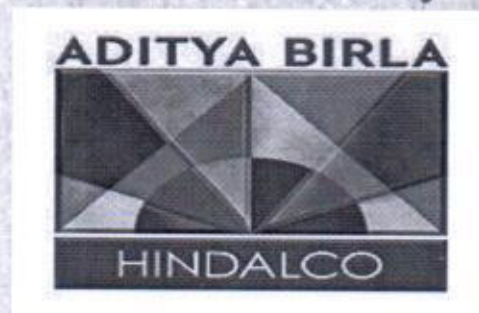


Environmental Status Report  
For  
Kudag Bauxite Mine  
at  
Post & Teh.: Samri, (Kusmi)  
Dist: Balrampur-Ramanujganj (C.G.)

**Duration: APRIL-MAY-JUNE-2020**

Name of Industry

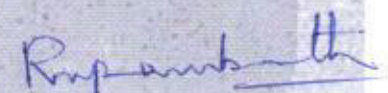


**M/s. Hindalco Industries Limited.,**

Name of Laboratory:-



QCI-NABET, MoEF & CC (GOI)  
ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007  
60, Bajiprabhu Nagar, Nagpur - 440 033, MS  
Lab. & Consultancy: FP-34, 35, Food Park,  
MIDC, Butibori, Nagpur - 441122  
Ph.: (0712) 2242077, 9373287475  
Email: [info@anacon.in](mailto:info@anacon.in), [ngp@anacon.in](mailto:ngp@anacon.in)  
website: [www.anaconlaboratories.com](http://www.anaconlaboratories.com)

  
Agent of Mines  
Samri Mines Division  
Hindalco Industries Ltd



## 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-2020 to June-2020** 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, 2020



  
Authorized Signatory



## **1.1 Introduction**

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

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

HINDALCO INDUSTRIES LTD., awarded the work to M/s ANACON LABORATORIES PVT. LTD. Nagpur(ALPL) for carrying out Environmental monitoring of parameters for assessing pollution levels and preparation of monthly reports (*April-May-June-2020*) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment, Forest and Climate Change (MoEF&CC) for Kudag mining lease in Balrampur District, Chhattisgarh State.

## **1.2 Background Information of Kudag Mine**

Hindalco was granted Kudag Bauxite mining lease over an area of 377.116 hec. In Kudag village, Post office-Dumarkholi, Tehsil-Samri (Kusmi) of Balrampur district, Chhattisgarh on 24/12/1996 for a period of 20 years. As per the Mines and Mineral (Development and Regulation) Amendment Act, 2015, Kudag lease has been extended up to another 30 years i.e 23/12/2046. The mining operations were started on 02/07/1997. The production capacity of Kudag Bauxite Mine is 60,000 Tonne /Year.

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

The deposits occur in Kudag block, Post office Dumarkholi, Tehsil-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 in Table1.

	<b>Hindalco Industries Limited</b> <b>Kudag Mining Environmental Status</b> <b>Report for April-2020 to June-2020</b>	<b>Introduction</b>
--	---	---------------------

**Table: 1**

**Salient Features of Kudag Bauxite Mines**

Sl. No.	Particulars	Details
1.	Survey of India Toposheet No.	64 M /15
2.	Latitude	23 <sup>0</sup> 26' 02"N to 23 <sup>0</sup> 29'00"N
3.	Longitude	83 <sup>0</sup> 51' 00"E to 83 <sup>0</sup> 59' 00"E
4.	Elevation	1145-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3 <sup>0</sup> C Annual minimum temperature : 17.7 <sup>0</sup> C Average annual rainfall : 1401.1 mm
6.	Mining lease area	377.116 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 Airport (151.09 Km)
12.	Nearest Town	Ambikapur (127 km, SW)

#### **14 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 ALPL has been monitoring air, water and noise quality on monthly basis during these months (Table-2).

## **15 AirEnvironment**

### **1.5.1 Ambient Air QualityMonitoring:**

Ambient Air Quality and Fugitive emission monitored at 8 following locations with reference to Kudag mine lease area shown in (Fig.-1).

**Table 2**

**Locations of Ambient Air Quality Monitoring (AAQM) (377.116 hec.)**

<b>Sr. No.</b>	<b>Core Zone</b>	<b>Sr. No.</b>	<b>Buffer Zone</b>
1	Sairaidh Campus	5	Kutku Village
2	New Kudag/Nr.Weigh Bridge	6	Rajendrapur
3	Old Kudag/Mining Area	7	Tatijharia Village
4	SamriGopatu/Nr. Weigh Bridge	8	Virhorepat

The sampling stations are selected at the above mentioned locations, in downwind and upwind directions of the mining site. ALPL is carrying out regular monitoring for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and Pb, Hg, As and Cr at above Ambient Air Quality Monitoring (AAQM) locations. The dust fall rate was measured in the mining area and Khas kudag during April-May-June-2020. The AAQM sampling sites are selected considering seasonal variation in wind speed and wind direction.

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

Ambient air quality monitoring was carried out for the parameters PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and Pb, Hg, As & Cr from April-2020 to June-2020 as per CPCB norms.

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

### **1.5.3 MONITORED PARAMETERS AND FREQUENCY OF SAMPLING**

#### **Methods and Instruments used for Sampling**

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

The levels of Particulate Matter (PM<sub>10</sub>), 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. PM<sub>10</sub> 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 fiber filter paper. The dust deposited over the filter paper is measured as PM<sub>10</sub> and the smaller particulates from PM<sub>2.5</sub> 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 (BKB campus) Tatijharia village during April-2020 to June- 2020. 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 **(Table3)**.

**Table 3**

#### **MONITORED PARAMETERS AND FREQUENCY OF SAMPLING**

<b>Parameters</b>	<b>Sampling frequency</b>
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 (So2)	24 hourly sample twice a week for Three months
Oxides of Nitrogen (NOx)	24 hourly sample twice a week for Three months
Pb, Hg, As, Cr	8 hourly samples for 24 hour twice a week for three months

**Table 4.0**

**Measurement Techniques for various pollutants**

<b>Sr. No.</b>	<b>Parameter</b>	<b>Technique</b>	<b>Technical Protocol</b>	<b>Minimum Reportable Value(<math>\mu\text{g}/\text{m}^3</math>)</b>
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)	USEPA-40 (Part-50)	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)	—



**Hindalco Industries Limited**  
**Kudag Mining Environmental Status**  
**Report for April-2020 to June-2020**

**Introduction**

**1.6 Meteorology: Wind Pattern**

The data of wind pattern collected during the study period (April-May-June-2020) indicates that the wind was blowing predominately from (WSW and SW) directions, during study period.

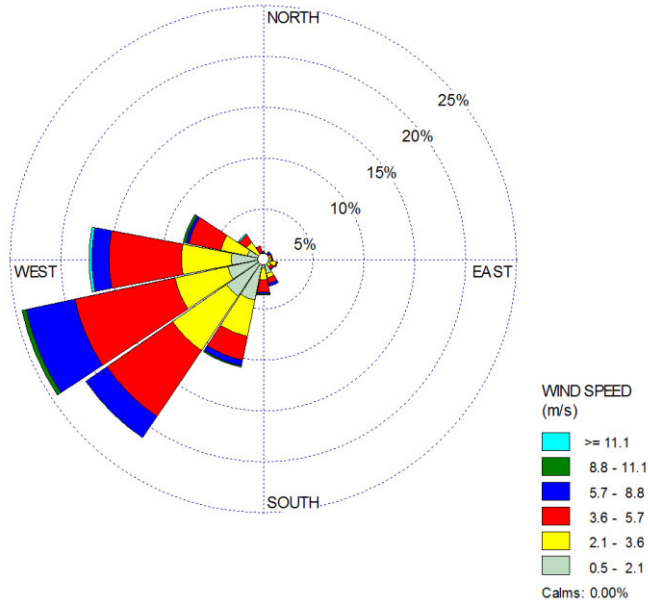
**Wind Frequency Distribution Data**

Sr. No.	Directions / Wind Classes (m/s)	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total (%)
1	348.75 - 11.25	0.002793	0.001397	0.002793	0.001397	0.000000	0.000000	0.008380
2	11.25 - 33.75	0.000000	0.004190	0.002793	0.000000	0.000000	0.000000	0.006983
3	33.75 - 56.25	0.002793	0.002793	0.001397	0.002793	0.000000	0.000000	0.009777
4	56.25 - 78.75	0.004190	0.004190	0.001397	0.000000	0.000000	0.000000	0.009777
5	78.75 - 101.25	0.004190	0.004190	0.001397	0.000000	0.000000	0.000000	0.009777
6	101.25 - 123.75	0.008380	0.005587	0.001397	0.000000	0.000000	0.000000	0.015363
7	123.75 - 146.25	0.005587	0.004190	0.002793	0.001397	0.000000	0.000000	0.013966
8	146.25 - 168.75	0.015363	0.004190	0.005587	0.002793	0.000000	0.000000	0.027933
9	168.75 - 191.25	0.009777	0.011173	0.012570	0.001397	0.001397	0.000000	0.036313
10	191.25 - 213.75	0.041899	0.036313	0.023743	0.005587	0.001397	0.000000	0.108939
11	213.75 - 236.25	0.044693	0.064246	0.078212	0.025140	0.000000	0.000000	0.212291
12	236.25 - 258.75	0.036313	0.053073	0.100559	0.048883	0.004190	0.000000	0.243017
13	258.75 - 281.25	0.032123	0.048883	0.071229	0.016760	0.000000	0.002793	0.171788
14	281.25 - 303.75	0.016760	0.026536	0.032123	0.002793	0.002793	0.000000	0.081006
15	303.75 - 326.25	0.004190	0.016760	0.008380	0.000000	0.000000	0.001397	0.030726
16	326.25 - 348.75	0.001397	0.005587	0.006983	0.000000	0.000000	0.000000	0.013966
	<b>Sub-Total</b>	<b>0.230447</b>	<b>0.293296</b>	<b>0.353352</b>	<b>0.108939</b>	<b>0.009777</b>	<b>0.004190</b>	<b>0.994444</b>
	Calms							0.000000
	Missing/Incomplete							0.005556
	Total							1.000000

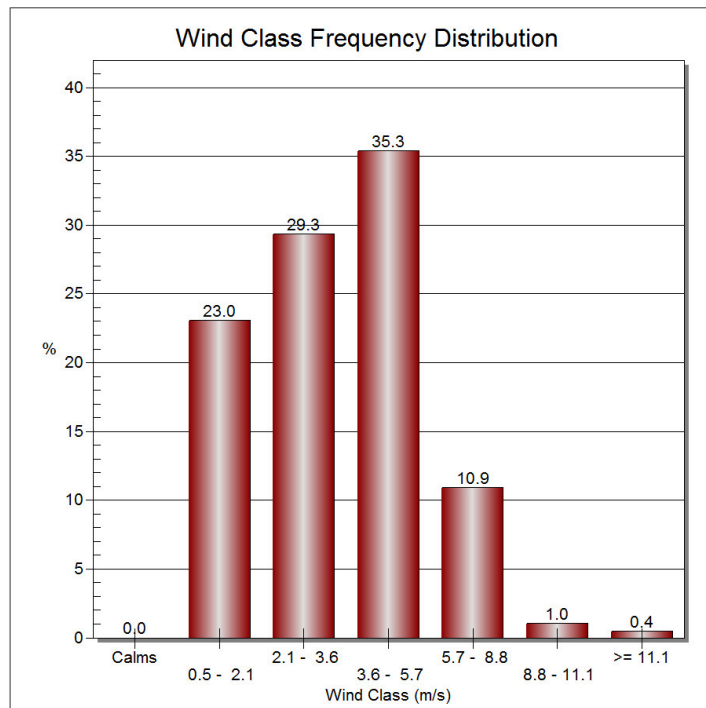
**Summary of Wind Pattern**

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Condition
April-May-June-2020	S (24.3%)	SW (21.2%)	0.0%





**Figure.01: Wind Rose Diagram (April-May-June-2020)**



**Figure.02: Wind Class Frequency Distribution (April-May-June-2020).**



## **16** **MONITORED PARAMETERS AND FREQUENCY OF SAMPLING**

### **Methods and Instruments used for Sampling**

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

The levels of Particulate Matter (PM<sub>10</sub>), Particulate Matter (PM<sub>2.5</sub>), 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. PM<sub>10</sub> 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 fiber filter paper. The dust deposited over the filter paper is measured as PM<sub>10</sub> 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 Chowk 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 3).

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.

**Table 3.0**  
**Measurement Techniques for various pollutants**

<b>Sl. No.</b>	<b>Parameter</b>	<b>Technique</b>	<b>Technical Protocol</b>	<b>Minimum Reportable Value (µg/m<sup>3</sup>)</b>
1.	Respirable Particulate Matter	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part-23)	5
2.	Particulate Matter 2.5	Respirable Dust Sampler (Gravimetric Method)	Gravimetric Method	5
3.	Sulphur Dioxide	Modified West and Gaeke	IS-5182 (Part - II)	4
4.	Oxide of Nitrogen	Jacob & Hochheiser Method	IS-5182 (Part - VI)	4
5.	Pb, As, Hg, Cr	Acid Digestion Method	EPA Method	0.1
6.	Dust Fall	Gravimetric	IS-5182 (Part-I)	—



**Table 4**

**Statistical Analysis**

Location	Month & Year	PM-10 ( $\mu\text{g}/\text{m}^3$ )	PM-2.5 ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>x</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	Hg ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	Cr ( $\mu\text{g}/\text{m}^3$ )
<b>Core Zone</b>									
Sairaidh Campus	April-2020	48.3	16.2	6.8	17.3	ND	ND	ND	ND
	May-2020	53.7	16.9	7.2	17.3	ND	ND	ND	ND
	June-2020	47.3	16.4	6.8	17.3	ND	ND	ND	ND
New Kudag/Nr. Weigh Bridge	April-2020	52.9	17.6	7.3	18.1	ND	ND	ND	ND
	May-2020	56.1	19.4	8.4	18.7	ND	ND	ND	ND
	June-2020	52.9	18.3	7.2	18.6	ND	ND	ND	ND
Old Kudag/Mining Area	April-2020	47.1	14.9	6.2	16.2	ND	ND	ND	ND
	May-2020	47.3	16.2	6.3	16.8	ND	ND	ND	ND
	June-2020	57.1	19.7	7.6	18.9	ND	ND	ND	ND
Samri Gopatu/ Nr. Weigh Bridge	April-2020	54.6	17.3	6.8	18.4	0.014	ND	ND	ND
	May-2020	56.7	21.4	7.9	18.1	0.016	ND	ND	ND
	June-2020	53.1	17.4	7.3	18.3	0.013	ND	ND	ND
<b>CPCB Standards</b>		<b>100</b> <b>(24 hrs)</b>	<b>60</b> <b>(24 hrs)</b>	<b>80</b> <b>(24 hrs)</b>	<b>80</b> <b>(24 hrs)</b>	<b>1.0</b> <b>(24 hrs)</b>	---	<b>6.0</b> <b>(annual)</b>	---
<b>Minimum</b>		<b>47.1</b>	<b>14.9</b>	<b>6.2</b>	<b>16.2</b>	<b>0.013</b>	---	---	---
<b>Maximum</b>		<b>57.1</b>	<b>21.4</b>	<b>8.4</b>	<b>18.9</b>	<b>0.016</b>	---	---	---
<b>Average</b>		<b>52.3</b>	<b>17.6</b>	<b>7.2</b>	<b>17.8</b>	<b>0.014</b>	---	---	---
<b>98% le</b>		<b>57.0</b>	<b>21.0</b>	<b>8.3</b>	<b>18.9</b>	<b>0.016</b>	---	---	---

- The Average Concentration of PM<sub>10</sub> within the Core Zone of Kudag Lease is 52.3 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of PM<sub>2.5</sub> within the Core Zone of Kudag Lease is 17.6 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of SO<sub>2</sub> within the Core Zone of Kudag Lease is 7.2 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of NO<sub>x</sub> within the Core Zone of Kudag Lease is 17.8  $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of Pb within the Core Zone of Kudag Lease is 0.014 $\mu\text{g}/\text{m}^3$ .

**Conclusion :-**

The Average Concentration within the Core Zone of Kudag Lease during this period (April-May-June-2020), it is within permissible limits as per CPCB Standards.



**Hindalco Industries Limited**  
**Kudag Mining Environmental Status**  
**Report for April-2020 to June-2020**

**Introduction**

Location	Month & Year	PM-10 ( $\mu\text{g}/\text{m}^3$ )	PM-2.5 ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NO <sub>x</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	Hg ( $\mu\text{g}/\text{m}^3$ )	As ( $\text{ng}/\text{m}^3$ )	Cr ( $\mu\text{g}/\text{m}^3$ )
<b>Buffer Zone</b>									
Kutku Village	April-2020	53.6	17.4	7.1	16.4	0.021	ND	ND	ND
	May-2020	54.7	18.6	8.1	17.3	0.019	ND	ND	ND
	June-2020	47.1	18.3	6.4	16.4	0.014	ND	ND	ND
Rajendrapur	April-2020	61.2	21.6	9.4	19.3	0.016	ND	ND	ND
	May-2020	64.3	29.3	11.3	21.6	0.017	ND	ND	ND
	June-2020	56.2	21.2	8.1	19.6	0.019	ND	ND	ND
Tatijharia Village	April-2020	61.4	23.6	7.9	21.8	0.028	ND	ND	ND
	May-2020	63.8	27.4	9.3	21.8	0.023	ND	ND	ND
	June-2020	56.2	23.7	8.2	17.4	0.017	ND	ND	ND
Virhorepat	April-2020	56.1	18.6	7.1	17.9	0.017	ND	ND	ND
	May-2020	61.3	21.3	6.4	17.3	0.021	ND	ND	ND
	June-2020	61.3	21.4	8.7	17.9	0.016	ND	ND	ND
<b>CPCB Standards</b>		<b>100</b> <b>(24 hrs)</b>	<b>60</b> <b>(24 hrs)</b>	<b>80</b> <b>(24 hrs)</b>	<b>80</b> <b>(24 hrs)</b>	<b>1.0</b> <b>(24 hrs)</b>	---	<b>6.0</b> <b>(annual)</b>	---
<b>Minimum</b>		47.1	17.4	6.4	16.4	0.014	---	---	---
<b>Maximum</b>		64.3	29.3	11.3	21.8	0.028	---	---	---
<b>Average</b>		58.1	21.9	8.2	18.7	0.019	---	---	---
<b>98% le</b>		64.2	28.9	10.9	21.8	0.027	---	---	---

- The Average Concentration of PM<sub>10</sub> within the Buffer Zone of Kudag Lease is 58.1 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of PM<sub>2.5</sub> within the Buffer Zone of Kudag Lease is 21.9 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of SO<sub>2</sub> within the Buffer Zone of Kudag Lease is 8.2 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of NO<sub>x</sub> within the Buffer Zone of Kudag Lease is 18.7 $\mu\text{g}/\text{m}^3$ .
- The Average Concentration of Pb within the Buffer Zone of Kudag Lease is 0.019 $\mu\text{g}/\text{m}^3$ .

**Conclusion :-**

The Average Concentration within the Buffer Zone of Kudag Lease during this period (April-May-June-2020). It is within permissible limits as per CPCB Standards.





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

#### **Kudag Lease (Core Zone):-**

##### **3.1 Ambient AirQuality:**

Ambient air quality has been generated as per NAAQS 2009 for the month of April-2020 to June-2020. PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>& NO<sub>x</sub>, The values obtained were then compared vis-a-vis the standards prescribed by CPCB for Industrial/ Rural / Residential uses.

##### **3.2 Presentation ofResults:**

The summary of Ambient Air Quality monitoring results from April-2020 to June-2020 are presented in detail in Table 4.0. 98th percentile; maximum and minimum values etc. have been computed from the collected raw data for all the AAQ monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQS for residential andruralzone.

##### **A. ParticulateMatter-PM<sub>10</sub>:**

The Minimum and maximum concentrations for Particulate Matter-PM<sub>10</sub> were recorded as 47.1µg/m<sup>3</sup>and 57.1µg/m<sup>3</sup> respectively. The minimum and maximum concentration was recorded at Old Kudag/Mining area location. The average concentration of PM10 was 52.3µg/m<sup>3</sup>.

##### **B. ParticulateMatter-PM<sub>2.5</sub>:**

The Minimum and maximum concentrations for Particulate Matter-PM<sub>2.5</sub> were recorded as 14.9µg/m<sup>3</sup> & 21.4µg/m<sup>3</sup> respectively. The minimum concentration was recorded at Old Kudag/Mining area. The maximum concentration was also recorded at Samri Gopatu/Nr. Weigh Bridge. The average concentration of PM<sub>2.5</sub>was 17.6µg/m<sup>3</sup>.

##### **C. Sulphur Dioxide(SO<sub>2</sub>):**

The minimum and maximum for SO<sub>2</sub>concentrations were recorded as 6.2µg/m<sup>3</sup>and 8.4µg/m<sup>3</sup>at respectively. The minimum concentration was recorded at Old Kudag/Mining area. The maximum concentration was also recorded at New Kudag location. The average concentration of SO<sub>2</sub> was 7.2µg/m<sup>3</sup>.



**D. Nitrogen Oxide(NO<sub>x</sub>):**

The minimum and maximum for NO<sub>x</sub> concentrations were recorded as 16.2µg/m<sup>3</sup> and 18.9µg/m<sup>3</sup>. The minimum & maximum concentration was recorded at Old kudag/Mining area. The average concentration of NO<sub>x</sub> was 17.8µg/m<sup>3</sup>.

**E. Lead (Pb):**

Maximum Lead detected in PM<sub>10</sub> samples was 0.016µg/m<sup>3</sup> at Samri-Gopatu/Nr. Weigh Bridge location.

No lead could be detected in PM<sub>2.5</sub> samples at any of the Ambient Air samples at any of the locations.

**F. Mercury(Hg):**

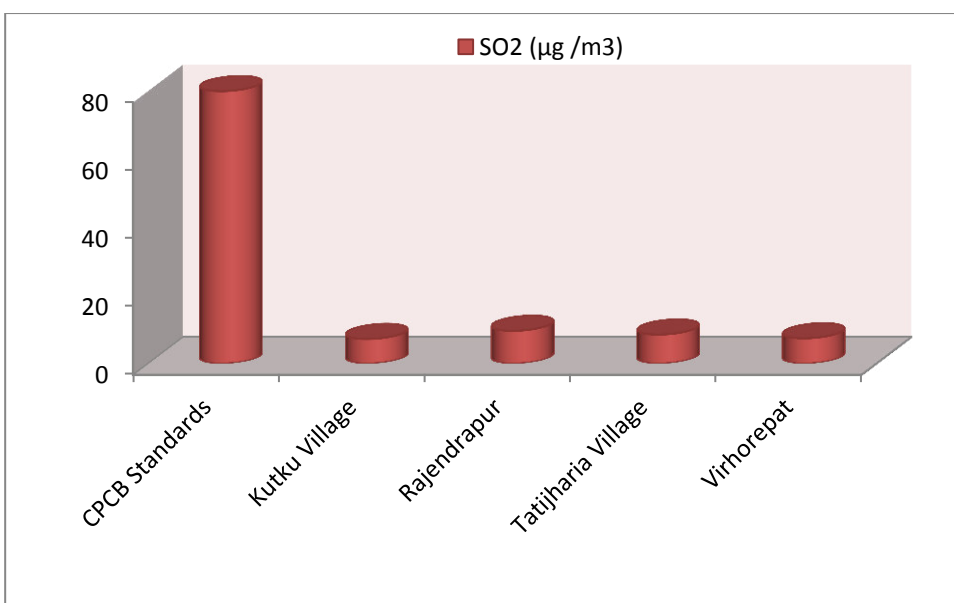
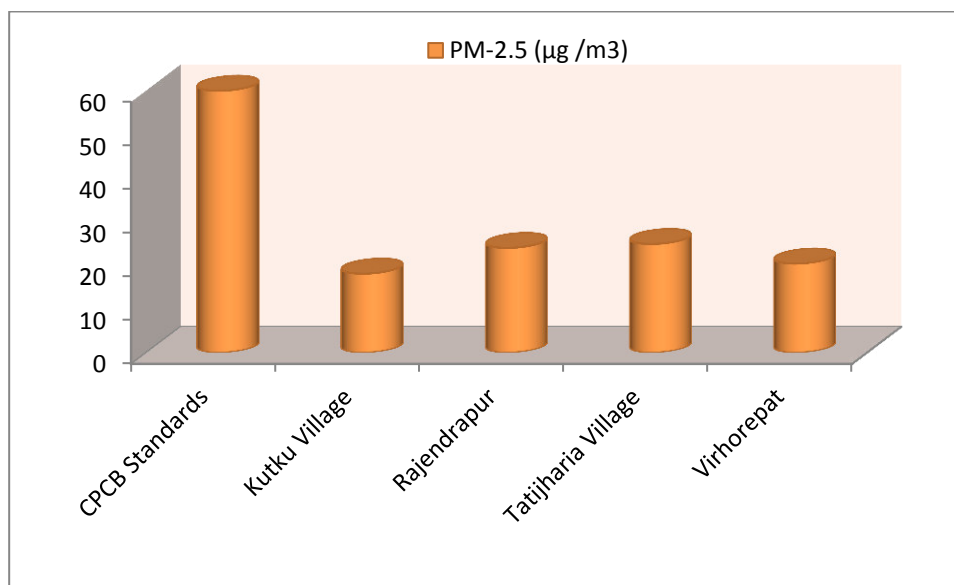
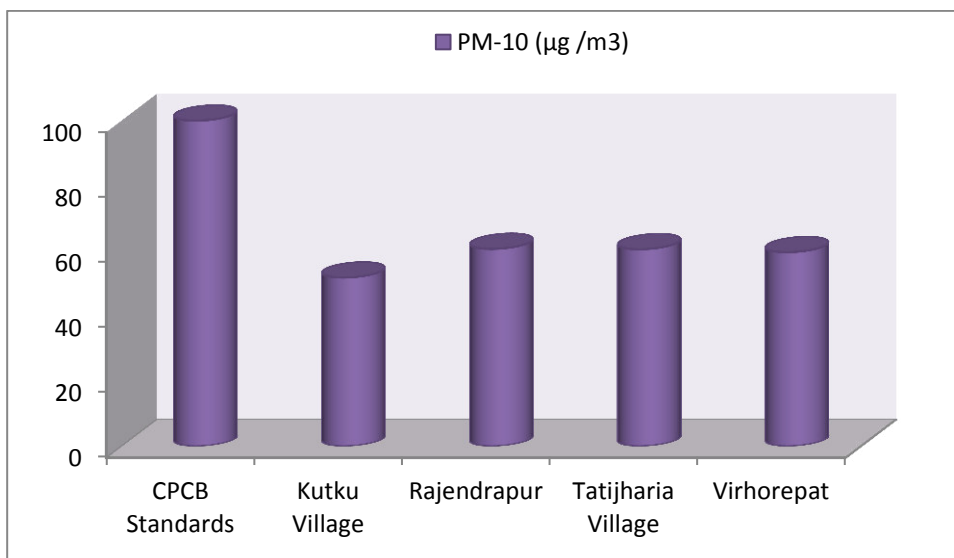
Mercury was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.

**G. Arsenic (As):**

Arsenic was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.

**H. Chromium(Cr):**

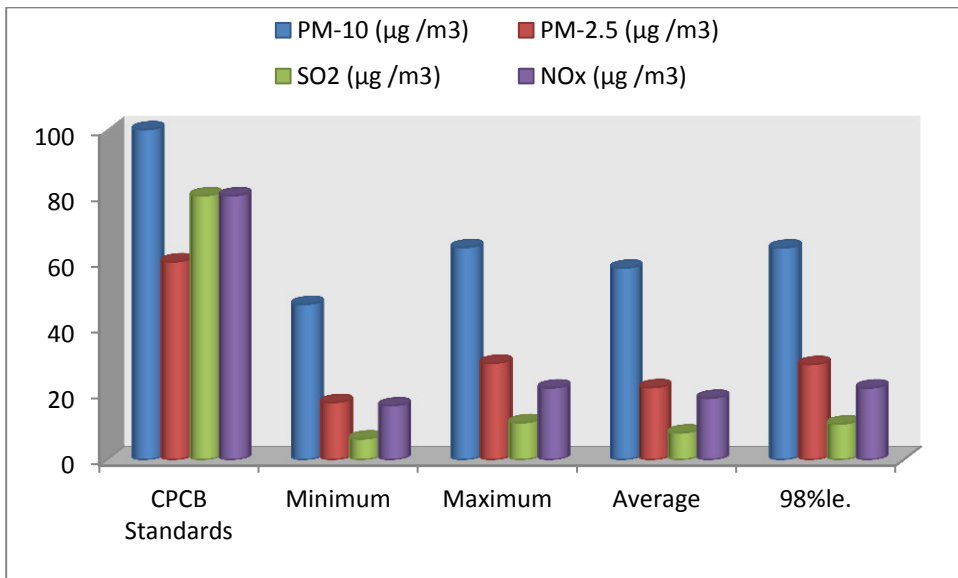
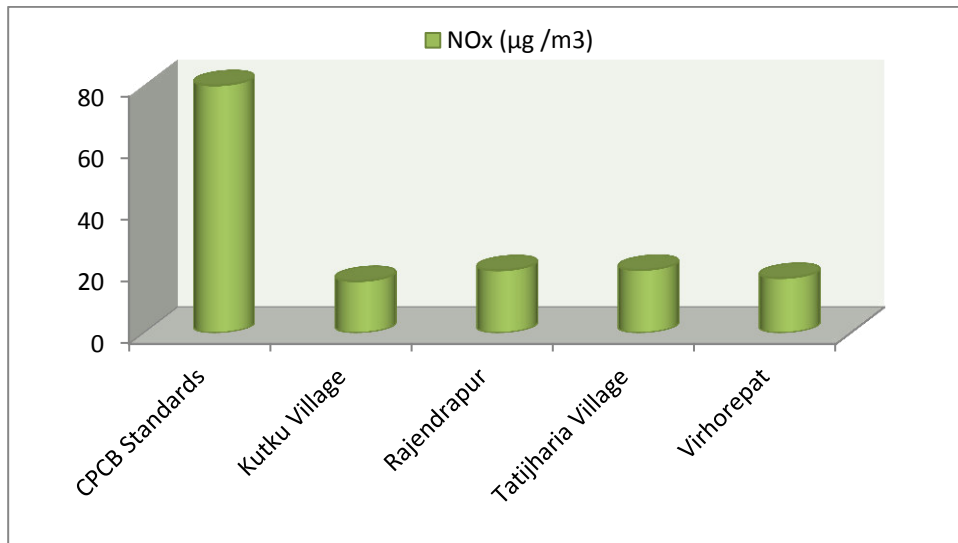
Chromium was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.





**Hindalco Industries Limited  
Kudag Mining Environmental Status  
Report for April-2020 to June-2020**

**Introduction**







## **Kudag Lease (Buffer Zone):-**

### **3.3 Ambient AirQuality:**

Ambient air quality has been generated as per NAAQS 2009 for the month of April-2020 to June-2020. PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>& NO<sub>x</sub>, The values obtained were then compared vis-a-vis the standards prescribed by CPCB for Industrial/ Rural / Residential uses.

#### **3.3.1 Presentation ofResults:**

The summary of Ambient Air Quality monitoring results from April-2020 to June-2020 are presented in detail in Table 4.0. 98th percentile; maximum and minimum values etc. have been computed from the collected raw data for all the AAQ monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQS for residential and rural zone.

##### **A. ParticulateMatter-PM<sub>10</sub>:**

The Minimum and maximum concentrations for Particulate Matter-PM<sub>10</sub> were recorded as 47.1µg/m<sup>3</sup> and 64.3µg/m<sup>3</sup> respectively. The minimum concentration was recorded at Kutku Village. The maximum concentration was also recorded at Rajendrapur village. The average concentration of PM<sub>10</sub> was 58.1µg/m<sup>3</sup>.

##### **B. ParticulateMatter-PM<sub>2.5</sub>:**

The Minimum and maximum concentrations for Particulate Matter-PM<sub>2.5</sub> were recorded as 17.4µg/m<sup>3</sup> & 29.3µg/m<sup>3</sup> respectively. The minimum concentration was recorded at Kutku Village location. The maximum concentration was also recorded at Rajendrapur location. The average concentration of PM<sub>2.5</sub> was 21.9µg/m<sup>3</sup>.

##### **C. Sulphur Dioxide(SO<sub>2</sub>):**

The minimum and maximum for SO<sub>2</sub> concentrations were recorded as 6.4µg/m<sup>3</sup> and 11.3µg/m<sup>3</sup> at respectively. The minimum concentration was recorded at Kutku Village. The maximum concentration was also recorded at Rajendrapur. The average concentration of SO<sub>2</sub> was 8.2µg/m<sup>3</sup>.



**D. Nitrogen Oxide(NO<sub>x</sub>):**

The minimum and maximum for NO<sub>x</sub> concentrations were recorded as 16.4µg/m<sup>3</sup> and 21.8µg/m<sup>3</sup>. The minimum concentration was recorded at Kutku Village location and the maximum concentration was recorded at Tatijhara village. The average concentration of NO<sub>x</sub> was 18.7µg/m<sup>3</sup>.

**E. Lead (Pb):**

Maximum Lead detected in PM<sub>10</sub> samples was 0.028µg/m<sup>3</sup> at Tatijhara village location and the minimum lead in PM<sub>10</sub> sample was 0.014µg/m<sup>3</sup> detected at Kutku village location.

No lead could be detected in PM<sub>2.5</sub> samples at any of the Ambient Air samples at any of the locations.

**F. Mercury(Hg):**

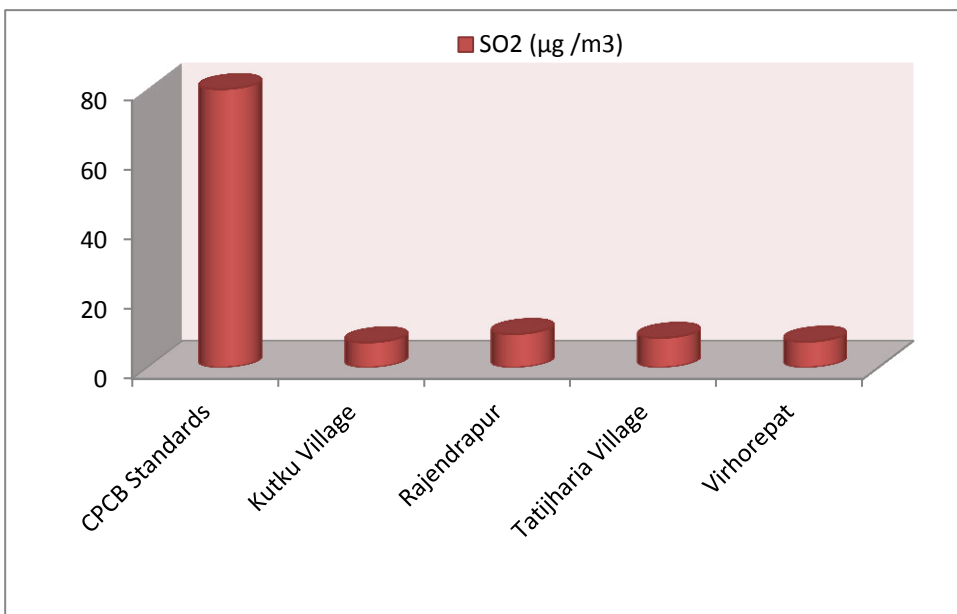
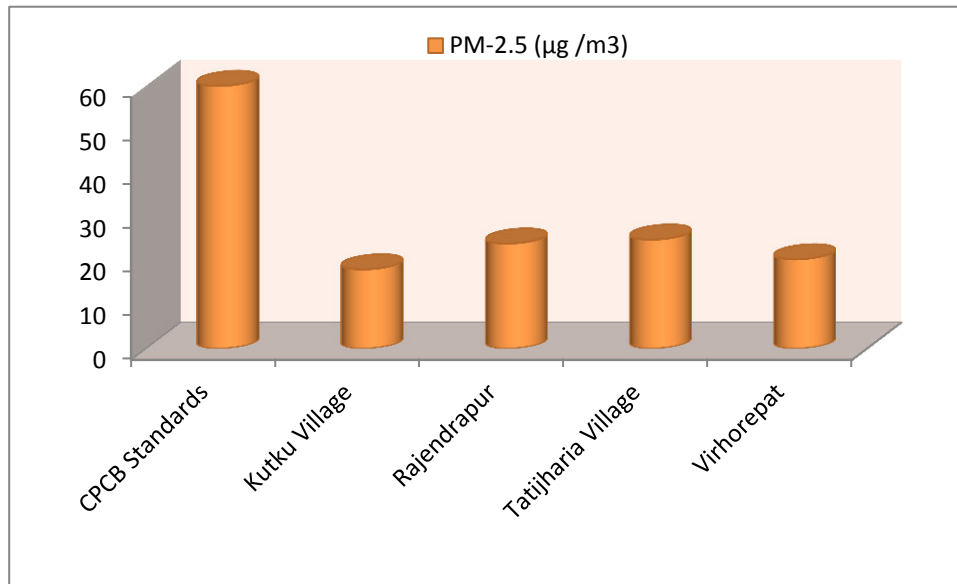
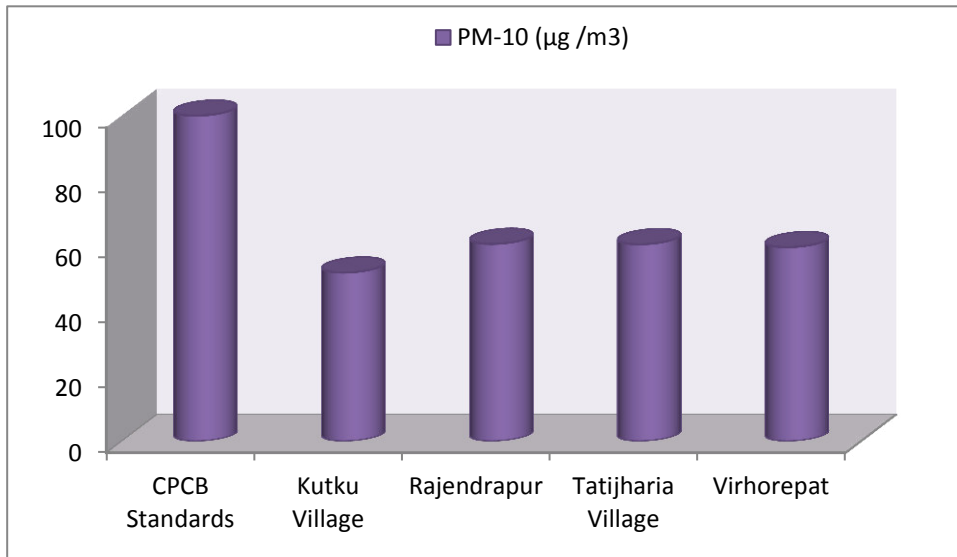
Mercury was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.

**G. Arsenic (As):**

Arsenic was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.

**H. Chromium(Cr):**

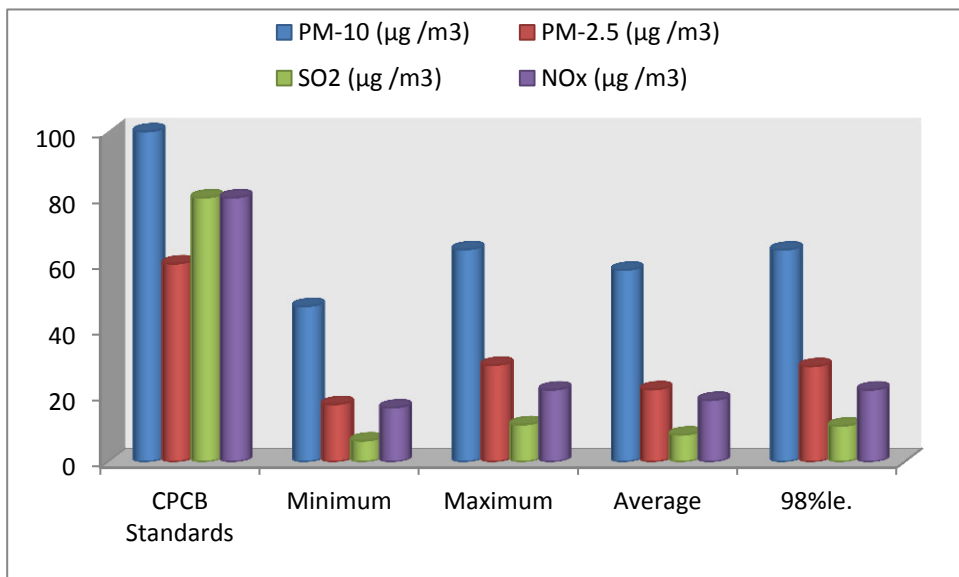
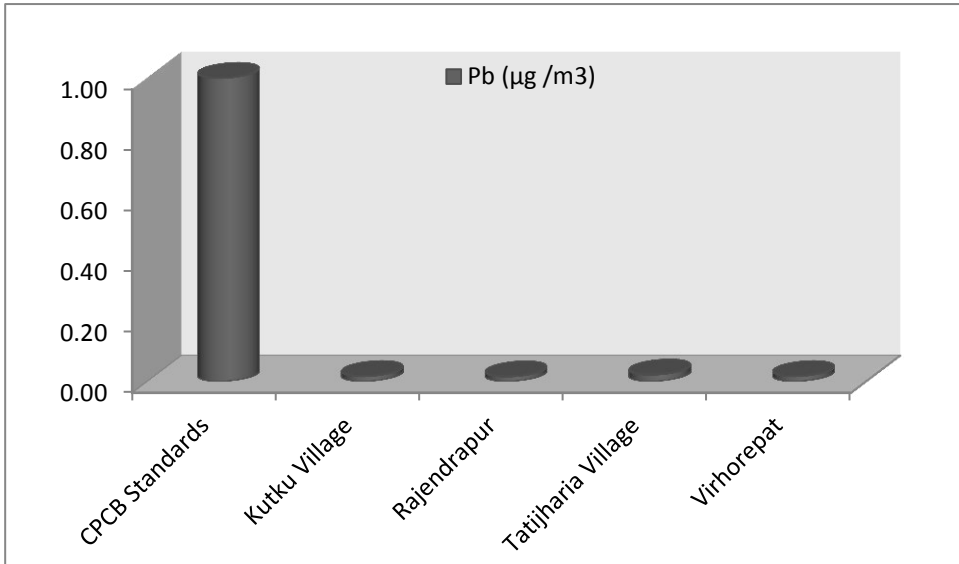
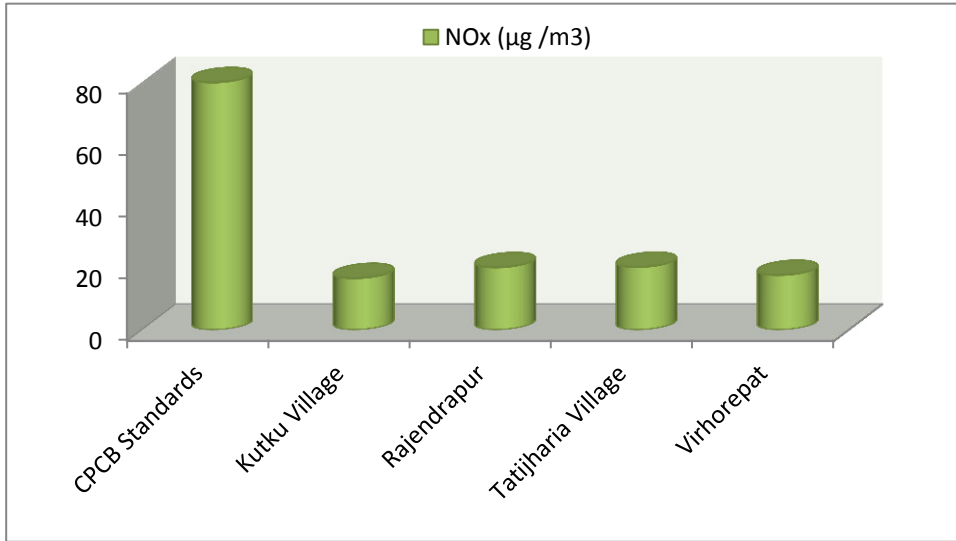
Chromium was not detected at any of the locations in PM<sub>10</sub> samples as well as PM<sub>2.5</sub> Samples.





**Hindalco Industries Limited  
Kudag Mining Environmental Status  
Report for April-2020 to June-2020**

**Introduction**





	<p><b>Hindalco Industries Limited</b>  <b>Kudag Mining Environmental Status</b>  <b>Report for April-2020 to June-2020</b></p>	<p><b>Introduction</b></p>
--	--	----------------------------

## **17 Noise Environment**

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

Work zone noise level in the mining area shall increase due to blasting excavation and transportation. The impacts due to the mining activities on the noise levels shall be negligible, if all the precautions for the elimination of the noise are taken. The mining activities will be undertaken during daytime only. The daytime equivalent noise levels, when all the machineries are in operation, shall be minimized as the machineries have been provided with control equipment. Noise monitoring carried out on monthly basis at mining site; Core Zone and Buffer Zone areas 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 levels 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 Model no. HTC-SL-1352. This instrument is capable of measuring the Sound Pressure Level (SPL), Leq.

### **Method of Monitoring**

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

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

	<b>Hindalco Industries Limited</b> <b>Kudag Mining Environmental Status</b> <b>Report for April-2020 to June-2020</b>	<b>Introduction</b>
--	---	---------------------

Noise levels monitored during day and night at Four locations are found to be below in the Mining Area than the stipulated standard of CPCB for Industrial area as 75dB(A) and 70dB(A) for day and night respectively as given in **(Table 5)**.

**Table 5**

**Noise Emission Monitoring Report**

SR. NO.	LOCATION	Month	Noise-dB(A)	
			Day Time	Night Time
<b>Core Zone</b>				
1.	New Kudag/Nr. Weigh Bridge	April-2020	53.7	41.9
		May-2020	57.2	48.3
		June-2020	51.6	39.2
2.	Old Kudag/Mining Area	April-2020	47.3	38.2
		May-2020	52.1	41.6
		June-2020	53.1	41.7
<b>Buffer Zone</b>				
1.	Rajendrapur	April-2020	49.6	38.2
		May-2020	53.6	42.7
		June-2020	52.8	41.9
2.	Tatijharia Village	April-2020	58.3	42.9
		May-2020	61.7	52.8
		June-2020	56.3	41.8
<b>CPCB Standards</b>				
<b>Industrial Area</b>			<b>75</b>	<b>70</b>
<b>Residential area</b>			<b>55</b>	<b>45</b>

**Conclusion:** -The Noise Monitoring Results at Kudag Lease during this period (April-May-June-2020), it is within permissible limits as per CPCB Standards.

**Table 6**

**HEMM Spot Noise Level Monitoring**

Unit: dB(A) Leq

Sl. No.	Location	April-2020		May-2020		June-2020	
		Min.	Max.	Min.	Max.	Min.	Max.
1.	Nr. Weigh Bridge	54.9	63.8	56.1	68.2	51.7	61.2
2.	Mining Area	52.1	61.7	54.2	64.1	49.8	58.3



## **2.0 Water Quality Monitoring**

The existing status of water quality for ground water was assessed by collecting the water samples from underground wells from the mining area/old kudag.

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

The physico-chemical analysis of water samples collected during the study period is given in **(Table-8 and Fig.5)**. The overall water quality found to be below the stipulated standards of IS 10500-2012 for ground water & found to be fit for drinking purpose for tested parameters. Thus the impacts due to mining activities have been found to be insignificant.

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



**Hindalco Industries Limited**  
**Kudag Mining Environmental Status**  
**Report for April-2020 to June-2020**

**Introduction**

**Table 8**  
**Report on Chemical Examination of Ground Water Quality**  
**(June-2020)**

<b>Location:</b>	<b>GW1) Saraidih (Hindalco Campus)</b> <b>Sample Source:-Borewell Water</b>
------------------	--

**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	7.27 at 25°C
2.	Turbidity	NTU	IS 3025 (Part 10)	1	5	0.6
3.	Colour	Hazen units	IS 3025 (Part 4)	5	15	1
4.	Odour	-	IS 3025 (Part 5)	Agreeable	Agreeable	Agreeable
5.	Taste	-	IS 3025 (Part 8)	Agreeable	Agreeable	Agreeable
6.	Iron (as Fe)	mg/l	IS 3025 (Part 2)	1.0	No relaxation	0.21
7.	Free residual chlorine	mg/l	IS 3025 (Part 26)	Min. 0.2	1	< 0.1
8.	Total dissolved solids	mg/l	IS 3025 (Part 16)	500	2000	462
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	68.19
12.	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 23)	200	600	126.52
13.	Total hardness (as CaCO <sub>3</sub> )	mg/l	IS 3025 (Part 21)	200	600	185.76
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	53.21
15.	Magnesium (as Mg)	mg/l	IS 3025 (Part 46)	30	100	12.84
16.	Sulphate (as SO <sub>4</sub> )	mg/l	IS 3025 (Part 24)	200	400	21.56
17.	Nitrate (as NO <sub>3</sub> )	mg/l	APHA Method	45	No relaxation	9.72
18.	Copper (as Cu)	mg/l	IS 3025 (Part 2)	0.05	1.5	< 0.03
19.	Manganese (as Mn)	mg/l	IS 3025 (Part 2)	0.1	0.3	< 0.05
20.	Mercury (as Hg)	mg/l	IS : 3025 (Part 48)	0.001	No relaxation	< 0.0005
21.	Cadmium (as Cd)	mg/l	IS : 3025 (Part 41)	0.003	No relaxation	< 0.001
22.	Selenium (as Se)	mg/l	IS : 3025 (Part 56)	0.01	No relaxation	< 0.001
23.	Arsenic (as As)	mg/l	IS : 3025 (Part 37)	0.01	No relaxation	< 0.01
24.	Aluminium (as Al)	mg/l	IS : 15302	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS : 3025 (Part 47)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	1.2



**Hindalco Industries Limited**  
**Kudag Mining Environmental Status**  
**Report for April-2020 to June-2020**

**Introduction**

Sr. No	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)		Test Result
				Acceptable Limit	*Permissible Limit	
27.	Nickel (as Ni)	mg/l	IS 3025 (Part 2)	0.02	No relaxation	< 0.01
28.	Total Chromium (as Cr)	mg/l	IS 3025 (Part 2)	0.05	No relaxation	< 0.03
29.	Barium (as Ba)	mg/l	Annexure F of IS 13428	0.7	No relaxation	< 0.01
30.	Ammonia (as N)	mg/l	IS 3025 (Part 34)	0.5	No relaxation	< 0.1
31.	Sulphide (as H <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	IS 3025 (Part 26)	4.0	No relaxation	< 0.05
33.	Molybdenum (as Mo)	mg/l	IS 3025 (Part 2)	0.07	No relaxation	< 0.001
34.	Silver (as Ag)	mg/l	Annexure J of IS 13428	0.1	No relaxation	< 0.001
35.	Polychlorinated Biphenyls (PCB)	µg/l	USEPA 508	0.5	No relaxation	< 0.03
36.	Boron (as B)	mg/l	IS 3025 (Part 2)	0.5	2.4	< 0.1
37.	Mineral Oil	mg/l	IS 3025 (Part 39)	0.5	No relaxation	< 0.001
38.	Tri Halo Methane					
	a. Bromoform	mg/l	APHA 6232	0.1	No relaxation	Absent
	b. Dibromochloromethane			0.1	No relaxation	Absent
	c. Bromodichloromethane			0.06	No relaxation	Absent
	d. Chloroform			0.2	No relaxation	Absent
39.	Phenolic compounds (as C <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	Per 100 ml	IS 15185	Absent	Absent	Absent
43.	<i>Escherichia coli</i>	Per 100 ml	IS 15185 : 2016	Absent	Absent	Absent



**Hindalco Industries Limited**  
**Kudag Mining Environmental Status**  
**Report for April-2020 to June-2020**

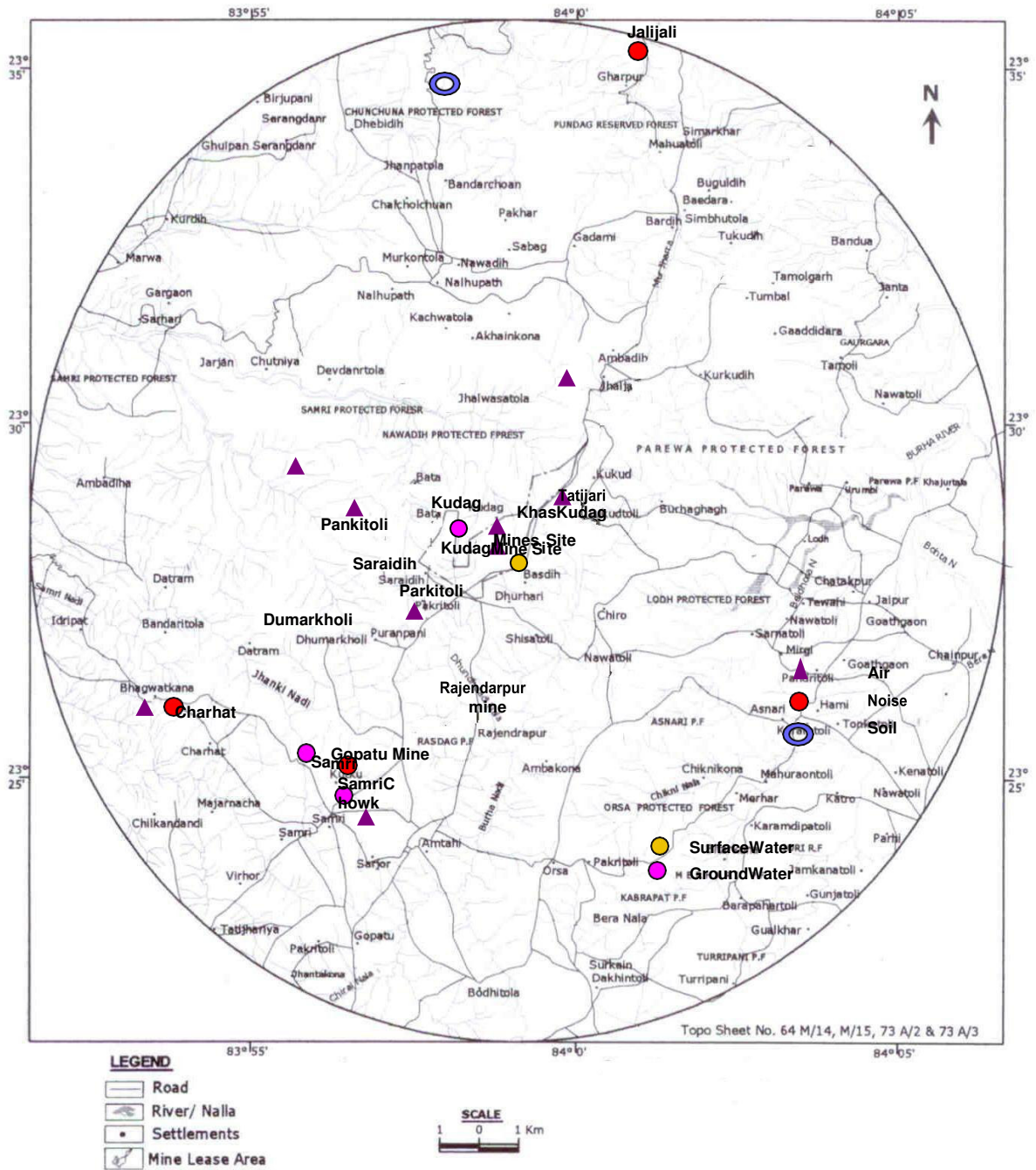
**Introduction**

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
ii.	Beta HCH	µg/l	USEPA 508	0.04	< 0.03
iii.	Delta- HCH	µg/l	USEPA 508	0.04	< 0.03
iv.	Alachlor	µg/l	USEPA 508	20	< 0.03
v.	Aldrin /Dieldrin	µg/l	USEPA 508	0.03	< 0.03
vi.	Atrazine	µg/l	USEPA 1657	2	< 0.03
vii.	Butachlor	µg/l	USEPA 508	125	< 0.03
viii.	Chlorpyrifos	µg/l	USEPA 1657	30	< 0.03
ix.	DDT and its Isomers	µg/l	USEPA 508	1	< 0.03
x.	Gamma - HCH (Lindane)	µg/l	USEPA 508	2	< 0.03
xi.	2,4-Dichlorophenoxyacetic acid	µg/l	USEPA 1657	30	< 0.03
xii.	Endosulphan	µg/l	USEPA 508	0.4	< 0.03
xiii.	Ethion	µg/l	USEPA 1657	3	< 0.03
xiv.	Isoproturon	µg/l	USEPA 1657	9	< 0.03
xv.	Malathion	µg/l	USEPA 1657	190	< 0.03
xvi.	Methyl Parathion	µg/l	USEPA 1657	0.3	< 0.03
xvii.	Monocrotophos	µg/l	USEPA 1657	1	< 0.03
xviii.	Phorate	µg/l	USEPA 1657	2	< 0.03

**NOTES:**●Please see watermark "Original Test Report" to confirm the authenticity of this report.●Results shall be referred to tested sample(s) and applicable to tested parameters only. ●Test report shall not be reproduced except in full without prior written approval of Anacon Labs. ●Liability of Anacon Labs is limited to invoiced amount only. ●Non-perishable and perishable sample(s) shall be disposed off after 30 days and 15 days respectively from the date of issue of Test Report, unless specified otherwise. ●#Permissible limit in absence of an alternate source for drinking water.●MPN indicates most probable number. ●„mg/l" is equivalent to „ppm". ●„µg/l" is equivalent to „ppb". ●' < ' indicates detection limit of instrument/method and shall be considered as 'absent'.●ND-Not detected●Result for test no. 7 is not relevant.

**REMARKS:** Based upon request of the party, sample was tested for above mentioned parameters only. Sample complies with IS:10500:2012, for test conducted, indicating that it is fit for drinking purpose with respect to tested parameters.





**Fig 5: Sampling Locations for Water**