



1-11L/SAM/APCCF/47/2016/T

09.5.2016

To,

**The Addl. Principal Chief Conservator of Forest (Central),
MoEF Regional Office (Western Zone)**
Kendriya Paryavaran Bhawan, Link Road-3, Ravisankar Nagar
Bhopal-462016 (M P)

Sub:- Status of compliance of EC condition (Half yearly status of compliance report) of Tatijharia Bauxite Mine (Lease area- 1218.762 Ha.) of Hindalco Industries Limited of Chhattisgarh state from October-2015 to March-2016.

Ref No:- Environment Clearance Letter No-J-11015/337/2007-IA. II(M) dated August 9, 2007

Dear Sir,


We do hereby submit half yearly status of compliance report of EC condition from April-2015 to September-2015 of Tatijharia Bauxite Mine, Lease area -1218.762 Ha, of Hindalco Industries Limited, P.O- Kusmi, Dist- Balrampur- Ramanujanj, Chhattisgarh state, PIN-497224.

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)
Agent of 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. Environment Status Report from Jan-2016 to Mar-2016 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 Oct-2015 to Mar-2016 as annex-VII.

09.5.2016.

Status of Compliance from October-2015 to March-2016 of Environmental Condition laid down by MOEF

Tatijharia Bauxite Mine

The status of compliance of the conditions (as per point no.3) with reference to the environment clearance letter no.J-11015/337/2007-IA. II(M) dated 9.8.2012 of Ministry of Environment & Forests, New Delhi, to maintain the production capacity of Tatijharia Bauxite Mine as under.

A Specific condition:-

- (i) The wild life management plan has been approved.- Annexure-A
- (ii) We accept the condition.
- (iii) The conservation plan for schedule I fauna have been prepared. The authenticated list of flora and fauna for core and buffer zone is enclosed for perusal please. (Annexure- B).
- (iv) The mining operation is restricted to well above ground water table during currency of mining operation. The ultimate depth of working will be about 14 meters below whereas the water table in the core zone is about 50-52 meters.
- (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 is stacked at earmark location and slope of dump is maintained less than 28 degree. All protective measure such as retaining walls, bunds and also plantation on available land 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. The garland drains are regularly desilted before the monsoon.
- (viii) We undertake that no natural water course is obstructed during mining operation.


Agent of
Samri Mines Division
Hindalco Industries Ltd

- (ix) Controlled blasting is in practiced in the mine. Dust extractors are being used during drilling operations. Cord relay & effective blast design are used to control blast vibration and fly rocks. Blasting is carried out only in day hours.
- (x) The plantation in reclaimed area is carried out as per plan and is carried out as suggested. The density is being maintained about 2500 plant per hectare with the species like jatorpha, Kasia-Samia, mango, babul, pears, & guava etc. Social forestry is also being encouraged among the local villagers.
- (xi) The ground water table does not intersect during our mining operation because of shallow depth of mining
- (xii) Regular water spraying with 12 KL water tanker in the mine lease hold area is being carried out regularly to control air pollution. The ambient air quality is within the stipulated norms.
- (xiii) Regular monitoring of ground water quality is being carried out. The analysis reports are being submitted to Regional Office, CECB, Ambikapur and other regulating authority.
- (xiv) Till date three rain water harvesting ponds has been made at lease area.
- (xv) We are not drawing ground water for industrial use, if required, the permission will be taken from competent authority.
- (xvi) No endanger fauna is present in mines area however all possible measures is taken to prevent ecological status of project area.
- (xvii) 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.
- (xviii) All workers are provided personal protective equipment and training are also being imparted to them for safety & health, sanitation and will be continued. Health awareness camps including HIV are organized for all workmen. One doctor having MBBS qualification has been appointed for facilitation of OHS. We have undergone through initial & periodical test of all workers employed in the mines by the certified team. The records related to initial and periodical medical examination of all workmen is maintained.
- (xix) 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 to other regulatory authorities 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 are 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) Separate 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.


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

- (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.
Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.
Encl: As Above

कार्यालय प्रधान मुख्य वन संरक्षक (वन्यप्राणी प्रबंधन एवं जैव विविधता
संरक्षण सह मुख्य वन्यप्राणी अभिरक्षक), छत्तीसगढ़
अरण्य गवन, मेडिकल कॉलेज रोड, रायपुर
ईमेल: ocw@wsi.gov.in (Ph.0771-2552228, Fax 0771-2552227)

क्रमांक/व.प्र./प्रबंध-12/13/2967

रायपुर दिनांक 07/10/2013

प्रति,

- संचालक,
इन्वायरनमेंट क्लीयरेंस सेल
भारत सरकार, वन एवं पर्यावरण मंत्रालय,
पर्यावरण भवन, सी.जी.ओ. कॉम्प्लेक्स,
लोधी रोड, नई दिल्ली-111003

विषय :- छत्तीसगढ़ के बलरामपुर जिले (तत्कालीन सरगुजा जिला) में स्थित सामरी बॉक्साइट
माईन्स, कुदाग बॉक्साइट माईन्स एवं टाटीझरिया बॉक्साइट माईन्स की क्षमता बढ़ाये हेतु
इन्वायरमेंट क्लीयरेंस।

- संदर्भ:-
1. पर्यावरण व वन मंत्रालय, भारत सरकार का पत्र क्रमांक J-11015/353/2007-IA.II(M) दिनांक
27 जुलाई 2007.
 2. पर्यावरण व वन मंत्रालय, भारत सरकार का पत्र क्रमांक J-11015/337/2007-IA.II(M) दिनांक
27 जुलाई 2007.
 3. पर्यावरण व वन मंत्रालय, भारत सरकार का पत्र क्रमांक J-11015/337/2007-IA.II(M) दिनांक
9 अगस्त 2007.

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कृपया आपके उपरोक्त संदर्भित पत्रों का अवलोकन करने का कष्ट करें। जिसके द्वारा बलरामपुर जिले
(पुराने सरगुजा जिले) के सामरी बॉक्साइट खुली खदान (1 LTPA) की क्षमता बढ़ाकर (5LTPA) करने, कुदाग बॉक्साइट
खदान (0.4 LTPA) की क्षमता बढ़ाकर (0.6 LTPA) करने तथा टाटीझरिया बॉक्साइट खदान (0.5 TPA) की क्षमता बढ़ाकर
(4 TPA) करने के परियोजना प्रस्ताव के संबंध में वन्य प्राणी (संरक्षण) अधिनियम, 1972 के तहत अनुसूची-1 के वन्यप्राणियों
हेतु "वन्य प्राणी संरक्षण व प्रबंधन योजना" तैयार की जाकर इस कार्यालय की सहमति दिये जाने का लेख किया है।

1. विषयांकित परियोजना हेतु खदान के लीज के अनुबंध दिसंबर 1996 एवं जून 1998 में हस्ताक्षरित
हुये थे। सामरी क्षेत्र में भारत सरकार पर्यावरण व वन मंत्रालय के आदेश क्रमांक J-11015/353/2007-
IA.II/M दिनांक 27 जुलाई, 2007 द्वारा 2146.746 हे. में, कुदाग क्षेत्र में भारत सरकार पर्यावरण व वन
मंत्रालय आदेश क्रमांक J-11015/354/2007-IA.II/M दिनांक 27 जुलाई 2007 द्वारा 377.116 हे. में, तथा
टाटीझरिया में भारत सरकार पर्यावरण व वन मंत्रालय के आदेश क्रमांक J-11015/337/2007-IA.II/M
दिनांक 9 अगस्त 2007 द्वारा 1218.762 हे. में बॉक्साइट खनन की स्वीकृति प्राप्त कर संस्था द्वारा खनन
का कार्य किया जा रहा है।

1. वन्य प्राणी संरक्षण अधिनियम 1972 के अन्तर्गत स्वीकृत खादानों की क्षमता सामग्री के लिये 1.0 LPTA से बढ़ाकर 5.0 LPTA किया जाना, वन्य प्राणी संरक्षण अधिनियम के लिये 0.4 LPTA से बढ़ाकर 0.6 LPTA किया जाना एवं टाटीझरिया के लिये 30,000 TPA से बढ़ाकर 4,00,000 TPA किया जाना प्रस्तावित है। भारत सरकार पर्यावरण व वन विभाग के द्वारा उपरोक्त वृद्धि हेतु प्रथम चरण की स्वीकृति क्रमांक J-11015/353/2007-IA.II/M दिनांक 27 जुलाई 2007, J-11015/354/2007-IA.II/M दिनांक 27 जुलाई 2007 एवं J-11015/337/2007-IA.II/M दिनांक 9 अगस्त 2007 द्वारा कुछ शर्तों के साथ दी गई है जिसमें एक महत्वपूर्ण शर्त यह भी उल्लेखित है कि संबंधित क्षेत्र में वन्य प्राणी (संरक्षण) अधिनियम के शेड्यूल 1 के पाये जाने वाले वन्य प्राणियों के संरक्षण हेतु प्रबंध योजना तैयार की जाकर राज्य के मुख्य वन्य जीव अभिरक्षक के अभिमत सहित प्रस्तुत किया जाये। जिसके पालन में संस्था द्वारा एक वन्य प्राणी संरक्षण योजना तैयार की गयी है।
3. खनन क्षमता बढ़ाने से संबंधित प्रस्तावित तीनों ही परियोजनाओं के एक दूसरे से 4 कि.मी. की परिधि में स्थित होने एवं सभी के बफर क्षेत्र ओवरलैपिंग होने के कारण सभी के लिये संयुक्त रूप से वन्य प्राणी संरक्षण व प्रबंधन योजना तैयार की जाकर महाप्रबंधक, (खादान), हिन्डालको इन्डस्ट्रीज के पत्र क्रमांक HIL/SAM/300/2013 दिनांक 2.03.2013 द्वारा प्रस्तुत किया गया है जिसका समग्र रूप से परीक्षण किया गया। प्रस्तावित परियोजनाओं के कोर क्षेत्र से 10 कि.मी. की परिधि में आने वाले ओवरलैपिंग बफर क्षेत्र में वन्य प्राणियों एवं उपलब्ध वनस्पतियों का सर्वे किया जाकर पाये गये स्पेसिज को परियोजना प्रस्ताव में अनेक्सर-4 के में उल्लेखित किया गया है।
4. उल्लेखित सूचि में वन्य प्राणी (संरक्षण) अधिनियम के शेड्यूल 1 के वन्य प्राणी नहीं पाये गये हैं। परंतु इस कार्यालय द्वारा वन संरक्षक (वन्य प्राणी), सरगुजा से विगत दस वर्षों में वन्य प्राणियों द्वारा की गई क्षति की जानकारी चाही गयी। वन संरक्षक ने अपने पत्र क्रमांक 749 दिनांक 24.05.2012 से यह जानकारी उपलब्ध कराया है कि उक्त क्षेत्र में हाथियों का वर्ष 2005 में दो बार, वर्ष 2006 में आठ बार, 2007 में एक बार, 2008 में दो बार, 2009 में सात बार आना जाना हुआ है। इसी प्रकार भालुओं के द्वारा वर्ष 2007-08 में आठ, वर्ष 2008-09 में पाँच, वर्ष 2009-10 में छः एवं 2010-11 में 4 जनहानि व जनघायल के प्रकरण तथा वर्ष 2007-08 तथा 2008-09 में तेंदुआ द्वारा पशु हानि के दो प्रकरण तथा लकड़बग्घे के कारण एक प्रकरण दर्ज किये गये हैं। इस प्रकार वन्य प्राणी (संरक्षण) अधिनियम के शेड्यूल 1 के उपरोक्त उल्लेखित वन्य प्राणियों के परियोजना क्षेत्र में आने जाने के प्रमाण पाये गये हैं। प्रस्तावित क्षेत्र से 6 से 7 कि.मी.की दूरी पर झारखंड राज्य में भेड़िया अभ्यारण्य भी स्थापित है। अतः संस्था द्वारा दस वर्षों के लिये वन्य प्राणी संरक्षण व प्रबंध योजना श्री पी. के. सेन पूर्व वन्य प्राणी अभिरक्षक, झारखंड से तैयार कराया जाकर प्रस्तुत किया गया है। जिसका समग्र व विस्तृत अध्ययन किया गया। प्रबंधन योजना में प्रस्तावित प्रबंधन संबंधित मुख्य गतिविधियों का विवरण निम्नानुसार है।
5. योजना में वन्य प्राणियों के लिये जलग्रहण क्षेत्र विकास, रहवास-विकास, पेयजल व्यवस्था, विभाग के क्षेत्रीय अमले के सहयोग से क्षेत्र में पेट्रोलिंग व मॉनिटरिंग, अग्नि सुरक्षा, ईको विकास की गतिविधियाँ, स्थानीय ग्रामीणों के लिये आजीविका सृजन, टीकाकरण, जनजागृति कार्यक्रम जैसी गतिविधियों का

समाप्त करके इसे 04 वर्षों के लिये राशि रुपये 160 लाख प्रावधानित की गयी है। जिसका क्रियान्वयन उप विभाग के द्वारा किया जायेगा। प्रस्ताव में प्रावधानित बजट का विवरण निम्नानुसार है -

Sl. No.	Works to be done	Cost for Four years (Rs. In lakhs)					Remarks
		1 st Year	2 nd Year	3 rd Year	4 th Year	Total	
1	Plantation including soil and moisture Conservation works as per norms of forest department surrounding the lease hold	5.00	5.00	5.00	5.00	20.00	
2	Silvicultural Operation on degraded forest Land and cut back in rooted waste	2.00	2.00	2.00	2.00	8.00	
3	Habitat Management Eradication of unwanted species in buffer Zone area, Fire Protection work including wages for fire watchman, Creation of Fire line etc. surrounding lease hold and in buffer area.	2.50	2.50	2.50	2.50	10.00	
4	Monitoring - One Staff of forest department to monitor movement of wild life, encroachment, illicit cutting, poaching, fire etc. including Salary of 1 staff	3.00	3.00	3.00	3.00	12.00	
5	Construction of water holes, their maintenance and patrolling (One per Annum)	10.00	10.00	10.00	10.00	40.00	
6	Eco-development activities like poultry, piggery, bee keeping etc.	5.00	5.00	5.00	5.00	20.00	
7	Vocational Training to weaker section, females, old persons and minors of the surrounding villages in three centre in the buffer Zone of the mining lease @ 50000/- per centre.	3.00	3.00	3.00	3.00	12.00	
8	Veterinary camp for immunization of Cattle with the help of block veterinary staff.	2.00	2.00	2.00	2.00	8.00	
9	Awareness Programme including Signages, distribution of Pamphlets related to wild life conservation etc.	2.50	2.50	2.50	2.50	10.00	
10	Provision for conservation of Biodiversity among flora and fauna of the area & Preparation of Biodiversity register	20.00	0.00	0.00	0.00	20.00	The amount is to be deposited in the account of Biodiversity Board as this work is to be done by Biodiversity management committees (BMC's)
Total		55.00	35.00	35.00	35.00	160.00	

6. वन्यप्राणी संरक्षण योजना के अन्तर्गत रु. 160.00 लाख वर्तमान दरों पर है, परियोजना में दरी हानि से यह लागत काफी कम आयेगी। वन्यप्राणी संरक्षण से वृद्धि होगी। परियोजना के क्रियान्वयन के समय जो भी लागत आयेंगी वन्यप्राणी संरक्षण परियोजना के वन विभाग में एकमुश्त जमा करानी होगी। जिससे मूल्य वृद्धि के प्रभाव को समाप्त किया जा सकेगा। वन्यप्राणी संरक्षण योजना की गई राशि से वन्यप्राणी संरक्षण योजना क्रियान्वित करेगा।
7. अनुप्राणित वन्यप्राणी संरक्षण योजना की एक प्रति संलग्न प्रेषित है। कृपया वन्यप्राणी संरक्षण योजना में प्रावधानित राशि रु. 160.00 लाख एकमुश्त जमा कराने हेतु परियोजना प्रस्तावकों को आदेशित करने का कष्ट करें।

संलग्न:- उपरोक्तानुसार।

Ramprakash
(रामप्रकाश) 01/12/13

प्रधान मुख्य वन संरक्षक (वन्यप्राणी)
छत्तीसगढ़, रायपुर

पृष्ठा क्रमांक/व.प्रा./प्रबंध-12/13/ 2968.

रायपुर दिनांक 01/10/2013

प्रतिलिपि :-

1. प्रमुख सचिव, छत्तीसगढ़ शासन, वन विभाग, महानदी मंत्रालय भवन, नया रायपुर की ओर मय योजना की प्रति सहित सूचनार्थ प्रेषित।
2. श्री एम. के. नायक, जी. एम. माइन्स हिन्डालको इन्डस्ट्रीज लिमिटेड, सामरी बॉक्सवार्ड माइन्स, पोस्ट-कुसनी, जिला-सरगुजा, छत्तीसगढ़ की ओर मय योजना की प्रति सहित सूचनार्थ प्रेषित।

Ramprakash
प्रधान मुख्य वन संरक्षक (वन्यप्राणी) 01/12/13
छत्तीसगढ़, रायपुर

Annexure - B

Annexure-6

Details of Flora and Fauna


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

**ANNEXURE-6
DETAILS OF FLORA & FAUNA**

**TABLE-1
DETAILS OF DOMINANT PLANT SPECIES IN MINE LEASE AREA (CORE ZONE)**

Name of the plant Species	Local Name	Family
<i>Butea monosperma</i>	Palas	Fabaceae
<i>Acacia Arabica</i>	Babul	Mimosaceae
<i>Leucena leucophloe</i>	Sabubal	Mimosaceae
<i>Mangifera indica</i>	Aam	Anacardiaceae
<i>Citrus lemon</i>	Nimbu	Rutaceae
<i>Emblica officinalis</i>	Amla	Euphorbiaceae
<i>Ficus hispida</i>	Jungli anjir	Moraceae
<i>Spondias cythera</i>	Kathjamun	Myrtaceae
<i>Terminalia catapa</i>	Badam	Combretaceae
<i>Apluda mutica</i>	Grass	Poaceae
<i>Chloris dolichosta</i>	Grass	Poaceae
<i>Dichanthium annulatum</i>	Grass	Poaceae
<i>Inpurta cylendrica</i>	Grass	Poaceae
<i>Themeda quadrivalvis</i>	Grass	Poaceae
<i>Aristida adscensionsis</i>	Grass	Poaceae
<i>Eragrostis biferia</i>	Grass	Poaceae
<i>Eragrostis tenella</i>	Grass	Poaceae
<i>Setaria glauca</i>	Grass	Cyperaceae
<i>Thysanolaena maxima</i>	Grass	Graminae
<i>Parthenium hysterophorus</i>	Congress grass	Compositae
<i>Cassia tora</i>	-	Caesalpinaceae
<i>Delonix regia</i>	Kachnar	Caesalpinaceae
<i>Dalbergia Sissoo</i>	Sisoo	Caesalpinaceae

**TABLE-2
FLORA/VEGETATION IN STUDY AREA (BUFFER ZONE)**

Sr. No.	Technical Name	Family	Life Form
I. Agricultural Crops			
1	<i>Hordium vulgare</i>	Poaceae	Hemicryptophyte
2	Sorghum vulgare	Poaceae	Hemicryptophyte
3	<i>Triticum vulgare</i>	Poaceae	Hemicryptophyte
4	<i>Zea mays</i>	Poaceae	Hemicryptophyte
5	<i>Oryza sativa</i>	Poaceae	Hemicryptophyte
6	<i>Pennisetum typhoideum</i>	Poaceae	Hemicryptophyte
II. Commercial Crops (including Vegetables)			
7	<i>Abelmoschus indicus</i>	Malvaceae	Therophyte
8	<i>Allium cepa</i>	Liliaceae	Geophyte
9	<i>Allium sativum</i>	Liliaceae	Geophyte
10	<i>Annona squamosa</i>	Annonaceae	Phanerophyte
11	<i>Arachis hypogia</i>	Fabaceae	Geophyte
12	<i>Catharanthes pusillus</i>	Compositae	Therophyte
13	Cicer arletinum	Fabaceae	Hemicryptophyte
14	<i>Citrus lemon</i>	Ruataceae	Therophyte
15	<i>Colacasia esculenta</i>	Areaceae	Geophyte
16	<i>Coreandrum sativum</i>	Umbelliferae	Hemicryptophyte
17	<i>Daucus carota</i>	Umbelliferae	Geophyte
18	<i>Lycopersicum esculentus</i>	Solanaceae	Therophyte
19	<i>Mangifera indica</i>	Anacardiaceae	Phanerophyte
20	<i>Memordia charantia</i>	Cucurbitaceae	Therophyte
21	<i>Pisum sativum</i>	Fabaceae	Therophyte
22	<i>Psidium guava</i>	Myrtaceae	Phanerophyte
23	<i>Solanum tuberosum</i>	Solanaceae	Geophyte
24	<i>Litchi chinensis</i>	Sapindaceae	Phanerophyte
III. Plantations			
25	<i>Bauhinia cormbosa</i>	Caesalpinaceae	Phanerophyte
26	<i>Acacia nilotica</i>	Mimosaceae	Phanerophyte
27	<i>Albizia lebbeck</i>	Mimosaceae	Phanerophyte
28	<i>Albizia odorattissima</i>	Mimosaceae	Phanerophyte
29	<i>Albizia procera</i>	Mimosaceae	Phanerophyte

Sr. No.	Technical Name	Family	Life Form
30	<i>Azadirachta indica</i>	Meliaceae	Phanerophyte
31	<i>Bauhinia variegata</i>	Caesalpinaceae	Phanerophyte
32	<i>Bauhinia purpuria</i>	Caesalpinaceae	Phanerophyte
33	<i>Bambusa arundanaceae</i>	Poaceae	Phanerophyte
34	<i>Butea monosperma</i>	Caesalpinaceae	Phanerophyte
35	<i>Butea frondosa</i>	Caesalpinaceae	Phanerophyte
36	<i>Eucalyptus sp</i>	Myrtaceae	Phanerophyte
37	<i>Delonix regia</i>	Caesalpinaceae	Phanerophyte
38	<i>Leucena leucophloe</i>	Caesalpinaceae	Phanerophyte
IV. Natural Vegetation/ Forest Type			
39	<i>Abrus precatorius</i>	Fabaceae	Therophyte
40	<i>Abutilon indicum</i>	Malvaceae	Phanerophyte
41	<i>Acacia Arabica</i>	Mimosaceae	Phanerophyte
42	<i>Acacia auriculiformis</i>	Mimosaceae	Phanerophyte
43	<i>Acacia catechu</i>	Mimosaceae	Phanerophyte
44	<i>Acacia intinsia</i>	Mimosaceae	Phanerophyte
45	<i>Acacia fernacea</i>	Mimosaceae	Phanerophyte
46	<i>Acacia leucophloe</i>	Mimosaceae	Phanerophyte
47	<i>Acalypha lanceolata</i>	Euphorbiaceae	Therophyte
48	<i>Acanthospermum hispidum</i>	Compositae	Therophyte
49	<i>Achyranthes aspera</i>	Amaranthaceae	Therophyte
50	<i>Apathia vasica</i>	Acanthaceae	Therophyte
51	<i>Adina cordifolia</i>	Rubiaceae	Phanerophyte
52	<i>Aegle marmelos</i>	Rutaceae	Phanerophyte
53	<i>Aerva lanata</i>	Compositae	Phanerophyte
54	<i>Ageratum conyzoides</i>	Compositae	Therophyte
55	<i>Ailanthus excelsa</i>	Simaroubaceae	Phanerophyte
56	<i>Alangium salivus</i>	Alangiceae	Phanerophyte
57	<i>Albizia odoratissima</i>	Caesalpinaceae	Phanerophyte
58	<i>Albizia procera</i>	Caesalpinaceae	Phanerophyte
59	<i>Alstonia scholaris</i>	Apocyanaceae	Phanerophyte
60	<i>Alternanthera sessilis</i>	Amaranthaceae	Therophyte
61	<i>Alysicarpus hamosus</i>	Fabaceae	Therophyte
62	<i>Anogeissus latifolia</i>	Combretaceae	Phanerophyte
63	<i>Anogeissus sericea</i>	Combretaceae	Phanerophyte
64	<i>Argemone mexicana</i>	Papaveraceae	Phanerophyte
65	<i>Azadirachta indica</i>	Meliaceae	Phanerophyte
66	<i>Barleria prionites</i>	Acanthaceae	Therophyte
67	<i>Bidens biternata</i>	Compositae	Therophyte
68	<i>Blepharis asperima</i>	Acanthaceae	Phanerophyte
69	<i>Blepharis madaraspatens</i>	Acanthaceae	Therophyte
70	<i>Blumea lacera</i>	Compositae	Therophyte
71	<i>Boerhaavia chinensis</i>	Nyctaginaceae	Therophyte
72	<i>Boerhaavia diffusa</i>	Nyctaginaceae	Therophyte
73	<i>Bombax ceiba</i>	Bombacaceae	Phanerophyte
74	<i>Borreria hispida</i>	Rubiaceae	Therophyte
75	<i>Borreria stricta</i>	Rubiaceae	Therophyte
76	<i>Boswellia serrata</i>	Burseraceae	Phanerophyte
77	<i>Brassica campestris</i>	Cruciferae	Therophyte
78	<i>Bridelia retusa</i>	Euphorbiaceae	Phanerophyte
79	<i>Bridelia superba</i>	Euphorbiaceae	Phanerophyte
80	<i>Caesalpinia pulcherima</i>	Caesalpinaceae	Phanerophyte
81	<i>Calotropis procera</i>	Asclepiadaceae	Phanerophyte
82	<i>Canthium diddymum</i>	Rubiaceae	Phanerophyte
83	<i>Capparis aphylla</i>	Capparidaceae	Therophyte
84	<i>Capparis deciduas</i>	Capparidaceae	Phanerophyte
85	<i>Carissa carandus</i>	Apocyanaceae	Phanerophyte
86	<i>Carissa spinarium</i>	Apocyanaceae	Phanerophyte
87	<i>Casearia graveolens</i>	Samydiaceae	Phanerophyte
88	<i>Cassia absus</i>	Caesalpinaceae	Phanerophyte
89	<i>Cassia absus</i>	Caesalpinaceae	Therophyte
90	<i>Cassia auriculata</i>	Caesalpinaceae	Therophyte
91	<i>Cassia occidentalis</i>	Caesalpinaceae	Therophyte
92	<i>Cassia tora</i>	Caesalpinaceae	Phanerophyte
93	<i>Cestrum diurnum</i>	Rubiaceae	Therophyte
94	<i>Cestrum nocturnum</i>	Rubiaceae	Therophyte

Sr. No.	Technical Name	Family	Life Form
95	<i>Chloris variegata</i>	Poaceae	Therophyte
96	<i>Cissus quadrangularis</i>	Vitaceae	Therophyte
97	<i>Citrus limon</i>	Rutaceae	Phanerophyte
98	<i>Cleome gynandra</i>	Capparidaceae	Therophyte
99	<i>Combretum ovalifolium</i>	Rubiaceae	Phanerophyte
100	<i>Cordia myxa</i>	Rubiaceae	Phanerophyte
101	<i>Crotalaria medicagenia</i>	Fabaceae	Therophyte
102	<i>Croton bonplandinum</i>	Ameyllidaceae	Therophyte
103	<i>Cuscuta reflexa</i>	Cuscutaceae	Epiphyte
104	<i>Datura fastulosa</i>	Solanaceae	Therophyte
105	<i>Datura metal</i>	Solanaceae	Therophyte
106	<i>Desmodium triflorum</i>	Asclepiadaceae	Therophyte
107	<i>Diospyros melanoxylon</i>	Lythraceae	Phanerophyte
108	<i>Diospyros Montana</i>	Lythraceae	Phanerophyte
109	<i>Echinops echinatus</i>	Compositae	Therophyte
110	<i>Eclipta prostrate</i>	Compositae	Hemicryptophyte
111	<i>Emblca officinale</i>	Euphorbiaceae	Phanerophyte
112	<i>Emilia lajerium</i>	Compositae	Hemicryptophyte
113	<i>Erythrina indica</i>	Papillionaceae	Phanerophyte
114	<i>Euphorbia geniculata</i>	Euphorbiaceae	Therophyte
115	<i>Euphorbia hirta</i>	Euphorbiaceae	Therophyte
116	<i>Euphorbia hyperocifolia</i>	Euphorbiaceae	Therophyte
117	<i>Euphorbia neruri</i>	Euphorbiaceae	Therophyte
118	<i>Euphorbia nivula</i>	Euphorbiaceae	Therophyte
119	<i>Euphorbia piluliflora</i>	Euphorbiaceae	Hemicryptophyte
120	<i>Euphorbia tricauli</i>	Euphorbiaceae	Hemicryptophyte
121	<i>Evolvulus alsinoides</i>	Convolvulaceae	Therophyte
122	<i>Evolvulus numalaris</i>	Convolvulaceae	Therophyte
123	<i>Feronia elephantum</i>	Rutaceae	Phanerophyte
124	<i>Ficus benghalensis</i>	Moraceae	Phanerophyte
125	<i>Ficus carica</i>	Moraceae	Phanerophyte
126	<i>Ficus glomerata</i>	Moraceae	Phanerophyte
127	<i>Ficus hispida</i>	Moraceae	Phanerophyte
128	<i>Ficus racemosus</i>	Moraceae	Phanerophyte
129	<i>Ficus religiosa</i>	Moraceae	Phanerophyte
130	<i>Ficus gibbosa</i>	Moraceae	Phanerophyte
131	<i>Gardenia latifolia</i>	Rubiaceae	Phanerophyte
132	<i>Gardenia lucida</i>	Rubiaceae	Phanerophyte
133	<i>Garuga pinnata</i>	Burseraceae	Phanerophyte
134	<i>Glossocardia bosvellia</i>	Compositae	Hemicryptophyte
135	<i>Gmelina arborea</i>	Rubiaceae	Phanerophyte
136	<i>Gomphrena globosa</i>	Amaranthaceae	Therophyte
137	<i>Gossypium herbaceum</i>	Malvaceae	Therophyte
138	<i>Grewia abutifolia</i>	Tiliaceae	Phanerophyte
139	<i>Grewia salivifolia</i>	Tiliaceae	Phanerophyte
140	<i>Grewia subinaqualis</i>	Tiliaceae	Phanerophyte
141	<i>Gynandropis gynandra</i>	Capparidaceae	Hemicryptophyte
142	<i>Helictis isora</i>	Rubiaceae	Phanerophyte
143	<i>Heliotropium indicum</i>	Rubiaceae	Hemicryptophyte
144	<i>Heliotropium ovalifolium</i>	Rubiaceae	Hemicryptophyte
145	<i>Hemidesmus indicus</i>	Asclepiadaceae	Phanerophyte
146	<i>Hibiscus caesus</i>	Malvaceae	Hemicryptophyte
147	<i>Holarrhena antidycenterica</i>	Asclepiadaceae	Phanerophyte
148	<i>Holostemma annularia</i>	Asclepiadaceae	Phanerophyte
149	<i>Hygrophylla auriculata</i>	Acanthaceae	Hemicryptophyte
150	<i>Hyptis suavalens</i>	Labiatae	Therophyte
151	<i>Ichnocarpus frutens</i>	Poaceae	Hemicryptophyte
152	<i>Impatiens balasamania</i>	Balsaminaceae	Therophyte
153	<i>Indigofera hirsute</i>	Caesalpinaceae	Therophyte
154	<i>Indigofera limnacea</i>	Caesalpinaceae	Therophyte
155	<i>Indigofera tinctoria</i>	Caesalpinaceae	Therophyte
156	<i>Ipomea aquatica</i>	Convolvulaceae	Hydrophyte
157	<i>Ipomea coccinea</i>	Convolvulaceae	Therophyte
158	<i>Ipomea tuba</i>	Convolvulaceae	Hemicryptophyte
159	<i>Ixora arborea</i>	Rubiaceae	Phanerophyte
160	<i>Ixora parviflora</i>	Rubiaceae	Phanerophyte

Sr. No.	Technical Name	Family	Life Form
161	<i>Ixora singapuriens</i>	Rubiaceae	Phanerophyte
162	<i>Jasmimum arborens</i>	Oleaceae	Phanerophyte
163	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Therophyte
164	<i>Jussiaea suffraticosa</i>	Onagraceae	Hydrophyte
165	<i>Justia diffusa</i>	Acanthaceae	Therophyte
166	<i>Justicia diffusa</i>	Acanthaceae	Therophyte
167	<i>Lactuca punctata</i>	Compositae	Therophyte
168	<i>Lannea coramandalica</i>	Anacardiaceae	Phanerophyte
169	<i>Lannea grandis</i>	Anacardiaceae	Phanerophyte
170	<i>Lannea procumbens</i>	Anacardiaceae	Therophyte
171	<i>Lantana camara</i>	Verbinaceae	Phanerophyte
172	<i>Lawsonia inermis</i>	Lythraceae	Phanerophyte
173	<i>Lepidogathis cristata</i>	Acanthaceae	Therophyte
174	<i>Leptodenia reticulata</i>	Asclepiadaceae	Phanerophyte
175	<i>Leucas aspera</i>	Labiatae	Therophyte
176	<i>Leucas longifolia</i>	Labiatae	Therophyte
177	<i>Leucas longifolia</i>	Labiatae	Therophyte
178	<i>Leucena leucophloe</i>	Caesalpinaceae	Phanerophyte
179	<i>Linderbergia indica</i>	Scrophulariaceae	Therophyte
180	<i>Lindernbergia ciliate</i>	Scrophulariaceae	Therophyte
181	<i>Lophophora tridinatus</i>	Scrophulariaceae	Geophyte
182	<i>Luffa acutangularia</i>	Cucurbitaceae	Therophyte
183	<i>Lycopersicum esculentus</i>	Solanaceae	Therophyte
184	<i>Madhuca latifolia</i>	Sapotaceae	Phanerophyte
185	<i>Mallotus philippinus</i>	Euphorbiaceae	Phanerophyte
186	<i>Malvastrum coramandalicum</i>	Malvaceae	Therophyte
187	<i>Mangifera indica</i>	Anacardiaceae	Phanerophyte
188	<i>Marselia quadrifolia</i>	Marseliaceae	Phanerophyte
189	<i>Melia azadirachta</i>	Meliaceae	Phanerophyte
190	<i>Memordica diocea</i>	Cucurbitaceae	Therophyte
191	<i>Merremia emerginata</i>	Convolvulaceae	Therophyte
192	<i>Michaelia champaca</i>	Annonaceae	Phanerophyte
193	<i>Millingtonia hartensis</i>	Bignoniaceae	Phanerophyte
194	<i>Mimosa hamata</i>	Mimosaceae	Therophyte
195	<i>Mitragyna parviflora</i>	Rubiaceae	Phanerophyte
196	<i>Mollugo cerviana</i>	Aizoaceae	Therophyte
197	<i>Mollugo hirta</i>	Aizoaceae	Therophyte
198	<i>Moringa oleifera</i>	Moringaceae	Phanerophyte
199	<i>Morus alba</i>	Moraceae	Phanerophyte
200	<i>Mucuna prurita</i>	Papilionaceae	Hemicryptophyte
201	<i>Murraya exotica</i>	Rutaceae	Phanerophyte
202	<i>Murraya koenigii</i>	Rutaceae	Phanerophyte
203	<i>Musa paradisiaca</i>	Musaceae	Therophyte
204	<i>Nymphia sp</i>	Magnoliaceae	Hydrophyte
205	<i>Ocimum americanum</i>	Labiatae	Therophyte
206	<i>Ocimum basillum</i>	Labiatae	Therophyte
207	<i>Ocimum canum</i>	Labiatae	Therophyte
208	<i>Ocimum sanctum</i>	Labiatae	Therophyte
209	<i>Oldenlandia umbellate</i>	Convolvulaceae	Therophyte
210	<i>Oldenlandia corymbosa</i>	Rubiaceae	Therophyte
211	<i>Ooquinia oojensis</i>	Papilionaceae	Phanerophyte
212	<i>Opuntia dillinii</i>	Opuntiaceae	Therophyte
213	<i>Opuntia elator</i>	Cacataceae	Therophyteq
214	<i>Oxalis corniculata</i>	Oxalidaceae	Therophyte
215	<i>Panicum milliria</i>	Poaceae	Hemicryptophyte
216	<i>Panicum notatum</i>	Poaceae	Hemicryptophyte
217	<i>Papaver somniferum</i>	Papaveraceae	Hemicryptophyte
218	<i>Parkinsonia aculata</i>	Mimosaceae	Phanerophyte
219	<i>Parthenium hysterophorus</i>	Compositae	Therophyte
220	<i>Paspalum strobilanthus</i>	Passifloraceae	Hemicryptophyte
221	<i>Passiflora foetida</i>	Passifloraceae	Phanerophyte
222	<i>Pavonia zeylanica</i>	Malvaceae	Phanerophyte
223	<i>Peltophorum ferrusinum</i>	Caesalpinaceae	Phanerophyte
224	<i>Phoenix aculis</i>	Palmae	Phanerophyte
225	<i>Phyllanthus asperulatus</i>	Euphorbiaceae	Phanerophyte
226	<i>Phyllanthus emblica</i>	Euphorbiaceae	Phanerophyte

Sr. No.	Technical Name	Family	Life Form
227	<i>Phyllanthes niruri</i>	Euphorbiaceae	Therophyte
228	<i>Phyllanthes reticulatus</i>	Euphorbiaceae	Therophyte
229	<i>Physalis minima</i>	Solanaceae	Therophyte
230	<i>Pithecolobium dulce</i>	Mimosaceae	Phanerophyte
231	<i>Polyalthia longifolia</i>	Annonaceae	Phanerophyte
232	<i>Polygala ererptera</i>	Polygalaceae	Therophyte
233	<i>Pongamia pinnata</i>	Fabaceae	Phanerophyte
234	<i>Portulaca oleracea</i>	Portulacaceae	Therophyte
235	<i>Psidium guava</i>	Myrtaceae	Phanerophyte
236	<i>Punica granatum</i>	Puniaceae	Therophyte
237	<i>Randia dumetorum</i>	Rubiaceae	Phanerophyte
238	<i>Rosa indica</i>	Rosaceae	Therophyte
239	<i>Rosa machata</i>	Rosaceae	Therophyte
240	<i>Saccharum munja</i>	Poaceae	Hemicryptophyte
241	<i>Saccharum officinarum</i>	Poaceae	Therophyte
242	<i>Salmalia malabarica</i>	Salmaliaceae	Phanerophyte
243	<i>Sapindus emarginatus</i>	Sapindaceae	Phanerophyte
244	<i>Schleichera trijuga</i>	Combretaceae	Phanerophyte
245	<i>Schrebera swietenoides</i>	Sapindaceae	Phanerophyte
246	<i>Schleichera oleosa</i>	Sapindaceae	Phanerophyte
247	<i>Sesamum indicum</i>	Pedaliaceae	Hemicryptophyte
248	<i>Shorea robusta</i>	Dipterocarpaceae	Phanerophyte
249	<i>Sida orientalis</i>	Malvaceae	Phanerophyte
250	<i>Sida vernanifolia</i>	Malvaceae	Hemicryptophyte
251	<i>Solanum nigrum</i>	Solanaceae	Therophyte
252	<i>Solanum xanthocarpum</i>	Solanaceae	Therophyte
253	<i>Sterculia villosa</i>	Tiliaceae	Therophyte
254	<i>Stereospermum chelinoides</i>	Bignoniaceae	Phanerophyte
255	<i>Sygygium cumini</i>	Myrtaceae	Phanerophyte
256	<i>Tamarindus indica</i>	Caesalpinaceae	Phanerophyte
257	<i>Tecomella undulate</i>	Bignoniaceae	Therophyte
258	<i>Tectona grandis</i>	Verbinaceae	Phanerophyte
259	<i>Tephrosia purpuria</i>	Fabaceae	Therophyte
260	<i>Terminalia bellarica</i>	Combretaceae	Phanerophyte
261	<i>Terminalia chebula</i>	Combretaceae	Phanerophyte
262	<i>Terminalia tomentosa</i>	Combretaceae	Phanerophyte
263	<i>Tinospora cordifolia</i>	Rhamnaceae	Therophyte
264	<i>Tragus biflorus</i>	Poaceae	Hemicryptophyte
265	<i>Tribulus terrestris</i>	Zygophyllaceae	Therophyte
266	<i>Tridax procumbens</i>	Compositae	Therophyte
267	<i>Triumferta pilosa</i>	Tiliaceae	
268	<i>Vernonia cinera</i>	Compositae	Therophyte
269	<i>Vicoa indica</i>	Compositae	Phanerophyte
270	<i>Vitex Negundo</i>	Verbinaceae	Phanerophyte
271	<i>Vitex negundo</i>	Verbinaceae	Therophyte
272	<i>Vitis vermicifera</i>	Vitaceae	Therophyte
273	<i>Vivevera zizanoides</i>	Poaceae	Therophyte
274	<i>Wrightia tomentosa</i>	Apocyanaceae	Phanerophyte
275	<i>Xanthium strumarium</i>	Compositae	Therophyte
276	<i>Yucca gloriosa</i>	Agavaceae	Therophyte
277	<i>Zizyphus jujube</i>	Rhamnaceae	Phanerophyte
278	<i>Zizyphus mauritiana</i>	Rhamanaceae	Phanerophyte
V. Grasslands			
279	<i>Apluda mutica</i>	Poaceae	Hemicryptophyte
280	<i>Chloris dolichosta</i>	Poaceae	Hemicryptophyte
281	<i>Cyanodactylon sp</i>	Poaceae	Geophyte
282	<i>Dichanthium annulatum</i>	Poaceae	Hemicryptophyte
283	<i>Inpurta cylendrica</i>	Poaceae	Hemicryptophyte
284	<i>Sachharum spontansem</i>	Poaceae	Hemicryptophyte
285	<i>Themeda quadrivalvis</i>	Poaceae	Hemicryptophyte
286	<i>Aristida adscensionsis</i>	Poaceae	Hemicryptophyte
287	<i>Cenchrus ciliaris</i>	Poaceae	Therophyte
288	<i>Cenchrus setifera</i>	Poaceae	Therophyte
289	<i>Cymbopogon jwarancusa</i>	Cyperaceae	Hemicryptophyte
290	<i>Cyperus aristatus</i>	Cyperaceae	Therophyte
291	<i>Cyperus triceps</i>	Cyperaceae	Therophyte

Sr. No.	Technical Name	Family	Life Form
292	<i>Dactylectinium annualatum</i>	Poaceae	Therophyte
293	<i>Digetaria bicornis</i>	Poaceae	Hemicryptophyte
294	<i>Digetaria Segetaria</i>	Poaceae	Hemicryptophyte
295	<i>Eragrostis biferia</i>	Poaceae	Therophyte
296	<i>Eragrostis tenella</i>	Poaceae	Therophyte
297	<i>Ischaemum rugosum</i>	Poaceae	Hemicryptophyte
298	<i>Setaria glauca</i>	Cyperaceae	Hemicryptophyte
299	<i>Eulaliopsis binata</i>	Graminae	Hemicryptophyte
300	<i>Thysanolaena maxima</i>	Graminae	Hemicryptophyte
	Endangered plants	No endangered plant species observed during study period and also from records of Botanical Survey of India (Red data of Books of Indian Plants)	

TABLE-3
FAUNA AND THEIR CONSERVATION STATUS FROM MINE LEASE AREA (CORE ZONE)

Technical Name	English Name/ Local Name	Wild Life Protection Act (1972) Status
Aves		
<i>Phalacrocorax niger</i>	Little cormorant	Sch-IV
<i>Nycticorax nycticorax</i>	Night heron	Sch-IV
<i>Ardeola grayii grayii</i>	Paddy bird	Sch-IV
<i>Bubulcus ibis coromandus</i>	Cattle egret	Sch-IV
<i>Eudynamys scolopacea</i>	Indian koel	Sch-IV
<i>Meops philippinus philippinus</i>	Bluetailed bee-eater	Sch-IV
<i>Dinopium benghalense tehminae</i>	Malabar golden backed Woodpecker	Sch-IV
<i>Acridotheres tristis tristis</i>	Common myna	Sch-IV
<i>Nectarinia minima</i>	Small sunbird	Sch-IV
<i>Passer domesticus indicus</i>	Indian house sparrow	Sch-IV
Butterflies		
<i>Hypolimnas bolina Lin.</i>	Great eggfly	-
<i>Euploea core Cramer</i>	Common crow	-
<i>Neptis hylas Moore</i>	Common sailor	-
<i>Eurema hecabe Lin.</i>	Common grass yellow	-
<i>Parantica aqlea Stoll.</i>	Glassy tiger	-
Mammals		
<i>Funambulus palmarum</i>	Squirrel	Sch-IV
<i>Sus sucrofa</i>	Wild pig	Sch-III
<i>Herpestes edwardii</i>	Common mongoose	Sch-IV
<i>Vulpus benghalensis</i>	Wild fox	Sch-II
<i>Hystrix indica</i>	Porcupine	Sch-IV

TABLE-4
FAUNA AND THEIR CONSERVATION STATUS IN STUDY AREA (BUFFER ZONE)

Technical Name	English Name/Local Name	Wild Life Protection Act (1972)
Aves		
<i>Phalacrocorax niger</i>	Little cormorant	Sch-IV
<i>Ardea purpurea manilensis</i>	Eastern purple heron	Sch-IV
<i>Nycticorax nycticorax</i>	Night heron	Sch-IV
<i>Ardeola grayii grayii</i>	Paddy bird	Sch-IV
<i>Dupetor flavicollis</i>	Black bittern	Sch-IV
<i>Ardea alba modesta</i>	Large egret	Sch-IV
<i>Bubulcus ibis coromandus</i>	Cattle egret	Sch-IV
<i>Milvus migrans govinda</i>	Common pariah kite	Sch-IV
<i>Haliastur indus indus</i>	Brahminy kite	Sch-IV
<i>Vanellus indicus indicus</i>	Redwattled lapwing	Sch-IV
<i>Tringa hypoleucos</i>	Common sandpiper	Sch-IV
<i>Gelochelidon nilotica nilotica</i>	Gullbilled tern	Sch-IV
<i>Eudynamys scolopacea</i>	Indian koel	Sch-IV
<i>Halkyon smyrnensis fusca</i>	Indian white breasted Kingfisher	Sch-IV
<i>Meops philippinus philippinus</i>	Bluetailed bee-eater	Sch-IV

Technical Name	English Name/Local Name	Wild Life Protection Act (1972)
<i>Coracias benghalensis indica</i>	Southern Indian Roller	Sch-IV
<i>Dinopium benghalense tehrinae</i>	Malabar golden backed Woodpecker	Sch-IV
<i>Acridotheres tristis tristis</i>	Common myna	Sch-IV
<i>Corvus splendens protegatus</i>	Ceylon house crow	Sch-IV
<i>Nectarinia minima</i>	Small sunbird	Sch-IV
<i>Nectarinia. zeylonica sola</i>	Indian purple rumped sunbird	Sch-IV
<i>Arachnothera longirostris longirostris</i>	Little spinder hunter	Sch-IV
<i>Passer domesticus indicus</i>	Indian house sparrow	Sch-IV
<i>Copsychus saularis ceyonensis</i>	Southern magpie-robin	Sch-IV
<i>Orthotomus sutorius</i>	Tailor bird guzurata	Sch-IV
<i>Pavocristatus</i>	Peacock	Part-III of Sch-I
Amphibians		
<i>Rana tlqrlana</i>	Common frog	Sch-IV
<i>Buto melanosticus</i>	Toad	Sch-IV
Reptiles		
<i>Calotes versicolor</i>	Lizard	Sch-IV
<i>Calotes versicolor</i>	Common garden lizard	Sch-IV
<i>Chamaleon zeylanicus</i>	Indian chamaeleon	Sch-II
<i>Lycodon spp.</i>	Wolf snake	Sch-III
<i>Boiga spp.</i>	Cat snake	Sch-III
<i>Bangarus spp.</i>	Krait	Sch-II
<i>Naja naja</i>	Indian cobra	Sch-III
<i>Vipera spp.</i>	Russels viper	Sch-III
<i>Phyton sp</i>	Python sp	Sch-I
Butterflies		
<i>Pachloopta hector Lin.</i>	Crimson rose	-
<i>Papilio demoleus Lin.</i>	Lime butterfly	-
<i>Graphium agamemnon Lin.</i>	Tailed jay	-
<i>Junoria almana Lin.</i>	Peacock pansy	-
<i>Hypolimnas bolina Lin.</i>	Great eggfly	-
<i>Euploea core Cramer</i>	Common crow	-
<i>Neptis hylas Moore</i>	Common sailor	-
<i>Eurema hecabe Lin.</i>	Common grass yellow	-
<i>Catopsilia sp.</i>	Emigrant	-
Mammals		
<i>Rattus sp.</i>	Rat	Sch-IV
<i>Lepus nigricollis</i>	Hare	Sch-IV
<i>Canis aures</i>	Jackal	Sch-III
<i>Presbytis entellus</i>	Langur	Sch-II
<i>Presbytis phayrei</i>	Monkey	Sch-I
<i>Funambulus spp.</i>	Squirrel	Sch-IV
<i>Funambulus palmarum</i>	Squirrel	Sch-IV
<i>Sus sucrofa</i>	Wild pig	Sch-III
<i>Rattus norvegicus</i>	Field mouse	Sch-V
<i>Rattus rattus</i>	House rat	Sch-V
<i>Rhinolopus spp.</i>	Bat	Sch-V
<i>Hipposiderus spp.</i>	Bat	Sch-V
<i>Herpestes edwardii</i>	Common mongoose	Sch-IV
<i>Bandicota indica</i>	Bandicoot	Sch-V
<i>Bandicota bengalensis</i>	Bandicoot	Sch-V
<i>Vulpus benghalensis</i>	Wild fox	Sch-III
<i>Melsurus ursinus</i>	Bear	Sch-III
<i>Hystrix indica</i>	Porcupine	Sch-IV
<i>Axis axis</i>	Spotted deer	Sch-III
<i>Canis lupaspallipes</i>	Indian wolf	Part-I of Sch-I
<i>Mellivora capensis</i>	Indian Ratel	Part-I of Sch-I
<i>Elephas maximas</i>	Indian Elephant	Part-I of Sch-I
<i>Felis chaus</i>	Jungle cat	Part-II of sch-II
<i>Parodoxurus hermophroiditus</i>	Indian Small civet	Part-I of sch-I
<i>Muntiacus muntiacus</i>	Barking deer	Sch-III
<i>Macaca mulata</i>	Monkey	Part-I of Sch-I

Annexure - II
(18)

तारिका
Telegram : PARYAVARAN,
NEW DELHI
दूरभाष :
Telephone :
टेलिग्राम (द्विभाषीय) :
Telex : (bi-lingual) : W-66185 DOE IN
FAX : 4360678

TATISHARIA

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
पर्यावरण भवन, नं०. ३, श्री. कापल्लेन
PARYAVARAN BHAWAN, C.G.O. COMPLEX
लोधी रोड, नई दिल्ली - 110003
LOOHI ROAD, NEW DELHI - 110003
Dated: 1st March, 1996.

No.3-2J/95-FC

To

The Secretary (Forests)
Government of Madhya Pradesh
Bhopal.

Sfg
Suraj Gupta
R.Q.P.

R.Q.P./N.G.P./348/2006/A

Sub: Diversion of 514.019 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:5/19/95/10/3 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 514.019ha. 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.
- 11) Compensatory afforestation shall be carried out over double the degraded forest land at the project cost.

APPROVED

- (i) 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.
- (ii) Delineation of the mining area will be done on the ground at the project cost.
- (iii) Forest land will not be used for construction of buildings etc. and any purpose other than those mentioned in the proposal.
- (iv) Lease period shall remain coterminus with lease under MWLD Act subject to maximum of 20 years.
- (v) Free fuelwood will be provided to the labourers and staff working at the project site at the project cost.
- (vi) Any other condition the State Govt. may impose.
- (vii) 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:

- 1. The Principal Chief Conservator of Forests Government of Madhya Pradesh, Bhopal.
- 2. Nodal Officer, Office of the Principal Chief Conservator of Forests, Govt. of Madhya Pradesh, Bhopal.
- 3. The CCF (Central), Regional Office, Bhopal.
- 4. RO(HQ), New Delhi.
- 5. Guard file.

2.4.1976.
(R.K. CHAUDHRY)
AIGF.

APPROVED

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

Duration: January-February-March-2016

Name of Industry:-




Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

M/s. Hindalco Industries Limited.,

Name of Laboratory:-



Recognised by MoEF (GOI) Notifn. No. D.L.33004/99 Dt.24.10.2007
NABL T-1550 (Chemical), T-1826 (Biological), T-2344 (Mechanical) dt.04/10/2012 valid up to
03.10.2016

Accredited under the QCI-NABET Scheme for EIA Consultant
BIS vide No.CL/CQAPD/OSL (7124116) dt.16.12.2011

Certified by ISO 9001:2008, ISO 14001:2004, ISO 18001:2007

Head Office: 60, Bajiprabhu Nagar, Nagpur-440 033, MS

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Foreword

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

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

This report presents the Environmental Status for the period January-2016 To March-2016. 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.

Place: Nagpur

Date: March, 2016

for ANACON LABORATORIES PVT. LTD.



Dr. Anand

Authorized Signatory



Introduction

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

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

HINDALCO INDUSTRIES LTD. awarded the work to M/s ANACON LABORATORIES PVT. LTD. NAGPUR (ALPL) for carrying out monitoring of parameters for assessing pollution levels and preparation of monthly report (January-February-March-2016) as per the requirement of Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment and Forest (MoEF) for Tatijharia mining lease in Balrampur District, Chhattisgarh State.

1.2 Background Information of Tatijharia Mine

Hindalco was granted Tatijharia Bauxite mining lease over an area of 1218.762hec. in Tatijharia, Post Jamira, Tehsil Samri of Balrampur district, Chhattisgarh on 25/06/1998 for a period of 20 years. The mining operations were started on 01/04/2004. The production capacity of bauxite is 4.0 Lakh Tonnes Per Annum (LTPA).

1.3 Salient Features of Tatijharia Bauxite Mine

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



Table 1

Salient Features of Tatijharia Bauxite Mines

S.No.	Particulars	Details
1.	Survey of India Toposheet No.	64 M /15
2.	Latitude	23 ⁰ 21' 02"N to 23 ⁰ 24' 15"N
3.	Longitude	83 ⁰ 54' 50"E to 83 ⁰ 56' 30"E
4.	Elevation	1282-m above Mean Sea Level
5.	Climatic Conditions (as per IMD, Ambikapur)	Annual maximum temperature : 30.3 ⁰ C Annual minimum temperature : 17.7 ⁰ C Average annual rainfall : 1401.1 mm
6.	Mining lease area	1218.762hec.
7.	Method of mining	Open cast (Semi-Mechanized)
8.	Mode of transportation	Trucks
9.	Land use	Agricultural and Barren land
10.	Nearest Road	Samri to Kusmi (17 km)
11.	Nearest Airport	Ranchi (143.56 km, E)
12.	Nearest Town	Ambikapur (127 km, SW)

1.4 Environmental Monitoring

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

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

1.5 Air Environment

1.5.1 Ambient Air Quality Monitoring

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



Table 2

Locations of Ambient Air Quality Monitoring (AAQM) & Fugitive Emission (1218.762 hec.)

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

The sampling stations are selected at the above mentioned locations, in downwind and upwind directions of the mining site in the core zone and buffer zone. ALPL is carrying out regular monitoring for 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. The dust fall rate was measured in the mining area (BKB campus) and Tatijharia village during January-February-March-2016. The AAQM sampling sites are selected considering seasonal variation in wind speed and wind direction.

Sampling Duration and Frequency

Ambient air quality 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-2016 as per CPCB norms. Sampling 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) (August-20, 1994), 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).

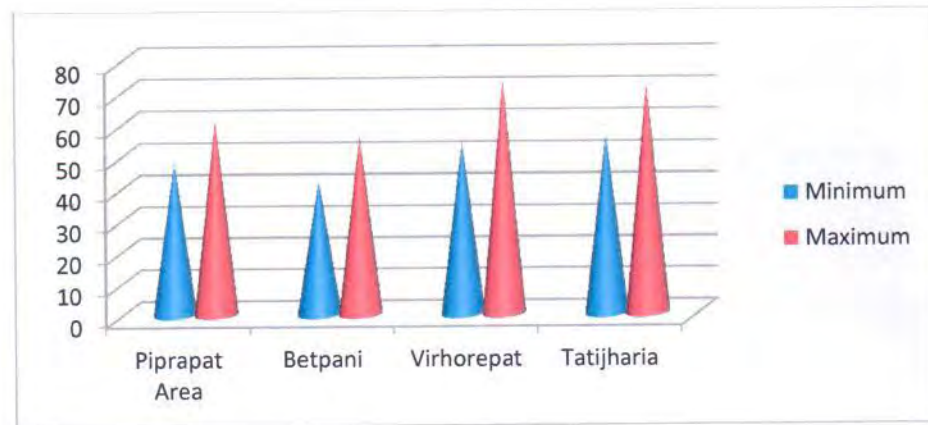
The levels of Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), Pb, Hg, As and Cr were monitored for establishing the baseline status. SPM and RPM was collected with the help of Respirable particulate sampler operating 24 hours 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, PM_{2.5} collected with

Respirable Suspended Particulate Matter –RSPM

The minimum and maximum concentrations for RSPM were recorded as 43 $\mu\text{g}/\text{m}^3$ and 73 $\mu\text{g}/\text{m}^3$ respectively. The average values were observed to be in the range of 48 to 60 $\mu\text{g}/\text{m}^3$ and 98th percentile values ranged between 52 to 73 $\mu\text{g}/\text{m}^3$ in the study area (**Table 7**)

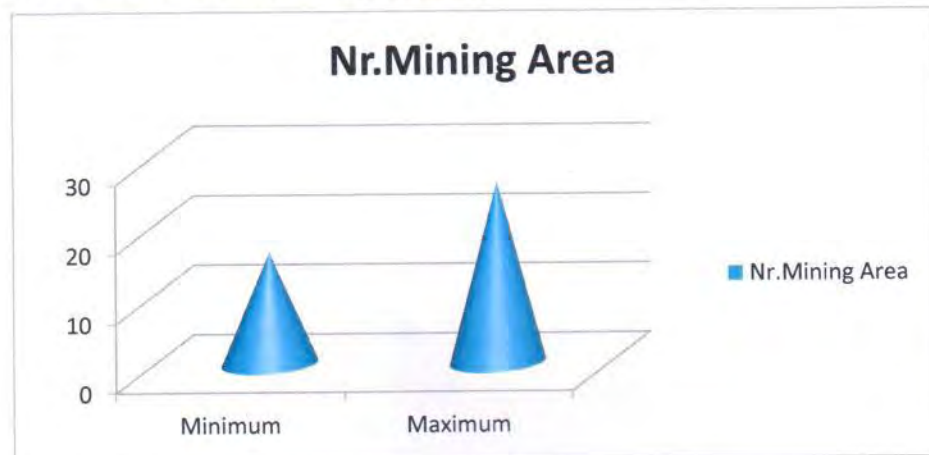
Graphical Presentation Of Fugitive Emission Monitoring

RSPM



Particulate Matter -PM_{2.5}

The minimum and maximum values of PM_{2.5} concentrations varied between 14 to 26 $\mu\text{g}/\text{m}^3$ respectively. The average values range between 16 to 23 $\mu\text{g}/\text{m}^3$ and 98th percentile values varied between 18 to 26 $\mu\text{g}/\text{m}^3$ (**Table 8**).

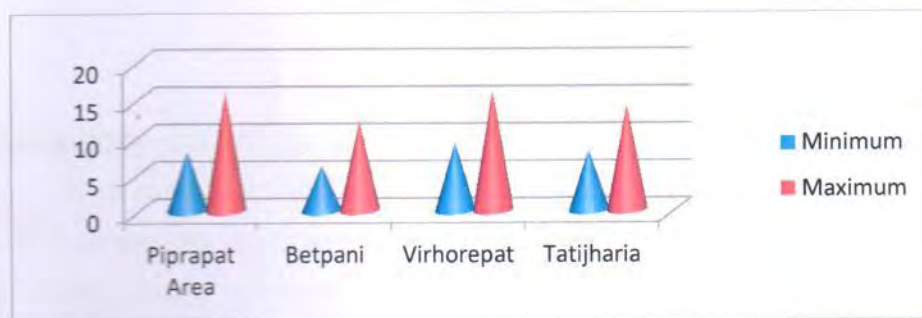


Sulphur Dioxide (SO₂)

The minimum and maximum SO₂ concentrations were recorded as 6 µg/m³ and 14 µg/m³ respectively. The average values were observed to be in the range of 7 to 12 µg/m³ and 98th percentile values varied between 8 to 14 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 16 µg/m³ and 26 µg/m³. The average concentrations were ranged between 18 to 24 µg/m³ and 98th percentile values varied between 19 to 26 µg/m³ (**Table 10**).



Lead (Pb)

The minimum and maximum Lead detected between 0.016 to 0.049 µg/m³ respectively. The average Lead detected between 0.020 to 0.041 µg/m³ & 98th percentile values varied between 0.024 to 0.042 µg/m³ in the study region. (**Table 11**).



Mercury (Hg)

The maximum concentrations of Hg varied $0.031 \mu\text{g}/\text{m}^3$ respectively. The average concentration varied $0.028 \mu\text{g}/\text{m}^3$ 98th percentiles values varied $0.031 \mu\text{g}/\text{m}^3$ in the study region. **(Table 12).**

Arsenic (As)

The maximum concentrations of As varied $0.28 \mu\text{g}/\text{m}^3$ respectively. The average concentration varied $0.26 \mu\text{g}/\text{m}^3$ and 98th percentiles values varied $0.28 \mu\text{g}/\text{m}^3$ 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)

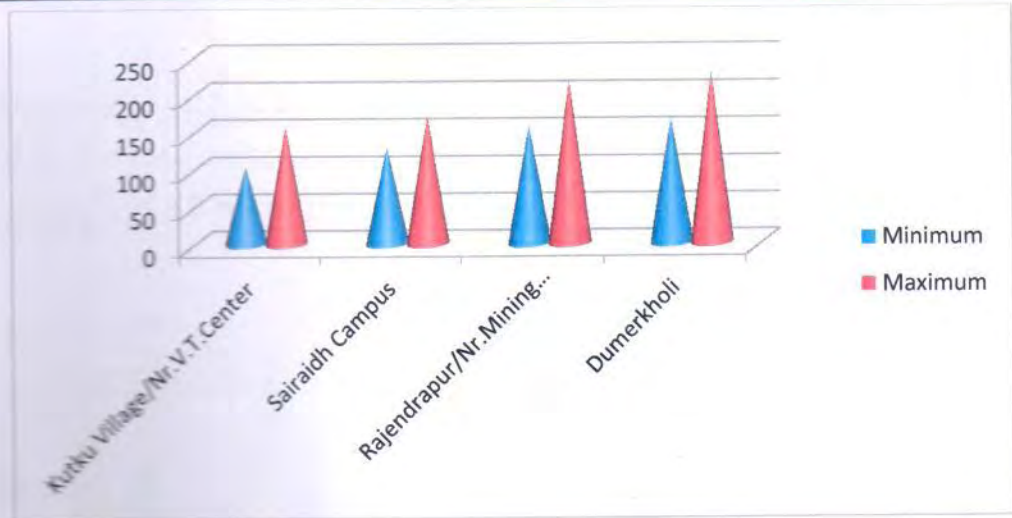
The background levels of SPM, RPM(PM_{10}), $\text{PM}_{2.5}$, SO_2 , NO_x , Pb, Hg, As and Cr measured are required to compute Ambient Air Quality. The sampling locations are selected at the above mentioned locations in downwind and upwind directions of the mine. The Minimum, Maximum concentration, 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-February-March-2016 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 standard prescribed by Central Pollution Control Board (CPCB)/NAAQ for residential and rural zone.

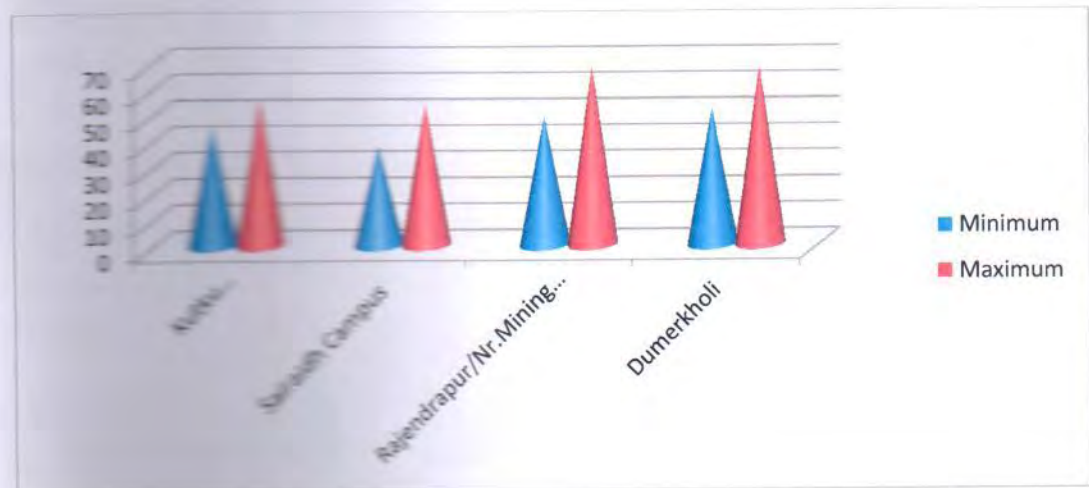
Suspended Particulate Matter-SPM

The statistical analysis of SPM is presented in **Table 6** for the mining area. The minimum and maximum values varied between 121 to $237 \mu\text{g}/\text{m}^3$ respectively during study period at all the 4 locations. The average values ranged between 13 to $207 \mu\text{g}/\text{m}^3$ and 98th percentile values ranged between 146 to $236 \mu\text{g}/\text{m}^3$ in the study area.



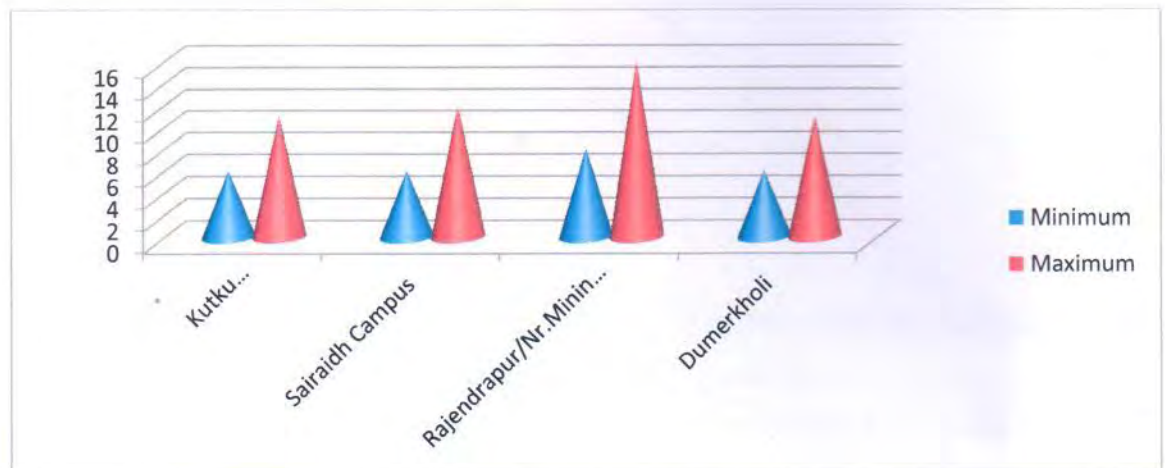
Particulate Matter-RSPM

The minimum and maximum values of RSPM varied between 37 to 64 $\mu\text{g}/\text{m}^3$ respectively (Table 7). The average values varied between 39 to 60 $\mu\text{g}/\text{m}^3$. The 98th percentile values varied between 41 to 64 $\mu\text{g}/\text{m}^3$ 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.



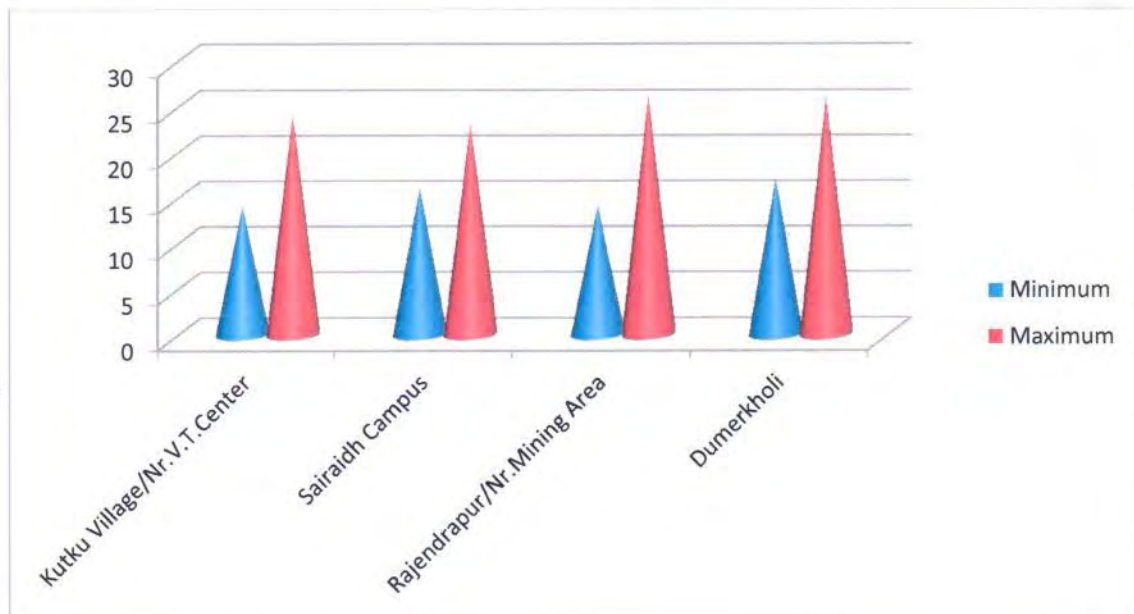
Sulphur Dioxide (SO₂)

The minimum and maximum values of SO₂ concentrations varied between 6 to 13 µg/m³ respectively. The average values range between 7 to 10 µg/m³ and 98th percentile values varied between 8 to 13 µg/m³ (**Table 9**).



Nitrogen Oxide (NO_x)

The minimum and maximum values of NO_x concentrations varied between 16 to 26 µg/m³ respectively. The average values range between 18 to 24 µg/m³ and 98th percentile values varied between 18 to 26 µg/m³ (**Table 10**).



Lead (Pb)

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

(Table 11).

Mercury (Hg)

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

(Table 12).

Arsenic (As)

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

(Table 13).

Chromium (Cr)

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

The Dust fall rate during the month of January-February-March-2016 was observed 25.7 and 21.4 month MT/km²/month in the Piprapat/Near Mining Area and Tatijharia Village respectively. (Table 14).

Overall the ambient air concentrations of SPM, PM 10(RPM), PM2.5, SO₂, NO_x, Pb, Hg, and As 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 (Jan-Feb-March 2016) indicates that the wind was blowing predominantly from (NNE and NE) directions, during study period, for 6.67 % 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 Figures 1 & 2 respectively.



Table.1
Wind Frequency Distribution Data

Sr.No.	Directions / Wind Classes (m/s)	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
1	348.75 - 11.25	0.08368	0.01255	0	0	0	0	0.09583
2	11.25 - 33.75	0.14226	0.01674	0	0	0	0	0.15833
3	33.75 - 56.25	0.12552	0	0	0	0	0	0.125
4	56.25 - 78.75	0.05021	0.00837	0	0	0	0	0.05833
5	78.75 - 101.25	0.05858	0.00418	0	0	0	0	0.0625
6	101.25 - 123.75	0.0251	0.00418	0	0	0	0	0.02917
7	123.75 - 146.25	0.0251	0.01255	0	0	0	0	0.0375
8	146.25 - 168.75	0.01674	0.00418	0	0	0	0	0.02083
9	168.75 - 191.25	0.00418	0	0	0	0	0	0.00417
10	191.25 - 213.75	0.03766	0.00418	0	0	0	0	0.04167
11	213.75 - 236.25	0.01255	0.01255	0.00418	0	0	0	0.02917
12	236.25 - 258.75	0.00418	0.00837	0.00418	0	0	0	0.01667
13	258.75 - 281.25	0.00837	0.0251	0	0	0	0	0.03333
14	281.25 - 303.75	0.02092	0.02929	0.00418	0	0	0	0.05417
15	303.75 - 326.25	0.03347	0.04184	0.00837	0	0	0	0.08333
16	326.25 - 348.75	0.04603	0.02929	0.00418	0	0	0	0.07917
	Sub-Total	0.69167	0.2125	0.025	0	0	0	0.92917
	Calms							0.06667
	Missing/Incomplete							0.00417
	Total							1

SUMMARY OF WIND PATTERN

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Condition
Jan-Feb-March 2016	NNE (15.8%)	NE (12.5%)	6.67 %

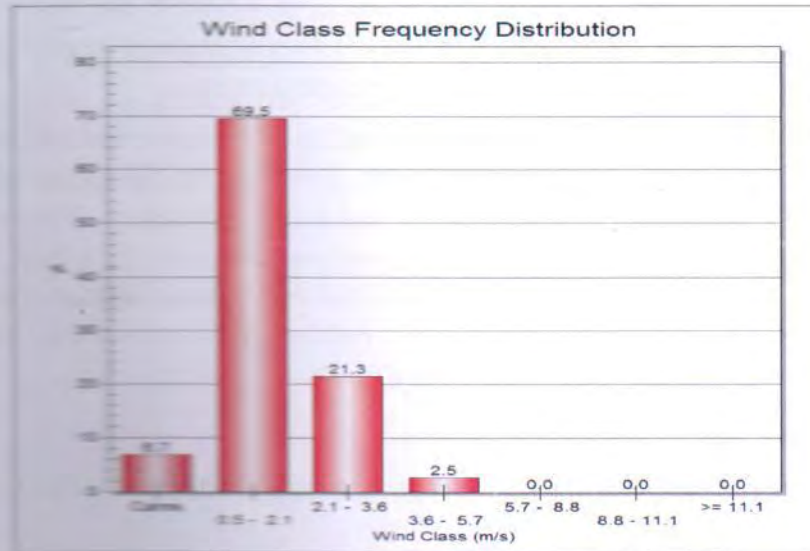


Figure.01: Wind Class Frequency Distribution

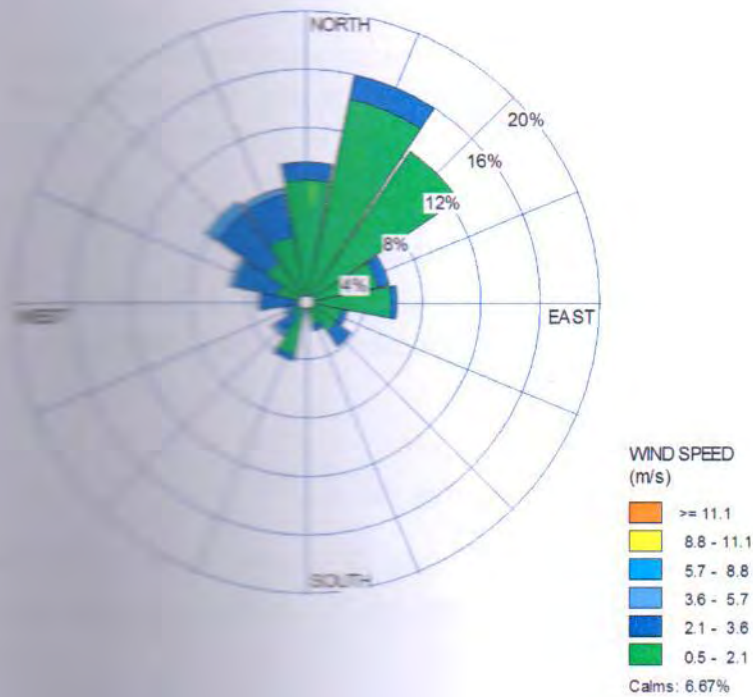


Figure.02: Wind Rose Diagram (Jan-Feb-March, 2016)

1.6 Noise Environment

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

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

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 am to 10 pm and night levels during 10 pm to 6 am at eight locations within 10-km radius of the study area.

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

Noise levels monitored during day and night at 8 locations are found to be below the stipulated standard of CPCB as for Industrial area as 75dB(A) and 70dB(A) for day and night respectively as given in **(Table 15)**.

Instrument used for monitoring

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



1.7 Water Quality

The existing status of water quality for ground water and surface water was assessed by collecting the water samples from underground wells from the piprapat/Nr.mining area and surface water sample from nallahs nearby mining area . The physico-chemical analysis of ground and surface water samples collected during study period reported as average of three month given in **(Table 16 & 17)**. The overall water quality found to be below the stipulated standards of IS 10500-2012 for ground water and found to be fit for drinking purpose for tested parameters. Surface water quality is satisfactory as per IS 10500-2012 for surface water. Thus the impacts due to mining activities in each month have been found to be insignificant.



Table 6
Statistical analysis of SPM

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat /Nr.Mining Area	January-2016	193	217	205	205	217
	February-2016	204	239	222	222	238
	March-2016	217	246	232	232	245
Betpani	January-2016	163	192	178	178	191
	February-2016	182	204	193	193	204
	March-2016	187	221	204	204	220
Virhorepat	January-2016	169	183	176	176	183
	February-2016	173	192	183	183	192
	March-2016	181	201	191	191	201
Tatijharia Village/Nr.Weigh Bridge	January-2016	239	257	248	248	257
	February-2016	247	283	265	265	282
	March-2016	218	236	227	227	236
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	121	146	134	134	146
	February-2016	139	157	148	148	157
	March-2016	146	182	164	164	181
Sairaidh Campus	January-2016	139	151	145	145	151
	February-2016	146	173	160	160	172
	March-2016	127	164	146	146	163
Rajendrapur/ Nr.Mining Area	January-2016	171	219	195	195	218
	February-2016	168	204	186	186	203
	March-2016	176	237	207	207	236
Dumerkholi/ Nr.Mining Area	January-2016	173	182	178	178	182
	February-2016	192	206	199	199	206
	March-2016	161	194	178	178	193

Conclusion (A):-

- 1) Piprapat /Nr.Mining Lease Area Core Zone:** For the Months of Jan-Feb-March-2016 Average of SPM is 220 $\mu\text{g}/\text{m}^3$.
- 2) Betpani Lease Area Core Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 192 $\mu\text{g}/\text{m}^3$.
- 3) Virhorepat Lease Area Core Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 183 $\mu\text{g}/\text{m}^3$.
- 4) Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 247 $\mu\text{g}/\text{m}^3$.
 - The Average Concentration of SPM within the Core Zone of Tatijharia Lease is 210 $\mu\text{g}/\text{m}^3$.

Conclusion (B):-

- 1) Kutku Village/ Nr.V.T.Center Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 149 $\mu\text{g}/\text{m}^3$.
- 2) Sairaidh Campus Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 150 $\mu\text{g}/\text{m}^3$.
- 3) Rajendrapur/ Nr.Mining Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 196 $\mu\text{g}/\text{m}^3$.
- 4) Dumerkholi/ Nr.Mining Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of SPM is 185 $\mu\text{g}/\text{m}^3$.
 - The Average Concentration of SPM within the Buffer Zone of Tatijharia Lease is 170 $\mu\text{g}/\text{m}^3$.

Monthwise Summary of Statistical Analysis of SPM

1.8 Fugitive Emission (Core Zone):-

1.8.1 Presentation of Results.

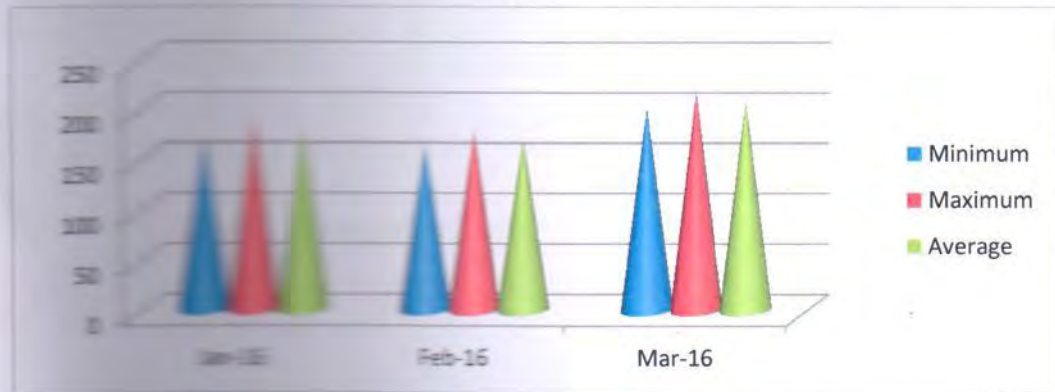
The summary of Statistical Analysis of SPM results for the month of January-February-March-2016 are presented in detail in Table 6. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as 193 $\mu\text{g}/\text{m}^3$ and 217 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 205 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as 204 $\mu\text{g}/\text{m}^3$ and 239 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 222 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as 217 $\mu\text{g}/\text{m}^3$ and 246 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 232 $\mu\text{g}/\text{m}^3$.



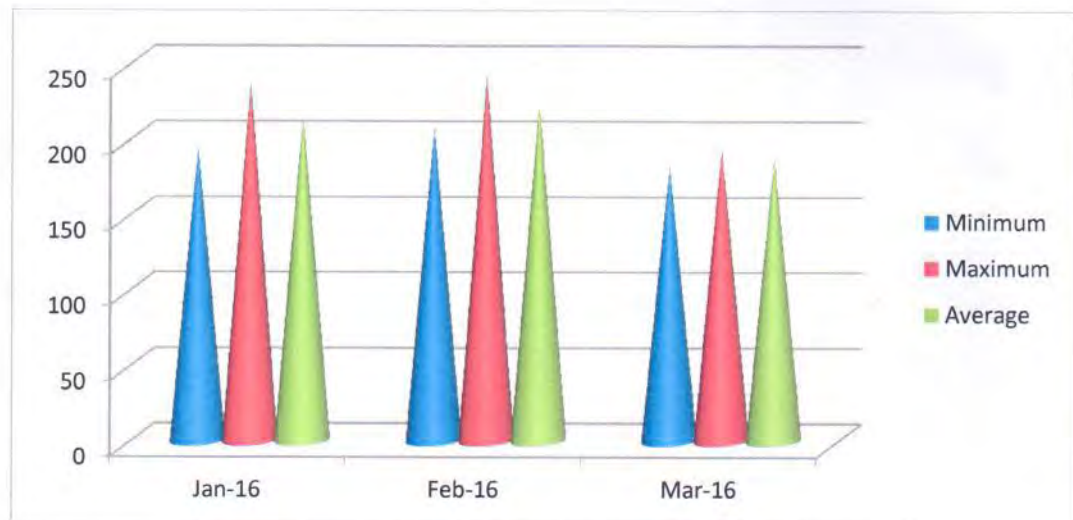
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as $163 \mu\text{g}/\text{m}^3$ and $192 \mu\text{g}/\text{m}^3$ respectively and average concentration of $178 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as $182 \mu\text{g}/\text{m}^3$ and $204 \mu\text{g}/\text{m}^3$ respectively and average concentration of $193 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as $187 \mu\text{g}/\text{m}^3$ and $221 \mu\text{g}/\text{m}^3$ respectively and average concentration of $204 \mu\text{g}/\text{m}^3$.



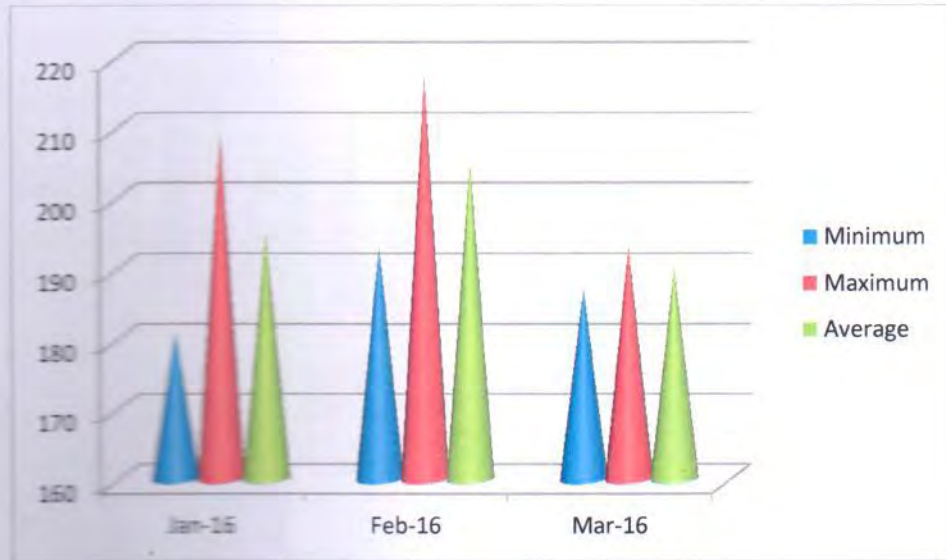
Graph:- Betpani

Virhorepat

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as $169 \mu\text{g}/\text{m}^3$ and $183 \mu\text{g}/\text{m}^3$ respectively and average concentration of $176 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as $173 \mu\text{g}/\text{m}^3$ and $192 \mu\text{g}/\text{m}^3$ respectively and average concentration of $183 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as $181 \mu\text{g}/\text{m}^3$ and $201 \mu\text{g}/\text{m}^3$ respectively and average concentration of $191 \mu\text{g}/\text{m}^3$.



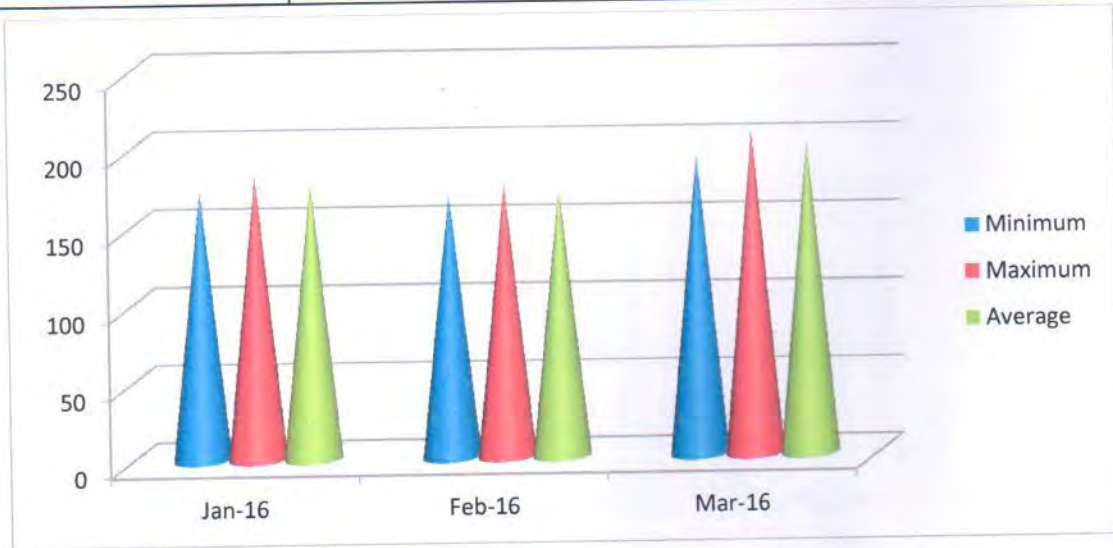
Graph:- Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as $239 \mu\text{g}/\text{m}^3$ and $257 \mu\text{g}/\text{m}^3$ respectively and average concentration of $248 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as $247 \mu\text{g}/\text{m}^3$ and $283 \mu\text{g}/\text{m}^3$ respectively and average concentration of $265 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as $218 \mu\text{g}/\text{m}^3$ and $236 \mu\text{g}/\text{m}^3$ respectively and average concentration of $227 \mu\text{g}/\text{m}^3$.



Graph:- Tatijharia Village/Nr.Weigh Bridge

1.9 Fugitive Emission (Buffer Zone):-

1.9.1 Presentation of Results.

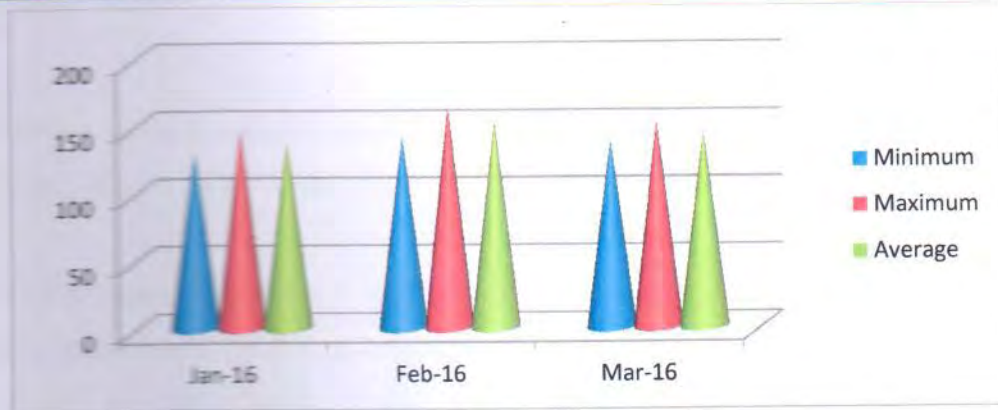
The summary of Statistical Analysis of SPM results for the month of January-February-March 2016 are presented in detail in **Table 6**. 98th percentile; maximum, minimum and average value etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr. V.T.Center

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as $121 \mu\text{g}/\text{m}^3$ and $146 \mu\text{g}/\text{m}^3$ respectively and average concentration of $134 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as $139 \mu\text{g}/\text{m}^3$ and $157 \mu\text{g}/\text{m}^3$ respectively and average concentration of $148 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as $146 \mu\text{g}/\text{m}^3$ and $182 \mu\text{g}/\text{m}^3$ respectively and average concentration of $164 \mu\text{g}/\text{m}^3$.



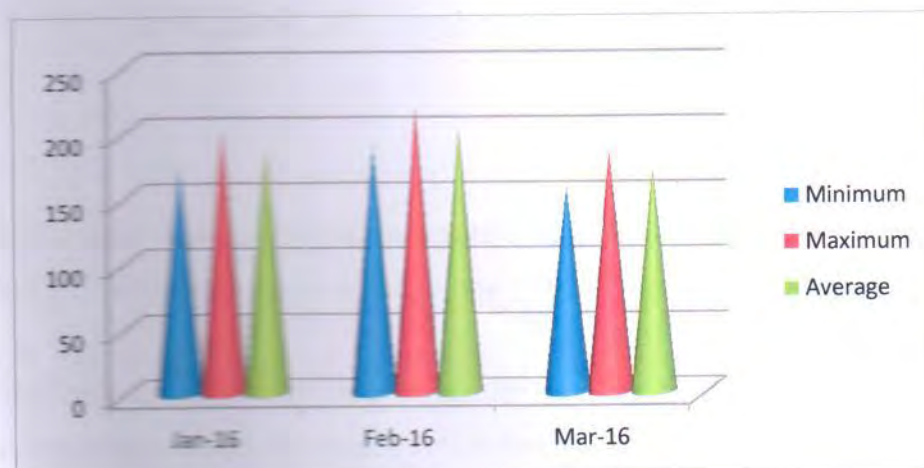
Graph:- Kutku Village / Nr. V.T.Center

Sairaidh Campus

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as $139 \mu\text{g}/\text{m}^3$ and $151 \mu\text{g}/\text{m}^3$ respectively and average concentration of $145 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as $146 \mu\text{g}/\text{m}^3$ and $173 \mu\text{g}/\text{m}^3$ respectively and average concentration of $160 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as $127 \mu\text{g}/\text{m}^3$ and $164 \mu\text{g}/\text{m}^3$ respectively and average concentration of $146 \mu\text{g}/\text{m}^3$.



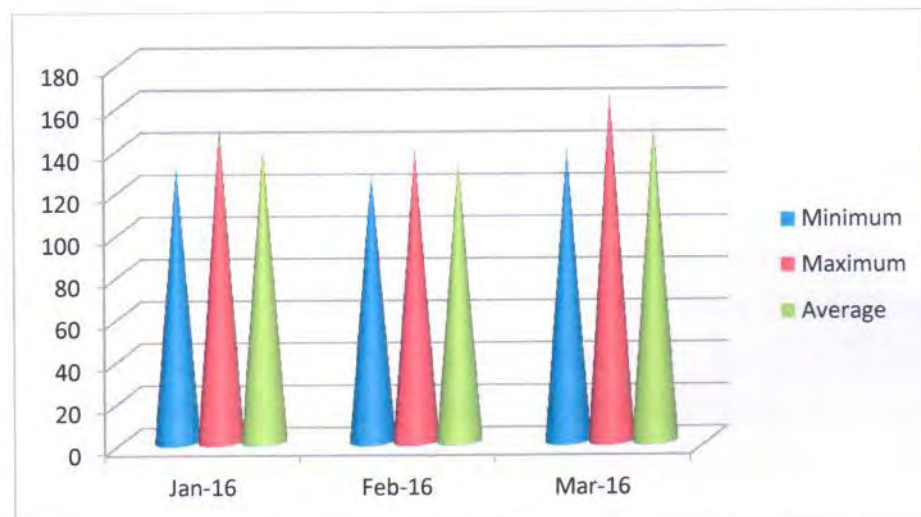
Graph:- Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as 171 $\mu\text{g}/\text{m}^3$ and 219 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 195 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as 168 $\mu\text{g}/\text{m}^3$ and 204 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 186 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as 176 $\mu\text{g}/\text{m}^3$ and 237 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 207 $\mu\text{g}/\text{m}^3$.



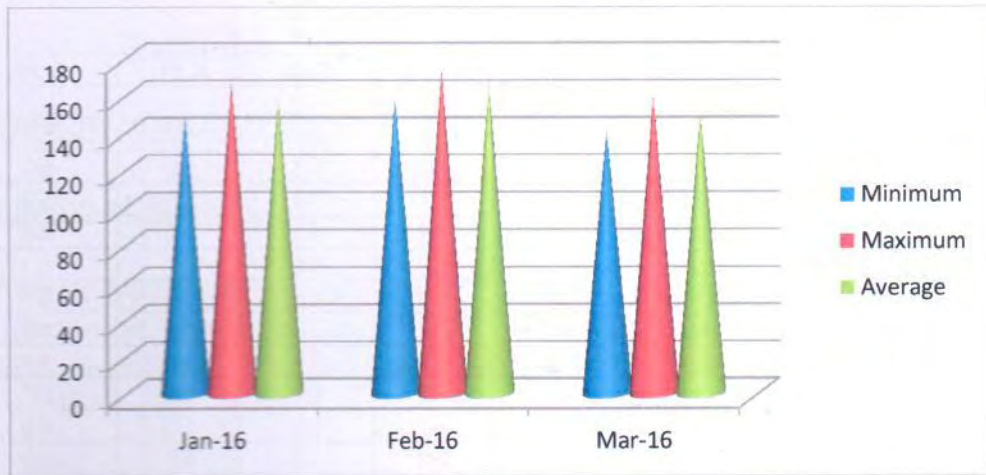
Graph:- Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SPM were recorded as 173 $\mu\text{g}/\text{m}^3$ and 182 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 178 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SPM were recorded as 192 $\mu\text{g}/\text{m}^3$ and 206 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 199 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SPM were recorded as 161 $\mu\text{g}/\text{m}^3$ and 194 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 178 $\mu\text{g}/\text{m}^3$.



Graph:- Dumerkholi / Nr.Mining Area



**Hindalco Industries Limited
Tatijharia Mining Environmental Status Report for
January-2016 To March-2016**

Introduction

**Table 7
Statistical analysis of RSPM**

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat /Nr.Mining Area	January-2016	52	61	57	57	61
	February-2016	56	63	60	60	63
	March-2016	47	59	53	53	59
Betpani	January-2016	43	52	48	48	52
	February-2016	48	56	52	52	56
	March-2016	52	61	57	57	61
Virhorepat	January-2016	47	58	53	53	58
	February-2016	51	63	57	57	63
	March-2016	53	67	60	60	67
Tatijharia Village/Nr.Weigh Bridge	January-2016	61	69	65	65	69
	February-2016	64	73	69	69	73
	March-2016	59	64	62	62	64
						100 $\mu\text{g}/\text{m}^3$ (24 hrs)

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	46	52	49	49	52
	February-2016	51	56	54	54	56
	March-2016	48	54	51	51	54
Sairaidh Campus	January-2016	39	43	41	41	43
	February-2016	42	46	44	44	46
	March-2016	37	41	39	39	41
Rajendrapur/ Nr.Mining Area	January-2016	56	64	60	60	64
	February-2016	52	59	56	56	59
	March-2016	47	53	50	50	53
Dumerkholi/ Nr.Mining Area	January-2016	56	61	59	59	61
	February-2016	53	59	56	56	59
	March-2016	48	57	53	53	57
CPCB Standard						100 $\mu\text{g}/\text{m}^3$ (24 hrs)

Conclusion (A):-

- 1) **Piprapat /Nr.Mining Lease Area Core Zone:** For the Months of Jan-Feb-March-2016 Average of RSPM is $57 \mu\text{g}/\text{m}^3$.
- 2) **Betpani Lease Area Core Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $52 \mu\text{g}/\text{m}^3$.
- 3) **Virhorepat Lease Area Core Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $57 \mu\text{g}/\text{m}^3$.
- 4) **Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone :-** For the Months of Jan-Feb-March-2016 Average of RSPM is $65 \mu\text{g}/\text{m}^3$
 - The Average Concentration of RSPM within the Core Zone of Tatijharia Lease is $58 \mu\text{g}/\text{m}^3$ and it is within permissible limits as per CPCB Standard.

Conclusion (B):-

- 1) **Kutku Village/ Nr.V.T.Center Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $51 \mu\text{g}/\text{m}^3$
- 2) **Sairaidh Campus Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $41 \mu\text{g}/\text{m}^3$.
- 3) **Rajendrapur/ Nr.Mining Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $55 \mu\text{g}/\text{m}^3$
- 4) **Dumerkholi/ Nr.Mining Lease Area Buffer Zone:-** For the Months of Jan-Feb-March-2016 Average of RSPM is $56 \mu\text{g}/\text{m}^3$
 - The Average Concentration of RSPM within the Buffer Zone of Tatijharia Lease is $51 \mu\text{g}/\text{m}^3$ and it is within permissible limits as per CPCB Standard.



Monthwise Summary of Statistical Analysis of RSPM

2.0 Fugitive Emission (Core Zone):-

2.0.1 Presentation of Results.

The summary of Statistical Analysis of RSPM results for the month of January-February-March-2016 are presented in detail in **Table 7**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as 52 $\mu\text{g}/\text{m}^3$ and 61 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 57 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as 56 $\mu\text{g}/\text{m}^3$ and 63 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 60 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as 47 $\mu\text{g}/\text{m}^3$ and 59 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 53 $\mu\text{g}/\text{m}^3$.



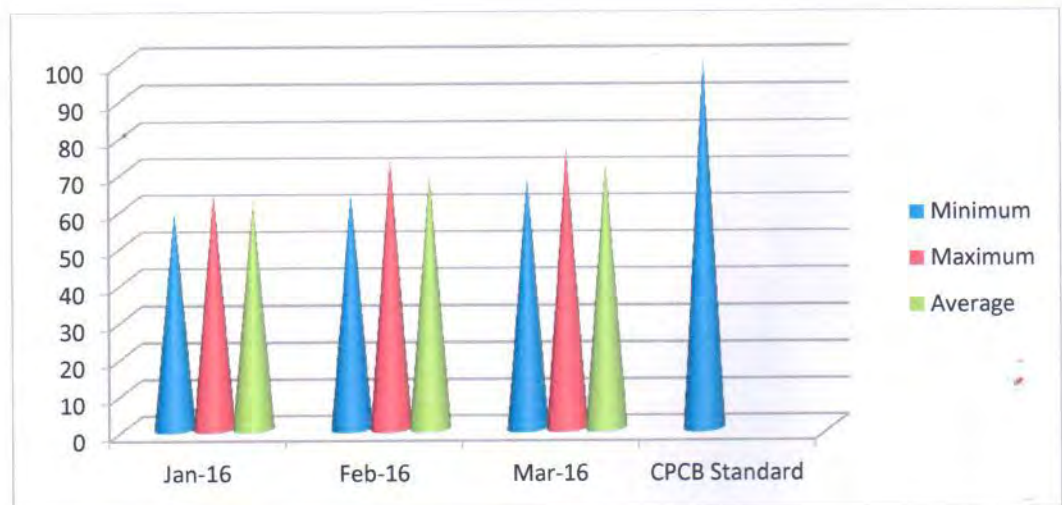
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as $43 \mu\text{g}/\text{m}^3$ and $52 \mu\text{g}/\text{m}^3$ respectively and average concentration of $48 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as $48 \mu\text{g}/\text{m}^3$ and $56 \mu\text{g}/\text{m}^3$ respectively and average concentration of $52 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as $52 \mu\text{g}/\text{m}^3$ and $61 \mu\text{g}/\text{m}^3$ respectively and average concentration of $57 \mu\text{g}/\text{m}^3$.



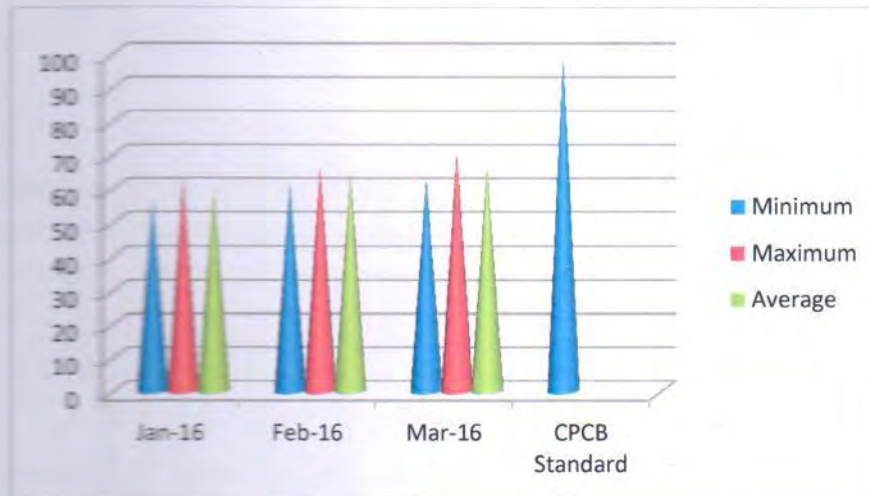
Graph:- Betpani

Virhorepat

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as $47 \mu\text{g}/\text{m}^3$ and $58 \mu\text{g}/\text{m}^3$ respectively and average concentration of $53 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as $51 \mu\text{g}/\text{m}^3$ and $63 \mu\text{g}/\text{m}^3$ respectively and average concentration of $57 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as $53 \mu\text{g}/\text{m}^3$ and $67 \mu\text{g}/\text{m}^3$ respectively and average concentration of $60 \mu\text{g}/\text{m}^3$.



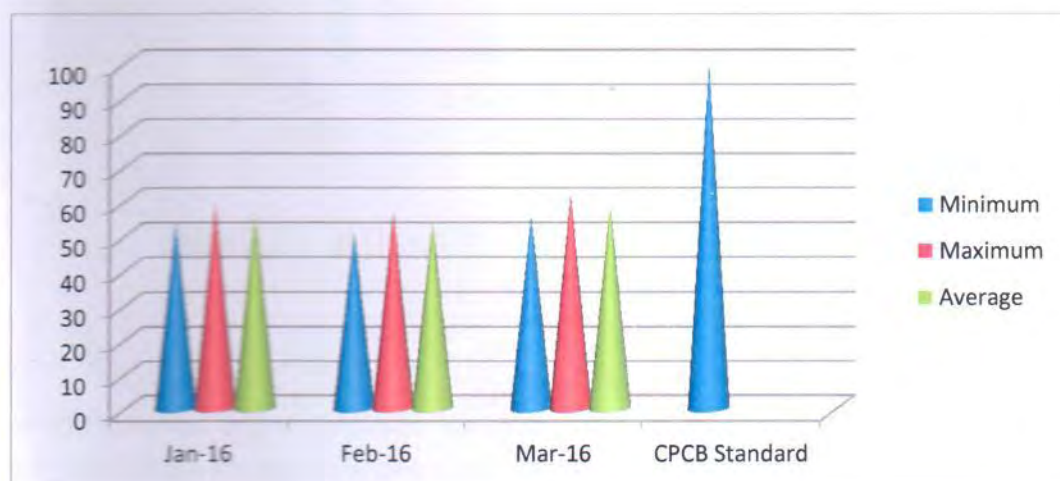
Graph:- Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as $61 \mu\text{g}/\text{m}^3$ and $69 \mu\text{g}/\text{m}^3$ respectively and average concentration of $65 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as $64 \mu\text{g}/\text{m}^3$ and $73 \mu\text{g}/\text{m}^3$ respectively and average concentration of $69 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as $59 \mu\text{g}/\text{m}^3$ and $64 \mu\text{g}/\text{m}^3$ respectively and average concentration of $62 \mu\text{g}/\text{m}^3$.



Graph:- Tatijharia Village/Nr.Weigh Bridge

2.1 Fugitive Emission (Buffer Zone):-

2.1.1 Presentation of Results.

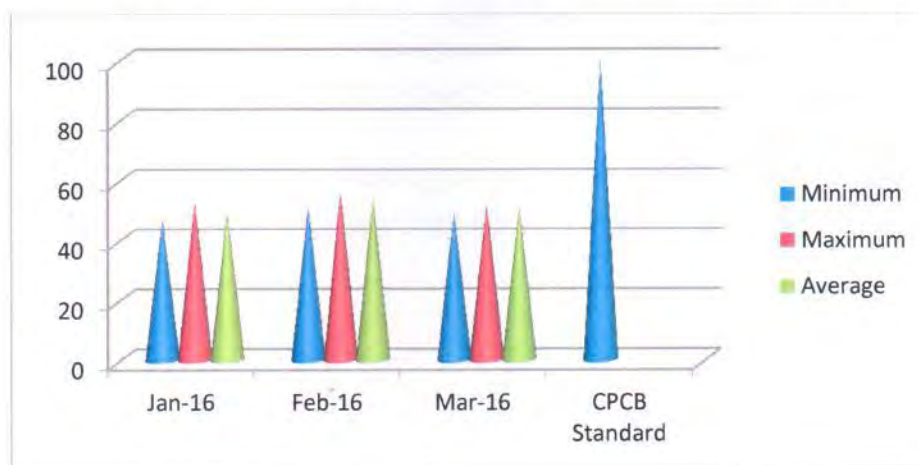
The summary of Statistical Analysis of RSPM results for the month of January-February-March 2016 are presented in detail in **Table 7**. 98th percentile; maximum, minimum and average value etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr. V.T.Center

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as 46 $\mu\text{g}/\text{m}^3$ and 52 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 49 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as 51 $\mu\text{g}/\text{m}^3$ and 56 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 54 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as 48 $\mu\text{g}/\text{m}^3$ and 54 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 51 $\mu\text{g}/\text{m}^3$.



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

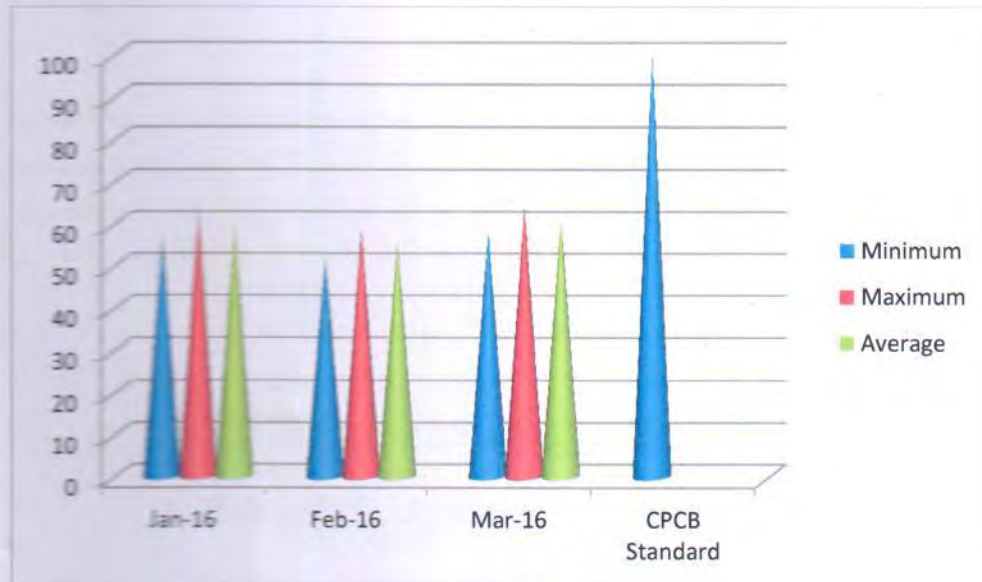
Sairaidh Campus

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as 39 $\mu\text{g}/\text{m}^3$ and 43 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 41 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as 42 $\mu\text{g}/\text{m}^3$ and 46 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 44 $\mu\text{g}/\text{m}^3$.



For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as $37 \mu\text{g}/\text{m}^3$ and $41 \mu\text{g}/\text{m}^3$ respectively and average concentration of $39 \mu\text{g}/\text{m}^3$.



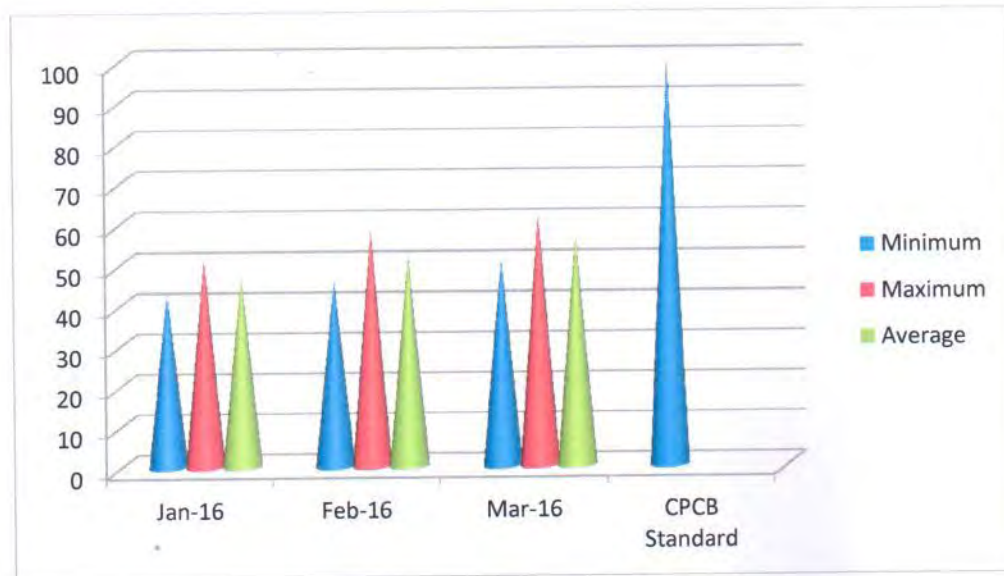
Graph:- Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as $56 \mu\text{g}/\text{m}^3$ and $64 \mu\text{g}/\text{m}^3$ respectively and average concentration of $60 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as $52 \mu\text{g}/\text{m}^3$ and $59 \mu\text{g}/\text{m}^3$ respectively and average concentration of $56 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as $47 \mu\text{g}/\text{m}^3$ and $53 \mu\text{g}/\text{m}^3$ respectively and average concentration of $50 \mu\text{g}/\text{m}^3$.



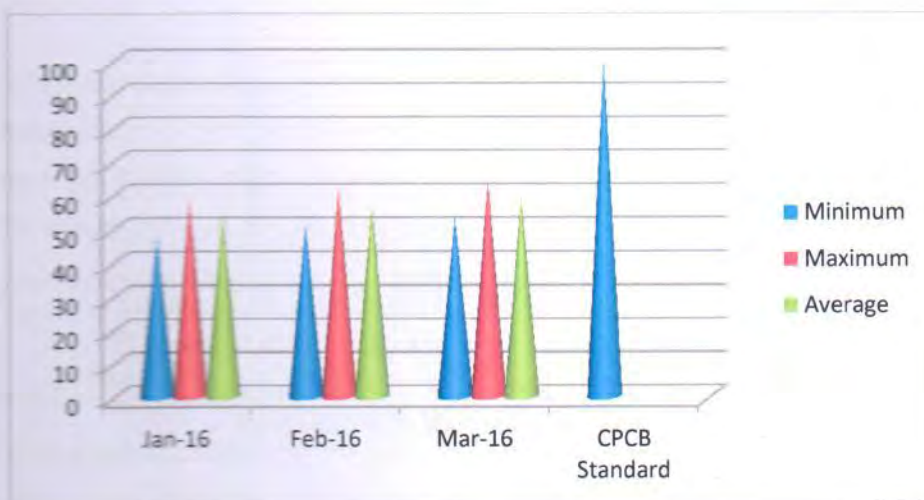
Graph:- Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for RSPM were recorded as 56 µg/m³ and 61 µg/m³ respectively and average concentration of 59 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for RSPM were recorded as 53 µg/m³ and 59 µg/m³ respectively and average concentration of 56 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for RSPM were recorded as 48 µg/m³ and 57 µg/m³ respectively and average concentration of 53 µg/m³.



Graph:- Dumerkholi / Nr. Mining Area

**Table 8
Statistical analysis of PM 2.5**

		Unit : µg/m ³				
Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Nr. Mining Area	January-2016	14	18	16	16	18
	February-2016	17	23	20	20	23
	March-2016	19	26	23	23	26
CPCB Standard		60 µg/m ³ (24 hrs)				

Note :- All the Values are in CPCB Limit

Conclusion:- The Average Concentration of PM_{2.5} within Tatijharia Lease during this period (Jan to Mar-2016) is 20 µg/m³ and it is within permissible limits as per CPCB Standard.

Monthwise Summary of Statistical Analysis of PM_{2.5}

2.2 Presentation of Results.

The summary of Statistical Analysis of PM_{2.5} results for the month of January-February-March-2016 are presented in detail in Table 8. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data.

Nr. Mining Area

For the month of January-2016 the minimum and maximum concentrations for PM_{2.5} were recorded as 14 µg/m³ and 18 µg/m³ respectively and average concentration of 16 µg/m³.

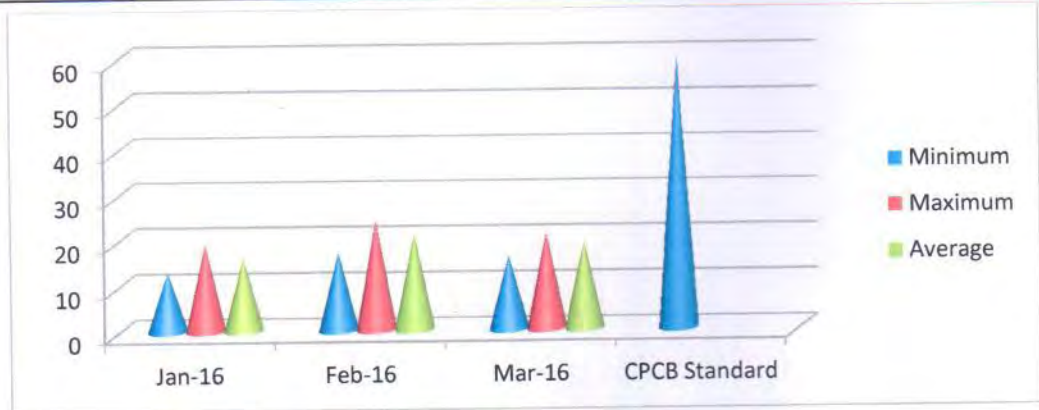
For the month of February-2016 the minimum and maximum concentrations for PM_{2.5} were recorded as 17 µg/m³ and 23 µg/m³ respectively and average concentration of 20 µg/m³.

For the month of March-2016 the minimum and maximum concentrations for PM_{2.5} were recorded as 19 µg/m³ and 26 µg/m³ respectively and average concentration of 23 µg/m³.



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Graph :- Nr.Mining Area

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):-						
Piprapat/ Nr.Mining Area	January-2016	7	12	10	10	12
	February-2016	9	13	11	11	13
	March-2016	7	11	9	9	11
Betpani	January-2016	8	13	11	11	13
	February-2016	9	12	11	11	12
	March-2016	6	8	7	7	8
Virhorepat	January-2016	7	13	10	10	13
	February-2016	9	14	12	12	14
	March-2016	6	9	8	8	9
Tatijharia Village/Nr.Weigh Bridge	January-2016	7	11	9	9	11
	February-2016	7	13	10	10	13
	March-2016	8	12	10	10	12
CPCB Standard				80 $\mu\text{g}/\text{m}^3$ (24 hrs)		

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	6	8	7	7	8
	February-2016	7	9	8	8	9
	March-2016	6	9	8	8	9
Sairaidh Campus	January-2016	8	11	10	10	11
	February-2016	7	9	8	8	9
	March-2016	7	13	10	10	13
Rajendrapur/ Nr.Mining Area	January-2016	8	12	10	10	12
	February-2016	6	13	10	10	13
	March-2016	9	11	10	10	11
Dumerkholi/ Nr.Mining Area	January-2016	6	8	7	7	8
	February-2016	7	11	9	9	11
	March-2016	6	9	8	8	9
CPCB Standard				80 $\mu\text{g}/\text{m}^3$ (24 hrs)		



Conclusion: (A)

1)Piprapat /Nr.Mining Lease Area Core Zone: For the Months of Jan-Feb-March-2016 Average of SO₂ is 10 µg/m³.

2)Betpani Lease Area Core Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 10 µg/m³.

3)Virhorepat Lease Area Core Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 10 µg/m³.

4)Tatijharia Village /Nr.Weigh Bridge Lease Area Core Zone :- For the Months of Jan-Feb-March-2016 Average of SO₂ is 10 µg/m³.

- The Average Concentration of SO₂ within the Core Zone of Tatijharia Lease during this period (Jan to March-2016) is 10 µg/m³ and it is within permissible limits as per CPCB Standard.

Conclusion: (B)

Kutku Village/ Nr.V.T.Center Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 8 µg/m³.

Sairaidh Campus Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 9 µg/m³.

Rajendrapur/ Nr.Mining Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 10 µg/m³..

Dumerkholi/ Nr.Mining Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of SO₂ is 8 µg/m³.

- The Average Concentration of SO₂ within the Buffer Zone of Tatijharia Lease during this period (Jan to Mar-2016) is 9 µg/m³ and it is within permissible limits as per CPCB Standard.

Monthwise Summary of Statistical Analysis of SO₂

2.3 Fugitive Emission (Core Zone):-

2.3.1 Presentation of Results.

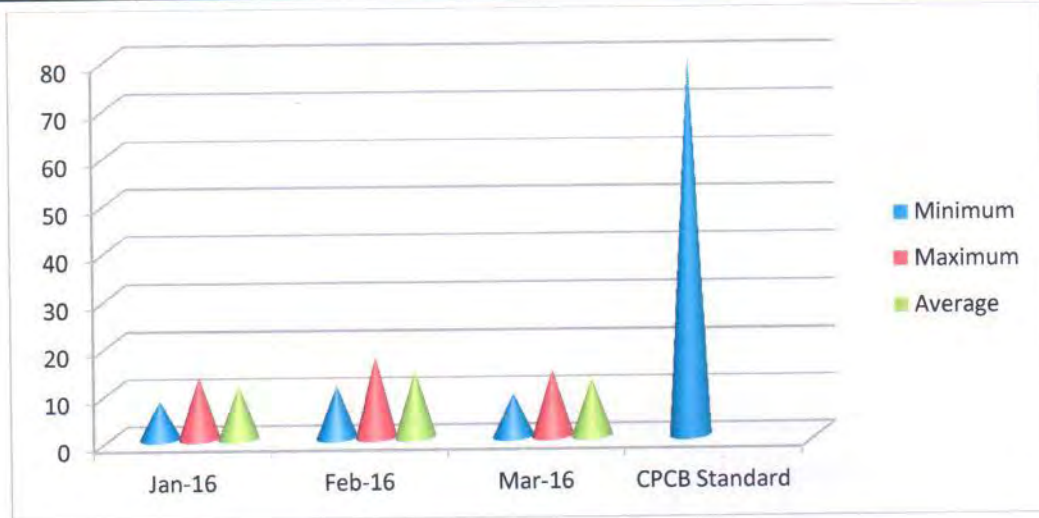
The summary of Statistical Analysis of SO₂ results for the month of January-February-March-2016 are presented in detail in **Table 9**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 12 µg/m³ respectively and average concentration of 10 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 9 µg/m³ and 13 µg/m³ respectively and average concentration of 11 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 11 µg/m³ respectively and average concentration of 9 µg/m³.



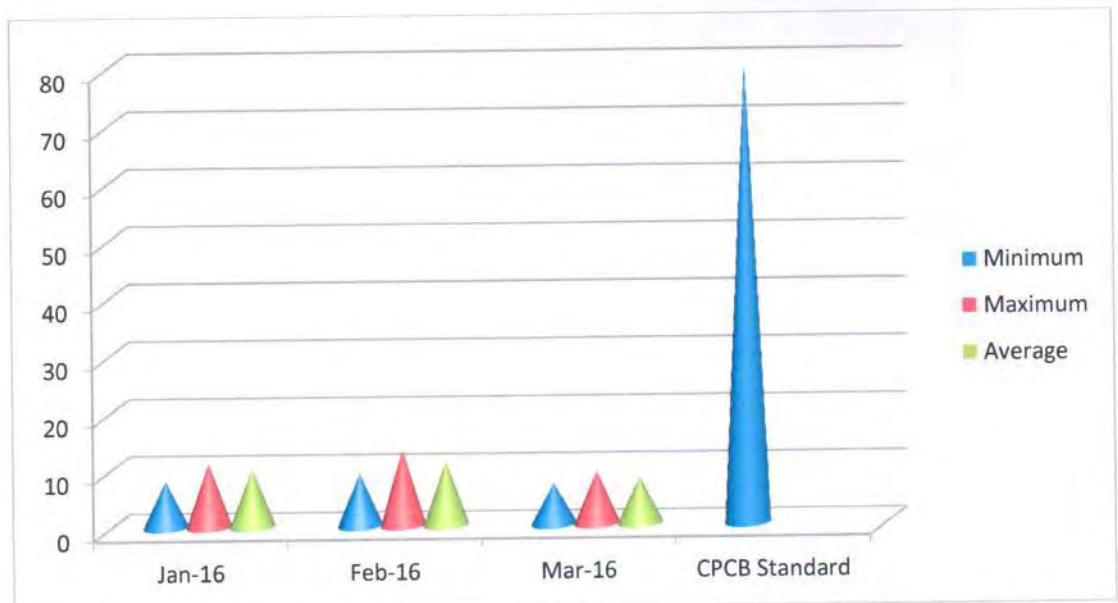
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 8 $\mu\text{g}/\text{m}^3$ and 13 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 11 $\mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 9 $\mu\text{g}/\text{m}^3$ and 12 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 11 $\mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded 6 $\mu\text{g}/\text{m}^3$ and 8 $\mu\text{g}/\text{m}^3$ respectively and average concentration of 7 $\mu\text{g}/\text{m}^3$.



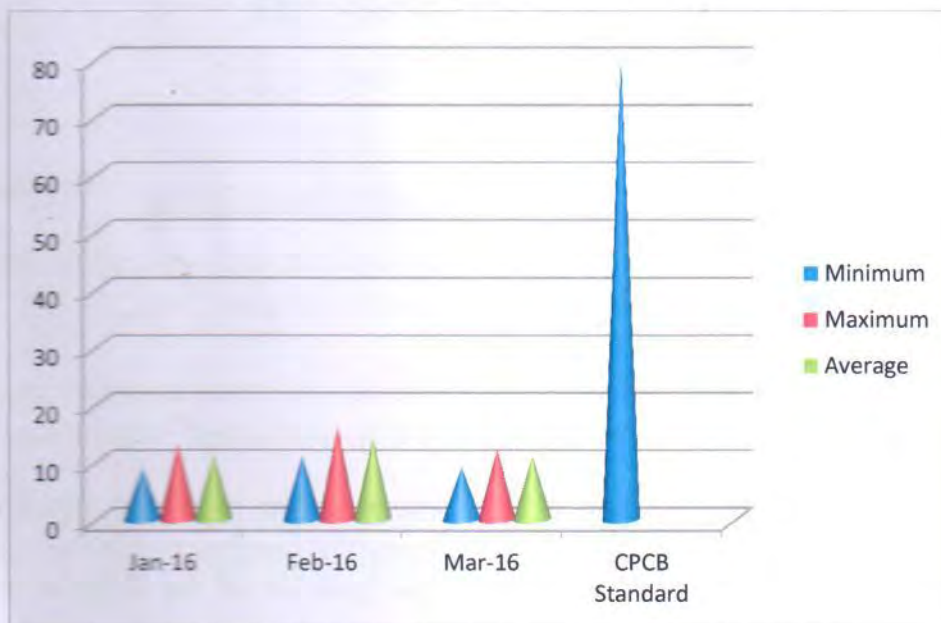
Graph:- Betpani

Virhorepat

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 13 µg/m³ respectively and average concentration of 10 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 9 µg/m³ and 14 µg/m³ respectively and average concentration of 12 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 9 µg/m³ respectively and average concentration of 8 µg/m³.



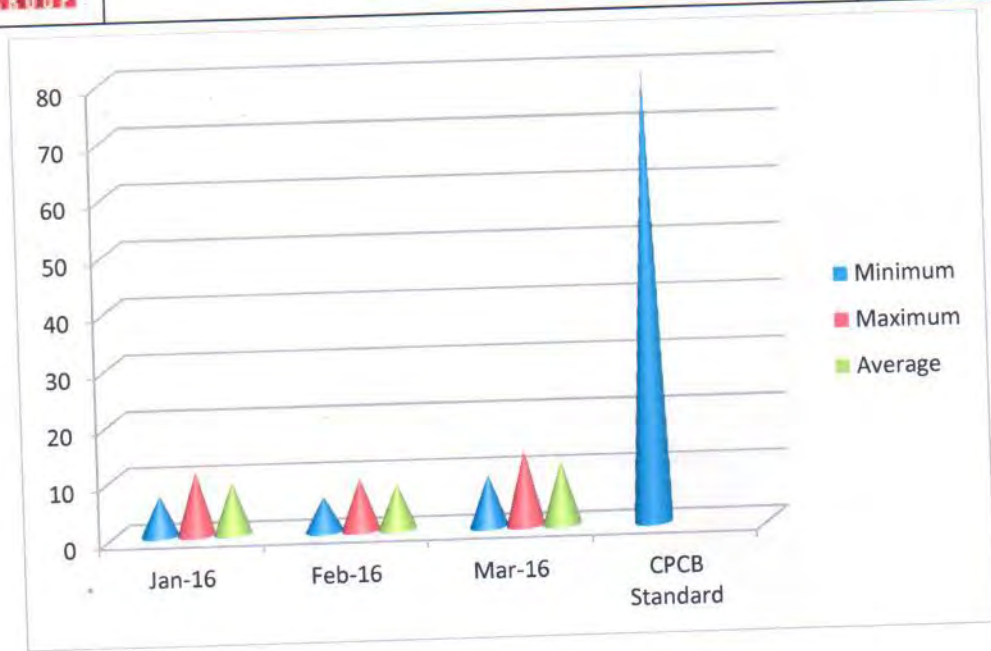
Graph:- Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 11 µg/m³ respectively and average concentration of 9 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 13 µg/m³ respectively and average concentration of 10 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 8 µg/m³ and 12 µg/m³ respectively and average concentration of 10 µg/m³.



Graph:- Tatijharia Village/Nr.Weigh Bridge

2.4 Fugitive Emission (Buffer Zone):-

2.4.1 Presentation of Results.

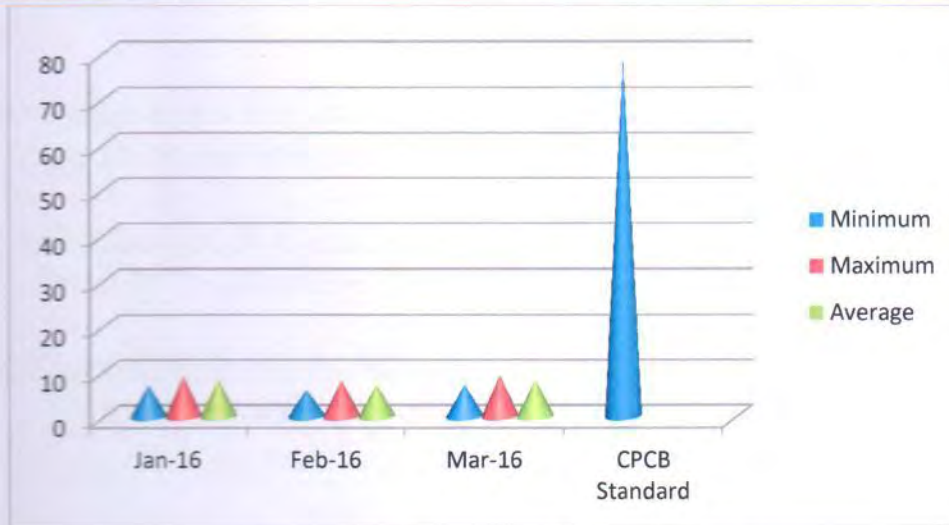
The summary of Statistical Analysis of SO₂ results for the month of January-February-March 2016 are presented in detail in **Table 9**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr. V.T.Center

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 8 µg/m³ respectively and average concentration of 7 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 9 µg/m³ respectively and average concentration of 8 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 9 µg/m³ respectively and average concentration of 8 µg/m³.



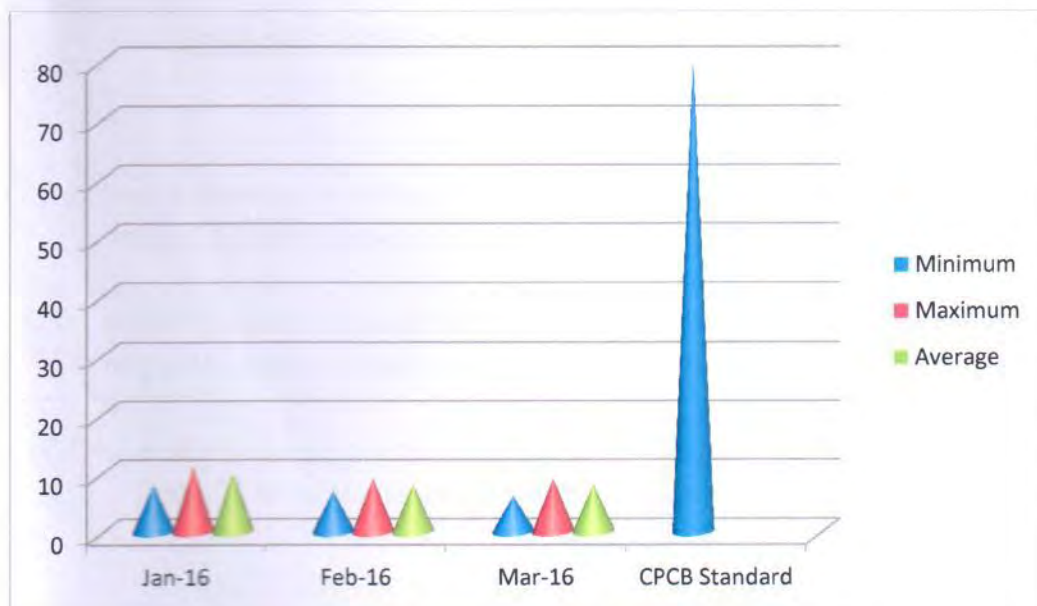
Graph:- Kutku Village / Nr. V.T.Center

Sairaidh Campus

For the Month of January-2016 the minimum and maximum concentrations for SO_2 were recorded as $8 \mu\text{g}/\text{m}^3$ and $11 \mu\text{g}/\text{m}^3$ respectively and average concentration of $10 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for SO_2 were recorded as $7 \mu\text{g}/\text{m}^3$ and $9 \mu\text{g}/\text{m}^3$ respectively and average concentration of $8 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for SO_2 were recorded as $7 \mu\text{g}/\text{m}^3$ and $13 \mu\text{g}/\text{m}^3$ respectively and average concentration of $10 \mu\text{g}/\text{m}^3$.



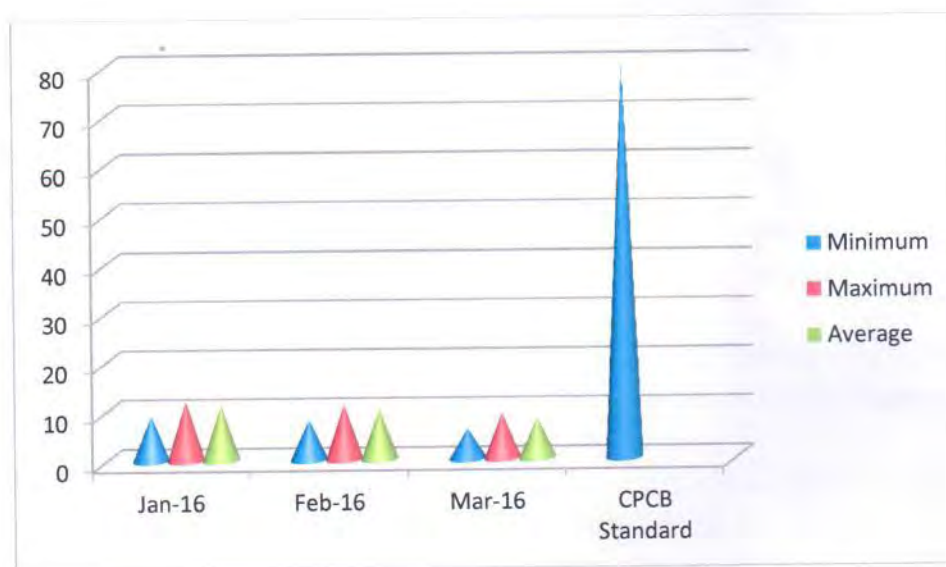
Graph:- Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 8 µg/m³ and 12 µg/m³ respectively and average concentration of 10 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 13 µg/m³ respectively and average concentration of 10 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 9 µg/m³ and 11 µg/m³ respectively and average concentration of 10 µg/m³.



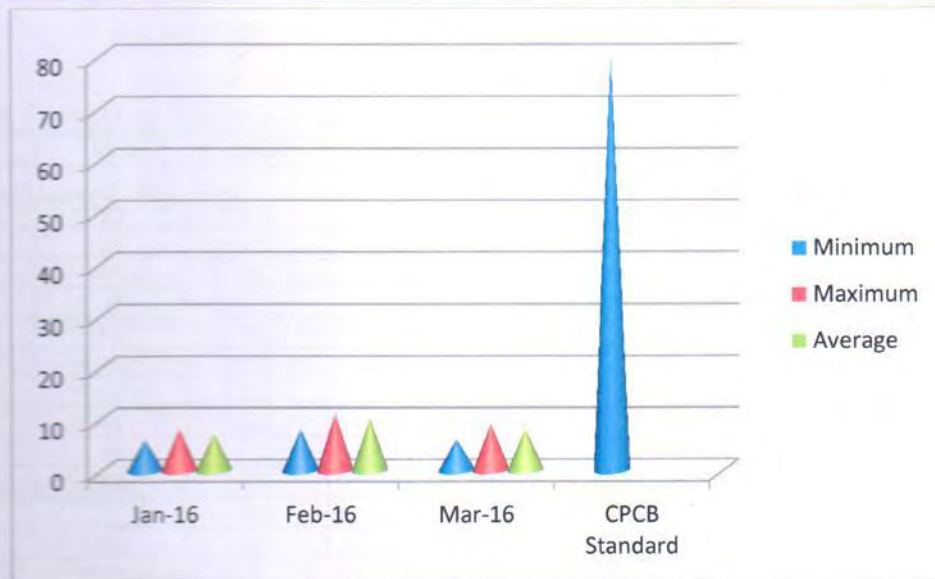
Graph:- Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 8 µg/m³ respectively and average concentration of 7 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for SO₂ were recorded as 7 µg/m³ and 11 µg/m³ respectively and average concentration of 9 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for SO₂ were recorded as 6 µg/m³ and 9 µg/m³ respectively and average concentration of 8 µg/m³.



Graph:- Dumerkholi / Nr.Mining Area



Table 10
Statistical Analysis of NO_x

Location	Month & Year	Min.	Max.	Unit : µg/m ³		
				A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	January-2016	16	23	20	20	23
	February-2016	18	21	20	20	21
	March-2016	21	26	24	24	26
Betpani	January-2016	16	19	18	18	19
	February-2016	18	23	21	21	23
	March-2016	17	21	19	19	21
Virhorepat	January-2016	19	23	21	21	23
	February-2016	21	26	24	24	26
	March-2016	18	21	20	20	21
Tatijharia Village/Nr.Weigh Bridge	January-2016	21	24	23	23	24
	February-2016	19	23	21	21	23
	March-2016	17	19	18	18	19
CPCB Standard		80 µg/m³ (24 hrs)				

Location	Month & Year	Min.	Max.	Unit : µg/m ³		
				A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	16	19	18	18	19
	February-2016	17	21	19	19	21
	March-2016	16	23	20	20	23
Sairaidh Campus	January-2016	18	24	21	21	24
	February-2016	16	18	17	17	18
	March-2016	19	23	21	21	23
Rajendrapur/ Nr.Mining Area	January-2016	17	21	19	19	21
	February-2016	16	19	18	18	19
	March-2016	17	21	19	19	21
Dumerkholi/ Nr.Mining Area	January-2016	18	24	21	21	24
	February-2016	19	23	21	21	23
	March-2016	21	26	24	24	26
CPCB Standard		80 µg/m³ (24 hrs)				

Conclusion (A):-

Piprapat /Nr.Mining Lease Area Core Zone: For the Months of Jan-Feb-March-2016 Average of NO_x is 21 µg/m³.

Betpani Lease Area Core Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 19 µg/m³.

Virhorepat Lease Area Core Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 22 µg/m³.**Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone :-** For the Months of Jan-Feb-March-2016 Average of NO_x is 21 µg/m³.

- The Average Concentration of NO_x within the Core Zone of Tatijharia Lease during this period (Jan-Feb-March-2016) is 21 µg/m³ and it is within permissible limits as per CPCB Standard.

Conclusion (B):-

1)Kutku Village/ Nr.V.T.Center Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 19 µg/m³.

2)Sairaidh Campus Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 20 µg/m³.

3)Rajendrapur/ Nr.Mining Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 19 µg/m³.

4)Dumerkholi/ Nr.Mining Lease Area Buffer Zone:- For the Months of Jan-Feb-March-2016 Average of NO_x is 22 µg/m³.

- The Average Concentration of NO_x within the Buffer Zone of Tatijharia Lease during this period (Jan-Feb-March-2016) is 20 µg/m³ and it is within permissible limits as per CPCB Standard.

Monthwise Summary of Statistical Analysis of NO_x

2.5 Fugitive Emission (Core Zone):-

2.5.1 Presentation of Results.

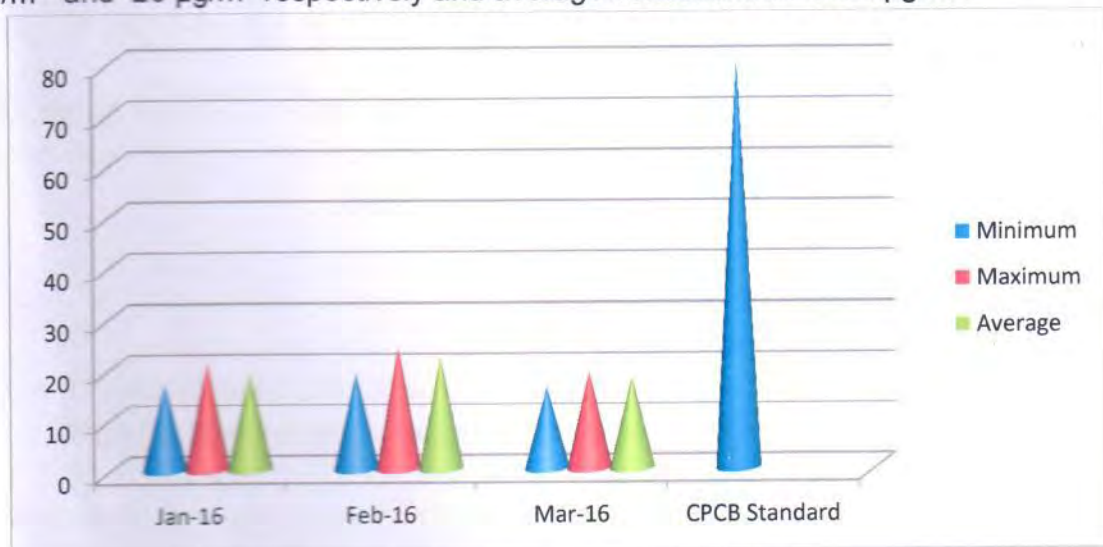
The summary of Statistical Analysis of NO_x results for the month of January-February-March-2016 are presented in detail in **Table 10**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 23 µg/m³ respectively and average concentration of 20 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 18 µg/m³ and 21 µg/m³ respectively and average concentration of 20 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 21 µg/m³ and 26 µg/m³ respectively and average concentration of 24 µg/m³.



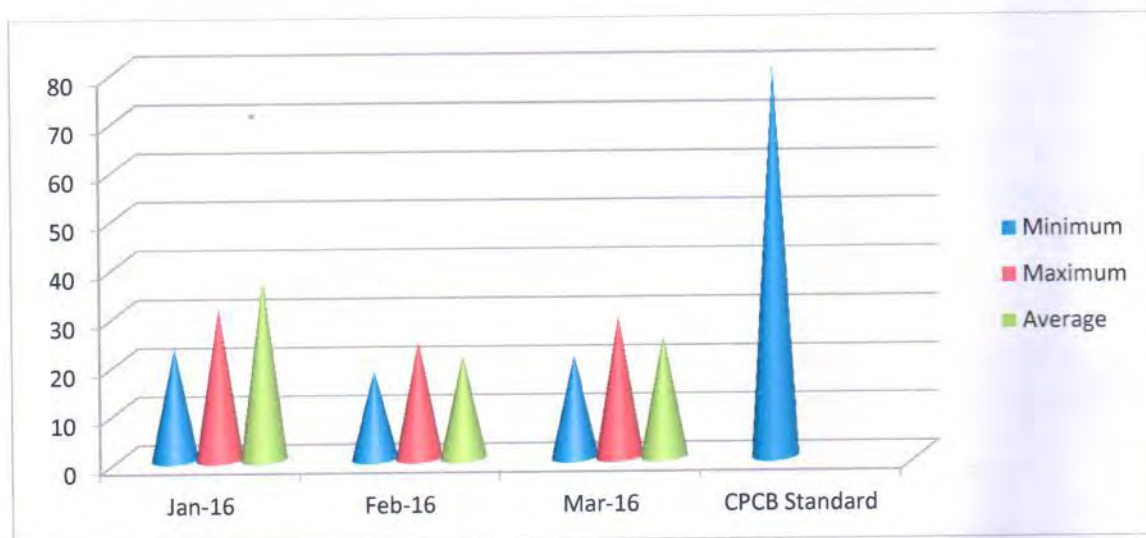
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 19 µg/m³ respectively and average concentration of 18 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 18 µg/m³ and 23 µg/m³ respectively and average concentration of 21 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 17 µg/m³ and 21 µg/m³ respectively and average concentration of 19 µg/m³.



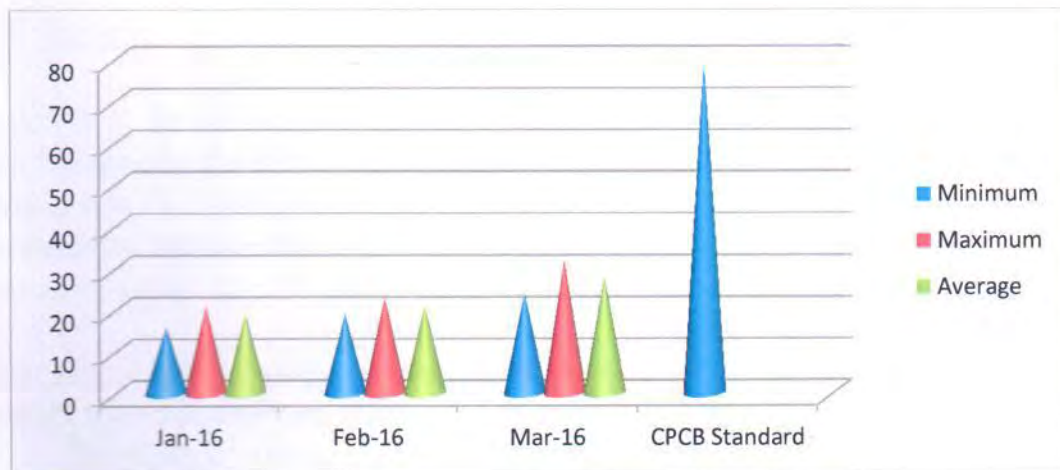
Graph:- Betpani

Virhorepat

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 19 µg/m³ and 23 µg/m³ respectively and average concentration of 21 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 21 µg/m³ and 26 µg/m³ respectively and average concentration of 24 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 18 µg/m³ and 21 µg/m³ respectively and average concentration of 20 µg/m³.



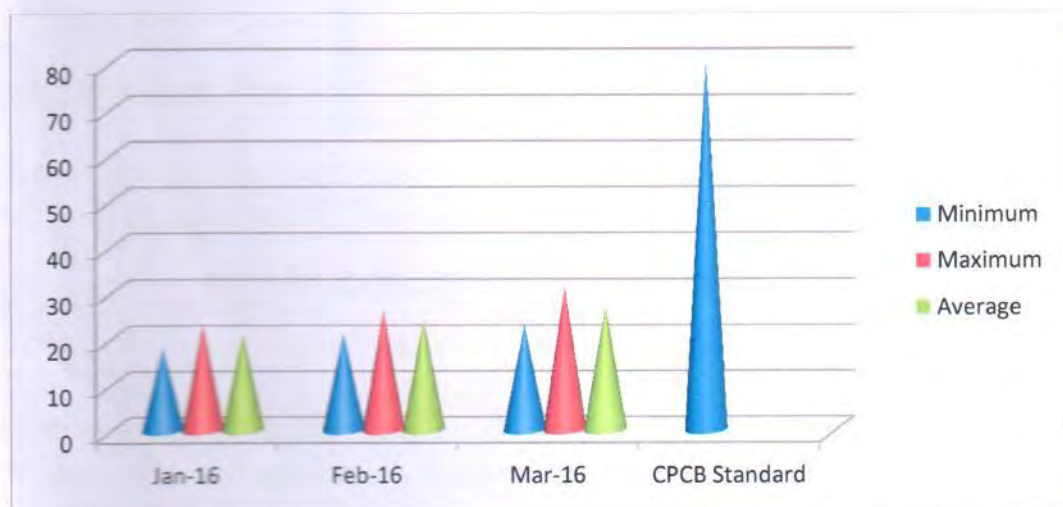
Graph:- Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as $21 \mu\text{g}/\text{m}^3$ and $24 \mu\text{g}/\text{m}^3$ respectively and average concentration of $23 \mu\text{g}/\text{m}^3$.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as $19 \mu\text{g}/\text{m}^3$ and $23 \mu\text{g}/\text{m}^3$ respectively and average concentration of $21 \mu\text{g}/\text{m}^3$.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as $17 \mu\text{g}/\text{m}^3$ and $19 \mu\text{g}/\text{m}^3$ respectively and average concentration of $18 \mu\text{g}/\text{m}^3$.



Graph:- Tatijharia Village/Nr.Weigh Bridge

2.6 Fugitive Emission (Buffer Zone):-

2.6.1 Presentation of Results.

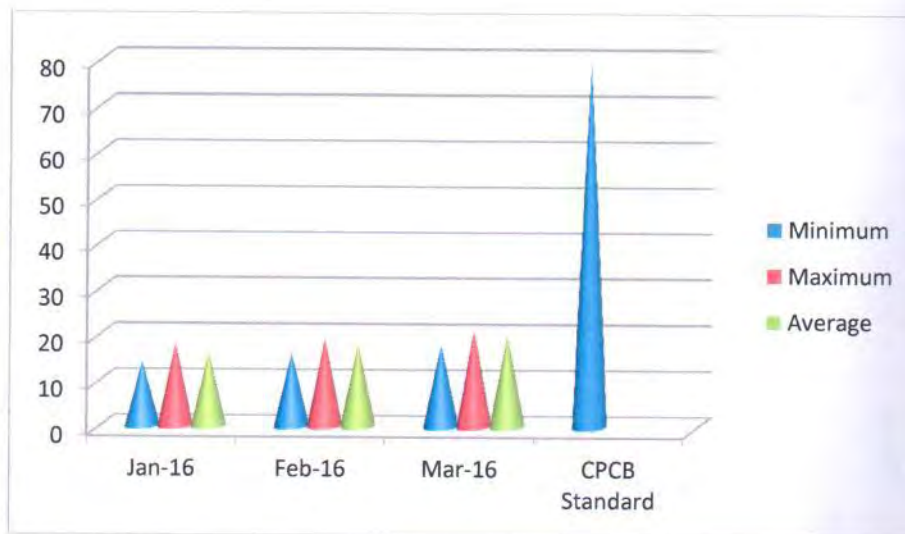
The summary of Statistical Analysis of NO_x results for the month of January-2016 to March 2016 are presented in detail in **Table 10**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr. V.T.Center

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 19 µg/m³ respectively and average concentration of 18 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 17 µg/m³ and 21 µg/m³ respectively and average concentration of 19 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 23 µg/m³ respectively and average concentration of 20 µg/m³.



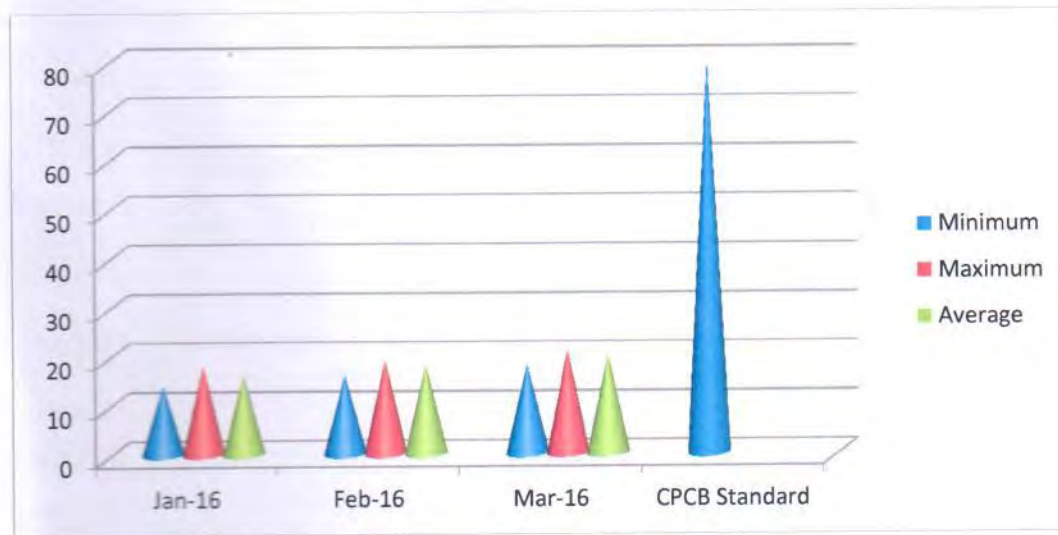
Graph:- Kutku Village / Nr. V.T.Center

Sairaidh Campus

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 18 µg/m³ and 24 µg/m³ respectively and average concentration of 21 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 18 µg/m³ respectively and average concentration of 17 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 19 µg/m³ and 23 µg/m³ respectively and average concentration of 21 µg/m³.



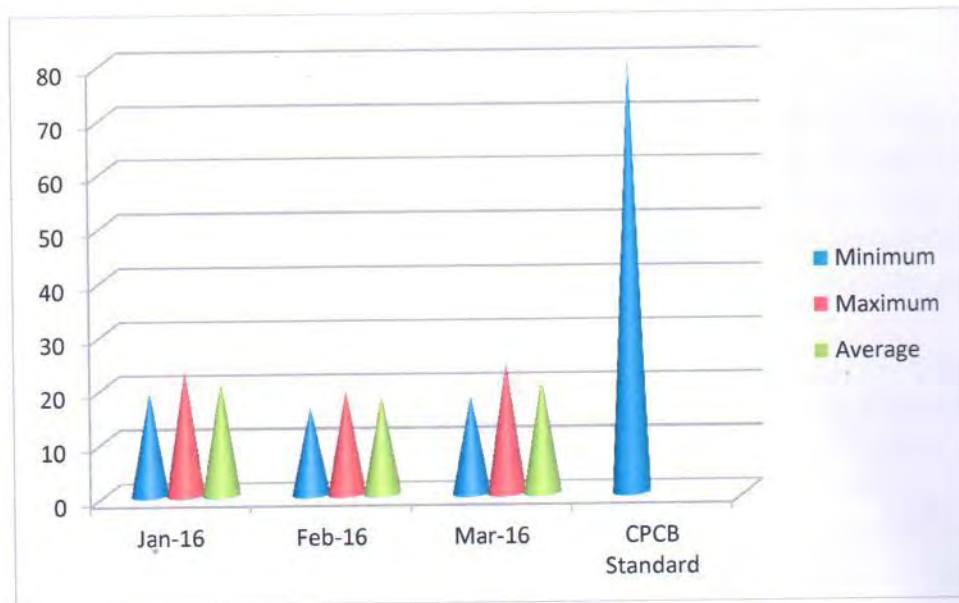
Graph:- Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 17 µg/m³ and 21 µg/m³ respectively and average concentration of 19 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 16 µg/m³ and 19 µg/m³ respectively and average concentration of 18 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 17 µg/m³ and 21 µg/m³ respectively and average concentration of 19 µg/m³.



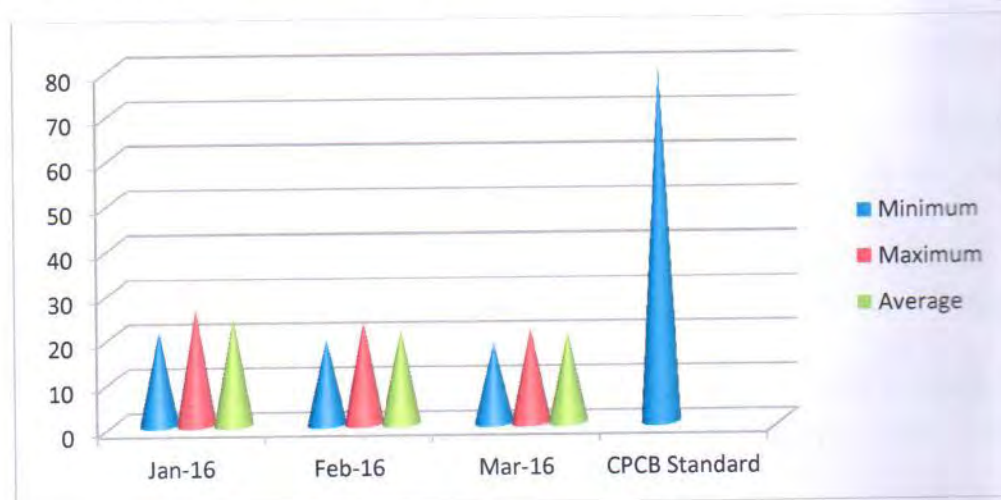
Graph:- Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of January-2016 the minimum and maximum concentrations for NO_x were recorded as 18 µg/m³ and 24 µg/m³ respectively and average concentration of 21 µg/m³.

For the Month of February-2016 the minimum and maximum concentrations for NO_x were recorded as 19 µg/m³ and 23 µg/m³ respectively and average concentration of 21 µg/m³.

For the Month of March-2016 the minimum and maximum concentrations for NO_x were recorded as 21 µg/m³ and 26 µg/m³ respectively and average concentration of 24 µg/m³.



Graph:- Dumerkholi / Nr.Mining Area



Table 11

Statistical Analysis of Pb

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	January-2016	0.016	0.027	0.022	0.022	0.027
	February-2016	0.019	0.031	0.025	0.025	0.031
	March-2016	0.017	0.028	0.023	0.023	0.028
Betpani	January-2016	0.018	0.026	0.022	0.022	0.026
	February-2016	0.016	0.024	0.020	0.020	0.024
	March-2016	0.017	0.029	0.023	0.023	0.029
Virhorepat	January-2016	0.024	0.036	0.030	0.030	0.036
	February-2016	0.028	0.042	0.035	0.035	0.042
	March-2016	0.019	0.024	0.022	0.022	0.024
Tatijharia Village/Nr.Weigh Bridge	January-2016	0.027	0.031	0.029	0.029	0.031
	February-2016	0.032	0.049	0.041	0.041	0.049
	March-2016	0.021	0.027	0.024	0.024	0.027
CPCB Standard		1.0 $\mu\text{g}/\text{m}^3$ (24 hrs)				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%ile
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	February-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	March-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sairaidh Campus	January-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	February-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	March-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Rajendrapur/ Nr.Mining Area	January-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	February-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	March-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dumerkholi/ Nr.Mining Area	January-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	February-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	March-2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
CPCB Standard		1.0 $\mu\text{g}/\text{m}^3$ (24 hrs)				

Conclusion: (A)

The Average concentration of Pb within the Core Zone of Tatijharia Lease during this period (Jan to March-2016) is $0.049 \mu\text{g}/\text{m}^3$ and it is within permissible limits as per CPCB Standard.

Conclusion: (B)

The Average concentration of Pb within the Buffer Zone of Tatijharia Lease during this period (Jan to March-2016) is $<0.0005 \mu\text{g}/\text{m}^3$ and it is within permissible limits as per CPCB Standard.

Table 12
Statistical Analysis of Hg

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

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	January-2016	0.013	0.018	0.016	0.016	0.018
	February-2016	0.016	0.021	0.019	0.019	0.021
	March-2016	0.014	0.019	0.017	0.017	0.019
Betpani	January-2016	0.016	0.024	0.020	0.020	0.024
	February-2016	0.019	0.028	0.024	0.024	0.028
	March-2016	0.014	0.019	0.017	0.017	0.019
Virhorepat	January-2016	0.021	0.026	0.024	0.024	0.026
	February-2016	0.019	0.024	0.022	0.022	0.024
	March-2016	0.024	0.031	0.028	0.028	0.031
Tatijharia Village/Nr.Weigh Bridge	January-2016	0.017	0.023	0.020	0.020	0.023
	February-2016	0.018	0.026	0.022	0.022	0.026
	March-2016	0.017	0.021	0.019	0.019	0.021
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2016	<0.01	<0.01	<0.01	<0.01	<0.01
Sairaidh Campus	January-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2016	<0.01	<0.01	<0.01	<0.01	<0.01
Rajendrapur/ Nr.Mining Area	January-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2016	<0.01	<0.01	<0.01	<0.01	<0.01
Dumerkholi/ Nr.Mining Area	January-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	February-2016	<0.01	<0.01	<0.01	<0.01	<0.01
	March-2016	<0.01	<0.01	<0.01	<0.01	<0.01
CPCB Standard		---				

Conclusion: (A)

The Average concentration of Hg within the Core Zone of Tatijharia Lease during this period (Jan to March-2016) is $0.031 \mu\text{g}/\text{m}^3$.

Conclusion: (B)

The Average concentration of Hg within the Buffer Zone of Tatijharia Lease during this period (Jan to March-2016) is $<0.01 \mu\text{g}/\text{m}^3$.

Table 13

Statistical Analysis of As

Unit: ng/m³

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	January-2016	0.13	0.21	0.17	0.17	0.21
	February-2016	0.14	0.19	0.17	0.17	0.19
	March-2016	0.17	0.24	0.21	0.21	0.24
Betpani	January-2016	0.16	0.21	0.19	0.19	0.21
	February-2016	0.19	0.26	0.23	0.23	0.26
	March-2016	0.14	0.19	0.17	0.17	0.19
Virhorepat	January-2016	0.14	0.17	0.16	0.16	0.17
	February-2016	0.18	0.23	0.21	0.21	0.23
	March-2016	0.17	0.21	0.19	0.19	0.21
Tatijharia Village/Nr.Weigh Bridge	January-2016	0.19	0.24	0.22	0.22	0.24
	February-2016	0.21	0.26	0.24	0.24	0.26
	March-2016	0.24	0.28	0.26	0.26	0.28
CPCB Standard		06 ng/m³ (Annual)				


Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	January-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2016	<0.1	<0.1	<0.1	<0.1	<0.1
Sairaidh Campus	January-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2016	<0.1	<0.1	<0.1	<0.1	<0.1
Rajendrapur/ Nr.Mining Area	January-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2016	<0.1	<0.1	<0.1	<0.1	<0.1
Dumerkholi/ Nr.Mining Area	January-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	February-2016	<0.1	<0.1	<0.1	<0.1	<0.1
	March-2016	<0.1	<0.1	<0.1	<0.1	<0.1
CPCB Standard		06 ng/m³ (Annual)				

Conclusion: (A)

The Average concentration of As within the Core Zone of Tatijharia Lease during this period (Jan to March-2016) is 0.28 ng/m³ and it is within permissible limits as per CPCB Standard.

Conclusion: (B)

The Average concentration of As within the Buffer Zone of Tatijharia Lease during this period (Jan to March-2016) is < 0.1 ng/m³ and it is within permissible limits as per CPCB Standard.

	<p align="center">Hindalco Industries Limited Tatijharia Mining Environmental Status Report for January-2016 To March-2016</p>	<p align="center">Introduction</p>
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Free Silica :-

Sr. No.	Location	Measurement Unit	January-2016		February-2016		March-2016	
			SPM	RSPM	SPM	RSPM	SPM	RSPM
1.	Piprapat/ Near Mining Area	g/100gm	0.19	0.07	0.24	0.16	0.21	0.13

Table 14

Dust fall Rate

Sl.No.	Location	January-2016	February-2016	March-2016	Average
		Rate (MT/km²/month)			
1	Piprapat/Near Mining Area	21.7	26.1	29.4	25.7
2	Tatijharia Village	18.6	21.6	23.9	21.4


	<p align="center">Hindalco Industries Limited Tatijharia Mining Environmental Status Report for January-2016 To March-2016</p>	<p align="center">Introduction</p>
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Table 15

Noise Level Monitoring

Unit: dB(A)

Sl. No.	Location	January-2016		February-2016		March-2016	
		Day	Night	Day	Night	Day	Night
Core Zone							
1.	Piprapat/Nr.Mining Area	57.3	48.2	62.8	53.9	58.7	46.2
2.	Betpani	56.9	47.3	59.2	46.1	61.8	54.7
3.	Virhorepat	57.8	46.9	61.3	52.8	59.3	47.9
4.	Tatijharia Village/ Nr.Weigh Bridge	62.1	53.7	67.9	56.3	58.6	49.3
Buffer Zone							
5.	Kutku Village/Nr.V.T.Center	51.7	42.8	49.3	38.7	52.6	41.9
6.	Sairaidh Campus	47.3	38.2	51.9	42.6	49.3	38.1
7.	Rajendrapur/Nr.Mining Area	52.6	41.9	48.7	41.3	51.6	42.7
8.	Dumerkholi/Nr.Mining Area	53.4	42.6	49.3	38.7	46.9	37.2

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

Unit: dB(A)

Sl. No.	Location	January-2016			February-2016			March-2016		
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
1	Piprapat/Nr.Mining Area	68.2	79.4	73.8	72.4	81.6	77.0	74.1	82.9	78.5

2.7 Ground Water Quality:-Most of the villages in the nearby plant area have hand pumps and wells, as most of the residents of these villages make use of this water for drinking and other domestic uses for TABLE NO.16



Table 16

Report on Chemical Examination of Ground Water

Location: GW1: Piprapat/Near Mining Area (Average of Jan-Feb-March-2016)

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	6.94 at 26°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)	0.3	No relaxation	0.21
7.	Free residual chlorine	mg/l	IS 3025 (Part 26)	Min. 0.2	Min. 1	< 0.1
8.	Total dissolved solids	mg/l	IS 3025 (Part 16)	500	2000	273
9.	Fluoride (as F)	mg/l	IS 3025 (Part 60)	1.0	1.5	< 0.1
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	46.18
12.	Total Alkalinity (as CaCO ₃)	mg/l	IS 3025 (Part 23)	200	600	112.54
13.	Total hardness (as CaCO ₃)	mg/l	IS 3025 (Part 21)	200	600	172.08
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	56.91
15.	Magnesium (as Mg)	mg/l	IS 3025 (Part 46)	30	100	7.26
16.	Sulphate (as SO ₄)	mg/l	IS 3025 (Part 24)	200	400	31.52
17.	Nitrate (as NO ₃)	mg/l	APHA Method	45	No relaxation	< 2
18.	Copper (as Cu)	mg/l	IS 3025 (Part 2)	0.05	1.5	< 0.03
19.	Manganese (as Mn)	mg/l	IS 3025 (Part 2)	0.1	0.3	< 0.05
20.	Mercury (as Hg)	mg/l	IS 3025 (Part 2)	0.001	No relaxation	< 0.0005
21.	Cadmium (as Cd)	mg/l	IS 3025 (Part 2)	0.003	No relaxation	< 0.001
22.	Selenium (as Se)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
23.	Arsenic (as As)	mg/l	IS 3025 (Part 2)	0.01	0.05	< 0.01
24.	Aluminium (as Al)	mg/l	IS 3025 (Part 2)	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	0.18

Contd...



(Contd.....)

Sr. No	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)		Test Result
				Acceptable Limit	*Permissible Limit	
27.	Nickel (as Ni)	mg/l	IS 3025 (Part 2)	0.02	No relaxation	< 0.01
28.	Total Chromium (as Cr)	mg/l	IS 3025 (Part 2)	0.05	No relaxation	< 0.03
29.	Barium (as Ba)	mg/l	Annexure F of IS 13428	0.7	No relaxation	< 0.01
30.	Ammonia (as N)	mg/l	IS 3025 (Part 34)	0.5	No relaxation	< 0.01
31.	Sulphide (as H ₂ S)	mg/l	IS 3025 (Part 29)	0.05	No relaxation	< 0.03
32.	Chloramines (as Cl ₂)	mg/l	APHA 4500-Cl ₂ G	4.0	No relaxation	< 0.01
33.	Molybdenum (as Mo)	mg/l	IS 3025 (Part 2)	0.07	No relaxation	< 0.001
34.	Silver (as Ag)	mg/l	Annexure J of IS 13428	0.1	No relaxation	< 0.001
35.	Polychlorinated Biphenyls (PCB)	µg/l	USEPA 508	0.5	No relaxation	< 0.03
36.	Boron (as B)	mg/l	IS 3025 (Part 2)	0.5	1.0	< 0.1
37.	Mineral Oil	mg/l	IS 3025 (Part 39)	0.5	No relaxation	< 0.001
38.	Tri Halo Methane					
	a. Bromoform	mg/l	APHA 6232	0.1	No relaxation	Absent
	b. Dibromochloromethane			0.1	No relaxation	Absent
	c. Bromodichloromethane			0.06	No relaxation	Absent
	d. Chloroform			0.2	No relaxation	Absent
39.	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	IS 3025 (Part 43) :1001	0.001	0.002	< 0.001
40.	Anionic detergents (as MBAS)	mg/l	IS 13428:2005 (Annex K)	0.2	1.0	< 0.001
41.	Polynuclear aromatic hydrocarbon (PAH)	µg/l	USEPA : 550	0.1	No relaxation	< 0.03
42.	Total coliform	MPN/100 ml	IS 1622	---	---	< 2
43.	<i>Escherichia coli</i>	Per100 ml	IS 1622	Absent	Absent	Absent
44.	Pesticides residues					
i.	Alpha-HCH	µg/l	USEPA 508	0.01		< 0.01
ii.	Beta HCH	µg/l	USEPA 508	0.04		< 0.03
iii.	Delta- HCH	µg/l	USEPA 508	0.04		< 0.03
iv.	Alachlor	µg/l	USEPA 508	20		< 0.03
v.	Aldrin / Dieldrin	µg/l	USEPA 508	0.03		< 0.03
vi.	Atrazine	µg/l	USEPA 1657	2		< 0.03
vii.	Butachlor	µg/l	USEPA 508	125		< 0.03
viii.	Chlorpyrifos	µg/l	USEPA 1657	30		< 0.03
ix.	DDT and its Isomers	µg/l	USEPA 508	1		< 0.03
x.	Gamma - HCH (Lindane)	µg/l	USEPA 508	2		< 0.03
xi.	2,4-Dichlorophenoxyacetic acid	µg/l	USEPA 1657	30		< 0.03
xii.	Endosulphan	µg/l	USEPA 508	0.4		< 0.03
xiii.	Ethion	µg/l	USEPA 1657	3		< 0.03
xiv.	Isoproturon	µg/l	USEPA 1657	9		< 0.03
xv.	Malathion	µg/l	USEPA 1657	190		< 0.03
xvi.	Methyl Parathion	µg/l	USEPA 1657	0.3		< 0.03
xvii.	Monocrotophos	µg/l	USEPA 1657	1		< 0.03
xviii.	Phorate	µg/l	USEPA 1657	2		< 0.03

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

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



Table 17

Monthly Report on Chemical Examination of Surface Water
(Nallah Near Mining Area)

S.No	Parameters	Unit	IS : 2296 Class 'C'	Results
				January-2016
1	pH Value	-	6.5 to 8.5	7.36
2	Total Hardness (CaCO ₃)	mg / l	\$	312.54
3	Iron as (Fe)	mg / l	50	18.3
4	Chlorides as (Cl)	mg / l	600	362.9
5	Electrical Conductivity	µS/cm	\$	482.7
6	Total Dissolved Solids (TDS)	mg / l	1500	271
7	Calcium as (Ca)	mg / l	\$	72.4
8	Magnesium as (Mg)	mg / l	\$	11.6
9	Sulphate as (SO ₄)	mg / l	400	183.7
10	Nitrates as (NO ₃)	mg / l	\$	8.2
11	Fluoride as (F)	mg / l	0.5	0.24
12	Alkalinity	mg / l	\$	57.9
13	Chemical Oxygen demand (COD)	mg / l	\$	23.7
14	BOD at 27°C for 3days	mg / l	3	7.4
15	Total Suspended Solid (TSS)	mg / l	\$	23

\$: Limits not specified

Table 18

Report on Soil Analysis, Tatijharia

Date of collection: January-2016.

Sample Location: Piprapat/Nr.Mining Area

Sr. No	Test Parameters	Measurement Unit	Results
1	pH	-	6.87 at 26 ^o C
2	Electrical Conductivity at 25 ^o C	µs/cm	317
3	Texture	-	Clay Loam
4	Sand	%	39.7
5	Silt	%	24.8
6	Clay	%	35.5
7	Bulk Density	g/cc	1.21
8	Porosity	%	16
9	Water Holding Capacity	%	51
10	Exchangeable Calcium as Ca	mg/kg	64.9
11	Exchangeable Magnesium as Mg	mg/kg	7.3
12	Exchangeable Sodium as Na	mg/kg	68.2
13	Available Potassium as K	kg/hect.	4.9
14	Available Phosphorous as P	kg/hect.	163
15	Available Nitrogen as N	kg/hect.	38.2
16	Organic Matter	%	0.27
17	Organic Carbon	%	0.19
18	Water Soluble Chloride as Cl ⁺	mg/kg	12.1
19	Water Soluble Sulphate as SO ₄	mg/kg	6.4
20	Sodium Absorption Ratio	-	4.07
21	CEC	meq/100 gm	12.8
22	Total Iron	%	4.16
23	Available Manganese	mg/kg	0.009
24	Available Zinc	mg/kg	0.006
25	Available Boron	mg/kg	0.003

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

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

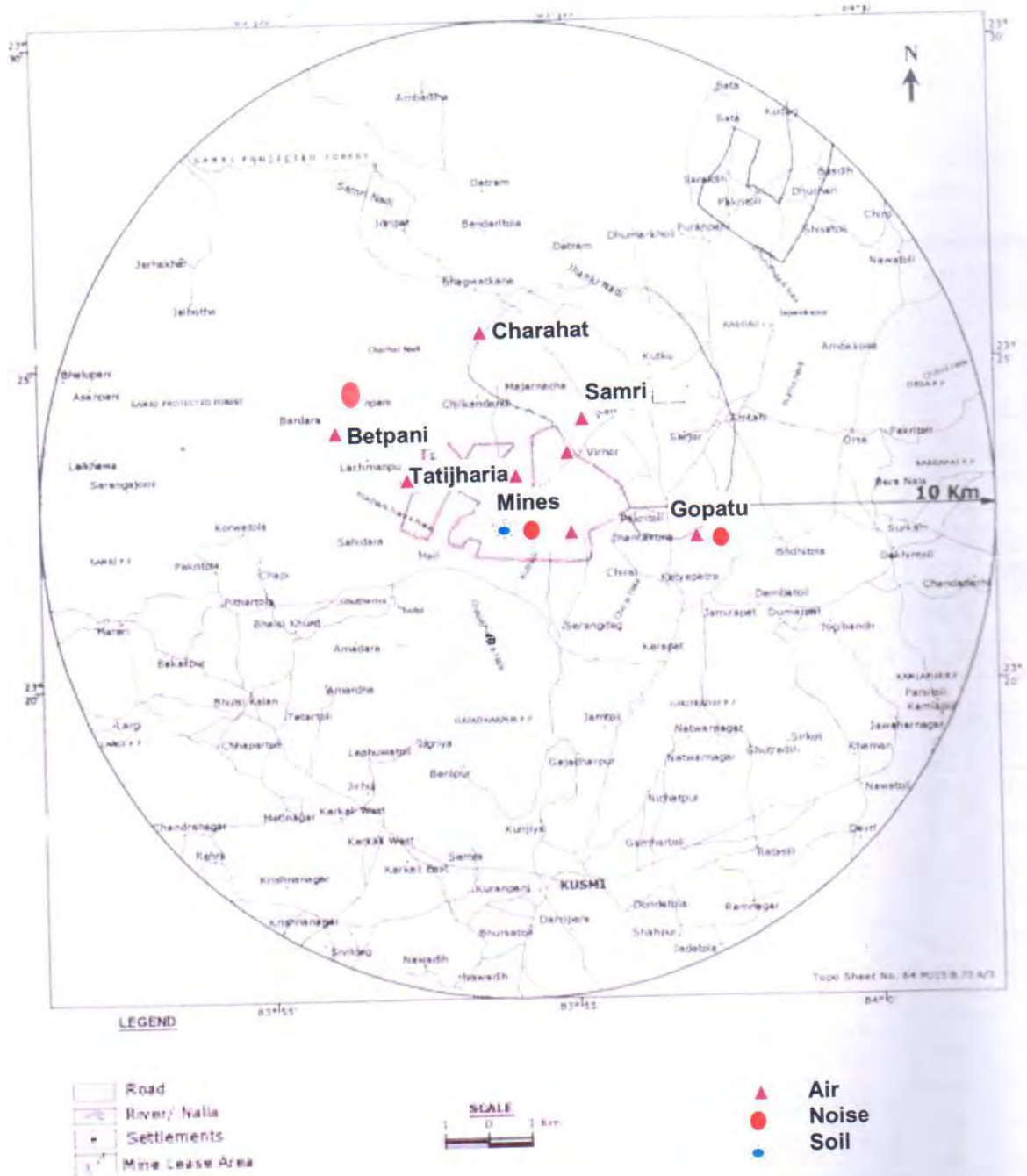


FIG 3: SAMPLING LOCATIONS FOR AIR, NOISE & SOIL

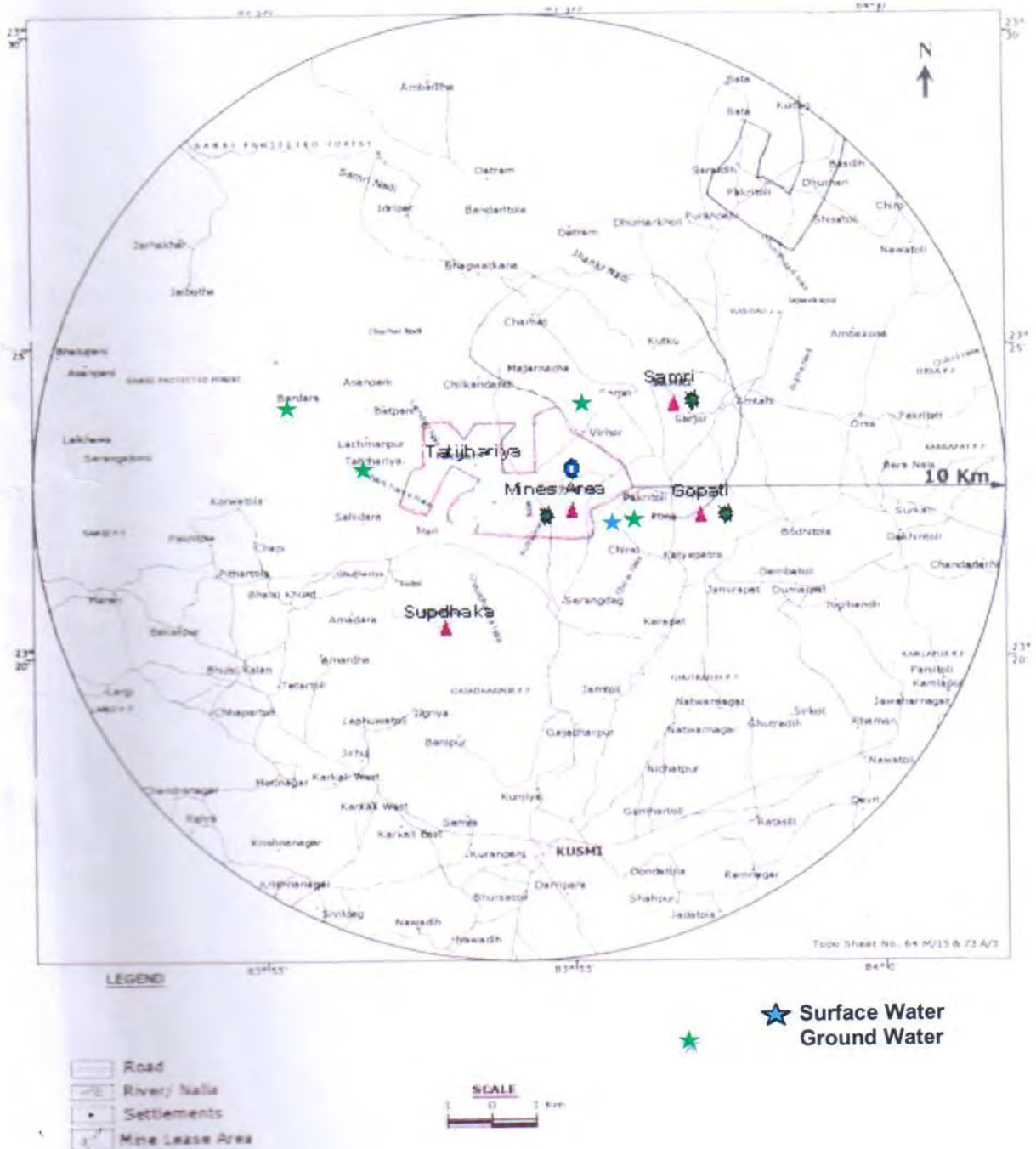


FIG 4: SAMPLING LOCATIONS FOR WATER



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

No. 6267/TS/CECB/2016
 To,

Raipur, dated: 17/3/2016

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

[Handwritten signature]
 21/3/16

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

- Ref: - 1. Consent of the Board issued under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 5685/TS/CECB/2007 Raipur, dated: 6886/TS/CECB/2007 Raipur, dated: 24/12/2007.
2. Last renewal of consent of the Board issued under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 1976/TS/CECB/2014 Raipur, dated: 02/07/2014.
3. Your application letter no. HIL/SAM/CECB/103/2015, dated: 14/07/2015 and subsequent correspondence ending dated: 16/11/2015.

--: 00 :--

With reference to your above application, consent is hereby renewed for a period of one year from 01/12/2015 to 30/11/2016 subject to the fulfillment of the terms and conditions incorporated in the consent letter no. 6886/TS/CECB/2007 Raipur, dated: 24/12/2007, subsequent renewal of consent issue by Board and additional conditions mentioned below.

This renewal of consent is valid for:-

Name	Production Capacity
Mining of Bauxite Ore	4.0 Lakh Tonnes Per Year [Four Lakh Tonnes Per Year]

Additional Conditions

1. Industry shall operate and maintain the air pollution control system effectively and regularly. Effective steps shall be taken to control fugitive dust emission. Fixed type automatic water sprinkling system shall be installed at haul road / other roads, ore stock yard etc. Dust suppression system (water sprinkling arrangement) shall be made more effective to ensure ambient air quality within prescribed limit. Industry shall maintain the ambient air quality within prescribed limit in and around the mine area all the time.

[Handwritten signature]

2. Regular monitoring for the measurement of air pollutants level in ambient shall be carried out. Industry shall submit ambient air quality monitoring reports to the Board regularly every month.
3. Industry shall ensure safe and scientific arrangement for disposal of all solid wastes. Excavated area shall be reclaimed scientifically.
4. All internal roads shall be made pucca at the earliest and shall be maintained properly. Dust, muck and sludge generated due to transportation on the roads shall be cleaned and disposed off properly. Industry shall maintain good housekeeping within mine lease area. Industry shall ensure the transportation of ore in duly covered vehicles.
5. Industry shall use fly ash brick, fly ash blocks or fly ash based products in their construction/repairing activities.
6. Wide green belt of broad leaf local species shall be developed along the mine lease area. As far as possible maximum area of open spaces shall be utilized for plantation purposes. Extensive tree plantation shall be carried out in this year.
7. 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.

Please acknowledge the receipt of this letter.

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


Member Secretary


Chhattisgarh Environment Conservation Board
Raipur (C.G.)

Endt. No. /TS/CECB/2016

Raipur, dated: ___ / ___ / 2016

Copy to: -

- 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.


Member Secretary

Chhattisgarh Environment Conservation Board
Raipur (C.G.)





CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

Commercial Complex, Housing Board Colony,
Kabir Nagar, Raipur (C.G.)

No. ⁶²⁶⁵ /TS/CECB/2016
To,

Raipur, dated: 17/3/2016

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

[Handwritten Signature]
3/3/16

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

- Ref: - 1. Consent of the Board issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 vide letter no. 6884/TS/CECB/2007 Raipur, dated: 24/12/2007.
2. Last renewal of consent of the Board issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 vide letter no. 1974/TS/CECB/2014 Raipur, dated: 02/07/2014.
3. Your application letter no. HIL/SAM/CECB/103/2015, dated: 14/07/2015 and subsequent correspondence ending dated: 16/11/2015.

--: 00 :--

With reference to your above application, consent is hereby renewed for a period of one year from 01/12/2015 to 30/11/2016 subject to the fulfillment of the terms and conditions incorporated in the consent letter no. 6884/TS/CECB/2007 Raipur, dated: 24/12/2007, subsequent renewal of consent issue by Board and additional conditions mentioned below.

This renewal of consent is valid for:-

Name	Production Capacity
Mining of Bauxite Ore	4.0 Lakh Tonnes Per Year [Four Lakh Tonnes Per Year]

Additional Conditions

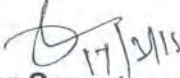
1. Industry shall operate and maintain the effluent treatment system effectively and regularly. Industry shall ensure treated effluent quality within the standards prescribed by Board published in Gazette Notification dated: 25/03/1988. Treated effluent shall be used for dust suppression, domestic use, irrigation, other useful purposes etc. Industry shall not discharge any treated / untreated effluent in to the river or any surface water bodies. No effluent shall be discharged outside of the mine premises in any circumstances; hence zero discharge condition shall be maintained all the time; failing which, this renewal of consent may be cancelled.

[Handwritten Signature]

2. Industry shall ensure safe and scientific arrangement for disposal of all solid wastes. Excavated area shall be reclaimed scientifically.
3. All internal roads shall be made pucca at the earliest and shall be maintained properly. Dust, muck and sludge generated due to transportation on the roads shall be cleaned and disposed off properly. Industry shall maintain good housekeeping within mine lease area. Industry shall ensure the transportation of ore in duly covered vehicles.
4. Industry shall use fly ash brick, fly ash blocks or fly ash based products in their construction/repairing activities.
5. Industry shall submit monitoring report of effluent regularly.
6. Wide green belt of broad leaf local species shall be developed along the mine lease area. As far as possible maximum area of open spaces shall be utilized for plantation purposes. Extensive tree plantation shall be carried out in this year.
7. 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.

Please acknowledge the receipt of this letter.

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



Member Secretary
Chhattisgarh Environment Conservation Board
Raipur (C.G.)

Endt. No. /TS/CECB/2016

Raipur, dated: / /2016

Copy to: -

- 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
Raipur (C.G.)



Hindalco Industries Ltd.
Mines Division, Samri

Lease wise Production 2015-16

Lease	Production (MT)
Samri	411399.000
Kudag	49372.000
Tatijharia	365945.000
Total	826716.000


Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

Hindalco Industries Ltd.
Mines Division, Samri

Lease wise Details 2015-16

Lease	Mined Out Area (Hact.)	Reclaimed Area (Hact.)	Nos. of Sapling	Area of Sapling (Hact.)
Samri	10.999	15.453	10139	4.050
Kudag	4.452	4.084	4000	1.600
Tatijharia	9.302	7.844	7500	3.000
Total	24.753	27.381	21639	8.650


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

Year wise /Lease wise Details of Afforestation

Year	Kudag Bauxite Mines		Samri Bauxite Mines		Tatijharia Bauxite Mines		Total	
	No. of Sapling	Area in hect.	No. of Sapling	Area in hect.	No. of Sapling	Area in hect.	No. of Sapling	Area in hect.
1998-99	900	0.1	0	0	0	0	900	0.1
1999-00	7000	2.58	0	0	0	0	7000	2.58
2000-01	7500	3.21	0	0	0	0	7500	3.21
2001-02	10000	5.01	0	0	0	0	10000	5.01
2002-03	4000	1.56	3800	2.44	0	0	7800	4
2003-04	4200	2.57	5500	2.81	0	0	9700	5.38
2004-05	6750	2.9	8222	2.8	2000	1	16972	6.7
2005-06	800	0.5	11100	3.8	8700	3.4	20600	7.7
2006-07	4940	2	16510	6.884	8190	3.3	29640	12.184
2007-08	2950	1.3	18880	7.75	6390	2.5	28220	11.55
2008-09	32200	12.72	5000	2.47	3000	1.5	40200	16.69
2009-10	15700	6.20	15100	6.00	7850	3.20	38650	15.40
2010-11	1500	0.600	18325	7.200	8750	3.400	28575	11.200
2011-12	3015	1.200	11575	4.600	3370	1.360	17960	7.160
2012-13	1200	0.500	12400	5.000	4600	1.900	18200	7.400
2013-14	950	0.400	8700	3.500	4875	2.000	14525	5.900
2014-15	5575	2.230	12850	5.150	7750	3.100	26175	10.480
2015-16	4000	1.600	10139	4.050	7500	3.000	21639	8.650
Total	113180	47.18	158101	64.454	72975	29.660	344256	141.294


Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.

Actual Expenditure incurred in Environment Management Plan:-

Total cost for protection of environment in Samri, Tatijharia & Kudag Bauxite Mine of Hindalco Industries Ltd. of Chhattisgarh state during the second half period of F.Y. 2015-16 (October15-March16).

SI No-	Environment Protection Measures	Actual Cost (Lac) (F.Y. 2015-16) (Oct15-Mar16))
1	Pollution Control	9.75
2	Environment Monitoring	1.51
3	Occupational Health	7.5
4	Green Belt	7.80
5	Reclamation/Rehabilitation of mined out area (Samri -2.944 Ha. Tatijharia-1.202 Ha. Kudag- 0.364 Ha. Total – 4.510 Ha.)	22.55
6	Total	49.11

- 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 of mined out land has been out sourced along with production. Average cost of reclamation considered @ 5.0 Lac per Ha.


 Agent of Mines
 Samri Mines Division
 Hindalco Industries Ltd