



Ref:- HIL/SAM/CCF/43/2014/S

24.5.2014

To,
The Chief Conservator of Forest (Central),
MoEF Regional Office (Western Zone)
Kendriya Paryavaran Bhawan, Link Road
Bhopal-462016

Sub:- Status of compliance of EC condition (Half yearly status of compliance report) Samri Bauxite Mine (Lease area- 2146.746 Ha.) of Hindalco Industries Limited of Chhattisgarh state from Oct-2013 to Mar-2014.

Ref No:- Environment Clearance Letter No-J-11015/353/2007-IA. II(M) dated July 27, 2007

Dear Sir,

We do hereby submit half yearly status of EC compliance with respect of Samri Bauxite Mine, Lease area -2146.746 Ha, of Hindalco Industries Limited, located in Balrampur- Ramanujganj district of Chhattisgarh state from Oct -2013 to Mar-2014.

We assure that we comply all the conditions laid down in the consent letter and also abide to follow all the Rules and Regulations.

Thanking you,

Yours' faithfully

For, Hindalco Industries Limited

(M. K. Nayak)

GM- Mines

Encl:-

1. Half Yearly Status of compliance of Environment condition as annexure-I.
2. Copy of Diversion of Revenue Forest Land enclosed as annexure -II.
3. Jan-14 to Mar-14, Environment Status Report enclosed as annexure -III
4. Renewal copy of Consent to Operate from CECB enclosed as annexure -IV
5. Yearly Production report enclosed as annex-V.
6. Status report of mined out, reclaimed and afforested land as annexure-VI.
7. Actual expenditure incurred in environment measure from Apr-13 to Oct-14 as annex-VII.

HINDALCO INDUSTRIES LIMITED
Samri Mines Division, Baba Chowk
At & Post - Kusmi, PIN : 497 224,
Distt. - Balrampur-Ramanujganj (CG), INDIA
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REGISTERED OFFICE
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Dr. Annie Besant Road,
Worli, Mumbai 400 030
Telephone +91 22 6662 6666.

Website www.hindalco.com
E mail hindalco@adityabirla.com
Corporate Identity No- L27020MH1958PLCO11238.

20.5.2014


**Status of Compliance from Oct-2013 to Mar-2014 of Environmental
Condition laid down by MOEF**

Samri Bauxite Mine

The status of compliance of the conditions (as per point no.4) with reference to, environment clearance letter no.J-11015/353/2007-IA. II(M) dated 27.07.07 of Ministry of Environment & Forests, New Delhi, to maintain production capacity of Samri Bauxite Mine is as under.

A Specific condition:-

- (i) The wild life management plan has been approved.
- (ii) We accept the condition.
- (iii) The conservation plan for schedule I fauna have been prepared.
- (iv) The report has been submitted to ministry. The rehabilitation of land ousters are not involved in the project.
- (v) Top soil and solid waste is being utilized for simultaneous back filling of mined out area for reclamation purpose and practice is followed.
- (vi) OB shall be stacked at earmark location and slope of dump is maintained less than 28 degree. All protective measure such as reclaiming walls, bunds are being taken to prevent erosion of soil.
- (vii) Garland drains have been made around the active mining pits coupled with arrester to arrest silt from soil and dumps are maintained.
- (viii) The slope of bench as per provision of approved mining scheme is being maintained.
- (ix) Wet drilling and dust extractors are being used during drilling operations.


(M. K. Nayak)
Agent of mines
Samri mines Division
Hindalco Industries Ltd

- (x) The plantation in reclaimed area is carried out as per plan and being carried out as suggested. The density is being maintained about 2500 plant per hectare with the species like Karanj, accasia, mango, babul , Peras, Jamun, Awla & govava etc. Social forestry is also being encouraged among the local villagers.

The ground water table does not intersect our mining operation because of shallow depth of mining.

- (xi) Regular monitoring of ground water quality is being carried out. The analysis reports are being submitted to Regional Office, CECB, Ambikapur.
- (xii) If required, the permission will be taken from competent authority.
- (xiii) Regular and periodic maintenance of HEMM is being carried out for control of vehicular emission in mines area. The bauxite ore are transported in trucks with tarpaulin cover.
- (xiv) We accept the condition.

(B) General Condition.

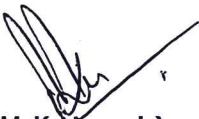
- (i) No change in mining technology and scope of working will be done without approval of MOEF New Delhi.
- (ii) Calendar plan will be followed and there will not be any change in calendar plan.
- (iii) The suggestion of local forest department will be implemented for conservation of flora and fauna in and around lease hold area.
- (iv) Ambient Air quality monitoring is being carried out as per guideline and will be followed.
- (v) Data of ambient air quality (RPM, SPM, SO₂, Nox) are being submitted to CECB and will be submitted as per guidelines.
- (vi) Fugitive dust emission from generating sources is being controlled. The dust extractor, wet drilling, regular water spraying with 12 KL water tanker in the mine lease hold area is being carried out regularly.
- (vii) The noise level in working area being maintained below the limit prescribed and will be maintained. The operators of HEMM are being provided earplug/muffs. The proper maintenance of HEMM is being carried out to control noise emission
- (viii) No waste water is generated from the mine however as suggested measures will be taken if required.

- (ix) All workers are provided personal protective equipment and training are also being imparted to them for safety & health and will be continued as per guidelines.
- (x) Periodical and Initial medical examination of all workers are being carried out as per provision of Mines Act.
- (xi) Environment cell is already in place at Samri Mines Division headed by GM (Mines) and comprises of suitable qualified persons.
- (xii) In case of final closure of mine the information will be submitted to Regional Office, Ministry of Environment & Forests, Bhopal.
- (xiii) Adequate fund provision is already earmarked for environmental protection measures and will not be diverted to other purpose. The year wise expenditure will be submitted to concern authorities as per guidelines.
- (xiv) The same will be intimated to Regional Office, Ministry of Environment & Forests, Bhopal.
- (xv) All cooperation is being extended to regulatory authorities and will be extended as earlier.
- (xvi) Although no suggestion/representation has been received by any Panchayat/Local NGO while processing the proposal. However we have forwarded the copy of clearance letter to Panchayat in our area. The copy of same has been already submitted to your good office.
- (xvii) The copy has been displayed by CECB in Balrampur Collectorate.
- (xviii) The information regarding environment clearance has been published in two local new papers namely Hari Bhumi & Ambika Vani. The copy of same has been already submitted to your good office.

Hope the above compliance will be found in order.

Yours truly,

(For Hindalco Industries Limited)



(M K Nayak)
Agent of Mines.

(M. K. Nayak)
Engbr As Above
Samri mines Division
Hindalco Industries Ltd

तार

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NEW DELHI

दूरभाष ।

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भारत सरकार

पर्यावरण एवं वन मंत्रालय

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

पर्यावरण भवन, सी० जी० एच० कॉम्प्लेक्स

PARYAVARAN BHAWAN, C.G.O. COMPLEX

लोदी रोड, नई दिल्ली - 110003

LODHI ROAD, NEW DELHI - 110003

Dated: 12th March, 1996. -SAMRI

No. 8-22/95-FC

To

The Secretary (Forests)
Government of Madhya Pradesh
Bhopal.Sg
Suraj GuptaSub: Diversion of 798.827 ha. of revenue forest land in
favour of M/s HINDALCO Industries Ltd. for Bauxite
mining in District Sarguja.

Sir,

I am directed to refer to your letter no.F.5/18/95/10/3 dated 9.3.95 on the above mentioned subject seeking prior approval of the Central Government in accordance with Section-2 of the Forest (Conservation) Act, 1980, and to say that the proposal has been examined by the Advisory Committee constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government and on the basis of the recommendation of the above mentioned Advisory Committee, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 798.827 ha. of revenue forest land in favour of M/s HINDALCO Industries Ltd. for Bauxite mining in District Sarguja subject to the following conditions:

- 1) Legal status of forest land shall remain unchanged.
- 1i) Compensatory afforestation shall be carried out over double the degraded forest land at the project cost.

- iii) Reclamation of the mining area will be done in consultation with the State Forest Deptt. at the project cost as per plan prepared in this regard.
- iv) Demarcation of the mining area will be done on the ground at the project cost.
- v) Forest land will not be used for construction of buildings etc. and any purpose other than those mentioned in the proposal.
- vi) Lease period shall remain coterminus with lease under MMRD Act subject to maximum of 20 years.
- vii) Free fuelwood will be provided to the labourers and staff working at the project site at the project cost.
- viii) Any other condition the State Govt. may impose.
- ix) This clearance is subject to the environmental clearance of the project under the Environment Protection Act.



Yours faithfully,

(R.K. CHAUDHRY)

Asstt. Inspector General of Forests.

Copy to:

The Principal Chief Conservator of Forests
Government of Madhya Pradesh, Bhopal.

Nodal Officer, Office of the Principal Chief Conservator
of Forests, Govt. of Madhya Pradesh, Bhopal.

The CCF (Central), Regional Office, Bhopal.

RO(HQ), New Delhi.

Guard file.

(R.K. CHAUDHRY)
AIGF.

APPROVED

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

Duration: January-February-March-2014

Sponsor:-



M/s. Hindalco Industries Limited.

(M. K. Nayak)
Agent of mines
Samri mines Division
Hindalco Industries Ltd

Prepared By :-



Recognised by MoEF (GOI) Notifn. No. D.L.33004/99 Dt.24.10.2007
NABL (DST GOI) Cert. No. T-1550 Dt. 16/05/2011
NABL (DST GOI) Cert. No.T-1826 dt. 04/10/2010
QCI-NABET Scheme for Accreditation of EIA Consultant
ISO 9001:2008 vide Registration No. 44 100 094152-E3
Head Office: 60, Bajiprabhu Nagar, Nagpur-440 033, MS
Lab. : FP-34, 35, Food Park, MIDC, Butibori, Nagpur - 441122
Ph. : (0712) 2242077, 9373287475 Fax: (0712) 2242077
Email: anaconngp@gmail.com, anaconlabngp@gmail.com
website: www.anaconlaboratories.com, www.anacongarway.com

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 **January-2014 to March-2014** 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 : March, 2014


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 (January, February & March-2014) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment and Forest (MoEF) 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 ha in Samri, Dumarkholi, Gopatu villages in Post Office & tehsil Samri (Kusmi) of Balrampur district, Chhattisgarh on 24/06/1998 for a period of 20 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 ^o 23' 02"N to 23 ^o 27' 05"N
3.	Longitude	83 ^o 53' 50"E to 83 ^o 57' 59"E
4.	Elevation	1140-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3 ^o C Annual minimum temperature : 17.7 ^o C Average annual rainfall : 1401.1 mm
6.	Mining lease area	2146.746 ha.
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

S.No.	core zone	Sr. No.	buffer zone
1	Mining Area	5	Saraidih (Hindalco Campus)
2	Samri Chowk/Nr.Weigh Bridge	6	Piprapat Mines area
3	Village Sarjam	7	Jaljali Village
4	Rajenderpur Mine	8	Tatijharia Weighbridge

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_{2.5}, RPM(PM₁₀), SO₂, NO_x and SPM, RSPM, SO₂, NO_x, 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 January-2014. 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_{2.5}, RPM (PM₁₀), SO₂, NO_x and SPM, RSPM, SO₂, NO_x Pb, Hg, As and Cr, from January-February-March-2014 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) 18th 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 (SO₂), Oxides of Nitrogen (NO_x), 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 m³/min which collects the particles less than 10 µm diameter over glass fiber 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 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 solution) 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-PM₁₀, Particulate Matter-PM_{2.5}, SO₂ and NO_x 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 (PM₁₀), Particulate Matter (PM_{2.5}), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), 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 ₂)	24 hourly sample twice a week for Three months
Oxides of Nitrogen (NO _x)	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 ³)
1.	Suspended Particulate Matter	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part - 23)	5
2.	Respirable Particulate Matter	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part-23)	5
3.	Particulate Matter 2.5	Respirable Dust Sampler (Gravimetric Method)	Gravimetric Method	5
4.	Sulphur Dioxide	Modified West and Gaeke	IS-5182 (Part - II)	4
5.	Oxide of Nitrogen	Jacob & Hochheiser Method	IS-5182 (Part - VI)	4
6.	Pb, As, Hg, Cr	Acid Digestion Method	EPA Method	0.1
7.	Dust Full	Gravimetric	IS-5182 (Part-I)	—



1.6 Fugitive Emission Monitoring

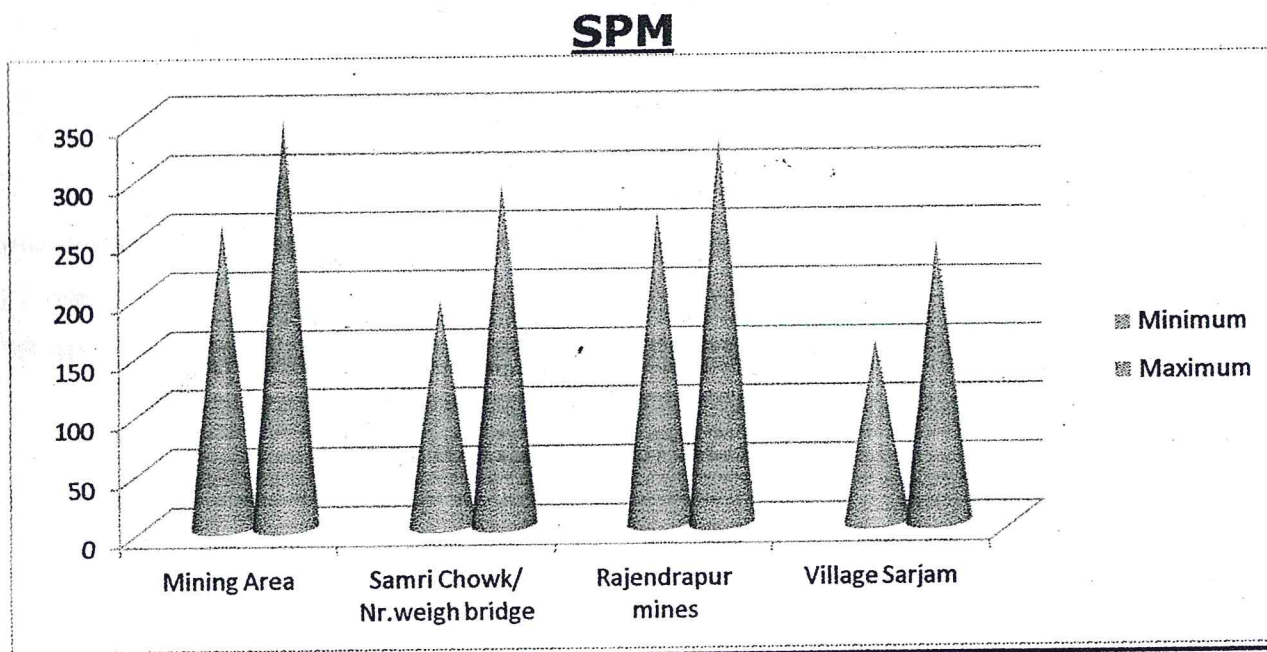
The summary of Fugitive Emission monitoring results for the month of January-2014 to March-2014 are presented in detail in **Table 6.0**. 98th percentile; maximum and minimum values etc have been computed from the collected raw data for all the Fugitive monitoring station. The data has been compared with the standards prescribed by Central Pollution Control Board (CPCB)/NAAQ 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 154 $\mu\text{g}/\text{m}^3$ and 347 $\mu\text{g}/\text{m}^3$ respectively. The average concentrations were ranged between 180 to 323 $\mu\text{g}/\text{m}^3$. and 98th percentile values ranged between 191 to 347 $\mu\text{g}/\text{m}^3$ in the study area (**Table 6**).

Graphical Presentation Of Fugitive Emission Monitoring

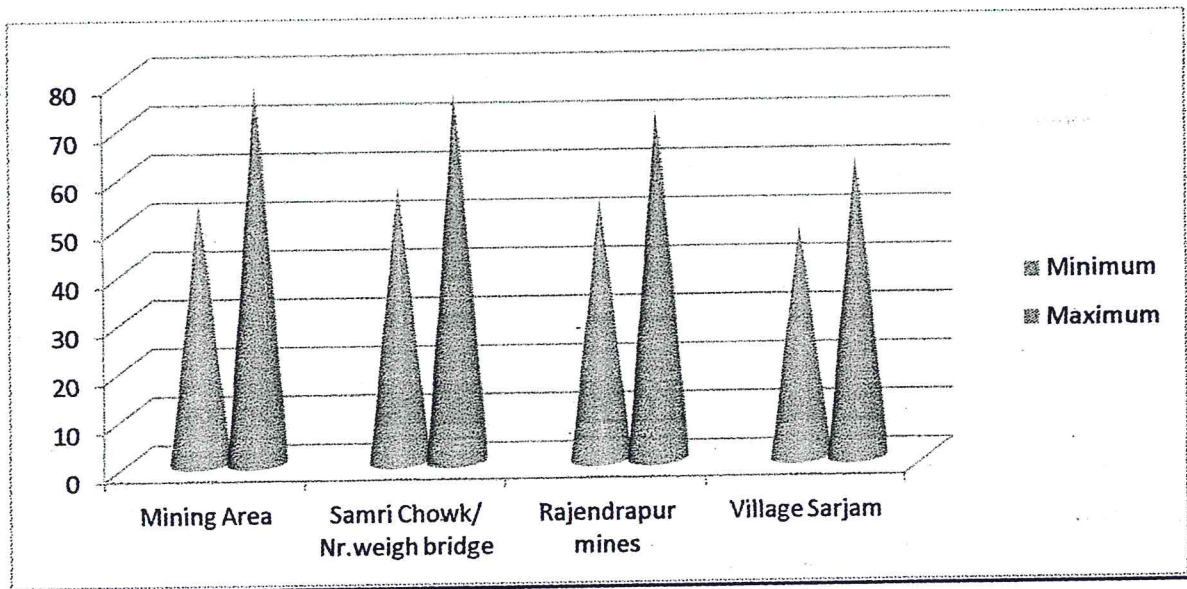




Respirable Suspended Particulate Matter –RSPM

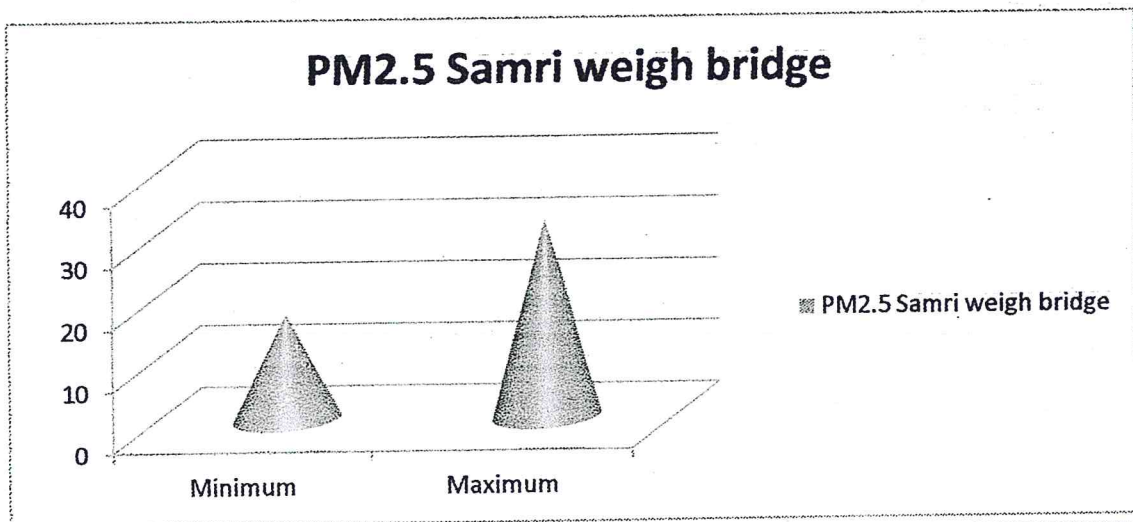
The minimum and maximum concentrations for RSPM were recorded as $48 \mu\text{g}/\text{m}^3$ and $78 \mu\text{g}/\text{m}^3$ respectively. The average values were observed to be in the range of 51 to $73 \mu\text{g}/\text{m}^3$ and 98th percentile values ranged between 54 to $78 \mu\text{g}/\text{m}^3$ in the study area (**Table 7**).

Graphical Presentation Of Fugitive Emission Monitoring RSPM



Particulate Matter - $\text{PM}_{2.5}$

The minimum and maximum values of $\text{PM}_{2.5}$ concentrations varied between 17 to $32 \mu\text{g}/\text{m}^3$ respectively. The average values range between 21 to $27 \mu\text{g}/\text{m}^3$ and 98th percentile values varied between 24 to $32 \mu\text{g}/\text{m}^3$ (**Table 8**).

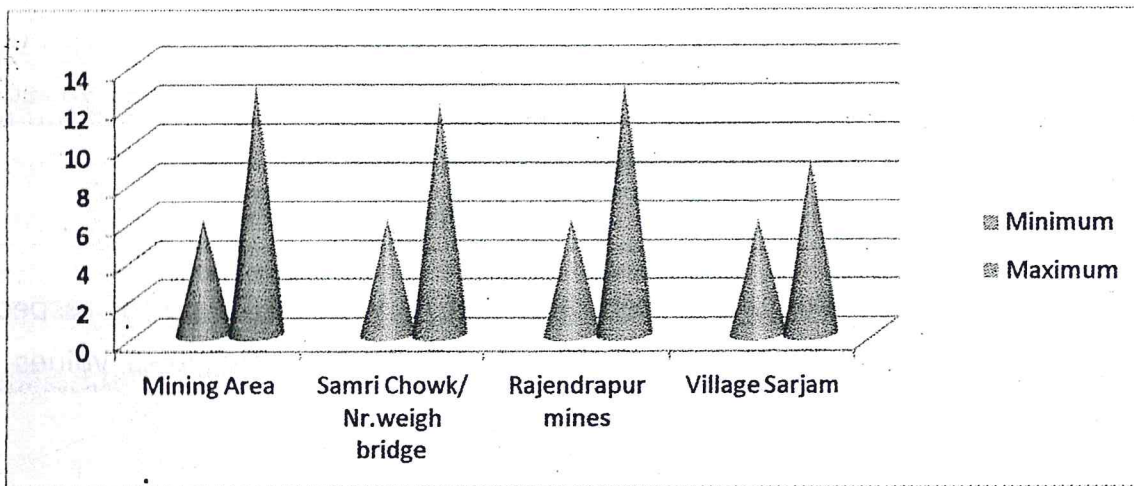


Sulphur Dioxide (SO₂)

The minimum and maximum SO₂ concentrations were recorded as 6 µg/m³ and 13 µg/m³ respectively. The average values were observed to be in the range of 7 to 11 µg/m³ and 98th percentile values varied between 8 to 13 µg/m³ (Table 9).

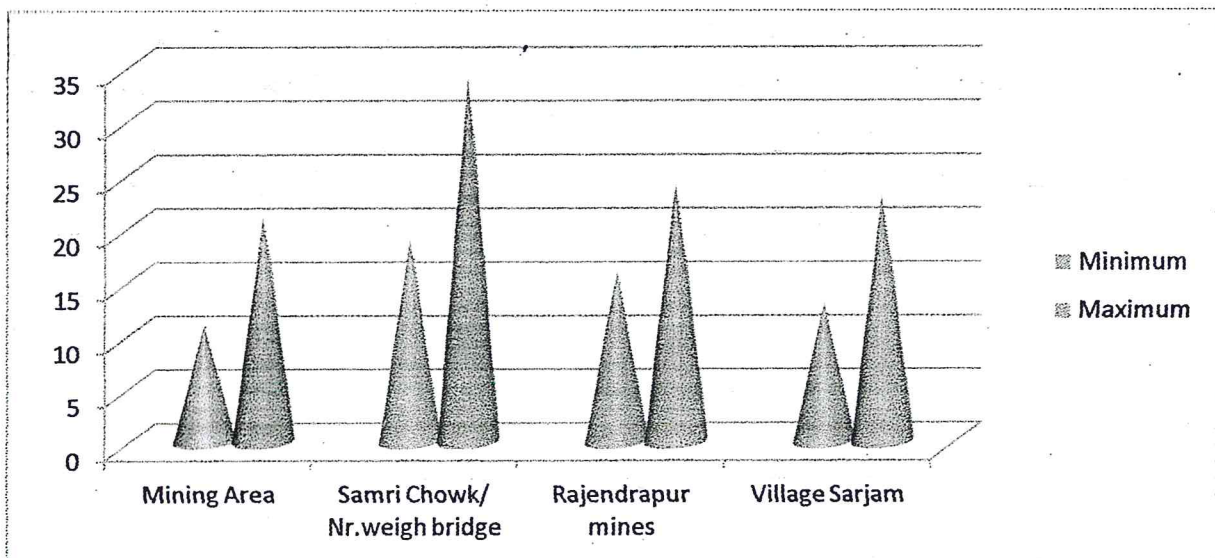
Graphical Presentation Of Fugitive Emission Monitoring

SO₂



Nitrogen Oxide (NO_x)

The minimum and maximum NO_x concentrations were recorded as 11 µg/m³ and 34 µg/m³. The average concentrations were ranged between 14 to 29 µg/m³ and 98th percentile values varied between 16 to 34 µg/m³ (Table 10).





Lead (Pb)

The minimum and maximum Lead detected between <0.005 to $0.082\mu\text{g}/\text{m}^3$ respectively. The average Lead detected between <0.005 to $0.073\mu\text{g}/\text{m}^3$ & 98th percentile values varied between <0.005 to $0.082\mu\text{g}/\text{m}^3$ in the study region. **(Table 11).**

Mercury (Hg)

The maximum concentrations of Hg varied $0.063\mu\text{g}/\text{m}^3$ respectively. The average concentration varied $0.047\mu\text{g}/\text{m}^3$ 98th percentiles values varied $0.063\mu\text{g}/\text{m}^3$ in the study region. **(Table 12).**

Arsenic (As)

The maximum concentrations of As varied $1.28\mu\text{g}/\text{m}^3$ respectively. The average concentration varied $1.09\mu\text{g}/\text{m}^3$ and 98th percentiles values varied $1.28\mu\text{g}/\text{m}^3$ in the study region **(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)

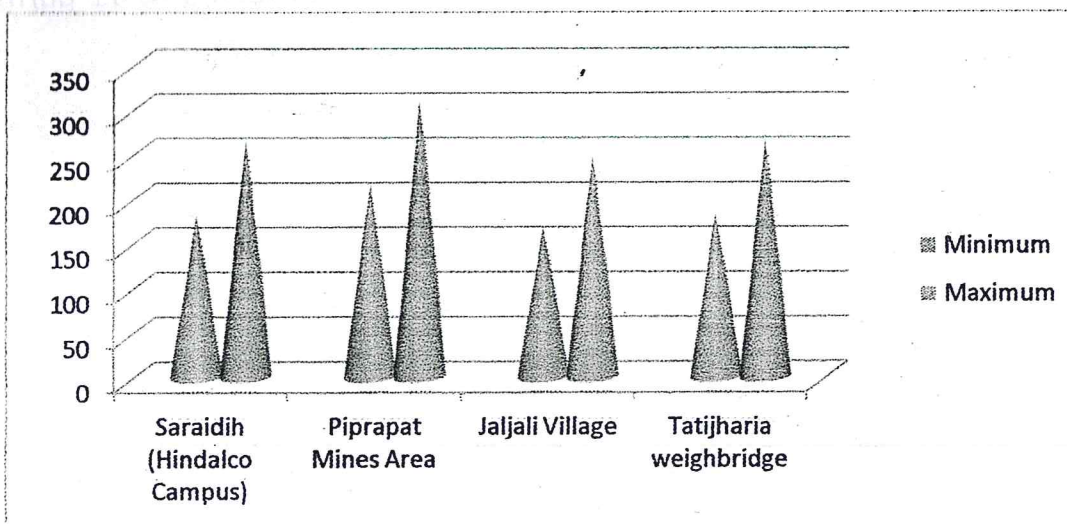
The background levels of SPM, RPM(PM₁₀), PM_{2.5}, SO₂, NO_x, Pb, Hg, As and Cr measured are required to compute Ambient Air Quality. The sampling locations are selected at the above mentioned locations in downwind and upwind directions of the mine. The Minimum, Maximum concentration, Arithmetic mean (AM), Geometric mean (GM) and 98 Percentile are presented in tabular form (**Table 6**).

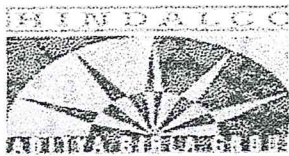
1.7.1 Presentation of Results.

The summary of Ambient Air Quality monitoring results for the month of January to March 2014 are presented in detail in **Table 3**. 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)/NAAQ for residential and rural zone.

Suspended Particulate Matter-SPM

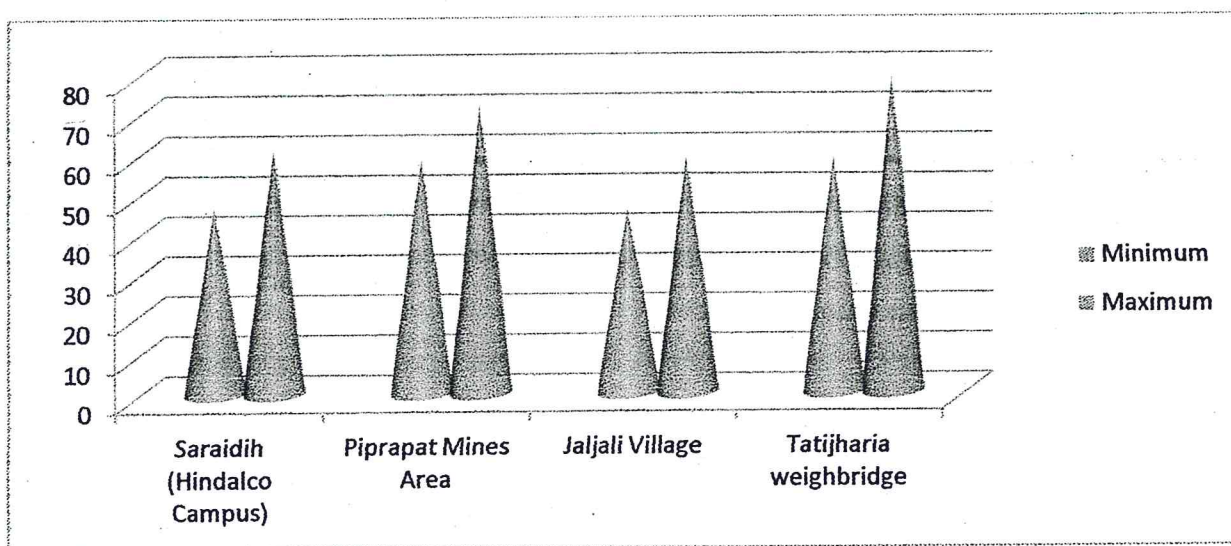
The statistical analysis of SPM is presented in **Table 6** for the mining area. The minimum and maximum values varied between 169 to 312 µg/m³ respectively during study period at all the 4 locations. The average values ranged between 182 to 288 µg/m³ and 98th percentile values ranged between 194 to 312 µg/m³ in the study area.





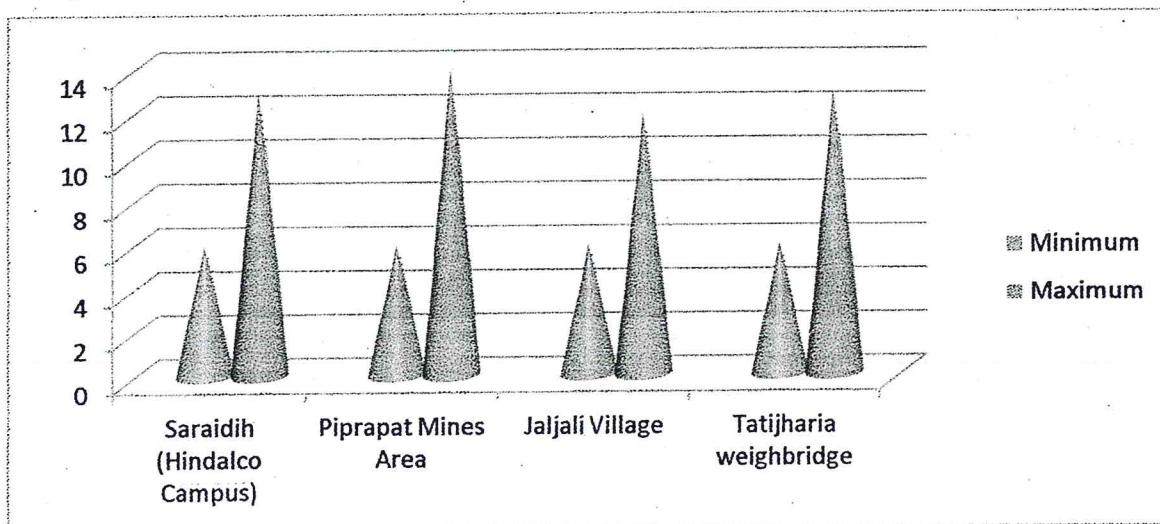
Particulate Matter-RSPM

The minimum and maximum values of RSPM varied between 46 to 79 $\mu\text{g}/\text{m}^3$ respectively (**Table 7**). The average values varied between 49 to 74 $\mu\text{g}/\text{m}^3$. The 98th percentile values varied between 51 to 79 $\mu\text{g}/\text{m}^3$ 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.



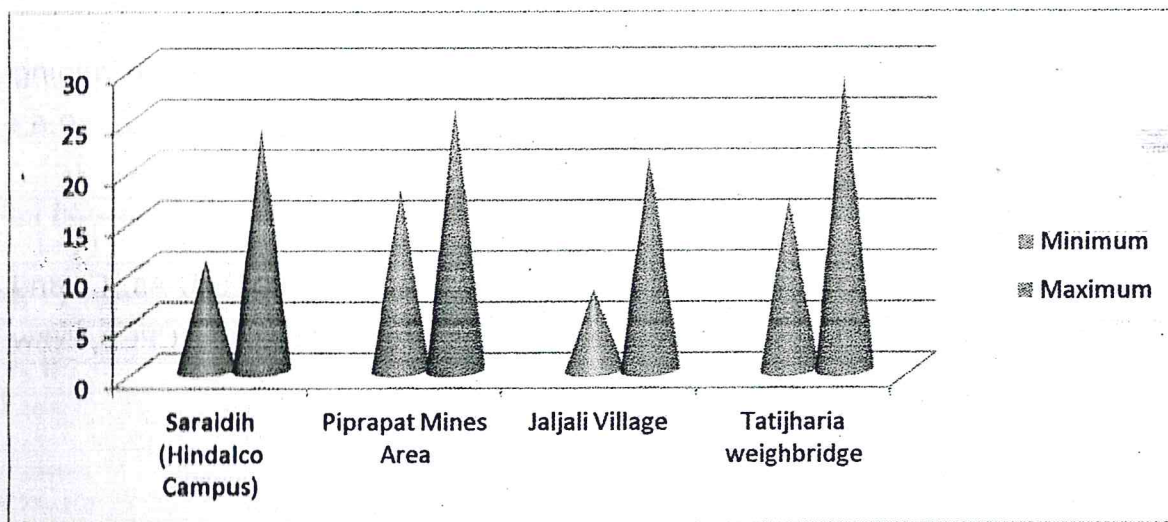
Sulphur Dioxide (SO₂)

The minimum and maximum values of SO₂ concentrations varied between 6 to 14 $\mu\text{g}/\text{m}^3$ respectively. The average values range between 9 to 11 $\mu\text{g}/\text{m}^3$ and 98th percentile values varied between 11 to 14 $\mu\text{g}/\text{m}^3$ (**Table 9**).



Nitrogen Oxide (NO_x)

The minimum and maximum values of NO_x concentrations varied between 8 to 29 µg/m³ respectively. The average values range between 11 to 25 µg/m³ and 98th percentile values varied between 14 to 29 µg/m³ (**Table 10**).



Lead (Pb)

The minimum and maximum Lead detected between <0.005 to 0.073 µg/m³ respectively. The average Lead detected between <0.005 to 0.057 µg/m³ and 98th percentile values varied between <0.005 to 0.073 µg/m³ in the study region (**Table 11**).

Mercury (Hg)

The maximum concentrations of Hg varied 0.047 µg/m³ respectively. The average concentration varied 0.034 µg/m³ 98th percentiles values varied 0.047 µg/m³ in the study region. (**Table 12**).

Arsenic (As)

The maximum concentrations of As varied 1.16 µg/m³ respectively. The average concentration varied 0.98 µg/m³ and 98th percentiles values varied 1.16 µg/m³ in the study region (**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 January 2014 in mining area and Samri Chowk. The dust fall rate was observed to be 28.47 and 19.63 MT/km²/month respectively as given in **(Table 14)**.

Overall the ambient air concentrations of SPM, RSPM, SO₂, NO_x, 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 (January-February-March 2014) indicates that the wind was blowing predominantly from (N), during study period, for 80.0% hours wind was found to be calm. The details of wind pattern in the form of wind frequency distribution are presented in table 1. The wind rose diagram and graphical illustration is presented in **Fig.1 & 2** respectively.

Table.5
Wind Frequency Distribution Data

Wind Direction	Speed m/s						Total
	0.5 – 2.1	2.1 – 3.6	3.6 – 5.7	5.7 – 8.8	8.8 –11.1	>= 11.1	
148.75-11.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.003738	0.003738
11.25 -33.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
33.75 – 56.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
56.25-78.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
78.75-101.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
101.25 – 123.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
123.75 – 146.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
146.25-168.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
168.75- 191.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
191.25 – 213.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
213.75-236.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
236.25 – 258.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
258.75 – 281.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
281.25 – 303.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
303.75 – 326.25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
326.25 – 348.75	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sub Total	0.000000	0.000000	0.000000	0.000000	0.000000	0.003738	0.003003
Calm							0.800300
Missing/Incomplete							0.196697
Total							1.000000

SUMMARY OF WIND PATTERN

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Condition
January-February-March -2014	N (0.3 %)	-	80.0 %

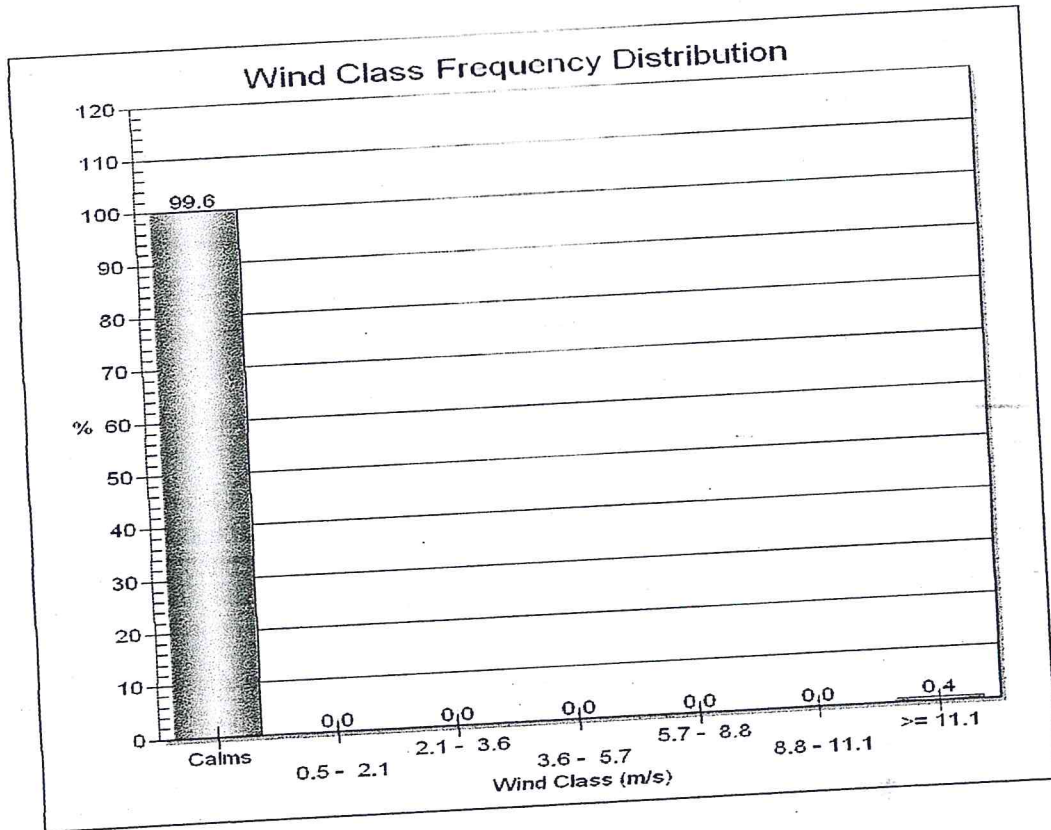


Fig.01 Wind Class Frequency Distribution

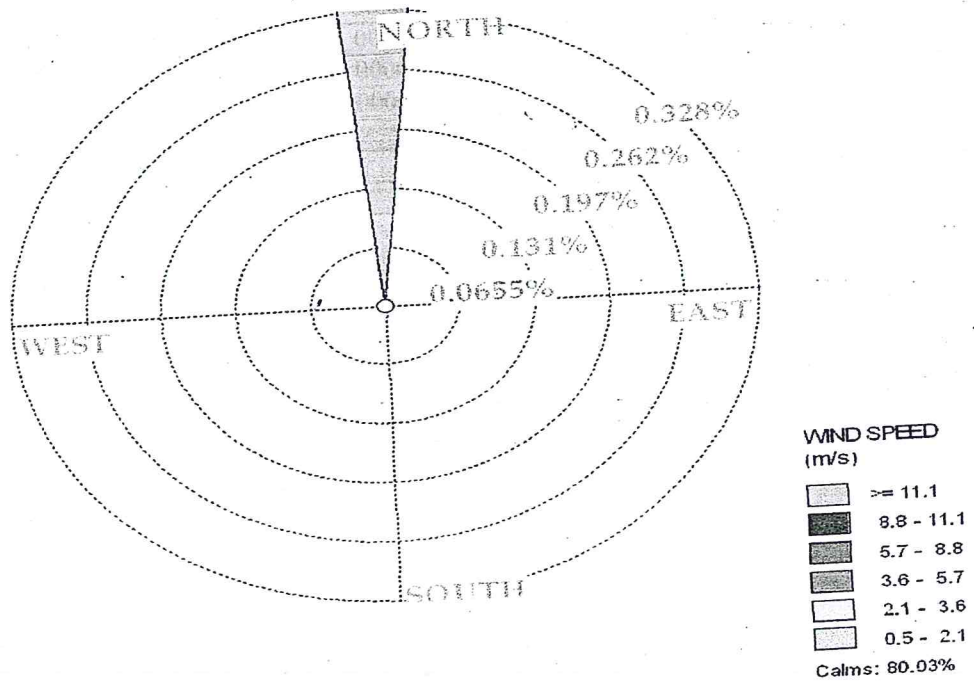


Fig.02 Wind Rose Diagram (January-February-March 2014)



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 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 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 test parameters. Surface water quality is satisfactory as per IS: 2296 Class 'C'. The impacts due to mining activities in each month have been found to be insignificant.



Table 6

Statistical Analysis of SPM

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	287	318	303	303	318
	February-2014	259	293	276	276	293
	March-2014	298	347	323	323	347
Samri Chowk/ Nr. weigh bridge	January-2014	249	291	270	270	291
	February-2014	252	287	270	270	287
	March-2014	193	228	211	211	228
Rajendrapur mines	January-2014	302	328	315	315	328
	February-2014	267	289	278	278	289
	March-2014	267	304	286	286	304
Village Sarjam	January-2014	167	239	203	203	239
	February-2014	154	218	186	186	218
	March-2014	169	191	180	180	191
Buffer Zone :-						
Saraldih (Hindalco Campus)	January-2014	204	267	236	236	267
	February-2014	183	228	206	206	228
	March-2014	212	253	233	233	253
Plprapat Mines Area	January-2014	264	312	288	288	312
	February-2014	259	302	281	281	302
	March-2014	218	287	253	253	287
Jaljali Village	January-2014	169	194	182	182	194
	February-2014	201	239	220	220	239
	March-2014	197	248	223	223	248
Tatijharia weighbridge	January-2014	184	239	212	212	239
	February-2014	218	268	243	243	268
	March-2014	239	257	248	248	257



Table 7

Statistical Analysis of RSPM

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	64	73	69	69	73
	February-2014	67	78	73	73	78
	March-2014	54	63	59	59	63
Samri Chowk/ weigh bridge	January-2014	68	76	72	72	76
	February-2014	61	72	67	67	72
	March-2014	57	68	63	63	68
Rajendrapur mines	January-2014	59	67	63	63	67
	February-2014	61	72	67	67	72
	March-2014	54	63	59	59	63
Village Sarjam	January-2014	57	62	60	60	62
	February-2014	53	59	56	56	59
	March-2014	48	54	51	51	54
Buffer Zone :-						
Saraidih (Hindalco Campus)	January-2014	47	53	50	50	53
	February-2014	52	61	57	57	61
	March-2014	49	56	53	53	56
Piprapat Mines Area	January-2014	63	72	68	68	72
	February-2014	59	68	64	64	68
	March-2014	67	71	69	69	71
Jaljali Village	January-2014	51	59	55	55	59
	February-2014	48	53	51	51	53
	March-2014	46	51	49	49	51
Tatijharia weighbridge	January-2014	64	72	68	68	72
	February-2014	68	79	74	74	79
	March-2014	59	68	64	64	68
CPCB Standard				100 $\mu\text{g}/\text{m}^3$ (24 hrs)		

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%
Samari Weigh bridge	January-2014	19	28	24	24	28
	February-2014	21	32	27	27	32
	March-2014	17	24	21	21	24
CPCB Standard				60 $\mu\text{g}/\text{m}^3$ (24 hrs)		



Table 9

Statistical Analysis of SO₂

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	6	11	9	9	11
	February-2014	9	13	11	11	13
	March-2014	6	10	8	8	10
Samri weigh bridge	January-2014	7	12	10	10	12
	February-2014	6	10	8	8	10
	March-2014	7	12	10	10	12
Rajendrapur mines	January-2014	6	11	9	9	11
	February-2014	7	10	9	9	10
	March-2014	6	13	10	10	13
Village Sarjam	January-2014	6	8	7	7	8
	February-2014	7	9	8	8	9
	March-2014	6	9	8	8	9
Buffer Zone :-						
Saraldih (Hindalco Campus)	January-2014	6	11	9	9	11
	February-2014	6	13	10	10	13
	March-2014	7	11	9	9	11
Piprapat Mines Area	January-2014	7	14	11	11	14
	February-2014	6	12	9	9	12
	March-2014	7	12	10	10	12
Jaljali Village	January-2014	6	11	9	9	11
	February-2014	6	12	9	9	12
	March-2014	7	11	9	9	11
Tatijharia weighbridge	January-2014	6	12	9	9	12
	February-2014	7	11	9	9	11
	March-2014	6	13	10	10	13
CPCB Standard		80 $\mu\text{g}/\text{m}^3$ (24 hrs)				



Table 10

Statistical Analysis of NOx

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	13	18	16	16	18
	February-2014	11	16	14	14	16
	March-2014	13	21	17	17	21
Samri weigh bridge	January-2014	21	32	27	27	32
	February-2014	19	28	24	24	28
	March-2014	23	34	29	29	34
Rajendrapur mines	January-2014	16	21	19	19	21
	February-2014	18	24	21	21	24
	March-2014	16	23	20	20	23
Village Sarjam	January-2014	14	21	18	18	21
	February-2014	13	19	16	16	19
	March-2014	14	23	19	19	23
Buffer Zone :-						
Saraidih (Hindalco Campus)	January-2014	13	21	17	17	21
	February-2014	11	19	15	15	19
	March-2014	13	24	19	19	24
Piprapat Mines Area	January-2014	21	26	24	24	26
	February-2014	18	24	21	21	24
	March-2014	19	26	23	23	26
Jaljali Village	January-2014	9	16	13	13	16
	February-2014	12	21	17	17	21
	March-2014	8	14	11	11	14
Tatijharia weighbridge	January-2014	17	28	23	23	28
	February-2014	21	29	25	25	29
	March-2014	18	26	22	22	26
CPCB Standard		80 $\mu\text{g}/\text{m}^3$ (24 hrs)				



Table 11

Statistical Analysis of Pb

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	0.021	0.029	0.025	0.025	0.029
	February-2014	0.018	0.024	0.021	0.021	0.024
	March-2014	0.031	0.048	0.040	0.040	0.048
Samri Chowk/weigh bridge	January-2014	0.064	0.082	0.073	0.073	0.082
	February-2014	0.059	0.071	0.065	0.065	0.071
	March-2014	0.052	0.073	0.063	0.063	0.073
Rajendrapur mines	January-2014	0.021	0.053	0.037	0.037	0.053
	February-2014	0.029	0.064	0.047	0.047	0.064
	March-2014	0.018	0.051	0.035	0.035	0.051
Village Sarjam	January-2014	<0.005	<0.005	<0.005	<0.005	<0.005
	February-2014	<0.005	<0.005	<0.005	<0.005	<0.005
	March-2014	<0.005	<0.005	<0.005	<0.005	<0.005
Buffer Zone :-						
Saraldih (Hindalco Campus)	January-2014	0.014	0.019	0.017	0.017	0.019
	February-2014	0.021	0.026	0.024	0.024	0.026
	March-2014	0.016	0.024	0.020	0.020	0.024
Plprapat Mines Area	January-2014	0.021	0.032	0.027	0.027	0.032
	February-2014	0.026	0.041	0.034	0.034	0.041
	March-2014	0.019	0.037	0.028	0.028	0.037
Jaljali Village	January-2014	<0.005	<0.005	<0.005	<0.005	<0.005
	February-2014	<0.005	<0.005	<0.005	<0.005	<0.005
	March-2014	<0.005	<0.005	<0.005	<0.005	<0.005
Tatijharia weighbridge	January-2014	0.041	0.073	0.057	0.057	0.073
	February-2014	0.034	0.068	0.051	0.051	0.068
	March-2014	0.039	0.071	0.055	0.055	0.071
CPCB Standard		1.0 $\mu\text{g}/\text{m}^3$ (24 hrs)				



Table 12

Statistical Analysis of Hg

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	0.009	0.018	0.014	0.014	0.018
	February-2014	0.012	0.024	0.018	0.018	0.024
	March-2014	0.011	0.026	0.019	0.019	0.026
Samri Chowk/weigh bridge	January-2014	0.031	0.063	0.047	0.047	0.063
	February-2014	0.029	0.058	0.044	0.044	0.058
	March-2014	0.024	0.047	0.036	0.036	0.047
Rajendrapur mines	January-2014	0.028	0.049	0.039	0.039	0.049
	February-2014	0.031	0.057	0.044	0.044	0.057
	March-2014	0.018	0.029	0.024	0.024	0.029
Village Sarjam	January-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2014	<0.01	<0.01	<0.01	<0.01	<0.01
Buffer Zone :-						
Saraidih (Hindalco Campus)	January-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2014	<0.01	<0.01	<0.01	<0.01	<0.01
Piprapat Mines Area	January-2014	0.016	0.038	0.027	0.027	0.038
	February-2014	0.021	0.047	0.034	0.034	0.047
	March-2014	0.019	0.032	0.026	0.026	0.032
Jaljali Village	January-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2014	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2014	<0.01	<0.01	<0.01	<0.01	<0.01
Tatijharia weighbridge	January-2014	0.021	0.037	0.029	0.029	0.037
	February-2014	0.019	0.034	0.027	0.027	0.034
	March-2014	0.023	0.041	0.032	0.032	0.041



Table 13

Statistical Analysis of As

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Mining Area	January-2014	0.32	0.53	0.42	0.42	0.53
	February-2014	0.29	0.58	0.43	0.43	0.58
	March-2014	0.24	0.61	0.42	0.42	0.61
Samri Chowk/weigh bridge	January-2014	0.63	1.07	0.85	0.85	1.07
	February-2014	0.91	1.28	1.09	1.09	1.28
	March-2014	0.67	0.96	0.81	0.81	0.96
Rajendrapur mines	January-2014	0.47	0.83	0.65	0.65	0.83
	February-2014	0.54	0.76	0.65	0.65	0.76
	March-2014	0.58	0.79	0.68	0.68	0.79
Village Sarjam	January-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2014	<0.1	<0.1	<0.1	<0.1	<0.1
Buffer Zone :-						
Saraidh (Hindalco Campus)	January-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2014	<0.1	<0.1	<0.1	<0.1	<0.1
Piprapat Mines Area	January-2014	0.81	1.16	0.98	0.98	1.16
	February-2014	0.76	1.03	0.89	0.89	1.03
	March-2014	0.73	0.97	0.85	0.85	0.97
Jaljali Village	January-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2014	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2014	<0.1	<0.1	<0.1	<0.1	<0.1
Tatijharia weighbridge	January-2014	0.48	0.63	0.63	0.63	0.63
	February-2014	0.52	0.79	0.79	0.79	0.79
	March-2014	0.49	0.67	0.67	0.67	0.67
CPCB Standard		06 $\mu\text{g}/\text{m}^3$ (Annual)				



Table 14

Dust fall Rate (January-2014)

Sl.No.	Location	Rate (MT/km ² /month)
1	Mining Area	28.47
2	Samri chowk	19.63

Table-15

Noise Level Monitoring

Sl. No.	Location	January-2014		February-2014		March-2014	
		Day	Night	Day	Night	Day	Night
1	Mining Area	71	64	68	57	72	63
2	Samri Weigh bridge	67	59	72	63	69	61
3	Rajenderpur Mines area	73	67	68	59	71	64

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	January-2014		February-2014		March-2014	
		Max	Min	Max	Min	Max	Min
1	Rajenderpur Mines	84.2	73.9	91.2	84.7	81.6	73.8



2.1 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.

Table 16

Report on Chemical Examination of Ground Water

(Average of Three Months January-February-March -2014)

Location:	GW1) Village Samri Hand pump near dispensary	GW2) Village Tatijharia
	GW3) Village Saraidih	GW4) Village Rajenderpur

Sl.No	Test Parameters	Units	Permissible Requirement As per IS:10500-2012	Results			
				GW1	GW2	GW3	GW4
1	Apparent Colour	Hazen units	5	3	2	4	3
2	Turbidity NTU	NTU	5	2	3	4	3
3	pH Value	-	6.5 to 8.5	7.39	7.82	8.14	7.68
4	Total Hardness	mg / l	300	190.18	170.98	178.07	176.25
5	Iron (as Fe)	mg / l	0.3	0.16	0.23	0.19	0.18
6	Chlorides (as Cl)	mg / l	250	52.8	41.9	43.7	39.8
7	TDS	mg / l	500	333	245	316	343
8	Calcium (as Ca)	mg / l	75	64.9	58.7	59.4	61.3
9	Magnesium (as Mg)	mg / l	30	6.8	5.9	7.2	5.6
10	Sulphate (as SO ₄)	mg / l	200	41.2	38.7	46.3	31.9
11	Nitrates (as NO ₃)	mg / l	45	< 2	< 2	< 2	< 2
12	Fluoride (as F)	mg / l	1	<0.1	<0.1	<0.1	<0.1
13	Total Alkalinity	mg / l	200	158.2	141.9	138.7	149.4
14	Free Residual Chlorine	mg / l	Min.0.2	< 0.1	< 0.1	< 0.1	< 0.1
15	Electrical Conductivity at 25°C	µs/cm	-	594.7	438.2	564.9	612.8
16	Copper as(Cu)	mg / l	0.05	< 0.03	< 0.03	< 0.03	< 0.03
17	Manganese as (Mn)	mg / l	0.1	< 0.05	< 0.05	< 0.05	< 0.05
18	Cadmium as (Cd)	mg / l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
19	Selenium as (Se)	mg / l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
20	Arsenic as (As)	mg / l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
21	Mercury as (Hg)	mg / l	0.001	<0.0005	<0.0005	<0.0005	<0.0005

Contd.....



Hindalco Industries Limited
Samri Mining Environmental Status Report for
January-2014 to March-2014

Data Analysis

(Contd....)

Sr. No	Test Parameters	Units	Permissible Requirement As per IS:10500-2012	Results			
				GW1	GW2	GW3	GW4
22	Zinc as (Zn)	mg / l	5	< 0.1	< 0.1	< 0.1	< 0.1
23	Aluminum as (Al)	mg / l	0.03	<0.005	<0.005	<0.005	<0.005
24	Boron as (B)	mg / l	1	0.4	0.7	0.3	0.6
25	Chromium as (Cr ⁺⁶)	mg / l	0.05	< 0.03	< 0.03	< 0.03	< 0.03
26	Cyanide as (CN)	mg / l	0.05	< 0.005	< 0.005	< 0.005	< 0.005
27	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
28	Total Coliform	MPN/100 ml	Absent	< 1	< 1	< 1	< 1
29	Phenolic Compounds	mg / l	0.001	< 0.001	< 0.001	< 0.001	< 0.001
30	Mineral oil	mg / l	0.01	< 0.001	< 0.001	< 0.001	< 0.001
31	Total Chromium as Cr	mg / l	0.05	< 0.01	< 0.01	< 0.01	< 0.01

Remark:- 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.



Table 17

Monthly Report on Chemical Examination of Surface Water

(Nallahs Near by Samri Mines)

S.No.	Parameters	Unit	IS 2296 Class 'B' Limits	Results		
				January-14	February-14	March-14
1	pH Value	-	6.5 to 8.5	7.14 at 23°C	7.38 at 23°C	7.91 at 23°C
2	Total Hardness (CaCO ₃)	mg / l	\$	204.48	219.81	193.25
3	Iron as (Fe)	mg / l	\$	5.3	4.9	5.1
4	Chlorides as (Cl)	mg / l	\$	28.7	43.9	61.2
5	Electrical Conductivity	µs/cm	\$	512	494	457
6	Total Dissolved Solids (TDS)	mg / l	\$	287	277	256
7	Calcium as (Ca)	mg / l	\$	68	72	64
8	Magnesium as (Mg)	mg / l	\$	8.4	9.7	8.1
9	Sulphate as (SO ₄)	mg / l	\$	64	73	69
10	Nitrates as (NO ₃)	mg / l	\$	7.4	8.1	7.6
11	Fluoride as (F)	mg / l	1.5	0.6	0.8	0.6
12	Alkalinity	mg / l	\$	148	167	149
13	Chemical Oxygen Demand (COD)	mg / l	\$	28	23	18
14	BOD at 27°C for 3days	mg / l	3	8.7	7.1	6.4
15	Total Suspended Solid (TSS)	mg / l	\$	61	54	59

\$: Limits not specified



Table 18

Soil Analysis Report

Date of collection: January-2014

Sr. No	Test Parameters	Measurement Unit	Results	
			Samri	Rajendrapur village
1	pH	-	6.47 at 23 ^o C	6.81 at 23 ^o C
2	Electrical Conductivity at 25 ^o C	µS/cm	357	389
3	Texture	-	Silty clay	Clay Loam
4	Sand	%	21.4	19.2
5	Silt	%	26.7	24.9
6	Clay	%	51.9	55.9
7	Bulk Density	g/cc	1.24	1.32
8	Porosity	%	32	27
9	Water Holding Capacity	%	38	34
10	Exchangeable Calcium as Ca	mg/kg	17.4	13.9
11	Exchangeable Magnesium as Mg	mg/kg	6.8	7.3
12	Exchangeable Sodium as Na	mg/kg	31.4	29.2
13	Available Potassium as K	kg/ha.	61.8	57.9
14	Available Phosphorous as P	kg/ha.	218	238
15	Available Nitrogen as N	kg/ha.	32.7	41.9
16	Organic Matter	%	0.28	0.37
17	Organic Carbon	%	0.19	0.24
18	Water Soluble Chloride as Cl ⁺	mg/kg	17.2	16.8
19	Water Soluble Sulphate as SO ₄	mg/kg	5.7	6.1
20	Sodium Absorption Ratio	-	8.14	7.62
21	CEC	meq/100 gm	28.6	31.8
22	Total Iron	%	9.4	8.1
23	Available Manganese	mg/kg	0.07	0.06
24	Available Zinc	mg/kg	0.014	0.011
25	Available Boron	mg/kg	0.006	0.003

Method of sampling and analysis: IS: 2720 and methods of soil analysis, part I, 2nd

Ed, 1986 of (American society for Agronomy and soil science society of America)

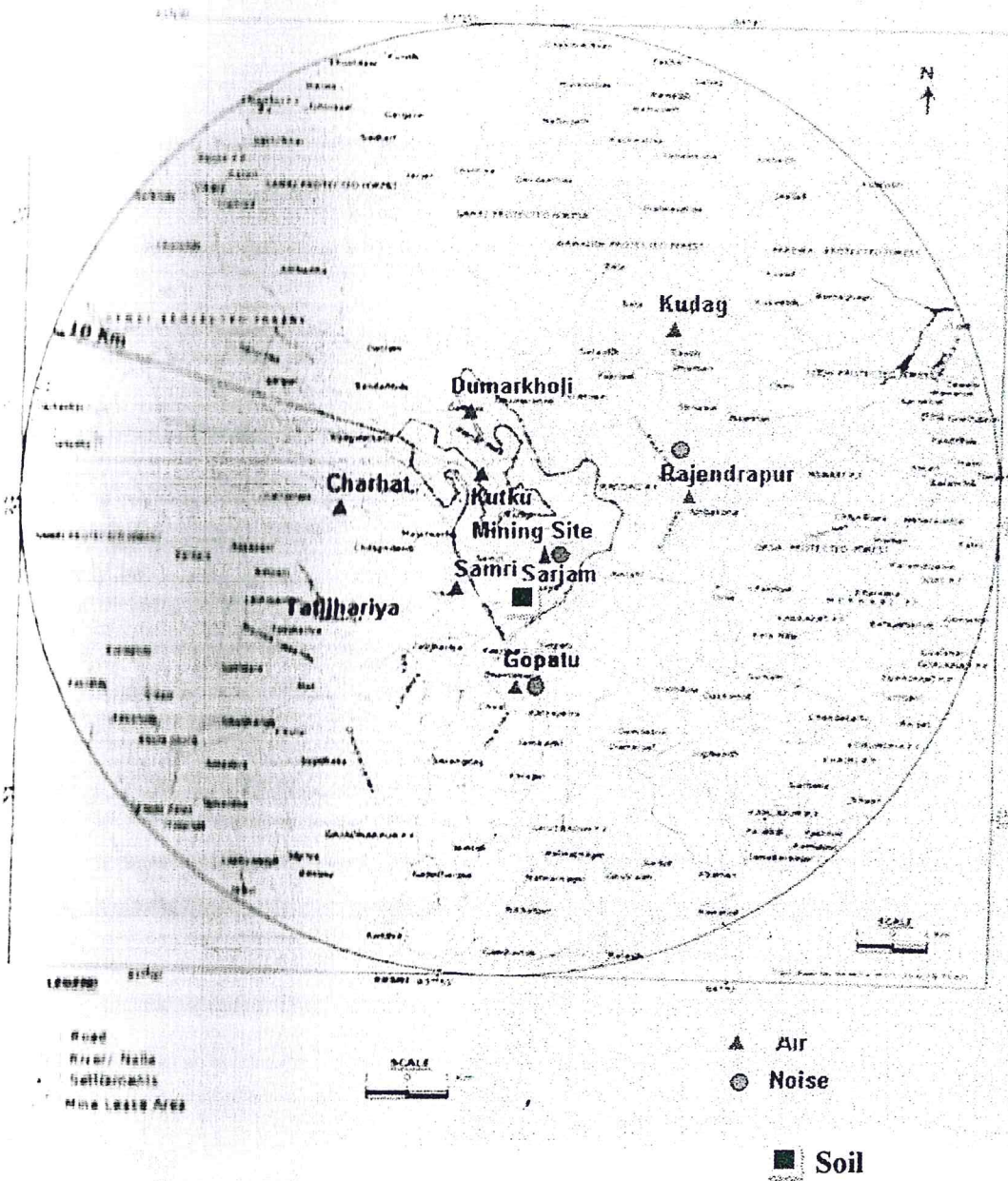
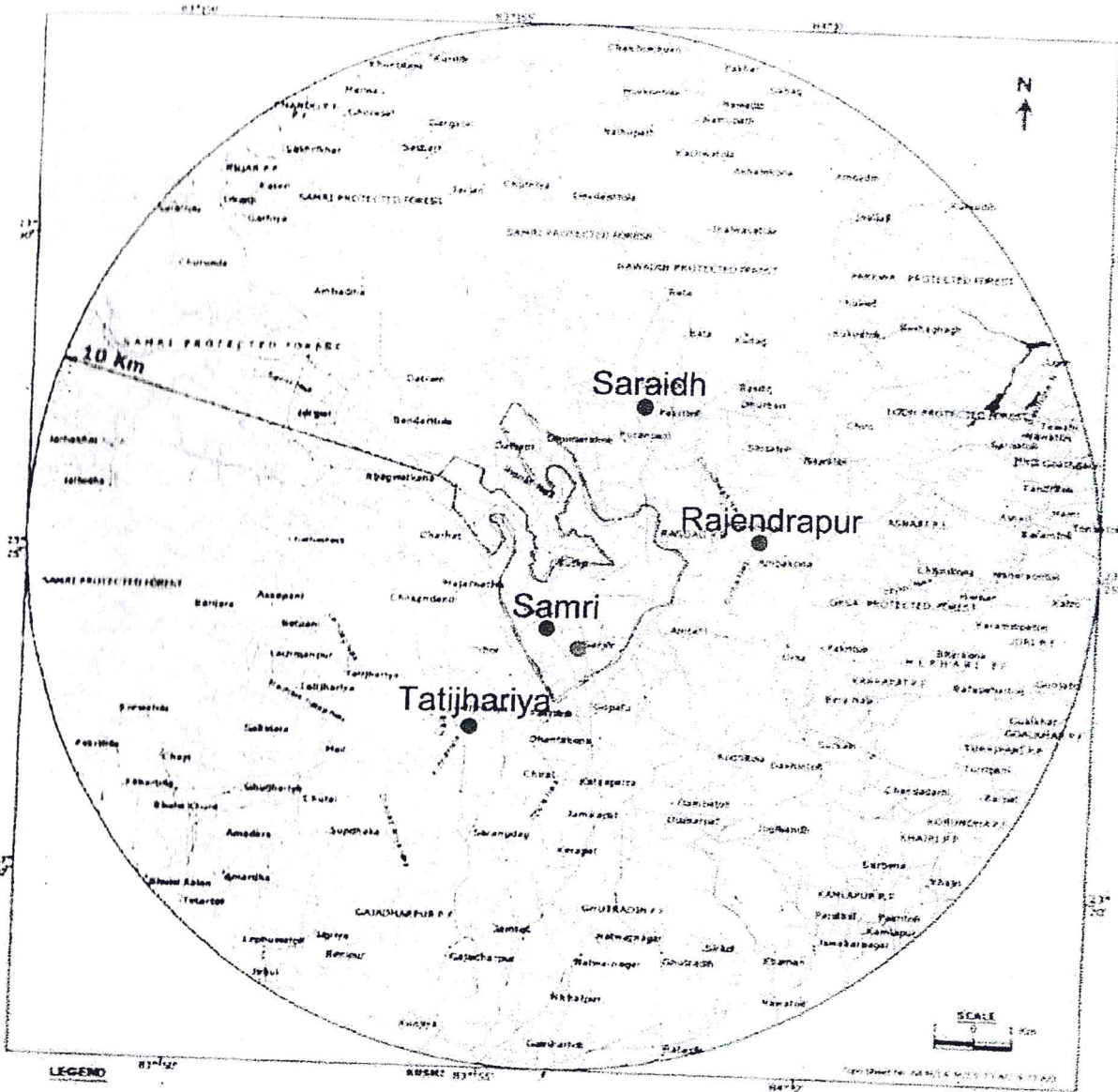


Fig 3: Sampling Locations for Air, Noise



- LEGEND**
- Road
 - River/ Nalla
 - Settlements
 - ▭ Mine Lease Area



- Surface Water
- Ground Water

Fig 04: Sampling Locations for Water



CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Commercial Complex, Housing Board Colony,
Kabir Nagar, Raipur (C.G.)

No. 5641 /TS/CECB/2014

Raipur, dated: 05/3/2014

To,

M/s Hindalco Industries Limited,
Samri Bauxite Mine,
Village-Samri, Gopatu & Dumerkholi,
Tehsil-Samri,
District- Balrampur (C.G.)

Sub: Renewal of consent of the Board for Bauxite Ore Mine under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974.

- Ref: 1. Consent of the Board for Bauxite Ore Mine issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 vide letter no. 6876/TS/C ECB/2007 Raipur, dated: 24/12/2007.
2. Last renewal of the Board for Bauxite Ore Mine issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 vide letter no. 1821/TS/CECB/2013 Raipur, dated: 05/07/2013.
3. Your Letter No. HIL/SAM/CECB/118/2013/S, dated: 26/07/2013 and subsequent correspondence ending letter dated: 11/01/2014.

--: 00 :--

With reference to your above application consent is hereby renewed for a period of One year i.e. from 01/12/2013 to 30/11/2014, subject to the fulfillment of the terms and conditions incorporated in the schedule of the consent letter No. 6876/TS/CECB/2007 Raipur, dated: 24/12/2007 and additional conditions mentioned below.

This renewal of consent is valid for: -

Name of Product	Production Capacity
Mining of bauxite ore	5.0 Lakhs Tonne per Annum [Five Lakhs Tonne per Annum]

Additional Conditions

1. Industry shall ensure the treated effluent quality within prescribed effluent standard all the time. Industry shall not discharge effluent out side the mine lease area in any circumstances; hence zero discharge condition shall be maintained all the time.
2. All internal roads shall be made pucca. Good house keeping practices shall be adopted. Dust muck generated on the road shall be dispose doff properly.

RCW

3. Bauxite ore shall be transported in duly covered vehicles.
4. Industry shall submit Environment Statement to this Board as per provision of Environment (Protection) amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.
5. All the solid waste rejects shall be disposed off properly and reclaimed scientifically. Industry shall obtain authorization under Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 from the Board (If required).
6. Extensive tree plantation shall be carried out in the reclaimed areas and within the mining lease area.

Please acknowledge the receipt of this letter.

For & on behalf of
Chhattisgarh Environment Conservation Board Raipur (C.G.)



Member Secretary

Chhattisgarh Environment Conservation Board
of Raipur (C.G.)

o/c

Endt. No. 5642/TS/CECB/2014
Copy to: -

Raipur, dated: 05/3/2014

- 1- Regional Officer, Regional Office, Chhattisgarh Environment Conservation Board, Ambikapur (C.G.). Please ensure compliance and report, if any condition/conditions are violated by the industry.
- 2- Cess Section, Chhattisgarh Environment Conservation Board, Raipur (C.G.)



Member Secretary

Chhattisgarh Environment Conservation Board
of Raipur (C.G.)

o/c

ROW



CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Commercial Complex, Housing Board Colony,
Kabir Nagar, Raipur (C.G.)

No. 5643 /TS/CECB/2014

Raipur, dated: 05/13 /2014

To,

M/s Hindalco Industries Limited,
 Samri Bauxite Mine,
 Village-Samri, Gopatu & Dumerkholi,
 Tehsil-Samri,
District- Balrampur (C.G.)

Sub: Renewal of consent of the Board for Bauxite Ore Mine under section 21 of the Air (Prevention and Control of Pollution) Act, 1981.

- Ref: 1. Consent of the Board for Bauxite Ore Mine issued under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 6878/TS/CECB/2007 Raipur, dated: 24/12/2007.
2. Last renewal of the Board for Bauxite Ore Mine issued under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 1823/TS/CECB/2013 Raipur, dated: 05/07/2013.
3. Your Letter No. HIL/SAM/CECB/118/2013/S, dated: 26/07/2013 and subsequent correspondence ending letter dated: 11/01/2014.

---: 00 :---

With reference to your above application consent is hereby renewed for a period of one year i.e. from 01/12/2013 to 30/11/2014, subject to the fulfillment of the terms and conditions incorporated in the consent letter No. 6878/TS/CECB/2007 Raipur, dated: 24/12/2007 and additional conditions mentioned below.

This renewal of consent is valid for: -

Name of Product	Production Capacity
Mining of bauxite ore	5.0 Lakhs Tonne per Annum [Five Lakhs Tonne per Annum]

Additional Conditions

- Industry shall operate & maintain the existing air pollution control facilities to ensure the emission of air pollutants within the prescribed emission standard the all time. Industry shall install some additional fixed type water sprinklers in haul roads fapproach roads for dust suppression. The industry shall also maintain the ambient air quality in and around the mine lease area within prescribed limits.
- All internal roads shall be made pucca. Good house keeping practices shall be adopted by the industry.

3. Blasting operations shall be carried out as per the standards prescribed by Director General of Mine Safety.
4. Industry shall transport Bauxite Ore in duly covered vehicles to avoid dust emission during transportation.
5. Industry shall submit Environment Statement to this Board as per provision of Environment (Protection) amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.
6. Extensive tree plantation shall be carried out in the reclaimed areas and with mining lease area to the plants.

Please acknowledge the receipt of this letter.

For & on behalf of
Chhattisgarh Environment Conservation Board Raipur (C.G.)


Member Secretary

%
Chhattisgarh Environment Conservation Board
of Raipur (C.G.)

Endt. No. 5644-ITS/CECB/2014
Copy to: -

Raipur, dated: 05/13/2014

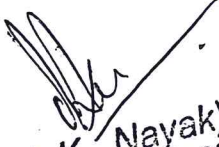
Regional Officer, Regional Office, Chhattisgarh Environment Conservation Board, Ambikapur (C.G.). Please ensure compliance and report, if any condition/conditions are violated by the industry.


Member Secretary

%
Chhattisgarh Environment Conservation Board
of Raipur (C.G.)

RSW

Lease	Production Capacity approved by MoEF (in Lakh Tonnes)	Production (April - 2013 to March -2014 (in Tonnes)
Samri	5.0	450449.000
Tatijharia	4.0	339284.000
Kudag	0.6	51724.000


(M. K. Nayak)
Agent of mines
Samri mines Division
Hindalco Industries Ltd

SAMRI LEASE

Particulars	Samri Lease
Approved lease area	2146.746 Ha.
Total Mined out up to the year (2013-14)	140.9008 Ha.
Total Reclaimed up to the year (2013-14)	111.1253 Ha.
Total afforestation in reclaimed land up to the year (2013-14)	55.254 Ha.
Total nos. of plants up to the year (2013-14)	135112
% of survival of plants	75 %
Mined out during April 2012 to March 2014	10.831 Ha.
Reclaimed during April 2013 to March 2014	10.087 Ha.
Afforestation (2013-14)	8700
Afforestation in 2013-14 (Ha.)	3.500 Ha.


 (M. K. Nayak)
 Agent of mines
 Samri mines Division
 Hindalco Industries Ltd

Actual Expenditure incurred in Environment Management Plan:-

Composite cost during the F.Y. 2013-14 for environment protection & pollution control by Samri Mines division, it includes Samri Bauxite Mine, Tatijharia Bauxite Mine & Kudag Bauxite Mine of Chhattisgarh state.

SI No-	Environment Protection Measures	Actual Cost (Lacs) (F.Y. 2013-14)
1	Pollution Control	3.20
2	Environment Monitoring	3.10
3	Green Belt	10.80
4	Reclamation/Rehabilitation of mined out area	--
5	Rural Development (This include capital cost of on going construction of 2.5km ring road, Building for 6 Bed hospital & Primary School)	237.85
6	Total	254.95

- Environment monitoring jobs has been out sourced to Annacon Lab, recognized by MoEF (GOI) & NABL etc.
- One centralized nursery has been established at Samri mines among three leases viz, Samri, Tatijharia & Kudag.
- Reclamation and rehabilitation is part of mining operation. Mined out area has been backfilled by using mines rejects, laterite, morrum and followed top of surface by top soil. As per type of the land we decide for cultivation or planting species. Cost of reclamation/rehabilitation already included in the mining operation.

(M. K. Nayak)
Agent of mines
Samri mines Division
Hindalco Industries Ltd

