## EC COMPLIANCE REPORT & ENVIRONMENTAL STATUS REPORT (January 2016 – July 2016)

of

Hindadih Coal Washery (Capacity – 3.6 MTPA)

*Located At* Village - Hindadih, Tehsil - Masturi, District - Bilaspur, State - Chhattisgarh

**Project Proponent:** 



Hind Energy & Coal Beneficiation (India) Pvt. Ltd. Hindadih Village, Masturi Tehsil, Bilaspur District, Chhattisgarh, India

**Environnent Consultant** 

## ANACON LABORATORIES PVT. LTD., NAGPUR

Recognized by MoEF (GOI) Notifn. No. D.L.33004/99 Dt.03.01.2014 NABL T-1550 (Chemical), T-1826 (Biological), T-2344, (Mechanical) Accredited under the QCI-NABET Scheme for EIA Consultant BIS vide No.CL/CQAPD/OSL(7124116) dt.16.12.2011 Certified ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007

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## September 2016



# Foreword

The protection of environment plays a crucial role in maintaining the local environment quality for any Industrial and mining activity. Hence compliance of the statutory requirements becomes very important to conserve the ecological balance within and surrounding of mining areas. Therefore, environment protection is becoming a prerequisite for sustainable development. In line with this requirement, the management of **Hind Energy & Coal Beneficiation (India) Pvt. Ltd.** has adopted a corporate responsibility of environment protection.

In order to comply with the Environment protection act, to fulfill statutory requirements and to be in tune with Environmental Preservation and Sustainable Development, **Hind Energy & Coal Beneficiation (India) Pvt. Ltd.,** has prepared this Six Monthly EC Compliance report by retaining **Anacon Laboratories Pvt. Ltd., Nagpur** as Environment Consultants for Environmental monitoring and various Environmental issues related to the Coal Washery.

This document presents the EC Compliance and Environmental Status Report for the period **Jan. 2016 – June 2016** (six months) as part of the statutory requirements.

For Hind Energy & Coal Beneficiation (India) Pvt. Ltd.

For ANACON LABORATORIES PVT. LTD.

Janny

**Authorized Signatory** 

**Authorized Signatory** 





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#### INTRODUCTION

**M/s Hind Energy & Coal Beneficiation (I) Pvt. Ltd, (HECBIPL)** has expanded capacity of its existing Coal beneficiation plant from 2.4 MTPA to **3.6 MTPA** on 01.10.2015 (project commissioned). The coal washery is located at Village Hindadih, Tehsil Masturi, District Bilaspur (C.G.). The raw coal is received generally from SECL Dipka mine which is about 70km from HECBIPL.

Coal beneficiation is the process for cleaning & reducing ash content in the coal, thus improving the quality of coal. This is a wet type of coal Washery, having obtained environmental clearance vide letter No. J-11015/364/2009.IA-II(M) dated 21<sup>st</sup> May, 2014.

**EC Conditions compliance** status and Environmental monitoring reports for the period of **July 2016 to Dec 2016** is given below.

Compliance Status of conditions stipulated in Environmental Clearance for 3.6 MTPA Coal Washery of M/s Hind Energy & Coal Beneficiation (I) Pvt. Ltd, (HECBIPL)

S. No.	Specific Conditions	Action Taken
	Coal transportation shall be by mechanically covered trucks for loading and unloading.	Noted and being complied. HECB enquired for mechanically covered trucks with leading truck manufacturers. However, mechanically covered trucks are not available in market, hence transportation of coal is done through tarpaulin covered trucks only (Refer Annexure VII).
ii.	Green belt in and around the coal washery should be further intensified.	Being complied. A total of 3500 saplings at washery, crushing plant, storage yard and along the roads have been planted during this year. (Refer Annexure III & IV)
iii.	Automatic sprinkler system at the railway siding should be installed.	Complied. Automatic sprinkler system at Gatora railway siding is installed.
iv.	No extension for the work of railway siding will be sought by the proponent.	Complied. Railway siding work has been completed within permitted time schedule and now in operation.
V.	No wastewater will be discharged into drains / water resources.	Complied. No wastewater is discharged into drains / water resources as plant is operating on zero discharge facility.

#### COMPLIANCE STATUS





S. No.	Specific Conditions	Action Taken
vi.	In the proposed expansion, technology used for the washing of coal is wet process. Closed circuit water system will be adopted in the proposed expansion project. Zero effluent discharge system will be maintained.	Complied. Zero discharge is strictly followed by recycling and use of treated water for green belt within the premises. No wastewater is discharged into drains / water resources.
vii.	The proponent should adhere to all the conditions stipulated in letter of Central Ground Water Board letter no.21 4(102)/CGWA/2011/ 174.	Complied. Proponent is adhering to all conditions of CGWB NoC.
viii.	The assurances given during the Public Hearing and as per the action plan developed by the proponent should be implemented	Complied. Air pollution control equipments are installed and Hind Energy is also actively doing CSR activities. (Refer Annexure II)
ix.	The CSR cost should be Rs 5 per Tonnes of Coal produced which should be adjusted as per the annual inflation.	Being complied. The company is actively doing CSR activities. During this monitoring period company has spent overall INR <u>3,50,000</u> in Hindadih & Nearby villages and INR <u>29,45,652</u> under Hind Energy Group CSR activities.
х.	Three-tier green belt should be developed along the washery boundary and along transfer and loading points and in the proposed railway siding to mitigate/check dust pollution and the entire coal dispatch from the group of mines should be dove-tailed with the Coal evacuation system prepared for the Angul-Talcher. A 3-tier avenue plantation should also be developed along vacant areas, near washery, storage yards, loading points and transfer points and along internal roads and main approach roads and on the 2-km road upto the railway siding and at the siding.	Being complied. The plantation is developed along washery boundary, transfer points and also railway siding. The areas wherever possible the green belt is developed. (Refer Annexure III & IV)
xi.	The raw coal, washed coal and coal wastes (rejects) shall be stacked properly at earmarked site(s) within stockyards fitted with wind breakers/shields. Adequate measures hall be taken to ensure that the stored minerals do not catch fire.	Complied. Raw Coal, Washed coal & coal waste (rejects) are stacked properly at earmarked sites(s) covered with boundary walls. Water Sprinklers are provided on the coal stock to reduce dispersion of coal





S. No.	Specific Conditions	Action Taken
		particulate matter in ambient air. This also helps minimizing risk of coal storages fire. (Refer Annexure I)
xii.	Hoppers of the coal crushing unit and washery unit shall be fitted with high efficiency bag filters and mist spray water sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operations, transfer points of closed belt conveyor systems and from transportation roads	Complied. Coal crusher and coal pulverizer of the plant are facilitated with Bag filters of adequate capacity and efficiency so as to comply with particulate emission norms. Mist spray water sprinkling system is provided. Closed conveyor system is provided to prevent fugitive dust emissions. (Refer Annexure II)
xiii.	All approach roads shall be black topped and internal roads shall be concreted. The roads shall be regularly cleaned with 8 mechanical sweepers.	Being complied. All internal roads are concrete & plantation has also been done along the road side wherever possible. (Refer Annexure III)
xiv.	Trucks engaged for mineral transportation outside the washery upto the railway siding covering a distance of 2 km shall be optimally loaded and covered with tarpaulin with no spillage en route. The trucks shall be properly maintained and emissions shall be below notified limits. Facilities for parking of trucks carrying raw coal from the linked coalmines shall be created within the Unit.	Being Complied. All the vehicles engaged in transportation are covered with tarpaulins and are maintained so as to follow emission norms.
XV.	Records of quantum and ash content of raw coal being washed, and clean coal and coal rejects produced from every batch of washing shall be maintained and details thereof uploaded on the company website	Being Complied. Records are maintained at plant.
xvi.	The transportation of coal should be by mechanically covered trucks in order to reduce coal spillage and dust pollution	Noted and being complied. All the vehicles engaged in transportation are covered with tarpaulins as mechanically covered trucks are not available in the market.
xvii.	The waste water should be discharged after proper treatment;	Complied. No wastewater is discharged into drains / water resources as plant is operating on





Compliance Period: Jan. 2016 – June 2016

S. No.	Specific Conditions	Action Taken	
		zero discharge facility.	
xviii.	All the conditions stipulated in the letter of Central Ground Water Board letter no. 21- 4(102)/CGWA/NCCR/2011/174 dated Nil should be adhered to.	Complied. All conditions in CGWB letter are adhered.	
xix.	The time limit should be provided to the Contractual vendors /contractors for providing mechanically covered trucks for coal transportation.	Noted and Being complied. HECB enquired for mechanically covered trucks with leading truck manufacturers. However, mechanically covered trucks are not available in market and also there is no any plan to manufacture mechanically covered trucks in future (Refer Annexure VII).	
XX.	The washery unit shall be a zero-discharge facility and no wastewater shall be discharged from the washery into the drains/natural water courses. Recycled water shall be used for development and maintenance of green belt and in the Plant Operations.	Complied. Zero discharge is strictly followed by recycling for process and use of treated water for green belt within the premises. No wastewater is discharged into drains / water resources.	
xxi.	Industrial wastewater (workshop) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May 1993 and 31 <sup>st</sup> December 1993 or as amended from time to time before use within the washery premises. Oil and grease trap shall be installed for treatment of workshop effluents. No wastewater shall be discharged from the washery into the drains/natural water courses.	Complied. Effluent treatment plant has been constructed and the treated effluent is confirming with CECB standards.	
xxii.	No additional groundwater shall be used for the Plant Operations. Any additional water requirement envisaged shall be obtained by recycle/reuse to the maximum extent and from rainwater harvesting measures.	Complied. Water recycled from ETP is re-used in plant operation and only makeup water is withdrawn from groundwater.	
xxiii.	Socio-economic and welfare measures for the local communities for the adjoining villages shall be implemented under CSR. Activities under CSR activities to be undertaken for the adjoining villages shall be identified in consultation with the local authorities, the	Being complied. The company is actively doing CSR activities. During this monitoring period company has spent overall INR 3,50,000 in Hindadih & Nearby villages and INR 29,45,652 under Hind Energy Group	





S. No.	Specific Conditions	Action Taken
	details of status of implementation of CSR and expenditure thereon which should be annually updated on the company website.	CSR activities. The amount was spent on various activities like pond construction, education facilities, drainage repairing, borewell construction and medical instrument donations to government hospital etc.
xxiv.	Heavy metal content in raw coal, and washed coal shall be analysed once in a year and records maintained thereof.	Being Complied. Analysis reports of raw coal and washed coal is maintained at plant.
XXV.	The project authorities shall in consultation with the Panchayats of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine.	Complied. The company is actively doing CSR activities in consultation with panchayats of nearby villages.
xxvi.	The commitment made by the Proponent to the issue raised during Public Hearing shall be implemented by the Proponent.	Complied. Air pollution control equipments are installed and Hind Energy is also actively doing CSR activities.
xxvii.	<ul> <li>Corporate Environment Responsibility:</li> <li>a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.</li> <li>b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/ violation of the environmental or forest norms/conditions.</li> <li>c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring</li> </ul>	Complied. Corporate Environment Policy in place and adhered.
	<ul><li>compliance with the environmental clearance conditions shall be furnished.</li><li>d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.</li></ul>	





#### **General Conditions:**

Sr.	General Conditions	Action Taken
No. i.	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	Noted and agreed.
ii.	No change in the calendar plan of production for quantum of mineral coal shall be made.	Noted and agreed.
iii.	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.	Complied. Four nos. of ambient air quality monitoring stations have been established & are operational for monitoring ambient air data. Heavy metals (Hg, As, Ni, Cd & Cr) are monitored during June 2016. Ambient air quality monitoring data for current monitoring period is enclosed along with Status report.
iv.	Data on ambient air quality (PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EPA rules, 1986 shall be furnished as part of compliance report.	Being Complied on regular basis.
V.	Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.	Complied. Machines & equipment's producing noise are covered with sound absorbing material & ear plugs/muffs are being provided to the workers in noisy environment.
vi.	Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May 1993 and 31 <sup>st</sup> December 1993 or as amended from time to time	Complied. Effluent treatment plant has been constructed and the treated effluent is confirming with CECB





Compliance	Period:	Jan.	2016 -	June	2016

Sr. No.	General Conditions Action Taken	
	before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.	standards.
vii.	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.	Being complied. All the vehicles engaged in transportation are covered with tarpaulins and are maintained so as to follow emission norms.
Viii.	Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, 1986.	Complied. The environmental quality is being regularly monitored and analyzed through M/s Anacon Laboratory Pvt. Ltd., Nagpur, a MoEF recognized and NABET & NABL accredited Laboratory.
ix.	Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.	Complied. Protective Respiratory Devices are provided & safety appliances are being used by the workers. Shoes, mask helmet safety belt & ear plug, have been provided & adequate training has been given to workers.
х.	Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.	Complied. Protective Respiratory Devices are provided & safety appliances are being used by the workers. Shoes, mask helmet safety belt & ear plug, have been provided & adequate training has been given to workers. Regular health checkup taken periodically.
xi.	A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company	Being complied. Separate environment cell is in place which is headed by senior person.
xii.	The funds earmarked for environmental protection	Being complied. Company has





Sr.	General Conditions	Action Taken
No.	measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.	opened a separate bank account number <i>31214727669</i> in SBI Bank for the purpose of Environmental protection only.
xiii.	The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in.	Notice regarding award of environmental clearance was published in newspapers. (Refer Annexure VI)
xiv.	A copy of the environmental clearance letter shall be marked to concern Panchayat/Zila Parishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.	Circulated and displayed in Gram Panchayat.
XV.	A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.	In purview of CECB, CG.
xvi.	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NOx (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.	Being complied.





Sr. No.	General Conditions	Action Taken
xvii.	The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Office s of CPCB and the SPCB.	Being complied.
xviii.	The Regional Office of this Ministry located in the Region shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.	Noted and full co-operation will be given to the official of the Hon'ble Ministry and all data/document/reports as sought by them will be submitted.
xix.	The Environmental statement for each financial year ending 31 March in For –V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEF by e-mail.	Being complied. Environmental Statement for each year is submitted to CECB regularly.

#### Other Conditions:

Sr. No.	Other Conditions	Action Taken
1.	The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report so also during their presentation to the EAC.	Being Complied. Air pollution control measures and zero discharge measures have been installed. Plantation is done every year to increase green belt.
2.	The commitment made by the Proponent to the issue raised during Public Hearing shall be implemented by the Proponent	Complied.
3.	The proponent is required to obtain all necessary clearances/approvals that may be required before the start of the project. The Ministry or any other competent authority may stipulate any further condition for	Complied. All clearances required are obtained.



Compliance of EC conditions of 3.6 MTPA Coal Beneficiation Plant of Hind Energy & Coal Beneficiation (India) Pvt. Ltd.



Sr.	Other Conditions	Action Taken
No.		
	environmental protection.	
4.	The Ministry or any other competent authority may stipulate any further condition for environmental protection.	Noted.
5.	The Proponent shall setup an Environment Audit cell with responsibility and accountability to ensure implementation of all the EC Conditions.	Being complied. Environment Cell is established for monitoring of EC conditions.
6.	Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted and agreed.
7.	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India/ High Courts and any other Court of Law relating to the subject matter. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.	Noted and agreed.
8.	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Noted.
9.	This EC supersedes the earlier EC, vide letter no. J- 11015/190/2007-IA.II (M) dated 24.06.2008.	Noted.





## Annexure I Boundary Walls and Sprinklers









Annexure II Bag Filters









## Annexure III Plantation along the Road Side









### Annexure IV Plantation Programmed Carried out by HECBIL







## Annexure V Railway Siding at Gatora







#### Annexure VI







#### Annexure VII

#### Letters from Truck Manufacturers



To,

26/09/2018

.

The Director,

Hind Energy & Coal beneficiation (India) Ltd.,

Bllaspur.

Sub: Your query regarding mechanically covered & operated trucks.

Sir,

This is in reference to your letter dated 23/09/2013 regarding a query of mechanically covered & operated trucks.

We wish to inform you that presently we are not providing any mechanically covared & operated trucks in Tractor Trailer range.

Regards,

For, Tata Motors timited.

#### TATA MOTORS LIMITED

Parthlyl Pacific 2nd Floor Above Axis Bank Tatibandh GE Road Ralpur 492 009 Chhattisgarh Tel 91 771 6675501 Fax 91 771 6675523 www.tatamotors.com Registered Office Bombay House 24 Homi Mody Street, Mumbal 400 001









## To Whomsoever It May Concern:

This is to certify that our company "AMW Motors Ltd" is one among the largest manufacturer of the heavy commercial vehicles in India.

Furthermore, we certify that we do not manufacture any heavy commercial vehicles which are mechanically covered and operated, and further till date we have no future plans to manufacture the same.

This is for you kind reference.

Assuring best services all time.



AMW Motors Ltd.

AMW MOTORS LTD (Demerged entity of Asla Motor Works Ltd.) Plant & Regd. Office : 34 Km. Milestone, Bhuj - Bhachau Road, Vilage Kaniayabe, Kachohh, Gujarat 370 020, India Tel.: (91-2832) 243700-10 (11 linea), Fax : (91-2832) 243726 / 30. Web : www.amwasia.com Corporate Office : Asia MotorWorks-Ltd. 7th Floor, Tower I, Equinox Business Park, (Peninsula Techno Park) Off Bandra Kurla Road, L.B.S. Marg, Kurla (West) Mumbai - 400 070. Tel.: (91-22) 67101501 / 02 Fax: (91-22) 67101503 / 04





#### ENVIRONMENTAL STATUS REPORT

#### 1.1 Introduction

**M/s Hind Energy & Coal Beneficiation (I) Pvt. Ltd, (HECBIPL)** has been established in the year 2005 when a Coal benefication plant with capacity of 2.4 MTPA and now plant is under commissioning for expansion to **3.6 MTPA**. M/s Hind Energy & Coal Beneficiation (I) Pvt. Ltd is situated in village Hindadih, Tehsil Masturi, District Bilaspur (C.G.)

Coal beneficiation is the process for cleaning & reducing ash content in the coal, thus improving the quality of coal. For this wet type of coal Washery, HECB have obtained environmental clearance vide letter No No. J-11015/364/2009.IA-II(M) dated 21<sup>st</sup> May, 2014.

**M/s Hind Energy & Coal Beneficiation (I) Pvt. Ltd, (HECBIPL)**, awarded the work to M/s Anacon Laboratories Pvt. Ltd. Nagpur (ALPL) for carrying out Environmental monitoring of parameters for assessing pollution levels as per the requirement of State Pollution Control Board (SPCB) and Ministry of Environment and Forest (MoEF).

#### 1.2 Meteorological Data Recorded at IMD, Champa

Secondary information for the meteorological conditions was collected from the nearest IMD station at Champa. Pressure, temperature, relative humidity, rainfall, wind speed and direction are measured twice a day viz., at 0830 and 1730 hr. The meteorological data, rainfall data, climatological data and surface meteorology for the study area collected from IMD Champa for a 30 year period from 1971 to 2000 is presented in Table-1, Table-2 and Table-3 respectively.

#### Analysis of IMD Data Champa

The Indian Meteorological Department records the data twice a day viz. 0830 hr and 1730 hr.

#### • Temperature & Relative Humidity

The winter seasons sets in towards end of November and continues till mid of February. The last week of December to first week of January is the coolest period of the year, with lowest minimum temperature falling as low as  $9.3 \, ^{\circ}$ C or lower. Temperature gradually rises after February. March to June is the summer season. This is also referred to as Pre-monsoon season. During this time the highest maximum temperature may rise to 46.0  $\,^{\circ}$ C. From the post monsoon of October, the mean temperature falls gradually marking the onset of the winter season. The average humidity, during the monsoon season is about 48% – 89%. The humidity in Pre-monsoon (March- May) is about 19-46%. Generally the weather during the other seasons is more or less dry and in the comfortable zone.

#### Rainfall

Annual rainfall of an average is 1236.8 mm. The monsoon starts in end of June and continues till September. The maximum amount of rainfall and maximum rainy days generally occur in July, August and September months (**Table 2**). The rainfall is the highest in the southern parts and decreases gradually towards the northern part of the Barakar catchment.





Month	Pres (hF	sure	Tempe (°	erature C) ean	Relative Humidity (%)		
	08.30	17.30	Max	Min	08.30	17.30	
January	988.6	985.0	30.6	9.3	70	42	
February	986.7	982.9	34.8	10.8	61	34	
March	984.5	980.0	40.1	14.8	46	22	
April	980.5	975.4	44.2	20.3	41	19	
May	976.9	972.0	46.0	23.3	41	22	
June	973.2	969.2	44.7	22.9	64	48	
July	973.7	970.6	35.9	22.5	87	76	
August	974.2	971.1	34.2	22.8	89	78	
September	978.6	975.1	34.6	22.3	87	73	
October	983.7	980.1	34.6	17.6	80	60	
November	987.2	983.6	32.3	13.1	73	47	
December	989.4	985.7	30.2	10.0	72	46	
Range			9.3-	46.0			

#### TABLE – 2: Cloud & Rainfall Data from IMD, champa

		Cloud Cove	Rainfall (mm)			
Month	All C	louds	Low C	Clouds	Monthly Average	
	08.30	17.30	08.30	17.30		
January	1.7	2.0	0.5	0.4	11.6	
February	1.8	2.4	0.7	0.8	17.5	
March	1.6	2.5	0.4	0.6	17.2	
April	1.8	2.9	0.4	0.8	9.6	
May	2.2	3.7	0.2	1.4	14.0	
June	5.4	6.2	2.8	4.1	153.9	
July	7.1	7.2	5.9	6.0	363.9	
August	7.0	7.2	6.0	5.8	363.2	
September	5.4	6.3	4.0	4.5	212.1	
October	2.7	3.7	1.1	1.8	57.9	
November	1.9	2.2	0.5	0.7	9.0	
December	1.8	2.2	0.4	0.5	7.0	
Average					1236.8	





#### Cloud Cover

During winter and summer seasons, it was observed that the sky was very clear. In the summer season, light clouds were observed in the evenings, with no clouds in the mornings. During monsoon season, both in the mornings and evenings the sky was observed to be generally cloudy.

#### • Wind Speed / Direction

Season wise Wind Rose diagrams (IMD, Champa) are shown in Figure-1 and 2.

Season	First Prec Wir			redominant nds	Calm Condition		
	0830	1730	0830	1730	0830	1730	
Pre-Monsoon	Ν	W	E	NW	250/	150/	
Pre-monsoon	22%	27%	12%	20%	25%	15%	
Monsoon	W	W	SW	SW	18%	17%	
WONSOON	34%	25%	17%	21%	10%	1770	
Post-	Ν	N	NW	NW	32%	37%	
Monsoon	42%	32%	11%	9%	32%	31%	
Winter	Ν	N	NW	W	24%	220/	
winter	56%	29%	10%	14%	24%	33%	
Annual	Ν	N	W	W	240/	24%	
Annual	29%	20%	14%	19%	24%	Z4%	

#### TABLE – 3: SUMMARY OF WIND PATTERN – IMD Champa



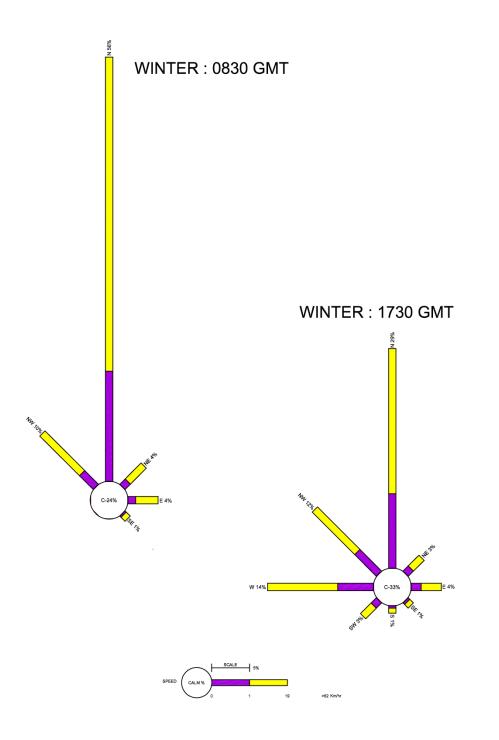


FIGURE - 1 WINDROSE FOR winter season IMD CHAMPA (8.30 HRS AND 17.30 HRS)





Compliance Period: Jan. 2016 – June 2016

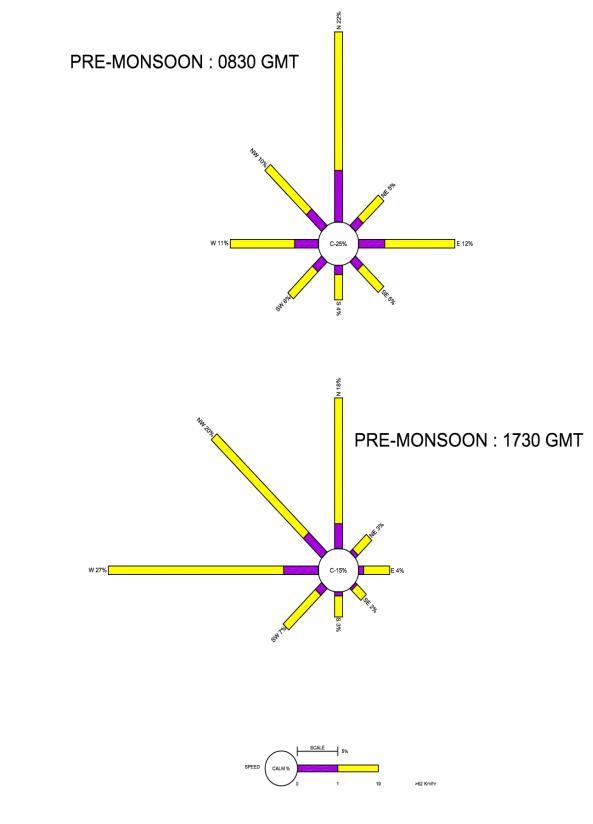


FIGURE- 2 WINDROSE FOR pre-Monsoon IMD Champa (8.30 HRS AND 17.30 HRS)





#### 1.3 Air Quality Monitoring

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

In order to find out the impact of plant activity on sensitive receptors, it is necessary to monitor Environmental Quality to know the level of concentrations of pollutants within and around the plant area. Accordingly Hind Energy & Coal Beneficiation (India) Pvt. Ltd. monitoring air, quality on monthly basis.

#### 1.3.1 Ambient Air Quality Monitoring

Ambient Air Quality was monitored at four locations within plant premises and four locations in nearby villages. Fugitive emissions were monitored at two locations in the plant premises.

The sampling stations are selected at the above mentioned locations, in downwind and upwind directions of the Industry. ALPL is carrying out regular monitoring for, SPM, RPM, SO<sub>2</sub>, NOx and heavy metals at above Ambient Air Quality Monitoring (AAQM) locations. Monitoring of fugitive emissions include parameters SPM, PM<sub>10</sub>, SO<sub>2</sub> & NOx.

#### Frequency of Sampling

Ambient air quality monitoring was carried out on 24 hourly on quarterly basis (once in a quarter) for the monitoring period.

#### **Duration of Sampling**

The duration of sampling for  $PM_{10}$ ,  $PM_{2.5}$ ,  $SO_2$ ,  $NO_x$  and heavy metals is twenty-four hourly. Data is compared with the standards mentioned in the Gazette Notification of the Central Pollution Control Board (CPCB) Notification 16<sup>th</sup> Nov. 2009.

#### Methods and Instruments used for Sampling

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

The levels of Suspended Particulate Matter, Respirable Particulate Matter, Sulphur Dioxide  $(SO_2)$ , Oxides of Nitrogen  $(NO_X)$  & heavy metals were monitored for identifying the impact on surrounding area.  $PM_{10}$  and  $PM_{2.5}$  were collected with the help of Respirable particulate sampler and Fine particulate sampler operating 24 hours and is computed by gravimetric method. Due to the high flow rate of air, the vacuum is formed into the hopper region of sampler which is tapped by providing a nozzle in the hopper which sucks the ambient air for sampling  $SO_2$  and  $NO_X$ . The gases were measured by wet chemical method and were analyzed by colorimetrical. The measurement techniques used for various pollutants and other details are given in **(Table 4)**.





S. No.			Technical Protocol	Minimum Detection limit (µg/m <sup>3</sup> )		
1.	Suspended Particulate Matter, SPM	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part – IV)	5		
2.	Respirable Particulate Matter, PM <sub>10</sub>	Respirable Dust Sampler (Gravimetric Method)	IS-5182 (Part – IV)	5		
3.	Fine Particulate Matter, PM <sub>2.5</sub>	Fine Particulate Sampler (Gravimetric Method)	IS-5182 (Part-IV)	-		
4.	Sulphur Dioxide	Improved West and Geake Method	IS-5182 (Part – II)	4		
5.	Oxide of Nitrogen	Jacob & Hochheiser Modified Method	IS-5182 (Part – VI)	4		
6.	Heavy Metals	Acid digestion	CPCB Guideline (Vol. 1)	0.0001		

#### TABLE - 4: MEASUREMENT TECHNIQUES FOR VARIOUS POLLUTANTS

#### 1.3.2 Ambient Air Quality

The ambient air quality monitoring was carried out at 4 locations in the Plant premises and 4 locations in the nearby villages in upwind, downwind and crosswind directions of the coal washery project. The air quality monitoring was conducted for  $PM_{10}$ ,  $PM_{2.5}$ ,  $SO_2$ ,  $NO_x$  and heavy meals during this monitoring period.

Fugitive emission monitoring was carried out at two locations within the washery premises during this period for the parameters which includes SPM, PM<sub>10</sub>, SO<sub>2</sub> & NOx.

The results of ambient air quality monitoring during this monitoring period are given in **Table 5** and the results of fugitive emission monitoring are given in **Table 6** below:

Overall the ambient air concentrations of  $PM_{10}$ ,  $PM_{2.5}$ ,  $SO_2$ ,  $NO_x$  and heavy meals were observed to be well within the limits of concentrations promulgated by CPCB, New Delhi.

National Ambient Air Quality Standard:

PM<sub>10</sub> (RPM): 100 µg/m<sup>3</sup>,

PM<sub>2.5</sub>: 60 µg/m<sup>3</sup>

 $SO_2$ : 80 µg/m<sup>3</sup> and

NO<sub>x</sub> : 80 μg/m<sup>3</sup>





#### TABLE - 5: AMBIENT AIR QUALITY MONITORING RESULTS FOR THIS MONITORING PERIOD

	(24 Hrs samp	ling)									
SL	Sampling	Sampling	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NOx	Pb	As	Ni	Cd	Cr
No.	Location	Date	µg /m³	μg /m <sup>3</sup>	µg /m³	μg /m <sup>3</sup>	µg /m³	ng /m³	ng /m³	µg /m³	µg /m³
Core	Zone (March 201	6)									
1.	Near Steel Yard	16.03.2016	68.1	26.7	12.5	28.1					
2.	Near Rotary Breaker	16.03.2016	61.3	21.6	15.6	23.9					
3.	Near Dispatch	17.03.2016	56.4	17.3	13.8	18.7					
4.	Near Barrack	17.03.2016	47.1	16.2	14.7	17.4					
Buffe	er Zone (March 2	016)		•							
1.	Bhandrapara Village	18.03.2016	57.7	12.5	7.3	17.9					
2.	Kalichhapar Village	18.03.2016	52.7	15.3	6.1	16.8					
3.	Dhaniya Village	19.03.2016	62.6	22.1	7.2	21.1					
4.	Hindadih Village	19.03.2016	49.1	16.6	7.3	16.9					
Core	Zone (June 2016	)									
1.	Near Steel Yard	27.06.2016	63.1	21.2	14.2	23.2	0.020	ND	0.0075	ND	ND
2.	Near Rotary Breaker	27.06.2016	53.5	15.1	13.9	17.1	0.015	ND	0.0067	ND	ND
3.	Near Dispatch	28.06.2016	63.4	20.2	12.8	24.1	0.019	ND	0.0069	ND	ND
4.	Near Barrack	28.06.2016	66.9	22.6	13.2	21.9	0.018	ND	0.0065	ND	ND
Buffe	er Zone (June 20 <sup>2</sup>	16)		•							
1.	Bhandrapara Village	29.06.2016	47.9	10.7	5.8	12.8	0.018	ND	0.0064	ND	ND
2.	Kalichhapar Village	29.06.2016	53.6	14.1	5.9	17.1	0.014	ND	0.0061	ND	ND
3.	Dhaniya Village	30.06.2016	54.9	19.1	5.5	18.1	0.016	ND	0.0061	ND	ND
4.	Hindadih Village	30.06.2016	47.6	14.1	5.7	15.6	0.015	ND	0.0066	ND	ND
NAA	Q Standards		100	60	80	80					

### TABLE 6: FUGITIVE DUST EMISSION MONITORING RESULT

(24 Hrs sampling)

SL NO.	Sampling Location	Sampling Date	SPM µg /m <sup>3</sup>	RSPM µg /m <sup>3</sup>	SO₂ µg /m³	NO <sub>x</sub> µg /m <sup>3</sup>
	(March 2015)					
1	Near Weight Bridge	16.03.2016	351	107.4	13.8	27.1
2	Near Environment Lab	17.03.2016	217	73.9	8.4	16.8
	(May 2015)			•		•
1	Near Weight Bridge	27.06.2016	281	1115	11.6	29.2
2 Near Environment Lab 28.06.2		28.06.2016	207	71	8.4	19.6
	CPCB Standards	-	100	80	80	

