BHARAT COKING COAL LIMITED
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
BLOCK-II AREA,PO-NAWAGARAH,DHANBAD-828306
CIN:U10101JH1972GO1000918
Tel. No-0326-2393108/Fax No-0326-2393108

Ref: GM/B-II/16-17/ 510 **Date: 11.05.16**

To,
The Director
Ministry of Environment, Forest & CC
Regional Office (ECZ), Bungalow No.-2
Shyamali Colony
Ranchi- 834002

Sub: Six monthly EC compliance reports for the period from October'2015 to March' 16 in respect of Cluster –II group of mines of BCCL.

Ref: EC order no. J/11015/35/2011- IA.II(M) dt. 06/02/2013

Dear Sir,

Kindly find enclosed herewith the Six monthly EC compliance reports for the period from October'2015 to March' 16 in respect of Cluster –II group of mines of BCCL.

Hope you will find the same in order.

Yours faithfully,

Encl: as above

General Manager
Block-II Area

C.C to
1.The Director, 1A monitoring cell, Paryavaran Bhawan CGO Complex, New Delhi-110003
2. Regional Officer, JSPCB, Dhanbad.
3. G.M(Env.) BCCL Koyla Bhawan, Dhanbad.
4. Nodal Officer (Env.) Block-II Area.
5. Nodal Officer (Env.) Barora Area.

ENVIRONMENTAL CLEARANCE COMPLIANCE OF CLUSTER-II MINING AREA OF BCCL
(GRANTED VIDE: J-11015/35/2011-IA II (M) dated 06.02.13
(01.10.15 to 31.03.16)

Sl. no.	A. Specific Conditions by MOEF:	Compliance
i	The maximum production by opencast mining shall not exceed beyond that for which environmental clearance has been granted for the 5 mine of Cluster- II	The production from the Cluster is within limit for which environment clearance has been granted.
ii	The measure to identify in the Environmental Plan for Cluster- II groups of mine and the conditions given in this environmental clearance letter shall be dovetailed to the implementation of the Jharia Action Plan.	Master Plan is dovetailed with environmental clearance condition.
iii	The proponent shall prepare time -series maps of the Jharia Coalfields through NRSA to monitor and prevent fire problems in the Jharia Coalfields by Isothermal mapping /imaging and monitoring temperatures of the coal seams (whether they are close to spontaneous ignition temperatures) and based on which, areas with potential fire problems shall be identified. Measures to prevent ingress of air (Ventilation) in such areas, to prevent restart fresh/spread fires in other areas including in mines of cluster II shall be undertaken. Expertise available internationally could also be utilized for control of fire in Jharia Coalfields and for their reclamation and to further minimize time for fire and subsidence control. Monitoring of fire should be carried out regularly.	A Global EOI was floated to control fire in Jharia Coalfield. None of the bidder qualified. CIMFR, Dhanbad has been requested to take up the study. NRSA has also been contacted to prepapre time-series map for monitoring of fire. NRSA will soon start the work. Fire affected area has been reduced from 9.00 KM^2 to 2.18 KM^2. For further dealing of fire and subsidence action has been taken and working as per the strategic plan of digging out of fiery coal followed by reclamation. Action is being taken as specified in EC and as per Jharia Master Plan. Further fire patches are under operation to dig out the fiery coal and combustible materials to save the coal from burning and to stop further spread of the fire. In Block-ii OCP, CIMFR has been awarded to prepare scheme for dealing of fire near Adra-Gomoh railway line.
iv	Underground mining should be taken up after completion of reclamation of Opencast mine area.	It shall be complied. Presently only Open Cast working is being practiced.
v	The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilized with plantation so as to withstand the peak water flow and prevent mine inundation.	It is being followed. Action for construction of Embankments have been taken as specified in EMP.
vi	The rejects of washeries in Cluster –II should be send to FBC based plant.	No washery at present in cluster.
vii	No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/ check such fire including in old OB dump areas where the fire	It is being complied. Mining is being carried out as per the guidelines of DGMS. In area only Open Cast

	could start due to presence of coal /shale with sufficient carbon content.	working is being practiced, However sufficient precaution is being taken to guard against fire.
viii	There shall be no external OB dumps. OB produce from the whole cluster will be 484.89Mm^3. OB from 3 OCP and 2 patches in mixed mine shall be backfilled. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.	Action is being taken as specified in EMP. At the end of the mining, there shall not be voids and area will be re-vegetated and reclaimed with the proper eco-restroration techniques suggested by the experts available in BCCL and in external agencies i.e. FRI Dehradoon, CEMDE Delhi.
ix	A detailed calendar plan of production with plan for OB dumping and backfilling (for OC mines) and reclamation and final mine closure plan for each mine of cluster-II shall be drawn up and implemented.	Calendar plan has been prepared. Mine closure plan as per the guidelines of Ministry of Coal have been prepared by Central Mine Planning and Design Institute (CMPDI) and it is being implemented
x	Mining shall be carried out as per statute from the streams/nalas flowing within the lease and maintaining a safe distance from the Nalas flowing along the lease boundary. A safety barrier of a minimum 60m width shall be maintained along the nalas/water bodies. The small water bodies in OC shall be protected to the extent feasible and the embankment proposed along water body shall be strengthened with stone pitching taking into account the highest flood level, based on past data, so as to guard against mine inundation. The slope of the embankment shall at least 2:1 towards the ML. The height of the embankment shall be at least 3 m higher than the HFL. The embankment to be constructed by OB /solid waste shall be strengthened with stone pitching. Slope stability of the embankment shall be done by planting suitable grass and shrubs using native species selected from the study area.	It is being followed. Action for construction of embankment has been taken as specified in EMP.
xi	Active OB dumps near water bodies and rivers should be re-handled for backfilling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.	No OB is being dumped near water bodies. The OB dumps created earlier already stabilized & further action has been taken for their eco-restoration work as per Road Map prepared by FRI, Dehradoon.
xii	Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. A total area of 1237.48ha shall be reclaimed and afforested.	It is being complied. Total area of 80.1 ha has been planted. New sites of 52.95 ha is being eco- restored for the financial year 2015-16.
xiii	The road should be provided with avenue plantation on both side as trees act as sink of carbon and other pollutant.	Most of the coal is being transported through railway siding .Road transport is being carried out through existing network of NH/SH where avenue plantation already exist, although proposal for avenue plantation along the sides of approach road to mine is initiated.
xiv	Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action Plan prepared for Dhanbad as a critically polluted are and relevant for Cluster- II shall be implemented.	Dhanbad Action Plan is being implemented. The salient actions of this area: 1. Covered transportation of Coal. 2. Water sprinkling. 3. Plantation. 4. Utilization of surplus mine water.
xv	The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board. The Committee stated that smoke/dust emission vary from source to source (fuel wood, coal, fly ash from TPPs, silica from natural dust, etc) and a Source Apportionment Study should be got carried out for the entire Jharia Coalfields. Mineralogical composition	Establishment of ambient environment quality monitoring stations has been finalized with the consultation of Jharkhand State Pollution Control Board. The work of monitoring of ambient environment was done by Central Institute of Mining & Fuel Research (CIMFR), Dhanbad which is a CSIR laboratory recognized under the EP Rules. Now the monitoring

	study should be undertaken on the composition of the suspended particulate matter (PM_{10} and $PM_{2.5}$) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.	work has been taken up by CMPDIL, Ranchi. Tender for source apportionment study has been cancelled 2 times as no bidder has qualify for the same. Now Proposal is being made for the same study by any government institution.
xvi	The Transportation Plan for conveyor-cum-rail for Cluster-II should be dovetailed with Jharia Action Plan. Road transportation of coal during Phase-I should be by mechanically covered trucks, which should be introduced at the earliest.	Action has been taken for the transportation plan for conveyor cum rail system of dispatch. CMPDIL, RI-II has been requested to conduct study and prepare the plan in this regarding. Conversion of existing truck in to mechanically covered trucks in a phased manner has been taken up. By that time transportation is being done by covering vehicle with tarpaulin cover.
xvii	R&R of 1137 nos of PAF's involved. They should be rehabilitated at cost of Rs 45.08 Crores as per the approved Jharia Action Plan.	Implementation of master plan has already been started through Jharkhand Rehabilitation and Development Authority, Dhanbad and 547 families (Non-BCCL) has been rehabilitated at well-established Jharia Vihar Township located at Belgoria.
xviii	Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be dome four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board/SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.	Groundwater level and quality is being regularly monitored by CMPDIL. The Location and design of Piezometers to be installed have been finalized by CMPDIL . A proposal for award of work of construction of new piezometers has been prepared and scheme has been approved by competent authority. The work will soon be tendered and will start shortly
xix	Regular monitoring of subsidence movement on the surface over and around the working area and impact on natural drainage pattern, water bodies, vegetation, structure, roads, and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate effective corrective measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.	It shall be complied. As the area is having O/C mines, hence no subsidence is there.
xx	Sufficient coal pillars shall be left un extracted around the air shaft (within the subsidence influence area) to protect from any damage from subsidence, if any.	Presently only OCP working exist.
xxi	High root density tree species shall be selected and planted over areas likely to be affected by subsidence.	As the area is having O/C mines, hence no subsidence is there.
xxii	Depression due to subsidence resulting in water accumulating within the low lying areas shall be filled up or drained out by cutting drains.	As the area is having O/C mines, hence no subsidence is there.
xxiii	Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.	As the area is having O/C mines, hence no subsidence is there.
xxiv	No depillaring operation shall be carried out below the township/colony.	Presently only OCP working exist in this cluster.
xxv	A detailed CSR Action Plan shall be prepared for Cluster II croup of mines. Specific activities shall be identified for CSR for the budget of Rs 77.50 Lakhs per year@ Rs 5/T of coal provided for CSR for 2012-2013 and Rs. 5/T of coal as recurring expenditure. The	BCCL is implementing CSR activities, as per Govt. norms with a CSR Committee being evaluated by Tata Institute of Social Science.

	study should be undertaken on the composition of the suspended particulate matter (PM_{10} and $PM_{2.5}$) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.	work has been taken up by CMPDIL, Ranchi. Tender for source apportionment study has been cancelled 2 times as no bidder has qualify for the same. Now Proposal is being made for the same study by any government institution.
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	416.98 ha of area within Cluster II ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. In addition to afforesting 1237.48 ha of area at the post-mining stage, the 122.18ha of fallow/abandoned land and 416.98 ha waste land /barren land within Cluster- II mining lease area shall be rehabilitated/reclaimed as forest/agricultural land under CSR Plan in consultation with local communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the local youth, who are motivated to carry out the work in future.	All welfare/ CSR activities are also uploaded in Company web site.
xxvi	Details of transportation, CSR, R&R and implementation of environmental action plan for the clusters-II should be brought out in a booklet form within a year and regularly updated	Booklet form is being maintained at Company Level.
xxvii	Mine discharge water shall be treated to meet standards prescribed standards before discharge into natural water courses/agriculture. The quality of the water discharged shall be monitored at the outlet points and proper records maintained thereof and uploaded regularly on the company website.	Mine discharge water is being allowed to settle down in the mine sumps and after treatment through Pressure Filter is being used for domestic purpose . Regular monitoring of Water Quality Parameters is being carried out by CMPDIL.
xxviii	No groundwater shall be used for the mining activities. Additional water required, if any, shall be met from mine water or by recycling/reuse of the water from the existing activities and from rainwater harvesting measures. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry to dewatering of mine.	It is being complied and mine water is being used for the industrial purpose. Further mine water is also utilized for the community and irrigation purposes. Following action has been taken by the Company: 1. Utilization of surplus mine water for irrigation, pisciculture purpose.
xxix	The void shall be converted into a water reservoir of a maximum depth of 15-20 m and shall be gently sloped and the upper benches of the reservoir shall be stabilised with plantation and the periphery of the reservoir fenced. The abandoned pits and voids should be backfilled with OB and reclaimed with plantation and or may be used for pisciculture.	. The void will be converted into the water body as specified in EMP at the end of the mining..
xxx	Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be dome four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board/SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.	Groundwater level and quality is being regularly monitored by CMPDIL. The Location and design of Piezometers to be installed have been finalized by CMPDIL. A proposal for award of work of construction of new piezometers has been prepared and scheme has been approved by competent authority. The work will soon be tendered and will start shortly

xxxi	ETP shall also be provided for workshop, and CHP, if any. Effluents shall be treated to confirm to prescribed standards in case discharge into the natural water course.	Oil & grease Trap for workshop is provided
xxxii	The location of monitoring stations in the Jharia coalfield should be finalized in consultation with Jharkhand State Pollution Control Board.	The location of monitoring stations in the Jharia Coalfield has been finalized with the Jharkhand State pollution Control Board.
xxxiii	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneswar.	Presently a time series map of vegetation cover in the Jharia Coal Field is being carried out through CMPDI, Ranchi using satellite imagery for every 3 years & it has been uploaded on the official website of company. Further CMPDI has been requested to prepare "Time series of land use maps based on satellite imagery of the core zone and buffer zone in the scale 1:5000.
xxxiv	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests five year before mine closure for approval. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem, which were conserved in-situ and ex-situ in an identified area within the lease for reintroduction in the mine during mine reclamation and at the post mining stage for habitat restoration.	CMPDI, has prepare the "Final Mine Closure Plan along with a Plan for Habitat Restoration and with details of Corpus Fund". BCCL is being depositing the amount as specified in the mine closure Plan.
xxv	A separate management structure for implementing environment policy and socio-economic issues and the capacity building required in this regard.	A full-fledged Environment Department, headed by a HoD (Environment) along with a suitable qualified multidisciplinary team of executives which includes Environment, Mining, Excavation, Civil, Survey ,Electrical & mechanical, Forestry disciplines executives and technicians has been established in Headquarters. They are also trained in ecological restoration, sustainable development, rainwater harvesting methods etc. At the project level, one Executive in each area has also been nominated as Project Nodal Officer (Environment) and is also entrusted with the responsibility of compliance and observance of the environmental Acts/Laws including environment protection measures .The activities are monitored on regular basis at Area and at Head quarters levels. GM (Environment) at head quarter level, co-ordinates with all the Areas and reports to the Director (Technical) and in turn he reports to the CMD of the company. The team is multidisciplinary and very much motivated under the guidance of company's Director (Technical) and CMD. Further capacity building at both corporate and operating level is being done. Socio economic issues and capacity building are being evaluated by Tata Institute of Social Science.

xxxvi	(A) Corporate Environment Responsibility:	
	a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.	A well defined Corporate Environment Policy has already been laid down and approved by the Board of Directors. This is also posted on BCCL website.
	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.	Complied.
	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.	A hierarchical system of the company to deal with environmental issues from corporate level to mine level already exists.
	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.	Being complied.
B	General Conditions by MOEF:	
i	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	Being complied.
ii	No change in the calendar plan of production for quantum of mineral coal shall be made.	Being complied.
iii	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2 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.	The location of monitoring stations in Jharia Coal Field has been finalized in consultation with the Jharkhand State Pollution Control Board. Ambient air quality is regularly monitored by CMPDIL, Ranchi.
iv	Data on ambient air quality (PM10, $PM_{2.5}$, SO2 and NOx Hg,As,Ni,Cd,Cr and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar 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 recognized under the EPA rules,1986 shall be furnished as part of compliance report.	The monitoring was done by CIMFR, Dhanbad, which is a CSIR laboratory recognized under the EP Rules. Now the monitoring work has been taken up by CMPDIL, Ranchi.
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.	Being Complied. Regular maintenance of vehicles and other machineries are being practiced for control of noise level. Ear plugs/muffs are provided to the persons engaged in blasting and drilling operations, operation of HEMM, etc.
vi	Industrial waste water (workshop and waste water from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and	Excess mine water is being stored at old quarries and ponds for community use. This will help to recharge the ground water.

	grease trap shall be installed before discharge of workshop effluents.	
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.	It shall be complied. Regular maintenance of vehicle is being practiced to kept vehicular emission under control. Coal is being transported in tarpaulin covered trucks.
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 analyzed through a laboratory recognized under EPA Rules, 1986.	It was done through CIMFR having CSIR Laboratory Now the monitoring work has been taken up by CMPDIL, Ranchi.
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.	Being Complied. Vocational training center under separate Human Resource Development Deptt. Is conducting regular training programme on these issues.
x	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.	Initial Medical Examination (IME) and Periodical Medical Examination (PME) of all the personnel are carried out as per the Statutes and Director General of Mines Safety (DGMS) guideline. Medical examination of outsourcing Manpower is also being done.
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.	A full-fledged Environment Department, headed by a HOD (Environment) along with a suitable qualified multidisciplinary team of executives which includes Environment, Mining, Excavation, Civil, Survey ,Electrical & mechanical, Forestry disciplines executives and technicians has been established in Headquarters. They are also trained in ecological restoration, sustainable development, rainwater harvesting methods etc. At the project level, one Executive in each area has also been nominated as Project Nodal Officer (Environment) and is also entrusted with the responsibility of compliance and observance of the environmental Acts/ Laws including environment protection measures .The activities are monitored on regular basis at Area and at Head quarters levels. GM (Environment) at head quarter level, co-ordinates with all the Areas and reports to the Director (Technical) and in turn he reports to the CMD of the company. the team multidisciplinary and very much motivated under the guidance of company's Director (Tech.) and CMD. Further capacity building at both corporate and operating level is being done.
xii	The funds earmarked for environmental protection 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 Regional Office at Bhubaneswar.	It is being complied.
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	It has been complied. Advertisement in local newspaper has been given.

	Environment & Forests at http://envfor.nic.in.	
xiv	A copy of the environmental clearance letter shall be marked to concern Panchayat/ZilaParishad,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.	Being complied. Clearance letter has been displayed on our Company web site.
xv	A copy of the environmental clearance letter 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	Complied .
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_{10}, $PM_{2.5}$, SO_2 and NO_x (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.	Complied.
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 at Bhubaneswar 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.
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.

9/05/16

Nodal Officer
Barora Area

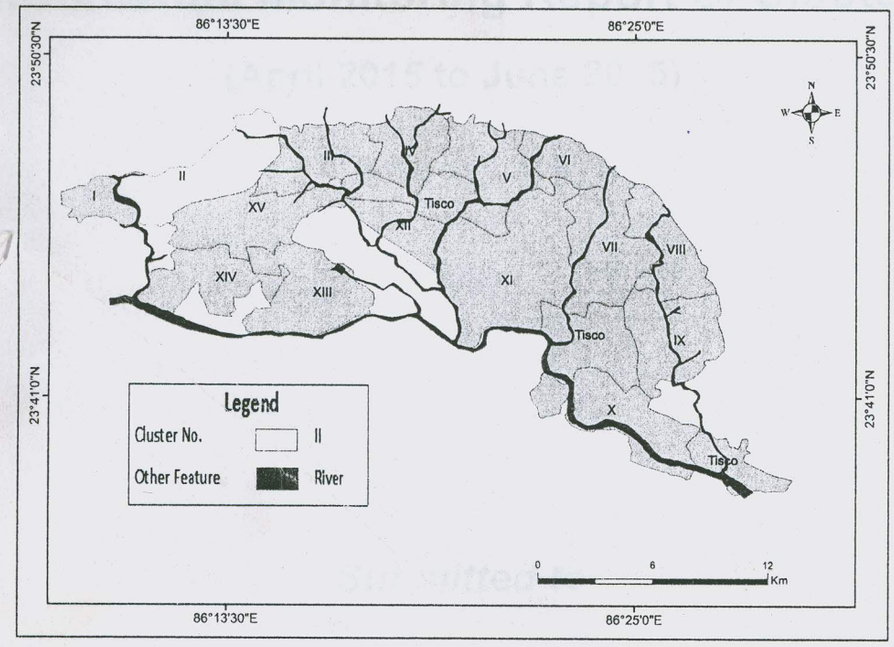
10/5/16

Nodal Officer
Block-II Area

General Manager
Block-II Area

Environmental Monitoring Report of Cluster – II

(April 2015 to June 2015)



Submitted to

Bharat Coking Coal Limited

Koyla Nagar, Dhanbad

Prepared by

Environment Management Group

CSIR-Central Institute of Mining and Fuel Research

(Council of Scientific and Industrial Research)

Barwa Road, Dhanbad 826015

Jharkhand, India

August 2015

Environmental Monitoring Report of Cluster – II

(April 2015 to June 2015)

Submitted to

Bharat Coking Coal Limited
Koyla Nagar, Dhanbad

Project No.: CNP/3937/14 -15

(T. B Singh /Siddharth Singh)
Project Leaders

(K. B. Singh)
HOD & Project Coordinator

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1.0 Introduction

Mining activities like drilling, blasting, excavation, loading/unloading and transportation are often considered to contribute in the environmental pollution of the area. Moreover, the pollution has also been significantly contributed by heavy public traffic, poor road Condition / Kutchha road, coke oven plants, burning of coal by the surrounding habitants, brick making, municipal waste dumps and industries situated in around Jharia Coalfield (JCF) like Steel plant, thermal Plants including their fly ash plant etc. Consequently the health issues of nearby population and ecosystem services may come under stress conditions. Realising the situation, statutory bodies and implementing agencies express their concern by putting conditions of post environmental clearance monitoring of selected environmental parameters.

In order to meet the commitment made to Ministry of Environment and Forest during environmental clearance, Bharat Coking Coal Ltd., Dhanbad awarded the work order to EMG CIMFR, Dhanbad vide letter No. BCCL/GM/(Env.)/F-ENV. Monitoring/2013/1186 Dated 26.10.2013 for environmental monitoring of mines/washeries/units of BCCL as per requirement of environmental Acts, Laws and environmental clearance conditions. As a part of work order the environmental monitoring has been carried out in Pre Monsoon season (April to June 2015) for parameters of Air, Water and Noise in the Cluster -II and covered in this report.

1.1Study Area

Jharia coalfield (JCF) is a part of Gondwana Coalfields and unique in terms of sole repository of precious coking coal in India. Located in Dhanbad district of Jharkhand, the JCF is bounded by 23°37' N to 23°52'N latitudes and 86°09'E to 86°30'E longitude occupying an area of 450 km^2. The cluster – II is in the western part of the Jharia coalfield and situated in the Block-II area and Barora area of BCCL. It includes Block II OCP, Block II UG, Jamunia OCP, Phulari Tand OCP, Muraidih OCP and Shatabdi OCP mines. The aerial distance of Cluster-II from Dhanbad Railway Station is about 20-25 km in the west. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Khudia Nala.

1.2 Climate of the area

The area is having tropical climate and is characterized by very hot summer and cold winters. Among summer (March to June) months, May and June are very hot. The temperature in the cold weather months (November to February) varies from lowest minimum of 8.3° C to the highest maximum of 34.4°C. During summer months March to June it varies from the lowest minimum of 13.3°C to the highest maximum of 45.0°C. During the remaining months, July to October, the rainy season, the temperature varies from the lowest minimum 15°C to 36°C. Relative humidity (RH) is high in the rainy days being about 94% in June and low in the month of May which about 36%. Thunder storms usually occur in the month of April, May and June accompanied by temporary fall in temperature by few degrees. The area receives annual rainfall of about 1100-1200 mm, out of which 75-80% of the annual rainfall occurs during the three months of June to September with smaller amounts during winter months.

2.0 Air Environment

2.1 Micro-Meteorology

Micro-meteorological properties of the atmosphere, govern the concentration of pollutants and its variation with time and location, with respect to the emission source of various industries and different human activities in and around Jharia Coalfield (JCF). The severity of the pollution depends on the various meteorological variables. This includes wind speed and direction, humidity, air temperature, atmospheric diffusion, and mixing height.

2.2 Air Quality

To know the air quality of the area different air quality monitoring stations have been fixed by BCCL in consultation of Jharkhand pollution control Board, Govt. of Jharkhand, considering cluster as a whole and not the individual mines. Sampling and analysis have been carried out for the quarter April to June 2015 on these locations. The details of the study including results are discussed below

2.2.1 Sampling and Analysis

Total four sampling stations have been selected for air quality monitoring on the basis of wind direction and other meteorological parameters. Two air sampling location have been identified in core zone and remaining two in the buffer zone. Details of sampling stations along with the source of air pollution are given in **Table 1.** The parameters monitored are $PM_{2.5}$, PM_{10}, sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). The sampling locations of air are depicted in **Figure 1.** Methods and instruments used for air pollutant analysis are given in **Table 2.**

Table 1: Details of Air Sampling Locations of Cluster II

Station Code	Location	Latitude & Longitude	Source of Air Pollution
Core Zone			
A 4	Block II OCP	23°47.297'N 86°12.290'E	Pollution is a consequence of Mining activities, poor roads condition, heavy public traffic, coke oven plants, burning of coal by the surrounding habitants, other major industries situated in and around Jharia Coalfield (JCF) like Steel plant, thermal Plants etc (List of Industries within Jharia Coalfield (JCF) is enclosed).
A5	Nico Plant	23°47.956'N 86°13.667'E	
Buffer Zone			
A 3	Project Office Block II	23°46.744'N 86°11.805'E	
A 33	Madhuband UGP office	23°45'24.48"N 86°11'59.44"E	

Table 2: Methodology and Instrument Used for Air Quality Analysis

Parameter	Method	Instrument
$PM_{2.5}$	Gravimetric Method	Fine Particulate Sampler
PM_{10}	Gravimetric Method	Respirable Dust Sampler (RDS)
SO_2	IS-5182 Part II (Improved West &Gaeke method)	Fine Particulate Sampler with gaseous attachment
NO_2	IS-5182 Part II (Jacob &Hochheiser modified method)	Fine Particulate Sampler with gaseous attachment

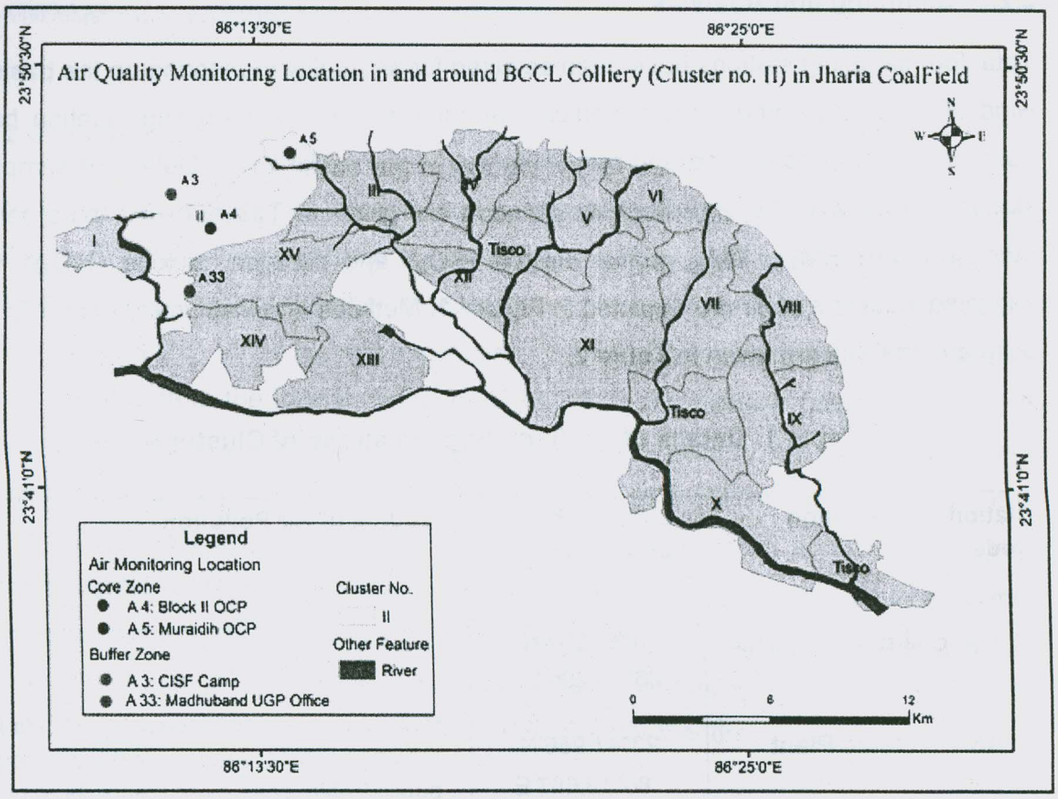

Figure 1: Location of Air Monitoring Stations in Cluster - II

2.2.2 Sampling and Methodology

At each monitoring stations, samples were collected twice a Month for three months. Twenty four hourly sampling has been done for measuring $PM_{2.5}$, PM_{10}, SO_2, NO_2 as per the work order and CPCB guidelines.

2.2.3 Results and Discussions

The results of air quality monitoring of four locations in Cluster II are summarized in **Table 3.** Air quality monitored data for the mines of Cluster - II show that in the core zone $PM_{2.5}$ value ranges from 49 to 107 $\mu g/m^3$ with an average value of 73.08 $\mu g/m^3$. The PM_{10} value ranges from 94 to 221 $\mu g/m^3$ and average value is 145.08 $\mu g/m^3$. Similarly SO_2 values are ranging from 14 to 47 $\mu g/m^3$ against the permissible limit of 80 $\mu g/m^3$ and NO_2 values range from 28 to 69 $\mu g/m^3$ against the permissible limit of 80 $\mu g/m^3$.

Table 3: Ambient Air Quality data

(April 2015 to June 2015)

Location	Month	Date of sampling	Parameters (µg/m^3)				
			PM_{10}	$PM_{2.5}$	NO_2	SO_2	Remarks
Core Zone							
Block II OCP A 4	April	02-04-2015	165	95	52	44	Sunny
		25-04-2015	94	52	42	22	Rainy
	May	08-05-2015	140	82	40	39	Sunny
		29-05-2015	144	49	64	14	Sunny
	June	11-06-2015	151	69	31	24	Cloudy
		23-06-2015	107	56	28	23	Rainy
Nico plant A 5	April	10-04-2015	192	93	31	22	Sunny
		27-04-2015	106	76	44	26	Rainy
	May	09-05-2015	221	107	67	47	Sunny
		01-06-2015	134	56	37	18	Cloudy/Sunn
	June	12-06-2015	98	54	34	25	Heavy Rain
		23-06-2015	189	88	69	44	Rainy
Buffer Zone							
Project Office Block II A 3	April	07-04-2015	142	67	40	29	Sunny
		24-04-2015	159	92	37	23	Rainy
	May	07-05-2015	150	59	36	23	Sunny
		28-05-2015	164	52	34	29	Sunny/Cloud
	June	12-06-2015	218	115	60	46	Sunny
		24-06-2015	54	28	10	10	Rainy
Madhuband UGP office A 33	April	07-04-2015	48	31	49	55	Rainy
	May	01-05-2015	113	57	67	37	Sunny
		13-05-2015	137	21	67	51	Sunny
		23-05-2015	61	31	57	60	Sunny
	June	01-06-2015	211	85	66	58	Sunny
		16-06-2015	62	40	80	58	Sunny

Note :

1. The standard notified vide G.S.R. 742(E) dated 25.9.2000 under Environment (Protection) Amendment Rules 2000 for the coal mining Area is not withdrawn yet and are applicable for the coalfields - Annexure-1
2. National Ambient Air Quality Standards (NAAQS) as per MoEF Notification on 16th November, 2009 - Annexure-2

In the buffer zone, air quality monitoring data shows that the $PM_{2.5}$ value ranges from 21 to 115 µg/m^3 with an average value of 56.5 µg/m^3. The concentration of PM_{10} ranges from 48 to 218 with an average value of 126.58 µg/m^3. SO_2 concentration ranges from 10 to 60 µg/m^3 and NO_2 values from 10 to 80 µg/m^3 against the permissible limit of 80 µg/m^3 each. The relatively observed higher values of $PM_{2.5}$ and PM_{10} at Nico Office(A5) may be attributed to its vicinity to the active coal mine site,

heavy transportation and washery installation.

2.2.4 Probable Cause of Pollution

The probable reason for the monitored and analyzed pollution level includes, apart from ongoing coal mining activity, other industries, and human activities sources like plying of public transportation and conveyance on poor/damaged/katchcha roads (other than the mine haul road which are water sprinkled adequately on regular basis).

Major reason attributed to:

i. Background Levels of pollution are high due to age old mining activity continuing since 100 years or more.
ii. Thickly populated area, high traffic density and poorly maintained road networks.
iii. Domestic coal burning is prevalent in the area.

2.2.5 Recommendations

- Source Apportionment Study: Pollution inventory of different sources within the area apart from the coal mining of BCCL has to be carried out for actual assessment of pollution load by mining of BCCL.
- Dense three stage of plantation with broader leaves all around the cluster boundary
- Avenue plantation along the periphery of the road.
- All bare OB dumps should be covered by plantation and initially by suitable grass species (species of dry and arid area)
- Water sprinkling on haul roads and transportation roads specially in winter and summer months
- Regular maintenance of transport roads and vehicles.

3.0 Water Environment

3.1 Water Quality Assessment

Four water samples comprising two from surface water, one from ground water and one from effluents water resources were collected in April 2015 to assess the water quality of the Cluster-II mining area of BCCL (**Table 4 & Figure 2**). Samples were preserved immediately after collection for the analysis of various water quality parameters. The samples were preserved for trace metals analysis by adding 2ml of 6N HNO_3 to 100ml of sample.Testing of water samples were done as per standard methods described in

Standard Methods of Analysis of Effluents Water Samples, Part A Schedule VI, 1993. Standard method for the examination of water and wastewater, published jointly by APHA, AWWS and WPCF and Manual on Water and Wastewater analysis by NEERI were followed. pH, temperature, conductivity, total dissolved solids and dissolved oxygen (DO) of the water samples were measured in the field itself using Water Analyzer Kit. Heavy metal analysis was carried out by ICP MS (Perkin Elmer). Results are summarized in **Table 5-7.**

Table 4: Sampling locations for water quality monitoring in cluster – II

Sl. No.	Location Name	Location Code	Latitude	Longitude
Surface Water				
1	Khudia Nala U/S	SW 3	23°48.404'N	086°13.774'E
2	Khudia Nala D/S	SW 4	23°47.852'N	086°15.264'E
Groundwater				
3	Joyrampur Village	GW2	23°47.539'N	086°12.486'E
Mine Water				
4	Block II Ocp	MW2	23°46.224'N	086°12.192'E

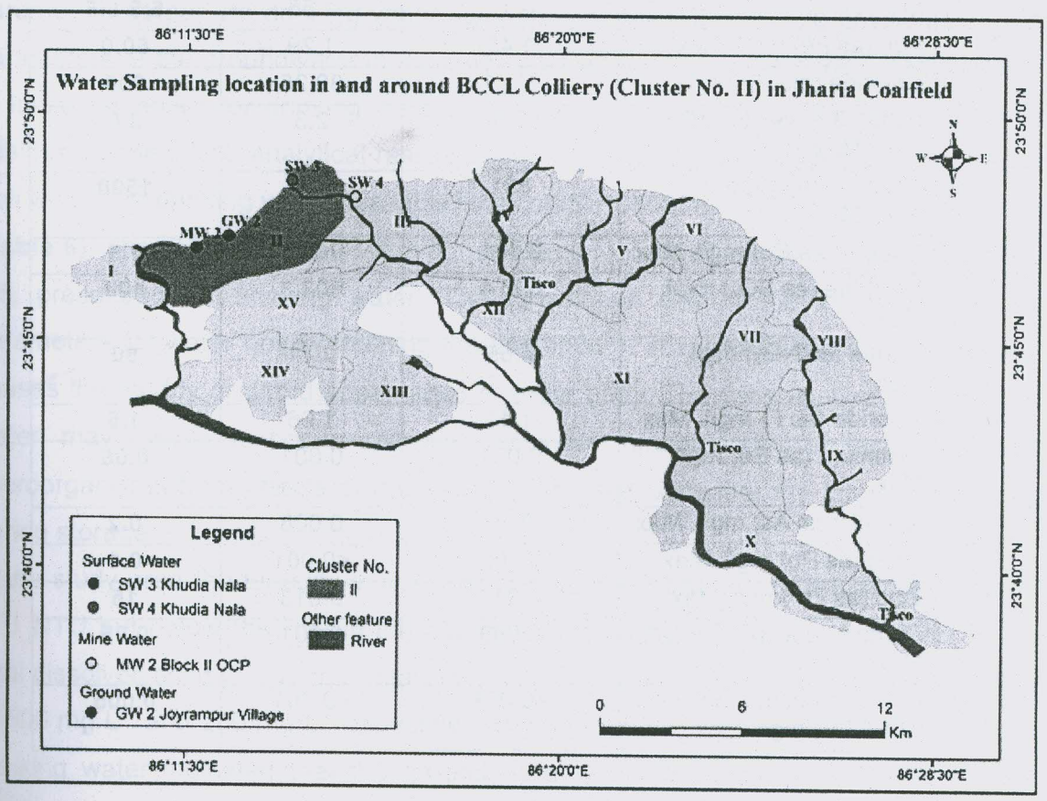

Figure 2: Location of Water monitoring stations in Cluster- II

3.2 Results and Discussion

The physico-chemical characteristics of the analysed surface water, groundwater and effluent water is presented in **Tables 5, 6 and 7** along with the prescribed standards. The water quality of the area is discussed in the following paragraphs.

3.2.1 Surface Water Quality

The analytical results of physico-chemical analysis of two surface water samples collected from upstream and downstream of Khudia Nala is given in **Table - 5**.

Table 5: Physico-chemical characteristics of Surface water

S.N.	Parameter and Unit	Sampling Stations & Date		Inland Surface water IS: 2296 (1982)
		SW-3 Khudia Nala U/S 09/04/2015	SW-4 Khudia Nala D/S 09/04/2015	
1.	Color	colourless	colourless	**300**
2.	DO (mg/l)	3.4	3.1	**4.0**
3.	pH	8.11	7.55	**6.5-8.5**
4.	Iron (as Fe) mg/l, Max	1.45	1.29	**50.0**
5.	Chloride (as Cl) (mg/l)	27.12	30.25	**600**
6.	BOD (3 days at 27°C) mg/l, Max	2.6	2.3	**3.0**
7.	Total Dissolve Solids mg/l, Max	891	896	**1500**
8.	Copper(as Cu) mg/l, Max	0.001	0.001	**1.5**
9.	Sulphate (as SO_4) mg/l, Max	590.4	608.7	**400**
10.	Nitrate (as NO_3) mg/l, Max	2.65	0.71	**50**
11.	Fluoride (as F) mg/l, Max	1.41	1.66	**1.5**
12.	Selenium (as Se) mg/l, Max	0.001	0.001	**0.05**
13.	Arsenic(as As) mg/l, Max	0.05	0.008	**0.2**
14.	Lead (as Pb) mg/l, Max	0.002	<0.001	**0.1**
15.	Zinc (as Zn)mg/l, Max	0.013	0.013	**15**
16.	Chromium as (Cr^{+6})mg/l, Max	0.003	0.001	**0.05**
17.	Phenolic compounds (as C6H5OH) mg/l, Max	<0.001	<0.001	**0.005**

To assess the quality of the surface water source, the results have been compared with the prescribed surface water standards IS-2296 for Class 'C' water (tolerance limits for stream water used drinking water sources with conventional treatment followed by disinfection).

It is observed that the pH of the water is neutral to slightly alkaline in nature and found well within the prescribed limit of 6.5-8.5. The concentrations of total dissolved solids (TDS) are found well within the threshold value of 1500 mgL-1. The concentrations of other analysed parameters are also found well within the threshold values. The concentration of the heavy metals in the surface water e is found within the prescribed limits. It shows that the surface water of the area is suitable for its designated use as a drinking water source with conventional treatment followed by disinfection.

3.2.2 Drinking Water Quality Assessment

To assess the quality of drinking water in Cluster –II area , one ground water was collected from hand pump at Joyrampur village in April 2015 and analyzed for parameters as per the drinking water standard (IS:10500,2012). The physico-chemical parameters of the groundwater in the study area are compared with the prescribed limit of Indian standard for drinking water to assess the suitability for drinking and public health purposes. The analytical results show the most of the analysed parameters are well within the drinking water desirable limits of IS: 10500 and water is potable in nature (**Table 6**). The pH of the analysed groundwater is found well within the safe limit of 6.5-8.5, prescribed for drinking water. The turbidity is one of the important physical parameters for water quality defining the presence of suspended solids in water much causes the muddy or turbid appearance of water body. The consumption of high turbid water may cause a health risk as excessive turbidity can protect pathogenic microorganisms from effects of disinfectants and also stimulate the growth of bacteria during storage.

In the study area the turbidity in the groundwater are found above the acceptable limit of 1 NTU but below the limit in the absence of alternate source value of 5 NTU. The total dissolved solid (TDS) and Total Hardness (TH) values are within the desirable limit of 500 mg L^{-1} and 200 mg L^{-1}respectively in the ground water sample. MPN analysis of drinking water indicated that the ground water was not contaminated. Heavy metal analysis in the groundwater samples indicated that the analyzed heavy metals like As,

Cr, Pb,Cu, Se, Zn, B and Mn are found below the acceptable limit prescribed for drinking water under IS-10500. Concentration of Iron in groundwater (1.1 mg L^{-1}) exceeds the prescribed limit of drinking water of 0.3 mg L^{-1}.

Table 6: Physico-chemical characteristics of Groundwater (Drinking Water)

Sl. No.	Parameter	Sampling Station & Date	Drinking water IS: 10500 (2012)	
		GW 2 Joyrampur Village	Requirement (Acceptable Limits)	Permissible Limit in the Absence of Alternate Source
	Date	08.04.2015		
1.	Colour, Hazen units	1	5	15
2.	Odor	Odourless	Agreeable	Agreeable
3.	Taste	Agreeable	Agreeable	Agreeable
4.	Turbidity NTU Max	1	1	5
5.	pH	6.75	6.5-8.5	No relaxation
6.	Alkalinity as CaCO3 (mg/l)	138	200	600
7.	Total Hardness as CaCO3 (mg/l)	243	200	600
8.	Iron as Fe (mg/l)	1.9	0.3	No relaxation
9.	Chloride Cl (mg/l)	101.2	250	1000
10.	Total Residual chlorine	0.19	0.2	1.0
11.	Total Dissolve Solids (mg/l)	797	500	2000
12.	Calcium as Ca (mg/l)	126	75	200
13.	Copper as Cu (mg/l)	0.009	0.05	1.5
14.	Manganese as Mn (mg/l)	0.2	0.1	0.3
15.	Sulphate as SO_4 (mg/l)	130.9	200	400
16.	Nitrate as NO_3 (mg/l)	154	45	No relaxation
17.	Fluoride as F(mg/l)	0.9	1.0	1.5
18.	Selenium as Se (mg/l)	0.002	0.01	No relaxation
19.	Arsenic as As (mg/l)	0.01	0.05	No relaxation
20.	Lead as Pb (mg/l)	0.08	0.1	No relaxation
21.	Zinc as Zn (mg/l)	7.41	5.0	15
22.	Chromium as Cr^{+6} (mg/l	0.01	0.05	No relaxation
23.	Coliform bacteria in 100ml	nil	nil	No relaxation
24.	Boron as B (mg/l)	<0.001	0.5	1.0
25.	Phenolic Compounds	<0.001	0.001	0.002

3.2.3 Effluent Water Quality

Mine water of Block II OCP was collected to assess the effluent water quality in the cluster II area. The analytical result is compared with the effluent water quality standard as per the IS-2490 and presented in **Table 7**.

Table 7: Physico-Chemical Characteristics of Effluent discharge (Mine water)

Sl. No.	Parameter	Sampling Station & Date	Effluent discharge into Inland Surface water IS:2490 (1981)
		MW 2 Block II OCP 08/04/2015	
1.	Colour, Hazen units	1	
2.	Odor	Unobjectionable	Unobjectionable
3.	Total Suspended Solids mg/l, max	52.1	100.0
4.	pH value	7.72	5.5-9.0
5.	Temperature °C	29.2°C	Shall not exceed 5 °C above the receiving water temperature
6.	Oil & Grease(mg/l max)	4.1	10.0
7.	Total Residual Chlorine (mg/l max))	0.38	1.0
8.	Ammonical nitrogen (as N), mg/l max	5.4	50.0
9.	Kjeldahl nitrogen (as N),mg/l max.	9.4	50.0
10.	Free ammonia (as NH_3), mg/l	1.2	5.0
11.	Biological Oxygen Demand BOD (3 days at 27°C), mg/l max	5.3	30.0
12.	Chemical Oxygen Demand (COD), mg/l max	50.4	250.0
13.	Arsenic (as As), mg/l max.	0.048	0.2
14.	Lead(as Pb), mg/l	<0.001	0.1
15.	Hexavalent chromium (as Cr^{+6}), mg/l max.	0.001	0.1
16.	Total Chromium(as Cr) (mg/l)	0.002	2.0
17.	Copper As Cu (mg/l)	0.001	3.0
18.	Zinc (as Zn) mg/l	0.025	5.0
19.	Selenium(as Se) mg/L max	0.004	0.05
20.	Nickel (as Ni) mg/l max	0.014	3.0
21.	Fluoride (as F) mg/l max	2.75	2.0
22.	Total Dissolved Solids mg/l max	1303	2100
23.	Sulphide (as S), mg/l max	0.48	2.0
24.	Phenolic compound (as C_6H_5OH)	<0.001	1.0
25.	Manganese (as Mn), mg/l max	0.003	2.0
26.	Iron (as Fe)mg/l max	1.96	3.0
27.	Nitrate as N (mg/l)	4.42	10.0

The mine water effluent is found slightly alkaline in nature and measured pH is found well within the prescribed limit of 5.5 to 9.0 as per IS-2490. A total dissolved solid (TDS) in the mine water is also found below the recommended limit of 2100 mg L^{-1}. The concentration of total suspended solid (TSS) in the mine water of Block II OCP is found 52.1 mg L^{-1}, below the permissible limit of 100 mg L^{-1}. Heavy metal analysis in the mine water indicate that all the analyzed heavy metals like As, Pb, Cr, Cu, Zn, Se, Ni, Fe and Mn are found below the acceptable limit prescribed for effluent water under IS:2490.

Block II OCP mine water was also collected fortnightly from the month of April to June 2015 to assess the effluent water quality on the basis of four prescribed parameters. The analytical results are compared with the effluent water quality standard as per the IS-2490 and presented in **Table 8**. The mine water is found neutral to slightly alkaline in nature and measured pH value is well within the prescribed limit of 5.5 to 9.0. Total suspended solid concentration (TSS) in the mine water is also found below the recommended limit of 100 mg L^{-1}. The concentration of oil and grease is found below the recommended limit of 10 mg L^{-1}.

Table 8: Effluent (Mine water) characteristics
(January 2015 to March 2015)

Sl. No.	Parameter	Sampling Station & Date						Effluent discharge into Inland Surface water IS:2490(1981)
		MW 2 Block II OCP						
		April		May		June		
		08/04/15	24/04/15	08/05/15	29/05/15	11/06/15	26/06/15	
1.	pH	7.72	7.28	7.53	7.64	7.72	7.53	5.5-9.0
2.	TSS(mg/l)	52.1	54.2	50.8	51.1	54.8	53.4	100.0
3.	Oil & Grease (mg/l)	4.1	4.3	3.9	4.2	4.4	3.8	10.0
4.	COD(mg/l)	50.4	53	51.6	52.8	51.9	52.2	250.0

4.0 Noise Environment

4.1 Instrument Used And Methodology

Noise level study has been done for monitoring the ambient noise level in the core and buffer zone. Sound level meter SL-4001 meeting IEC-197 A was used to measure the noise level. Average day and night Leq values have been assessed at each location for four hours duration both during day and night time with the interval of 30 minutes.

4.2 Noise Standards

Central Pollution Control Board has stipulated some specific standard for ambient noise-level in industrial, commercial, residential and silence zones for both day and night time. These are given in **Table 9.**

Table 9: Ambient Noise Standard

S.N.	Location	Noise Level [Leq in dB(A)]	
		Day Time	Night Time
I.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Residential Area	55	45
4.	Silence Zone	50	40

4.3. Assessment of Noise Level

To assess the ambient noise level, measurements have been carried out at 4 sites, which are listed in **Table 10 and Figure 3.**

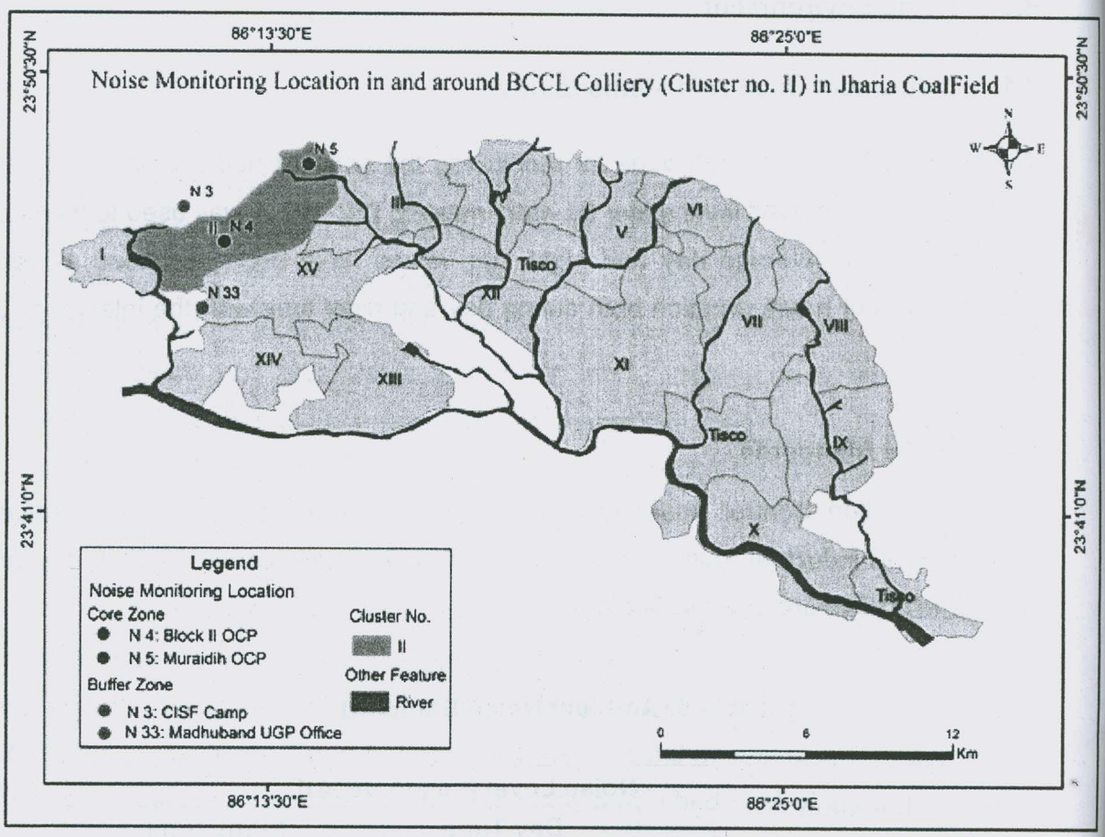

Figure 3: Location of Noise Monitoring in Cluster II

4.4. Results and Discussions

Noise, often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, disturb sleep thus deteriorating quality of human environment. Noise level was measured at several locations in the human settlements around the proposed mining site by using precision noise level meter. The result along with monitored location is given in **Table 10.**

Table 10: Noise Level measurements
(April 2015 to June 2015)

Location ID	Location Name with Latitude & Longitude	Date	Noise level dB(A) average	
			Day	Night
Core Zone				
N 4	**Block II OCP** 23°47.297'N 86°12.290'E	02-04-2015	69	54
		25-04-2015	68	52
		08-05-2015	71	54
		29-05-2015	70	53
		11-06-2015	67	52
		23-06-2015	66	51
N 5	**Nico plant** 23°47.956'N 86°13.667'E	10-04-2015	54	44
		27-04-2015	54	48
		09-05-2015	56	46
		01-06-2015	57	50
		12-06-2015	56	49
		23-06-2015	56	50
Buffer Zone				
N 3	**Project Office Block II** 23°46.744'N 86°11.805'E	07-04-2015	58	47
		24-04-2015	61	51
		07-05-2015	61	52
		25-06-2015	63	49
		12-06-2015	59	53
		24-06-2015	57	49
N 33	**Madhuband UGP office** 23°45.408'N 86°11.940'E	07-04-2015	55	57
		01-05-2015	57	58
		13-05-2015	56	57
		23-05-2015	58	55
		01-06-2015	56	56
		16-06-2015	53	55

Detailed analysis of noise has revealed that there is no noticeable impact of noise in the surrounding environment. All the study sites in the residential areas exhibited a noise level well within the corresponding threshold limit value as prescribed by CPCB, both during the day and night time. At Block II OCP the noise level is relatively higher as compared to the other sites. It is mainly due to proximity of haul road, washery installation nearby the monitoring site.

Annexure-1
Ambient Air Quality Standard

494 *The Environment (Protection) Rules, 1986*

[1][90. STANDARDS FOR COAL MINES

1. AIR QUALITY STANDARDS

The Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NOx) concentration in downwind direction considering predominant wind direction, at a distance of 500 metres from the following dust generating sources shall not exceed the standards specified in the Tables I, II and III given below:

Dust Generating Sources

Loading or unloading, Haul road, coal transportation road, Coal handling plant (CHP), Railway sliding, Blasting, Drilling, Overburden dumps, or any other dust generating external sources like coke ovens (hard as well as soft), briquette industry, nearby road etc.

Table-I

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
I New Coal Mines (Coal Mines commenced operation after the date of publication of this notification)	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	360 µg/m^3 500 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1 m^3/min)
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	180 µg/m^3 250 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	- Improved west and Gaeke method - Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	- Jacob & Hochheiser Modified (Na-Arsenic) Method - Gas phase Chemiluminescence

[1] Serial No.90 to 93 and entries relating thereto were inserted by Rule 2(1) of the Environment (Protection) Amendment Rules, 2000 notified vide notification G.S.R. 742(E), dated 25.9.2000.

Table-II

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
II Existing coal fields/mines given below: Karanpura, Ramgarh, Giridih, Rajhara, Wardha, Nagpur, Silewara, Pench Kanhan, Patharkhera, Umrer, Korba, Chirimiri, Central India Coalfields, (including Baikunthpur, Bisrampur), Singrauli, Ib Valley, Talcher, Godavary Valley and any other	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	430 µg/m^3 600 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1 m^3/minute)
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	215 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Improved west and Gaeke method 2. Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Table-III

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
III Coal mines located in the coal fields of • Jharia • Raniganj • Bokaro	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	500 µg/m^3 700 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1 m^3/minute)
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	250 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1.Improved west and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Note:

* Annual Arithmetic mean for the measurements taken in a year, following the guidelines for frequency of sampling laid down in clause 2.

** 24 hourly / 8 hourly values shall be met 92% of the time in a year. However, 8% of the time it may exceed but not on two consecutive days.

Unauthorised construction shall not be taken as a reference of nearest residential or commercial place for monitoring.

In case any residential or commercial or industrial place falls within 500 metres of any dust generating sources, the National Ambient Air Quality Standards notified under schedule VII shall be applicable.

2. FREQUENCY OF SAMPLING

– Air quality monitoring at a frequency of once in a fortnight at the dust generating sources given in clause 1 shall be carried out.

– As a result of monthly monitoring, if it is found that the value of the pollutant is less than 50% of the specified standards for three consecutive months, then the sampling frequency may be shifted to two days in a quarter year (3 months).

– In case, the value has exceeded the specified standards, the air quality sampling shall be done twice a week. If the results of four consecutive weeks indicate that the concentration of pollutants is within the specified standards, then fortnight monitoring may be reverted to.

3. EFFLUENT STANDARDS

The standards for effluent discharge into sewer or stream or land, are given below:

pH	–	5.5 to 9.0
Chemical Oxygen Demand (COD)	–	250 mg/l
Total Suspended Solids (TSS)	–	100 mg/l 200 mg/l (Land for irrigation)
Oil & Grease (O & G)	–	10 mg/l

(Monitoring frequency of these parameters shall be once in a fortnight)

Optional parameters : All other parameters indicated in the general standards for discharge of environment pollutants under Schedule VI, shall be in addition to the effluent standards specified under clause 3. (Monitoring frequency shall be once in a year for the optional parameters)

4. NOISE LEVEL STANDARDS

	6.00 AM – 10.00 PM	10.00 PM – 6.00 AM
Noise level	Leq 75 dB(A)	Leq 70 dB(A)

(Monitoring frequency for noise level shall be once in a fortnight)
Occupational exposure limit of noise specified by Director General of Mines Safety (DGMS) shall be complied with by the local mines.

Annexure – 2

National Ambient Air Quality Standards (NAAQS)
(As per MoEF Notification on 16th November, 2009)

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial, Residential, rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulpher Dioxide (SO_2), µg/m^3	Annual* 24 hours**	50 80	20 80	- Improved West and Gaeke - Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m^3	Annual* 24 hours**	40 80	30 80	-Modified Jacob &Hochheiser (Na-Arsenite) -Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM_{10} µg/m^3	Annual* 24 hours**	60 100	60 100	-Gravimetric -TOEM - Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM_2 µg/m^3	Annual* 24 hours**	40 60	40 60	-Gravimetric -TOEM - Beta attenuation
5	Ozone (O_3) µg/m^3	8 Hour ** 1 hours**	100 180	100 180	UV photometsic -Chemiluminescence Chemical Method
6	Lead (Pb) µg/m^3	Annual* 24 hours**	0.50 1.0	0.50 1.0	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/m^3	8 Hour ** 1 hours**	02 04	02 04	- Non Dispersive Infra Red (NDIR) spectroscopy
8	Ammonia (NH3) µg/m^3	Annual* 24 hours**	100 400	100 400	- Chemiluminescence - Indephenol blue method
9	Benzene (C_6H_6) µg/m^3	Annual *	05	05	- Gas chromatography based continuous analyzer - Adsorption and desorption followed by GC Analysis
10	Benzo (O) Pyrene (BaP) Particulate phase only, µg/m^3	Annual *	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic(As), µg/m^3	Annual*	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel(Ni), µg/m^3	Annual*	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note – Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limit specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation

Note : The notification on National ambient Air Quality Standards were published by the Central Pollution Control Board in the gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April 1994 and S.O. 935(E), dated 14th October 1998.

Annexure – 3

IS Standard for Surface Water

S.N.	Parameter and Unit	IS:2296(1982)
1.	Odour	--
2.	Colour (True) (Hazen unit)	300
3.	pH (max) (min : 6.5)	8.5
4.	Conductivity (25°C) µS/cm	--
5.	DO (mg/L) (minimum)	4
6.	BOD (3d, 27oC) (mg/L)	3
7.	Total Coliforms (MPN/100 mL)	5000
8.	Total Dissolved Solids (mg/L)	1500
9.	Oil and Grease (mg/L)	0.1
10.	Mineral oil (mg/L)	--
11.	Total Hardness (mg/L as $CaCO_3$)	--
12.	Chlorides (mg/L as Cl)	600
13.	*Sulfates (mg/L as SO_4)*	*400*
14.	Nitrates (mg/L as NO_3)	50
15.	Free CO_2 (mg/L)	--
16.	Free NH_3 (mg/L as N)	--
17.	Fluorides (mg/L as F)	1.5
18.	Calcium (mg/L)	--
19.	Magnesium (mg/L)	--
20.	Copper (mg/L)	1.5
21.	Iron (mg/L)	50
22.	Manganese (mg/L)	--
23.	Zinc (mg/L)	15
24.	Boron (mg/L as B)	--
25.	Barium (mg/L)	--
26.	Silver (mg/L)	--
27.	Arsenic Total (mg/L)	0.2
28.	Mercury (mg/L)	--
29.	Lead (mg/L)	0.1
30.	Cadmium (mg/L)	0.01
31.	Chromium (VI) (mg/L)	0.05
32.	Selenium (mg/L)	0.05
33.	Cyanide (mg/L)	0.05
34.	Phenols (mg/L)	0.005
35.	Anionic detergents (mg/L as MBAS)	1
36.	PAH (mg/L)	--
37.	Pesticides (ug/L)	--
38.	Percent Sodium (%)	--
39.	Sodium Absorption Ratio (SAR)	--

Note: ND=Not Detected, BDL: Below detection limit

Annexure – 4

IS Standard for Ground water

S.N.	*Parameters*	*IS: 10500(2012)*
1.	Colour, Hazen units	5
2.	Odour	Un-objectionable
3.	Taste	Agreeable
4.	Turbidity NTU Max	5
5.	Dissolved Solids mg/l, Max	500
6.	pH Value	6. 5 to 8. 5
7.	Total hardness (as $CaCO_3$) mg/l, Max	300
8.	Calcium (as Ca) mg/l, Max	75
9.	Magnesium (as Mg) mg/l, Max	30
10.	Copper (as Cu) mg/l, Max	0.05
11.	Iron (as Fe) mg/l, Max	0.3
12.	Manganese (as Mn) mg/l, Max	0.1
13.	Chlorides (as Cl) mg/l, Max	250
14.	Sulphate (as SO_4) mg/l, Max	200
15.	Nitrate (as NO_3)	45
16.	Fluoride (as F) mg/l)	0.6 to 1. 2
17.	Phenolic Compounds (as C_6H_5OH) mg/l, Max	0.001
18.	Mercury (as Hg) mg/l, Max	0.001
19.	Cadmium (as Cd) mg/l, Max	0.01
20.	Selenium(as Se mg/l, Max	0.01
21.	Arsenic (as As) mg/l, Max	0.05
22.	Cyanide (as Cn) mg/l, Max	0.05
23.	Lead (As Pb) mg/l, Max	0.05
24.	Zinc (as Zn) mg/l, Max	5.0
25.	Arionic detergents (as MBAS), mg/l, Max	0.2
26.	Chromium (as Cr^{6++}) mg/l, Max	0.05
27.	Polynuclear aromatic hydrocarbon (PAH) mg/l, Max	Absent
28.	Mineral Oil mg/l, Max	0.01
29.	Residual, free chlorine, mg/l, Min	0.2
30.	Pesticides	Absent
31.	Radioactive materials a) Alpha emitters uc/ml, Max b) Beta emitters uc/ml, Max	 10^{-8} 10^{-7}

Note: ND=Not Detected, BDL: Below detection limit

Annexure – 5

IS Standard for Effluent discharge

S.N.	Parameter	Inland Surface water IS:2490(1981)
1.	Colour and odour	
2.	Suspended solids mg/l, max.	100
3.	pH value	5.5 to 9.0
4.	Temperature (^{0}C)	Shall not exceed 5°C above the receiving water temperature
5.	Total Dissolved Solids mg/l	2100
6.	Oil and grease, mg/l max.	10
7.	Total residual chlorine, mg/l max.	1.0
8.	Ammonical nitrogen (as N), mg/l max.	50
9.	Total nitrogen (as N), mg/l max.	100
10.	Free ammonia (as NH_3), mg/l max.	5.0
11.	Biochemical oxygen demand, BOD (3 days at 27°C), mg/l max.	30
12.	Chemical oxygen demand, mg/l max.	250
13.	Arsenic (as As), mg/l max.	0.2
14.	Mercury (as Hg), mg/l max.	0.01
15.	Lead (as Pb), mg/l max.	0.1
16.	Cadmium (as Cd), mg/l max.	2.0
17.	Hexavalent chromium (as Cr^{+6}), mg/l max.	0.1
18.	*Total Chromium (as Cr), mg/l max.*	*2.0*
19.	Copper (as Cu), mg/l max.	3.0
20.	Zinc (as Zn), mg/l max.	5.0
21.	Selenium (as Se), mg/l max.	0.05
22.	Nickel (as Ni), mg/l max.	3.0
23.	*Cyanide (as CN), mg/l max.*	0.2
24.	Fluoride (as F), mg/l max.	*2.0*
25.	Dissolved phosphates (as P), mg/l max.	5.0
26.	Sulphide (as S), mg/l max.	2.0
27.	Phenolic compounds (as C_6H_5OH), mg/l max.	1.0
28.	Radioactive materials a. α emitters micro cure, mg/l max. b. β emitters micro cure, mg/l max.	 10^{-7} 10^{-6}
29.	Manganese (as Mn)	2 mg/l
30.	Iron (as Fe)	3 mg/l
31.	Vanadium (as V)	0.2 mg/l
32.	Nitrate Nitrogen	10 mg/l

Note: ND=Not Detected, BDL: Below detection limit

* All efforts should be made to remove colour and unpleasant odour as far as practicable (Annexure-1)

ENVIRONMENTAL MONITORING REPORT OF BHARAT COKING COAL LIMITED, CLUSTER – II

(FOR THE Q.E. MARCH, 2016)

E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.

June, 2016

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

CLUSTER - II

(FOR THE Q.E. March, 2016)

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ENVIRONMENTAL MONITORING REPORT OF BHARAT COKING COAL LIMITED CLUSTER – II

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EXECUTIVE SUMMARY

1.0 Introduction

The purpose of environmental monitoring is to assess the quality of various attributes that affects the fauna and flora. In accordance with the quality of these attributes appropriate strategy is to be developed to control the pollution level within the permissible limits. The three major attributes are air, water and noise level.

Bharat Coking Coal Limited (BCCL), a Subsidiary company of Coal India Limited is operating Underground and Opencast Mines in Jharia Coalfield (JCF) is a part of Gondwana Coalfields located in Dhanbad district of Jharkhand, the JCF is bounded by $23^0$37' N to $23^0$52' N latitudes and $86^0$09' E to $86^0$30' E longitude occupying an area of 450 Sq.km. BCCL has awarded Environmental monitoring work of Jharia Coalfield (JCF) to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per the conditions laid down by the MoEF&CC while granting environmental clearance of project, consent letter issued by the respective SPCB, and other statutory requirements.

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

The ambient air quality monitoring stations were selected to represent core, buffer zone area. The rationale has been based on the guidelines stipulated by MoEF&CC, consent letter of SPCB, as well as other statutory requirements.

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water, drinking water supply, well/ Hand pump water also surface water samples.

2.3 Noise level monitoring locations

Noise levels vary depending on the various activities in mining areas. The monitoring of noise level in different locations will be helpful to take appropriate mitigating measures. The noise levels were recorded in mining area, washery and in residential area.

3.0 Methodology of sampling and analysis

3.1 Ambient air quality

Parameters chosen for assessment of ambient air quality were Particulate Matter (PM_{10}), Fine Particulate Matter ($PM_{2.5}$), Sulphur Di-oxide (SO_2) and Nitrogen Oxides (NO_X). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM2.5 sampler) were used for sampling of PM_{10}, SO_2, & NO_X and Fine Dust Sampler (PM2.5 sampler) were used for

sampling of $PM_{2.5}$ at 24 hours interval once in a fortnight and the same for the gaseous pollutants. The samples were analysed in Environmental Laboratory of CMPDI, RI-I, Asansol.

3.2 Water quality

Water samples were collected as per standard practice. The Mine effluent samples were collected and analysed for four parameters on fortnightly basis. Mine Effluent samples were also analysed for 27 parameters on half-yearly basis. The drinking and Surface water samples were collected and analysed for 25 and 17 parameters respectively, on quarterly basis. Thereafter the samples were preserved and analysed at the Environmental Laboratory at CMPDI (HQ), Ranchi.

3.3 Noise level monitoring

Noise level measurements in form of 'L_{EQ}' were taken using Integrated Data Logging Sound Level Meter. Noise levels were measured in Decibels, 'A' weighted average, i.e. dB(A).

4.0 Results and interpretations

4.1 Air quality

It has been seen from the analysis results that the 24 hours average concentration parameters like PM_{10}, $PM_{2.5}$, SO_2 and NO_X are mostly within the permissible limits in all sampling locations as per MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines and National Ambient Air Quality Standard -2009. Sometimes the concentration of PM_{10} & $PM_{2.5}$ exceeds the limits due to heavy public traffic, poor road condition, coke oven plants, burning of coal by surrounding habitants, brick making, municipal waste dumps and industries like Steel Plant, thermal Plants including their fly ash etc.

4.2 Water quality

The test results indicate that the major parameters compared with MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines, IS.10500/2012 (Drinking water) and IS: 2296 (Surface water), are with in permissible limits.

4.3 Noise Level

During the noise level survey it has been observed that the noise level in the sampling locations is within the permissible limits prescribed as per MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines for Industrial Area and Noise pollution (Regulation and Control) Rules, 2000.

CHAPTER - I

INTRODUCTION

1.0 Any industry and development activities including coal mining is bound to affect environmental attributes. There are positive as well as negative impacts of such operations. For controlling the adverse impacts a regular monitoring is essential. The environmental monitoring is being done as per the guide-lines stipulated by Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt. of India.

The very purpose of environmental monitoring is to assess the quality of various attributes which affects the environment. As per quality of these attributes appropriate strategy is to be developed to control the pollution level within the permissible limits. The three major attributes are air, water and noise level.

Bharat Coking Coal Limited (BCCL), a subsidiary company of Coal India Limited (CIL) is operating UG Mines and Opencast Mines in Jharia Coalfield (JCF). The Jharia Coalfield (JCF) having an area of 450 Sq.KM.

Bharat Coking Coal has awarded Environmental Monitoring work of all Projects, Cluster wise, to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per conditions laid down by MoEF&CC while granting environmental clearance to different projects. CMPDI has trained manpower and well equipped laboratory to carry out monitoring, analysis and R&D work in the field of environment.

1.1 The Cluster II is in the westernmost part of the Jharia coalfield. It includes Block II Colliery, Jamunia OCP, Shatabdi UG & OC & Phularitand. The cluster – II is situated about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster - II are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.

1.2 The cluster II is designed to produce 15.55 Mtpa (normative) and 20.215 Mtpa peak capacity of coal. The average grade of coal W-II to W-IV.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 15.55 MTPA (normative) and 20.215 MTPA peak capacity of coal production vide letter no **E.C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board." And other conditions regarding water / effluent and noise level monitoring.

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB and other statutory authorities.

CHAPTER-II

AMBIENT AIR QUALITY MONITORING

2.1 Location of sampling station and their rationale:

(As per G.S.R. 742 (E) dt. 25th December, 2000)

2.1.1 Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Block II OCP (A4): Industrial Area

The location of the sampling station is 23^0 47.297' N 86^0 12.290' E . The sampler was placed at ground level near water treatment plant of Block II OCP. The station was selected to represent the impact of mining activities of Block II, poor roads condition, heavy public traffic, coke oven plants, burning of coal by the surrounding habitants.

ii) Muraidiah OCP (A5): Industrial Area

The sampler was placed at ground level at Shatabdi Colliery. The station was selected to represent the impact of mining activities of Muraidiah OCP, poor roads condition, Mine activity generate coal dust for coal transport.

II. BUFFER ZONE Monitoring Location

i) Madhuband washery (A3) : industrial area

The location of the sampling station is 23º47.297'N & 086º12.290'E The sampler was placed at ground level near water treatment plant of Block II OCP.

ii) Madhuband UGP (A33): Industrial Area

The location of the sampling station is 23º45'24.48'' N & 086º11'59.44''E. The sampler was placed at ground level near water treatment plant of Block II OCP.

2.2 Methodology of sampling and analysis

Parameters chosen for assessment of ambient air quality were Particulate Matter (PM 10), Particulate Matter (PM 2.5), Sulphur Di-oxide (SO_2) and Nitrogen Oxides (NO_X). Respirable Dust Samplers & fine particulates sampler were used for sampling PM 10 & PM 2.5 respectively at 24 hours interval once in a fortnight and the same for the gaseous pollutants. The samples were analysed in Environmental Laboratory of CMPDI, RI-I, Asansol.

2.3 Results & Interpretations

The results of Ambient Air Quality are presented in tabular form along with Bar chart for each monitoring station. The interpretations of different parameters are given below:

2.3.1 **Ambient air quality**

Particulate Matter PM_{10}

In **core zone** under **Industrial area** varies from 78 to 106 μ/m^3.
In **buffer zone** in **Industrial area** varies from 78 to 93 μ/m^3

Particulate Matter $PM_{2.5}$

In **core zone** under **Industrial area** varies from 40 to 54 μ/m^3.
In **buffer zone** in **Industrial area** varies from 34 to 47 μ/m^3

Sulphur Dioxide:

In **core zone** under **Industrial area** varies from 10 to 12 μ/m^3.
In **buffer zone** in **Industrial area** varies from 10 to 12 μ/m^3

Oxides of Nitrogen:

In **core zone** under **Industrial area** varies from 20 to 28 μ/m^3.
In **buffer zone** in **Industrial area** varies from 18 to 26 μ/m^3.

AMBIENT AIR QUALITY DATA

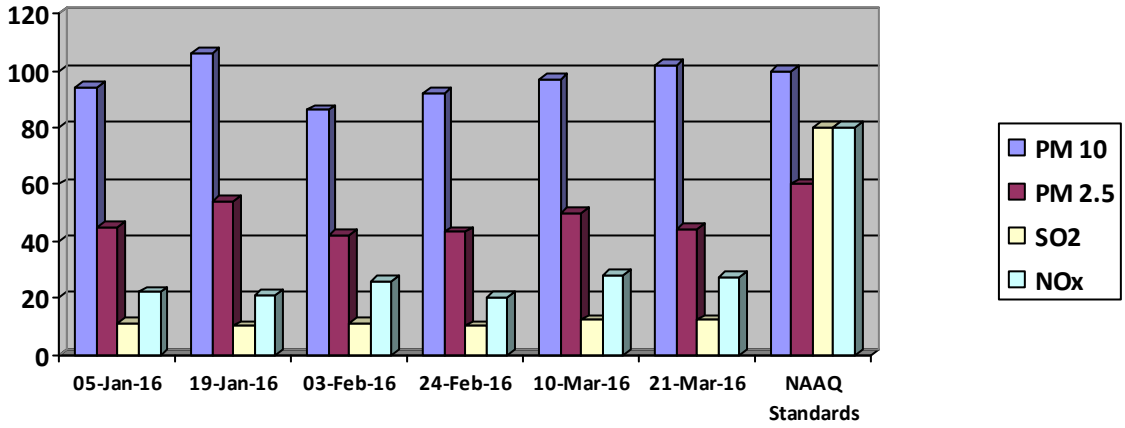
Name of the Company: **Bharat Coking Coal limited** Year : **2015-16.**
Name of the Cluster : **Cluster – II** Q.E.: **March' 2016**

Station Code/Name: (a) A4 Block II OCP **Category: Industrial[1].**
(b) A5 Muraidih OCP

ZONE: CORE

(a). Station Code/Name: A4 Block II OCP Category: Industrial.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_x
1	05 - Jan - 16	94	45	11	22
2	19 - Jan - 16	106	54	<10.0	21
3	03 - Feb - 16	86	42	11	26
4	24 - Feb - 16	92	43	<10.0	20
5	10 - Mar - 16	97	50	12	28
6	21 - Mar - 16	102	44	12	27
NAAQ Standards		100	60	80	80



Trace Metal analysis report of Ambient Air Quality

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

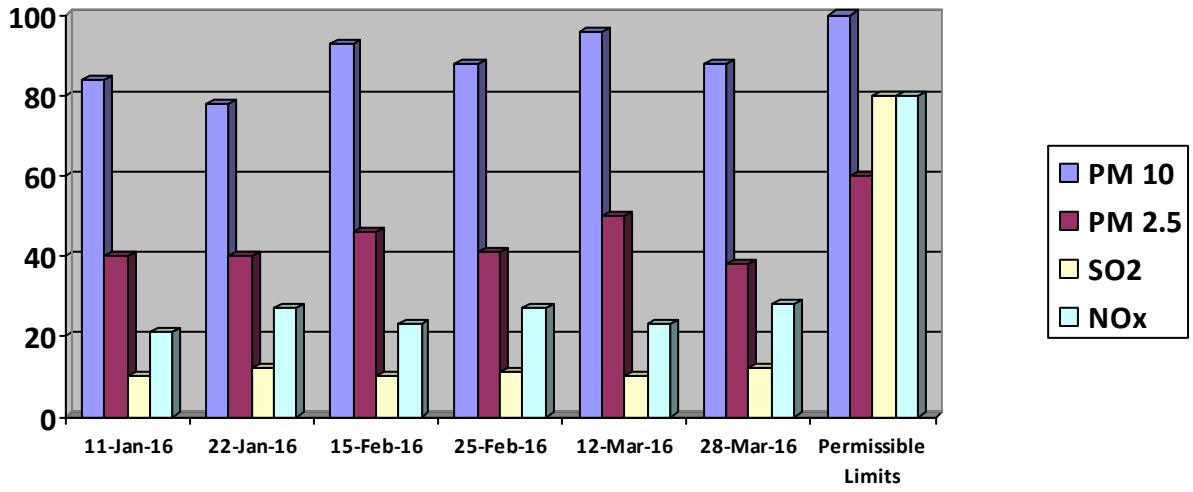
Note:

- *All values are expressed in microgram per cubic meter.*

[1] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

(b). Station Code/Name: A5 – Muraidih OCP, Category: Industrial[2].

Sl. No.	Dates of sampling	PM 10	PM 20.5	SO2	NOx
1	11 - Jan - 16	84	40	<10.0	21
2	22 - Jan - 16	78	40	12	27
3	15 - Feb - 16	93	46	<10.0	23
4	25 - Feb - 16	88	41	11	27
5	12 - Mar - 16	96	50	<10.0	23
6	28 - Mar - 16	88	38	12	28
	NAAQ Standards	100	60	80	80



Trace Metal analysis report of Ambient Air Quality

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

Note:

- *All values are expressed in microgram per cubic meter.*
- *24 hours duration*
- *Predominant wind direction South – West.*

[2] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

AMBIENT AIR QUALITY DATA

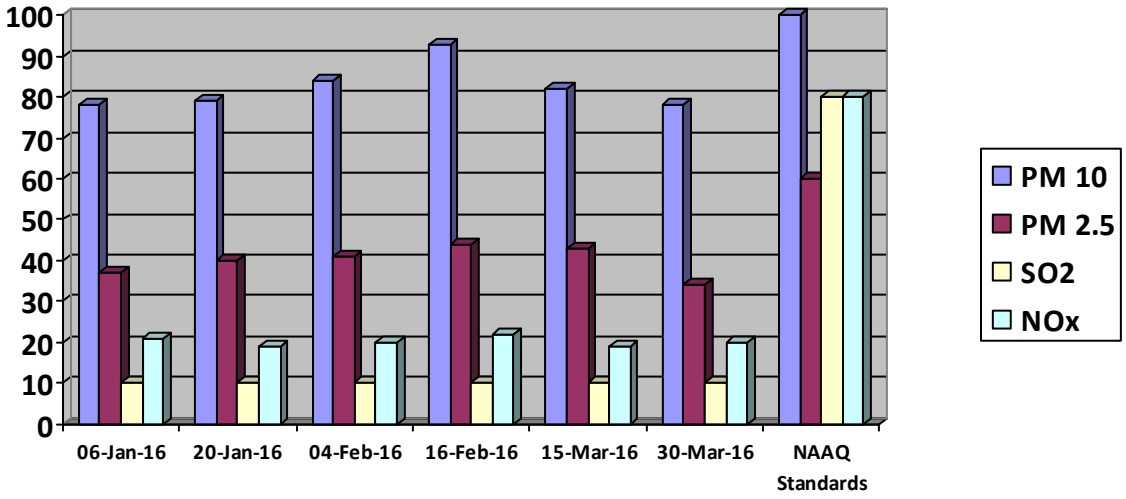
Name of the Company: **Bharat Coking Coal limited** Year : **2015-16.**

Name of the Cluster : **Cluster – II** Q.E.: **March' 2016**

Station Code/Name: (a) A3 Madhuband Washery **Category:**
(b) A33 Madhuband UGP **Industrial[3].**
ZONE: BUFFER

(a). Station Code/Name: A3 – Madhuband Washery, Category: Industrial.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	06 - Jan - 16	78	37	<10.0	21
2	20 - Jan - 16	79	40	<10.0	19
3	04 - Feb - 16	84	41	<10.0	20
4	16 - Feb - 16	93	44	<10.0	22
5	15 - Mar - 16	82	43	<10.0	19
6	30 - Mar - 16	78	34	<10.0	20
	Permissible Limits	100	60	80	80



Trace Metal analysis report of Ambient Air Quality

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

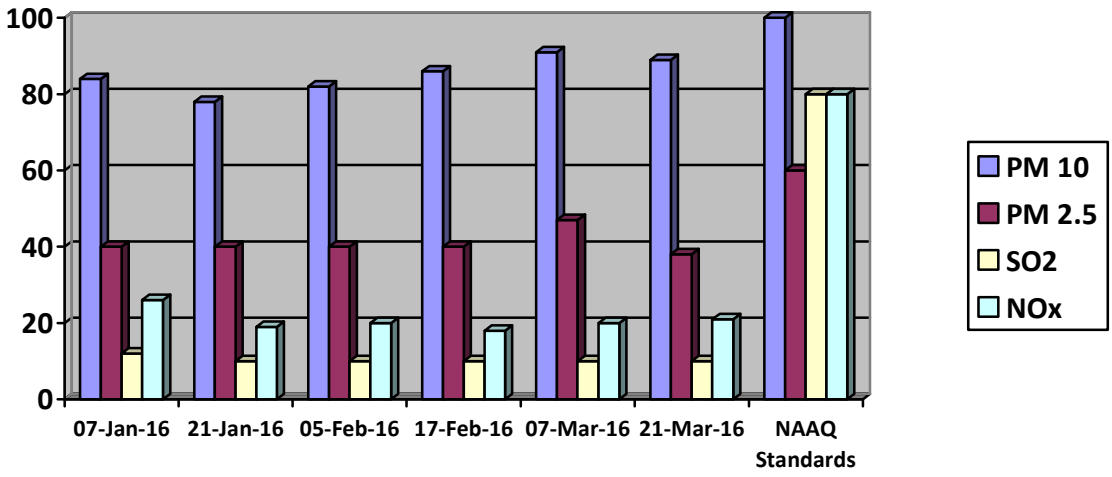
Note:

- *All values are expressed in microgram per cubic meter.*

[3] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

(b). Station Code/Name: A33 – Madhuband UGP Category: Industrial[4].

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	07 - Jan -16	84	40	12	26
2	21 - Jan - 16	78	40	<10.0	19
3	05 - Feb -16	82	40	<10.0	20
4	17 - Feb - 16	86	40	<10.0	18
5	07 - Mar - 16	91	47	<10.0	20
6	21 - Mar - 16	89	38	<10.0	21
	NAAQ Standards	100	60	80	80



Trace Metal analysis report of Ambient Air Quality

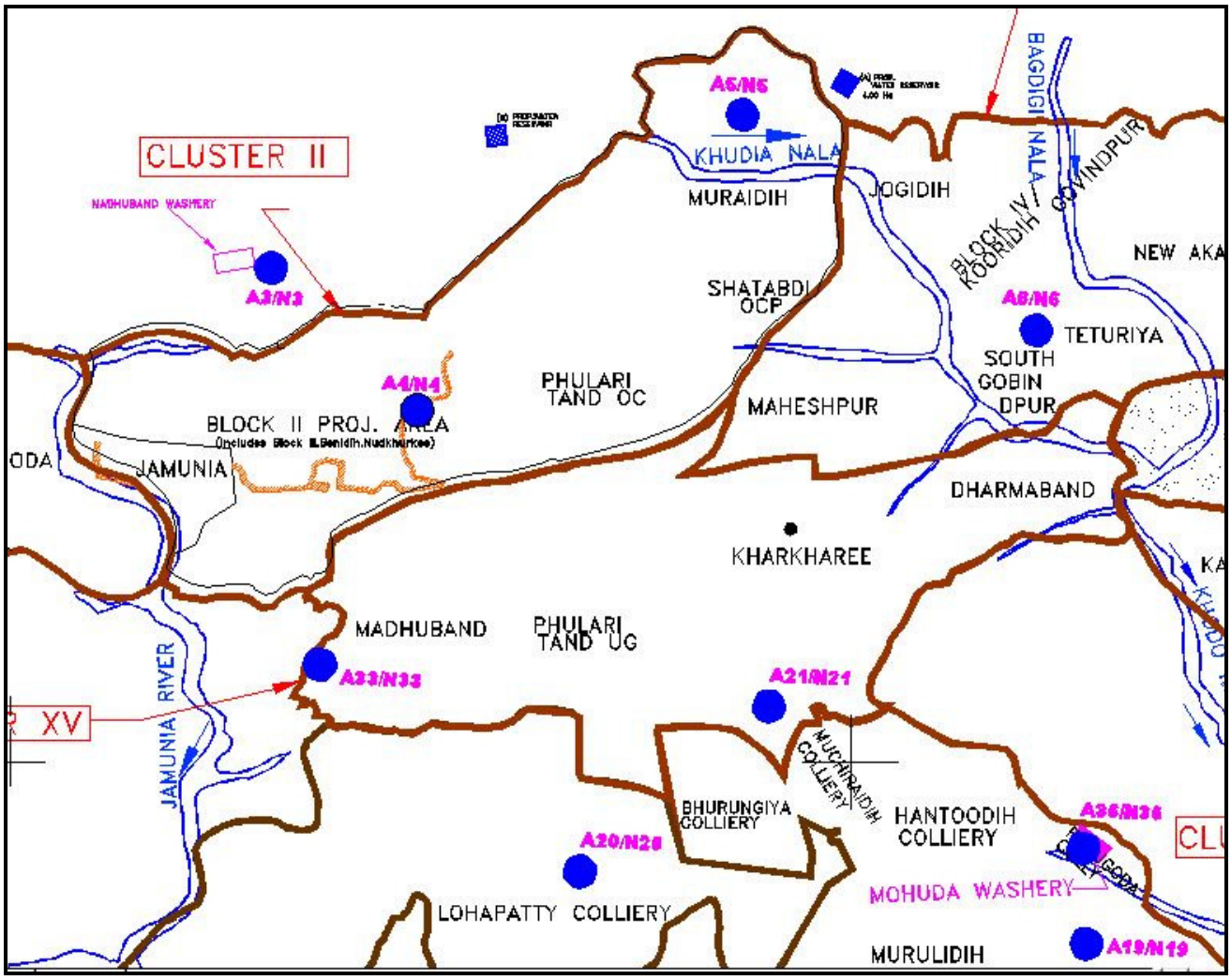
Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

Note:

- *All values are expressed in microgram per cubic meter.*
- *24 hours duration*
- *Predominant wind direction South – West.*

[4] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

Ambient Air Monitoring Stations in Cluster- II in Core & Buffer Zones



Ambient Air Quality Standards for Jharia Coal Field
As per the Environment (Protection) Amendment Rules, 2000 notified vide notification G.S.R. 742(E), dated 25.9.2000.

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
III Coal mines located in the coal fields of • Jharia • Raniganj • Bokaro	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	500 µg/m^3 700 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1 m^3/minute)
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	250 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1.Improved west and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Note:

* Annual Arithmetic mean for the measurements taken in a year, following the guidelines for frequency of sampling laid down in clause 2.

** 24 hourly / 8 hourly values shall be met 92% of the time in a year. However, 8% of the time it may exceed but not on two consecutive days.

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No. 14 of 1981), and in supersession of the notification No(s).S.O.384(E), dated 11th April 1994 and S.O.935(E), dated 14th October 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect

Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO_2), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO_2), µg/m³	Annual * 24 Hours **	40 80	30 80	-Jacob &Hochheiser modified ($NaOH$-$NaAsO_2$) Method -Gas Phase Chemiluminescence
Particulate Matter (Size less than 10µm) or PM_{10}, µg/m³	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
Particulate Matter (Size less than 2.5µm) or $PM_{2.5}$, µg/m³	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
Ozone (O_3) , µg/m³	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
Lead (Pb) , µg/m³	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
Carbon Monoxide (CO), mg/m³	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
Ammonia (NH_3), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C_6H_6), µg/m³	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m³	Annual *	01	01	-Solvent extraction followed byHPLC/GC analysis
Arsenic (As), ng/m³	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m³	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

NOTE: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

CHAPTER – III

WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. - II**)

i) **Mine Discharge of Block II OCP (MW2)**
A sampling point is fixed to assess the effluent quality of Mine discharge. This location is selected to monitor effluent discharge in to Khudia Nala.

ii) Drinking water quality at **Jogidih Village (DW2)**

iii) Surface water quality at **U/S of Khudia Nala (SW3)**

iv) Surface water quality at **D/S of Khudia Nala (SW4)**

3.2 Methodology of sampling and analysis

Water samples were collected as per standard practice. The effluent samples were collected and analysed for four parameters on fortnightly basis. Effluent samples were also analysed for 27 parameters on half-yearly basis. The drinking and Surface water samples were collected and analysed for 25 and 17 parameters respectively, on quarterly basis. Thereafter the samples were preserved and analysed at the Environmental Laboratory at CMPDI (HQ), Ranchi.

3.3 Results & Interpretations

The results are given in tabular form along with the applicable standards. Results are compared with Schedule - VI, effluent prescribed by MoEF&CC. Results show that most of the parmeters are within the permissible limits.

WATER QUALITY DATA
(*EFFLUENT WATER- FOUR PARAMETERS*)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **January, 2016.**

Name of the Stations & Code : **1. MW2- Mine Discharge of Block II OCP**

First Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 01.01.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	72	*100 (Max)*
2	pH	7.61	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	48	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 20.01.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	48	*100 (Max)*
2	pH	7.68	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	28	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY DATA
(*EFFLUENT WATER- FOUR PARAMETERS*)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **February, 2016.**

Name of the Stations & Code : **1. MW2- Mine Discharge of Block II OCP**

First Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 04.02.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	62	*100 (Max)*
2	pH	7.61	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	32	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 25.02.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	66	*100 (Max)*
2	pH	7.64	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	36	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY DATA
(*EFFLUENT WATER- FOUR PARAMETERS*)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **March, 2016.**

Name of the Stations & Code : **1. MW2- Mine Discharge of Block II OCP**

First Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 10.03.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	56	*100 (Max)*
2	pH	8.21	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	32	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW2 (Mine Discharge) 21.03.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	50	*100 (Max)*
2	pH	7.97	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	36	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY

(EFFLUENT WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **H. E. March, 2016**

Area : Block-II OCP **Project:** Block-II OCP **Cluster II**

Stations: 1. Mine Water Discharge Block-II OCP MW-2 **Date of Sampling:** 21/03/2016

Sl.No.	Parameter	Sampling Stations			Detection Limit	MOEF -SCH-VI STANDARDS Class 'A'	BIS Standard & Method
		MW-2	2	3			
1	Ammonical Nitrogen, mg/l, Max	0.67			0.02	50.0	IS 3025/34:1988, R : 2009, Nessler's
2	Arsenic (as As), mg/l, *Max*	<0.002			0.002	0.2	IS 3025/37:1988 R : 2003, AAS-VGA
3	B.O.D (3 days 27°C), mg/l, Max	<2.00			2.00	30.0	IS 3025 /44:1993,R:2003 3 day incubation at 27°C
4	COD, mg/l, Max	36			4.00	250.0	APHA, 22nd Edition, Closed Reflux, Titrimetric
5	Colour	colourless			Qualitative	Qualitative	Physical/Qualitative
6	Copper (as Cu), mg/l, *Max*	<0.03			0.03	3.0	IS 3025/42: 1992 R : 2009, AAS-Flame
7	Dissolved Phosphate, mg/l, Max	0.3			0.30	5.0	APHA, 22nd Edition Molybdovanadate
8	Fluoride (as F) mg/l, *Max*	0.99			0.02	2.0	APHA, 22nd Edition, SPADNS
9	Free Ammonia, mg/l, Max	<0.01			0.01	5.0	IS:3025/34:1988, Nesseler's
10	Hexavalent Chromium, mg/l, Max	<0.01			0.01	0.1	APHA, 22nd Edition, Diphenylcarbohydrazide
11	Iron (as Fe), mg/l, *Max*	<0.06			0.06	3.0	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
12	Lead (as Pb), mg/l, *Max*	<0.005			0.005	0.1	APHA, 22nd Edition, AAS-GTA
13	Manganese(as Mn), mg/l, Max	<0.02			0.02	2.0	IS-3025/59:2006, AAS-Flame
14	Nickel (as Ni), mg/l, *Max*	<0.10			0.10	3.0	IS-3025/54:2003, AAS-Flame
15	Nitrate Nitrogen, mg/l, *Max*	3.4			0.50	10.0	APHA, 22nd Edition, UV-Spectrphotometric
16	Oil & Grease, mg/l, Max	<2.00			2.00	10.0	IS 3025/39:1991, R : 2003, Partition Gravimetric
17	Odour	Agreeable			Agreeable	Qualitative	Is-3015/5:1983/R:2012/Qualitative
18	pH value	7.97			2.5	5.5 to 9.0	IS-3025/11:1983, R-1996, Electrometric
19	Phenolic compounds (as C_6H_5OH),mg/l, *Max*	<0.002			0.002	1.0	APHA, 22nd Edition 4-Amino Antipyrine
20	Selenium (as Se), mg/l, *Max*	<0.002			0.002	0.05	APHA, 22nd Edition, AAS-GTA
21	Sulphide (as SO_3), mg/l, Max	<0.005			0.005	2.0	APHA, 22nd Edition Methylene Blue
22	Temperature (°C)	36.1			Shall not exceed 5^0 C above the receiving temp.		IS-3025/09:1984, Thermometeric
23	Total Chromium (as Cr), mg/l, *Max*	<0.04			0.04	2.0	IS-3025/52:2003, AAS-Flame
24	Total Kjeldahl Nitrogen, mg/l, Max	2.8			1.00	100.0	IS:3025/34:1988, Nesseler's
25	Total Residual Chlorine, mg/l, Max	0.04			0.02	1.0	APHA, 22nd Edition, DPD
26	Total Suspended Solids, mg/l, Max	50			10.00	100.0	IS 3025/17:1984, R :1996, Gravimetric
27	Zinc (as Zn), mg/l, *Max*	0.01			0.01	5.0	IS 3025 /49 : 1994, R : 2009, AAS-Flame

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY

(SURFACE WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **Q. E. March, 2016**

Area : Block-II OCP **Project:** Block-II OCP **Cluster II**

Stations: **Date of Sampling:**

1. Upstream in Khudia Nala SW-3 10/03/2016
2. Downstream in Khudia Nala SW-4 10/03/2016

Sl. No	Parameter	Sampling Stations				Detection Limit	BIS Standard & Method
		SW-3	SW-4	3	4		
1	Arsenic (as As), mg/l, Max	<0.002	<0.002			0.002	IS 3025/37:1988 R : 2003, AAS-VGA
2	BOD (3 days 27°C), mg/l, Max	2.40	2.40			2.00	IS 3025 /44: 1993, R : 2003 3 day incubation at 27°C
3	Colour (Hazen Unit)	colourless	colourless			Qualitative	Physical/Qualitative
4	Chlorides (as Cl), mg/l, Max	36	52			2.00	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03			0.03	IS 3025 /42 : 1992 R : 2009, AAS-Flame
6	Disolved Oxygen, min.	6.1	5.3			0.10	IS 3025/381989, R : 2003, Winkler Azide
7	Fluoride (as F) mg/l, Max	1.4	1.17			0.02	APHA, 22nd Edition SPADNS
8	Hexavalent Chromium, mg/l, Max	<0.01	<0.01			0.01	APHA, 22nd Edition, 1,5 - Diphenylcarbohydrazide
9	Iron (as Fe), mg/l, Max	<0.06	<0.06			0.06	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
10	Lead (as Pb), mg/l, Max	<0.005	<0.005			0.005	APHA, 22nd Edition AAS-GTA
11	Nitrate (as NO_3), mg/l, Max	5.32	13.73			0.50	APHA, 22nd Edition, UV-Spectrphotometric
12	pH value	6.89	7.69			2.5	IS-3025/11:1983, R-1996, Electrometric
13	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.002	<0.002			0.002	APHA, 22nd Edition 4-Amino Antipyrine
14	Selenium (as Se), mg/l, Max	<0.002	<0.002			0.002	APHA, 22nd Edition AAS-GTA
15	Sulphate (as SO_4) mg/l, Max	75	80			2.00	APHA, 22nd Edition Turbidity
16	Total Dissolved Solids, mg/l, Max	268	296			25.00	IS 3025 /16:1984 R : 2006, Gravimetric
17	Zinc (as Zn), mg/l, Max	0.022	0.017			0.01	IS 3025 /49 : 1994, R : 2009, AAS-Flame

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY

(DRINKING WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster : **Cluster - II** Month: **Q. E. March, 2016**

Area : Block-II OCP **Project:** Block-II OCP **Cluster II**

Stations: 1. Drinking Water from Joyrampur Village DW-2 **Date of Sampling:** 10/03/2016

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		DW-2	2	3			
1	Boron (as B), mg/l, Max	<0.20			0.20	0.5	APHA, 22nd Edition ,Carmine
2	Colour,in Hazen Units	2			1	5	APHA, 22nd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	77			1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	40			2.00	250	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03			0.03	0.05	IS 3025/42 : 1992 R : 2009, AAS-Flame
6	Fluoride (as F) mg/l, Max	1.18			0.02	1.0	APHA, 22nd Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.02			0.02	0.2	APHA, 22nd Edition, DPD
8	Iron (as Fe), mg/l, Max	<0.06			0.06	0.3	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
9	Lead (as Pb), mg/l, Max	<0.005			0.005	0.01	APHA, 22nd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	0.317			0.02	0.1	IS-3025/59:2006, AAS-Flame
11	Nitrate (as NO_3), mg/l, Max	1			0.5	45	APHA, 22nd Edition, UV-Spectrphotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	7.64			2.5	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.002			0.002	0.001	APHA, 22nd Edition,4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002			0.002	0.01	APHA, 22nd Edition, AAS-GTA
16	Sulphate (as SO_4) mg/l, Max	36			2.00	200	APHA, 22nd Edition. Turbidity
17	Taste	Acceptable			Qualitative	Acceptable	APHA, 22nd Edition. Taste
18	Total Alkalinity (c_aco_3),, mg/l, Max	180			4.00	200	IS-3025/23:1986, Titration
19	Total Arsenic (as As), mg/l, Max	<0.002			0.002	0.01	IS 3025/ 37:1988 R : 2003, AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04			0.04	0.05	IS-3025/52:2003, AAS-Flame
21	Total Dissolved Solids, mg/l, Max	380			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c_aco_3), mg/l, Max	276			4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	3			1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.081			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Cluster: **Cluster - II** Month: **Q. E. March, 2016**

Area : Block-II OCP **Project:** Block-II OCP **Cluster II**

Stations: 1. Ground Water from Khodovaly Village GW-2 **Date of Sampling:** 28/02/2016

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW-2	2	3			
1	Boron (as B), mg/l, Max	<0.20			0.20	0.5	APHA, 22nd Edition ,Carmine
2	Colour,in Hazen Units	1			1	5	APHA, 22nd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	79			1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	96			2.00	250	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03			0.03	0.05	IS 3025/42 : 1992 R : 2009, AAS-Flame
6	Fluoride (as F) mg/l, Max	1.11			0.02	1.0	APHA, 22nd Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.06			0.02	0.2	APHA, 22nd Edition, DPD
8	Iron (as Fe), mg/l, Max	<0.06			0.06	0.3	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
9	Lead (as Pb), mg/l, Max	<0.005			0.005	0.01	APHA, 22nd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	<0.02			0.02	0.1	IS-3025/59:2006, AAS-Flame
11	Nitrate (as NO_3), mg/l, Max	2			0.5	45	APHA, 22nd Edition, UV-Spectrphotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	8.01			0.2	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.001			0.001	0.001	APHA, 22nd Edition,4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002			0.002	0.01	APHA, 22nd Edition, AAS-GTA
16	Sulphate (as SO_4) mg/l, Max	152			2.00	200	APHA, 22nd Edition. Turbidity
17	Taste	Acceptable			Qualitative	Acceptable	APHA, 22nd Edition. Taste
18	Total Alkalinity (c_aco_3),, mg/l, Max	372			4.00	200	IS-3025/23:1986, Titration
19	Total Arsenic (as As), mg/l, Max	<0.002			0.002	0.01	IS 3025/ 37:1988 R : 2003, AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04			0.04	0.05	IS-3025/52:2003, AAS-Flame
21	Total Dissolved Solids, mg/l, Max	860			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c_aco_3), mg/l, Max	532			4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	3			1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.017			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

Analysed By

18/5/16

Dy.Technical Manager
Env. Lab, CMPDI(HQ)
(Authorized Signatory)

CHAPTER - IV
NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites and their rationale

i) **Block II OCP (N4)**

To assess the noise level in mine site, the noise levels were recorded in the mine area where all mining activities are in progress.

ii) **Muraidiah OCP (N5)**

To assess the noise generated in the Shatabdi mines activity. Noise levels were recorded in the mines area,

iii) **Madhuband Washery (N3)**

To assess the noise level in the industrial area, noise levels were recorded near washery where activities of project during day time in the project area.

iv) **Madhuband UGP (N33)**

To assess the noise level in the industrial area, noise levels were recorded during day time in the Mines area.

4.2 Methodology of sampling and analysis

Noise level measurements in form of 'L_{EQ}' were taken using Integrated Data Logging Sound Level Meter (NL-52 OF RION CO. Ltd. Make) during day time. Noise levels were measured for about one hour time in day time. Noise levels were measured in Decibels, 'A' weighted average, i.e. dB (A).

4.3 Results & Interpretations

Ambient noise levels were recorded during day and night time and the observed values were compared with standards prescribed by MoEFCC.

The results of Noise levels recorded during day and night time on fortnightly basis are presented in tabular form along with the applicable standard permissible limits. The observed values in terms of L_{EQ} are presented**.**

The observed values at all the monitoring locations are found to be within permissible limits.

NOISE LEVEL DATA

Name of the Company: **Bharat Coking Coal Limited**

Year : **2015-16.**

Name of the Project : **Cluster -II**

Month: **January, 2016.**

Name of the Stations & Code :

1. **Block II OCP (N4)**
2. **Muraidiah OCP (N5)**
3. **Madhuband Washery (N3)**
4. **Madhuband UGP (N33)**[1]

(a) First Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	05.01.2016	63.4	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	11.01.2016	61.6	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	06.01.2016	63.4	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	07.01.2016	63.8	*75*

(b) Second Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	19.01.2016	61.6	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	22.01.2016	59.3	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	20.01.2016	61.5	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	21.01.2016	63.8	*75*

****Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control)Rules,2000.***

*** Day Time: 6.00 AM to 10.00 PM, +Night Time: 10.00 PM to 6.00 AM.**

[1] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

NOISE LEVEL DATA

Name of the Company: **Bharat Coking Coal Limited** Year : **2015-16.**

Name of the Project : **Cluster -II** Month: **February, 2016**

Name of the Stations & Code :

1. **Block II OCP (N4)**
2. **Muraidiah OCP (N5)**
3. **Madhuband Washery (N3)**
4. **Madhuband UGP (N33)**[2]

a. First Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	03.02.2016	62.8	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	15.02.2016	57.8	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	04.02.2016	63.4	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	05.02.2016	63.6	*75*

b. Second Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	24.02.2016	57.6	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	25.02.2016	60.3	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	16.02.2016	59.8	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	17.02.2016	61.8	*75*

Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control)Rules,2000.

*** Day Time: 6.00 AM to 10.00 PM, +Night Time: 10.00 PM to 6.00 AM.**

[2] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

NOISE LEVEL DATA

Name of the Company: **Bharat Coking Coal Limited**

Year : **2015-16.**

Name of the Project : **Cluster -II**

Month: **March, 2016**

Name of the Stations & Code :

1. **Block II OCP (N4)**
2. **Muraidiah OCP (N5)**
3. **Madhuband Washery (N3)**
4. **Madhuband UGP (N33)**[3]

a. First Fortnight data

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	10.03.2016	60.2	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	12.03.2016	58.2	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	15.03.2016	61.6	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	07.03.2016	62.7	*75*

b. Second Fortnight data

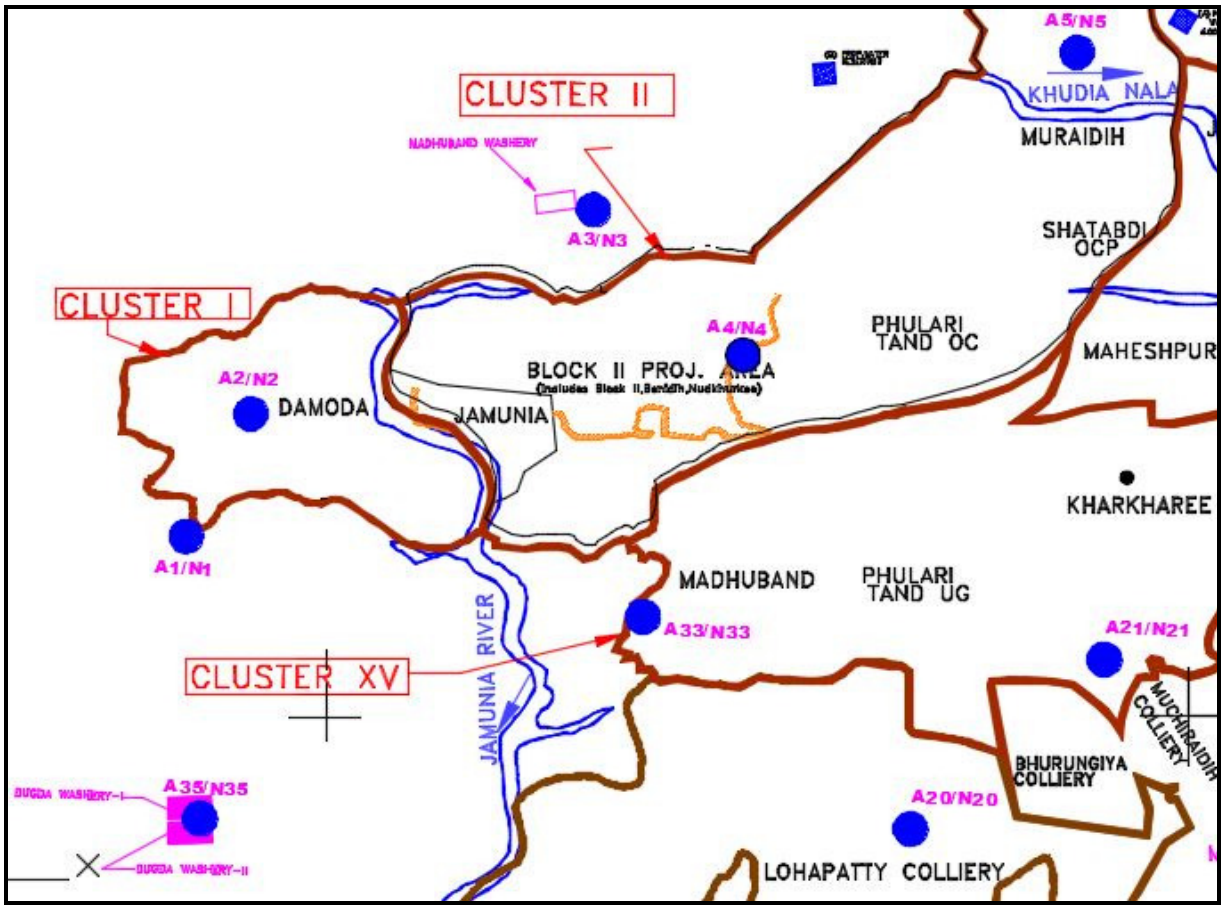
Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Block II OCP (N4)**	**Industrial area**	21.03.2016	61.8	*75*
2	**Muraidiah OCP (N5)**	**Industrial area**	28.03.2016	57.4	*75*
3	**Madhuband Washery (N3)**	**Industrial area**	30.03.2016	58.7	*75*
4	**Madhuband UGP (N33)**	**Industrial area**	21.03.2016	60.6	*75*

Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control)Rules,2000.

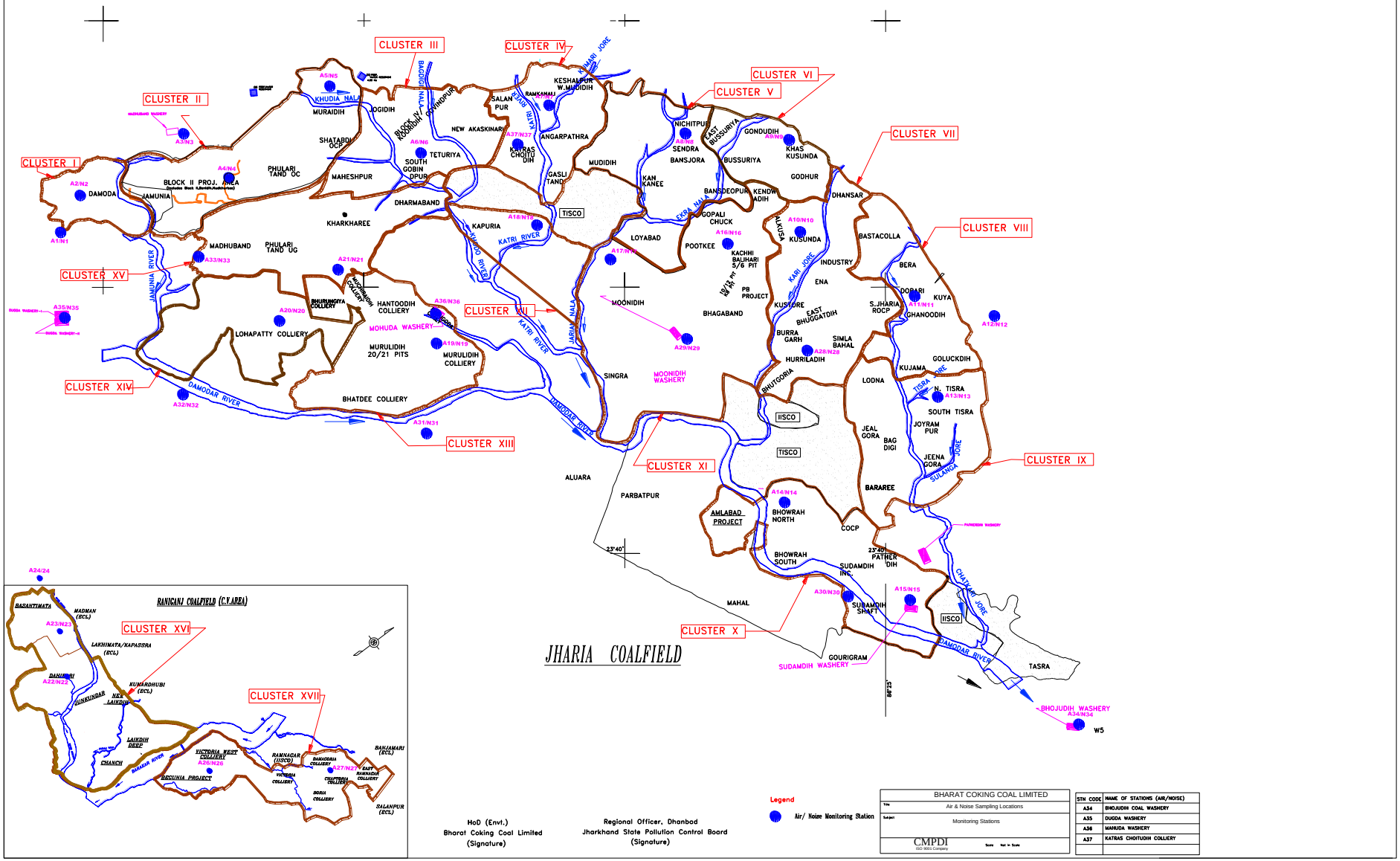
*** Day Time: 6.00 AM to 10.00 PM, +Night Time: 10.00 PM to 6.00 AM.**

[3] Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed……  …….Dated 28.05.2016. Job No. 110310

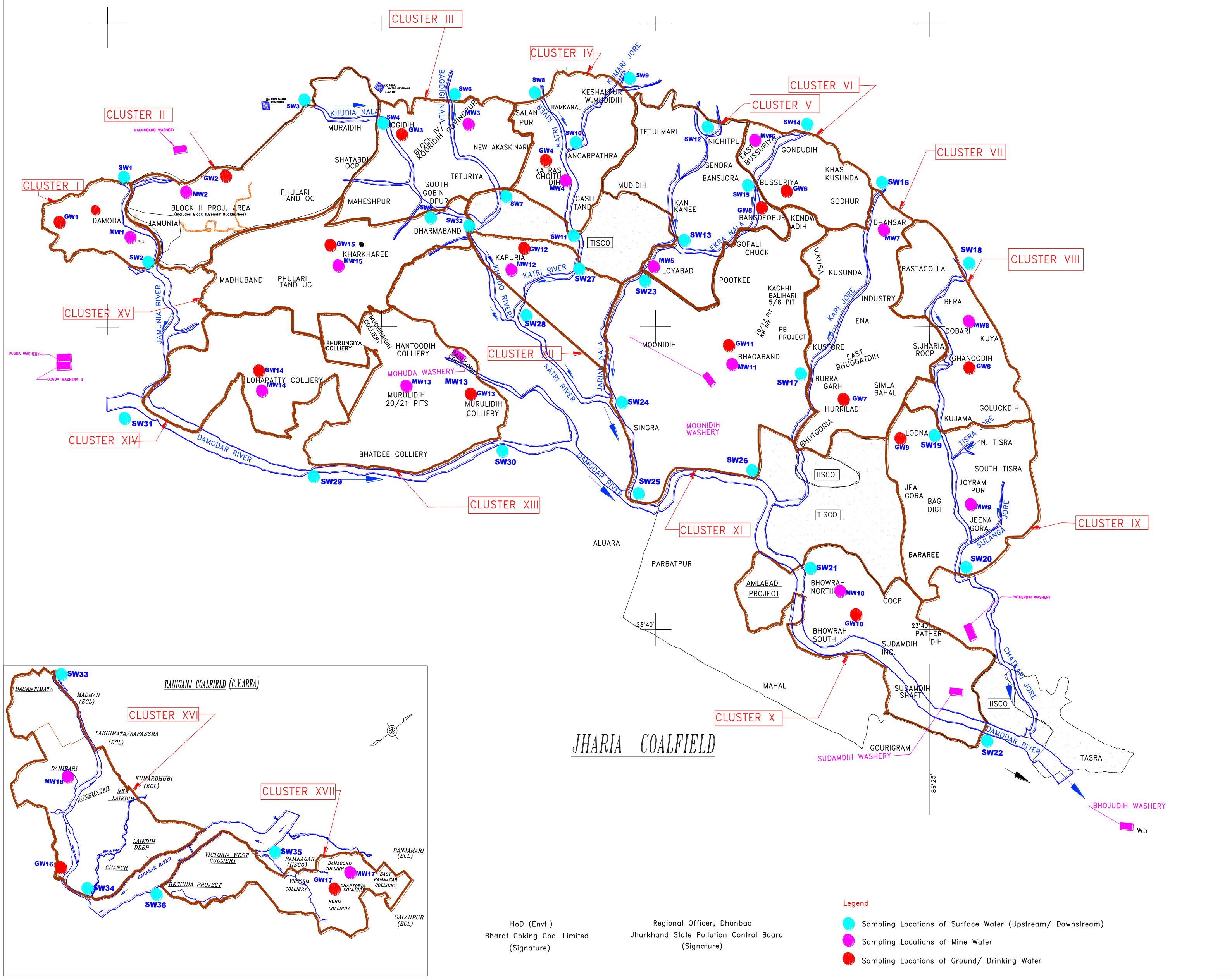
Noise Level Monitoring Locations of Cluster II



Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL



INDEX

Cluster	Suface Water (U/S, D/S)	Name of River/ Nala / Jore	Mine/ Effluent Water	Sampling Location	Ground Water	Sampling Location
I	SW1, SW2	Jamunia River	MW1	Damoda Area	GW1	Ghutway Village
II	SW3, SW4	Khudia Nala	MW2	Block II OCP	GW2	Joyrampur Village
III	SW4, SW5, SW6, SW7	Khudia Nala, Bagdigi Nala	MW3	Govindpur Colliery	GW3	Jogidih Village
IV	SW8, SW11, SW9, SW10	Katri River, Kumari Jore	MW4	Chotudih	GW4	Kankanee Village
V	SW12, SW13, SW15	Jarian Nala, Ekra Nala	MW5	Mudidih	GW5	Nichitpur
VI	SW14, SW15	Ekra Nala	MW6	East Bassuria UGP	GW6	Bansjora Borewell
VII	SW16, SW17	Kari Jore	MW7	Dhansar UGP	GW7	Hurriladih
VIII	SW18, SW19	Kashi Jore	MW8	Dobari UGP	GW8	Ghanudih
IX	SW19, SW20	Kashi Jore	MW9	Jeenagora	GW9	Lodna
X	SW21, SW22	Damodar River	MW10	Bhowrah North	GW10	Bhowrah South
XI	SW23, SW24, SW25, SW26	Jarian Nala, Damodar River	MW11	Bhagabandh UGP	GW11	Bhagabandh
XII	SW27, SW28	Katri River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Murulidih (20/21)	GW13	Murilidih
XIV	SW31, SW29	Damodar River	MW14	Lohapatti	GW14	Lohapatti
XV	SW5, SW32	Khudia Nala	MW15	Kharkharee UGP	GW15	Kharkharee
XVI	SW33, SW34	Khudia River	MW16	Dahibari OCP	GW16	Patlabari Village
XVII	SW35, SW36	Barakar River	MW17	Damagoria Colliery	GW17	Chaptoria

Legend

- Sampling Locations of Surface Water (Upstream/ Downstream)
- Sampling Locations of Mine Water
- Sampling Locations of Ground/ Drinking Water

HoD (Envt.)
Bharat Coking Coal Limited
(Signature)

Regional Officer, Dhanbad
Jharkhand State Pollution Control Board
(Signature)

Customer: BHARAT COKING COAL LIMITED
Title: WATER SAMPLING LOCATIONS
Subject: MONITORING STATIONS
CMPDI
ISO 9001 Company
Scale: Not to Scale