

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

**Duration: April-May-June-2018**

Name of Industry:-



*Rupambhathi*  
Agent of Mines  
Samri Mines Division  
Hindalco Industries Ltd.

M/s. Hindalco Industries Limited.,

Name of Laboratory:-



Recognised by MoEF (GOI) Notifn. No. D.L.33004/99 Dt.24.10.2007  
NABL T-1550 (Chemical), T-1826 (Biological), T-2344 (Mechanical) dt.04/10/2016 valid up to 03.10.2018  
Accredited under the QCI-NABET Scheme for EIA Consultant  
BIS vide No.CL/CQAPD/OSL (7124116) dt.16.12.2011  
Certified by ISO 9001:2008, ISO 14001:2004, ISO 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 **April-2018 to June-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 : June, 2018



A handwritten signature in blue ink, appearing to read "Shawar".

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 Aluminium.

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. HINDALCO possesses bauxite mine leases of Kudag, Samri and Tatijharia 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 Environmental monitoring of parameters for assessing pollution levels and preparation of monthly report (April, May & June-2018) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment, Forest and Climate Change (MoEFCC) for Samri mining leases in Balrampur District, Chhattisgarh State.

## **1.2 Background Information of Samri Mine**

HINDALCO was granted Samri Bauxite mining lease over an area of 2146.746 hec in Samri, Dumarkholi, Gopatu villages in Post Office & Tehsil Samri (Kusmi) of Balrampur district, Chhattisgarh on 24/06/1998 for a period of **50** years. The mining operations were started on 25/05/1999. The production capacity of Bauxite is 5.0 Lakh Tonnes Per Annum (LTPA).

## **1.3 Salient Features of Samri Bauxite Mine**

The deposits occur in Samri block, Post Office & Tahsil Samri (Kusmi) 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 Samri Bauxite Mines**

S.No.	Particulars	Details
1.	Survey of India Topo sheet No.	64 M /15
2.	Latitude	23 <sup>o</sup> 23' 02"N to 23 <sup>o</sup> 27' 05"N
3.	Longitude	83 <sup>o</sup> 53' 50"E to 83 <sup>o</sup> 57' 59"E
4.	Elevation	1140-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3 <sup>o</sup> C Annual minimum temperature : 17.7 <sup>o</sup> C Average annual rainfall : 1401.1 mm
6.	Mining lease area	2146.746 hec.
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 (146.06 km, ESE)
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 environmental 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 the impact of mining activity on sensitive receptors, it is necessary to monitor Environmental Quality to know the level of concentrations of pollutants within and around the mining lease area. Accordingly Hindalco Industries through Anacon Laboratories Pvt. Ltd., Nagpur has been monitoring at following locations for air, water and Noise 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 Samri mine lease area as shown in (Fig. 1).

**Table 2**

**Locations of Ambient Air Quality Monitoring (AAQM) & Fugitive Emission**  
**(2146.746hec.)**

S.No.	Core zone	Sr.No.	Buffer zone
1	Samri-Gopatu/Near Weigh Bridge	5	Sairaidh Campus
2	Rajendrapur/Near Mining Area	6	Jaljali Village
3	Kutku Village/Near V.T.Center	7	Tatijharia Village/Near Weigh Bridge
4	Dumerkholi/Near Mining Area	8	Piprapat/Near 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. Anacon Laboratories Pvt. Ltd., Nagpur is carrying out regular monitoring for PM<sub>2.5</sub>, RPM(PM<sub>10</sub>), SO<sub>2</sub>, NO<sub>x</sub> and SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, Pb, Hg, As and Cr at above Ambient Air Quality Monitoring (AAQM) locations and Fugitive Emission. The dust fall rate was measured in the mining area and Samri chowk during April-May-June-2018. The AAQM and Fugitive Emission sampling sites are selected considering seasonal variation in wind speed and wind direction.

#### **Sampling Duration and Frequency**

Ambient air quality monitoring and Fugitive Emission monitoring was carried out for the parameters PM<sub>2.5</sub>, RPM (PM<sub>10</sub>), SO<sub>2</sub>, NO<sub>x</sub> and SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub> Pb, Hg, As and Cr, from April-May-June-2018 as per CPCB norms. Sampling Duration and Frequency is given in (Table 3).

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



## 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 Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM), Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>), Pb, Hg, As and Cr were monitored for establishing the baseline status. SPM and RPM 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<sup>3</sup>/min which collects the particles less than 10 µm diameter over glass fibre filter paper and the bigger particulates from 10 to 100 µm are collected into the cup provided at the bottom of the cyclone. The dust deposited over the filter paper is measured as RPM and the smaller particulates from 2.5 µm are collected into the Membrane Filter Paper. The dust fall rate was measured using dust fall jar. The jar was exposed for one month in the mining area and Samri-Gopatu during pre and post monsoon period. The jar was filled with 2 lit of distilled water. The water in the jar is mixed with copper sulphate solution (0.02 N solutions) to prevent any growth of algae. The water level in the jar is constantly maintained in such a way that 2 lit of water is always retained. The measurement techniques used for various pollutants and other details are given in **(Table 4)**.

Sampling was carried out continuously for 24 hourly monitoring twice a week at each station during the stipulated study period using pre-calibrated Respirable Dust Samplers in each of the stations.

Earmarked samples were collected for Particulate Matter-PM<sub>10</sub>, Particulate Matter-PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> for 24 hourly. Collected samples were sent to Laboratories for analysis.

The baseline data of air environment is generated for the parameters namely: Suspended Particulate Matter (SPM), Particulate Matter (PM<sub>10</sub>), Particulate Matter (PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>), Lead (Pb), Mercury (Hg), Arsenic (As) and Chromium (Cr) **Table-3.0**.



**Table-3.0**

Parameters	Sampling frequency
Suspended Particulate Matter	24 hourly sample twice a week for Three months
Respirable Particulate Matter	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 <sub>2</sub> )	24 hourly sample twice a week for Three months
Oxides of Nitrogen (NO <sub>x</sub> )	24 hourly sample twice a week for Three months
Pb, Hg, As, Cr	8 hourly basis for 24 hour sample for three months

**Table 4.0**

**Measurement Techniques for various pollutants**

S.No.	Parameter	Technique	Technical Protocol	Minimum Reportable Value (µg/ m <sup>3</sup> )
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 Fugitive Emission Monitoring**

The summary of Fugitive Emission monitoring results for the month of April-May-June-2018 are presented in detail in **Table 6.0**. 98<sup>th</sup> percentile; maximum and minimum values etc. have been computed from the collected raw data for all the Fugitive monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQS for residential and rural zone.

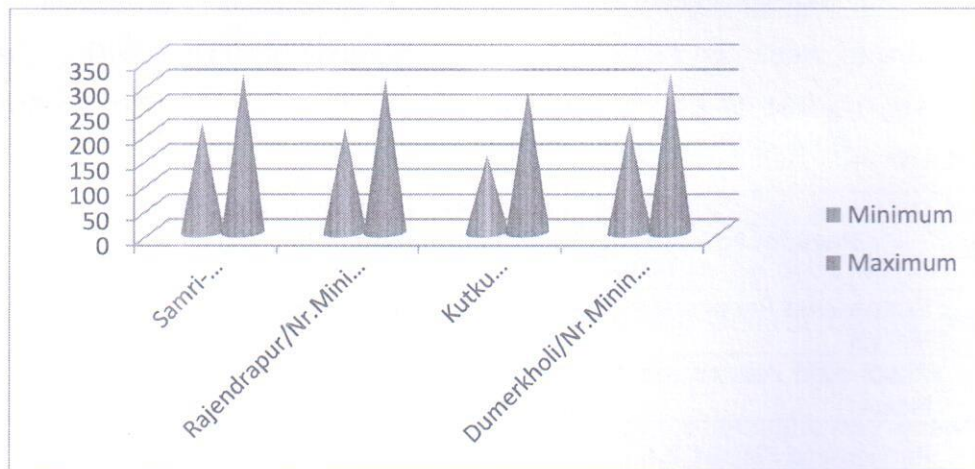


**1.6.1 Presentation of Results.**

**Suspended Particulate Matter-SPM**

The minimum and maximum concentrations for Suspended Particulate Matter-SPM were recorded as  $153\mu\text{g}/\text{m}^3$  and  $319\mu\text{g}/\text{m}^3$  respectively. The average concentrations were ranged between 168 to  $307\mu\text{g}/\text{m}^3$  and 98<sup>th</sup> percentile values ranged between 181 to  $319\mu\text{g}/\text{m}^3$  in the study area (Table 6).

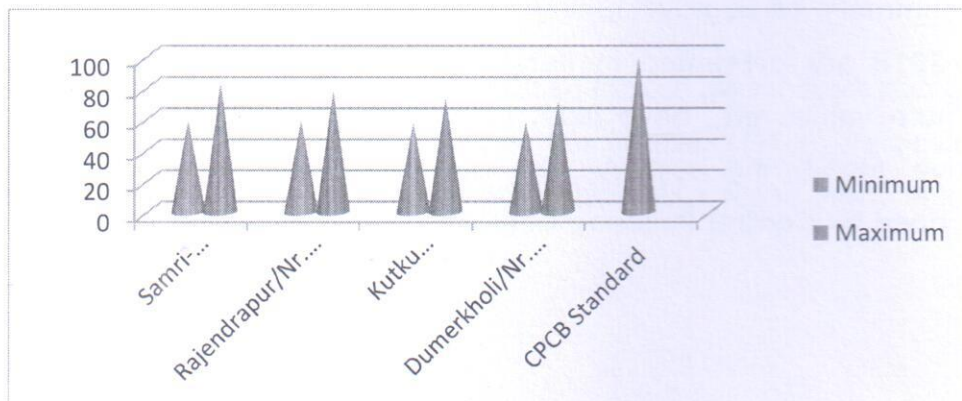
**Graphical Presentation of Fugitive Emission SPM Monitoring**



**Respirable Suspended Particulate Matter –RSPM**

The minimum and maximum concentrations for RSPM were recorded as  $58\mu\text{g}/\text{m}^3$  and  $83\mu\text{g}/\text{m}^3$  respectively. The average values were observed to be in the range of 62 to  $75\mu\text{g}/\text{m}^3$  and 98<sup>th</sup> percentile values ranged between 65 to  $83\mu\text{g}/\text{m}^3$  in the study area (Table 7).

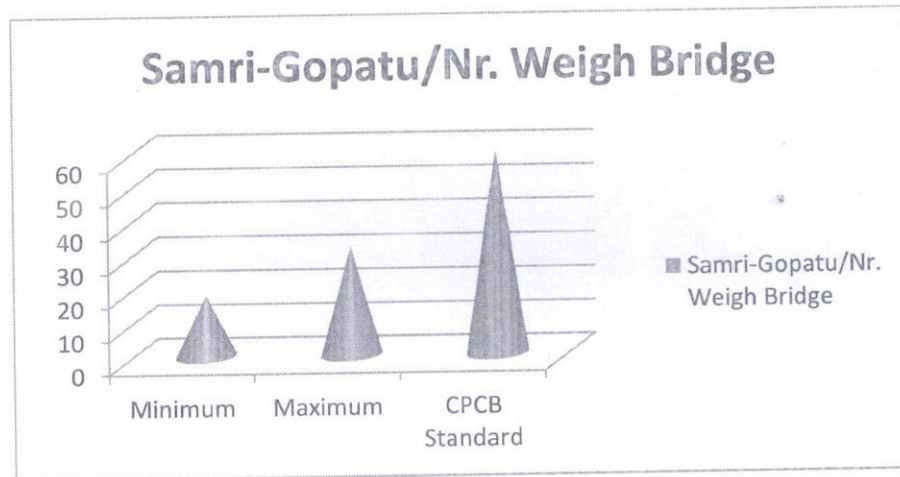
**Graphical Presentation of Fugitive Emission RSPM Monitoring**





**Particulate Matter -PM<sub>2.5</sub>**

The minimum and maximum values of PM<sub>2.5</sub> concentrations varied between 18 to 32µg/m<sup>3</sup> respectively. The average values range between 21 to 28µg/m<sup>3</sup> and 98<sup>th</sup> percentile values varied between 24 to 32µg/m<sup>3</sup> (**Table 8**).



**Sulphur Dioxide (SO<sub>2</sub>)**

The minimum and maximum SO<sub>2</sub> concentrations were recorded as 11µg/m<sup>3</sup> and 19µg/m<sup>3</sup> respectively. The average values were observed to be in the range of 13 to 17 µg/m<sup>3</sup> and 98<sup>th</sup> percentile values varied between 14 to 19µg/m<sup>3</sup> (**Table 9**).

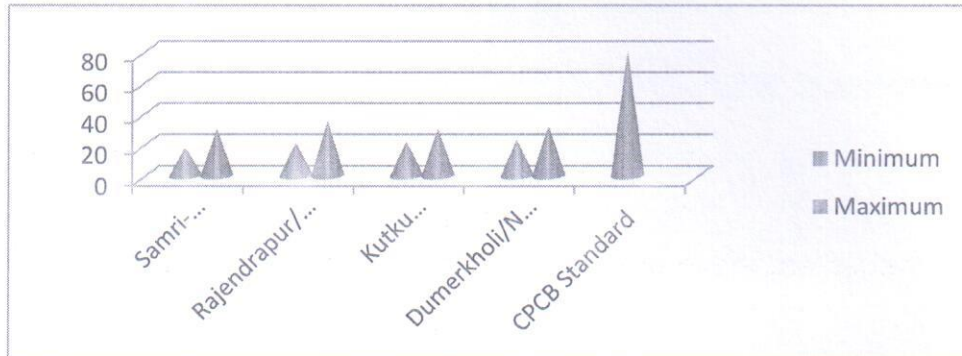
**Graphical Presentation of Fugitive Emission SO<sub>2</sub> Monitoring**





### Nitrogen Oxide (NO<sub>x</sub>)

The minimum and maximum NO<sub>x</sub> concentrations were recorded as 18µg/m<sup>3</sup> and 35µg/m<sup>3</sup>. The average concentrations were ranged between 20 to 29µg/m<sup>3</sup> and 98<sup>th</sup> percentile values varied between 22 to 35µg/m<sup>3</sup> (Table 10).



### Lead (Pb)

The maximum concentrations of Lead varied 0.080µg/m<sup>3</sup> respectively. The average concentration varied 0.072µg/m<sup>3</sup> & 98<sup>th</sup> percentiles values varied 0.080µg/m<sup>3</sup> in the study region (Table 11).

### Mercury (Hg)

Mercury was not detected at any of the locations in SPM samples as well as RSPM Samples (Table 12).

### Arsenic (As)

Arsenic was not detected at any of the locations in SPM samples as well as RSPM Samples (Table 13).

### Chromium (Cr)

Chromium was not detected at any of the locations in SPM samples as well as RSPM Samples



### 1.7 Ambient Air Quality (Buffer Zone)

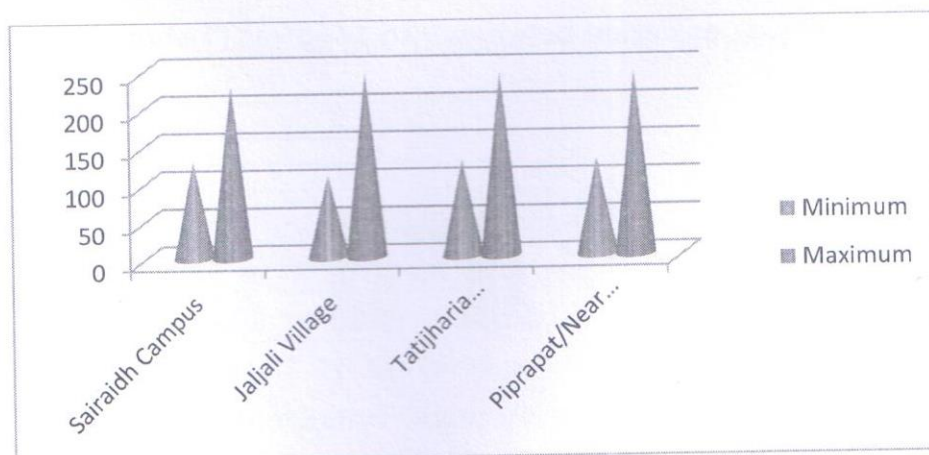
The background levels of SPM, RPM (PM<sub>10</sub>), PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, Pb, Hg, As and Cr measured are required to compute Ambient Air Quality. The sampling locations are selected at the above mentioned locations in downwind and upwind directions of the mine. The Minimum, Maximum concentration, Arithmetic mean (AM), Geometric mean (GM) and 98 Percentile are presented in tabular form (**Table-6**).

#### 1.7.1 Presentation of Results.

The summary of Ambient Air Quality monitoring results for the month of April-May-June-2018 are presented in detail in **Table-3**. 98<sup>th</sup> 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.

#### Suspended Particulate Matter-SPM

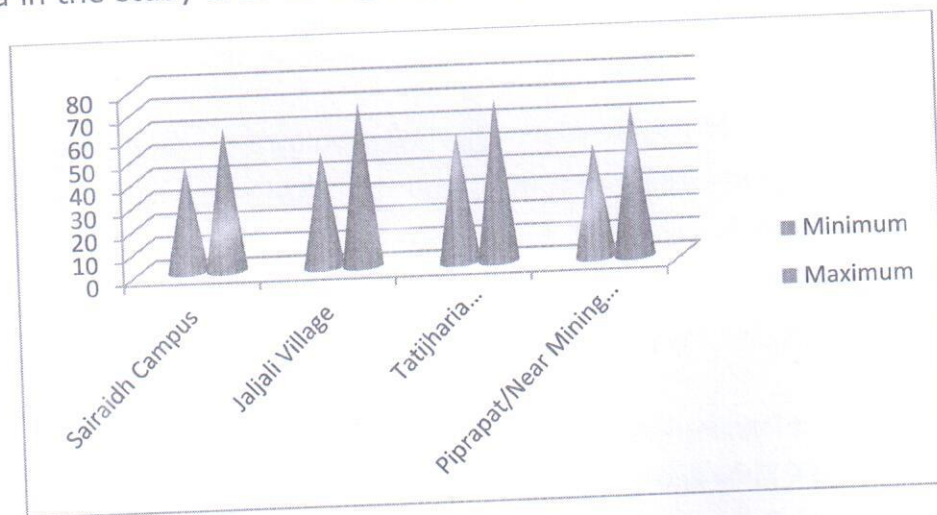
The statistical analysis of SPM is presented in **Table-6** for the mining area. The minimum and maximum values varied between 109 to 244µg/m<sup>3</sup> respectively during study period at all the 4 locations. The average values ranged between 131 to 225µg/m<sup>3</sup> and 98<sup>th</sup> percentile values ranged between 151 to 242µg/m<sup>3</sup> in the study area.





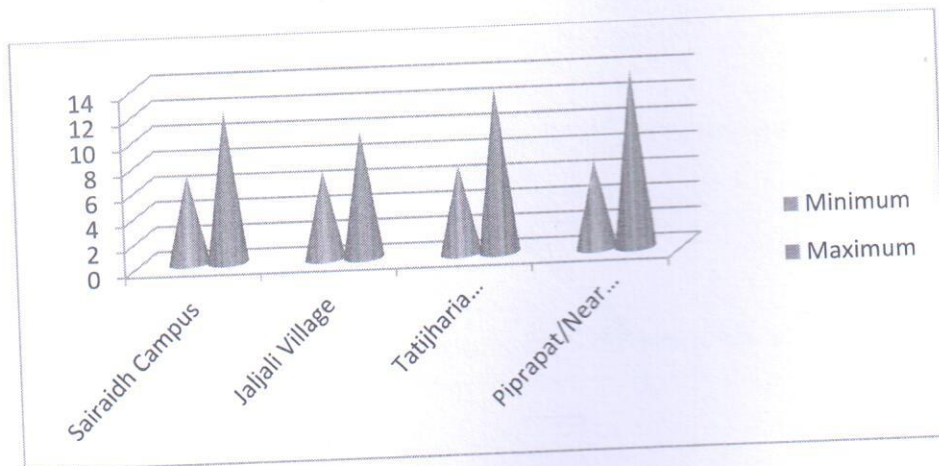
### Particulate Matter-RSPM

The minimum and maximum values of RSPM varied between 46 to 71 $\mu\text{g}/\text{m}^3$  respectively (**Table 7**). The average values varied between 51 to 64 $\mu\text{g}/\text{m}^3$ . The 98th percentile values varied between 53 to 71 $\mu\text{g}/\text{m}^3$  in the mining area. The overall values of SPM and RSPM were well within the CPCB limits prescribe for industrial and residential area in the study area during the study period.



### Sulphur Dioxide (SO<sub>2</sub>)

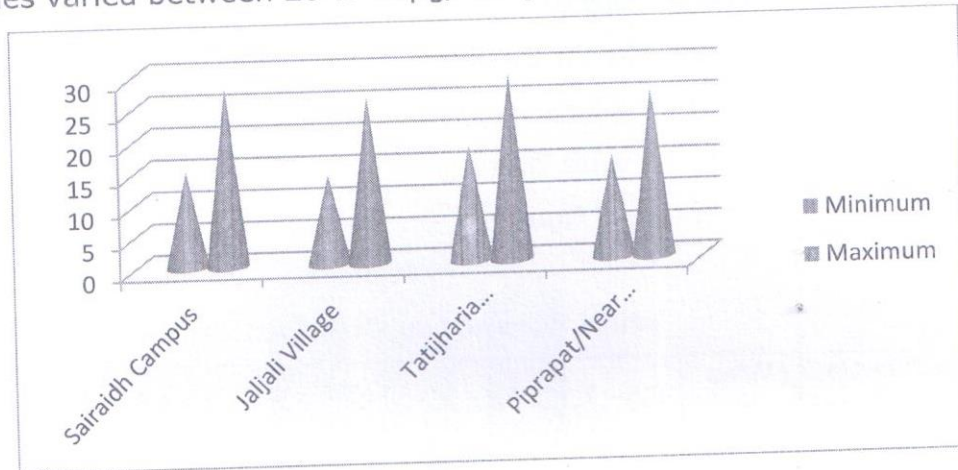
The minimum and maximum values of SO<sub>2</sub> concentrations varied between 7 to 14 $\mu\text{g}/\text{m}^3$  respectively. The average values range between 8 to 11  $\mu\text{g}/\text{m}^3$  and 98th percentile values varied between 9 to 14 $\mu\text{g}/\text{m}^3$  (**Table 9**).





**Nitrogen Oxide (NO<sub>x</sub>)**

The minimum and maximum values of NO<sub>x</sub> concentrations varied between 14 to 29µg/m<sup>3</sup> respectively. The average values range between 18 to 25µg/m<sup>3</sup> and 98th percentile values varied between 20 to 29µg/m<sup>3</sup> (**Table 10**).



**Lead (Pb)**

Lead was not detected at any of the locations in SPM samples as well as RSPM Samples (**Table 11**).

**Mercury (Hg)**

Mercury was not detected at any of the locations in SPM samples as well as RSPM Samples (**Table 12**).

**Arsenic (As)**

Arsenic was not detected at any of the locations in SPM samples as well as RSPM Samples (**Table 13**).

**Chromium (Cr)**

Chromium was not detected at any of the locations in SPM samples as well as RSPM Samples.

The dust fall rate was measured by exposing a jar during April-May-June-2018 in Rajendrapur/Nr.Mining Area and Samri-Gopatu/Nr.Weigh Bridge. The dust fall rate was observed to be 18.76 and 21.12 MT/km<sup>2</sup>/month respectively as given in (**Table 14**).





Overall the ambient air concentrations of SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, Pb, Hg, As, Cr and Dust fall were well within the limits of concentrations promulgated by CPCB, New Delhi in the study area.

### 1.8 Meteorology: Wind Pattern

The data of wind pattern collected during the study period (April-May-June-2018) indicates that the wind was blowing predominantly from (WSW and SW) directions, during study period, for 0.22 % wind was found to be calm. The graphical illustration and wind rose diagram is presented in Figures-1 & 2 respectively.

**Table.1**  
**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	0.000000	0.003917	0.002798	0.000000	0.000000	0.000000	0.006715
2	11.25 - 33.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	33.75 - 56.25	0.000000	0.000000	0.001119	0.000000	0.000000	0.000000	0.001119
4	56.25 - 78.75	0.000000	0.001119	0.002798	0.000000	0.000000	0.000000	0.003917
5	78.75 - 101.25	0.000000	0.001679	0.002798	0.000560	0.000000	0.000000	0.005036
6	101.25 - 123.75	0.000000	0.002798	0.000560	0.002238	0.000000	0.000000	0.005596
7	123.75 - 146.25	0.002798	0.003917	0.003917	0.001119	0.000000	0.000000	0.011752
8	146.25 - 168.75	0.001679	0.006715	0.010632	0.003358	0.000000	0.000000	0.022384
9	168.75 - 191.25	0.002798	0.013430	0.022943	0.008394	0.000560	0.000000	0.048125
10	191.25 - 213.75	0.004477	0.030218	0.050923	0.013430	0.001119	0.000000	0.100168
11	213.75 - 236.25	0.005596	0.044208	0.100727	0.027420	0.001119	0.000000	0.179071
12	236.25 - 258.75	0.005596	0.051483	0.095691	0.060996	0.000560	0.000000	0.214326
13	258.75 - 281.25	0.006156	0.034695	0.096810	0.055400	0.000000	0.000000	0.193061
14	281.25 - 303.75	0.006715	0.029659	0.057639	0.036374	0.000000	0.000000	0.130386
15	303.75 - 326.25	0.004477	0.020145	0.022943	0.003917	0.001119	0.000000	0.052602
16	326.25 - 348.75	0.002238	0.009513	0.010632	0.000000	0.001119	0.000000	0.023503
	<b>Sub-Total</b>	<b>0.042529</b>	<b>0.253497</b>	<b>0.482932</b>	<b>0.213206</b>	<b>0.005596</b>	<b>0.000000</b>	<b>0.997204</b>
	Calms							<b>0.002237</b>
	Missing/Incomplete							<b>0.000559</b>
	Total							<b>1.000000</b>

### SUMMARY OF WIND PATTERN

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Condition
April-May-June 2018	WSW (21%)	SW (18%)	0.22 %



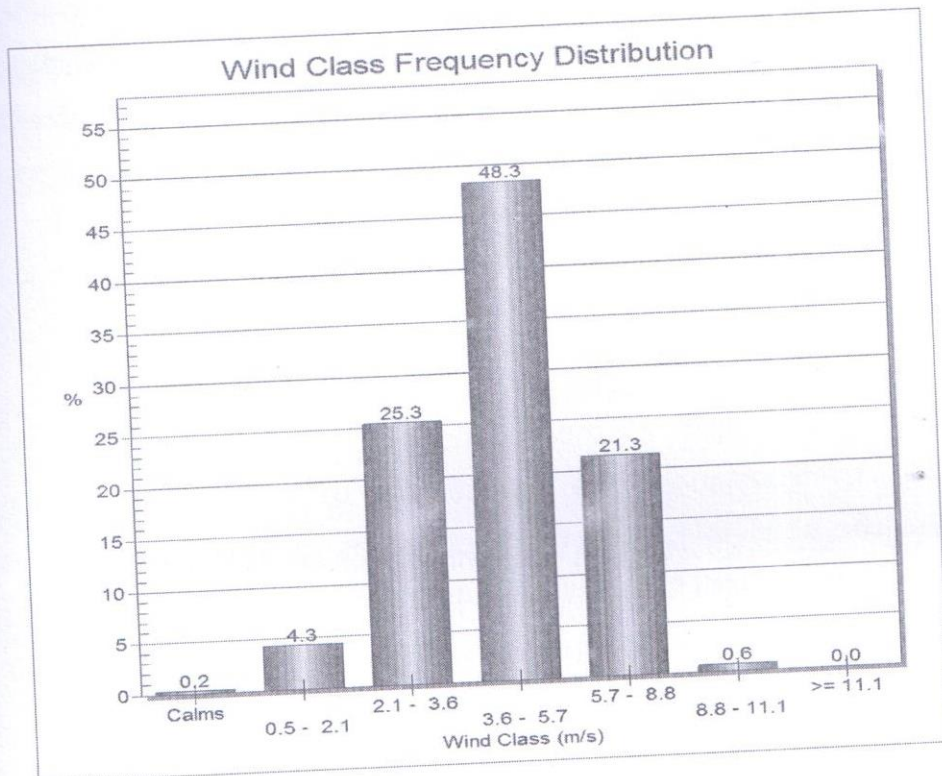


Figure.01: Wind Class Frequency Distribution (April-May-June-2018).

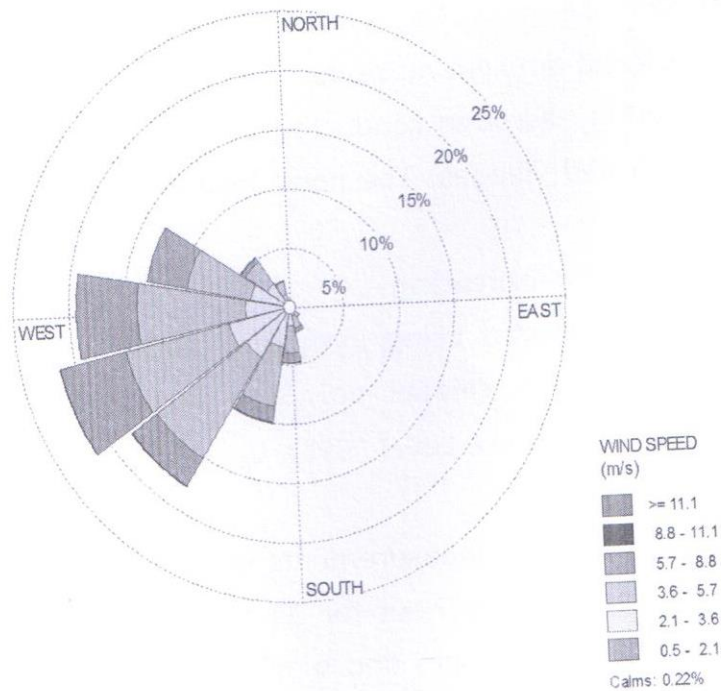
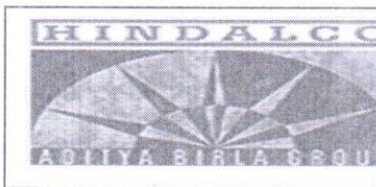


Figure.02: Wind Rose Diagram (April-May-June-2018)





### **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 and excavation, 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 if machineries have been provided with noise control equipment. Noise monitoring is carried out on monthly basis at three locations in each month are shown in (Fig 3).

#### **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 level in the mining area and villages. The noise levels at each location were recorded for 24 hours.

#### **Instrument used for monitoring**

Noise levels were measured using integrated sound level meter manufactured by Envirotech made in India (Model no. SLM-100). This instrument is capable of measuring the Sound Pressure Level (SPL),  $L_{eq}$ .

#### **Method of Monitoring**

Sound Pressure Level (SPL) measurements were monitored at three 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 three 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.



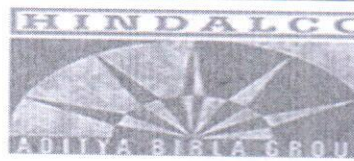


Noise levels monitored during day and night at 3 locations are found to be below the stipulated standard of CPCB for Industrial area as 75dB (A) and 70dB (A) for day and night respectively as given in **(Table 15)**

## **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 village Samri, Kudag, Tatijhariya, Saraidih, Rajendrapur and surface water sample from Nallahs nearby Samri mines. The physico-chemical analysis of water samples collected during study period reported as average of three months given in **(Table 16)**. 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. Surface water quality is satisfactory as per IS: 10500-2012. Thus the impacts due to mining activities in each month have been found to be insignificant.





**Table 6**  
**Statistical Analysis of SPM**

Location	Month & Year	Min.	Max.	A.M.	G.M.	Unit: $\mu\text{g}/\text{m}^3$ 98%le
<b>Fugitive Emission (Core Zone):-</b>						
Samri-Gopatu/ Nr.weigh bridge	April-2018	281	309	295	295	308
	May-2018	283	318	301	301	317
	June-2018	218	276	247	247	275
Rajendrapur/ Nr.Mining Area	April-2018	273	310	292	292	309
	May-2018	266	293	280	280	292
	June-2018	209	246	228	228	245
Kutku Village/ Nr.V.T. Center	April-2018	243	269	256	256	268
	May-2018	261	284	273	273	284
	June-2018	153	182	168	168	181
Dumerkholi/ Nr.Mining Area	April-2018	283	303	293	293	303
	May-2018	294	319	307	307	319
	June-2018	216	251	234	234	250

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%le
<b>Buffer Zone :-</b>						
Sairaidh Campus	April-2018	195	229	212	212	228
	May-2018	192	217	205	205	217
	June-2018	128	163	146	146	162
Jaljali Village	April-2018	184	244	214	214	243
	May-2018	195	222	209	209	221
	June-2018	109	152	131	131	151
Tatijharia Village/ Nr. Weigh bridge	April-2018	205	229	217	217	229
	May-2018	189	243	216	216	242
	June-2018	127	184	156	156	183
Piprapat/ Nr.Mining Area	April-2018	180	216	198	198	215
	May-2018	207	243	225	225	242
	June-2018	128	157	143	143	156

**Conclusion-A:-**

- 1) Samri-Gopatu/ Nr.weigh bridge Lease Area Core Zone: For the Months of Apr-May-June-2018 Average of SPM is  $281 \mu\text{g}/\text{m}^3$ .
- 2) Rajendrapur/Nr.Mining Lease Area Core Zone:- For the Months of Apr-May-June-2018 Average of SPM is  $267 \mu\text{g}/\text{m}^3$ .
- 3) Kutku Village / Nr.V.T. Center Lease Area Core Zone:- For the Months of Apr-May-June-2018 Average of SPM is  $232 \mu\text{g}/\text{m}^3$ .
- 4) Dumerkholi/ Nr.Mining Lease Area Core Zone:- For the Months of Apr-May-June-2018 Average of SPM is  $278 \mu\text{g}/\text{m}^3$ .

**The Average Concentration of SPM within the core zone of Samri Lease is  $265 \mu\text{g}/\text{m}^3$ .**

**Conclusion-B:-**

1. Sairaidh Campus Lease Area Buffer zone:- For the Months of Apr-May-June-2018 Average of SPM is  $188 \mu\text{g}/\text{m}^3$ .
2. Jaljali Village Lease Area Buffer zone:- For the Months of Apr-May-June-2018 Average of SPM is  $185 \mu\text{g}/\text{m}^3$ .
3. Tatijharia Village/ Nr. Weigh bridge Buffer zone:- For the Months of Apr-May-June-2018 Average of SPM is  $196 \mu\text{g}/\text{m}^3$ .
4. Piprapat/ Nr.Mining Area Buffer zone:- For the Months of Apr-May-June-2018 Average of SPM is  $189 \mu\text{g}/\text{m}^3$ .

- **The Average Concentration of SPM within the Buffer Zone of Samri Lease is  $189 \mu\text{g}/\text{m}^3$ .**



**Month-wise Summary of Statistical Analysis of SPM**

**3.0 Fugitive Emission (Core Zone):-**

**3.0.1 Presentation of Results.**

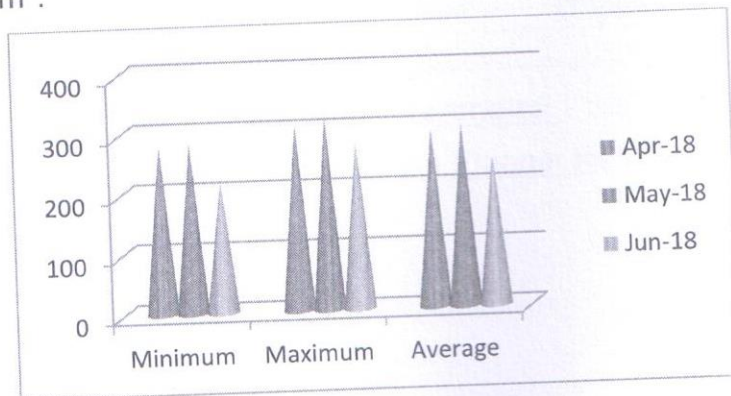
The summary of Statistical Analysis of SPM results for the month of April-May-June-2018 are presented in detail in **Table 6**. 98<sup>th</sup> percentile; maximum, minimum and average values etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Samri-Gopatu/ Nr.weigh bridge**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as 281 $\mu\text{g}/\text{m}^3$  and 309 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 295 $\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as 283 $\mu\text{g}/\text{m}^3$  and 318 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 301 $\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as 218 $\mu\text{g}/\text{m}^3$  and 276 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 247 $\mu\text{g}/\text{m}^3$ .



**Graph :- Samri-Gopatu/ Nr.weigh bridge**

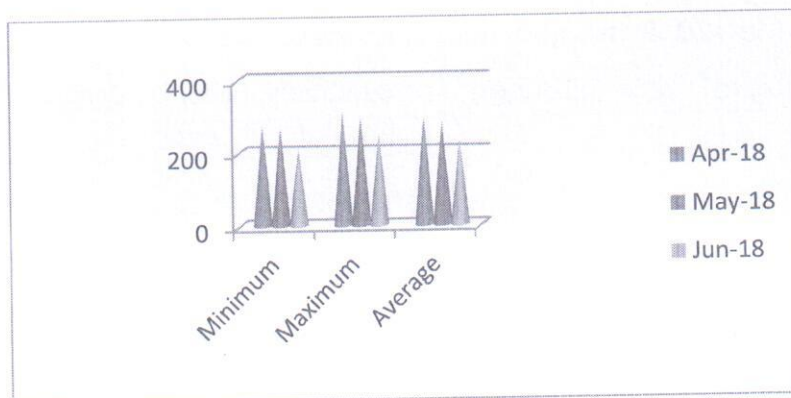


**Rajendrapur/ Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as  $273\mu\text{g}/\text{m}^3$  and  $310\mu\text{g}/\text{m}^3$  respectively and average concentration  $292\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as  $266\mu\text{g}/\text{m}^3$  and  $293\mu\text{g}/\text{m}^3$  respectively and average concentration  $280\mu\text{g}/\text{m}^3$ .

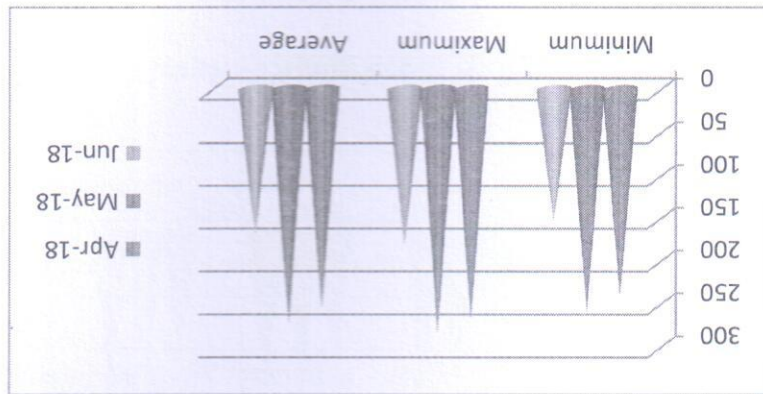
For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as  $209\mu\text{g}/\text{m}^3$  and  $246\mu\text{g}/\text{m}^3$  respectively and average concentration  $228\mu\text{g}/\text{m}^3$ .



**Graph: - Rajendrapur/ Nr.Mining Area**



Graph: - Kutku Village/ Nr.V.T. Center

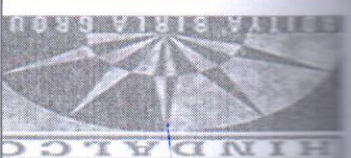


Kutku Village/ Nr.V.T. Center

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as 243µg/m<sup>3</sup> and 269µg/m<sup>3</sup> respectively and average concentration of 256µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as 261µg/m<sup>3</sup> and 284µg/m<sup>3</sup> respectively and average concentration of 273µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as 153µg/m<sup>3</sup> and 182µg/m<sup>3</sup> respectively and average concentration of 168µg/m<sup>3</sup>.

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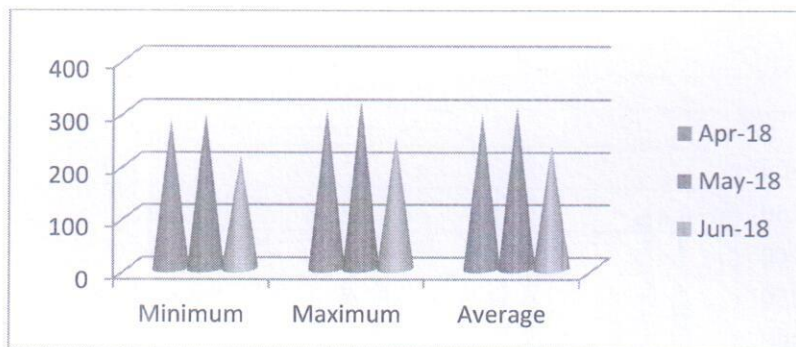


**Dumerkholi/ Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as  $283\mu\text{g}/\text{m}^3$  and  $303\mu\text{g}/\text{m}^3$  respectively and average concentration  $293\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as  $294\mu\text{g}/\text{m}^3$  and  $319\mu\text{g}/\text{m}^3$  respectively and average concentration  $307\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as  $216\mu\text{g}/\text{m}^3$  and  $251\mu\text{g}/\text{m}^3$  respectively and average concentration  $234\mu\text{g}/\text{m}^3$ .



**Graph:- Dumerkholi/ Nr.Mining Area**



**3.1 Fugitive Emission (Buffer Zone):-**

**3.1.1 Presentation of Results.**

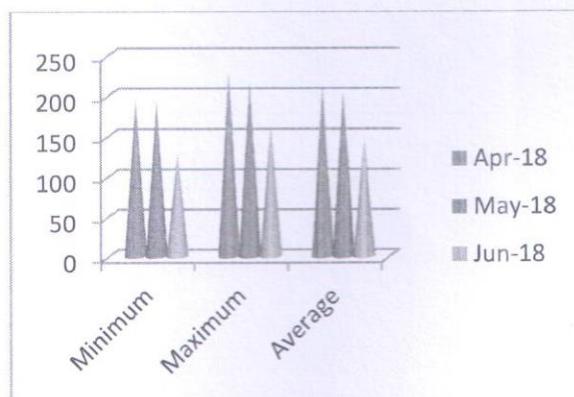
The summary of Statistical Analysis of SPM results for the month of April-May-June-2018 are presented in detail in **Table 6**. 98<sup>th</sup> percentile; maximum, minimum and average values etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Sairaidh Campus**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as 195 $\mu\text{g}/\text{m}^3$  and 229 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 212 $\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as 192 $\mu\text{g}/\text{m}^3$  and 217 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 205 $\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as 128 $\mu\text{g}/\text{m}^3$  and 163 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 146 $\mu\text{g}/\text{m}^3$ .



**Graph:- Sairaidh Campus**

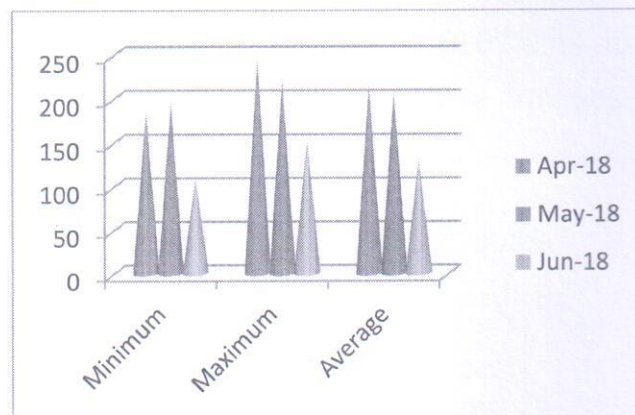


**Jaljali Village**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as  $184\mu\text{g}/\text{m}^3$  and  $244\mu\text{g}/\text{m}^3$  respectively and average concentration of  $214\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as  $195\mu\text{g}/\text{m}^3$  and  $222\mu\text{g}/\text{m}^3$  respectively and average concentration of  $209\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as  $109\mu\text{g}/\text{m}^3$  and  $152\mu\text{g}/\text{m}^3$  respectively and average concentration of  $131\mu\text{g}/\text{m}^3$ .



**Graph:- Jaljali Village**

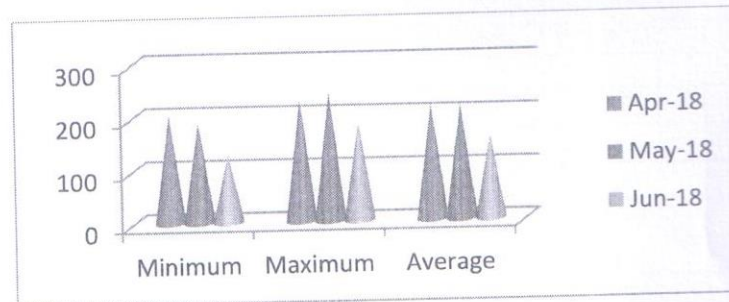


**Tatijharia Village/Nr.Weigh Bridge**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as  $205\mu\text{g}/\text{m}^3$  and  $229\mu\text{g}/\text{m}^3$  respectively and average concentration of  $217\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as  $189\mu\text{g}/\text{m}^3$  and  $243\mu\text{g}/\text{m}^3$  respectively and average concentration of  $216\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as  $127\mu\text{g}/\text{m}^3$  and  $184\mu\text{g}/\text{m}^3$  respectively and average concentration of  $156\mu\text{g}/\text{m}^3$ .



**Graph:- Tatijharia Village/Nr.Weigh Bridge**

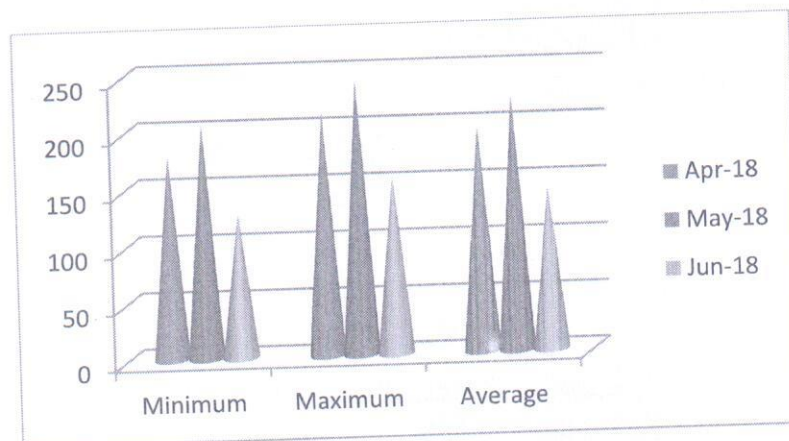


**Piprapat/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SPM were recorded as  $180\mu\text{g}/\text{m}^3$  and  $216\mu\text{g}/\text{m}^3$  respectively and average concentration of  $198\mu\text{g}/\text{m}^3$ .

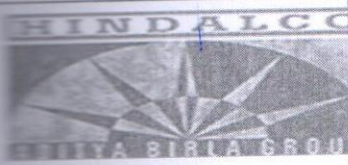
For the month of May-2018 the minimum and maximum concentrations for SPM were recorded as  $207\mu\text{g}/\text{m}^3$  and  $243\mu\text{g}/\text{m}^3$  respectively and average concentration of  $225\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for SPM were recorded as  $128\mu\text{g}/\text{m}^3$  and  $157\mu\text{g}/\text{m}^3$  respectively and average concentration of  $143\mu\text{g}/\text{m}^3$ .



**Graph:- Piprapat/Nr.Mining Area**





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**Table 7**  
**Statistical Analysis of RSPM**

Unit :  $\mu\text{g}/\text{m}^3$

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
<b>Fugitive Emission (Core Zone):-</b>						
Samri-Gopatu/ Nr.weigh bridge	April-2018	66	83	75	75	83
	May-2018	59	74	67	67	74
	June-2018	62	82	72	72	82
Rajendrapur/ Nr.Mining Area	April-2018	64	70	67	67	70
	May-2018	66	78	72	72	78
	June-2018	59	67	63	63	67
Kutku Village/ Nr.V.T. Center	April-2018	61	73	67	67	73
	May-2018	57	71	64	64	71
	June-2018	59	68	64	64	68
Dumerkholi/ Nr.Mining Area	April-2018	63	71	67	67	71
	May-2018	58	65	62	62	65
	June-2018	61	69	65	65	69
<b>CPCB Standard</b>		<b>100</b> <b>(24 hrs)</b>				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
<b>Buffer Zone :-</b>						
Sairaidh Campus	April-2018	46	55	51	51	55
	May-2018	50	62	56	56	62
	June-2018	47	53	50	50	53
Jaljali Village	April-2018	52	63	58	58	63
	May-2018	56	71	64	64	71
	June-2018	50	66	58	58	66
Tatijharia Village/ Nr. Weigh bridge	April-2018	56	59	58	58	59
	May-2018	60	65	63	63	65
	June-2018	58	70	64	64	70
Piprapat/ Nr.Mining Area	April-2018	54	63	59	59	63
	May-2018	50	65	58	58	65
	June-2018	49	55	52	52	55
<b>CPCB Standard</b>		<b>100</b> <b>(24 hrs)</b>				

**Conclusion: A)**

- Samri-Gopatu/ Nr.weigh bridge Lease Area Core Zone:** For the Months of Apr-May-June-2018 Average of RSPM is  $71 \mu\text{g}/\text{m}^3$ .
- Rajendrapur/Nr.Mining Area Lease Area Core Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $67 \mu\text{g}/\text{m}^3$ .
- Kutku Village / Nr.V.T. Center Lease Area Core Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $65 \mu\text{g}/\text{m}^3$ .
- Dumerkholi/ Nr.Mining Area Lease Area Core Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $65 \mu\text{g}/\text{m}^3$ .

• The Average Concentration of RSPM within the Core Zone of Samri Lease is  $67 \mu\text{g}/\text{m}^3$  and it is within permissible limits as per CPCB Standard.

• **Conclusion (B)**

- Sairaidh Campus Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $52 \mu\text{g}/\text{m}^3$ .
- Jaljali Village Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $60 \mu\text{g}/\text{m}^3$ .
- Tatijharia Village/ Nr. Weigh bridge Buffer Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $62 \mu\text{g}/\text{m}^3$ .
- Piprapat/ Nr.Mining Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of RSPM is  $56 \mu\text{g}/\text{m}^3$ .

• The Average Concentration of RSPM within the Buffer Zone of Samri Lease is  $58 \mu\text{g}/\text{m}^3$  and it is within permissible limits as per CPCB Standard.





Monthwise Summary of Statistical Analysis of RSPM

3.2 Fugitive Emission (Core Zone):-

3.2.1 Presentation of Results.

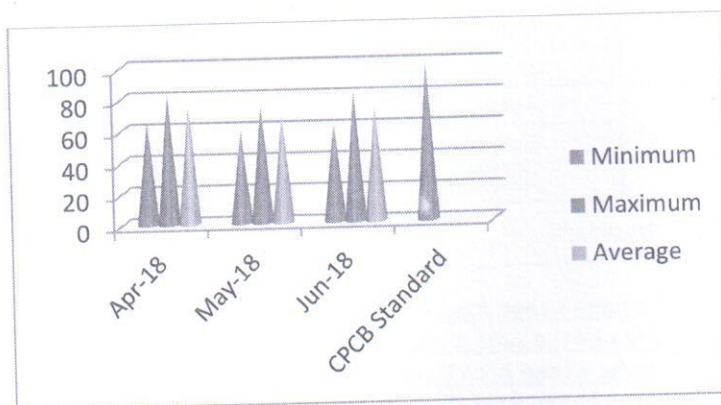
The summary of Statistical Analysis of RSPM results for the month of April-May-June-2018 are presented in detail in **Table 7**. 98<sup>th</sup> percentile; maximum, minimum and average value etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

Samri-Gopatu/ Nr.weigh bridge

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as 66 $\mu\text{g}/\text{m}^3$  and 83 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 75 $\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as 59 $\mu\text{g}/\text{m}^3$  and 74 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 67 $\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as 62 $\mu\text{g}/\text{m}^3$  and 82 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 72 $\mu\text{g}/\text{m}^3$ .



!



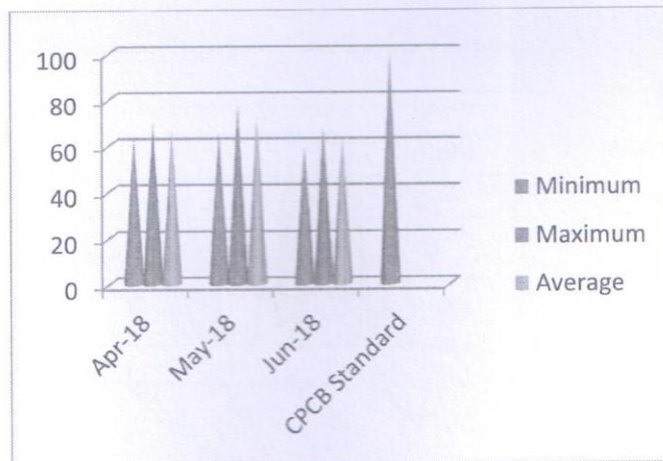


**Rajendrapur/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $64\mu\text{g}/\text{m}^3$  and  $70\mu\text{g}/\text{m}^3$  respectively and average concentration of  $67\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $66\mu\text{g}/\text{m}^3$  and  $78\mu\text{g}/\text{m}^3$  respectively and average concentration of  $72\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $59\mu\text{g}/\text{m}^3$  and  $67\mu\text{g}/\text{m}^3$  respectively and average concentration of  $63\mu\text{g}/\text{m}^3$ .



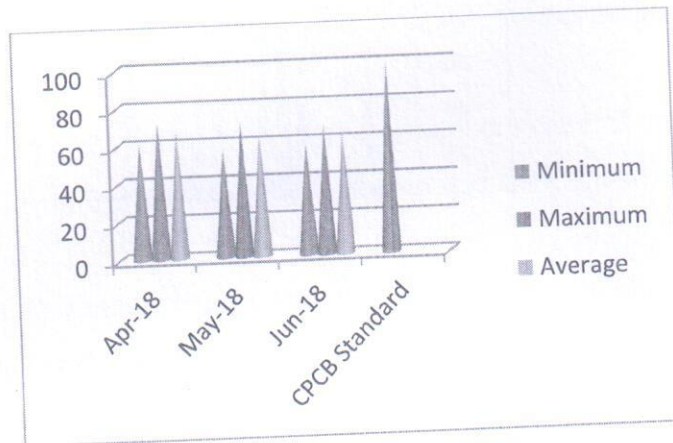


Kutku Village/Nr.V.T. Center

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $61\mu\text{g}/\text{m}^3$  and  $73\mu\text{g}/\text{m}^3$  respectively and average concentration of  $67\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $57\mu\text{g}/\text{m}^3$  and  $71\mu\text{g}/\text{m}^3$  respectively and average concentration of  $64\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $59\mu\text{g}/\text{m}^3$  and  $68\mu\text{g}/\text{m}^3$  respectively and average concentration of  $64\mu\text{g}/\text{m}^3$ .





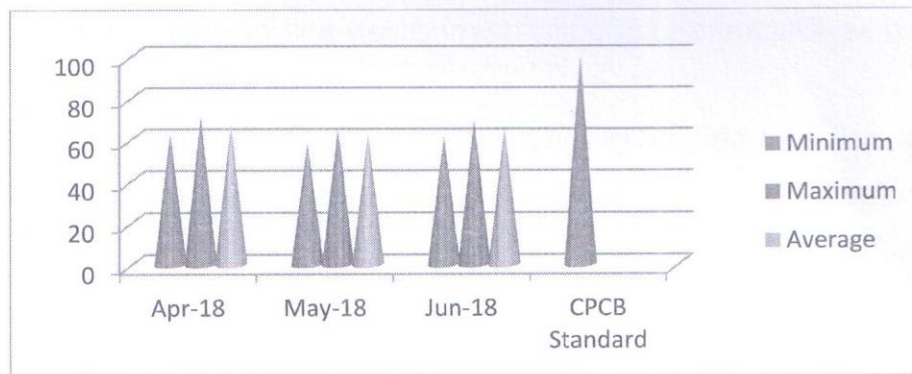


**Dumerkholi/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $63\mu\text{g}/\text{m}^3$  and  $71\mu\text{g}/\text{m}^3$  respectively and average concentration of  $67\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $58\mu\text{g}/\text{m}^3$  and  $65\mu\text{g}/\text{m}^3$  respectively and average concentration of  $62\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $61\mu\text{g}/\text{m}^3$  and  $69\mu\text{g}/\text{m}^3$  respectively and average concentration of  $65\mu\text{g}/\text{m}^3$ .



**3.3 Fugitive Emission (Buffer Zone):-**

**3.3.1 Presentation of Results.**

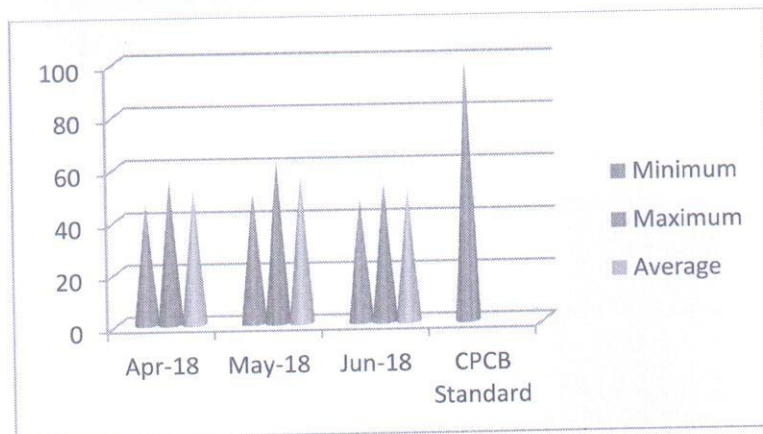
The summary of Statistical Analysis of RSPM results for the month of April-May-June-2018 are presented in detail in **Table 6**. 98<sup>th</sup> percentile; maximum, minimum and average value etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Sairaidh Campus**

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $46\mu\text{g}/\text{m}^3$  and  $55\mu\text{g}/\text{m}^3$  respectively and average concentration of  $51\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $50\mu\text{g}/\text{m}^3$  and  $62\mu\text{g}/\text{m}^3$  respectively and average concentration of  $56\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $47\mu\text{g}/\text{m}^3$  and  $53\mu\text{g}/\text{m}^3$  respectively and average concentration of  $50\mu\text{g}/\text{m}^3$ .





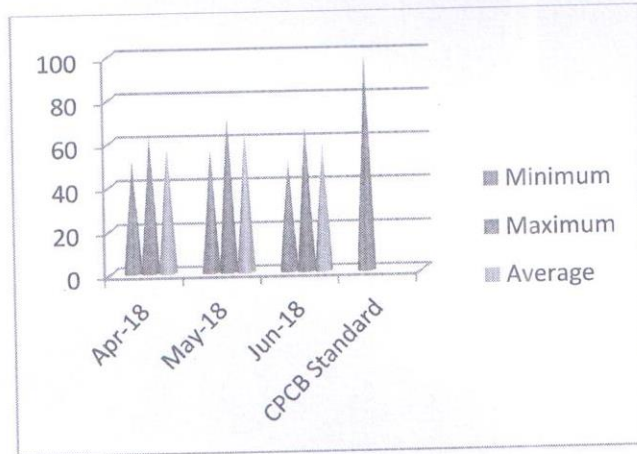


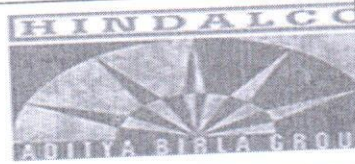
**Jaljali Village**

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $52\mu\text{g}/\text{m}^3$  and  $63\mu\text{g}/\text{m}^3$  respectively and average concentration of  $58\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $56\mu\text{g}/\text{m}^3$  and  $71\mu\text{g}/\text{m}^3$  respectively and average concentration of  $64\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $50\mu\text{g}/\text{m}^3$  and  $66\mu\text{g}/\text{m}^3$  respectively and average concentration of  $58\mu\text{g}/\text{m}^3$ .



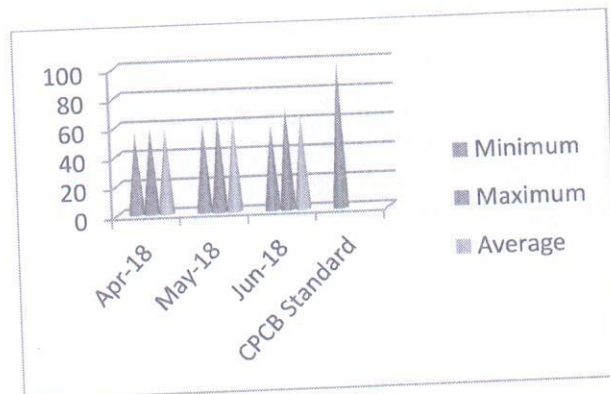


Tatijharia Village

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $56\mu\text{g}/\text{m}^3$  and  $59\mu\text{g}/\text{m}^3$  respectively and average concentration of  $58\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $60\mu\text{g}/\text{m}^3$  and  $65\mu\text{g}/\text{m}^3$  respectively and average concentration of  $63\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $58\mu\text{g}/\text{m}^3$  and  $70\mu\text{g}/\text{m}^3$  respectively and average concentration of  $64\mu\text{g}/\text{m}^3$ .



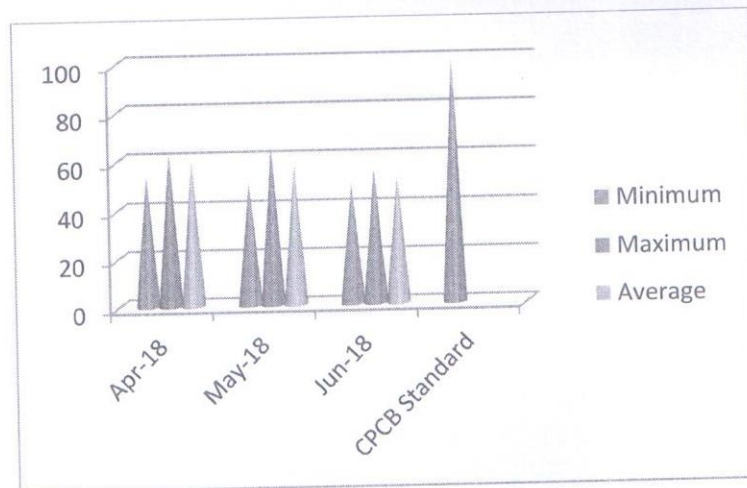


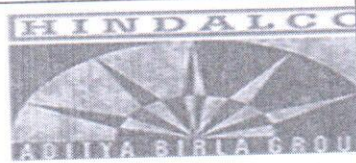
**Piprapat/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for RSPM were recorded as  $54\mu\text{g}/\text{m}^3$  and  $63\mu\text{g}/\text{m}^3$  respectively and average concentration of  $59\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for RSPM were recorded as  $50\mu\text{g}/\text{m}^3$  and  $65\mu\text{g}/\text{m}^3$  respectively and average concentration of  $58\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for RSPM were recorded as  $49\mu\text{g}/\text{m}^3$  and  $55\mu\text{g}/\text{m}^3$  respectively and average concentration of  $52\mu\text{g}/\text{m}^3$ .





**Table 8**

**Statistical Analysis of PM 2.5**

Unit:  $\mu\text{g}/\text{m}^3$

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%	
Samri-Gopatu/ Near Weigh bridge	April-2018	21	28	25	25	28	
	May-2018	24	32	28	28	32	
	June-2018	18	24	21	21	24	
CPCB Standard		60 (24 hrs)					

**Conclusion :-** The Average Concentration of  $\text{PM}_{2.5}$  within Samri Lease during this period (Apr-May-June-2018) is  $25 \mu\text{g}/\text{m}^3$  and it is within permissible limits as per CPCB Standard.

**3.4 Statistical Analysis of PM 2.5:-**

**3.4.1 Presentation of Results.**

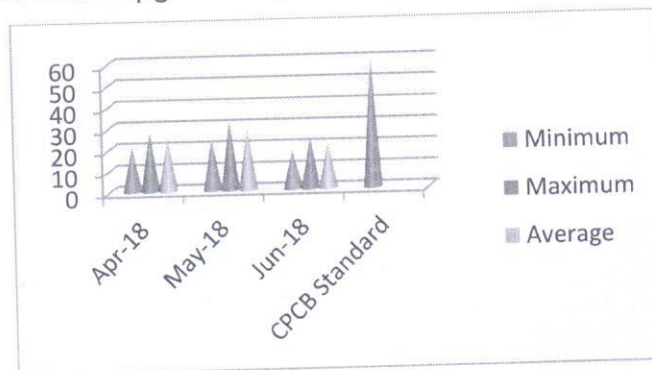
The summary of Statistical Analysis of  $\text{PM}_{2.5}$  results for the month of April-May-June-2018 are presented in detail in Table 8. 98th percentile; maximum, minimum and average value etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Samri-Gopatu/Near Weigh Bridge**

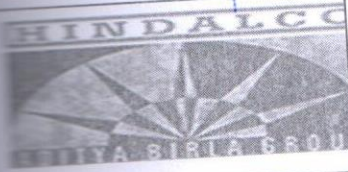
For the month of April-2018 the minimum and maximum concentrations for  $\text{PM}_{2.5}$  were recorded as  $21 \mu\text{g}/\text{m}^3$  and  $28 \mu\text{g}/\text{m}^3$  respectively and average concentration of  $25 \mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for  $\text{PM}_{2.5}$  were recorded as  $24 \mu\text{g}/\text{m}^3$  and  $32 \mu\text{g}/\text{m}^3$  respectively and average concentration of  $28 \mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for  $\text{PM}_{2.5}$  were recorded as  $18 \mu\text{g}/\text{m}^3$  and  $24 \mu\text{g}/\text{m}^3$  respectively and average concentration of  $21 \mu\text{g}/\text{m}^3$ .







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**Table 9**

**Statistical Analysis of SO<sub>2</sub>**

Unit: µg/m<sup>3</sup>

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Fugitive Emission (Core Zone):-</b>						
Samri-Gopatu/ Nr.weigh bridge	April-2018	12	14	13	13	14
	May-2018	11	15	13	13	15
	June-2018	12	17	15	15	17
Rajendrapur/ Nr.Mining Area	April-2018	14	19	17	17	19
	May-2018	12	16	14	14	16
	June-2018	14	17	16	16	17
Kutku Village/ Nr.V.T. Center	April-2018	11	14	13	13	14
	May-2018	12	16	14	14	16
	June-2018	11	17	14	14	17
Dumerkholi/ Nr.Mining Area	April-2018	11	19	15	15	19
	May-2018	13	18	16	16	18
	June-2018	12	16	14	14	16
<b>CPCB Standard</b>				<b>80 (24 hrs)</b>		

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Buffer Zone :-</b>						
Sairaidh Campus	April-2018	7	10	9	9	10
	May-2018	7	9	8	8	9
	June-2018	9	12	11	11	12
Jaljali Village	April-2018	8	10	9	9	10
	May-2018	7	9	8	8	9
	June-2018	8	10	9	9	10
Tatijharia Village/ Nr. Weigh bridge	April-2018	8	12	10	10	12
	May-2018	7	10	9	9	10
	June-2018	8	13	11	11	13
Piprapat/ Nr.Mining Area	April-2018	8	14	11	11	14
	May-2018	7	10	9	9	10
	June-2018	8	12	10	10	12
<b>CPCB Standard</b>				<b>80 (24 hrs)</b>		

**Conclusion:- A)**

- 1) **Samri-Gopatu/ Nr.weigh bridge Lease Area Core Zone:** For the Months of Apr-May-June-2018 Avg. of SO<sub>2</sub> is 14 µg/m<sup>3</sup>.
  - 2) **Rajendrapur/Nr.Mining Area Lease Area Core Zone:-** For the Months of Apr-May-June-2018 Avg. of SO<sub>2</sub> is 16 µg/m<sup>3</sup>.
  - 3) **Kutku Village / Nr.V.T. Center Lease Area Core Zone:-** For the Months of Apr-May-June-2018 Avg. of SO<sub>2</sub> is 14 µg/m<sup>3</sup>.
  - 4) **Dumerkholi/ Nr.Mining Area Core Zone:-** For the Months of Apr-May-June-2018 Average of SO<sub>2</sub> is 15 µg/m<sup>3</sup>.
- The Average Concentration of SO<sub>2</sub> within the Core Zone of Samri Lease during this period (Apr-May-June-2018) is 15 µg/m<sup>3</sup> and it is within permissible limits as per CPCB Standard.

**Conclusion : B)**

- 1) **Sairaidh Campus Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of SO<sub>2</sub> is 9 µg/m<sup>3</sup>.
  - 2) **Jaljali Village Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of SO<sub>2</sub> is 9 µg/m<sup>3</sup>.
  - 3) **Tatijharia Village/ Nr. Weigh bridge Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Avg. of SO<sub>2</sub> is 10 µg/m<sup>3</sup>.
  - 4) **Piprapat/ Nr.Mining Lease Area Buffer Zone:-** For the Months of Apr-May-June-2018 Average of SO<sub>2</sub> is 10 µg/m<sup>3</sup>.
- The Average Concentration of SO<sub>2</sub> within the Buffer Zone of Samri Lease during this period (Apr-May-June-2018) is 10 µg/m<sup>3</sup> and it is within permissible limits as per CPCB Standard.



**Monthwise Summary of Statistical Analysis of SO<sub>2</sub>**

**3.5 Fugitive Emission (Core Zone):-**

**3.5.1 Presentation of Results.**

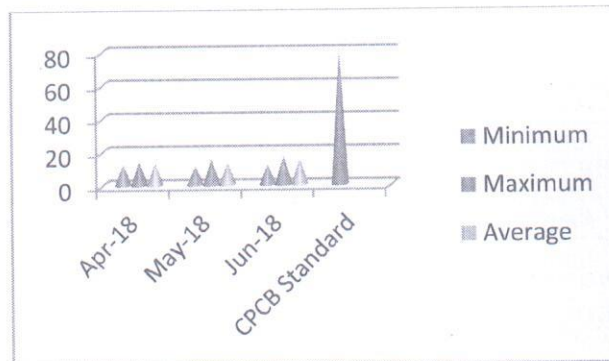
The summary of Statistical Analysis of SO<sub>2</sub> results for the month of April-May-June-2018 are presented in detail in **Table 7**. 98<sup>th</sup> percentile; maximum, minimum and average value etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Samri-Gopatu/ Nr.weigh bridge**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 12µg/m<sup>3</sup> and 14µg/m<sup>3</sup> respectively and average concentration of 13µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 11µg/m<sup>3</sup> and 15µg/m<sup>3</sup> respectively and average concentration of 13µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 12µg/m<sup>3</sup> and 17µg/m<sup>3</sup> respectively and average concentration of 15µg/m<sup>3</sup>.





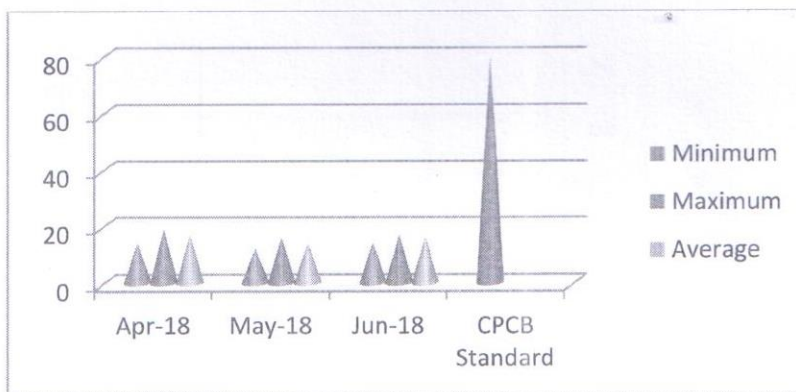


**Rajendrapur/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 14µg/m<sup>3</sup> and 19µg/m<sup>3</sup> respectively and average concentration of 17µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 12µg/m<sup>3</sup> and 16µg/m<sup>3</sup> respectively and average concentration of 14µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 14µg/m<sup>3</sup> and 17µg/m<sup>3</sup> respectively and average concentration of 16µg/m<sup>3</sup>.



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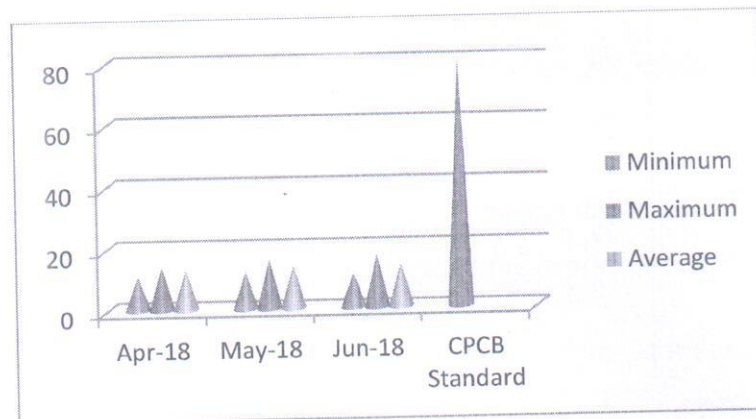


Kutku Village/Nr.V.T. Center

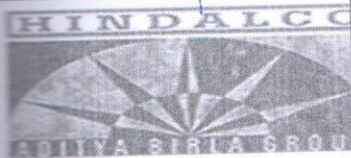
For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 11µg/m<sup>3</sup> and 14µg/m<sup>3</sup> respectively and average concentration of 13µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 12µg/m<sup>3</sup> and 16µg/m<sup>3</sup> respectively and average concentration of 14µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 11µg/m<sup>3</sup> and 17µg/m<sup>3</sup> respectively and average concentration of 14µg/m<sup>3</sup>.





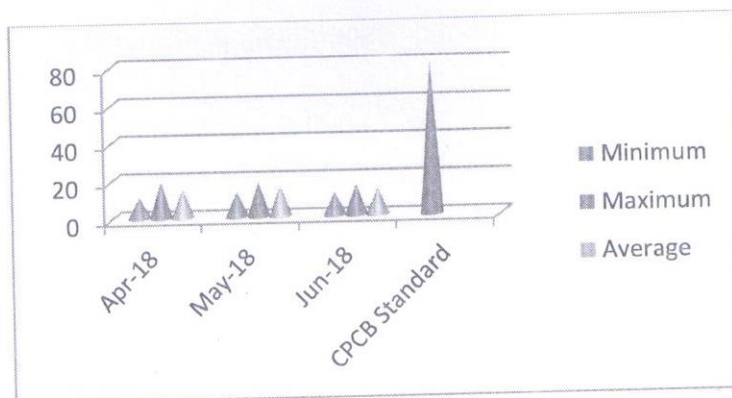


**Dumerkholi/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 11µg/m<sup>3</sup> and 19µg/m<sup>3</sup> respectively and average concentration of 15µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 13µg/m<sup>3</sup> and 18µg/m<sup>3</sup> respectively and average concentration of 16µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 12µg/m<sup>3</sup> and 16µg/m<sup>3</sup> respectively and average concentration of 14µg/m<sup>3</sup>.





### 3.6 Fugitive Emission (Buffer Zone):-

#### 3.6.1 Presentation of Results.

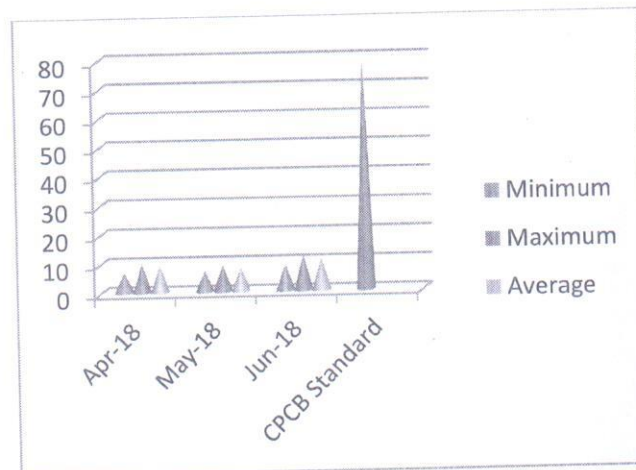
The summary of Statistical Analysis of SO<sub>2</sub> results for the month of April-May-June-2018 are presented in detail in **Table 9**. 98<sup>th</sup> percentile; maximum, minimum and average value etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

#### Sairaidh Campus

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 7µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respectively and average concentration of 9µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 7µg/m<sup>3</sup> and 9µg/m<sup>3</sup> respectively and average concentration of 8µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 9µg/m<sup>3</sup> and 12µg/m<sup>3</sup> respectively and average concentration of 11µg/m<sup>3</sup>.





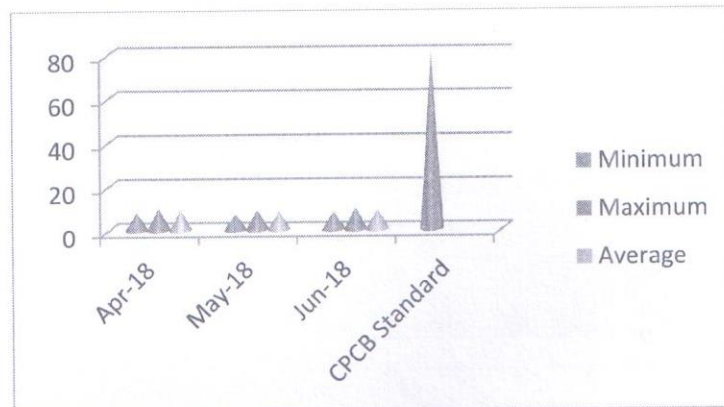


**Jaljali Village**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respectively and average concentration of 9µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 7µg/m<sup>3</sup> and 9µg/m<sup>3</sup> respectively and average concentration of 8µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respectively and average concentration of 9µg/m<sup>3</sup>.

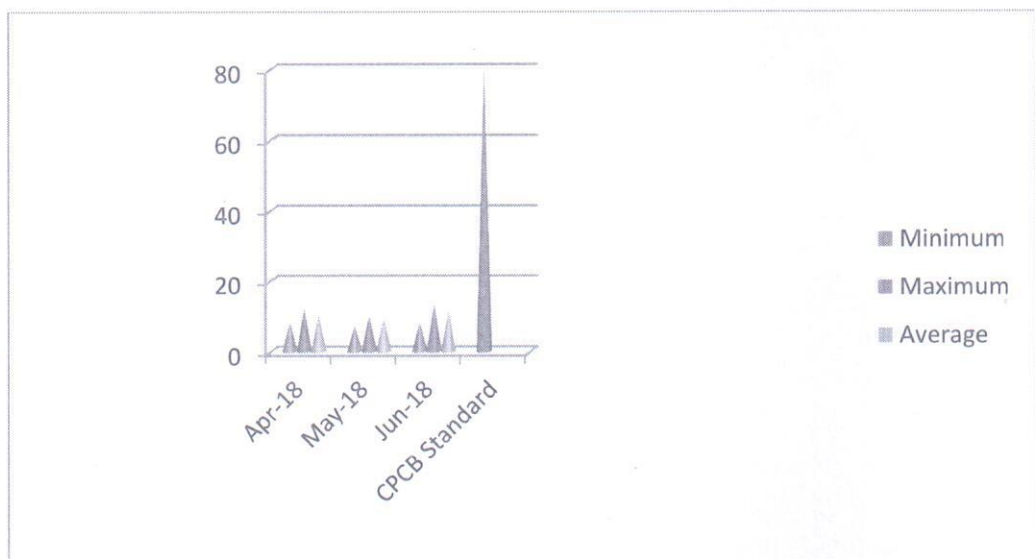


**Tatijharia Village/Nr.Weigh Bridge**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 12µg/m<sup>3</sup> respectively and average concentration of 10µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 7µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respectively and average concentration of 9µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 13µg/m<sup>3</sup> respectively and average concentration of 11µg/m<sup>3</sup>.





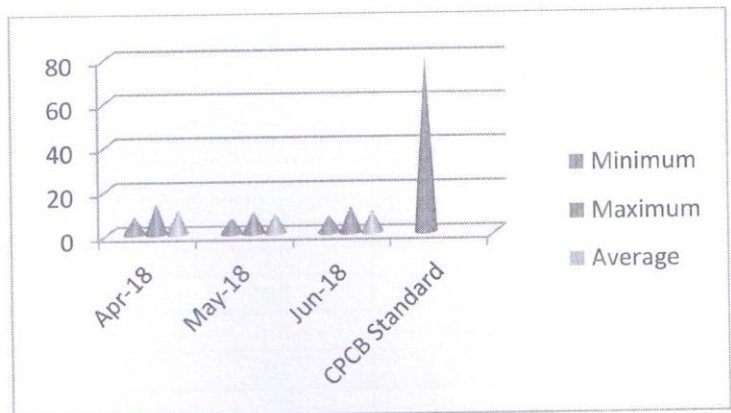


**Piprapat/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 14µg/m<sup>3</sup> respectively and average concentration of 11µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 7µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respectively and average concentration of 9µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for SO<sub>2</sub> were recorded as 8µg/m<sup>3</sup> and 12µg/m<sup>3</sup> respectively and average concentration of 10µg/m<sup>3</sup>.





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**Table 10**  
**Statistical Analysis of NO<sub>x</sub>**

Location	Month & Year	Min.	Max.	Unit: µg/m <sup>3</sup>		98%
				A.M.	G.M.	
<b>Fugitive Emission (Core Zone):-</b>						
Samri-Gopatu/ Nr.weigh bridge	April-2018	18	22	20	20	22
	May-2018	20	28	24	24	28
	June-2018	22	30	26	26	30
Rajendrapur/ Nr.Mining Area	April-2018	21	35	28	28	35
	May-2018	23	31	27	27	31
	June-2018	25	32	29	29	32
Kutku Village/ Nr.V.T. Center	April-2018	23	28	26	26	28
	May-2018	25	30	28	28	30
	June-2018	22	25	24	24	25
Dumerkholi/ Nr.Mining Area	April-2018	25	31	28	28	31
	May-2018	23	27	25	25	27
	June-2018	25	32	29	29	32
CPCB Standard	<b>80</b> <b>(24 hrs)</b>					

Location	Month & Year	Min.	Max.	Unit: µg/m <sup>3</sup>		98%
				A.M.	G.M.	
<b>Buffer Zone :-</b>						
Sairaidh Campus	April-2018	16	25	21	21	25
	May-2018	17	28	23	23	28
	June-2018	15	20	18	18	20
Jaljali Village	April-2018	14	21	18	18	21
	May-2018	16	24	20	20	24
	June-2018	16	26	21	21	26
Tatijharia Village/ Nr. Weigh bridge	April-2018	21	28	25	25	28
	May-2018	20	29	25	25	29
	June-2018	18	25	22	22	25
Riprapat/ Nr.Mining Area	April-2018	19	23	21	21	23
	May-2018	17	26	22	22	26
	June-2018	16	23	20	20	23
CPCB Standard	<b>80</b> <b>(24 hrs)</b>					

**Conclusion: A)**

- 1) Samri-Gopatu/ Nr.weigh bridge Lease Area Core Zone: For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 23 µg/m<sup>3</sup>.
  - 2) Rajendrapur/Nr.Mining Lease Area Core Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 28 µg/m<sup>3</sup>.
  - 3) Kutku Village / Nr.V.T. Center Lease Area Core Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 26 µg/m<sup>3</sup>.
  - 4) Dumerkholi/ Nr.Mining Lease Area Core Zone:- For the Months of Apr-May-June-2018 of NO<sub>x</sub> is 27 µg/m<sup>3</sup>.
- The Average Concentration of NO<sub>x</sub> within the Core Zone of Samri Lease during this period (Apr-May-June-2018) is 26 µg/m<sup>3</sup> and it is within permissible limits as per CPCB Standard.

**Conclusion: B)**

- 1) Sairaidh Campus Lease Area Buffer Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 21 µg/m<sup>3</sup>.
  - 2) Jaljali Village Lease Area Buffer Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 20 µg/m<sup>3</sup>.
  - 3) Tatijharia Village/ Nr. Weigh bridge Lease Area Buffer Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 24 µg/m<sup>3</sup>.
  - 4) Piprapat/ Nr.Mining Lease Area Buffer Zone:- For the Months of Apr-May-June-2018 Average of NO<sub>x</sub> is 21 µg/m<sup>3</sup>.
- The Average Concentration of NO<sub>x</sub> within the Buffer Zone of Samri Lease during this period (Apr-May-June-2018) is 21 µg/m<sup>3</sup> and it is within permissible limits as per CPCB Standard.





Monthwise Summary of Statistical Analysis of NOx

**3.7 Fugitive Emission (Core Zone):-**

**3.7.1 Presentation of Results.**

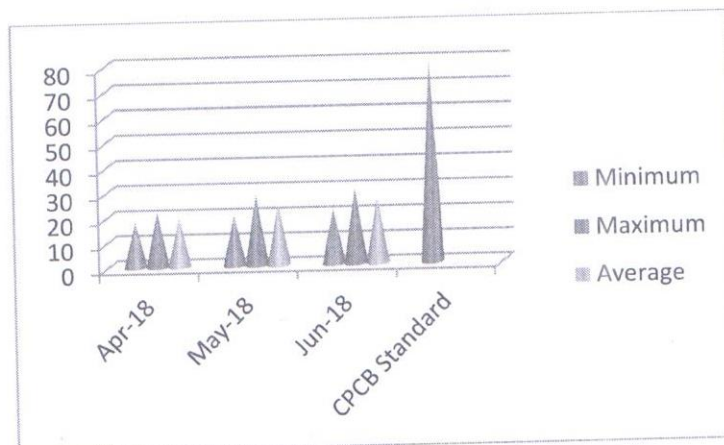
The summary of Statistical Analysis of NOx results for the month of April-May-June-2018 are presented in detail in **Table 10**. 98<sup>th</sup> percentile; maximum, minimum and average values etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Samri-Gopatu/ Nr.weigh bridge**

For the month of April-2018 the minimum and maximum concentrations for NOx were recorded as 18µg/m<sup>3</sup> and 22µg/m<sup>3</sup> respectively and average concentration of 20µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for NOx were recorded as 20µg/m<sup>3</sup> and 28µg/m<sup>3</sup> respectively and average concentration of 24µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for NOx were recorded as 22µg/m<sup>3</sup> and 30µg/m<sup>3</sup> respectively and average concentration of 26µg/m<sup>3</sup>.



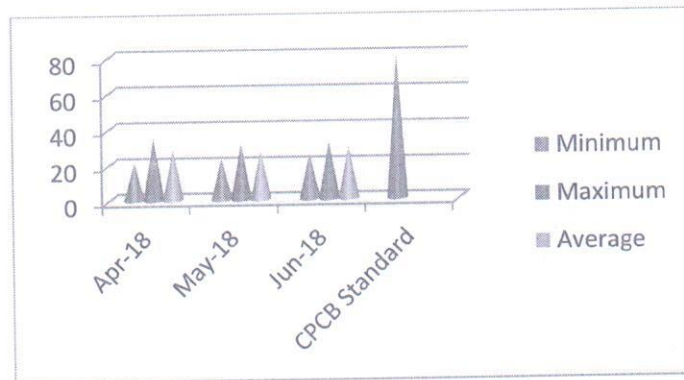


**Rajendrapur/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 21 $\mu\text{g}/\text{m}^3$  and 35 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 28 $\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 23 $\mu\text{g}/\text{m}^3$  and 31 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 27 $\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 25 $\mu\text{g}/\text{m}^3$  and 32 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 29 $\mu\text{g}/\text{m}^3$ .





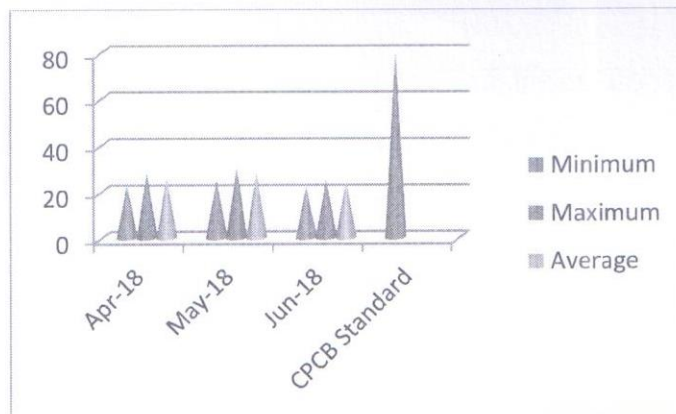


**Kutku Village/Nr.V.T. Center**

NOx were recorded as 23µg/m<sup>3</sup> and 28µg/m<sup>3</sup> respectively and average concentration of 26µg/m<sup>3</sup>.

NOx were recorded as 25µg/m<sup>3</sup> and 30µg/m<sup>3</sup> respectively and average concentration of 28µg/m<sup>3</sup>.

NOx were recorded as 22µg/m<sup>3</sup> and 25µg/m<sup>3</sup> respectively and average concentration of 24µg/m<sup>3</sup>.

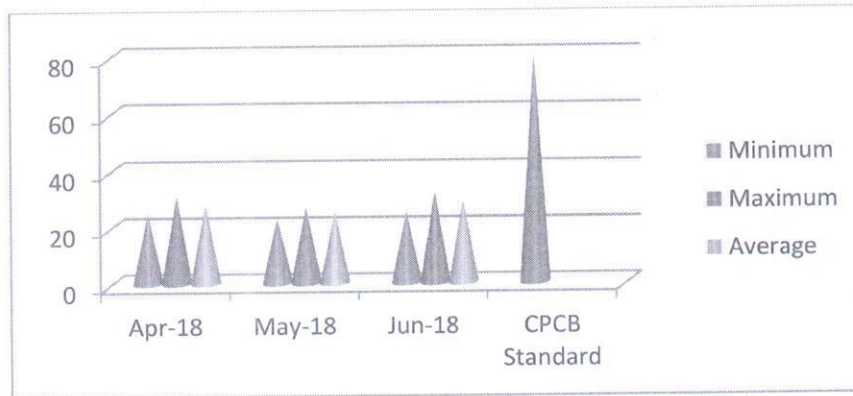


**Dumerkholi/Nr.Mining Area**

For the month of April-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 25µg/m<sup>3</sup> and 31µg/m<sup>3</sup> respectively and average concentration of 28µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 23µg/m<sup>3</sup> and 27µg/m<sup>3</sup> respectively and average concentration of 25µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 25µg/m<sup>3</sup> and 32µg/m<sup>3</sup> respectively and average concentration of 29µg/m<sup>3</sup>.







**18 Fugitive Emission (Buffer Zone):-**

**18.1 Presentation of Results.**

NOx were  
 $\mu\text{g}/\text{m}^3$ .

NOx were  
 $\mu\text{g}/\text{m}^3$ .

NOx were  
 $\mu\text{g}/\text{m}^3$ .

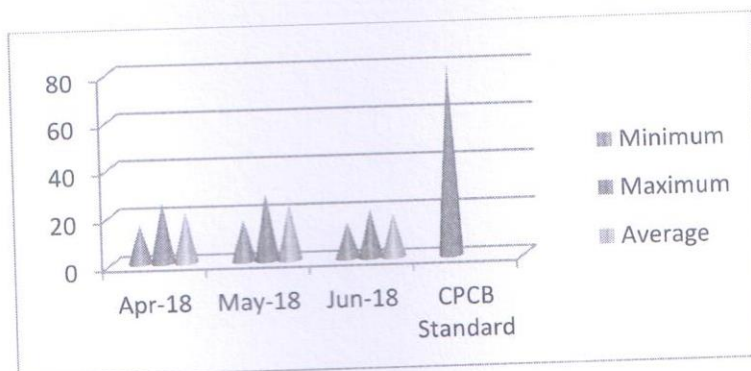
The summary of Statistical Analysis of NOx results for the month of April-May-June-2018 are presented in detail in **Table 10**. 98<sup>th</sup> percentile; maximum, minimum and average values etc. have been computed from the collected raw data for all the Fugitive emission monitoring station.

**Sairaidh Campus**

For the month of April-2018 the minimum and maximum concentrations for NOx were recorded as  $16\mu\text{g}/\text{m}^3$  and  $25\mu\text{g}/\text{m}^3$  respectively and average concentration of  $21\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for NOx were recorded as  $17\mu\text{g}/\text{m}^3$  and  $28\mu\text{g}/\text{m}^3$  respectively and average concentration of  $23\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for NOx were recorded as  $15\mu\text{g}/\text{m}^3$  and  $20\mu\text{g}/\text{m}^3$  respectively and average concentration of  $18\mu\text{g}/\text{m}^3$ .



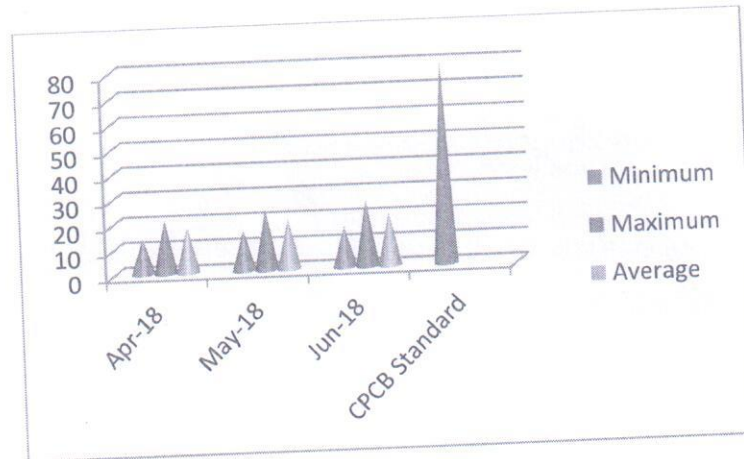


**Jaljali Village**

For the month of April-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 14 $\mu\text{g}/\text{m}^3$  and 21 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 18 $\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 16 $\mu\text{g}/\text{m}^3$  and 24 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 20 $\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for NO<sub>x</sub> were recorded as 16 $\mu\text{g}/\text{m}^3$  and 26 $\mu\text{g}/\text{m}^3$  respectively and average concentration of 21 $\mu\text{g}/\text{m}^3$ .





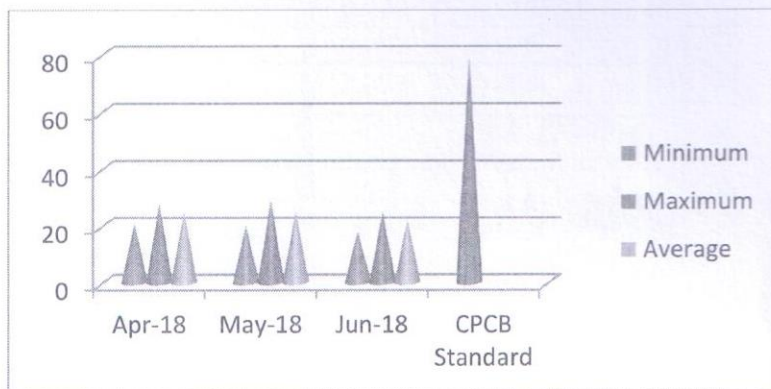


**Tatijharia Village/Nr.Weigh Bridge**

For the month of April-2018 the minimum and maximum concentrations for NOx were recorded as 21µg/m<sup>3</sup> and 28µg/m<sup>3</sup> respectively and average concentration of 25µg/m<sup>3</sup>.

For the month of May-2018 the minimum and maximum concentrations for NOx were recorded as 20µg/m<sup>3</sup> and 29µg/m<sup>3</sup> respectively and average concentration of 25µg/m<sup>3</sup>.

For the month of June-2018 the minimum and maximum concentrations for NOx were recorded as 18µg/m<sup>3</sup> and 25µg/m<sup>3</sup> respectively and average concentration of 22µg/m<sup>3</sup>.



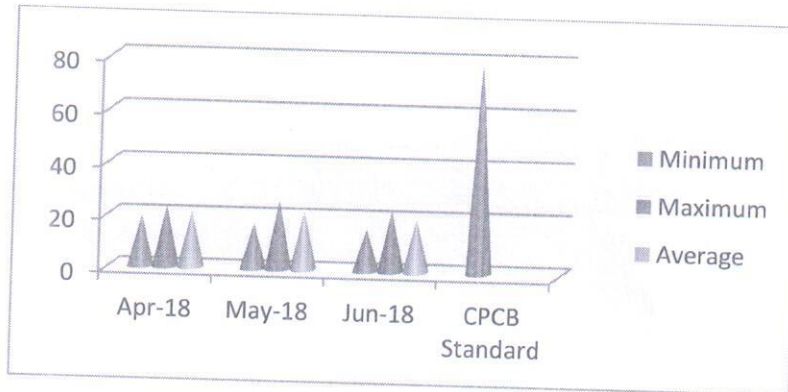


Piprapat/Nr.Mining Area

For the month of April-2018 the minimum and maximum concentrations for NOx were recorded as  $19\mu\text{g}/\text{m}^3$  and  $23\mu\text{g}/\text{m}^3$  respectively and average concentration of  $21\mu\text{g}/\text{m}^3$ .

For the month of May-2018 the minimum and maximum concentrations for NOx were recorded as  $17\mu\text{g}/\text{m}^3$  and  $26\mu\text{g}/\text{m}^3$  respectively and average concentration of  $22\mu\text{g}/\text{m}^3$ .

For the month of June-2018 the minimum and maximum concentrations for NOx were recorded as  $16\mu\text{g}/\text{m}^3$  and  $23\mu\text{g}/\text{m}^3$  respectively and average concentration of  $20\mu\text{g}/\text{m}^3$ .







**Table 11**  
**Statistical Analysis of Pb**

Unit:  $\mu\text{g}/\text{m}^3$

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Fugitive Emission (Core Zone):-</b>						
<b>Samri-Gopatu/ Nr.weigh bridge</b>	April-2018	0.058	0.073	0.066	0.066	0.073
	May-2018	0.063	0.080	0.072	0.072	0.080
	June-2018	0.052	0.071	0.062	0.062	0.071
<b>Rajendrapur/ Nr.Mining Area</b>	April-2018	0.049	0.058	0.054	0.054	0.058
	May-2018	0.060	0.066	0.063	0.063	0.066
	June-2018	0.054	0.063	0.059	0.059	0.063
<b>Kutku Village/ Nr.V.T. Center</b>	April-2018	0.048	0.054	0.051	0.051	0.054
	May-2018	0.043	0.061	0.052	0.052	0.061
	June-2018	0.052	0.068	0.060	0.060	0.068
<b>Dumerkholi/ Nr.Mining Area</b>	April-2018	0.048	0.061	0.055	0.055	0.061
	May-2018	0.057	0.070	0.064	0.064	0.070
	June-2018	0.053	0.065	0.059	0.059	0.065
<b>CPCB Standard</b>	<b>1.0 (24 hrs)</b>					

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Buffer Zone :-</b>						
<b>Sairaidh Campus</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Jaljali Village</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Tatijharia Village/ Nr. Weigh bridge</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Piprapat/ Nr.Mining Area</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>CPCB Standard</b>	<b>1.0 (24 hrs)</b>					

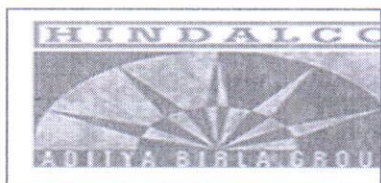
**Conclusion: A)**

The Average Concentration of Pb within the Core Zone of Samri Lease during this period (April To June-2018) is  $0.080 \mu\text{g}/\text{m}^3$  and it is within permissible limits as per CPCB Standard.

**Conclusion: B)**

The Average Concentration of Pb within the Buffer Zone of Samri Lease during this period (April To June-2018) is Not detected.





**Table 12**

**Statistical Analysis of Hg**

Unit:  $\mu\text{g}/\text{m}^3$

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
<b>Fugitive Emission (Core Zone):-</b>						
Samri-Gopatu/ Nr.weigh bridge	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Rajendrapur/ Nr.Mining Area	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Kutku Village/ Nr.V.T. Center	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Dumerkholi/ Nr.Mining Area	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Buffer Zone :-</b>						
Sairaidh Campus	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Jaljali Village	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Tatijharia Village/ Nr. Weigh bridge	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
Piprapat/ Nr.Mining Area	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>CPCB Standard</b>		----				

- ND-Not Detected.

**Conclusion: A)**

The Average Concentration of Hg within the Core Zone of Samri Lease during this period (April To June-2018) is Not Detected.

**Conclusion: B)**

The Average Concentration of Hg within the Buffer Zone of Samri Lease during this period (April To June-2018) is Not Detected.





**Hindalco Industries Limited  
Samri Mining Environmental Status  
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**Introduction**

**Table 13  
Statistical Analysis of As**

Unit: ng/m<sup>3</sup>

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Fugitive Emission (Core Zone):-</b>						
<b>Samri-Gopatu/ Nr.weigh bridge</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Rajendrapur/ Nr.Mining Area</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Kutku Village/ Nr.V.T. Center</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Dumerkholi/ Nr.Mining Area</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>CPCB Standard</b>	<b>06 (Annual)</b>					

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
<b>Buffer Zone :-</b>						
<b>Sairaidh Campus</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Jaljali Village</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Tatijharia Village/ Nr. Weigh bridge</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>Piprapat/ Nr.Mining Area</b>	April-2018	ND	ND	ND	ND	ND
	May-2018	ND	ND	ND	ND	ND
	June-2018	ND	ND	ND	ND	ND
<b>CPCB Standard</b>	<b>06 (Annual)</b>					


• ND-Not Detected.

**Conclusion: A)**

The Average Concentration of As within the Core Zone of Samri Lease during this period (April To June-2018) is Not Detected.

**Conclusion: B)**

The Average Concentration of As within the Buffer Zone of Samri Lease during this period (April To June-2018) is Not Detected.

	<b>Hindalco Industries Limited</b> <b>Samri Mining Environmental Status</b> <b>Report for April-2018 To June-2018</b>	<b>Introdu</b>
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**Free Silica :-**

Sr. No.	Location	Measurement Unit	April-2018		May-2018		June-2018
			SPM	RSPM	SPM	RSPM	SPM
1.	Rajendrapur/ Near Mining Area	g/100gm	0.28	0.19	0.26	0.17	0.24

**Table 14**

**Dust fall Rate**

Sr. No.	Location	April-2018	May-2018	June-2018
		Rate (MT/km <sup>2</sup> /Month)		
1.	Rajendrapur/Nr.Mining Area	18.42	21.59	16.27
2.	Samri-Gopatu/Nr.Weigh Bridge	21.51	24.48	17.36



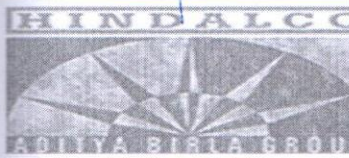


Table-15

Noise Level Monitoring

Unit: dB(A)

Sl. No.	Location	April-2018		May-2018		June-2018	
		Day	Night	Day	Night	Day	Night
<b>Core Zone</b>							
1.	Samri-Gopatu/Nr.Weigh Bridge	64	53	58	46	61	52
2.	Rajendrapur/Nr.Mining Area	57	49	61	43	63	47
3.	Kutku Village/Nr.V.T.Center	53	47	48	37	51	43
4.	Dumerkholi/Nr.Mining Area	67	56	62	53	61	48
<b>Buffer Zone</b>							
1.	Sairaidh Campus	51	39	48	36	52	41
2.	Jaljali Village	47	38	51	42	47	38
3.	Tatijharia Village/Nr.Weigh Bridge	53	42	47	38	52	39
4.	Piprapat/Near Mining Area	53	41	51	37	49	36

CPCB Standards for Residential Area: 55 (Day time) 45 (Night time)  
Industrial Area : 75 (Day time) 70 (Night time)

Table 15-(A)

HEMM Spot Noise Level Monitoring

Sl. No.	Location	April-2018			May-2018			June-2018		
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
1.	Rajendrapur/Nr .Mining Area	64.2	71.6	67.9	73.1	76.2	74.7	68.1	71.9	70.0

Note:- All the Values are in CPCB Limit.





**3.9 Ground Water Quality:-** Most of the villages in the nearby plant area have hand pumps and wells, as most of the residents of these villages make use of this water for drinking and other domestic uses for

**Table 16**  
**Report on Chemical Examination of Ground Water**  
**(Average of Three Months April-May-June-2018)**

<b>Location:</b>	<b>GW1) Rajendrapur / Near Mining Area</b>
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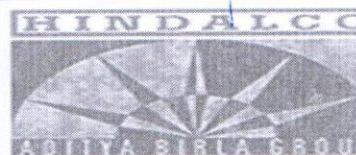
**TEST RESULTS**

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	7.43 at 25°C
2.	Turbidity	NTU	IS 3025 (Part 10)	1	5	0.8
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	0.24
7.	Free residual chlorine	mg/l	IS 3025 (Part 26)	Min. 0.2	Min. 1	< 0.1
8.	Total dissolved solids	mg/l	IS 3025 (Part 16)	500	2000	287
9.	Fluoride (as F)	mg/l	IS 3025 (Part 60)	1.0	1.5	0.26
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	108.52
12.	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 23)	200	600	121.46
13.	Total hardness (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 21)	200	600	184.04
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	58.39
15.	Magnesium (as Mg) *	mg/l	IS 3025 (Part 46)	30	100	9.27
16.	Sulphate (as SO <sub>4</sub> )	mg/l	IS 3025 (Part 24)	200	400	43.82
17.	Nitrate (as NO <sub>3</sub> )	mg/l	APHA Method	45	No relaxation	< 2
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 2)	0.001	No relaxation	< 0.0005
21.	Cadmium (as Cd)	mg/l	IS 3025 (Part 2)	0.003	No relaxation	< 0.001
22.	Selenium (as Se)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
23.	Arsenic (as As)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.01
24.	Aluminium (as Al)	mg/l	IS 3025 (Part 2)	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	< 0.1

'<' indicates detection limit of the laboratory.

**Contd.....**





**Hindalco Industries Limited**  
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**Report for April-2018 To June-2018**

**Introduction**

(Contd.....)

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	< 0.01
31.	Sulphide (as H <sub>2</sub> S)	mg/l	IS 3025 (Part 29)	0.05	No relaxation	< 0.03
32.	Chloramines (as Cl <sub>2</sub> )	mg/l	APHA 4500-Cl <sub>2</sub> G	4.0	No relaxation	< 0.01
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	1.0	< 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 <sub>6</sub> H <sub>5</sub> 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	MPN/100 ml	IS 1622	---	---	Absent
43.	<i>Escherichia coli</i>	Per100 ml	IS 1622	Absent	Absent	Absent

\*' <' indicates detection limit of the laboratory.

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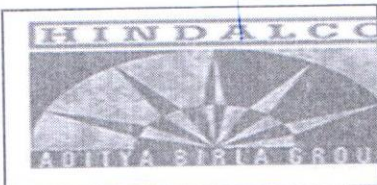
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Sr. No.	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)	Test Result
<b>44.</b>	<b>Pesticides residues</b>				
i.	Alpha-HCH	µg/l	USEPA 508	0.01	Absent
ii.	Beta HCH	µg/l	USEPA 508	0.04	Absent
iii.	Delta- HCH	µg/l	USEPA 508	0.04	Absent
iv.	Alachlor	µg/l	USEPA 508	20	Absent
v.	Aldrin / Dieldrin	µg/l	USEPA 508	0.03	Absent
vi.	Atrazine	µg/l	USEPA 1657	2	Absent
vii.	Butachlor	µg/l	USEPA 508	125	Absent
viii.	Chlorpyrifos	µg/l	USEPA 1657	30	Absent
ix.	DDT and its Isomers	µg/l	USEPA 508	1	Absent
x.	Gamma - HCH (Lindane)	µg/l	USEPA 508	2	Absent
xi.	2,4-Dichlorophenoxyacetic acid	µg/l	USEPA 1657	30	Absent
xii.	Endosulphan	µg/l	USEPA 508	0.4	Absent
xiii.	Ethion	µg/l	USEPA 1657	3	Absent
xiv.	Isoproturon	µg/l	USEPA 1657	9	Absent
xv.	Malathion	µg/l	USEPA 1657	190	Absent
xvi.	Methyl Parathion	µg/l	USEPA 1657	0.3	Absent
xvii.	Monocrotophos	µg/l	USEPA 1657	1	Absent
xviii.	Phorate	µg/l	USEPA 1657	2	Absent

**Note:** 1. Results relate to tested sample only. 2. Test report should not be reproduced partially. 3. \*Permissible limit in the absence of alternate source. 4. 'mg/l' is equivalent to 'ppm' 5. 'µg/l' is equivalent to 'ppb' 6. '<' indicates detection limit of the laboratory. 7. MP - Most probable number. 8. Results for test no. 7 are not applicable.

**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 17**

**Monthly Report on Chemical Examination of Surface Water**

**(Nallahs Near by Rajendrapur/Near Mining Area)**

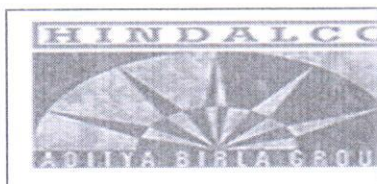
**(Average of Three Months April-May-June-2018)**

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	6.87 at 25°C
2.	Turbidity	NTU	IS 3025 (Part 10)	1	5	9.2
3.	Colour	Hazen units	IS 3025 (Part 4)	5	15	8
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	0.32
7.	Free residual chlorine	mg/l	IS 3025 (Part 26)	Min. 0.2	Min. 1	< 0.1
8.	Total dissolved solids	mg/l	IS 3025 (Part 16)	500	2000	416
9.	Fluoride (as F)	mg/l	IS 3025 (Part 60)	1.0	1.5	0.52
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	181.69
12.	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 23)	200	600	141.28
13.	Total hardness (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 21)	200	600	220.38
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	67.39
15.	Magnesium (as Mg)	mg/l	IS 3025 (Part 46)	30	100	12.64
16.	Sulphate (as SO <sub>4</sub> )	mg/l	IS 3025 (Part 24)	200	400	124.52
17.	Nitrate (as NO <sub>3</sub> )	mg/l	APHA Method	45	No relaxation	11.64
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 2)	0.001	No relaxation	< 0.0005
21.	Cadmium (as Cd)	mg/l	IS 3025 (Part 2)	0.003	No relaxation	< 0.001
22.	Selenium (as Se)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
23.	Arsenic (as As)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.01
24.	Aluminium (as Al)	mg/l	IS 3025 (Part 2)	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	2.1

'<' indicates detection limit of the laboratory.

**Contd.....**





(Contd.....)

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	< 0.01
31.	Sulphide (as H <sub>2</sub> S)	mg/l	IS 3025 (Part 29)	0.05	No relaxation	< 0.03
32.	Chloramines (as Cl <sub>2</sub> )	mg/l	APHA 4500-Cl <sub>2</sub> G	4.0	No relaxation	< 0.01
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	1.0	0.13
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 <sub>6</sub> H <sub>5</sub> 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	MPN/100 ml	IS 1622	---	---	1600
43.	<i>Escherichia coli</i>	Per100 ml	IS 1622	Absent	Absent	Present

'<' indicates detection limit of the laboratory.

**Contd.....**





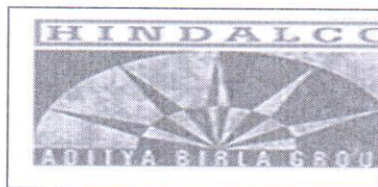
(Contd.....)

Sr. No.	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)	Test Result
<b>44.</b>	<b>Pesticides residues</b>				
i	Alpha-HCH	µg/l	USEPA 508	0.01	< 0.01
	Beta HCH	µg/l	USEPA 508	0.04	< 0.03
	Delta- HCH	µg/l	USEPA 508	0.04	< 0.03
	Alachlor	µg/l	USEPA 508	20	< 0.03
	Aldrin / Dieldrin	µg/l	USEPA 508	0.03	< 0.03
	Atrazine	µg/l	USEPA 1657	2	< 0.03
	Butachlor	µg/l	USEPA 508	125	< 0.03
	Chlorpyrifos	µg/l	USEPA 1657	30	< 0.03
	DDT and its Isomers	µg/l	USEPA 508	1	< 0.03
	Gamma - HCH (Lindane)	µg/l	USEPA 508	2	< 0.03
	2,4-Dichlorophenoxyacetic acid	µg/l	USEPA 1657	30	< 0.03
	Endosulphan	µg/l	USEPA 508	0.4	< 0.03
	Ethion	µg/l	USEPA 1657	3	< 0.03
	Isoproturon	µg/l	USEPA 1657	9	< 0.03
	Malathion	µg/l	USEPA 1657	190	< 0.03
	Methyl Parathion	µg/l	USEPA 1657	0.3	< 0.03
	Monocrotophos	µg/l	USEPA 1657	1	< 0.03
	Phorate	µg/l	USEPA 1657	2	< 0.03

**Note:** 1. Results relate to tested sample only. 2. Test report should not be reproduced partially. 3. \*Permissible limit in the absence of alternate source. 4. 'mg/l' is equivalent to 'ppm' 5. 'µg/l' is equivalent to 'ppb' 6. '<' indicates detection limit of the laboratory. 7. MPN-Most probable number. 8. Results for test no. 7 are not applicable.

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





**Table 18**

**Soil Analysis Report**

Date of collection: May-2018

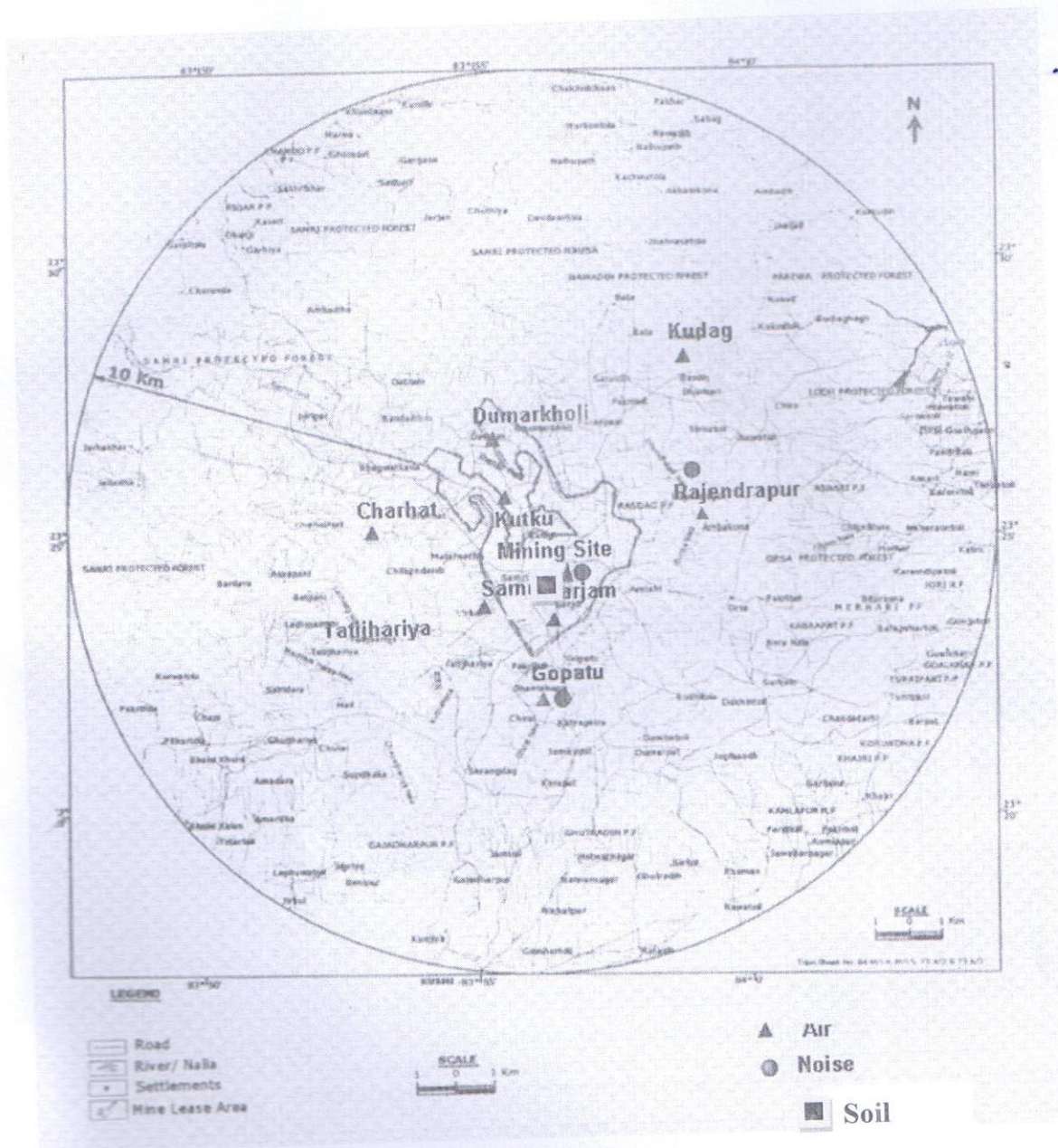
Sr. No	Test Parameters	Measurement Unit	Results
			Rajendrapur/Nr.Mining Area
1	pH	-	7.05 at 25°C
2	Electrical Conductivity at 25°C	µS/cm	139.5
3	Texture	-	Silty clay
4	Sand	%	62.15
5	Silt	%	13.55
6	Clay	%	24.3
7	Bulk Density	g/cc	1.51
8	Porosity	%	12.58
9	Water Holding Capacity	%	18.66
10	Exchangeable Calcium as Ca	mg/kg	643.5
11	Exchangeable Magnesium as Mg	mg/kg	144.6
12	Exchangeable Sodium as Na	mg/kg	118.4
13	Available Potassium as K	kg/ha.	403.4
14	Available Phosphorous as P	kg/ha.	13.92
15	Available Nitrogen as N	kg/ha.	174.92
16	Organic Matter	%	1.22
17	Organic Carbon	%	0.71
18	Water Soluble Chloride as Cl <sup>+</sup>	mg/kg	570.3
19	Water Soluble Sulphate as SO <sub>4</sub>	mg/kg	590.6
20	Sodium Absorption Ratio	-	6.21
21	CEC	meq/100 gm	11.48
22	Total Iron	%	8.1
23	Available Manganese	mg/kg	121.8
24	Available Zinc	mg/kg	76.3
25	Available Boron	mg/kg	ND

\* Method of sampling and analysis: IS: 2720 and methods of soil analysis, part I, 2<sup>nd</sup> Ed, 1986 of (American society for Agronomy and soil science society of America)

**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'.

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





**Fig 3: Sampling Locations for Air, Noise**





- Road
- River/ Nalla
- Settlements
- Mine Lease Area



- Surface Water
- Ground Water

Fig 04: Sampling Locations for Water