

**ENVIRONMENTAL CLEARANCE COMPLIANCE OF**  
**CLUSTER-XIV (GRANTED VIDE LETTER NO.J-**  
**11015/10/2010-IA.II (M) DATED 06.06.2013**

**(OCTOBER'15 – MARCH'16)**

Sl. No.	A. Specific Conditions by MOEF:	Compliance
i.	<b>No mining shall be undertaken in/under the forestland until prior forestry clearance has been obtained under the provisions of FC Act 1980.</b>	Application for forest clearance was applied on 16.3.2010 to DFO, Dhanbad vide ref. no. WJA/MND/F/10/13 dated 16.3.2010. The initial application was misplaced from the office of DFO Dhanbad. It was further directed to apply again demanding “Jungle- Jhari” report for the whole leasehold area. We applied to get the above report from concerned Circle Officer. After several correspondences, C.O. sent the “Jungle- Jhari report for 3 mouzas out of 14 mauza only, showing unavailability/ tearing off of Khatiyani. After putting up the above report to DFO, Dhanbad, he directed to get the above report for rest of Mouzas from D.C’s Office, Dhanbad. D.C’s office issued the same for 2 mauzas only showing unavailability/tearing off of Khatiyani. Hence, application for forest clearance was again applied to DFO, Dhanbad vide ref. no. WJA/MND/GM/2013/2529 dt. 22.4.13/28.5.13 including above report. There are two no. of Mouzas namely Kunji and Lohapatti which have forest land under leasehold area of Lohapatti colliery. NOC from above Mouzas are obtained from the village panchayats as per the advice of the DFO. DFO, Dhanbad directed us to apply forest clearance of the same through ON-LINE. So Online registration for the same was done vide Unique Proposal no. FP/JH/MIN/9728/2015. Form ‘A’ application for the same has been completed, toposheets uploaded and Geo-reference is being done.
ii.	<b>The maximum production in the cluster shall not exceed beyond that for which environmental clearance has been granted for the cluster XIV.</b>	Being implemented
iii.	<b>The measure identified in the environmental plan for cluster – XIV group of mine and the condition given in this environmental clearance letter shall be dovetailed to the implementation of Jharia Action Plan.</b>	Agreed

iv.	<b>As there is no fire in cluster XIV but the measure should be adopted proponent to control spread of neighboring fire to this cluster XIV. The proponent shall prepare time series maps of Jharia Coal field through NRSA to monitor &amp; prevent fire problems in this Jharia Coalfield by Isothermal mapping / imaging and monitoring temperatures of the coal seam (whether they are closed 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 fire in other areas including in mines of cluster - XIV shall be undertaken.</b>	Already complied
V.	<b>Underground mining should be taken up after completion of reclamation of O/C mine area after two years.</b>	Agreed
vi.	<b>No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/check such fire including in old OB dump.</b>	At present there is no fire
vii.	<b>A part of Cluster XIV is under River Damodar. It was clarified that although the mine is underground, there is no coal underneath River Damodar, which would be mined. The Committee desired that the data of bore wells near River Damodar require to be monitored for permeability and seepage of water of River Damodar.</b>	Agreed.
viii.	<b>The rejects of washeries in Cluster –XIV should be send to FBC based plant.</b>	There is no washery in cluster XIV, so rejects of washery in cluster XIV cannot be sent to FBC based plant.
ix	<b>There shall be no external OB dumps.OB produce from the whole cluster will be 7.29 Mm<sup>3</sup>. OB from one patch OCP 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.</b>	Will be complied. There is no opencast mine in this cluster at present.
x.	<b>A detailed calendar plan of production with plan for OB dumping and back filling (for open cast mines) and reclamation and final mine closure plan for each mine of cluster XIV shall be drawn up &amp; implemented.</b>	Being implemented. Mine closure plan is approved
xi.	<b>The void in 5 ha area shall be converted in to a water reservoir of maximum depth of</b>	

	<b>15-20 mtr in post mining stage and shall be gently sloped and upper benches of the reservoir shall be stabilized with plantation and periphery of the reservoir fenced . The abandoned pits and voids should be backfilled with OB &amp; biologically reclaimed with plantation and or may used for pisciculture.</b>	Will be Complied
xii.	<b>Mining shall be carried out as per statuette 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.</b>	Complied.
xiii.	<b>Active OB dumps near water body and rivers should be rehandled for back filling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.</b>	No active OB dumps in this cluster at present.
xiv.	<b>Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 47.63 ha would be reclaimed and afforested by planting native species in consultation with local DFO/Agriculture deptt. Institutions with the relevant discipline. The density of the trees should be around 2500 plants per ha.</b>	Agreed. Sufficient plantation in required area is done and is also being done. There is no reclaimed land under the leasehold area of cluster XIV and so thick green belt is already developed in adjoining area of cluster XIII ( Ecological restoration of 4.2 ha & 1.5 ha area are maintained for the purpose in reclaimed land).
xv.	<b>The roads should be provided with avenue plantation on both sides as trees act as sink of carbon and other pollutant.</b>	Agreed. Being complied.
xvi.	<b>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- XIV shall be implemented.</b>	Implemented. Environmental action plan is maintained for the purpose.
xvii.	<b>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, flyash from TPPs, silica from natural dust, etc.) and a Source Apportionment Study should be got carried out for the entire Jharia Coalfields. Mineralogical composition study should be undertaken on the</b>	Location of monitoring stations was already finalized. For award of Source Apportionment study and Mineralogical composition study. Tendering was done twice but cancelled as no bidder qualified. A MoU was signed with NEERI/ICFRE to take up such studies.

	<b>composition of the suspended particulate matter (PM10 and PM2.5) 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.</b>	
xviii.	<b>No ground water shall be used for mining activities. Additional water required, if any, shall be met from mine water or by recycling / reused of the water from the existing activities and from rain water harvesting measures. The project authority shall meet water requirement of nearby village (s) in case the village wells go dry to dewatering of mine.</b>	Already being done water supplied to Kandra and Bhurungia village and all other adjoining villages. There are 8 no. of ponds maintained for the purpose within leasehold area of Cluster XIV.
xix.	<b>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 done 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 &amp; 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.</b>	Complied by CMPDI, DHANBAD. Applied for getting permission to dewater ground water to CGWA, New Delhi. 8 no. of ponds within leasehold area of Cluster XIV maintained for rain water harvesting.
xx.	<b>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.</b>	Being complied by CMPDI. Records maintained for the purpose.
xxi.	<b>ETP shall also be provided for workshop, and CHP, if any. Effluents shall be treated to confirm to prescribe standards in case discharge into the natural water course.</b>	There is no effluent discharge into natural water course. However there is arrangement for treatment of effluent discharge to prescribed standards. There is neither Open Cast mine running nor CHP nor such workshop in this cluster at present.
xxii.	<b>Regular monitoring of subsidence movement on the surface over and around the working area and impact natural drainage pattern, water bodies, vegetation, structure, roads and surroundings shall be</b>	At present there is no active depillaring operation in the underground workings of ClusterXIV. There is no chance of active subsidence at present. However

	<b>continued till movement ceases completely. In case observation of any high rate of subsidence movement, appropriate effective corrective measure shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil /suitable material.</b>	subsidence monitoring is being done.
xxiii.	<b>Sufficient coal pillars shall be left un extracted around the air shaft (within subsidence influence area) to protect from any damage from subsidence, if any.</b>	Already complied as per DGMS provisions
xxiv.	<b>High root density tree species shall be selected and planted over areas likely to be affected by subsidence.</b>	At present there is no active depillaring operation in the underground workings of ClusterXIV. There is no chance of active subsidence at present. However subsidence monitoring is being done.
Xxv.	<b>Depression due to subsidence resulting in water accumulating within low lying areas shall be filled up or drained out by cutting drains.</b>	At present there is no active depillaring operation in the underground workings of ClusterXIV. There is no chance of active subsidence at present. However subsidence monitoring is being done.
Xxvi.	<b>Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the road.</b>	Already complied as per DGMS's statutory provisions.
xxvii.	<b>No depillaring operation shall be carried out below the township/colony.</b>	At present there is no active depillaring operation in the underground workings of ClusterXIV. There is no chance of active subsidence at present.
xxviii.	<b>The transportation plan for conveyor – cum – rail for cluster XIV 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. The plan for conveyor – cum – rail for cluster XIV should be dovetailed with Jharia Action Plan. The road transportation of coal during phase I should be by mechanically covered trucks.</b>	Agreed.  Transportation trucks /dumpers are already covered by Tarpaulin during transport.
xxix.	<b>A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.</b>	Being studied.
xxx.	<b>R &amp; R of 713 nos. of PAF's involved. They should be rehabilitated at cost of Rs. 5035.38 lacs as per the approved Jharia Action Plan.</b>	PAF's involved is being rehabilitated as per cost specified as per Jharia Action Plan.

Xxxi.	<b>Details of transportation, CSR, R&amp;R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet for and submitted to Ministry.</b>	Complied. Will be submitted soon.
Xxxii.	<b>A detailed CSR action plan shall be prepared for cluster XIV group of mines. Specific activities shall be identified for CSR of Rs. 20.25 / annum @of Rs.5/ton of coal production as recurring expenditure. The area within the cluster XIV ML that would be existing 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 . Third party evaluation shall be got carried out regularly for the proper implementation of activities under taken in the project area under CSR. Issue raised in the public hearing should also be integrated with activities being taken up under CSR. The details of CSR undertaken alongwith budgetary provisions for the village wise various activities and the 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.</b>	Agreed. Being complied
xxxiii.	<b>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.</b>	Being prepared

xxxiv.	<b>A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment &amp; 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.</b>	<p>Mine closure plan has already been approved.</p> <p>Required Habitat Restoration Plan of the mine area is off – loaded to CMPDIL and is being maintained.</p>
xxxv.	<b>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 Company for implementing environment policy and socio – economic issues and the capacity building required in this regard.</b>	<p>A full-fledged Environment Department, headed by a HoD (Environment) along with a suitable qualified multidisciplinary team of executives (12 nos.) which includes Environment, Mining, Excavation, Civil, Survey, Electrical &amp; mechanical, Forestry disciplines executives and technicians (4 nos.) 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.</p>
xxxvi.	<b>Implementation of final mine closure plan for cluster XIV, subject to obtaining prior approval of the DGMS in regard to mines safety issues.</b>	<p>Mine closure plan has been approved.</p>

xxxvii.	<b>Corporate Environment Responsibility:</b>	Agreed
a)	<b>The Company shall have a well laid down Environment Policy approved by the Board of Directors.</b>	Agreed
b)	<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.</b>	Complied
c)	<b>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.</b>	Complied
d)	<b>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.</b>	Complied
Sl. No.	<b>B. General Conditions Conditions by MOEF:</b>	<b>Compliance</b>
i.	<b>No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.</b>	Being Complied
ii.	<b>No change in the calendar plan of production for quantum of mineral coal shall be made.</b>	Being Complied
iii.	<b>Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM 2.5, SO<sub>2</sub> and NO<sub>x</sub> monitoring. Location of the stations shall be decided based on the meteorological data,</b>	The fixing up of locations of monitoring stations in the Jharia Coalfields has been taken up with the Jharkhand State Pollution Control Board. The work of monitoring of ambient environment is being done through CMPDIL which is having laboratory




	<b>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.</b>	under EP rule.  Records for the same are maintained.
iv.	<b>Data on ambient air quality (PM10, PM 2.5, SO<sub>2</sub> and NO<sub>x</sub>) and heavy metals such as 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.</b>	Being complied. Monitoring for the same is done by CMPDIL.
v.	<b>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.</b>	Being complied  No opencast projects at present in Cluster XIV
vi.	<b>Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31<sup>st</sup> December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.</b>	The work of monitoring of ambient environment will be done through CMPDIL which is having laboratory under EP rule. There is neither Open Cast mine running nor CHP nor such workshop from where effluent discharge is found. Very small quantity of burnt oil is generated which is used to lubricate the machines.
vii.	<b>Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.</b>	Already Complied.
viii.	<b>Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in</b>	It is complied.Montoring for the same is being done by CMPDIL which is having laboratory under EP rule.

	<b>consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, 1986.</b>	
ix.	<b>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.</b>	Being Complied. Vocational training Centers under separate Human Resource Development Deptt. is conducting regular training programme on these issues.
x.	<b>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.</b>	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) `s guideline.
xi.	<b>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.</b>	A full-fledged Environment Department, headed by a HoD (Environment) along with a suitable qualified multidisciplinary team of executives (12 nos.) which includes Environment, Mining, Excavation, Civil, Survey ,Electrical & mechanical, Forestry disciplines executives and technicians (4 nos.) 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.
xii.	<b>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.</b>	It is being initiated to comply the same. Agreed to report the same.

xiii.	<b>The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment &amp; Forests at <a href="http://envfor.nic.in">www.envfor.nic.in</a> <a href="http://envfor.nic.in">http://envfor.nic.in</a>.</b>	It has been complied.
xiv.	<b>A copy of the environmental clearance letter shall be marked to concern Panchayat/Zila Parishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.</b>	Complied.
xv.	<b>A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.</b>	Complied.
xvi.	<b>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 PM10, PM2.5, SO 2 and NOx (ambient) and critical sectorial parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.</b>	Complied.
xvii.	<b>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.</b>	Being complied.

xviii.	<b>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.</b>	Agreed .It is being and shall be complied.
xix	<b>The Environmental statement for each financial year ending 31<sup>st</sup> March – Form – V is mandated to be submitted by the Project proponent for the concerned State Pollution Control Board as prescribed under the Environmental (Protection) Rules, 1986 as amended subsequently, shall also be uploaded on the company's website along with the status of compliances of EC conditions and shall be sent to the respective Regional Officers of the MOEF by e-mail.</b>	Already complied
8	<b>The Ministry or any other competent authority may stipulate any further condition for environmental protection.</b>	Agreed
9	<b>Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.</b>	Agreed
10	<b>The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention &amp; Control of Pollution) Act, 1974, the Air (Prevention &amp; Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.</b>	Agreed

11	The Environmental Clearance is subject to the outcome of the Writ Petition filed by M/S Bharat Coking Coal Limited (BCCL) in response to the closure orders issued by the Jharkhand State Pollution Control Board which is pending in the Jharkhand High Court.	Agreed
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 Project officer, Lohapatti colliery  
 Project Officer  
 Lohapatti Colliery  
 W.J. Area (B.C.C.L)

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**ENVIRONMENTAL MONITORING REPORT  
OF  
BHARAT COKING COAL LIMITED,  
CLUSTER – XVI**

**(FOR THE Q.E. MARCH, 2016)**

**E. C. no. J-11015/185/2010-IA.II (M) dated 06.02.2013-**

**May, 2016**



**CMPDI**

ISO 9001 Company  
**Regional Institute-II**  
**Dhanbad, Jharkhand**

**CLUSTER - XVI**  
**(FOR THE Q.E. March, 2016)**

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# **ENVIRONMENTAL MONITORING REPORT OF BHARAT COKING COAL LIMITED CLUSTER – XVI**

**(FOR THE Q.E. MARCH, 2016)**

**E. C. no. J-11015/185/2010-IA.II (M) dated 06.02.2013-**

**May, 2016**



## **CMPDI**

**ISO 9001 Company  
Regional Institute-II  
Dhanbad, Jharkhand**



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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 Raniganj Coalfield (RCF) is a part of Gondwana Coalfields located in Dhanbad district of Jharkhand, the RCF is bounded by 23°42' N to 23°75' N latitudes and 86°43' E to 86°85' E longitude occupying an area of 450 Sq.km. BCCL has awarded Environmental monitoring work of Raniganj Coalfield (RCF) to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per the conditions laid down by the MoEFCC 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 MoEFCC, 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, washray 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<sub>10</sub>), Fine Particulate Matter (PM<sub>2.5</sub>), Sulphur Di-oxide (SO<sub>2</sub>) and Nitrogen Oxides (NO<sub>x</sub>). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM<sub>2.5</sub> sampler) were used for sampling of PM<sub>10</sub>, SO<sub>2</sub>, & NO<sub>x</sub> and Fine Dust Sampler (PM<sub>2.5</sub> sampler) were used for sampling of PM<sub>2.5</sub> 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.

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### **3.2 Water quality**

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 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<sub>EQ</sub>' 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<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are mostly within the permissible limits in all sampling locations as per MoEFCC 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 SPM, PM<sub>10</sub> & PM<sub>2.5</sub> 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 MoEFCC 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 within 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 MoEFCC 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.

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## 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 (MoEFCC), 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 Raniganj Coalfield (RCF).

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 MoEFCC 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-XVI is in the Western part of the Raniganj coalfield and situated in the C.V. area of BCCL. It includes a group of 5 Mines (viz. Dahibari Basantimata OCP, Basantimata UG, New Laikdih OCP, Laikdih Deep UG & Chanch UG). The Cluster – XVI is situated about 50 - 55 kms from Dhanbad Railway Station. The mines of this Cluster – XVI 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 River & Barakar River.
- 1.2 The Cluster-XVI is designed to produce 1.51 MTPA (normative) and 1.963 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEFCC) for a rated capacity 1.51 MTPA (normative) and 1.963 MTPA (peak) capacity of coal production vide letter no. J-11015/185/2010-IA.II (M) dated 06<sup>th</sup> February, 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<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> 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.

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

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## 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) Dahibari OCP (A22): Industrial Area

The location of the sampling station is 23°42'20" to 23°44'40"N 086°43'35" to 086°47'06"E. The sampler was placed at Ground level of Substation Office. The station was selected to represent the impact of mining activities of C.V. area, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

##### ii) Basntimata UGP Office (A23): Industrial Area

The location of the sampling station is 23°43'20" to 23°44'40"N 086°43'35" to 086°46'E. The sampler was placed at Roof of Project Office. The station was selected to represent the impact of mining activities of C.V. Area, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

#### 2.2 Methodology of sampling and analysis

Parameters chosen for assessment of ambient air quality were Particulate Matter (PM<sub>10</sub>), Particulate Matter (PM<sub>2.5</sub>), Sulphur di-oxide (SO<sub>2</sub>) and Nitrogen oxides (NO<sub>x</sub>). Respirable Dust Samplers (RDS) & fine particulates for PM<sub>2.5</sub> sampler were used for sampling PM<sub>10</sub> & PM<sub>2.5</sub> 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<sub>10</sub>**

In **core zone** under **Industrial area** varies from 86 to 108  $\mu\text{m}^3$

#### **Particulate Matter PM<sub>2.5</sub>**

In **core zone** under **Industrial area** varies from 40 to 56  $\mu\text{m}^3$

#### **Sulphur Dioxide:**

In **core zone** under **Industrial area** varies from 10 to 13  $\mu\text{m}^3$

#### **Oxides of Nitrogen:**

In **core zone** under **Industrial area** varies from 19 to 28  $\mu\text{m}^3$

## AMBIENT AIR QUALITY DATA

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

Year : **2015-16.**

Name of the Cluster : **Cluster – XVI**

Q.E.: **March 2016**

**Station Code/Name: (a) A22 Dahibari OCP**

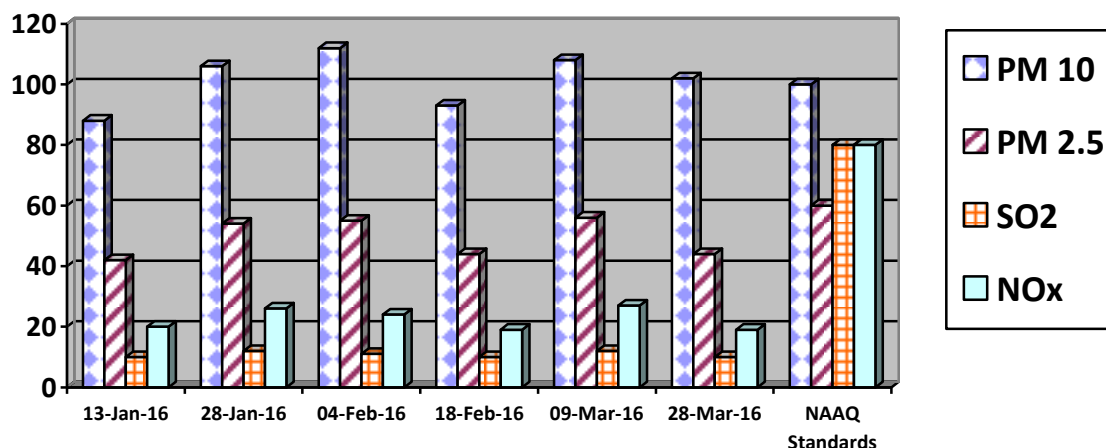
**Category: Industrial.**

**(b) A23 Basantimata UGP**

**ZONE: Core**

**(a). Station Code/Name: A22- Dahibari OCP Category: Industrial<sup>1</sup>.**

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>
1	13 - Jan -16	88	42	<10.0	20
2	28 - Jan - 16	106	54	12	26
3	04 - Feb -16	112	55	11	24
4	18 - Feb - 16	93	44	<10.0	19
5	09 - Mar - 16	108	56	12	27
6	28 - Mar - 16	102	44	<10.0	19
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( $\mu\text{g}/\text{m}^3$ )	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

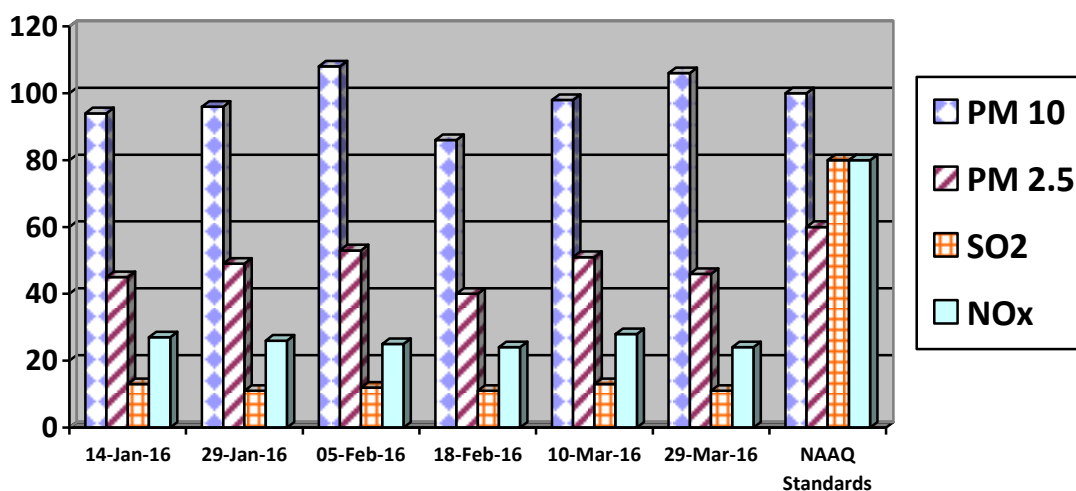
**Note:**

➤ All values are expressed in microgram per cubic meter.

<sup>1</sup> Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed..........Dated 28.05.2016. Job No. 110310

**(b). Station Code/Name: A23- Basantimata UGP Category: Industrial<sup>2</sup>.**

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>
1	14 - Jan -16	94	45	13	27
2	29 - Jan - 16	96	49	11	26
3	05 - Feb -16	108	53	12	25
4	18 - Feb - 16	86	40	11	24
5	10 - Mar - 16	98	51	13	28
6	29 - Mar - 16	106	46	11	24
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(µg/m <sup>3</sup> )	<0.005	<0.001	<0.01	<0.001	<0.01	<0.005

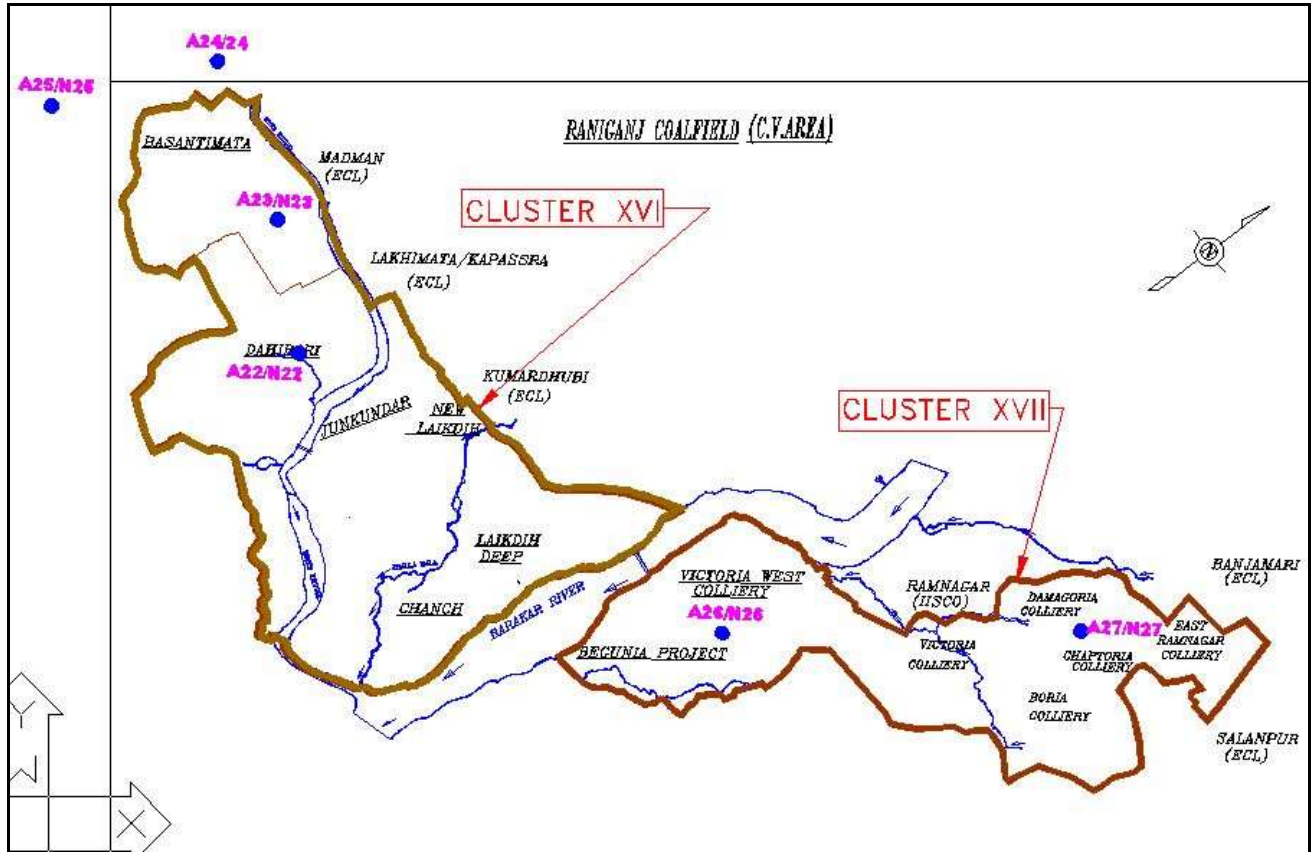
**Note:**

- All values are expressed in microgram per cubic meter.
- 24 hours duration

<sup>2</sup> 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- XVI in Core & Buffer Zones



**Ambient Air Quality Standards for Raniganj 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
<b>III</b> Coal mines located in the coal fields of <ul style="list-style-type: none"> <li>• Jharia</li> <li>• Raniganj</li> <li>• Bokaro</li> </ul>	Suspended Particulate Matter (SPM)	Annual Average *  24 hours **	500 $\mu\text{g}/\text{m}^3$  700 $\mu\text{g}/\text{m}^3$	- High Volume Sampling (Average flow rate not less than 1.1 $\text{m}^3/\text{minute}$ )
	Respirable Particulate Matter (size less than 10 $\mu\text{m}$ ) (RPM)	Annual Average *  24 hours **	250 $\mu\text{g}/\text{m}^3$  300 $\mu\text{g}/\text{m}^3$	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide ( $\text{SO}_2$ )	Annual Average *  24 hours **	80 $\mu\text{g}/\text{m}^3$  120 $\mu\text{g}/\text{m}^3$	1.Improved west and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as $\text{NO}_2$	Annual Average *  24 hours **	80 $\mu\text{g}/\text{m}^3$  120 $\mu\text{g}/\text{m}^3$	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemiluminescence

**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 18<sup>th</sup> 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 11<sup>th</sup> April 1994 and S.O.935(E), dated 14<sup>th</sup> 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)	
<b>Sulphur Dioxide (SO<sub>2</sub>), µg/m<sup>3</sup></b>	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
<b>Nitrogen dioxide (NO<sub>2</sub>), µg/m<sup>3</sup></b>	Annual * 24 Hours **	40 80	30 80	-Jacob & Hochheiser modified (NaOH-NaAsO <sub>2</sub> ) Method -Gas Phase Chemiluminescence
<b>Particulate Matter (Size less than 10µm) or PM<sub>10</sub>, µg/m<sup>3</sup></b>	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
<b>Particulate Matter (Size less than 2.5µm) or PM<sub>2.5</sub>, µg/m<sup>3</sup></b>	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
<b>Ozone (O<sub>3</sub>), µg/m<sup>3</sup></b>	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
<b>Lead (Pb), µg/m<sup>3</sup></b>	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
<b>Carbon Monoxide (CO), mg/m<sup>3</sup></b>	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
<b>Ammonia (NH<sub>3</sub>), µg/m<sup>3</sup></b>	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
<b>Benzene (C<sub>6</sub>H<sub>6</sub>), µg/m<sup>3</sup></b>	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
<b>Benzo(a)Pyrene (BaP) Particulate phase only, ng/m<sup>3</sup></b>	Annual *	01	01	-Solvent extraction followed by HPLC/GC analysis
<b>Arsenic (As), ng/m<sup>3</sup></b>	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
<b>Nickel (Ni), ng/m<sup>3</sup></b>	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.

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## CHAPTER – III

### WATER QUALITY MONITORING

#### 3.1 Location of sampling sites

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

i) **Mine Discharge of Dahibari (MW16)**

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 Patlabari Village (DW16)**

iii) **Surface Water quality at U/S of Khudia River (SW33)**

iv) **Surface Water quality at D/S of Khudia River (SW34)**

#### 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 parameters 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 Project: **Cluster - XVI**

Month: **January, 2016.**

Name of the Stations & Code :

**1. MW16- Mine Discharge of Dahibari**

#### First Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		08.01.2016	
1	Total Suspended Solids	48	100 (Max)
2	pH	7.92	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	36	250 (Max)

#### Second Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		25.01.2016	
1	Total Suspended Solids	54	100 (Max)
2	pH	7.81	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	40	250 (Max)

All values are expressed in mg/lit unless specified.

  
Analysed By

  
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 Project: **Cluster - XVI**

Month: **February, 2016.**

Name of the Stations & Code :

**1. MW16- Mine Discharge of Dahibari**

#### First Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		05.02.2016	
1	Total Suspended Solids	68	100 (Max)
2	pH	7.75	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	52	250 (Max)

#### Second Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		19.02.2016	
1	Total Suspended Solids	74	100 (Max)
2	pH	7.66	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	56	250 (Max)

All values are expressed in mg/lit unless specified.

  
Analysed By

  
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 Project: **Cluster - XVI**

Month: **March, 2016.**

Name of the Stations & Code :

**1. MW16- Mine Discharge of Dahibari**

#### First Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		05.03.2016	
1	Total Suspended Solids	54	100 (Max)
2	pH	8.45	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	36	250 (Max)

#### Second Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge )	As per MOEF General Standards for schedule VI
		16.03.2016	
1	Total Suspended Solids	42	100 (Max)
2	pH	8.30	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

  
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 Project: **Cluster - XVI** Period: **H. E. March, 2016**

Area : **Dahibari UGP**

Project: **Dahibari UGP** Cluster **XVI**

Stations:

Date of Sampling:  
16/03/2016

1. Mine Water Discharge Dahibari UGP MW-16

Sl.No.	Parameter	Sampling Stations			Detection Limit	MOEF -SCH-VI STANDARDS Class 'A'	BIS Standard & Method
		MW-16	2	3			
1	Ammonical Nitrogen, mg/l, Max	0.43			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, 22 <sup>nd</sup> 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	<0.30			0.30	5.0	APHA, 22 <sup>nd</sup> Edition Molybdovanadate
8	Fluoride (as F) mg/l, Max	0.80			0.02	2.0	APHA, 22 <sup>nd</sup> Edition, SPADNS
9	Free Ammonia, mg/l, Max	<0.01			0.01	5.0	IS:3025/34:1988, Nessler's
10	Hexavalent Chromium, mg/l, Max	<0.01			0.01	0.1	APHA, 22 <sup>nd</sup> 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, 22 <sup>nd</sup> 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	4.7			0.50	10.0	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric
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	8.30			2.5	5.5 to 9.0	IS-3025/11:1983, R-1996, Electrometric
19	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH),mg/l, Max	<0.002			0.002	1.0	APHA, 22 <sup>nd</sup> Edition 4-Amino Antipyrine
20	Selenium (as Se), mg/l, Max	<0.002			0.002	0.05	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
21	Sulphide (as SO <sub>3</sub> ), mg/l, Max	<0.005			0.005	2.0	APHA, 22 <sup>nd</sup> Edition Methylene Blue
22	Temperature (°C)	36.4			Shall not exceed 5° C above the receiving temp.		IS-3025/09:1984, Thermometric
23	Total Chromium (as Cr), mg/l, Max	<0.06			0.06	2.0	IS-3025/52:2003, AAS-Flame
24	Total Kjeldahl Nitrogen, mg/l, Max	1.4			1.00	100.0	IS:3025/34:1988, Nessler's
25	Total Residual Chlorine, mg/l, Max	0.05			0.02	1.0	APHA, 22 <sup>nd</sup> Edition, DPD
26	Total Suspended Solids, mg/l, Max	42			10.00	100.0	IS 3025/17:1984, R :1996, Gravimetric
27	Zinc (as Zn), mg/l, Max	0.017			0.01	5.0	IS 3025 /49 : 1994, R : 2009, AAS-Flame

Analysed By

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 Project : **Cluster - XVI**

Period: **Q. E. March, 2016**

Area : **Dahibari UGP**

Project: **Dahibari UGP** Cluster **XVI**

Stations:

1. Upstream in Khudia River SW-33
2. Downstream in Khudia River SW-34

Date of Sampling:

05/03/2016

05/03/2016

Sl. No	Parameter	Sampling Stations				Detection Limit	BIS Standard & Method
		SW-33	SW-34	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	2.6	2.8			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	42	46			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	Dissolved Oxygen, min.	6.7	5.5			0.10	IS 3025/381989, R : 2003, Winkler Azide
7	Fluoride (as F) mg/l, Max	0.57	0.64			0.02	APHA, 22 <sup>nd</sup> Edition SPADNS
8	Hexavalent Chromium, mg/l, Max	<0.01	<0.01			0.01	APHA, 22 <sup>nd</sup> 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, 22 <sup>nd</sup> Edition AAS-GTA
11	Nitrate (as NO <sub>3</sub> ), mg/l, Max	0.89	1.33			0.50	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric
12	pH value	7.58	7.72			2.5	IS-3025/11:1983, R-1996, Electrometric
13	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.002	<0.002			0.002	APHA, 22 <sup>nd</sup> Edition 4-Amino Antipyrine
14	Selenium (as Se), mg/l, Max	<0.002	<0.002			0.002	APHA, 22 <sup>nd</sup> Edition AAS-GTA
15	Sulphate (as SO <sub>4</sub> ) mg/l, Max	95	160			2.00	APHA, 22 <sup>nd</sup> Edition Turbidity
16	Total Dissolved Solids, mg/l, Max	224	328			25.00	IS 3025 /16:1984 R : 2006, Gravimetric
17	Zinc (as Zn), mg/l, Max	<0.01	<0.01			0.01	IS 3025 /49 : 1994, R : 2009, AAS-Flame

Analysed By

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 Project: **Cluster - XVI**

Period: **Q. E. March, 2016**

Area : **Dahibari UGP**

Project: **Dahibari UGP**      Cluster **XVI**

Stations:

1. Drinking Water from Pattabari village DW-16

Date of Sampling:  
05/03/2016

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		DW-16	2	3			
1	Boron (as B), mg/l, Max	<0.20			0.20	0.5	APHA, 22 <sup>nd</sup> Edition ,Carmin
2	Colour,in Hazen Units	1			1	5	APHA, 22 <sup>nd</sup> Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	50			1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	90			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	0.64			0.02	1.0	APHA, 22 <sup>nd</sup> Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.04			0.02	0.2	APHA, 22 <sup>nd</sup> Edition, DPD
8	Iron (as Fe), mg/l, Max	0.507			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, 22 <sup>nd</sup> 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 <sub>3</sub> ), mg/l, Max	1			0.5	45	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	8.39			2.5	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001			0.001	0.001	APHA, 22 <sup>nd</sup> Edition,4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002			0.002	0.01	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
16	Sulphate (as SO <sub>4</sub> ) mg/l, Max	34			2.00	200	APHA, 22 <sup>nd</sup> Edition. Turbidity
17	Taste	Acceptable			Qualitative	Acceptable	APHA, 22 <sup>nd</sup> Edition. Taste
18	Total Alkalinity (c <sub>a</sub> CO <sub>3</sub> ),, mg/l, Max	160			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	480			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c <sub>a</sub> CO <sub>3</sub> ), mg/l, Max	336			4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	2			1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.032			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

Analysed By

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 Project: **Cluster - XVI**

Period: **Q. E. March, 2016**

Area : **Dahibari UGP**

Project: **Dahibari UGP**      Cluster **XVI**

Stations:

1. Ground Water from Dahibari, Niche Basti GW-16

Date of Sampling:  
29/02/2016

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW-16	2	3			
1	Boron (as B), mg/l, Max	<0.20			0.20	0.5	APHA, 22 <sup>nd</sup> Edition ,Carmin
2	Colour,in Hazen Units	4			1	5	APHA, 22 <sup>nd</sup> Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	75			1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	56			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	0.48			0.02	1.0	APHA, 22 <sup>nd</sup> Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.03			0.02	0.2	APHA, 22 <sup>nd</sup> 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, 22 <sup>nd</sup> 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 <sub>3</sub> ), mg/l, Max	12			0.5	45	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	7.92			0.20	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001			0.001	0.001	APHA, 22 <sup>nd</sup> Edition, 4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002			0.002	0.01	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
16	Sulphate (as SO <sub>4</sub> ) mg/l, Max	122			2.00	200	APHA, 22 <sup>nd</sup> Edition. Turbidity
17	Taste	Acceptable			Qualitative	Acceptable	APHA, 22 <sup>nd</sup> Edition. Taste
18	Total Alkalinity (c <sub>a</sub> CO <sub>3</sub> ), mg/l, Max	148			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	580			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c <sub>a</sub> CO <sub>3</sub> ), mg/l, Max	364			4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	6			1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.149			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

Analysed By

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

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## CHAPTER - IV

### NOISE LEVEL QUALITY MONITORING

#### 4.1 Location of sampling sites and their rationale

##### i) Dahibari OCP (N22)

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) Basantimata UGP (N23)

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

#### 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 -XVI**

Month: **January, 2016.**

Name of the Stations & Code :

1. **Dahibari OCP(N22)**
2. **Basantimata UGP (N23)<sup>1</sup>**

### (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	Dahibari OCP (N22)	Industrial area	13.01.2016	63.8	75
2	Basantimata UGP (N23)	Industrial area	14.01.2016	62.8	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	Dahibari OCP (N22)	Industrial area	28.01.2016	61.2	75
2	Basantimata UGP (N23)	Industrial area	29.01.2016	64.6	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.

<sup>1</sup> 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 -XVI**

Month: **February, 2016.**

Name of the Stations & Code :

1. **Dahibari OCP(N22)**
2. **Basantimata UGP (N23)<sup>2</sup>**

### 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	Dahibari OCP (N22)	Industrial area	04.02.2016	60.6	75
2	Basantimata UGP (N23)	Industrial area	05.02.2016	61.3	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	Dahibari OCP (N22)	Industrial area	18.02.2016	64.7	75
2	Basantimata UGP (N23)	Industrial area	18.02.2016	57.6	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.*

<sup>2</sup> 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 -XVI**

Month: **March, 2016.**

Name of the Stations & Code :

1. **Dahibari OCP(N22)**
2. **Basantimata UGP (N23)<sup>3</sup>**

### 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	Dahibari OCP (N22)	Industrial area	09.03.2016	62.6	75
2	Basantimata UGP (N23)	Industrial area	10.03.2016	64.2	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	Dahibari OCP (N22)	Industrial area	28.03.2016	63.4	75
2	Basantimata UGP (N23)	Industrial area	29.03.2016	63.8	75

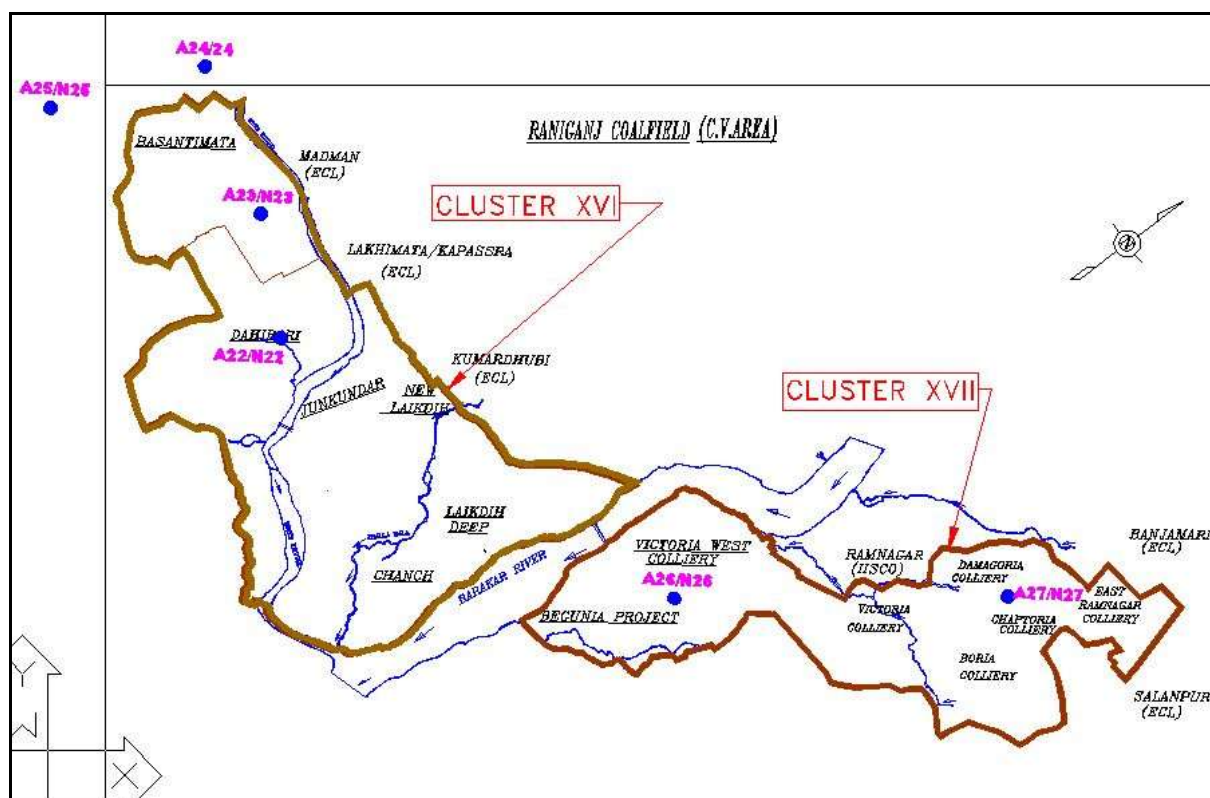
*\*Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control) Rules, 2000.*

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

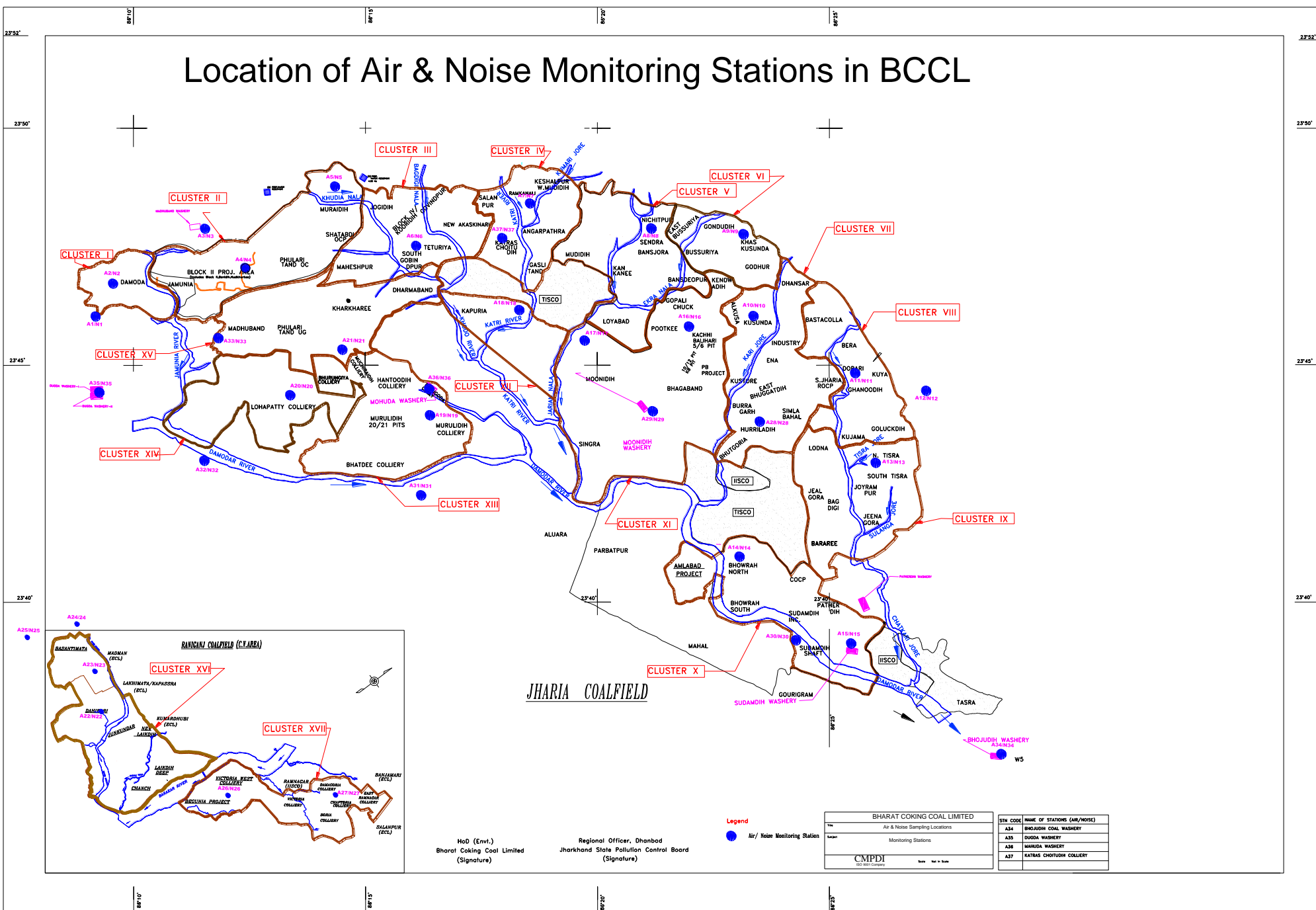
<sup>3</sup> Report released by Shri Indranil De, Manager (Env), CMPDI, RI-1, Asansol, Signed..........Dated 28.05.2016. Job No. 110310



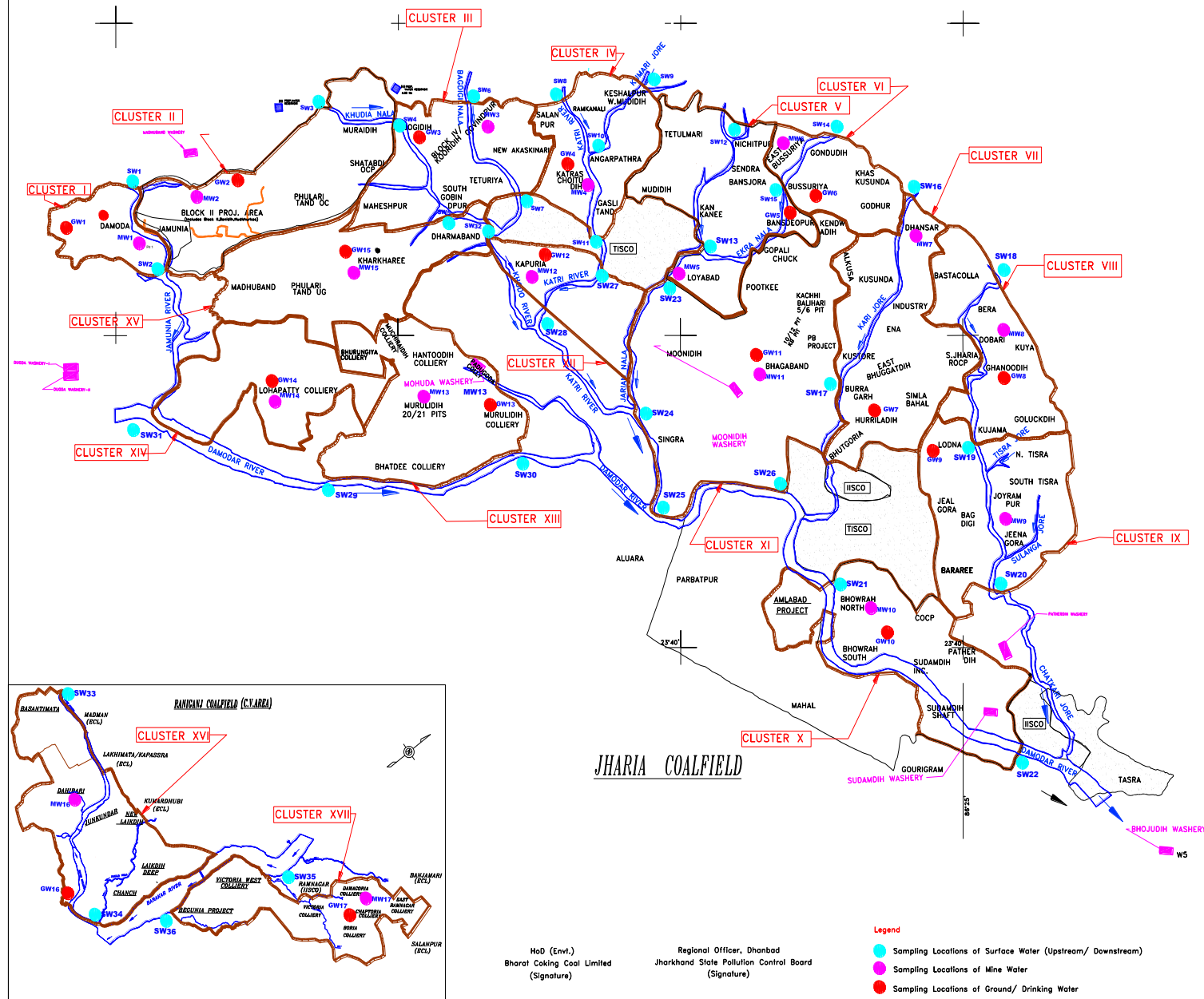
### Noise Level Monitoring Location of Cluster XVI



# Location of Air & Noise Monitoring Stations in BCCL



# Water Sampling Locations in BCCL



## INDEX

Cluster	Surface 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 Block II OCP	GW1	Shutway Village
II	SW3, SW4	Khudra Nala	MW2		GW2	Joyrampur Village
III	SW4, SW5, SW6, SW7	Khudra Nala, Bagdi Nala	MW3	Govindpur Colliery	GW3	Jogidh Village
IV	SW8, SW11, SW9, SW10	Kari River, Kumari Jore	MW4	Chotudih	GW4	Kankane Village
V	SW12, SW13, SW15	Jarian Nala, Ekra Nala	MW5	Mudidih	GW5	Nichitpur
VI	SW14, SW15	Ekra Nala	MW6	East Bessura UGP	GW6	Bansjora Borewell
VII	SW16, SW17	Kari Jore	MW7	Dhanar UGP	GW7	Huriladih
VIII	SW18, SW19	Kash Jore	MW8	Dhanar UGP	GW8	Ghanudih
IX	SW19, SW20	Kash Jore	MW9	Jeena Gora	GW9	Lodna
X	SW21, SW22	Damodar River	MW10	North	GW10	Bhowrah South
XI	SW23, SW24, SW25, SW26	Damodar River	MW11	Bhowrah h UGP	GW11	Bhagbandh
XII	SW27, SW28	Kari River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Muridih (20/21)	GW13	Muridih
XIV	SW31, SW29	Damodar River	MW14	Lohapatti	GW14	Lohapatti
XV	SW5, SW32	Khudra Nala	MW15	Kharkharee UGP	GW15	Kharkharee
XVI	SW33, SW34	Khudra River	MW16	Dahbari OCP	GW16	Pallabari Village
XVII	SW35, SW36	Damodar River	MW17	Damagoria Colliery	GW17	Chaptoria

Source: BHARAT COKING COAL LIMITED

Title: WATER SAMPLING LOCATIONS

Subject: MONITORING STATIONS

CMPDI

Scale: Not to Scale