	Total coliform	Per 100 ml	IS 15185	Absent	Absent	Absent
43.	<i>Escherichia coli</i>	Per 100 ml	IS 15185 : 2016	Absent	Absent	Absent

TEST RESULTS

Sr. No.	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)	Test Result
44.	Pesticides residues				
i.	Alpha-HCH	µg/l	USEPA 508	0.01	< 0.01
ii.	Beta HCH	µg/l	USEPA 508	0.04	< 0.03
iii.	Delta- HCH	µg/l	USEPA 508	0.04	< 0.03
iv.	Alachlor	µg/l	USEPA 508	20	< 0.03
v.	Aldrin / Dieldrin	µg/l	USEPA 508	0.03	< 0.03
vi.	Atrazine	µg/l	USEPA 1657	2	< 0.03
vii.	Butachlor	µg/l	USEPA 508	125	< 0.03
viii.	Chlorpyrifos	µg/l	USEPA 1657	30	< 0.03
ix.	DDT and its Isomers	µg/l	USEPA 508	1	< 0.03
x.	Gamma - HCH (Lindane)	µg/l	USEPA 508	2	< 0.03
xi.	2,4-Dichlorophenoxyacetic acid	µg/l	USEPA 1657	30	< 0.03
xii.	Endosulphan	µg/l	USEPA 508	0.4	< 0.03
xiii.	Ethion	µg/l	USEPA 1657	3	< 0.03
xiv.	Isoproturon	µg/l	USEPA 1657	9	< 0.03
xv.	Malathion	µg/l	USEPA 1657	190	< 0.03
xvi.	Methyl Parathion	µg/l	USEPA 1657	0.3	< 0.03
xvii.	Monocrotophos	µg/l	USEPA 1657	1	< 0.03
xviii.	Phorate	µg/l	USEPA 1657	2	< 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. ● MPN indicates most probable number. ● 'mg/l' is equivalent to 'ppm'. ● 'µg/l' is equivalent to 'ppb'. ● '<' indicates detection limit of instrument/method and shall be considered as 'absent'. ● Result for test no. 7 is not relevant.

REMARKS: Based upon request of the party, sample was tested for above mentioned 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 10

Free Silica :-

Sr. No.	Location	Measurement Unit	October-2018		November-2018		December-2018	
			SPM	RSPM	SPM	RSPM	SPM	RSPM
1.	Tatijharia Village/ Nr. Weigh Bridge	g/100gm	0.32	0.16	0.38	0.17	0.27	0.16
2.	Piprapat/ Nr. Mining Area	g/100gm	0.28	0.11	0.32	0.14	0.18	0.09
3.	Virhorepat	g/100gm	0.26	0.09	0.21	0.08	0.16	0.07
4.	Betpani	g/100gm	0.21	0.07	0.18	0.06	0.14	0.06

Table 11

Dust fall Rate

Sr. No.	Location	October-2018	November-2018	December-2018	Average
		Rate (MT/km ² /Month)			
1.	Piprapat/Near Mining Area	18.17	23.58	19.73	20.49
2.	Tatijharia Village	16.24	18.47	17.29	17.33

Table 12

Monthly Report on Chemical Examination of Surface Water
(Nallahs Near by Mining Area)
(Average of Three Months October-November-December-2018)
Monthly Report on Chemical Examination of Surface Water

S. No.	Parameters	Unit	IS : 2296 Class 'C'	Results
				December-2018
1	pH Value	-	6.5 to 8.5	6.92
2	Total Hardness (CaCO ₃)	mg / l	\$	245.46
3	Iron as (Fe)	mg / l	50	17.29
4	Chlorides as (Cl)	mg / l	600	264.73
5	Electrical Conductivity	µS/cm	\$	264
6	Total Dissolved Solids (TDS)	mg / l	1500	416
7	Calcium as (Ca)	mg / l	\$	73.94
8	Magnesium as (Mg)	mg / l	\$	14.76
9	Sulphate as (SO ₄)	mg / l	400	112.59
10	Nitrates as (NO ₃)	mg / l	\$	13.6
11	Fluoride as (F)	mg / l	0.5	0.47
12	Alkalinity	mg / l	\$	51.68
13	Chemical Oxygen demand (COD)	mg / l	\$	17.3
14	BOD at 27°C for 3days	mg / l	3	5.9
15	Total Suspended Solid (TSS)	mg / l	\$	16

\$: Limits not specified

Table 13

**Soil Analysis Report
(Tatijharia)**

Date of Sample collection: December-2018

Sr. No.	Test Parameters	Measurement Unit	Results
1	pH	-	6.71 at 25°C
2	Electrical Conductivity at 25°C	µs/cm	239
3	Texture	-	Clay Loam
4	Sand	%	27.76
5	Silt	%	21.58
6	Clay	%	50.66
7	Bulk Density	g/cc	1.16
8	Porosity	%	12.58
9	Water Holding Capacity	%	31.46
10	Exchangeable Calcium as Ca	mg/kg	482
11	Exchangeable Magnesium as Mg	mg/kg	149
12	Exchangeable Sodium as Na	mg/kg	104.76
13	Available Potassium as K	kg/hect.	403.82
14	Available Phosphorous as P	kg/hect.	17.38
15	Available Nitrogen as N	kg/hect.	194
16	Organic Matter	%	1.16
17	Organic Carbon	%	0.57
18	Water Soluble Chloride as Cl ⁺	mg/kg	11.9
19	Water Soluble Sulphate as SO ₄	mg/kg	517.3
20	Sodium Absorption Ratio	-	6.17
21	CEC	meq/100 gm	11.54
22	Total Iron	mg/kg	1173
23	Available Manganese	mg/kg	103.49
24	Available Zinc	mg/kg	62.51
25	Available Boron	mg/kg	ND

Note: 1. Results relate to tested sample only. 2. Test report should not be reproduced partially. 3. 'mg/Kg' is equivalent to 'ppm'. 4. 'g/100g' is equivalent to '%w/w'. 5. All parameters are in 1:5 water extract.

REMARKS: Based upon request of party, sample was tested for above mentioned parameters only.

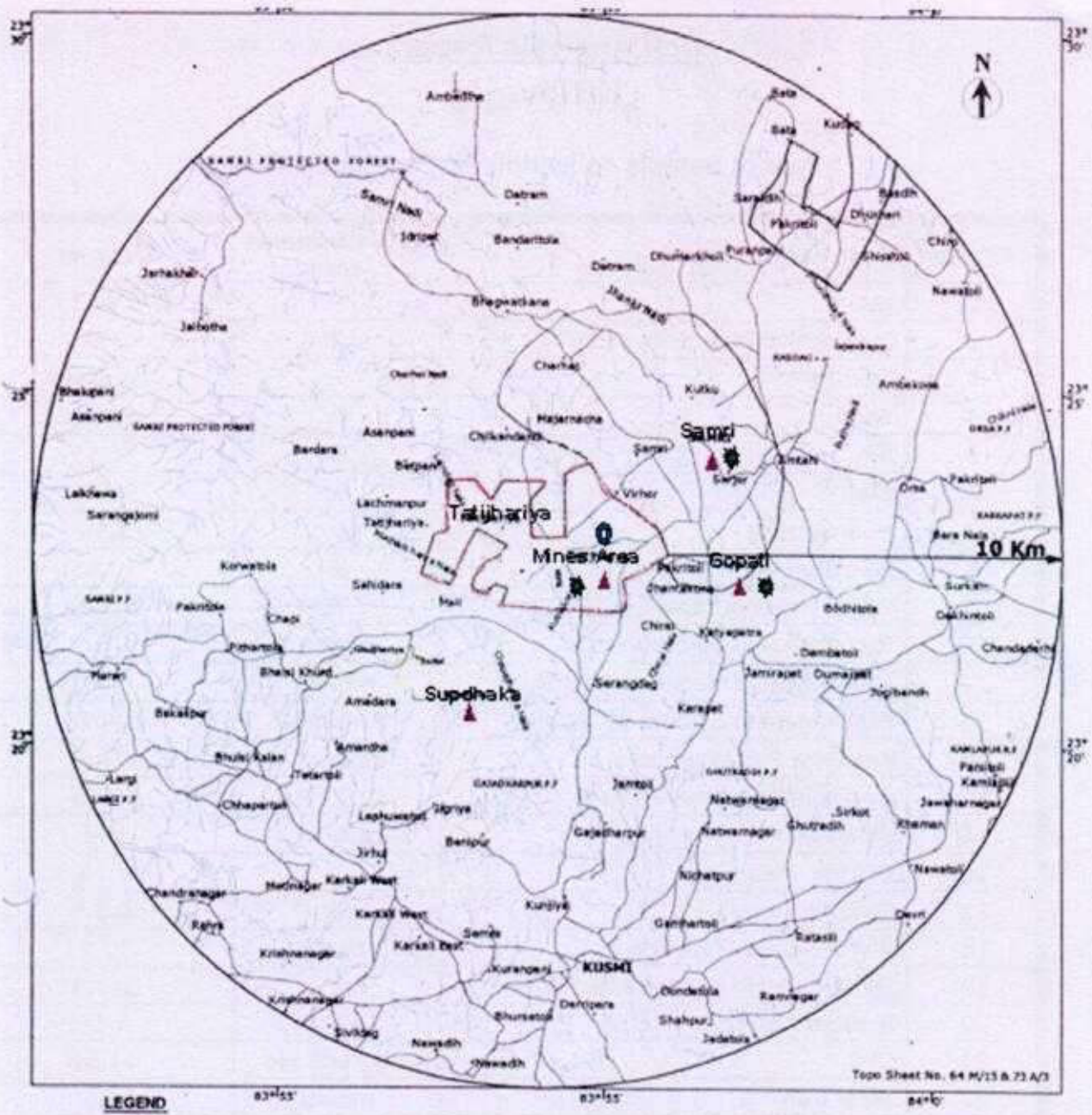


FIG 3: SAMPLING LOCATIONS FOR AIR, NOISE & SOIL

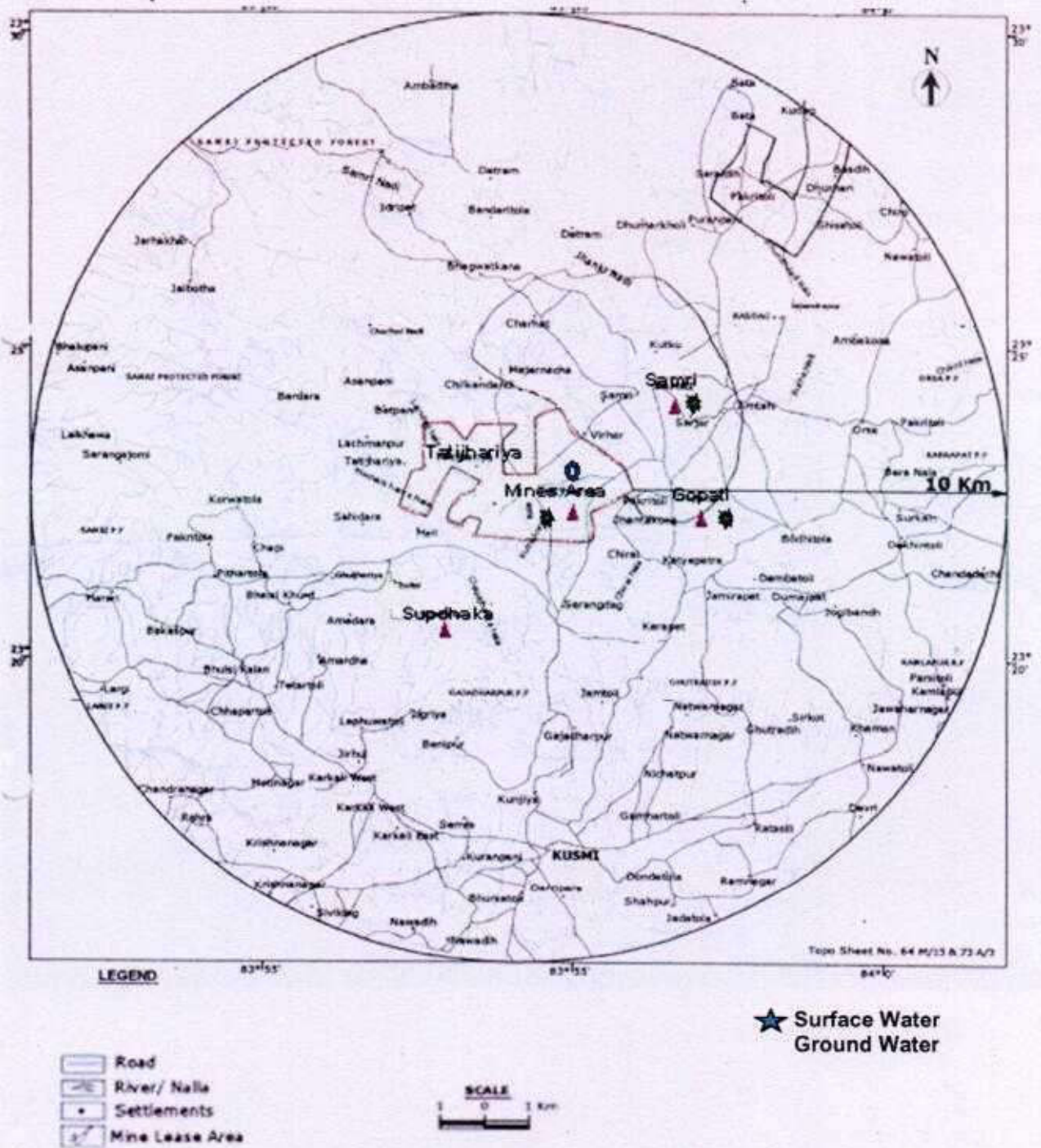


FIG 4: SAMPLING LOCATIONS FOR WATER