HIL/SMM/APCCF/236/2017/T

16.11.2017.

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 April-2017 to September-2017.

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 of Tatijharia Bauxite Mine, Lease area -1218.762 Ha. of Hindalco Industries Limited. P.O- Kusmi, Dist- Balrampur- Ramanujganj, Chhattisgarh state. PIN-497224 from April-2017 to September-2017.

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

16/11/17

(M. K. Nayak)
Agent of Mines

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

Encl:-

1. Half Yearly Status of compliance of Environment condition as annexure-I.
2. Copy of Diversion and extension of Revenue Forest Land enclosed as annexure -II.
3. Environment Status Report from July-2017 to September-2017, enclosed as annexure –III
4. Renewal copy of Consent to Operate from CECB enclosed as annexure -IV
5. Production report from April-2017 to September-2017 enclosed as annexure-V.
6. Status report of mined out, reclaimed and afforestated land as annexure-VI.
7. Actual expenditure incurred in protection of environment from April-2017 to September-2017 as annexure-VII.

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Samri Mines Division, Baba Chowk,
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Distt.- Balrampur-Ramanujganj (CG), INDIA,
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REGISTERED OFFICE
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Mahakali Caves Road, Andheri (East),
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Website : www.hindalco.com
E-mail : hindalco@adityabirla.com,
corporate Identity No. L220MH1958PLCO11238.

Annexure - I

14.11.2017.

Status of Compliance from April-2017 to September-2017of 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.

(ix) Controlled blasting is in practiced in the mine. Dust extractors are being used during drilling operations. Cord relay & effective blast design are

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.

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) tn case of final closure of mine the information will be submitted to Regional Office, Ministry of Environment & Forests, Bhopal.

(xiii) Adequate fund provision is already earmarked for environmental protection measures and will not be diverted to other purpose. The year wise expenditure will be submitted to concern authorities as per guidelines.

(xiv) The same will be intimated to Regional Office, Ministry of Environment & Forests, Bhopal.

(xv) All cooperation is being extended to regulatory authorities and will be extended as earlier.

(xvi) Although no suggestion/representation has been received by any Panchayat/Local NGO while processing the proposal. However we have forwarded the copy of clearance letter to Panchayat in our area. The copy of same has been already submitted to your good office.

(xvii) The copy has been displayed by CECB in Balrampur Collectorate.

(xviii) The information regarding environment clearance has been published in two local new papers namely Hari Bhumi & Ambika Vani. The copy of same has been already submitted to your good office.

Hope the above compliance will be found in order.

Yours truly,
For Hindalco Industries Limited

(M K Nayak)
Agent of Mines

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

Encl. : As Above

Annexure - A

कार्यालय प्रधान मुख्य वन संरक्षक (वन्यप्राणी प्रबंधन एवं जैव विविधता
संरक्षण सह मुख्य वन्यप्राणी अभिरक्षक), छत्तीसगढ़
अरण्य भवन, मेडिकल कॉलेज रोड, रायपुर
Ph.0771-2552228, Fax 0771-2552227

क्रमांक/व.प्रा./प्रबंध-12/13/2967 रायपुर दिनांक 07/10/2013

प्रति,

संचालक,
इन्वायरनमेंट क्लीयरेंश सेल
भारत सरकार, वन एवं पर्यावरण मंत्रालय,
पर्यावरण भवन, सी.जी.ओ. काम्प्लेक्स,
लोधी रोड़, नई दिल्ली–111003

विषय :– छत्तीसगढ़ के बलरामपुर जिले (तत्कालीन सरगुजा जिला) में स्थित सामरी बॉक्साईट माईन्स, कुदाग बॉक्साईट माईन्स एवं टाटीझरिया बॉक्साईट माईन्स की क्षमता बढ़ाये हेतु ईन्वायरमेंट 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 बॉक्साईट खुली खदान (1 LTPA) की क्षमता बढ़ाकर (5LTPA) करने, कुदाग बॉक्साईट खदान (0.4 LTPA) की क्षमता बढ़ाकर (0.6 LTPA) करने तथा टाटीझरिया बॉक्साईट 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 मंत्रलाय 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 बॉक्साईट खनन की स्वीकृति प्राप्त कर संस्था द्वारा खनन का कार्य किया जा रहा है।

I

[illegible] स्वीकृत खादानों की क्षमता सामरी के लिये 1.0 LPTA से बढाकर 5.0 LPTA किया जाना, बुंदाग के लिये 0.4 LPTA से बढाकर 0.6 LPTA किया जाना एवं टाटीझरिया के लिये 50,000 TPA से बढाकर 4,00,000 TPA किया जाना प्रस्तावित है। भारत सरकार पर्यावरण व वन मंत्रालय के द्वारा उपरोक्त वृद्धि हेतु प्रथम चरण की स्वीकृति क्रमश: आदेश 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 महत्वपूण 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 रुप 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 रुप 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 पॉच, वर्ष 2009–10 में छ: 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 है। 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 संबधित 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 गतिविधियॉ, स्थानीय ग्रामीणों के लिये आजीविका सृजन, टीकाकरण, जनजागृति कार्यक्रम जैसी गतिविधियों का

[illegible] 04 वर्षों के लिये राशि रुपये 160 लाख प्रावधानित की गयी है। जिसका क्रियान्वयन [illegible] विभाग के द्वारा किया जायेगा। प्रस्ताव में प्रावधानित बजट का विवरण निम्नानुसार है :-

Sr No.	Work to be done	Cost for Four years (Rs. In lakhs)					Remarks
		1st Year	2nd Year	3rd Year	4th 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 sataff.	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 Bio-diversity management committees (BMC's)
	Total	55.00	35.00	35.00	35.00	160.00	

IV

[illegible] 160.00 लाख वर्तमान दरों पर है. परियोजना में देरी होने से यह लागत [illegible] विलंब से वृद्धि होगी। परियोजना के क्रियान्वयन के समय जो भी लागत आयेगी [illegible] विभाग में एकमुश्त जमा करानी होगी। जिससे मूल्य वृद्धि के प्रभाव को समाप्त [illegible] विभाग एकमुश्त जमा की गई राशि से वन्यप्राणी संरक्षण योजना क्रियान्वित करेगा।

अनुमोदित वन्यप्राणी संरक्षण योजना की एक प्रति संलग्न प्रेषित है। कृपया वन्यप्राणी संरक्षण योजना में प्रावधानित राशि रू. 160.00 लाख एकमुश्त जमा कराने हेतु परियोजना प्रस्तावकों को आदेशित करने का कष्ट करें।

संलग्नः–उपरोक्तानुसार।

(रामप्रकाश) 01/X/13
प्रधान मुख्य वन संरक्षक (वन्यप्राणी)
छत्तीसगढ़, रायपुर

पृष्ठां क्रमांक/व.प्रा./प्रबंध–12/13/ 2968. रायपुर दिनांक 07/10/2013

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 बॉक्साईट माईन्स, पोस्ट–कुसनी, जिला–सरगुजा, छत्तीसगढ़ की ओर मय योजना की प्रति सहित सूचनार्थ प्रेषित।

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

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.

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

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

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

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

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

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

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

Sr. No.	Technical Name	Family	Life Form
292	*Dactylectinium annualatum*	Poaceae	Therophyte
293	*Digetaria bicornis*	Poaceae	Hemicryptophyte
294	*Digetaria Segetaria*	Poaceae	Hemicryptophyte
295	*Eragrostis biferia*	Poaceae	Therophyte
296	*Eragrostis tenella*	Poaceae	Therophyte
297	*Ischaemum rugosum*	Poaceae	Hemicryptophyte
298	*Setaria glauca*	Cyperaceae	Hemicryptophyte
299	*Eulaliopsis binata*	Graminae	Hemicryptophyte
300	*Thysanolaena maxima*	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		
Phlacrocorax niger	Little cormorant	Sch-IV
Nycticorax nycticorax	Night heron	Sch-IV
Ardeola grayii grayii	Paddy bird	Sch-IV
Bubulcus ibis coromandus	Cattle egret	Sch-IV
Eudynamys scolopacea	Indian koel	Sch-IV
Meops philippinus philippinus	Bluetailed bee-eater	Sch-IV
Dinopium benghalense tehminae	Malabar golden backed Woodpecker	Sch-IV
Acridotheres tristis tristis	Common myna	Sch-IV
Nectarinia minima	Small sunbird	Sch-IV
Passer domesticus indicus	Indian house sparrow	Sch-IV
Butterflies		
Hypolimnas bolina Lin.	Great eggfly	-
Euploea core Cramer	Common crow	-
Neptis hylas Moore	Common sailor	-
Eurema hecabe Lin.	Common grass yellow	-
Parantica aglea Stoll.	Glassy tiger	-
Mammals		
Funambulus palmarum	Squirrel	Sch-IV
Sus sucrofa	Wild pig	Sch-III
Herpestes edwardii	Common mongoose	Sch-IV
Vulpus benghalensis	Wild fox	Sch-II
Hystrix indica	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		
Phlacrocorax niger	Little cormorant	Sch-IV
Ardea purpurea manilensis	Eastern purple heron	Sch-IV
Nycticorax nycticorax	Night heron	Sch-IV
Ardeola grayii grayii	Paddy bird	Sch-IV
Dupetor flavicollis	Black bittern	Sch-IV
Ardea alba modesta	Large egret	Sch-IV
Bubulcus ibis coromandus	Cattle egret	Sch-IV
Milvus migrans govinda	Common pariah kite	Sch-IV
Haliastur indus indus	Brahminy kite	Sch-IV
Vanellus indicus indicus	Redwattled lapwing	Sch-IV
Tringa hypoleucos	Common sandpiper	Sch-IV
Gelochelidon nilotica nilotica	Gullbilled tern	Sch-IV
Eudynamys scolopacea	Indian koel	Sch-IV
Halcyon smyrnensis fusca	Indian white breasted Kingfischer	Sch-IV
Meops philippinus philippinus	Bluetailed bee-eater	Sch-IV

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

Annexure - II

Annx. XVII-B
(18)

Annexure - II

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

TATIJHARIA

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
पर्यावरण भवन, सी० जी० ओ० कॉम्प्लेक्स
PARYAVARAN BHAWAN, C.G.O. COMPLEX
लोदी रोड, नई दिल्ली - 110003
LODHI ROAD, NEW DELHI-110003

No.3-23/95-FC

Dated: 1st March, 1996.

To

The Secretary (Forests)
Government of Madhya Pradesh
Bhopal.

Suraj Gupta
R.Q.P.
R.Q.P./N.G.P./548/2006/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.5/19/95/1C/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:

i) Legal status of forest land shall remain unchanged.

ii) Compensatory afforestation shall be carried out over double the degraded forest land at the project cost.

APPROVED

(iii) Reclamation of the mining area will be done in consultati with the State Forest Deptt. at the project cost as per plan prepared in this regard.

(iv) Demarcation of the mining area will be done on the ground at the project cost.

(v) Forest land will not be used for construction of buildings etc. and any purpose other than those mentioned in the proposal.

(vi) Lease period shall remain coterminus with lease under MMRD Act subject to maximum of 20 years.

(vii) Free fuelwood will be provided to the labourers and staff working at the project site at the project cost.

(viii) Any other condition the State Govt. may impose.

(ix) This clearance is subject to the environmental clearance of the project under the Environment Protection Act.

Yours faithfully,

(R.K. CHAUDHRY)
Asstt. Inspector General of Forests.

Copy to:

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.

6.9.96.
(R.K. CHAUDHRY)
AIGF.

APPROVED

कार्यालय वनमण्डलाधिकारी, बलरामपुर
वनमण्डल बलरामपुर (छत्तीसगढ़)

दूरभाष:- 07831-273091,273092 (Office), 273093 (Fax). ई–मेल dfobalrampur@gmail.com

क्रमांक / मा.चि. / 2017 / 2451 बलरामपुर दिनाँक 24/7/2017

प्रति

महाप्रबंधक

मेसर्स हिण्डाल्को इण्डस्ट्रीज लि

सामरी माइन्स डिवीजन

बाबा चौक, पोस्ट कुसमी पिन न. 497224

जिला बलरामपुर–रामानुजगंज छ0ग0

24.7.2017

Hindalco Industries Ltd
Samri Mines Division
Kusmi
Dist. Balrampur (C.G.)
Date- 24/7/17 113
Received by

विषय :– बलरामपुर–रामानुजगंज जिले के बलरामपुर वनमण्डल अंतर्गत मेसर्स हिण्डाल्कों इण्डस्ट्रीज लिमिटेड के टाटीझारिया बाक्साईट खदान हेतु रकबा 514.019 हे. वन भूमि में बाक्साईट खनिज उत्खनन के लीज अवधि के एम.एम.डी.आर अधिनियम 2015 के अनुरुप विस्तारीकरण बावत्।

संदर्भ :– (1)छ0ग0 शासन वन विभाग का पत्र क्रमाँक /एफ 5–18/2017/10–2 दिनांक 07.07.2017

(2)अपर प्रधान मुख्य वनसंरक्षक (भू–प्रबंध/व.स.अ.) छ0ग0 का पत्र क्रमाँक/भू–प्रबंध /खनिज/331–219/2202 रायपुर 12.07.2017

(3) मुख्य वनसंरक्षक सरगुजा वनवृत्त अम्बिकापुर का पत्र क्रमाँक/मा.चि/न.क्र–21 /2017/2613 अम्बिकापुर दिनाँक 20.07.2017

(4) आपका पत्र क्रमाँक / HIL/SBM/DFO/119/2017/S date 21-07-2017

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विषयांतर्गत संदर्भित पत्र से छ0ग0 शासन वन विभाग द्वारा हिण्डाल्को इण्डस्ट्रीज लि. के टाटीझारिया बाक्साईट खदान हेतु रकबा 514.019 हे. वन भूमि में बाक्साईट खनिज उत्खनन हेतु वनसंरक्षण अधिनियम 1980 अंतर्गत गैर वानिकी कार्य की स्वीकृति माईनिंग लीज अवधि के समान्तर दिनांक 24.06.2048 तक अधिरोपित शर्तों के अधीन जारी की गई है। जिसके पालन में आपके द्वारा संदर्भित पत्र क्रमाँक 04 से पालन प्रतिवेदन एवं कलेक्टर बलरामपुर का अनुबंध पत्र प्रस्तुत किया गया। बाक्साईट उत्खनन हेतु निम्नानुसार शर्तों के अधीन कार्य की अनुमति दी जाती है

1. भारत सरकार पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय द्वारा जारी पत्र क्रमाँक /एफ न. 8–23/95–एफ. सी. दिनाँक 19.03.1996 एवं पत्र क्रमाँक/एफ न. 11–51/2015–एफ.सी. दिनाँक 01.04.2015 व 01.05.2015 तथा खनिज साधन विभाग के छत्तीसगढ़ शासन के पत्र क्रमाँक/एफ 7–9/2015/12 दिनाँक 19.05.2015 में उल्लेखित समस्त शर्तें व अद्यतन समी दिशा–निर्देश बधनकारी होगे।
2. लीज क्षेत्र के खनन निकासी मार्ग पर दोनो तरफ पथ वृक्षारोपण करना होगा।
3. सेफ्टी जोन क्षेत्र के आउटर साउण्ड्री में 4 फिट के आर.सी.सी बाउण्ड्री पोल्स को सफेद रंग से रंगाई करे हरे रंग से जी.पी.एस. को–ऑर्डिनेट एवं नम्बर अंकित करना होगा। एक पोल से दूसरे पोल में अंकित जी.पी.एस को–ऑर्डिनेट एवं नम्बर स्पष्ट रुप से पठनीय होना चाहिए।

4. लीज क्षेत्र अंतर्गत आवश्यक जगहों पर भू. जल संरक्षण का कार्य करना होगा।

5. सफटी जोन के 1.5 गुना बिगड वन क्षेत्र रकबा 46.261 हे. में रोपण हेतु वर्तमान नार्मस के अनुसार राशि रू 74,84,984.00 का डी.डी. अथवा चेक जो वनमण्डलाधिकारी बलरामपुर के नाम से देय हो 45 दिवस के अंदर इस कार्यालय में प्रस्तुत करेंगें अन्यथा की स्थिति में उत्खनन कार्य बंद कर दिया जाएगा।

6. छत्तीसगढ़ शासन वन विभाग द्वारा अतिरिक्त कोई शर्त लागू की जाती हो तो मान्य करना होगा।

वनमण्डलाधिकारी
बलरामपुर वनमण्डल बलरामपुर

पृ. क्रमॉक/मा.चि./ 2452 बलरामपुर, दिनॉक 04/07/2017

प्रतिलिपि –

1. अपर प्रधान मुख्य वनसंरक्षक (भू–प्रबंध/व.स.अ.) छ0ग0 रायपुर को अवलोकनार्थ सादर सम्प्रेषित।
2. मुख्य वनसंरक्षक सरगुजा वनवृत्त अम्बिकापुर को अवलोकनार्थ हेतु सादर सम्प्रेषित।
3. उपवनमण्डलाधिकारी बलरामपुर/राजपुर एवं परिक्षेत्राधिकारी वान्दों/ कुसमी को सूचनार्थ अग्रेषित कर निर्देशित है कि उपरोक्तानुसार अधिरोपित शर्तो का पालन कराया जाना सुनिश्चित करें तथा रकबा 514.019 हे. बिगडे वन भूमि में रोपण हेतु परियोजना प्रतिवेदन प्रस्तुत करें।

वनमण्डलाधिकारी
बलरामपुर वनमण्डल बलरामपुर

ADITYA BIRLA
HINDALCO

HIL/SBM/DFO/164/2017/T

Date: 4-9-2017

To,
Divisional Forest Officer
Balrampur Ramanujganj

Sub: Extension of validity of approval accorded under Forest (conservation) Act, 1980 for diversion of 514.019 Hect Revenue forest land for non-forest (Mining operation) purpose in respect of Tatijharia Bauxite Mine of M/s Hindalco Industries Limited.

Ref: Your letter number cramank/ma.chi/2017/2451, dated 24/07/2017

With reference to Clause no.-5 of your above said letter, herewith we are depositing a sum of Rs. 74,84,984.00 (Seventy four Lac Eighty four thousand Nine Hundred Eighty four Only) in favour of DFO, Balrampur, vide Cheque no 918132, Dated 04-09-2017 at your good office for the plantation to be carried out by yourselves in degraded forest land @ 1.5 times of safety zone of Tatijharia Bauxite Mine.

Hope you find the above in order.

Kindly acknowledge the receipt.

Thanking You,
Yours Faithfully,
For Hindalco Industries Limited

(M. K.Nayak)
(Agent of Mines)
04/09/2017

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.

CC: 1. Addl.PCCF, Aranya Bhawan, Raipur
2. PCCF, Aranya Bhawan, Raipur
3. CCF, Ambikapur
4. Forest Ranger, Kusmi & Chando

Website www.hindalco.com
E-mail hindalco@adityabirla.com
Corporate Identity No L27020MH1958LC011238

भारतीय स्टेट बैंक
State Bank Of India

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HINDALCO INDUSTRIES LTD.

ACCOUNT PAYEE CROSSED CHEQUE Payable at Par at All Branches of SBI

⑈ 9 1 8 1 3 2 ⑈ 4 9 7 0 0 2 5 1 2 ⑆ 0 0 0 0 3 2 ⑈ 2 9

Annexure - III

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

Duration: July-August-September-2017

Name of Industry:-

HINDALCO
ADITYA BIRLA GROUP

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd.

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

Name of Laboratory:-

ANACONLABS
MARK OF PROGRESS FOR BETTER ENVIRONMENT & HEALTH

Recognised by MoEF (GOI) Notifn. No. D.L.33004/99 Dt.24.10.2007
NABL T-1550 (Chemical), T-1826 (Biological), T-2344 (Mechanical) dt.04/10/2016 valid up to 03.10.2018
Accredited under the QCI-NABET Scheme for EIA Consultant
BIS vide No.CL/CQAPD/OSL (7124116) dt.16.12.2011
Certified by ISO 9001:2008, ISO 14001:2004, ISO 18001:2007
Head Office: 60, Bajiprabhu Nagar, Nagpur-440 033, MS
Lab. : FP-34, 35, Food Park, MIDC, Butibori, Nagpur – 441122
Ph.: (0712) 2242077, 9373287475 Fax: (0712) 2242077
Email: labngp@anacon.in
info@anacon.in
Website: www.anaconlaboratories.com,

Foreword

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

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

This report presents the Environmental Status for the period **July-2017 To September-2017.** 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 : **September, 2017**

for **ANACON LABORATORIES PVT. LTD.**

ANACON LABORATORIES PVT. LTD. NAGPUR

Authorized Signatory

1.1 Introduction

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

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

HINDALCO INDUSTRIES LTD. awarded the work to M/s ANACON LABORATORIES LTD. NAGPUR (ALPL) for carrying out monitoring of parameters for assessing pollution le and preparation of monthly report (July-August-September-2017) as per the requiremer Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment and Fo (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 1218.762hec.inTatijharia, Post Jamira, Tehsil Samri of Balrampur district, Chhattisgarh 25/06/1998 for a period of 20 years. The mining operations were started on 01/04/2004. 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 JamiraTehsil Samri of Balrampur district. deposit has been identified as one of the resources to cater the raw material requirement the Hindalco Alumina refinery at Renukoot, Uttar Pradesh. The salient features of the pro 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 status of environment during mining operation. With the knowledge of baseline conditi the monitoring program will serve as an indicator for any deterioration in environn conditions due to mining operation of the project. Suitable mitigation steps will be take time to safeguard the environment ,based on monitoring reports. Monitoring is importa the control of pollution since the efficiency of control measures can only be determine monitoring.

In order to find out impact of mining activity on sensitive receptors, it is necessary to mo Environmental Quality to know ground level concentrations of pollutants within and ar the mining lease area, accordingly Hindalco Industries through ALPL has been monitorin the following locations air, water and Noise quality on monthly basis during t 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 referenc 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 ou regular monitoring for $PM_{2.5}$, RPM(PM_{10}), SO_2,NO_x and SPM, RSPM,SO_2,NO_xPb, Hg, As and Cra above Ambient Air Quality Monitoring (AAQM) locations. The dust fall rate was measured ir the mining area (BKB campus) and Tatijharia village during July to September-2017.The AAQM sampling sites are selected considering seasonal variation in wind speed and winc direction.

Sampling Duration and Frequency

Ambient air quality monitoring was carried out for the parameters$PM_{2.5}$, RPM(PM_{10}),SO_2, NOx and SPM, RSPM, SO_2,NO_x, Pb, Hg, As and Cr from July to September-2017 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 Bo (CPCB).

The levels of Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM), Sulp Dioxide (SO_2,), Oxides of Nitrogen (NO_x), Pb, Hg, As and Cr were monitored for establishing baseline status. SPM and RPM was collected with the help of Respirable particulate sam operating 24 hours by drawing air which passes through the cyclone at the rate of 1.0 m^3/min which collects the particles less than 10 µm diameter over glass fiber filter paper the bigger particulates from 10 to 100 µm are collected into the cup provided at the bottor the cyclone.. The dust deposited over the filter paper is measured as RPM, $PM_{2.5}$ collected the help of Fine Dust sampler operating 24 hours Due to the high flow rate of air. The dust rate was measured using dust fall jar. The jar was exposed for one month in the mining a and (BKB campus) Tatijharia village during July to September-2017. The jar was filled with of distilled water. The water in the jar is mixed with copper sulphate solution (0.02 N solut to prevent any growth of algae. The water level in the jar is constantly maintained in such a that 2 lit of water is always retained. The measurement techniques used for various pollut and other details are given in**(Table 4)**.

Table 3

MONITORED PARAMETERS AND FREQUENCY OF SAMPLING

Parameters	Sampling frequency
Suspended Particulate Matter	24 hourly sample twice a week for Three months
Respirable Particulate Matter	24 hourly sample twice a week for Three months
Particulate Matter 2.5	24 hourly sample twice a week for Three months
Sulphur dioxide (So2)	24 hourly sample twice a week for Three months
Oxides of Nitrogen (NOx)	24 hourly sample twice a week for Three months
Pb,Hg,As,Cr	8 hourly samples for 24 hour twice a week for three months

Table 4.0

Measurement Techniques for various pollutants

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

1.6 Fugitive Emission Monitoring (Core Zone)

The summary of Fugitive Emission monitoring results for the month of July September-2017 are presented in detail in **Table 3.0**. 98th percentile; maximum a minimum values etc have been computed from the collected raw data for all the Fugit monitoring station. The data has been compared with the standards prescribed by Cen Pollution Control Board (CPCB)/NAAQ for residential and rural zone.

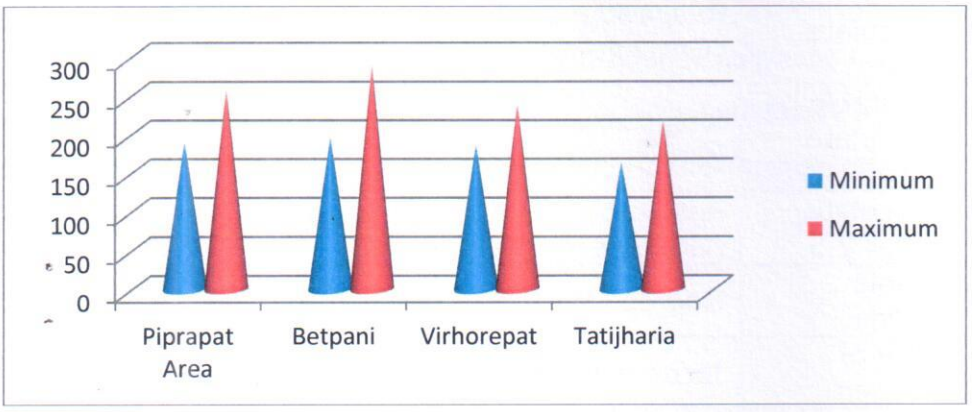
1.6.1 Presentation of Results.

Suspended Particulate Matter-SPM

The minimum and maximum concentrations for Suspended Particulate Matter-S were recorded as 162 µg/m^{3}and 288 µg/m^3 respectively. The average concentrations w ranged between 194 to 262 µg/m^3.and 98th percentile values ranged between 181 to 2 µg/m^3 in the study area**(Table 6)**.

Graphical PresentationOf Fugitive Emission Monitoring

SPM

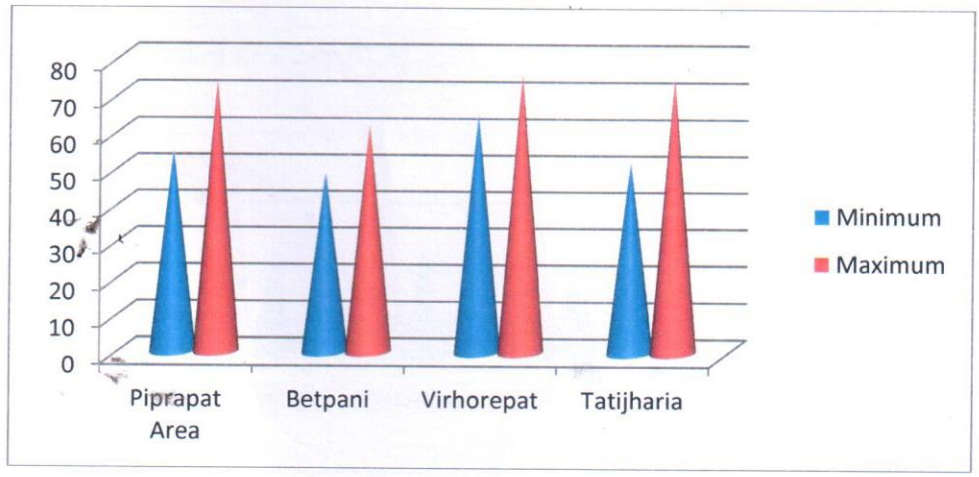


Respirable Suspended Particulate Matter –RSPM

The minimum and maximum concentrations for RSPMwere recorded as 49 µg/m^{3}and µg/m^3 respectively. The average values were observed to be in the range of 53 to µg/m^{3}and 98th percentile values ranged between 57 to 76 µg/m^3 in the study area**(Table 7)**

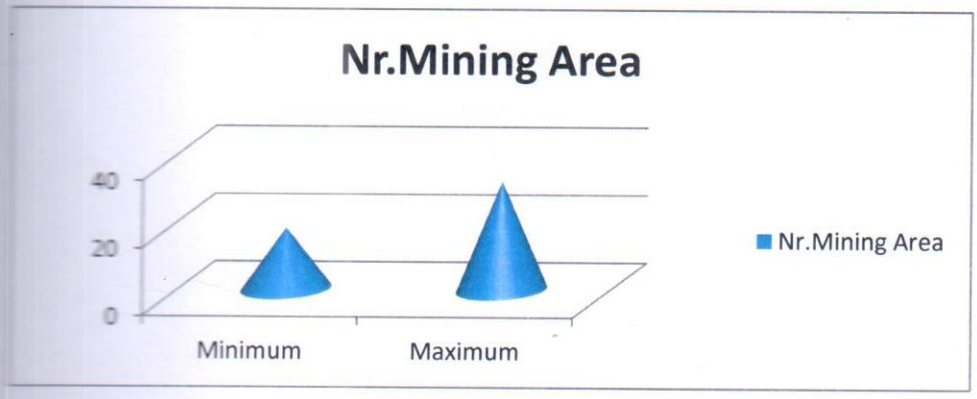
Graphical PresentationOf Fugitive Emission Monitoring

RSPM



Particulate Matter -$PM_{2.5}$

The minimum and maximum values of $PM_{2.5}$ concentrations varied between 18 to 32 µg/ respectively. The average values range between 21 to 29 µg/m^3 and98th percentile valu varied between 23 to 32 µg/m^3**(Table 8)**.

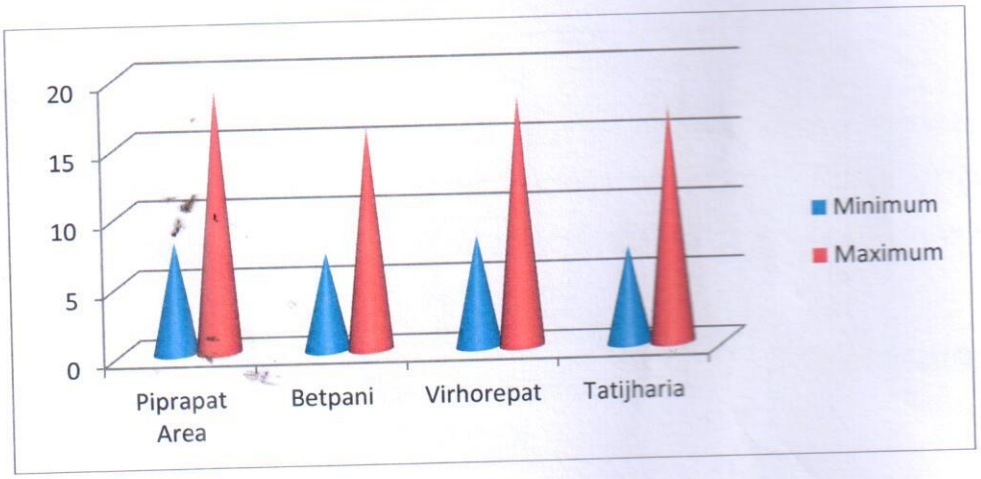


Sulphur Dioxide (SO_2)

The minimum and maximum SO_2 concentrations were recorded as 7 µg/m^3 and 19 µg/ respectively.The average values were observed to be in the range of 9 to 16 µg/$m^3$and percentile values varied between 10 to 19 µg/m^3**(Table 9)**.

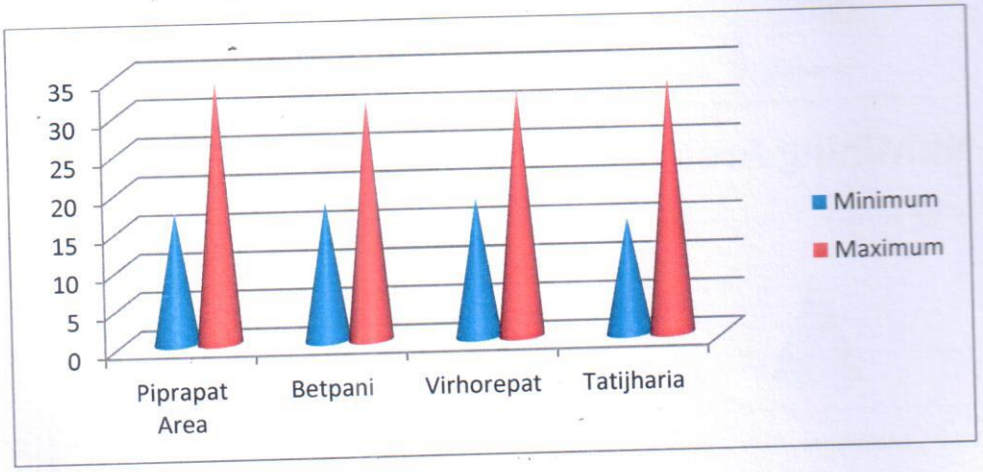
Graphical PresentationOf Fugitive Emission Monitoring

SO_2



Nitrogen Oxide (NO_x)

The minimum and maximum NO_x concentrations were recorded as 15 µg/m^3 and 34 µg/ The average concentrations were ranged between 20 to 29 µg/m^3and98th percentile va varied between 21 to 34 µg/m^3**(Table 10)**.



Lead (Pb)

The minimum and maximum Lead detected between 0.017 to 0.052µg respectively. The average Lead detected between 0.023 to 0.042 µg/m^3 & 98th perce values varied between 0.028 to 0.051 µg/m^3 in the study region.**(Table 11).**

Mercury (Hg)

Mercury was not detected at any of the locations in SPM samples as well as RSP Samples.

(Table 12).

Arsenic (As)

Arsenic was not detected at any of the locations in SPM samples as well as RSPI Samples.

(Table 13).

Chromium (Cr)

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

1.7 Ambient Air Quality (Buffer Zone)

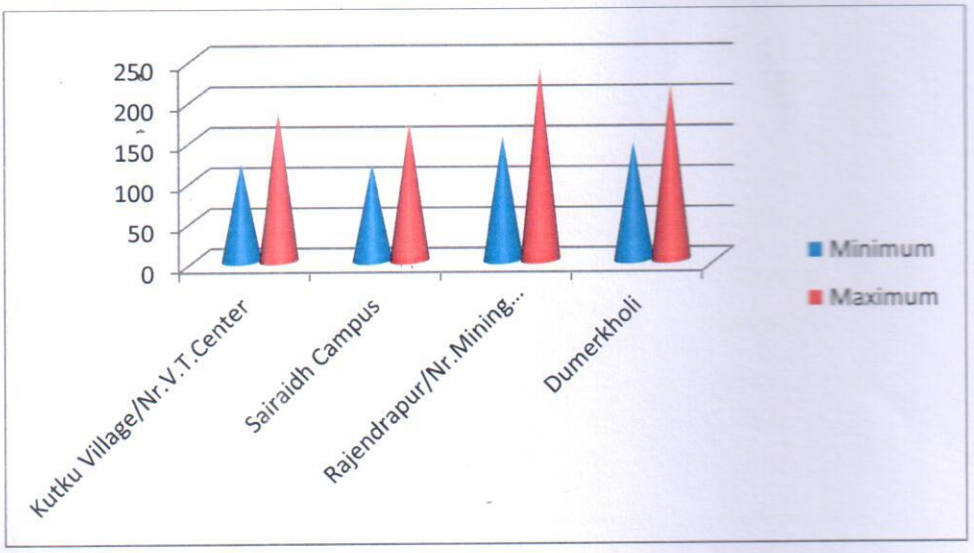
The background levels of SPM, RPM(PM_{10}),$PM_{2.5}$, SO_2, NOx, Pb, Hg, As and measured are required to compute Ambient Air Quality. The sampling locations are selec at the above mentioned locations in downwind and upwind directions of the mine. Minimum, Maximum concentration, Arithmetic mean (AM), Geometric mean (GM) and 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 July to September-2017 are presented in detail in **Table 3**. 98th percenti maximum and minimum values etc have been computed from the collected raw da for all the AAQ monitoring station. The data has been compared with the standa prescribed by Central Pollution Control Board (CPCB)/NAAQ for residential and ru zone.

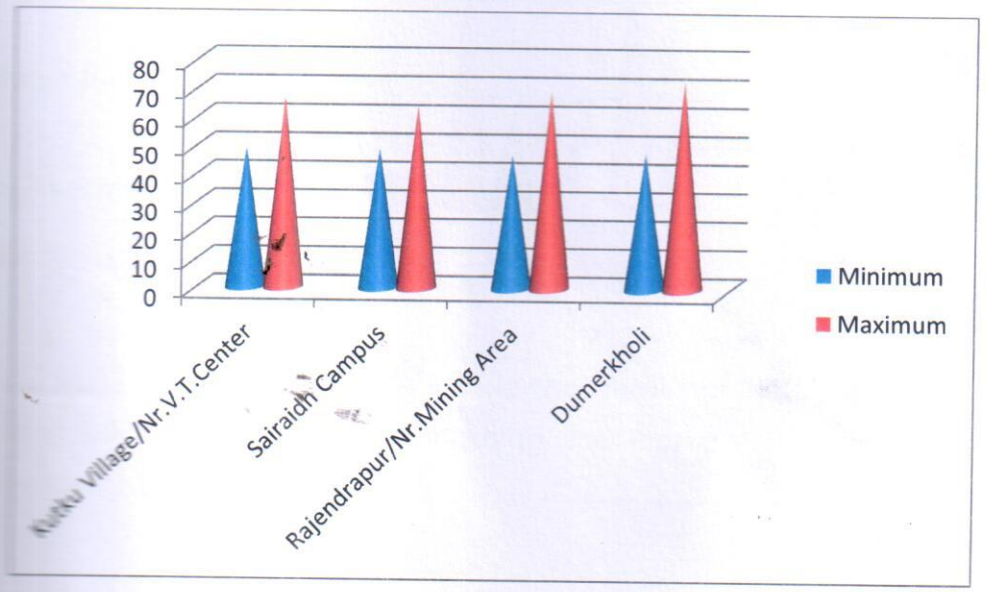
Suspended Particulate Matter-SPM

The statistical analysis of SPM is presented in **Table 6** for the mining area. minimum and maximum values varied between 120 to 237 µg/m^3 respecti during study period at all the 4 locations. The average values ranged between to 201 µg/m^3 and 98th percentile values ranged between 161 to 236 µg/m^3 in study area.



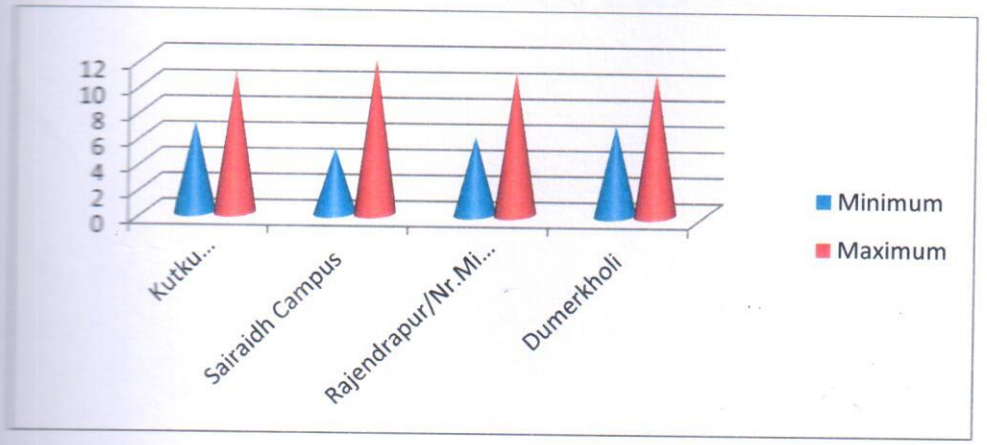
Particulate Matter-RSPM

The minimum and maximum values of RSPM varied between 47 to 73 µg respectively **(Table 7)**. The average values varied between 51 to 69 µg/m^3. The percentile values varied between 55 to 73 µg/m^3 in the mining area. The overall value SPM and RSPM were well within the CPCB limits prescribe for industrial and residential a in the study area during the study period.



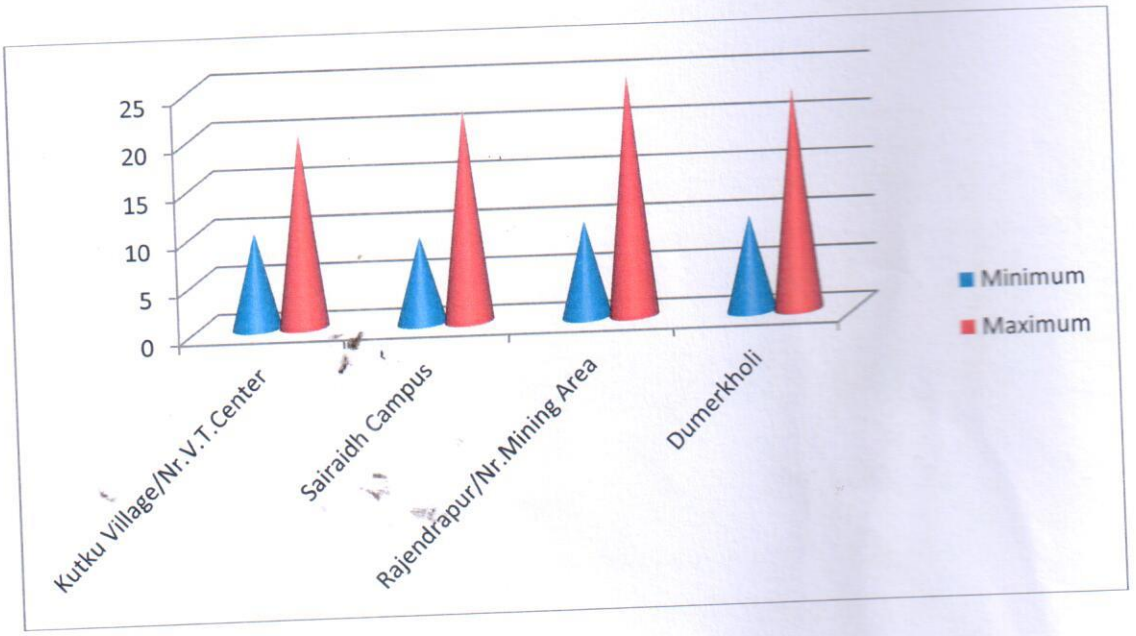
Sulphur Dioxide (SO_2)

The minimum and maximum values of SO_2 concentrations varied betwee to 12 µg/m^3 respectively. The average values range between 8 to 11 µg/m^3 and 9 percentile values varied between 8 to 12 µg/m^3**(Table 9).**



Nitrogen Oxide (NO_x)

The minimum and maximum values of NOx concentrations varied between 9 to $\mu g/m^3$ respectively. The average values range between 12 to 21 $\mu g/m^3$ and 98th percen values varied between 14 to 25 µg/m3 **(Table 10).**



Lead (Pb)

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

(Table 11).

Mercury (Hg)

Mercury (Hg) was not detected at any of the locations in SPM samples as well 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 July to september-2017was observed 2 and 20.1 month MT/km^2/month in the Piprapat/Near Mining Area and Tatijharia Vill respectively. **(Table14)**.

Overall the ambient air concentrations of SPM, PM 10(RPM), PM2.5, SO_2, NOx, Hg, and As were well within the limits of concentrations promulgated by CPCB, New Delh the study area.

1.8 Meteorology: Wind Pattern

The data of wind pattern collected during the study period (**July-Aug-Sept-2017**) indicates that the wind wa blowing predominantly from (WSW and W) directions, during study period, for 0.14 % wind was found to be calm The details of wind pattern in the form of wind frequency distribution are presented in **table 1**. The graphic illustration and wind rose diagram is presented in **Figures 1 & 2** respectively.

Table.1

Wind Frequency Distribution Data

Sr.No.	Directions / Wind Classes (m/s)	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
1	348.75 - 11.25	0.000000	0.001361	0.000000	0.000000	0.000000	0.000000	0.001361
2	11.25 - 33.75	0.008163	0.009524	0.001361	0.000000	0.000000	0.000000	0.019048
3	33.75 - 56.25	0.004082	0.004082	0.001361	0.000000	0.000000	0.000000	0.009524
4	56.25 - 78.75	0.010884	0.002721	0.002721	0.000000	0.000000	0.000000	0.016327
5	78.75 - 101.25	0.004082	0.006803	0.002721	0.000000	0.000000	0.000000	0.013605
6	101.25 - 123.75	0.008163	0.004082	0.000000	0.000000	0.000000	0.000000	0.012245
7	123.75 - 146.25	0.004082	0.008163	0.000000	0.000000	0.000000	0.000000	0.012245
8	146.25 - 168.75	0.002721	0.008163	0.004082	0.000000	0.000000	0.000000	0.014966
9	168.75 - 191.25	0.005442	0.008163	0.002721	0.000000	0.000000	0.000000	0.016327
10	191.25 - 213.75	0.019048	0.017687	0.006803	0.000000	0.000000	0.000000	0.043537
11	213.75 - 236.25	0.029932	0.084354	0.062585	0.001361	0.001361	0.000000	0.179592
12	236.25 - 258.75	0.028571	0.133333	0.144218	0.043537	0.000000	0.000000	0.349660
13	258.75 - 281.25	0.028571	0.053061	0.099320	0.019048	0.000000	0.000000	0.200000
14	281.25 - 303.75	0.016327	0.019048	0.040816	0.000000	0.000000	0.000000	0.076190
15	303.75 - 326.25	0.020408	0.006803	0.000000	0.000000	0.000000	0.000000	0.027211
16	326.25 - 348.75	0.001361	0.005442	0.000000	0.000000	0.000000	0.000000	0.006803
	Sub-Total	**0.191837**	**0.372789**	**0.368707**	**0.063946**	**0.001361**	**0.000000**	**0.998639**
	Calms							**0.00136**
	Missing/Incomplete							**0.00136**
	Total							**1.00**

SUMMARY OF WIND PATTERN

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Calm Conditio
July-Aug-Sept-2017	**WSW (34.97%)**	**W (20.00%)**	**0.14 %**

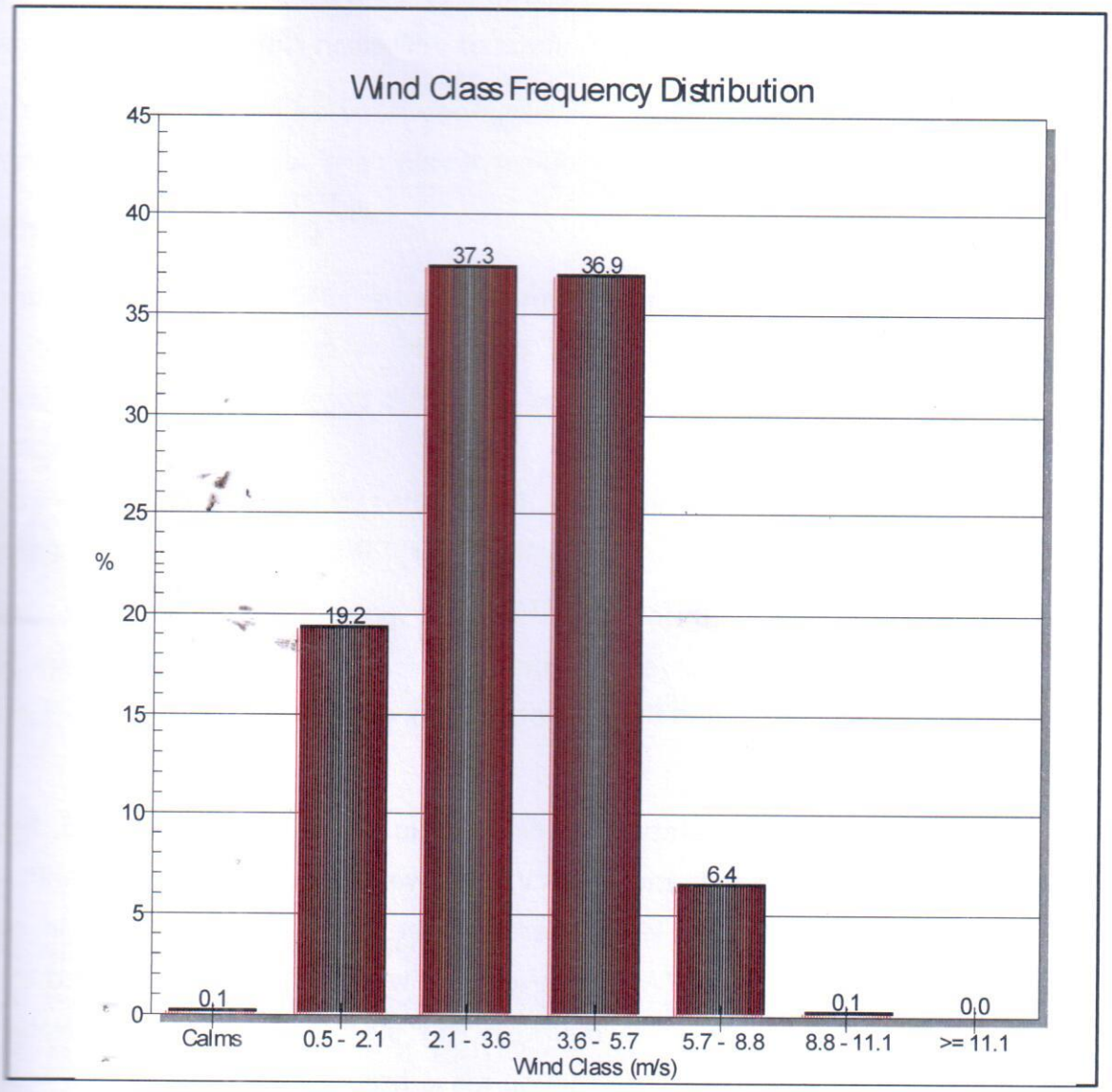


Figure.01: Wind Class Frequency Distribution (July-Aug-Sept-2017)

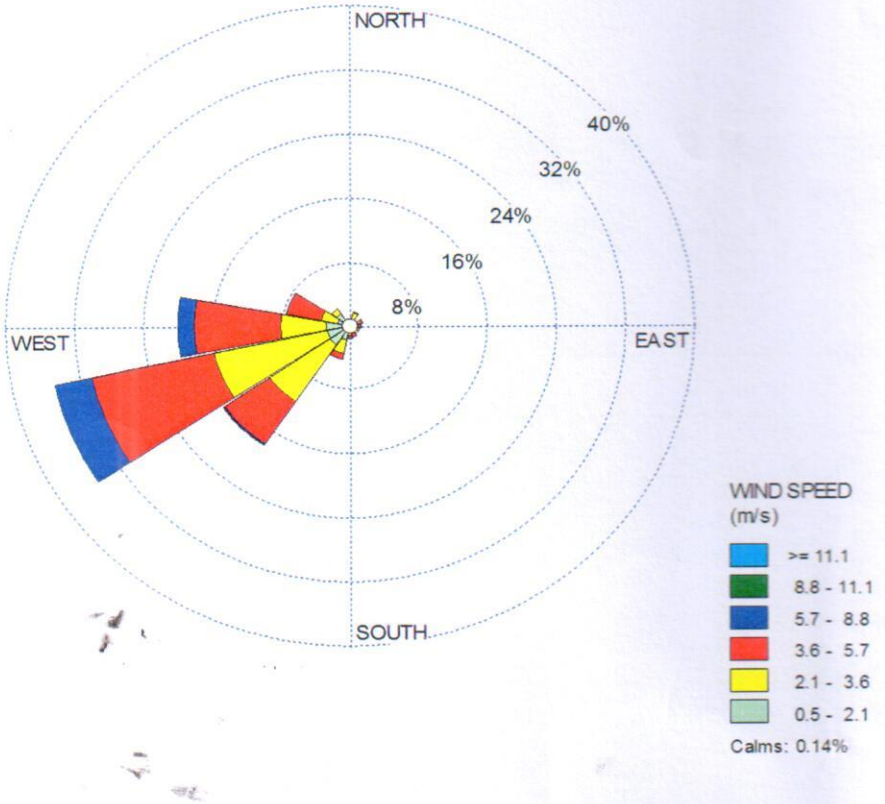


Figure.02: Wind Rose Diagram (July-Aug-Sept-2017)

1.6 Noise Environment

The Director General of Mines Safety in its circular No. DG (Tech)/18 of 1975, has prescri the noise level in mining occupations (TLV) for workers, in an 8 hour shift period w unprotected ear as 90 dB(A) or less. There will be some noise sources in mines, wh produce noise levels above 90 dB(A), however, the workers are not expected to be expo continuously for 8 hours. In order to maintain this statutory requirement Noise monito 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 transportation. The impacts due to the mining activities on the noise levels shall be negli if all the precautions for the elimination of the noise are taken. The mining activities wi undertaken during daytime only. The daytime equivalent noise levels, when all machineries are in operation, shall be minimized asthe machineries have been provided noise control equipment. Noise monitoring carried out on monthly basis at eight locat namely core and buffer zoneis shown in **(Fig. 3)**.

Identification of sampling locations

Noise at different noise generating sources has been identified based on the activities in village area and ambient noise due to traffic.

The noise monitoring has been conducted for determination of ambient noise levels in 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 read were taken for every hour for 24 hours. The day noise levels have been monitored duri am to 10 pm and night levels during 10 pm to 6 am at eight locations within 10-km radiu the study area.

Noise level monitoring was carried out continuously for 24 hours with one hour inte 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 stipulated standard of CPCB as for Industrial area as 75dB(A) and 70dB(A) for day and n respectively as given in **(Table 15)**.

Instrument used for monitoring

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

1.7 Water Quality

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

Table 6
Statistical analysis of SPM

Unit : µg/

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/Nr.Mining Area	July-2017	230	257	244	244	256
	August-2017	212	233	223	223	233
	September-2017	189	209	199	199	209
Betpani	July-2017	220	279	250	250	278
	August-2017	235	288	262	262	287
	September-2017	195	215	205	205	215
Virhorepat	July-2017	185	222	204	204	221
	August-2017	210	238	224	224	237
	September-2017	186	201	194	194	201
Tatijharia Village/Nr.Weigh Bridge	July-2017	188	206	197	197	206
	August-2017	192	217	205	205	217
	September-2017	162	181	172	172	181
Kutku Village/ Nr.V.T.Center	July-2017	130	175	153	153	174
	August-2017	145	183	164	164	182
	September-2017	120	165	143	143	164
Sairaidh Campus	July-2017	130	162	146	146	161
	August-2017	134	168	151	151	167
	September-2017	118	162	140	140	161
Rajendrapur/ Nr.Mining Area	July-2017	165	237	201	201	236
	August-2017	158	189	174	174	188
	September-2017	152	175	164	164	175
Dumerkholi/ Nr.Mining Area	July-2017	180	215	198	198	214
	August-2017	171	197	184	184	196
	September-2017	145	178	162	162	177

Conclusion (A):-

1) **Piprapat /Nr.Mining Lease Area Core Zone:** For the Months of July-Aug-Sept -2017 Average of SPM is 222µg/m^3.

2) **Betpani Lease Area Core Zone:**- For the Months of July-Aug-Sept -2017 Average of SPM is 239 µg/m^3.

3) **Virhorepat Lease Area Core Zone**:- For the Months of July-Aug-Sept -2017 Average of SPM is 207 µg/m^3.

4) **Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone:-**For the Months of July-Aug-Sept -2017 Avg of SPM is 191µg/m^3.

- The Average Concentration of SPM within the Core Zone of Tatijharia Lease is 215 µg/m^3.

Conclusion (B):-

1) **Kutku Village/ Nr.V.T.CenterLease Area Buffer Zone**:- For the Months of July-Aug-Sept -2017 Average of SPM is 153 µg/m^3.

2) **Sairaidh Campus Lease Area Buffer Zone**:- For the Months of July-Aug-Sept -2017 Average of SPM is 146 µg/m^3.

3) **Rajendrapur/ Nr.Mining Lease Area Buffer Zone**:-For the Months of July-Aug-Sept -2017 Average of SPM is 180 µg/m^3.

4) **Dumerkholi/ Nr.Mining Lease Area Buffer Zone**:-For the Months of July-Aug-Sept -2017 Average of SPM is 181 µg/m^3.

- The Average Concentration of SPM within the Buffer Zone of Tatijharia Lease is 165 µg/m^3.

Monthwise Summary of Statistical Analysis of SPM

1.8Fugitive Emission (Core Zone):-

1.8.1Presentation of Results.

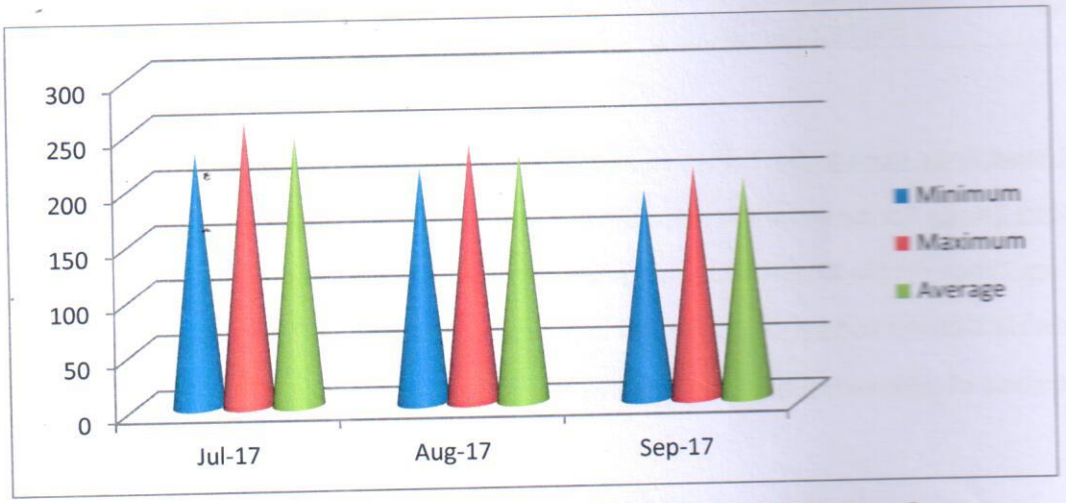
The summary of Statistical Analysis of SPM results for the month of July to September-2017 a presented in detail in **Table 6**. 98th percentile; maximum, minimum and average values etc ha been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded 230 µg/m^3 and 257 µg/m^3 respectively and average concentration of 244 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were record as 212 µg/m^3 and 233 µg/m^3 respectively and average concentration of 223 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM we recorded as 189 µg/m^3 and 209 µg/m^3 respectively and average concentration of 199 µg/m^3.



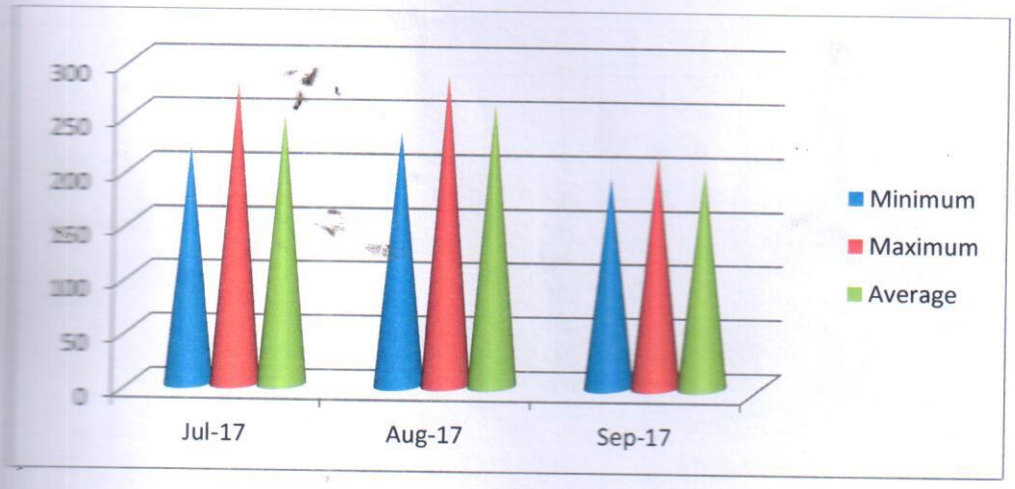
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorde 220 µg/m^3 and 279 µg/m^3 respectively and average concentration of 250 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were reco as 235 µg/m^3 and 288 µg/m^3 respectively and average concentration of 262 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM v recorded as 195 µg/m^3 and 215 µg/m^3 respectively and average concentration of 205 µg/m^3.



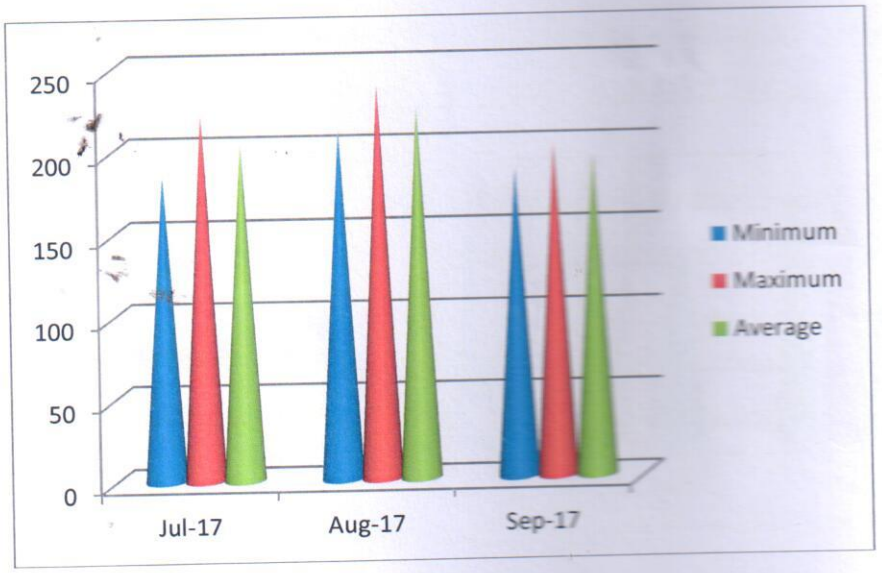
Graph:-Betpani

Virhorepat

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded 185 µg/m^3 and 222 µg/m^3 respectively and average concentration of 204 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were recorded as 210 µg/m^3 and 238 µg/m^3 respectively and average concentration of 224 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM were recorded as 186 µg/m^3 and 201 µg/m^3 respectively and average concentration of 194 µg/m^3.



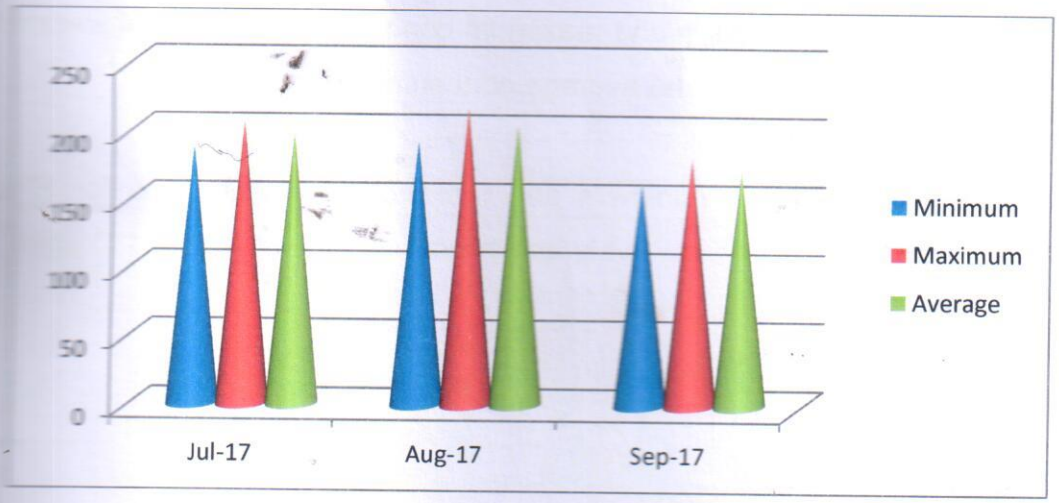
Graph:-Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of July-2017 the minimum and maximum concentrations for SPM were record 188 µg/m^3 and 206 µg/m^3 respectively and average concentration of 197 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were rec as 192 µg/m^3 and 217 µg/m^3 respectively and average concentration of 205 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM recorded as 162 µg/m^3 and 181 µg/m^3 respectively and average concentration of 172 µg/m^3.



Graph:-Tatijharia Village/Nr.Weigh Bridge

1.9Fugitive Emission (Buffer Zone):-

1.9.1Presentation of Results.

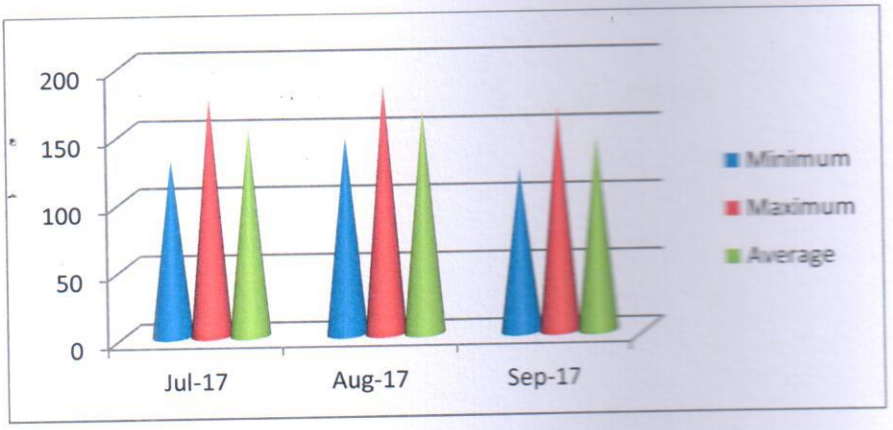
The summary of Statistical Analysis of SPM results for the month of July to September-2017 a presented in detail in **Table 6**. 98th percentile; maximum, minimum and average values etc ha been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr.V.T.Center

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded 130 µg/m^3 and 175 µg/m^3 respectively and average concentration of 153 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were record as 145 µg/m^3 and 183 µg/m^3 respectively and average concentration of 164 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM we recorded as 120 µg/m^3 and 165 µg/m^3 respectively and average concentration of 143 µg/m^3.



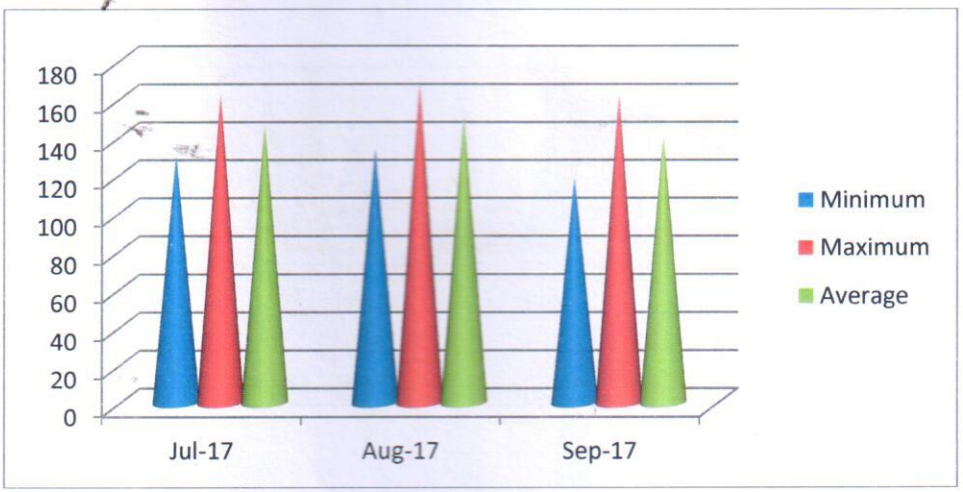
Graph:-Kutku Village / Nr.V.T.Center

Sairaidh Campus

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded 130 µg/m^3 and 162 µg/m^3 respectively and average concentration of 146 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were recorded as 134 µg/m^3 and 168 µg/m^3 respectively and average concentration of 151 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM were recorded as 118 µg/m^3 and 162 µg/m^3 respectively and average concentration of 140 µg/m^3.



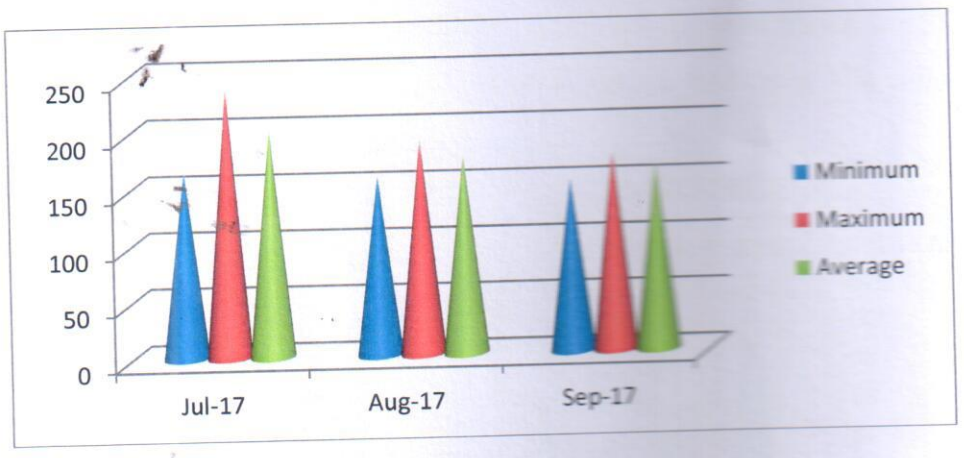
Graph:-Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded a 165 µg/m^3 and 237 µg/m^3 respectively and average concentration of 201 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were record as 158 µg/m^3 and 189 µg/m^3 respectively and average concentration of 174 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM we recorded as 152 µg/m^3 and 175 µg/m^3 respectively and average concentration of 164 µg/m^3.



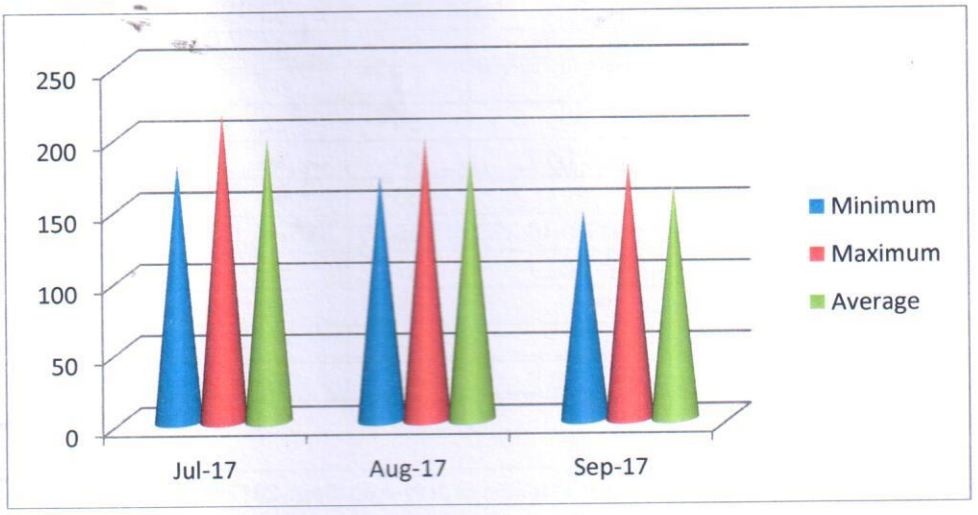
Graph:-Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SPM were recorded 180 µg/m^3 and 215 µg/m^3 respectively and average concentration of 198 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SPM were recor as 171 µg/m^3 and 197 µg/m^3 respectively and average concentration of 184 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SPM w recorded as 145 µg/m^3 and 178 µg/m^3 respectively and average concentration of 162 µg/m^3.



Graph:-Dumerkholi / Nr.Mining Area

Table 7
Statistical analysis of RSPM

Unit : µg/m

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/Nr.Mining Area	July-2017	63	74	69	69	74
	August-2017	58	67	63	63	67
	September-2017	55	61	58	58	61
Betpani	July-2017	57	62	60	60	62
	August-2017	54	59	57	57	59
	September-2017	49	57	53	53	57
Virhorepat	July-2017	69	76	73	73	76
	August-2017	67	75	71	71	75
	September-2017	65	74	70	70	74
Tatijharia Village/Nr.Weigh Bridge	July-2017	67	75	71	71	75
	August-2017	55	68	62	62	68
	September-2017	52	64	58	58	64
		100 µg/m³ (24 hrs)				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	July-2017	58	67	63	63	67
	August-2017	54	63	59	59	63
	September-2017	49	56	53	53	56
Sairaidh Campus	July-2017	55	64	60	60	64
	August-2017	54	62	58	58	62
	September-2017	49	56	53	53	56
Rajendrapur/ Nr.Mining Area	July-2017	60	69	65	65	69
	August-2017	55	64	60	60	64
	September-2017	47	55	51	51	55
Dumerkholi/ Nr.Mining Area	July-2017	65	73	69	69	73
	August-2017	57	63	60	60	63
	September-2017	48	57	53	53	57
CPCB Standard		100 µg/m³ (24 hrs)				

Conclusion (A):-

1) Piprapat /Nr.Mining Lease Area Core Zone: For the Months of July-Aug-Sept-2017Average of RSPM is 63 µg/m³.

2)Betpani Lease Area Core Zone:- For the Months of July-Aug-Sept-2017 Average of RSPM is 57 µg/m³.

3)Virhorepat Lease Area Core Zone:- For the Months of July-Aug-Sept-2017 Average of RSPM is 71 µg/m³.

4)Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone:-For the Months of July-Aug-Sept-2017 Average of RSPM is 64 µg/m

The Average Concentration of RSPM within the Core Zone of Tatijharia Lease is 64 µg/m³ and it is within permissible limits as CPCB Standard.

Conclusion (B):-

1)Kutku Village/ Nr.V.T.CenterLease Area Buffer Zone:- For the Months of July-Aug-Sept-2017Average of RSPM is 58 µg/m
2)Sairaidh CampusLease Area Buffer Zone:- For the Months of July-Aug-Sept-2017 Average of RSPM is 57 µg/m³.
3)Rajendrapur/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-Aug-Sept-2017 Average of RSPM is 59 µg/m
4)Dumerkholi/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-Aug-Sept-2017 Average of RSPM is 61 µg/m³.

- The Average Concentration of RSPM within the Buffer Zone of Tatijharia Lease is 59 µg/m³ and it is within permissible li as per CPCB Standard.

Monthwise Summary of Statistical Analysis of RSPM

2.0 Fugitive Emission (Core Zone):-

2.0.1 Presentation of Results.

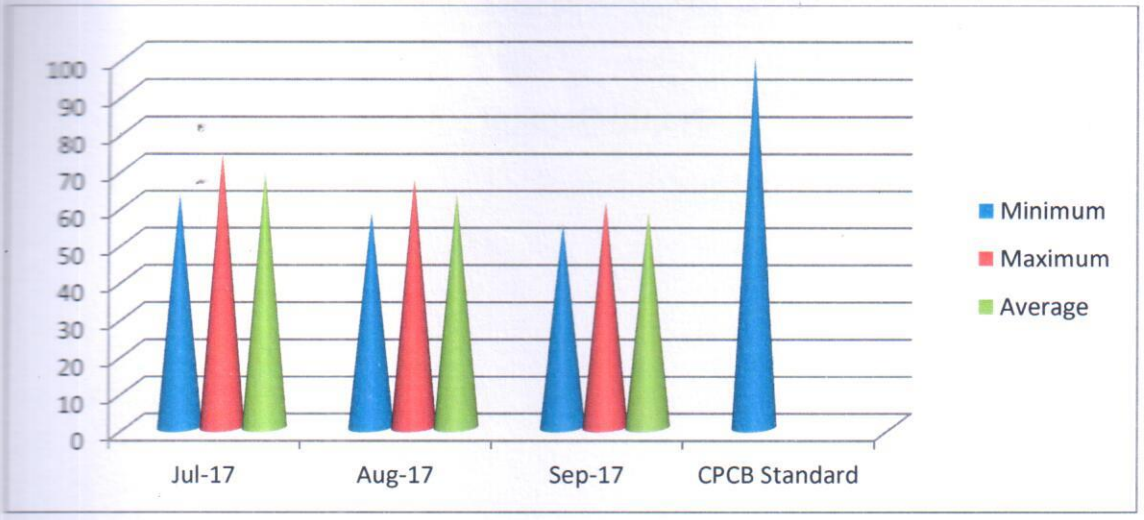
The summary of Statistical Analysis of RSPM results for the month of July-August-Septembe 2017 are presented in detail in **Table 7**. 98th percentile; maximum, minimum and average valu etc have been computed from the collected raw data for all the Fugitive emission monitor station.

Piprapat / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for RSPM were record as 63 µg/m^3 and 74 µg/m^3 respectively and average concentration of 69 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM we recorded as 58 µg/m^3 and 67 µg/m^3 respectively and average concentration of 63 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM we recorded as 55 µg/m^3 and 61 µg/m^3 respectively and average concentration of 58 µg/m^3.



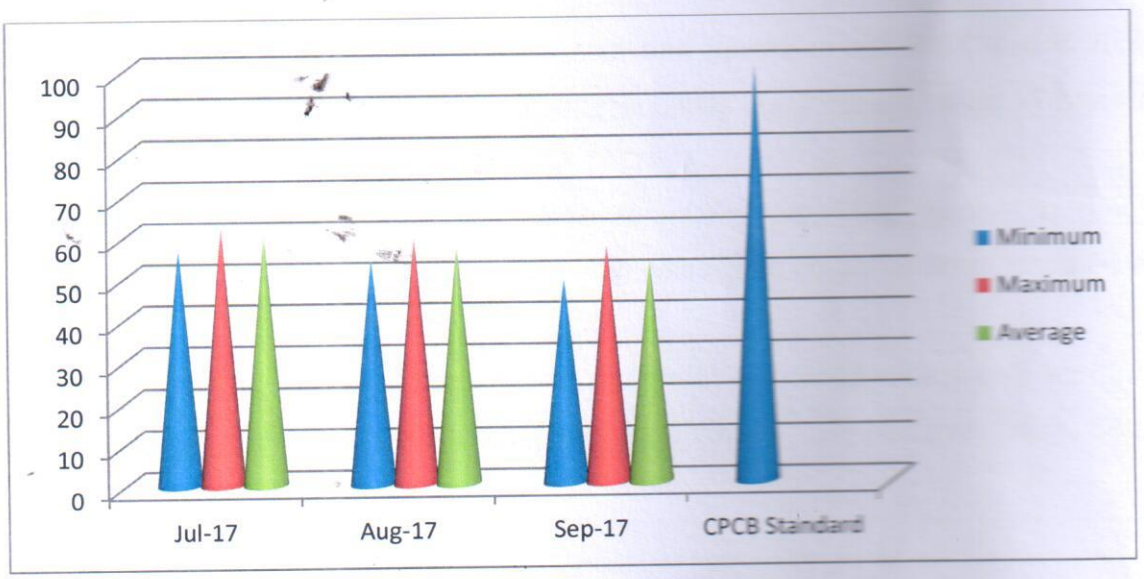
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of July-2017 the minimum and maximum concentrations for RSPM were recorde as 57 µg/m^3 and 62 µg/m^3 respectively and average concentration of 60 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM we recorded as 54 µg/m^3 and 59 µg/m^3 respectively and average concentration of 57 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM we recorded as 49 µg/m^3 and 57 µg/m^3 respectively and average concentration of 53 µg/m^3.



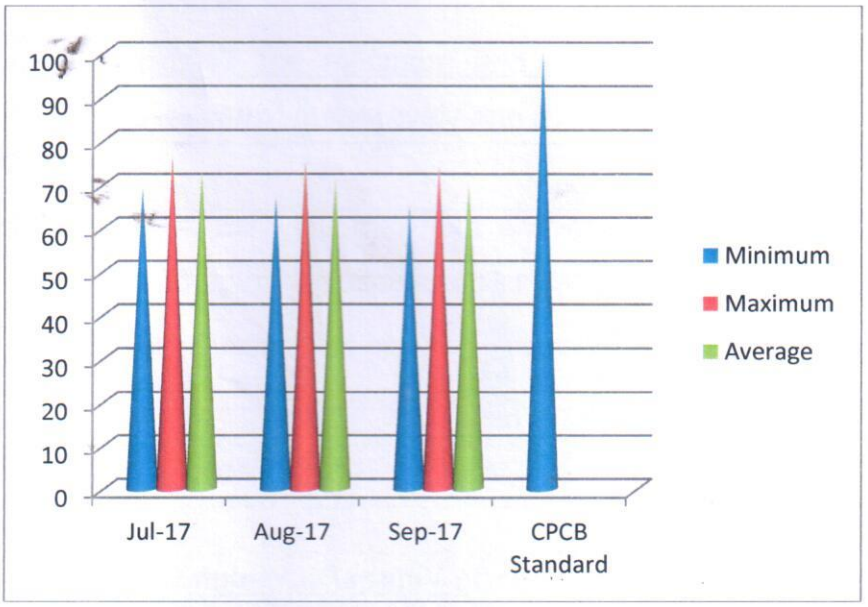
Graph:-Betpani

Virhorepat

For the Month of July-2017 the minimum and maximum concentrations for RSPM were recorded as 69 µg/m^3 and 76 µg/m^3 respectively and average concentration of 73 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM were recorded as 67 µg/m^3 and 75 µg/m^3 respectively and average concentration of 71 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM were recorded as 65 µg/m^3 and 74 µg/m^3 respectively and average concentration of 70 µg/m^3.



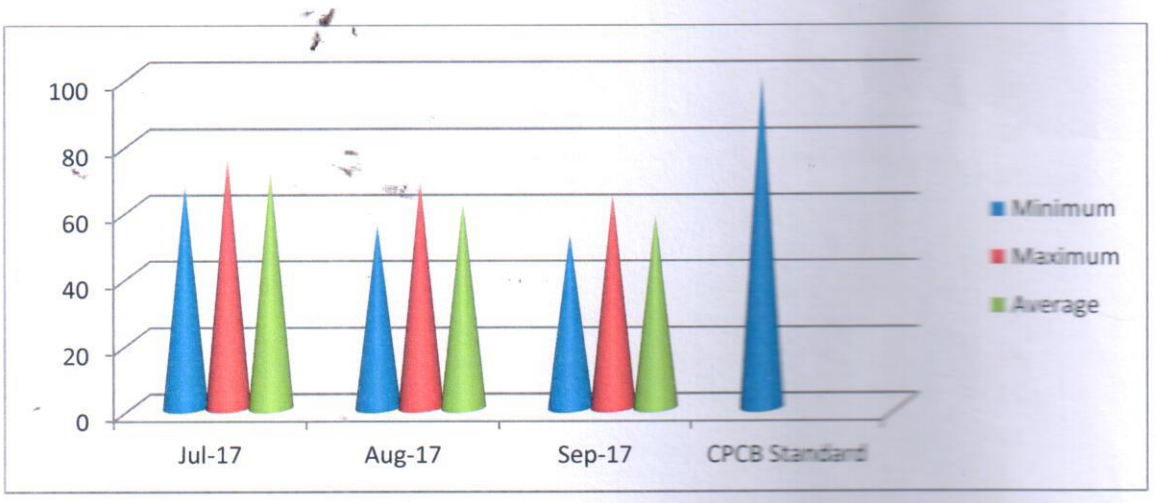
Graph:-Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of July-2017 the minimum and maximum concentrations for RSPM were record as 67 µg/m^3 and 75 µg/m^3 respectively and average concentration of 71 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM we recorded as 55 µg/m^3 and 68 µg/m^3 respectively and average concentration of 62 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM we recorded as 52 µg/m^3 and 64 µg/m^3 respectively and average concentration of 58 µg/m^3.



Graph:-Tatijharia Village/Nr.Weigh Bridge

2.1 Fugitive Emission (Buffer Zone):-

2.1.1 Presentation of Results.

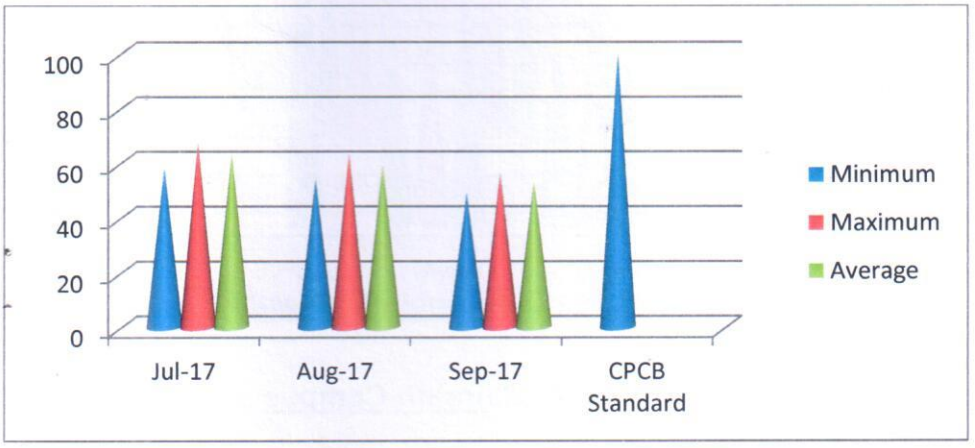
The summary of Statistical Analysis of RSPM results for the month of July-August-Septemb 2017 are presented in detail in **Table 7**. 98th percentile; maximum, minimum and average valu etc have been computed from the collected raw data for all the Fugitive emission monitor station.

Kutku Village / Nr.V.T.Center

For the Month of July-2017 the minimum and maximum concentrations for RSPM were recorc as 58 µg/m^3 and 67 µg/m^3 respectively and average concentration of 63 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM w recorded as 54 µg/m^3 and 63 µg/m^3 respectively and average concentration of 59 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM w recorded as 49 µg/m^3 and 56 µg/m^3 respectively and average concentration of 53 µg/m^3.



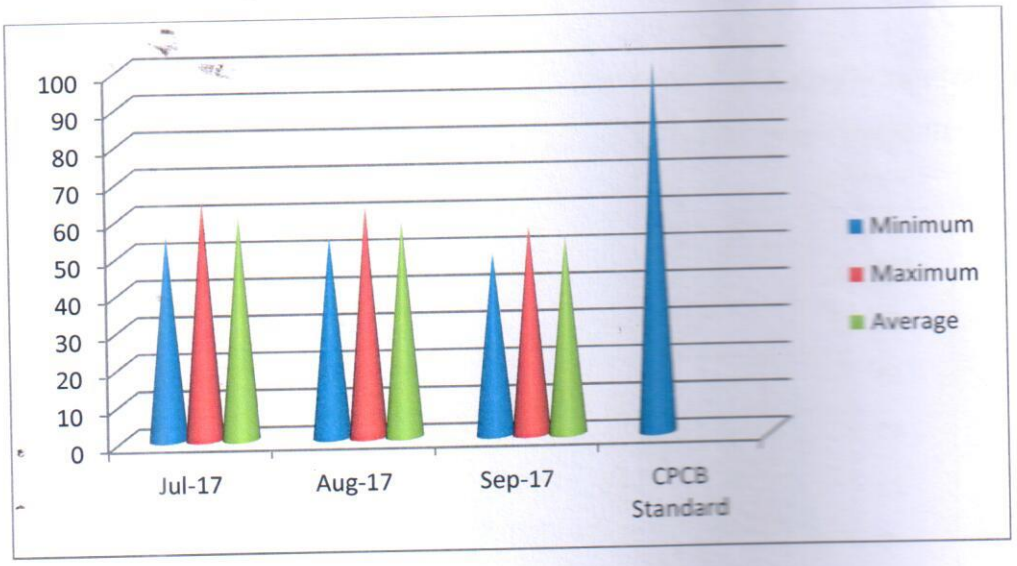
Graph:-Kutku Village / Nr.V.T.Center

Sairaidh Campus

For the Month of July-2017 the minimum and maximum concentrations for RSPM were record as 55 µg/m^3 and 64 µg/m^3 respectively and average concentration of 60 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM we recorded as 54 µg/m^3 and 62 µg/m^3 respectively and average concentration of 58 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM we recorded as 49 µg/m^3 and 56 µg/m^3 respectively and average concentration of 53 µg/m^3.



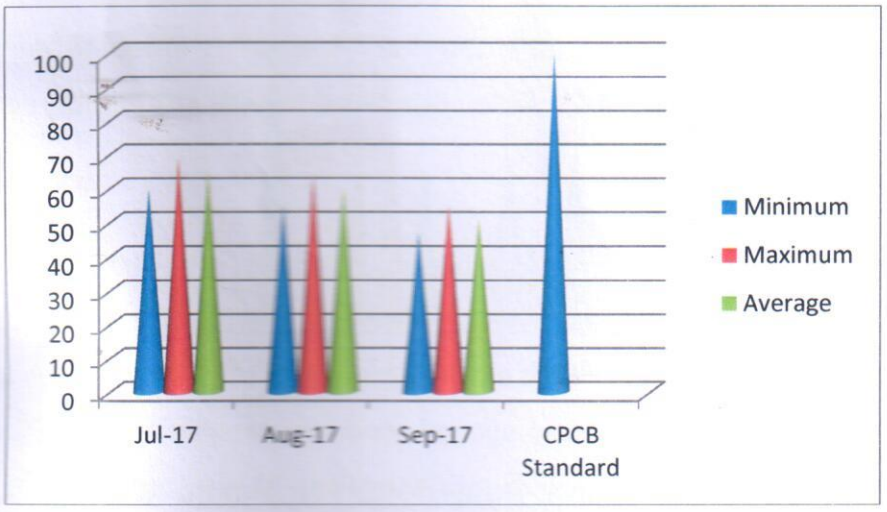
Graph:-Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for RSPM were recor as 60 µg/m^3 and 69 µg/m^3 respectively and average concentration of 65 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM w recorded as 55 µg/m^3 and 64 µg/m^3 respectively and average concentration of 60 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM w recorded as 47 µg/m^3 and 55 µg/m^3 respectively and average concentration of 51 µg/m^3.



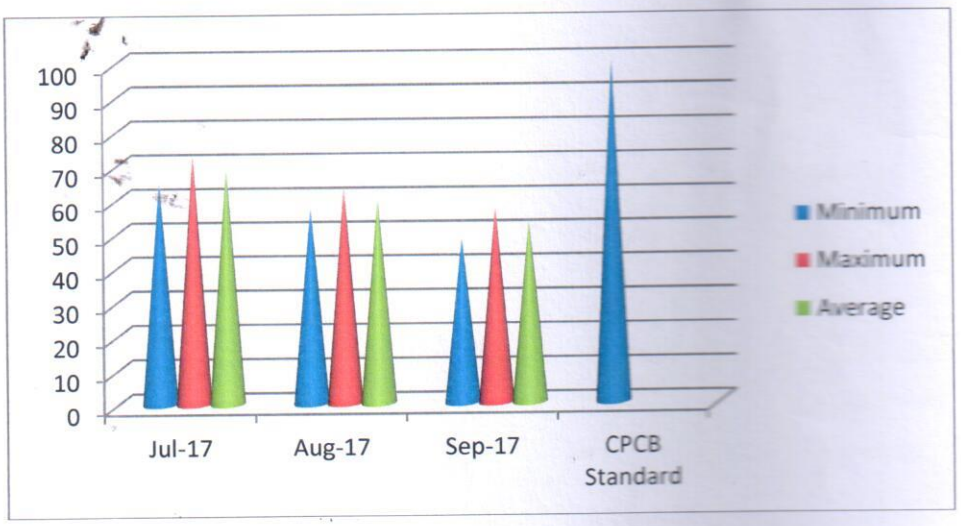
Graph:-Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for RSPM were reco as 65 µg/m^3 and 73 µg/m^3 respectively and average concentration of 69 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for RSPM recorded as 57 µg/m^3 and 63 µg/m^3 respectively and average concentration of 60 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for RSPM recorded as 48 µg/m^3 and 57 µg/m^3 respectively and average concentration of 53 µg/m^3.



Graph:-Dumerkholi / Nr.Mining Area

Table 8
Statistical analysis of PM 2.5

Unit : µg

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Nr.Mining Area	July-2017	22	30	26	26	30
	August-2017	25	32	29	29	32
	September-2017	18	23	21	21	23
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 (July-Aug September-2017) is 25 µg/m^3 and it is within permissible limits as per CPCB Standard.

Monthwise Summary of Statistical Analysis of $PM_{2.5}$

2.2Presentation of Results.

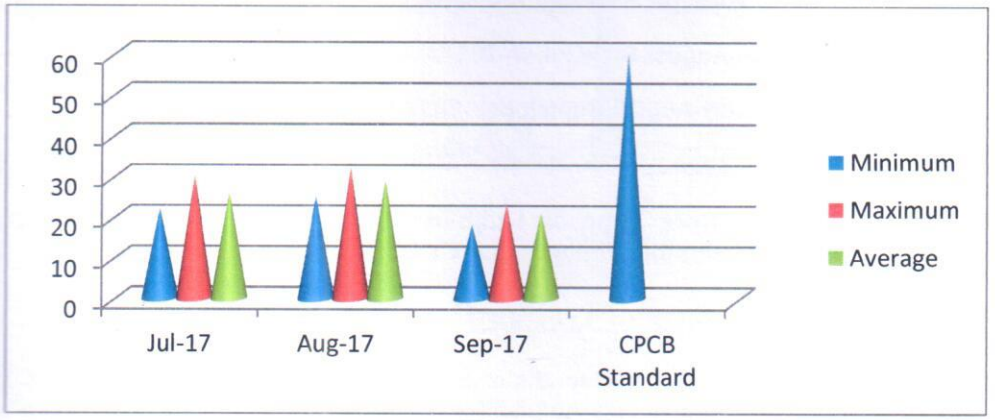
The summary of Statistical Analysis of $PM_{2.5}$ results for the month of July-August-Septem 2017 are presented in detail in **Table 8**. 98th percentile; maximum, minimum and average va etc have been computed from the collected raw data.

Nr.Mining Area

For the month of July-2017 the minimum and maximum concentrations for $PM_{2.5}$ were recorde 22 µg/m^3 and 30 µg/m^3 respectively and average concentration of 26 µg/m^3.

For the month of August-2017 the minimum and maximum concentrations for $PM_{2.5}$ were recor as 25 µg/m^3 and 32 µg/m^3 respectively and average concentration of 29 µg/m^3.

For the month of September-2017 the minimum and maximum concentrations for $PM_{2.5}$ w recorded as 18 µg/m^3 and 23 µg/m^3 respectively and average concentration of 21 µg/m^3



Graph :- Nr.Mining Area

Table 9
Statistical Analysis of SO_2
Unit: µg/m^3

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/Nr.Mining Area	July-2017	12	17	15	15	17
	August-2017	11	19	15	15	19
	September-2017	8	12	10	10	12
Betpani	July-2017	10	12	11	11	12
	August-2017	11	16	14	14	16
	September-2017	7	13	10	10	13
Virhorepat	July-2017	14	17	16	16	17
	August-2017	12	15	14	14	15
	September-2017	8	18	13	13	18
Tatijharia Village/Nr.Weigh Bridge	July-2017	10	15	13	13	15
	August-2017	11	17	14	14	17
	September-2017	7	10	9	9	10
CPCB Standard		**80 µg/m^3 (24 hrs)**				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	July-2017	8	11	10	10	11
	August-2017	7	9	8	8	9
	September-2017	8	10	9	9	10
Sairaidh Campus	July-2017	9	12	11	11	12
	August-2017	8	10	9	9	10
	September-2017	5	10	8	8	10
Rajendrapur/ Nr.Mining Area	July-2017	6	9	8	8	9
	August-2017	8	11	10	10	11
	September-2017	7	8	8	8	8
Dumerkholi/ Nr.Mining Area	July-2017	8	11	10	10	11
	August-2017	7	10	9	9	10
	September-2017	7	9	8	8	9
CPCB Standard		**80 µg/m^3 (24 hrs)**				

Conclusion: (A)

1)Piprapat /Nr.Mining Lease Area Core Zone: For the Months of July-August-September-2017Average of SO_2 is13 µg/m^3.

2)Betpani Lease Area Core Zone:- For the Months of July-August-September -2017Average of SO_2 is 12 µg/m^3.

3)Virhorepat Lease Area Core Zone:- For the Months of July-August-September -2017Average of SO_2 is 14 µg/m^3.

4)Tatijharia Village/Nr.Weigh BridgeLease Area Core Zone :-For the Months of July-Aug-Sept -2017Average of SO_2 is 12 µg/m^3.

- The Average Concentration of SO_2 within the Core Zone of Tatijharia Lease during this period (July-August-September -2017) is 13 µg/m^3 and it is within permissible limits as per CPCB Standard.

Conclusion: (B)

Kutku Village/ Nr.V.T.CenterLease Area Buffer Zone:- For the Months of July-Aug-Sept -2017Average of SO_2 is 9 µg/m^3.
Sairaidh CampusLease Area Buffer Zone:- For the Months of July-August-September -2017Average of SO_2 is 9µg/m^3.
Rajendrapur/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-August-September -2017Average of SO_2 is 9µg/m^3.
Dumerkholi/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-August-September -2017Average of SO_2 is 9µg/m^3.

- The Average Concentration of SO_2 within the Buffer Zone of Tatijharia Lease during this period (July-August-September -2017) is 9 µg/m^3 and it is within permissible limits as per CPCB Standard.

Monthwise Summary of Statistical Analysis of SO_2

2.3Fugitive Emission (Core Zone):-

2.3.1Presentation of Results.

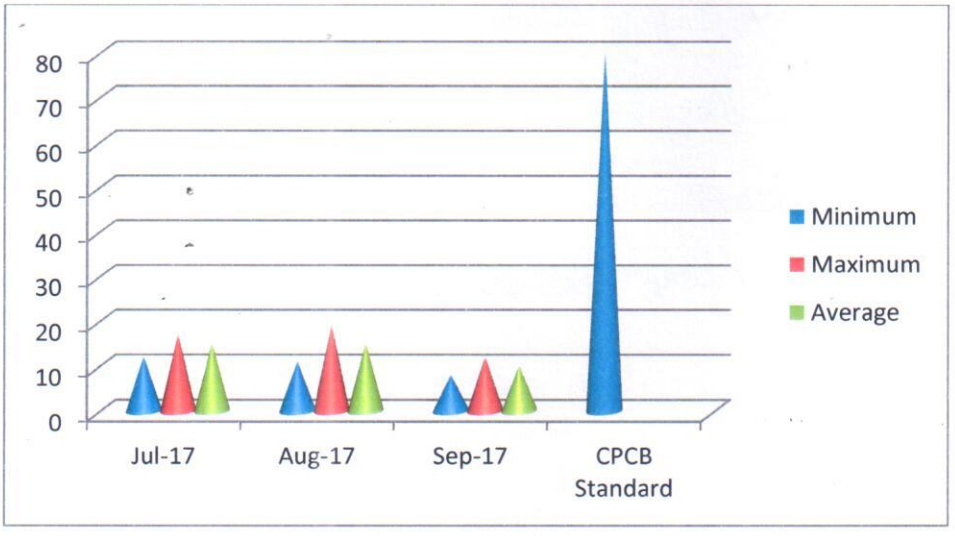
The summary of Statistical Analysis of SO_2 results for the month of July-August-September-2(are presented in detail in **Table 9**. 98th percentile; maximum, minimum and average values have been computed from the collected raw data for all the Fugitive emission monitoring station

Piprapat / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded 12 µg/m^3 and 17 µg/m^3 respectively and average concentration of 15 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recor as 11 µg/m^3 and 19 µg/m^3 respectively and average concentration of 15 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SO_2w recorded as 8 µg/m^3 and 12 µg/m^3 respectively and average concentration of 10 µg/m^3.



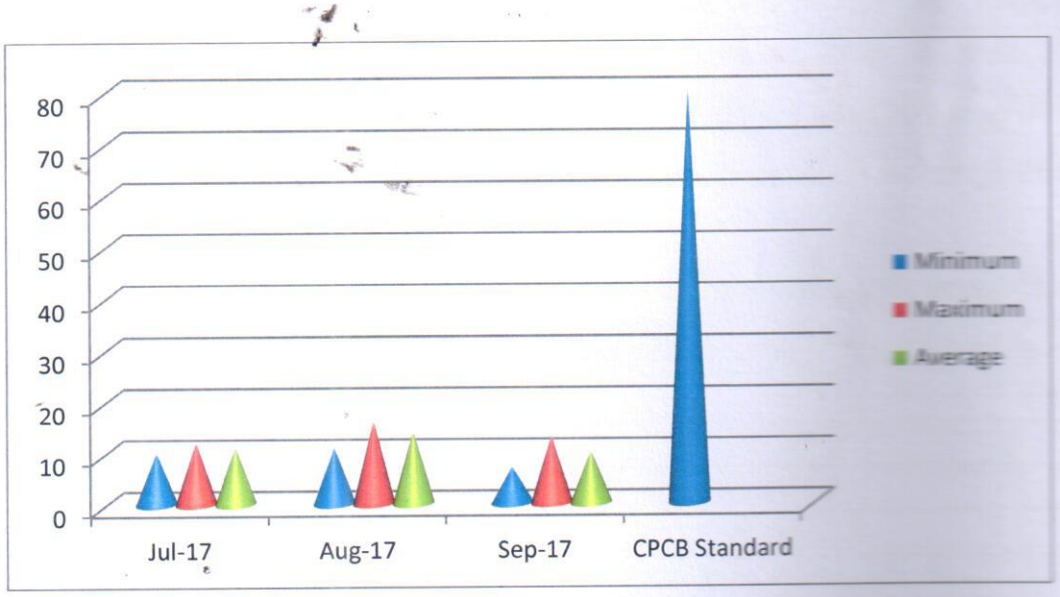
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded a 10 µg/m^3 and 12 µg/m^3 respectively and average concentration of 11 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorde as 11 µg/m^3 and 16 µg/m^3 respectively and average concentration of 14 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SO_2 we recorded as 7 µg/m^3 and 13 µg/m^3 respectively and average concentration of 10 µg/m^3.



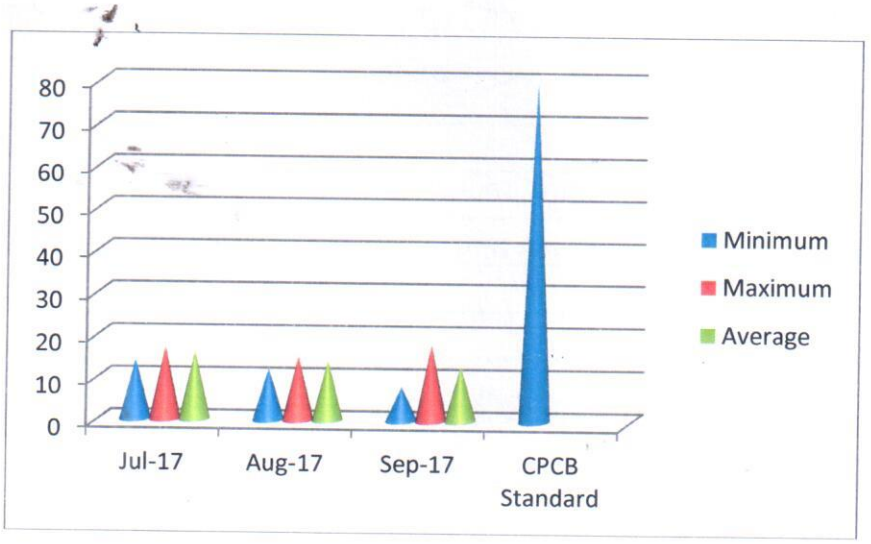
Graph:-Betpani

Virhorepat

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded a 14 µg/m^3 and 17 µg/m^3 respectively and average concentration of 16 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorde as 12 µg/m^3 and 15 µg/m^3 respectively and average concentration of 14 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SO_2wer recorded as 8 µg/m^3 and 18 µg/m^3 respectively and average concentration of 13 µg/m^3.



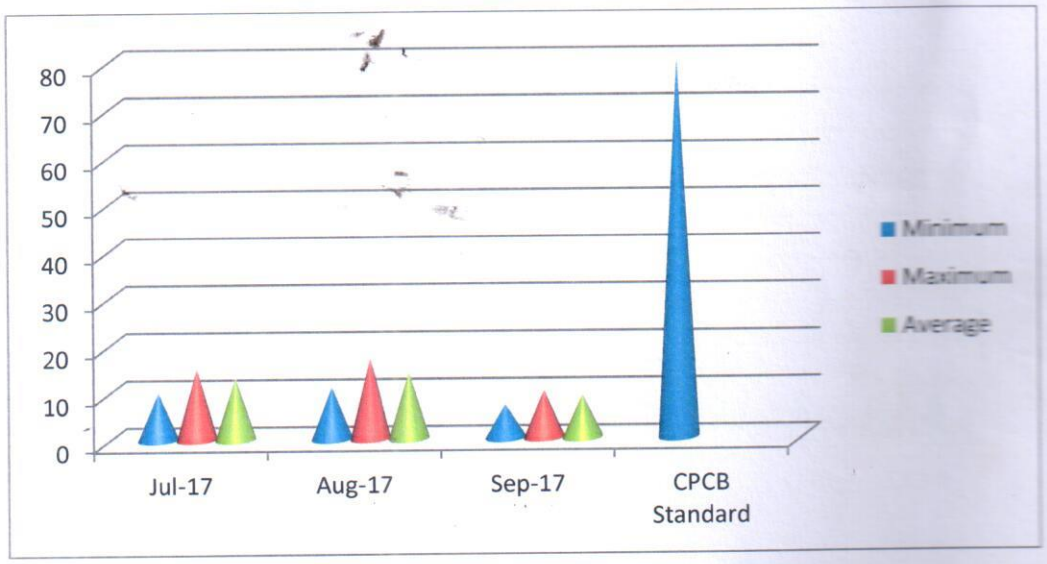
Graph:-Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded as 10 $\mu g/m^3$ and 15 $\mu g/m^3$ respectively and average concentration of 13 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorded as 11 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively and average concentration of 14 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for SO_2were recorded as 7 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively and average concentration of 9 $\mu g/m^3$.



Graph:-Tatijharia Village/Nr.Weigh Bridge

2.4Fugitive Emission (Buffer Zone):-

2.4.1Presentation of Results.

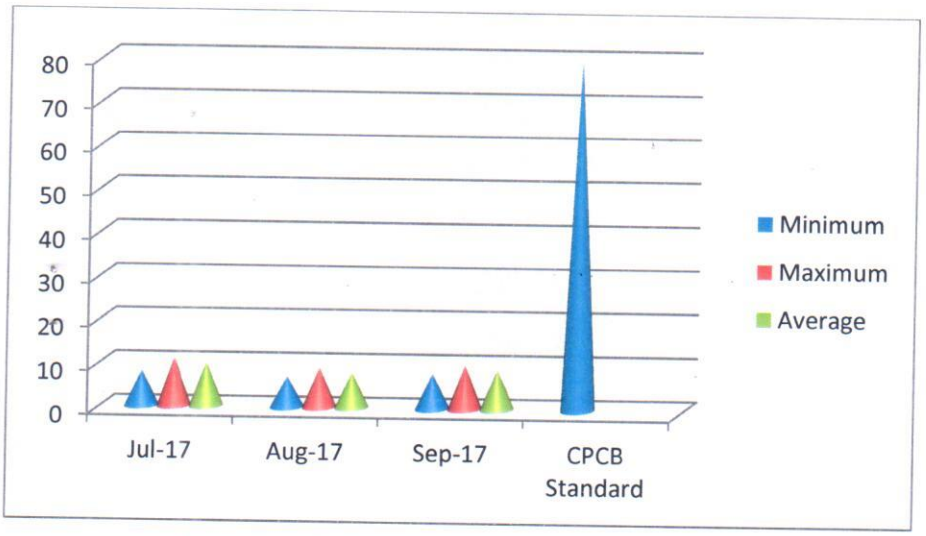
The summary of Statistical Analysis of SO_2 results for the month of July-August-September-2017 are presented in detail in **Table9**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr.V.T.Center

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded as 8 µg/m^3 and 11 µg/m^3 respectively and average concentration of 10 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorded as 7 µg/m^3 and 9 µg/m^3 respectively and average concentration of 8 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for SO_2were recorded as 8 µg/m^3 and 10 µg/m^3 respectively and average concentration of 9 µg/m^3.



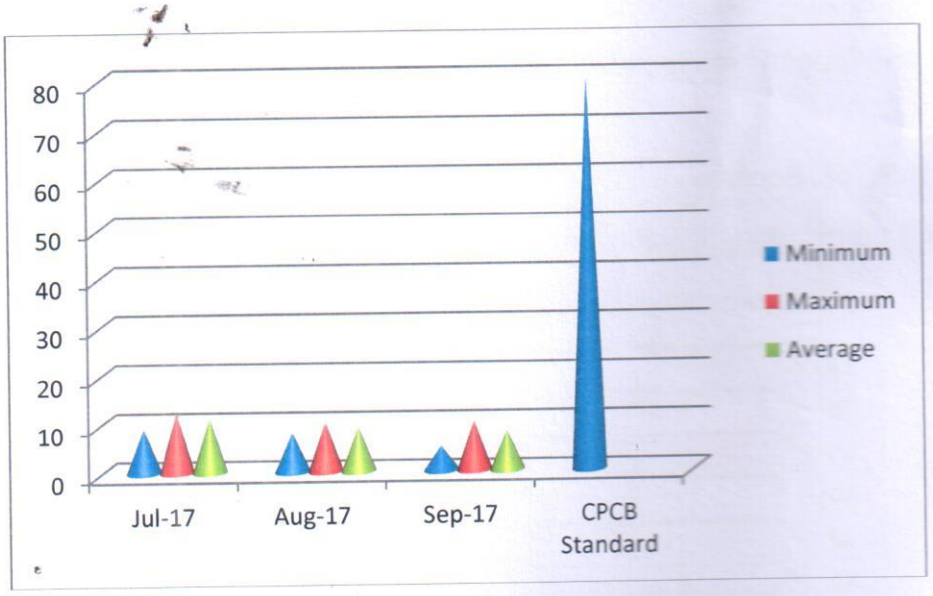
Graph:-Kutku Village / Nr.V.T.Center

Sairaidh Campus

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded as 9 $\mu g/m^3$ and 12 $\mu g/m^3$ respectively and average concentration of 11 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorded as 8 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively and average concentration of 9 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for SO_2were recorded as 5 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively and average concentration of 8 $\mu g/m^3$.



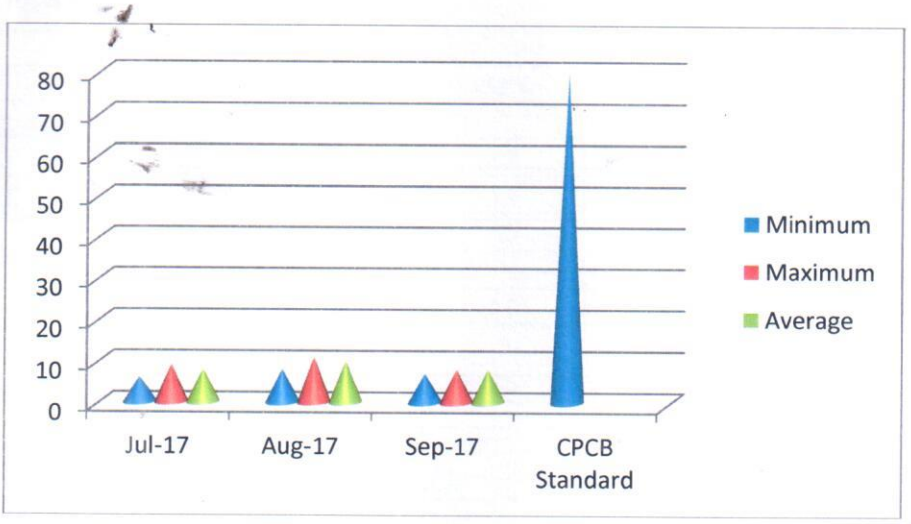
Graph:-Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded as $\mu g/m^3$ and 9 $\mu g/m^3$ respectively and average concentration of 8 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorde as 8 $\mu g/m^3$ and 11 $\mu g/m^3$ respectively and average concentration of 10 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for SO_2wer recorded as 7 $\mu g/m^3$ and 8 $\mu g/m^3$ respectively and average concentration of 8 $\mu g/m^3$.



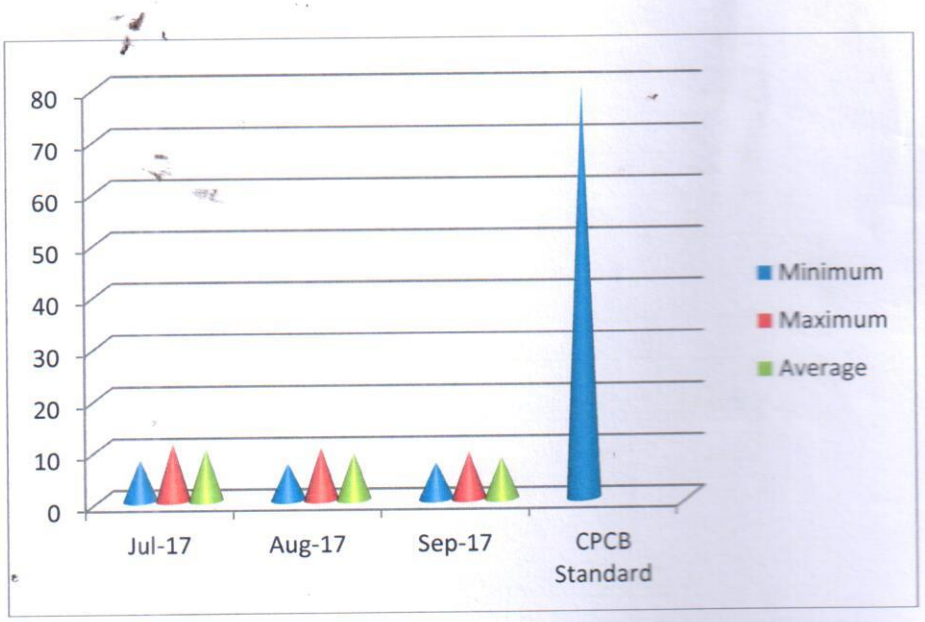
Graph:-Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for SO_2 were recorded as 8 $\mu g/m^3$ and 11 $\mu g/m^3$ respectively and average concentration of 10 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for SO_2 were recorded as 7 $\mu g/m^3$ and 10 $\mu g/m^3$ respectively and average concentration of 9 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for SO_2 were recorded as 7 $\mu g/m^3$ and 9 $\mu g/m^3$ respectively and average concentration of 8 $\mu g/m^3$.



Graph:-Dumerkholi / Nr.Mining Area

Table 10
Statistical Analysis of NO_x

Unit : $\mu g/m^3$

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	July-2017	21	33	27	27	33
	August-2017	23	34	29	29	34
	September-2017	17	25	21	21	25
Betpani	July-2017	20	29	25	25	29
	August-2017	22	31	27	27	31
	September-2017	18	22	20	20	22
Virhorepat	July-2017	20	30	25	25	30
	August-2017	23	32	28	28	32
	September-2017	18	30	24	24	30
Tatijharia Village/Nr.Weigh Bridge	July-2017	20	29	25	25	29
	August-2017	25	33	29	29	33
	September-2017	15	29	22	22	21
CPCB Standard		**80 $\mu g/m^3$ (24 hrs)**				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	July-2017	12	19	16	16	19
	August-2017	14	20	17	17	20
	September-2017	10	19	15	15	19
Sairaidh Campus	July-2017	14	21	18	18	21
	August-2017	16	22	19	19	22
	September-2017	9	14	12	12	14
Rajendrapur/ Nr.Mining Area	July-2017	15	22	19	19	22
	August-2017	17	25	21	21	25
	September-2017	10	17	14	14	17
Dumerkholi/ Nr.Mining Area	July-2017	14	20	17	17	20
	August-2017	13	23	18	18	23
	September-2017	10	16	13	13	16
CPCB Standard		**80 $\mu g/m^3$ (24 hrs)**				

Conclusion (A):-

Piprapat /Nr.Mining Lease Area Core Zone: For the Months of July-Aug-Sept-2017 Average of NO_x is26 $\mu g/m^3$.

Betpani Lease Area Core Zone:- For the Months of July-Aug-Sept-2017Average of NO_x is 24 $\mu g/m^3$.

Virhorepat Lease Area Core Zone:- For the Months of July-Aug-Sept-2017 Average of NO_x is 26 $\mu g/m^3$.**Tatijharia Village/Nr.Weigh Bridge Lease Area Core Zone:-**For the Months of July-Aug-Sept-2017Average of NO_x is 25$\mu g/m^3$.

- **The Average Concentration of NOx within the Core Zone of Tatijharia Lease during this period (July-Aug-Sept-201 is 25 $\mu g/m^3$ 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 July-Aug-Sept-2017Average of NO_x is 16 $\mu g/m^3$.

2)Sairaidh Campus Lease Area Buffer Zone:- For the Months of July-Aug-Sept-2017 Average of NO_x is 16 $\mu g/m^3$.

3)Rajendrapur/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-Aug-Sept-2017Average of NO_x is 18 $\mu g/m^3$.

4)Dumerkholi/ Nr.Mining Lease Area Buffer Zone:-For the Months of July-Aug-Sept-2017 Average of NO_x is 16 $\mu g/m^3$.

- **The Average Concentration of NOx within the Buffer Zone of Tatijharia Lease during this period (July-Aug-Sep 2017) is 17 $\mu g/m^3$ 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.

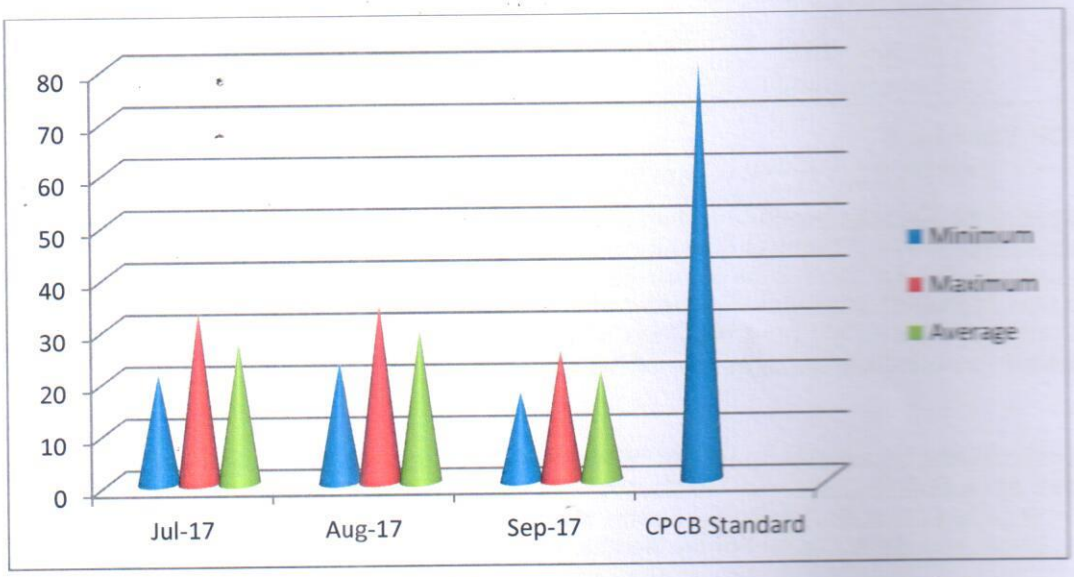
The summary of Statistical Analysis of NO_X results for the month of July-August-September-2017 are presented in detail in **Table 10**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Piprapat / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded as 21 $\mu g/m^3$ and 33 $\mu g/m^3$ respectively and average concentration of 27 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were recorded as 23 $\mu g/m^3$ and 34 $\mu g/m^3$ respectively and average concentration of 29 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for NO_X were recorded as 17 $\mu g/m^3$ and 25 $\mu g/m^3$ respectively and average concentration of 21 $\mu g/m^3$.



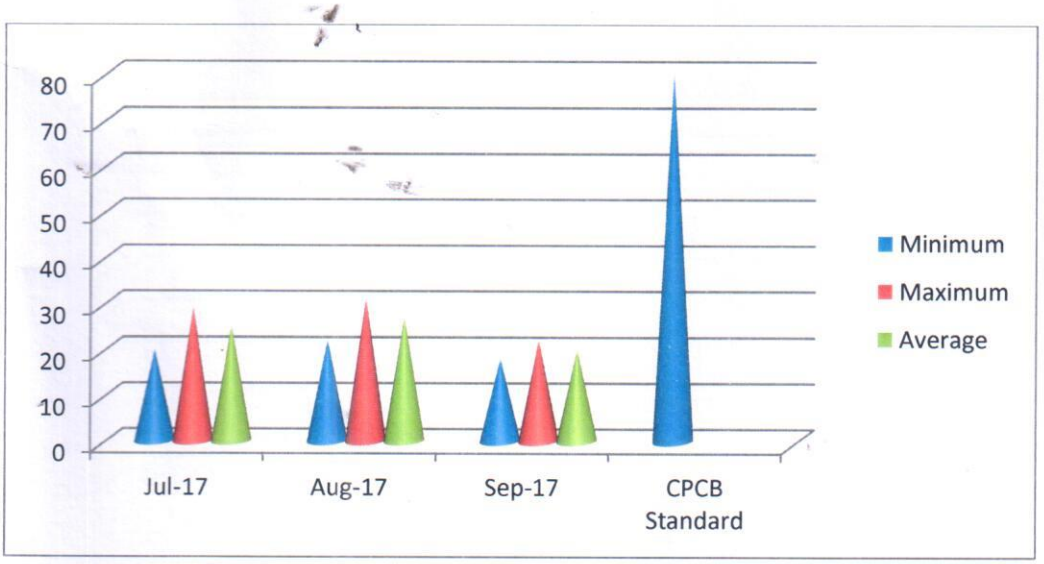
Graph :- Piprapat / Nr.Mining Area

Betpani

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded 20 µg/m^3 and 29 µg/m^3 respectively and average concentration of 25 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were record as 22 µg/m^3 and 31 µg/m^3 respectively and average concentration of 27 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X we recorded as 18 µg/m^3 and 22 µg/m^3 respectively and average concentration of 20 µg/m^3.



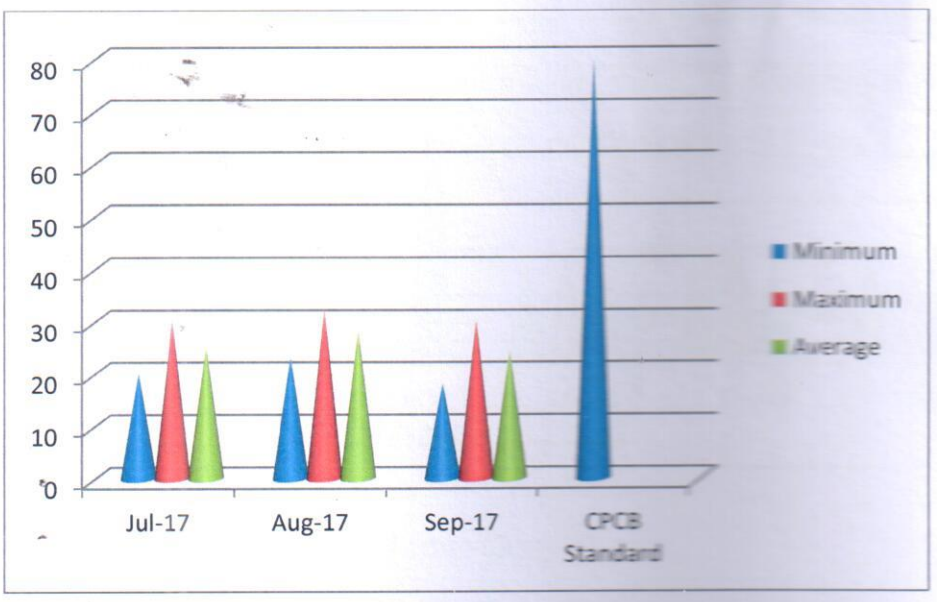
Graph:-Betpani

Virhorepat

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded as 20 µg/m^3 and 30 µg/m^3 respectively and average concentration of 25 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were recorded as 23 µg/m^3 and 32 µg/m^3 respectively and average concentration of 28 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X were recorded as 18 µg/m^3 and 30 µg/m^3 respectively and average concentration of 24 µg/m^3.



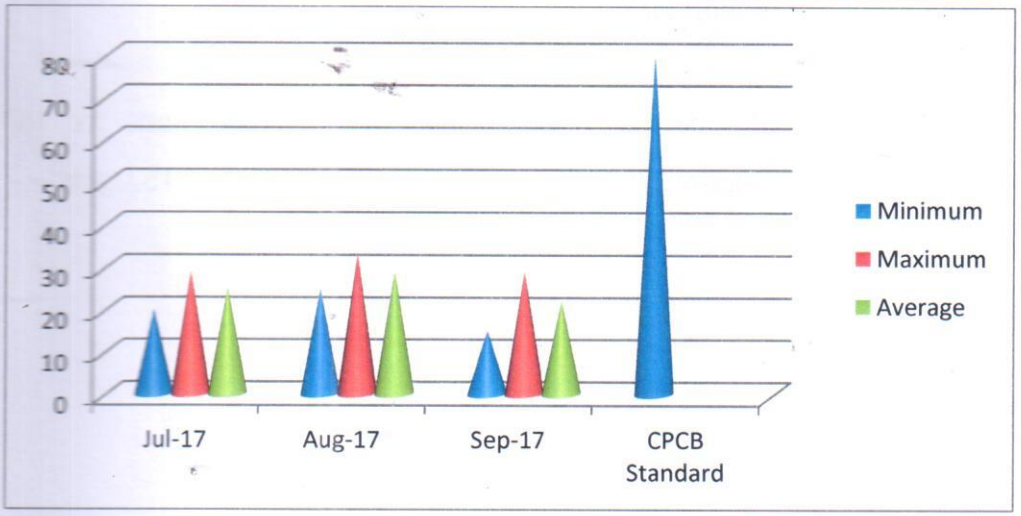
Graph:-Virhorepat

Tatijharia Village/Nr.Weigh Bridge

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded 20 µg/m^3 and 29 µg/m^3 respectively and average concentration of 25 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were recor as 25 µg/m^3 and 33 µg/m^3 respectively and average concentration of 29 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X w recorded as 15 µg/m^3 and 29 µg/m^3 respectively and average concentration of 22 µg/m^3.



Graph:-Tatijharia Village/Nr.Weigh Bridge

2.6Fugitive Emission (Buffer Zone):-

2.6.1Presentation of Results.

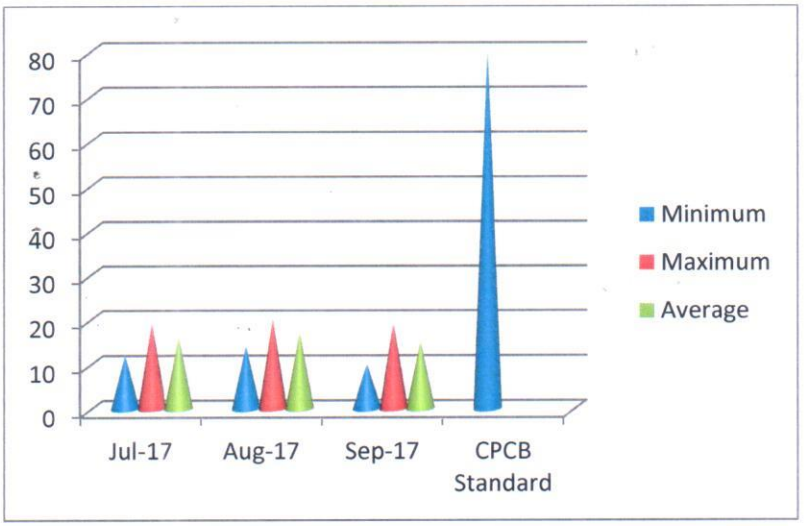
The summary of Statistical Analysis of NO_X results for the month of July-2017 to September-2017 are presented in detail in **Table10**. 98th percentile; maximum, minimum and average values etc have been computed from the collected raw data for all the Fugitive emission monitoring station.

Kutku Village / Nr.V.T.Center

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded as 12 µg/m^3 and 19 µg/m^3 respectively and average concentration of 16 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were recorded as 14 µg/m^3 and 20 µg/m^3 respectively and average concentration of 17 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X were recorded as 10 µg/m^3 and 19 µg/m^3 respectively and average concentration of 15 µg/m^3.



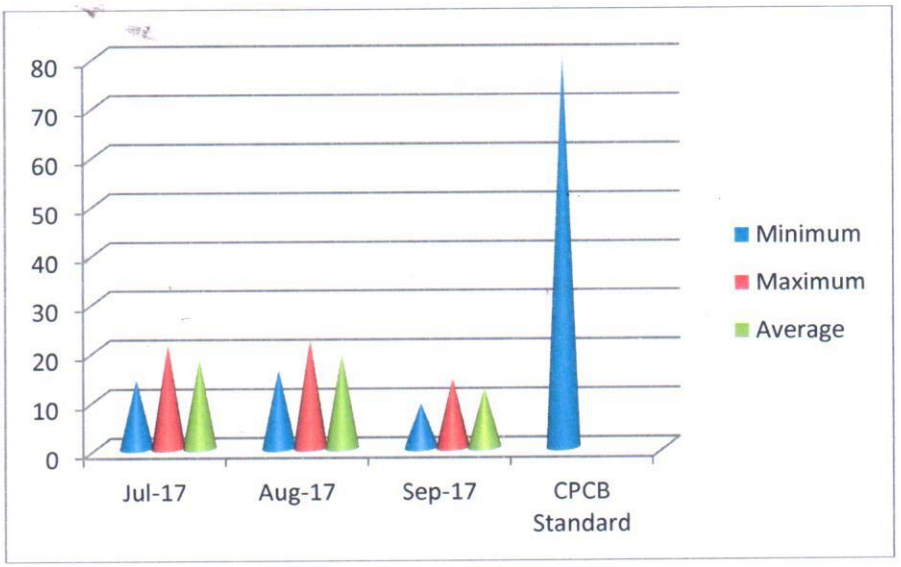
Graph:-Kutku Village / Nr.V.T.Center

Sairaidh Campus

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorde 14 µg/m^3 and 21 µg/m^3 respectively and average concentration of 18 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were reco as 16 µg/m^3 and 22 µg/m^3 respectively and average concentration of 19 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X recorded as 9 µg/m^3 and 14 µg/m^3 respectively and average concentration of 12 µg/m^3.



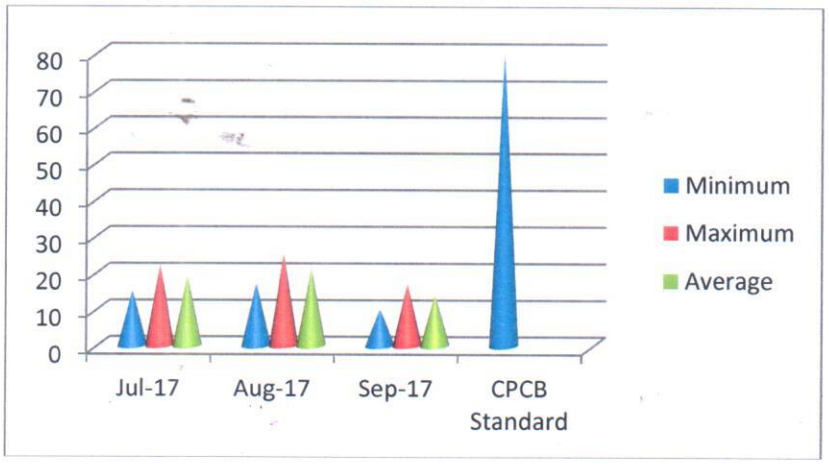
Graph:-Sairaidh Campus

Rajendrapur / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorded as 15 $\mu g/m^3$ and 22 $\mu g/m^3$ respectively and average concentration of 19 $\mu g/m^3$.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were recorded as 17 $\mu g/m^3$ and 25 $\mu g/m^3$ respectively and average concentration of 21 $\mu g/m^3$.

For the Month of September-2017 the minimum and maximum concentrations for NO_X were recorded as 10 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively and average concentration of 14 $\mu g/m^3$.



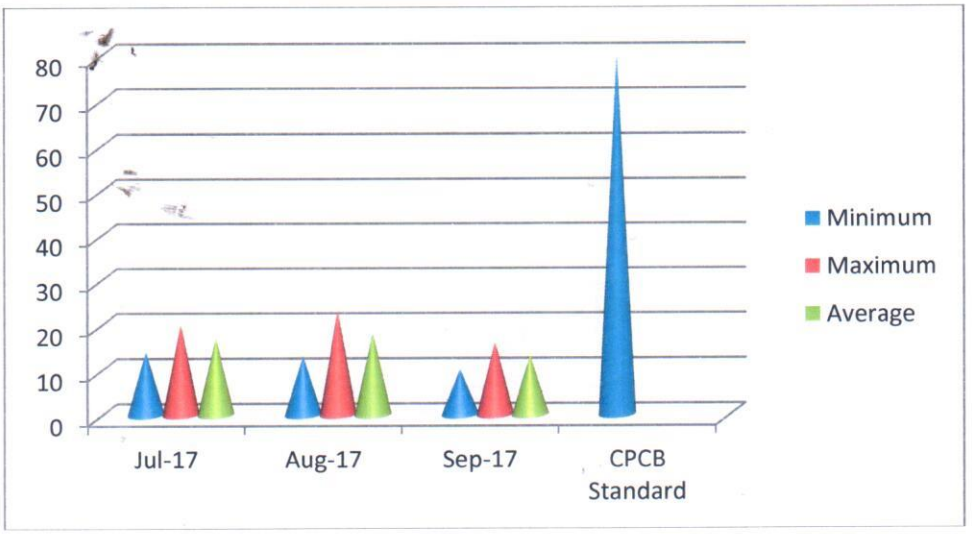
Graph:-Rajendrapur / Nr.Mining Area

Dumerkholi / Nr.Mining Area

For the Month of July-2017 the minimum and maximum concentrations for NO_X were recorde 14 µg/m^3 and 20 µg/m^3 respectively and average concentration of 17 µg/m^3.

For the Month of August-2017 the minimum and maximum concentrations for NO_X were reco as 13 µg/m^3 and 23 µg/m^3 respectively and average concentration of 18 µg/m^3.

For the Month of September-2017 the minimum and maximum concentrations for NO_X recorded as 10 µg/m^3 and 16 µg/m^3 respectively and average concentration of 13 µg/m^3.



Graph:-Dumerkholi / Nr.Mining Area

Table 11

Statistical Analysis of Pb

Unit: µg/m³

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%le
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	July-2017	0.018	0.032	0.025	0.025	0.032
	August-2017	0.024	0.043	0.034	0.034	0.043
	September-2017	0.018	0.029	0.024	0.024	0.029
Betpani	July-2017	0.026	0.048	0.037	0.037	0.048
	August-2017	0.021	0.037	0.029	0.029	0.037
	September-2017	0.017	0.031	0.024	0.024	0.031
Virhorepat	July-2017	0.038	0.047	0.043	0.043	0.047
	August-2017	0.026	0.039	0.033	0.033	0.039
	September-2017	0.021	0.042	0.032	0.032	0.042
Tatijharia Village/Nr.Weigh Bridge	July-2017	0.027	0.041	0.034	0.034	0.041
	August-2017	0.028	0.052	0.040	0.040	0.052
	September-2017	0.017	0.038	0.028	0.028	0.038
CPCB Standard		**1.0 µg/m³ (24 hrs)**				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%le
Buffer Zone:-						
Kutku Village/ Nr.V.T.Center	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Sairaidh Campus	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Rajendrapur/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Dumerkholi/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
CPCB Standard		**1.0 µg/m³ (24 hrs)**				

Conclusion: (A)

The Average concentration of Pb within the Core Zone of Tatijharia Lease during this period (July-August-September-2017) is 0.040µg/m³ 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 (July-August-September -2017) is Not Detected.and it is within permissible limits as per CPCB Standard.

Table 12

Statistical Analysis of Hg

Unit: µg/

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Betpani	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Virhorepat	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Tatijharia Village/Nr.Weigh Bridge	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Sairaidh Campus	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Rajendrapur/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Dumerkholi/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
CPCB Standard		---				

Conclusion: (A)

The Average Concentration of Hg within the Core Zone of Tatijharia Lea during this period (July-August-September-2017) is Not Detected.and it is within permissil limits as per CPCB Standard.

Conclusion: (B)

The Average Concentration of Hg within the Buffer Zone of Tatijharia Lea during this period (July-August-September -2017) is Not Detected.and it is within permissil limits as per CPCB Standard.

Table 13

Statistical Analysis of As

Unit: ng/m^3

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Fugitive Emission (Core Zone):-						
Piprapat/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Betpani	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Virhorepat	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Tatijharia Village/Nr.Weigh Bridge	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
CPCB Standard		06 ng/m^3 (Annual)				

Location	Month & Year	Min.	Max.	A.M.	G.M.	98%
Buffer Zone :-						
Kutku Village/ Nr.V.T.Center	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Sairaidh Campus	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Rajendrapur/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
Dumerkholi/ Nr.Mining Area	July-2017	ND	ND	ND	ND	ND
	August-2017	ND	ND	ND	ND	ND
	September-2017	ND	ND	ND	ND	ND
CPCB Standard		06 ng/m^3 (Annual)				

Conclusion: (A)

The Average Concentration of As within the Core Zone of Tatijharia Lease during this period (July-August-September-2017) is Not Detected.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 (July-August-September -2017) is Not Detected and it is within permissible limits as per CPCB Standard.

Free Silica :-

Sr. No.	Location	Measurement Unit	July 2017		August 2017		September 2017	
			SPM	RSPM	SPM	RSPM	SPM	RSPM
1.	Piprapat/ Near Mining Area	g/100gm	0.27	0.14	0.31	0.19	0.36	0.21

Table 14

Dust fall Rate

Sl.No.	Location	July 2017	August 2017	September 2017	Averag
		Rate (MT/km2/month)			
1	Piprapat/Near Mining Area	17.1	24.7	27.3	**23.0**
2	Tatijharia Village	14.9	21.6	23.8	**20.1**

Table 15

Noise Level Monitoring

Unit: dB(A)

Sl. No.	Location	July 2017		August 2017		September 2017	
		Day	Night	Day	Night	Day	Night
Core Zone							
1.	Piprapat/Nr.Mining Area	67.1	53.9	63.1	48.2	58.3	41.6
2.	Betpani	58.3	46.1	61.9	51.6	53.1	42.7
3.	Virhorepat	63.7	56.1	68.2	54.9	61.1	43.9
4.	Tatijharia Village/ Nr.Weigh Bridge	57.2	41.6	61.7	52.8	63.8	51.4
Buffer Zone							
5.	Kutku Village/Nr.V.T.Center	51.2	43.9	47.2	38.1	51.6	41.9
6.	Sairaidh Campus	47.3	38.1	51.6	41.2	49.7	38.3
7.	Rajendrapur/Nr.Mining Area	53.1	41.6	52.7	41.9	48.1	37.2
8.	Dumerkholi/Nr.Mining Area	49.7	36.2	51.2	42.6	52.6	42.8

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	July 2017			August 2017			September 2017		
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
1	Piprapat/Nr.Mining Area	64.7	71.9	**68.3**	68.3	81.4	**74.9**	64.2	79.3	**71.8**

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 July-August-September-2017)

TEST RESULTS

Sr. No.	Test Parameter	Measurement Unit	Test Method	As per IS 10500 : 2012 (Drinking Water - Specification)		Test Result
				Acceptable Limit	*Permissible Limit	
1.	pH value	-	IS 3025 (Part 11)	6.5 to 8.5	No relaxation	7.42 at 25°C
2.	Turbidity	NTU	IS 3025 (Part 10)	1	5	0.7
3.	Colour	Hazen units	IS 3025 (Part 4)	5	15	1
4.	Odour	-	IS 3025 (Part 5)	Agreeable	Agreeable	Agreeable
5.	Taste	-	IS 3025 (Part 8)	Agreeable	Agreeable	Agreeable
6.	Iron (as Fe)	mg/l	IS 3025 (Part 2)	1.0	No relaxation	0.09
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	281
9.	Fluoride (as F)	mg/l	IS 3025 (Part 60)	1.0	1.5	0.21
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	64.17
12.	Total Alkalinity (as $CaCO_3$)	mg/l	IS 3025 (Part 23)	200	600	118.54
13.	Total hardness (as $CaCO_3$)	mg/l	IS 3025 (Part 21)	200	600	181.18
14.	Calcium (as Ca)	mg/l	IS 3025 (Part 40)	75	200	57.18
15.	Magnesium (as Mg)	mg/l	IS 3025 (Part 46)	30	100	9.31
16.	Sulphate (as SO_4)	mg/l	IS 3025 (Part 24)	200	400	31.74
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	No relaxation	< 0.01
24.	Aluminium (as Al)	mg/l	IS 3025 (Part 2)	0.03	0.2	< 0.005
25.	Lead (as Pb)	mg/l	IS 3025 (Part 2)	0.01	No relaxation	< 0.001
26.	Zinc (as Zn)	mg/l	IS 3025 (Part 2)	5	15	< 0.1

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_2S)	mg/l	IS 3025 (Part 29)	0.05	No relaxation	< 0.03
32.	Chloramines (as Cl_2)	mg/l	APHA 4500-Cl'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_6H_5OH)	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.	*Escherichia coli*	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 NearMining Area)

S. No.	Parameters	Unit	IS : 2296 Class 'C'	Results
				Sept-2017
1	pH Value	-	6.5 to 8.5	6.94
2	Total Hardness ($CaCO_3$)	mg / l	$	239.73
3	Iron as (Fe)	mg / l	50	16.58
4	Chlorides as (Cl)	mg / l	600	304.27
5	Electrical Conductivity	µS/cm	$	501.94
6	Total Dissolved Solids (TDS)	mg / l	1500	241
7	Calcium as (Ca)	mg / l	$	67.38
8	Magnesium as (Mg)	mg / l	$	13.19
9	Sulphate as (SO_4)	mg / l	400	121.57
10	Nitrates as (NO_3)	mg / l	$	9.4
11	Fluoride as (F)	mg / l	0.5	0.29
12	Alkalinity	mg / l	$	56.73
13	Chemical Oxygen demand (COD)	mg / l	$	21.4
14	BOD at 27°C for 3days	mg / l	3	7.1
15	Total Suspended Solid (TSS)	mg / l	$	12

$: Limits not specified

Table 18

Report on Soil Analysis, Tatijharia

Date of collection: Sept-2017.

Sample Location: Piprapat/Nr.Mining Area

Sr. No	Test Parameters	Measurement Unit	Results
1	pH	-	6.82at 25^0C
2	Electrical Conductivity at 25^0C	µs/cm	301
3	Texture	-	Clay Loam
4	Sand	%	43.8
5	Silt	%	26.1
6	Clay	%	30.1
7	Bulk Density	g/cc	1.21
8	Porosity	%	11
9	Water Holding Capacity	%	51
10	Exchangeable Calcium as Ca	mg/kg	62.8
11	Exchangeable Magnesium as Mg	mg/kg	7.1
12	Exchangeable Sodium as Na	mg/kg	73.9
13	Available Potassium as K	kg/hect.	6.1
14	Available Phosphorous as P	kg/hect.	127
15	Available Nitrogen as N	kg/hect.	38.6
16	Organic Matter	%	0.28
17	Organic Carbon	%	0.19
18	Water Soluble Chloride as Cl^+	mg/kg	12.4
19	Water Soluble Sulphate as SO_4	mg/kg	5.8
20	Sodium Absorption Ratio	-	4.02
21	CEC	meq/100 gm	12.1
22	Total Iron	%	3.87
23	Available Manganese	mg/kg	0.0006
24	Available Zinc	mg/kg	0.008
25	Available Boron	mg/kg	0.004

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.

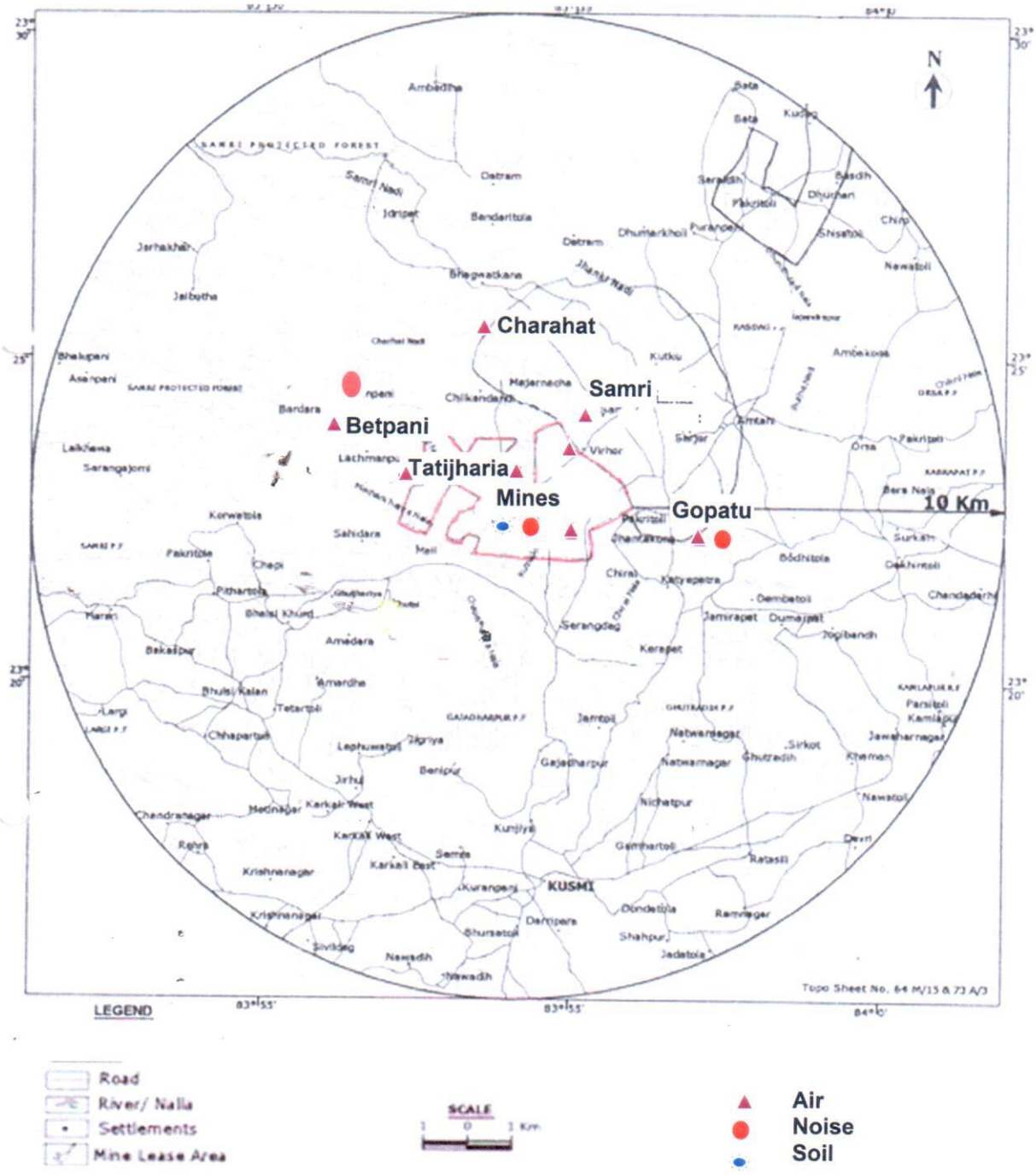


FIG 3: SAMPLING LOCATIONS FOR AIR, NOISE & SOIL

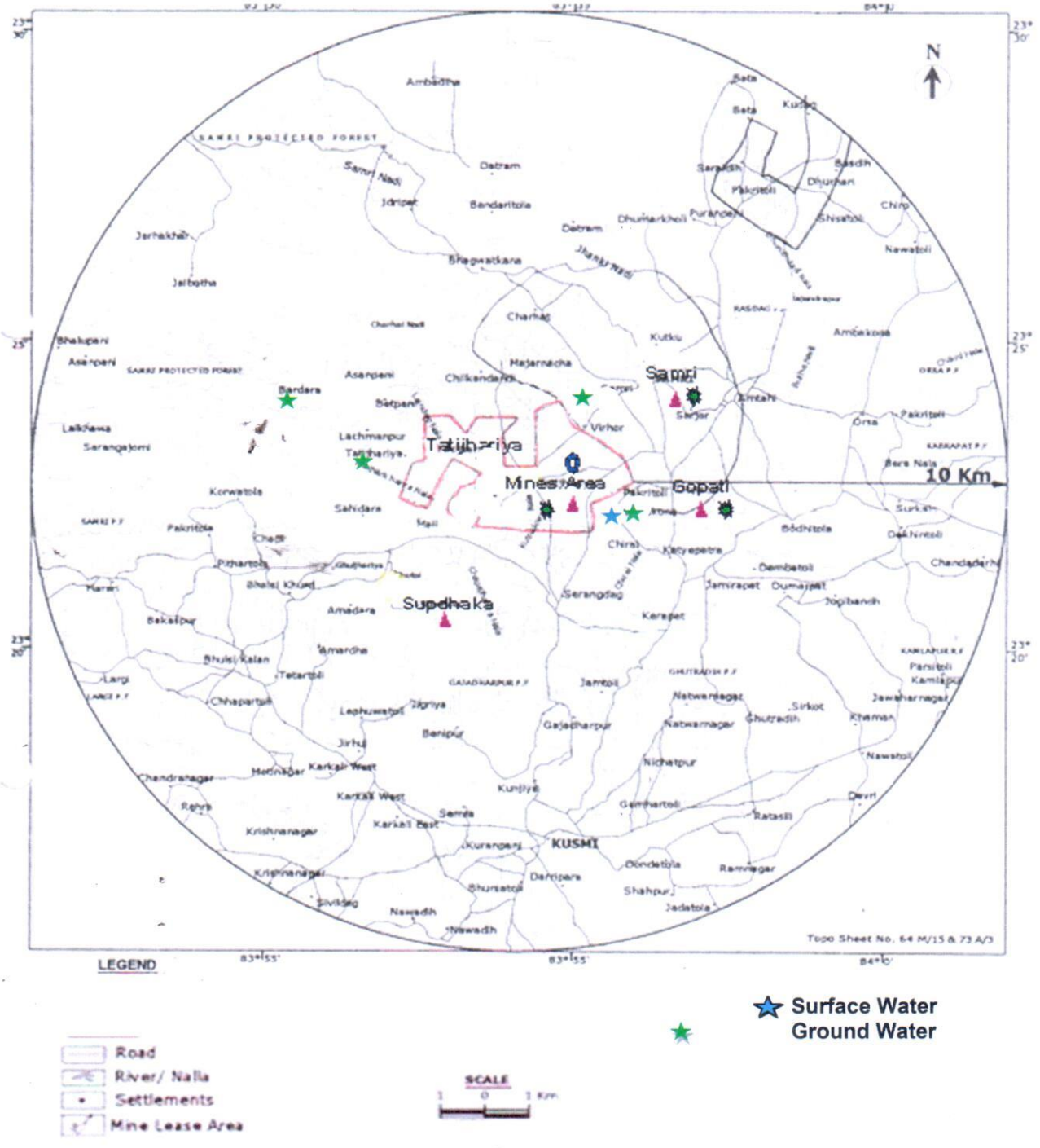


FIG 4: SAMPLING LOCATIONS FOR WATER

Annexure - IV

REGIONAL OFFICE
CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Bank Colony, Behind B.T.I., Nawapara, Ambikapur (C.G.) Fax/Phone 07774-231936

No. 983 /RO/TS/CECB/2016 Ambikapur, Dt. 02/11/2016

To,

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

Subject : Renewal of consent of the board under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981.

Ref. : Your letter No. HIL/SAM/CECB/118/2016/T dated 18/07/2016 and subsequent correspondence letter ending dated 23/09/2016.

With reference to your above, application consent and license are hereby renewed for a period from **01/12/2016 to 19/05/2018** with the terms and conditions incorporated in the consent issued by Board Office letter No. 6886/TS/CECB/2007, Raipur, dated 24/12/2007, subsequent renewal of consent issued by Board and additional condition mentioned below:-

NAME	PRODUCTION CAPACITY
Mining of Bauxite Ore	4.0 Lakhs Tonnes per Annum (Four Lakhs Tonnes Per Annum)

Additional Conditions:

1. The Industry shall operate & maintain the air pollution control system effectively & regularly. Effective steps shall be taken to control fugitive dust emission. Fixed type automatic water sprinkling system shall be installed at haul roads/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 in and around the mine area all the time.
2. Regular monitoring for the measurement of air pollutants level in ambient shall be carried out. Industry shall submit air quality monitoring reports to the Board regularly.
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 & shall be maintained properly. Dust, muck & sludge generated due to transportation on the road shall be cleaned and disposed off properly. Industry shall maintain good house keeping 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 for as possible maximum area of open spaces shall be utilized for plantation purposes.
7. Industry shall submit Environment statement to the Board as per provision of Environmental (Protection) Amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.
8. Chhattisgarh Environment Conservation Board reserves the rights to revoke the Consent at any time for any violation/non-compliance.

Please acknowledge the receipt of this letter.

For and on behalf of
CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

2/11/16

Regional Officer,
Chhattisgarh Environment Conservation Board,
Ambikapur

Hindalco Industries Ltd
Samri Mines Division
Distt-Balrampur (C.G.)
Date 9/11/16 (59)
Received by

REGIONAL OFFICE

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

Bank Colony, Behind B.T.I., Nawapara, Ambikapur (C.G.) Fax/Phone 07774-231936

No. 3822 /RO/TS/CECB/2016 Ambikapur, Dt. 02/11/2016

To,

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

Subject : Renewal of consent of the board under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref. : Your letter No. HIL/SAM/CECB/118/2016/T dated 18/07/2016 and subsequent correspondence letter ending dated 23/09/2016.

With reference to your above, application consent and license are hereby renewed for a period from **01/12/2016 to 19/05/2018** with the terms and conditions incorporated in the consent issued by Board Office letter No. 6884/TS/CECB/2007, Raipur, dated 24/12/2007, subsequent renewal of consent issued by Board and additional condition mentioned below:-

NAME	*PRODUCTION CAPACITY*
Mining of Bauxite Ore	***4.0 Lakhs Tonnes per Annum (Four Lakhs Tonnes Per Annum)***

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 effiuent into the river or any other 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.
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 & shall be maintained properly. Dust, muck & sludge generated due to transportation on the road shall be cleaned and disposed off properly. Industry shall maintain good house keeping 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 for as possible maximum area of open spaces shall be utilized for plantation purposes.
7. Provision of water harvesting system should be provided in the industry premises.
8. Industry shall submit Environment statement to the Board as per provision of Environmental (Protection) Amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.
9. Chhattisgarh Environment Conservation Board reserves the rights to revoke the Consent at any time for any violation/non-compliance.

Please acknowledge the receipt of this letter.

For and on behalf of
CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

2/11/16

Regional Officer
Chhattisgarh Environment Conservation Board,
Ambikapur

Hindalco Industries Ltd
Sarguja Bauxite Division
Dist. Balrampur
Date 3/11/16 (58)
Received by

Hindalco Industries Ltd.
Mines Division, Samri

Annexure -V

Lease wise Production 2017-18 (Up to September 2017)

Lease	Production (MT)
Samri	211170.000
Kudag	28910.000
Tatijharia	159525.000
Total	**399605.000**

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

Hindalco Industries Ltd.
Mines Division, Samri

Annexure -VI

Lease wise Details 2017-18 (Up to September 2017)

Lease	Mined Out Area (Hact.)	Reclaimed Area (Hact.	Nos. of Sapling	Area of Sapling (Hact.)
Samri	7.859	0.462	11681	4.970
Kudag	1.402	0.000	2960	1.220
Tatijharia	6.301	1.167	8868	3.540
Total	**15.562**	**1.629**	**23509**	**9.730**

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd

Hindalco Industries Ltd.
Mines Division,Samripat

Year wise /S[illegible]se 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
2016-17	4390	2.800	9110	3.700	5950	2.400	19450	8.900
2017-18	2960	1.220	11681	4.970	8868	3.540	23509	9.730
Total	**120530**	**51.2**	**178892**	**73.124**	**87793**	**35.600**	**387215**	**159.924**

Agent of Mines
Samri Mines Division
Hindalco Industries Ltd