Bharat Coking Coal Limited
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
CHANCH-VICTORIA AREA-XII
P.O.-BARAKAR – 713324, DIST-BURDWAN (W.B.)
Phone : 0341-2520061/62; FAX 0341-2520063

Ref. No: BCCL/CV/ ENVT/2017/99

Date: 02.12.2017

To,
The Director,
Ministry of Environment, Forest, Climate Change,
Regional Office (ECZ), Bungalow No. A-2,
Shyamali Colony,
Ranchi, Jharkhand- 834002

Sub:- Six Monthly Report On Implementation Of Environmental Measures For The Period From April 2017 To September 2017 In Respect Of Cluster-XVI Group Of Mines Of BCCL.

Dear Sir,

Enclosed please find herewith the six monthly reports on implementation of environmental protection measure for the period from April 2017 To September 2017 in respect of Cluster-XVI group of mines of BCCL.

Hope you will find the same in order.

Yours Faithfully

2/12/17

General Manager
CV Area

CC to: - (1) Dr. Sunita Aulock, Director 1A monitoring cell, Paryavaran Bhawan CGO Complex, New Delhi-110003
(2) The Incharge, Zonal Office, CPCB, Southernd Conclave, Block 502,5th & 6th Floors, 1582 Rajdanga Main Road Kolkata – 700107 (W.B)
(3) The Regional Officer, JSPCB, Hirapur, Dhanbad- 826001, Jharkhand
(4) Dy.GM (Environment), BCCL, Koyla Bhawan, Dhanbad.
(5) AGM, CV Area.
(6) Project Officer, DBOCP
(7) Nodal Officer (Envt), CV Area.
(8) Office Copy

COMPLIANCE OF EC CONDITIONS OF CLUSTER- XVI

EC order no- J-11015/185/2010-IA.II (M) Dated 06.02.2013

Up to September 2017

<table>
<tr><th>Sl. no.</th><th>A. Specific Conditions by MOEF:</th><th>Compliance</th></tr>
<tr><td>i</td><td>The maximum production shall not exceed beyond that for which environmental clearance has been granted for the 5 mines of cluster XVI as below:</td><td>The approved peak production of coal for Cluster XVI is 1.963 MTPA. The total production of coal for the cluster XVI for the FY 2016-17 is 1.299 MT which is well within the limit. Production of the coal in this FY 2016-17 during April'17 to September'17 is 0.64 MT.</td></tr>
<tr><td>ii</td><td>All the void /water bodies should be backfilled up to ground level and no OB dump at the end of mining.</td><td>Dahibari Basantimata OCP (DBOCP) is the only operating OC project in Cluster XVI and backfilling is being done simultaneously. At the end of mining all water bodies and void will be filled up to ground level and there will be no OB dump remains left.</td></tr>
<tr><td>iii</td><td>Extensive plantation should be provided on either side of River;</td><td>A total of 2, 42,500 Nos. saplings are planted till September 2017 in Cluster XVI. Apart from this extensive plantation already exist on both side of Khudia river.</td></tr>
<tr><td>iv</td><td>Impact of mining on ground water of the area (Impact Zone) should be provided;</td><td>There is no significant impact on ground water.</td></tr>
<tr><td>v</td><td>A Garland drain should be provided</td><td>Garland drain is already present along the periphery of quarry area along with master drain which is named as C-9 drain.</td></tr>
<tr><td>vi</td><td>Excess water from mine after treatment should be supplied to the villagers.</td><td>At present excess water from mine is supplied to the villages through settling pond. Location of pond is at the south of Palasia incline & Palasia village is beneficiary.

Apart from this an action plan for Utilization and treatment of surplus mine water has been prepared. In this regard, 26 mines have been identified for the implementation of the action plan in the Phase –I of the scheme.</td></tr>
<tr><td>vii</td><td>Rejects of washery along with dry carbon slurry should be utilized in power plant and other recognized vendors.</td><td>There is no washery in operation at present.</td></tr>
<tr><td>viii</td><td>A time schedule for filling of existing and abandoned quarries be done.</td><td>Old abandoned Quarry no. 1, 2, 3 & 3/4 of Kalimati Seam at Basantimata Mine has been filled upto ground level. NLOCP, JOCP & KOCP abandoned quarry has been filled up.

Year wise Backfilling till now is as below:-
<table>
<tr><th>Sl No.</th><th>Year</th><th>Quantity (Lakh M^3)</th></tr>
<tr><td>1.</td><td>2012-13</td><td>7.25</td></tr>
<tr><td>2.</td><td>2013-14</td><td>55.00</td></tr>
</table>
</td></tr>
</table>

			3.	2014-15	85.75
			4.	2015-16	5.00
			5.	2016-17	7.00
ix	**The measure identified in the environmental plan for cluster XVI 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 activities are dovetailed with compliance of environmental clearance conditions.			
x	**As there is no fire in Cluster XVI but the measure should be adopted by proponent to control spread of neighboring fire to this Cluster XVI. 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 XIV shall be undertaken.**	**Preparation of time series maps is a continuous process and is being complied by BCCL. On three years interval time series maps are being prepared.** A study and first of the time series Map has been prepared through NRSC Hyderabad **and the report was submitted by NRSC on April, 2014. Presently (i.e. in 2017) the Work Order for "Delineation of Surface Fire and associated land subsidence in Jharia Coal Field using satellite based remote sensing techniques" has already been awarded to NRSC under the MoU signed with NRSC**.			
xi	**Underground mining should be taken up after completion of reclamation of Opencast mine area after 2 years.**	It shall be complied. Mining is being done as per the guidance and approval/permission of DGMS.			
xii	**No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/ check such fire including in old OB dump**	It is being complied. The fire control measures are being taken through opencast excavation method to prevent /check its further spread.			
xiii	**A part of cluster XVI is under Barakar River and Damodar River. 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 waster of River Damodar.**	At present there is no underground mining operation below the River Damodar & Barakar. The data of dugwell near Khudia River is being monitored for ground water level. Working underground mine has not reached near river Damodar & Barakar and it is more than 1000 mtr. away from river bed. When working mine will reach within 15 mtr. of river bed then seepage will be monitored as per requirement of regulation 126 , danger for surface water; of CMR 1957 under Mines act 1952. The bore hole will be maintained & monitored as per regulation 127 (B) of CMR 1957 of Mines act. 1952. So it will be complied on time.			

xiv	**The rejects of washeries in Cluster –XVI should be send to FBC based plant.**	Washery is yet to be started.
xv	**There shall be no external OB dumps. OB produce from the whole cluster will be 29.01 Mm^3. 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.**	There are seven OB dump in the cluster. All the OB dumps are within the leasehold area and are on de-coaled area. These dumps are created outside/externally to excavation area for reasons of safety and to facilitate mining. At the end of mining all the dumps will be leveled and backfilled in opencast excavated area. Action is being taken as specified in EMP for Backfilling of OB concurrent with mining. No fresh land is used for OB dumping. Proper vegetation is being developed on the OB dump to avoid erosion of soil and gully formation and also to stabilize sufficiently the OB slope.
xvi	**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- XVI shall be drawn up and implemented.**	Calendar plan has been prepared. Mine closure plan as per the guidelines of Ministry of Coal has been prepared by CMPDI and it is being followed.
xvii	**The void in 5 ha area shall be converted into a water reservoir of a maximum depth of 15-20 m in post mining stage 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 biologically reclaimed with plantation and or may be used for pisciculture**	It shall be complied. Continuous process of the backfilling has been adopted. A part of the void will be converted into the water body as specified in EMP.
xviii	**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.**	Mining is being carried out as per Statute from the streams/Nalas following within the lease and maintaining a safe distance from the nalas flowing along the lease boundary.
xix	**Active OB dumps near water bodies and rivers should be rehandled for backfilling abandoned mine voids. However, those which have been**	Presently 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, Dehradun and as per the action plan of Prof. CR Babu ,Professor Emirates CEMDE, Delhi University. The OB

<table>
<tr><td></td><td>biologically reclaimed need not be disturbed.</td><td>dumps which are already present at the bank of River will be provided with the Toe-Wall to arrest the silt from going into river.</td></tr>
<tr><td>xx</td><td>Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 242.09ha area would be reclaimed by planting native species in consultation with the local DFO/Agriculture Department/institution with the relevant discipline. The density of the trees shall be around 2500 plants per ha.</td><td>Year wise plantation is being done as per following plan:-
<table>
<tr><th>Year</th><th>Biologically Reclaimed Area</th></tr>
<tr><td>2013-14</td><td>1.0 Ha.</td></tr>
<tr><td>2014-15</td><td>4.6 Ha.</td></tr>
<tr><td>2015-16</td><td>4.0 Ha.</td></tr>
<tr><td>2016-17</td><td>12.5 Ha.</td></tr>
<tr><td>2017-18</td><td>7.0 Ha.</td></tr>
<tr><td>2018-19</td><td>10.0 Ha.</td></tr>
<tr><td>2019-20</td><td>15.0 Ha.</td></tr>
<tr><td>2020-21</td><td>15.0 Ha.</td></tr>
<tr><td>2021-22</td><td>15.0 Ha.</td></tr>
<tr><td>2022-23</td><td>15.0 Ha.</td></tr>
<tr><td>2023-24</td><td>15.0 Ha.</td></tr>
<tr><td>2024-25</td><td>25.0 Ha.</td></tr>
<tr><td>2025-26</td><td>25.0 Ha.</td></tr>
<tr><td>2026-27</td><td>25.0 Ha.</td></tr>
<tr><td>2027-28</td><td>25.0 Ha.</td></tr>
<tr><td>2028-29</td><td>28.0 Ha.</td></tr>
</table></td></tr>
<tr><td>xxi</td><td>The road should be provided with avenue plantation on both side as trees act as sink of carbon and other pollutant.</td><td>1700 gabion trees were planted by DFO along the transportation road and siding in cluster XVI. More roadside plantation has been included in 2017-18 plantation programme.</td></tr>
<tr><td>xxii</td><td>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 -XVI shall be implemented.</td><td>Dhanbad Action Plan has been prepared in consultation with Jharkhand Pollution Control Board for entire BCCL and not cluster wise. It is being implemented comprehensively for all the mines of BCCL.</td></tr>
<tr><td>xxiii</td><td>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 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</td><td>The locations in the Jharia coalfield have been finalized in consultation with the Jharkhand State Pollution Control Board. CIL has entered a MoU with NEERI to carry out such study.
Tender for conducting source apportionment study for BCCL was floated twice, however, none of the bidders qualified. Therefore, as per the MoU "Sustainable Coal Mining in Coal India Limited" entered between CIL and NEERI, NEERI Nagpur was approached for conducting Source Apportionment Study BCCL for compliance of EC conditions. The proposal regarding Conducting the Source Apportionment Study has been submitted by NEERI. Presently it has been submitted to CIL for further scrutiny and approval.</td></tr>
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	extent of the air pollution, based on which appropriate mitigative measures could be taken.	
xxiv	**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.**	No ground water is being utilized for the purpose of industrial use of the water. Mine water has been channelized through pipelines and through discharge in to the ponds for its use for the community and irrigation purposes. During summer season filter water as well as raw water is being supplied through water tanker to local adjacent villages where required. Pressure Filters have been installed for the filtration of mine water being supplied to nearby habitat. Aalready 6 Nos. filters have been installed and in operation.
xxv	**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.**	Ground water level and quality are being monitored by CMPDIL Ranchi. As of now water accumulated in quarries during monsoon is being extracted and being used in recharging of nearby ponds. Peizometer installation: Tender was done on 28.04.2017. Only one bidder applied who could not fulfil the eligibility criteria. Hence, that tender was cancelled and retendering for this work will be done.
xxvi	**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.**	Analysis report has been uploaded on the website.
xxvii	**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**	Proposal for ETP is under process in association with CMPDI at DBOCP. Since only crushing is being done at CHP, hence ETP is not required for CHP.

	water course.	
xxviii	**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.**	There is no depillaring is going on in underground mines of Cluster XVI, hence no mining induced subsidence is taking place. There has been no subsidence occurred during Environmental Clearance compliance period till now. Regular monitoring of the area is being done by mine officials in this regard.
xxix	**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.**	Sufficient coal pillars have been left around air shafts as per the statutes and DGMS guidelines.
xxx	**High root density tree species shall be selected and planted over areas likely to be affected by subsidence.**	It is being complied. The plantation programme includes such plants.
xxxi	**Depression due to subsidence resulting in water accumulating within the low lying areas shall be filled up or drained out by cutting drains.**	It is being complied.
xxxii	**Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.**	It is being followed. Sufficient barriers are left for saving the surface installation and infra structures as per the statute and DGMS guidelines.
xxxiii	**No depillaring operation shall be carried out below the township/colony.**	No depillaring operation is being carried out below township/colony.
xxxiv	**The Transportation Plan for conveyor-cum–rail for Cluster-XVI 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 transpiration of coal during**	Presently tarpaulin covered coal transportation is being done as earlier there were no OEM (original equipment manufacturer) which were supplying such trucks for coal transportation. However, Initiatives has been taken at corporate level of coal India Limited for developing the mechanically covered trucks and a vendor meeting for the same has been held with the OEM on dated 07.05.2016. Further, a proposal for inclusion of mechanically covered trucks in the Contract Terms has been initiated to ensure that the Outsourcing company should deploy Mechanically Covered Trucks for coal Transportation.

	phase–I should be by mechanically covered trucks.	Further, the study regarding installation of conveyer-cum-rail system for transportation of coal has been entrusted to CMPDIL. The conveyor-cum–rail system will be installed during Second Phase of Master Plan. Mechanically covered trucks were deployed of trial basis in Coal India ltd. but due to their unsuccessful run they have been removed. Tarpaulin covered trucks are being used until the introduction of successful mechanically truck in Coal India Ltd. However the matter has been taken to the higher management for introduction of conveyer-cum-rail system for transportation of coal Proposal for queries & inquiries is under progress for conveyer-cum-rail system.
xxxv	**A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.**	The study regarding pollution load in aspect of Cluster XVI is being been done by CMPDI, Ranchi for year 2017-18.
xxxvi	**R&R of 1193 nos of PAF's involved. They should be rehabilitated at cost of Rs 10171.88 lakhs as per the approved Jharia Action Plan.**	The rehabilitation of 1193 PAF is being done by Jharia Rehabilitation & Development Authority (JRDA) under Jharia Action Plan. Presently they are surveying the house in Cluster XVI. Final report on rehabilitation is yet to be submitted by District Collector, Dhanbad.
xxxvii	**Details of transportation, CSR, R&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.**	Booklet on CSR, Transportation and R&R activities and implementation of environmental action plan is prepared.
xxxviii	**A detailed CSR Action Plan shall be prepared for Cluster XVI croup 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 242.09ha of area within Cluster XVI 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. 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**	It is being complied. BCCL is implementing CSR activities.

	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.	
xxxix	**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.**	Time series map of vegetation cover in the Jharia Coal field has been carried out through CMPDI.
xl	**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.**	Mine closure plan as per the guidelines of Ministry of Coal has been prepared by CMPDI and it is being followed.
xli	**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 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 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 Headquarters 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.
xlii	**Implementation of final mine closure plan for Cluster XVI, subject to obtaining prior approval of the DGMS in regard to mine safety issues.**	Final Mine Closure Plan, as per the guideline will be submitted 5 years before the closure of the Mine. For the purpose of safety issues related to the closure prior approval of DGMS will be taken in this regard.
xliii	**Corporate Environment Responsibility:** **a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.** **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.** **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.** **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.**	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. Complied. A hierarchical system of the company to deal with environmental issues from corporate level to mine level already exists. 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.**	It is being followed.
ii	**No change in the calendar plan of production for quantum of mineral coal shall be made.**	The approved peak production of coal for Cluster XVI is 1.963 MTPA. The total production of coal for the cluster XVI for the FY 2016-17 is 1.299 MT which is well within the limit. Production of the coal in this FY 2016-17 during April'17 to September'17 is 0.64 MT.

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 has been finalized after the consultation with JSPCB. The work of monitoring of ambient air quality was being done by CMPDIL. **(Annexure-1)**
iv	**Data on ambient air quality (PM_{10}, $PM_{2.5}$, SO_2 and NO_x) 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.**	The location of monitoring stations has been finalized after the consultation with JSPCB. The work of monitoring of ambient air quality was being done by CMPDIL. **(Annexure-1)**
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.**	It is being complied. All the workers engaged in noisy operations are provided with the Ear plugs/muffs.
vi	**Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.**	Proposal for ETP is under process in association with CMPDI at DBOCP. Since only crushing is being done at CHP, hence ETP is not required for CHP.
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 is being complied. Only tarpaulin covered vehicles all allowed carrying minerals and they are optimally loaded.

viii	**Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, 1986.**	Monitoring work is being done by CMPDIL HQ which has a laboratory recognized under EPA rules 1986.
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.**	Dust masks are provided to persons working in dusty areas. Training on safety & health is imparted at regular intervals at VTCs and at work place.
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. Records of IME & PME are also being maintained.
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 (30 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 Headquarters 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	**The funds earmarked for**	It has been complied. The funds were earmarked as per EMP

	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.	plan and kept in separate finance head for the expenditure to maintain environmental protection measures.
xiii	**The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment& Forests at http://envfor.nic.in.**	It has been complied.
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.**	It has been complied.
xv	**A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.**	It has been 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**	It has been complied.

	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.	
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.**	It is 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.**	Full cooperation is being provided for the regional office authorities for monitoring of Environmental Clearance conditions compliances.
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 .**	Environmental Statement for each financial year is submitted to the regional office of Jharkhand State pollution control board by 30th June.

Project Officer
DBOCP

Manager
DBOCP

Nodal Officer(Env)
DBOCP

Addl. General Manager
CV Area

Area Manage (Env)
CV Area

Asst. Mgr. (Env)
CV Area

General Manager
CV Area

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

(FOR THE Q.E. JUNE, 2017)

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

October, 2017

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

CLUSTER - XVI

(FOR THE Q.E. June, 2017)

CONTENTS

ENVIRONMENTAL MONITORING REPORT OF BHARAT COKING COAL LIMITED CLUSTER – XVI

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CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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 Burdwan district of West Bengal, the RCF is bounded by $23^0$42' N to $23^0$75' N latitudes and $86^0$43' E to $86^0$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 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 mitigative 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 ($PM_{2.5}$ sampler) were used for sampling of PM_{10}, SO_2, & NO_X and Fine Dust Sampler ($PM_{2.5}$ 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 analyzed in Environmental Laboratory of CMPDI, RI-II,Dhanbad.

3.2 Water quality

Water samples were collected as per standard practice. The effluent samples were collected and analyzed for four parameters on fortnightly basis. The drinking and Surface water samples were collected and analyzed for 25 and 17 parameters on quarterly basis. Thereafter the samples were preserved and analyzed 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 SPM, 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 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 (MoEF&CC) 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 06th 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_{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 & SPCB 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) 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 a height of 1.5m from above ground level of Substation Office. The station was selected to represent the impact of mining activities and 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 and the poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

BUFFER ZONE Monitoring Location

i) Gopinathpur village (A24): Residential Area

The sampler was placed at a height of 1.5m from above ground level The station was selected to represent the impact of mining activities and poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

ii) Guliardih Village (A25): Residential Area

The sampler was placed at a height of 1.5m from above ground level The station was selected to represent the impact of mining activities and 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_{10}), Particulate Matter ($PM_{2.5}$), Sulphur di-oxide (SO_2) and Nitrogen oxides (NO_X). Respirable Dust Samplers (RDS) & fine particulates for $PM_{2.5}$ 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 analyzed in Environmental Laboratory of CMPDI, RI-II, Dhanbad.

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 76 to 234 μ/m^3
In **buffer zone** under **Industrial area** varies from 96 to 191 μ/m^3

Particulate Matter $PM_{2.5}$

In **core zone** under **Industrial area** varies from 42 to 83 μ/m^3
In **buffer zone** under **Industrial area** varies from 36 to 112 μ/m^3

Sulphur Dioxide:

In **core zone** under **Industrial area** varies from 10 to 13 μ/m^3
In **buffer zone** under **Industrial area** varies from 10 to 13 μ/m^3

Oxides of Nitrogen:

In **core zone** under **Industrial area** varies from 21 to 28 μ/m^3
In **buffer zone** under **Industrial area** varies from 19 to 25 μ/m^3

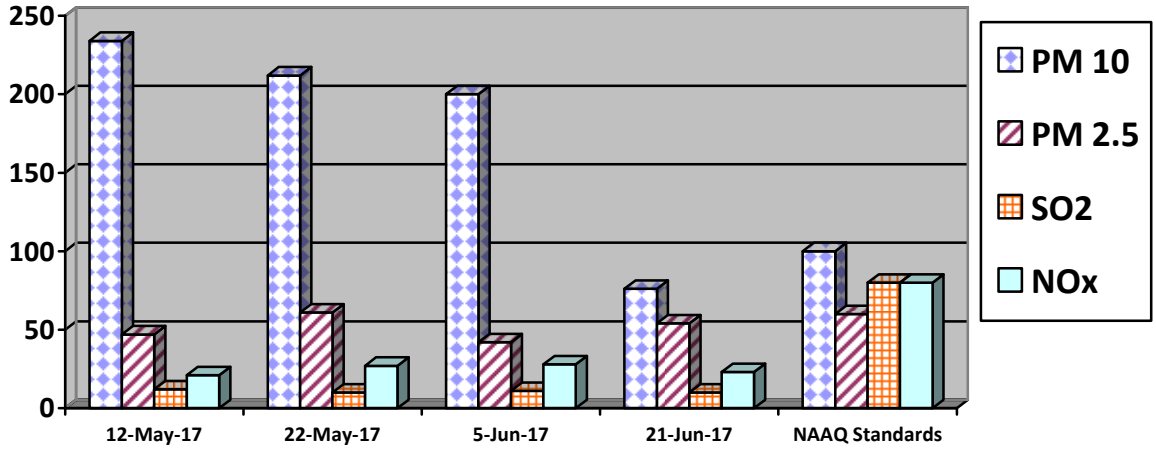
AMBIENT AIR QUALITY DATA

Name of the Company: **Bharat Coking Coal limited** Year : **2017-18.**
Name of the Cluster : **Cluster – XVI** Q.E.: **June 2017**

Station Code/Name: (a) A22 Dahibari OCP **Category: Industrial.**
(b) A23 Basantimata UGP
ZONE: Core

(a). Station Code/Name: A22- Dahibari OCP Category: Industrial[1].

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	12 - May -17	234	47	12	21
2	22 - May -17	212	61	<10.0	27
3	05 - Jun - 17	200	42	11	28
4	21 - Jun - 17	76	54	10	23
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)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

Note:

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

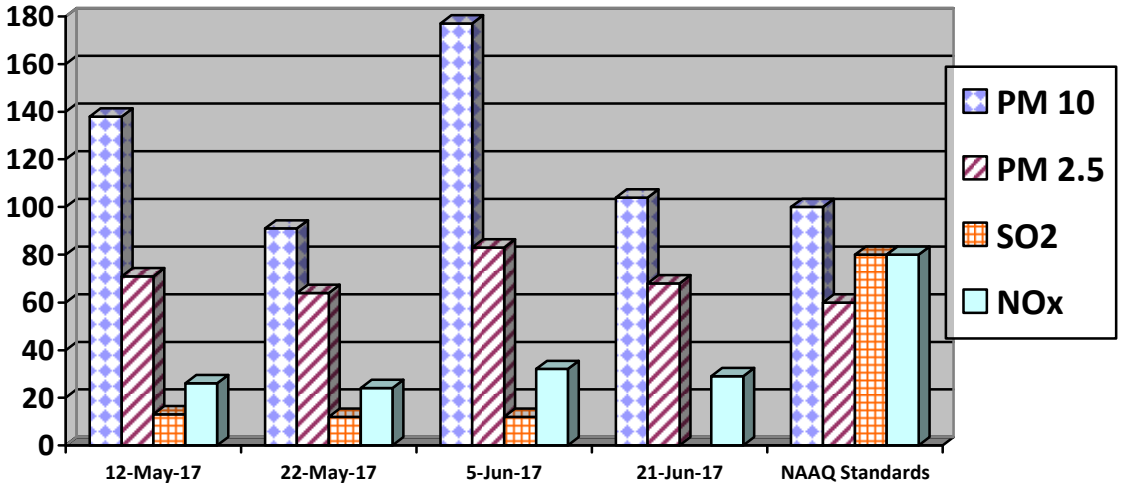
Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

(b). Station Code/Name: A23- Basantimata UGP Category: Industrial[2].

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	12 - May -17	138	71	13	26
2	22 - May -17	91	64	12	24
3	05 - Jun - 17	177	83	12	32
4	21 - Jun - 17	104	68	<10.00	29
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)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

Note:

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

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

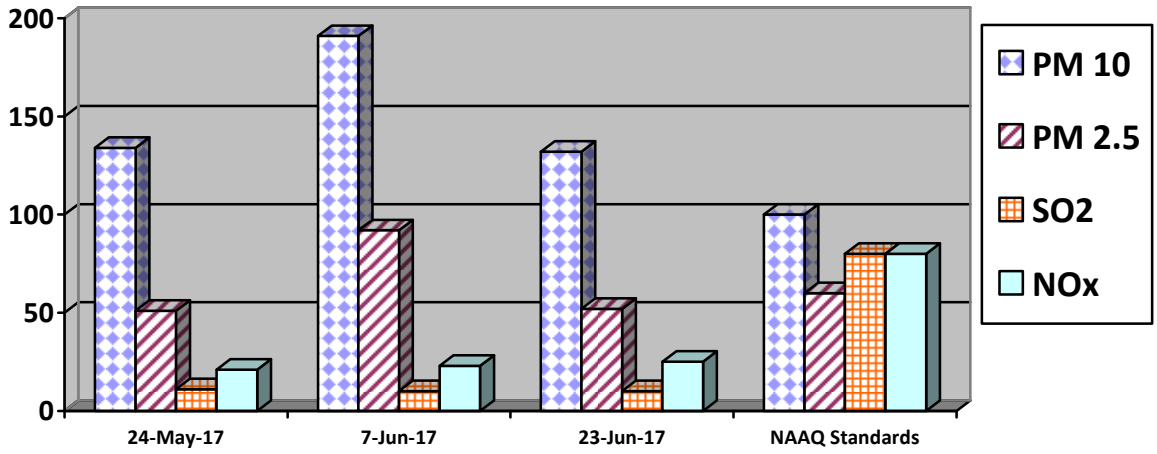
AMBIENT AIR QUALITY DATA

Name of the Company: **Bharat Coking Coal limited** Year : **2017-18.**
Name of the Cluster : **Cluster – XVI** Q.E.: **June 2017**

Station Code/Name: (a) A24 Gopinathpur Vill **Category: Industrial.**
(b) A25 Guliardih Vill
ZONE: Buffer

(a). Station Code/Name: A24- Gopinathpur Village Category: Industrial[3].

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	24 - May -17	134	51	11	21
2	07 - Jun - 17	191	92	<10.00	23
3	23 - Jun - 17	132	52	<10.00	25
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)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

Note:

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

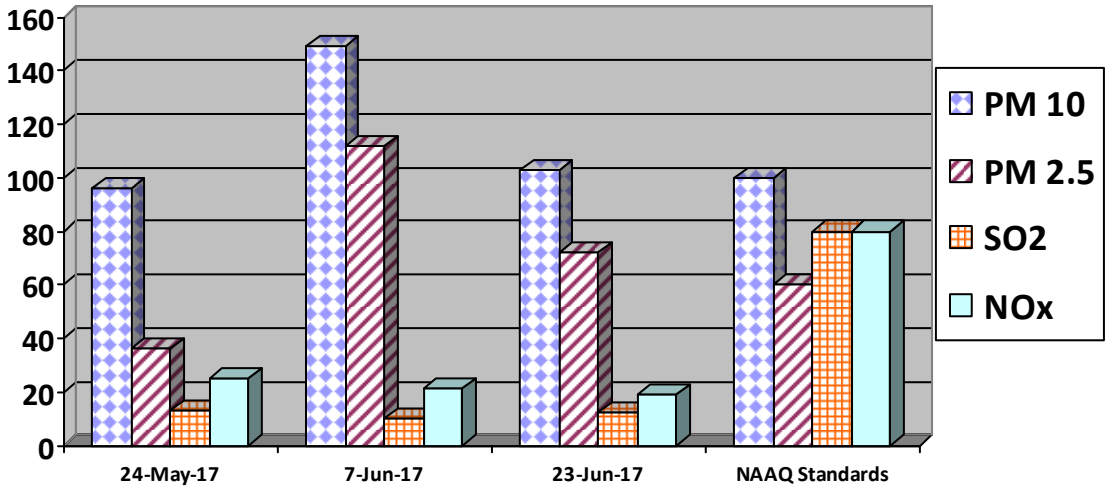
Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

(b). Station Code/Name: A25- Guliardih Village Category: Industrial[4].

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	24 - May -17	96	36	13	25
2	07 - Jun - 17	149	112	<10.00	21
3	23 - Jun - 17	103	72	12	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)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

Note:

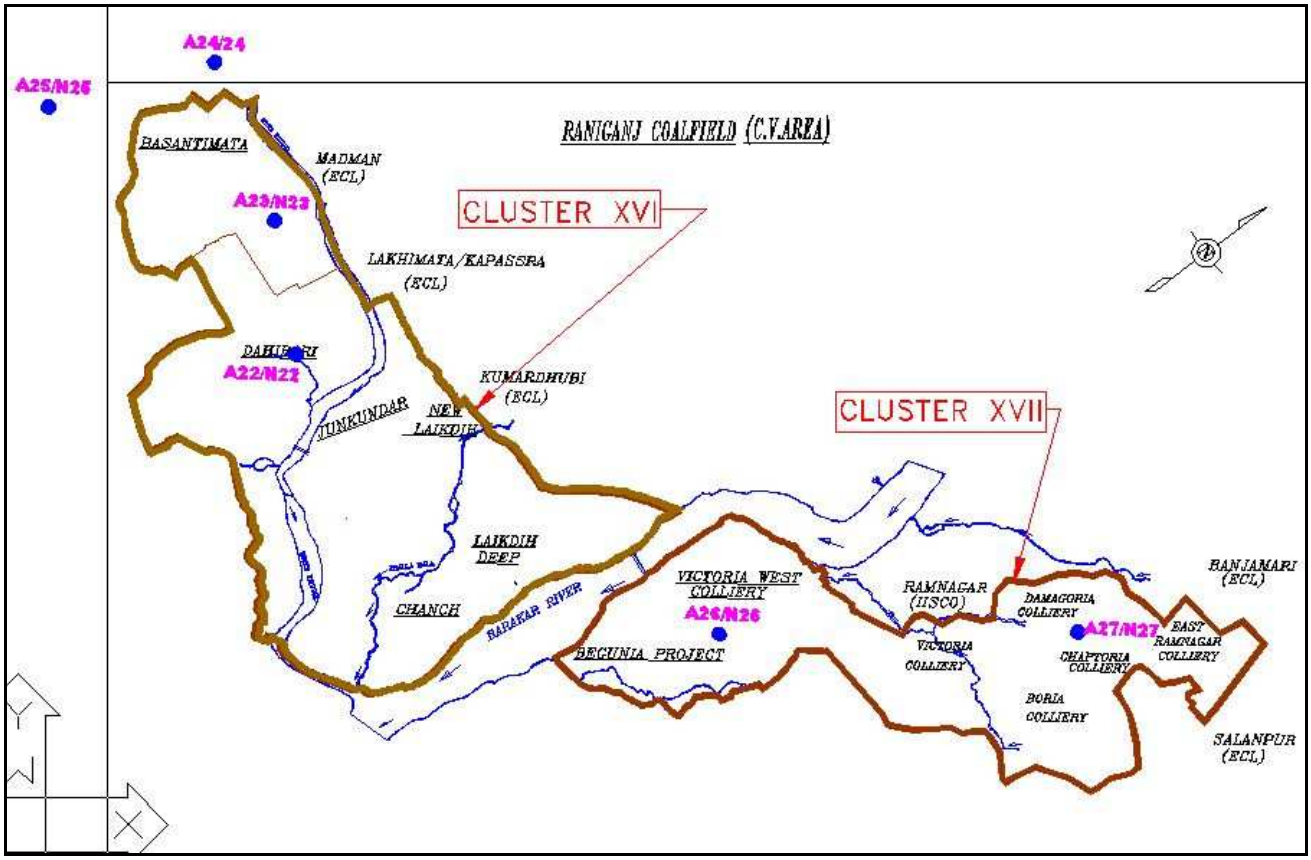
- *All values are expressed in microgram per cubic meter.*
- *24 hours duration*

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

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
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 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) Ground Water quality at **Patlabari Village (GW16)**

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 ground 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 : **2017-18.**

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

Month: **May, 2017.**

Name of the Stations & Code : **1. MW16- Mine Discharge of Dahibari**

First Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge) 12.05.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	40	*100 (Max)*
2	pH	8.53	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	24	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge) 23.05.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	36	*100 (Max)*
2	pH	8.70	*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
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

WATER QUALITY DATA

(*EFFLUENT WATER FOUR PARAMETERS)*

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

Year : **2017-18.**

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

Month: **June, 2017.**

Name of the Stations & Code : **1. MW16- Mine Discharge of Dahibari**

First Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge) 06.06.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	28	*100 (Max)*
2	pH	8.09	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	36	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW16 (Mine Discharge) 22.06.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	36	*100 (Max)*
2	pH	7.88	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	20	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

WATER QUALITY

(MINE EFFLUENT- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2017-18.**

Name of the Cluster : **Cluster -XVI** PERIOD: **Q. E. JUNE- 2017.**

Area : **Barora** **Project: Barora** **Cluster XVI**

Stations: **Date of Sampling:**

1. Mine Water Discharge Dahibari MW-16 22/06/2017

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	0.01			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	20			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	0.6			0.30	5.0	APHA, 22nd Edition Molybdovanadate
8	Fluoride (as F) mg/l, *Max*	0.93			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*	0.4			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*	2.8			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	7.88			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)	31.8			Shall not exceed 5^0 C above the receiving temp.		IS-3025/09:1984, Thermometeric
23	Total Chromium (as Cr), mg/l, *Max*	<0.06			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	<0.02			0.02	1.0	APHA, 22nd Edition, DPD
26	Total Suspended Solids, mg/l, Max	36			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
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

*All values are expressed in mg/lit unless specified.

WATER QUALITY

(SURFACE WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2017-18.**

Name of the Project : **Cluster - XVI** Period: **Q. E. June, 2017**

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

Stations: **Date of Sampling:**

1. Upstream in Khudia River SW-33 06/06/2017
2. Downstream in Khudia River SW-34 06/06/2017

Sl. No	Parameter	Sampling Stations				Detection Limit	IS:2296 – 1982 (Inland surface water) Class C	BIS Standard & Method
		SW-33	SW-34	3	4			
1	Arsenic (as As), mg/l, Max	<0.002	<0.002			0.002	0.2	IS 3025/37:1988 R : 2003, AAS-VGA
2	BOD (3 days 27°C), mg/l, Max	2.4	2.6			2.00	300	IS 3025 /44: 1993, R : 2003 3 day incubation at 27°C
3	Colour (Hazen Unit)	colourless	colourless			Qualitative	300	Physical/Qualitative
4	Chlorides (as Cl), mg/l, Max	16	19			2.00	600	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03			0.03	1.5	IS 3025 /42 : 1992 R : 2009, AAS-Flame
6	Disolved Oxygen, min.	5.2	5.0			0.10	4	IS 3025/381989, R : 2003, Winkler Azide
7	Fluoride (as F) mg/l, Max	0.71	0.73			0.02	1.5	APHA, 22nd Edition SPADNS
8	Hexavalent Chromium, mg/l, Max	<0.01	<0.01			0.01	0.05	APHA, 22nd Edition, 1,5 - Diphenylcarbohydrazide
9	Iron (as Fe), mg/l, Max	0.136	0.136			0.06	50	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
10	Lead (as Pb), mg/l, Max	<0.005	0.026			0.005	0.1	APHA, 22nd Edition AAS-GTA
11	Nitrate (as NO_3), mg/l, Max	7.52	7.51			0.50	50	APHA, 22nd Edition, UV-Spectrphotometric
12	pH value	7.69	7.80			2.5	6.5-8.5	IS-3025/11:1983, R-1996, Electrometric
13	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.002	<0.002			0.002	0.0005	APHA, 22nd Edition 4-Amino Antipyrine
14	Selenium (as Se), mg/l, Max	<0.002	<0.002			0.002	0.05	APHA, 22nd Edition AAS-GTA
15	Sulphate (as SO_4) mg/l, Max	38	44			2.00	400	APHA, 22nd Edition Turbidity
16	Total Dissolved Solids, mg/l, Max	357	403			25.00	1500	IS 3025 /16:1984 R : 2006, Gravimetric
17	Zinc (as Zn), mg/l, Max	0.053	0.252			0.01	5.0	IS 3025 /49 : 1994, R : 2009, AAS-Flame

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2017-18.**

Name of the Project : **Cluster - XVI** Period: **Q. E. June, 2017**

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

Stations: 1. Ground Water from Patlabari Village GW-16 **Date of Sampling:** 05/06/2017

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, 22nd Edition ,Carmine
2	Colour,in Hazen Units	2			1	5	APHA, 22nd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	64			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	0.79			0.02	1.0	APHA, 22nd Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.03			0.02	0.2	APHA, 22nd Edition, DPD
8	Iron (as Fe), mg/l, Max	0.085			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	41.18			0.5	45	APHA, 22nd Edition, UV-Spectrphotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	7.36			0.20	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	70			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	212			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	0.552			0.04	0.05	IS-3025/52:2003, AAS-Flame
21	Total Dissolved Solids, mg/l, Max	806			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c_aco_3), mg/l, Max	292			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	0.643			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame
25	Nickel (as Ni), mg/l, Max	0.016			0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

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.

iii) **Gopinathpur village (N24)**
To assess the noise level in village site, the noise levels were recorded in the village area where all mining activities are in progress.

iv) **Guliardih Village (N25)**
To assess the noise level in village site, the noise levels were recorded in the village 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 time and the observed values were compared with standards prescribed by MoEFCC.

The results of Noise levels recorded during day 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 : **2017-18.**

Name of the Project : **Cluster -XVI** Month: **May, 2017.**

Name of the Stations & Code :

1. **Dahibari OCP(N22)**
2. **Basantimata UGP (N23)[1]**
3. **Gopinathpur Village (N24)**
4. **Guliardih Village (N25)**

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**	12.05.2017	60.8	*75*
2	**Basantimata UGP (N23)**	**Industrial area**	12.05.2017	56.6	*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	**Dahibari OCP (N22)**	**Industrial area**	22.05.2017	62.2	*75*
2	**Basantimata UGP (N23)**	**Industrial area**	22.05.2017	56.8	*75*
3	**Gopinathpur Village (N24)**	**Residential area**	24.05.2017	52.2	*55*
4	**Guliardih Village (N25)**	**Residential area**	24.05.2017	54.8	*55*

****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**

Analysed By
JSA/SA/SSA

Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

Approved By
HOD(Mining/Environment)
RI-2, CMPDI, Dhanbad

NOISE LEVEL DATA

Name of the Company: **Bharat Coking Coal Limited** Year : **2017-18.**

Name of the Project : **Cluster -XVI** Month: **June, 2017.**

Name of the Stations & Code :

1. **Dahibari OCP(N22)**
2. **Basantimata UGP (N23)[2]**

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	05.06.2017	55.9	*75*
2	Basantimata UGP (N23)	Industrial area	05.06.2017	60.4	*75*
3	Gopinathpur Village (N24)	Residential area	07.06.2017	50.6	*55*
4	Guliardih Village (N25)	Residential area	07.06.2017	52.6	*55*

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	21.06.2017	58.8	*75*
2	Basantimata UGP (N23)	Industrial area	21.06.2017	61.2	*75*
3	Gopinathpur Village (N24)	Residential area	23.06.2017	55.4	*55*
4	Guliardih Village (N25)	Residential area	23.06.2017	51.8	*55*

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**

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RI-2, CMPDI, Dhanbad

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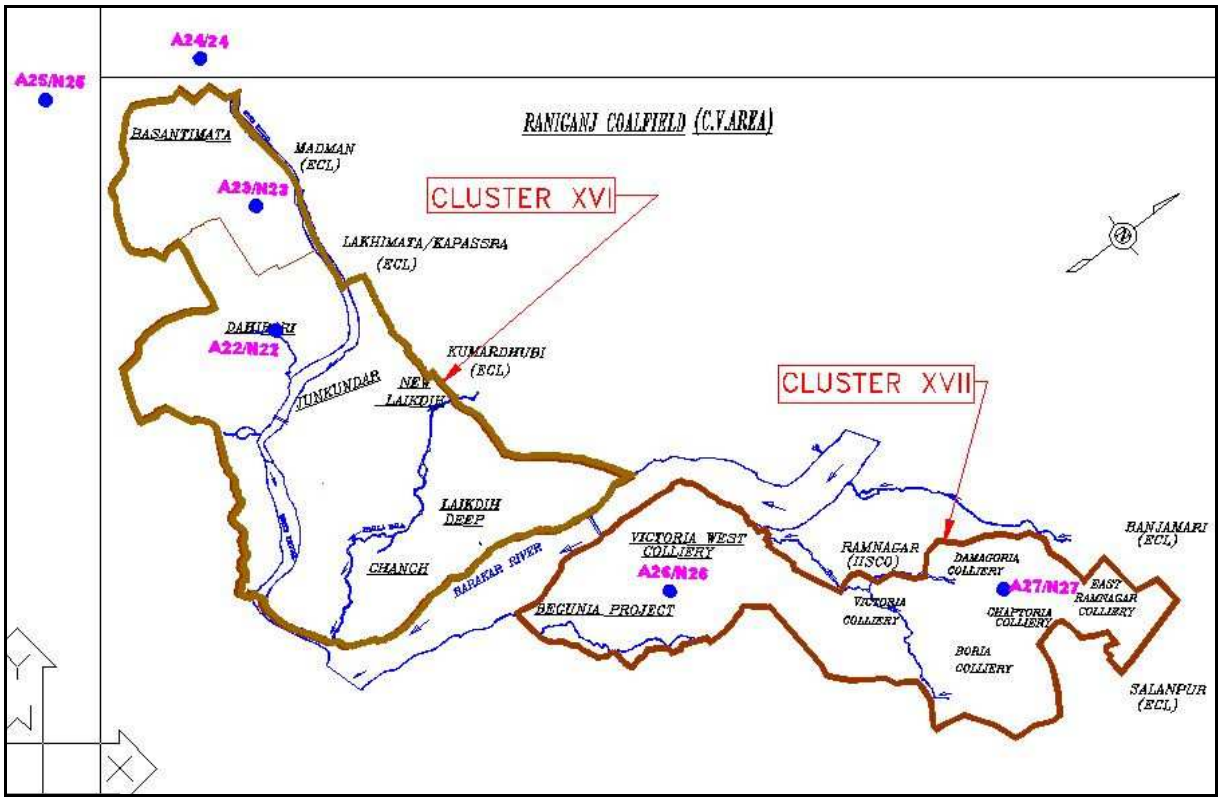
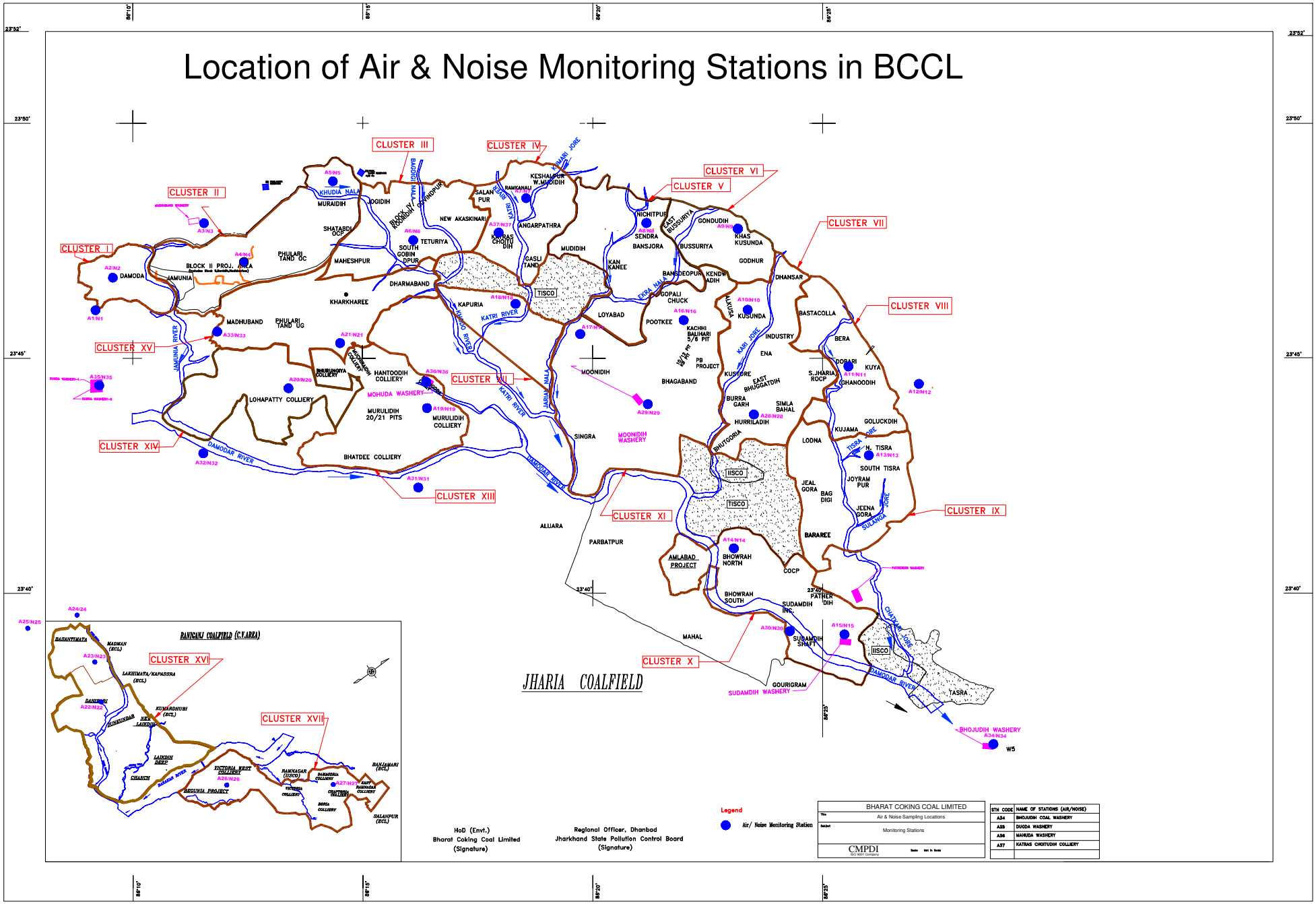
RI-2, CMPDI, Dhanbad

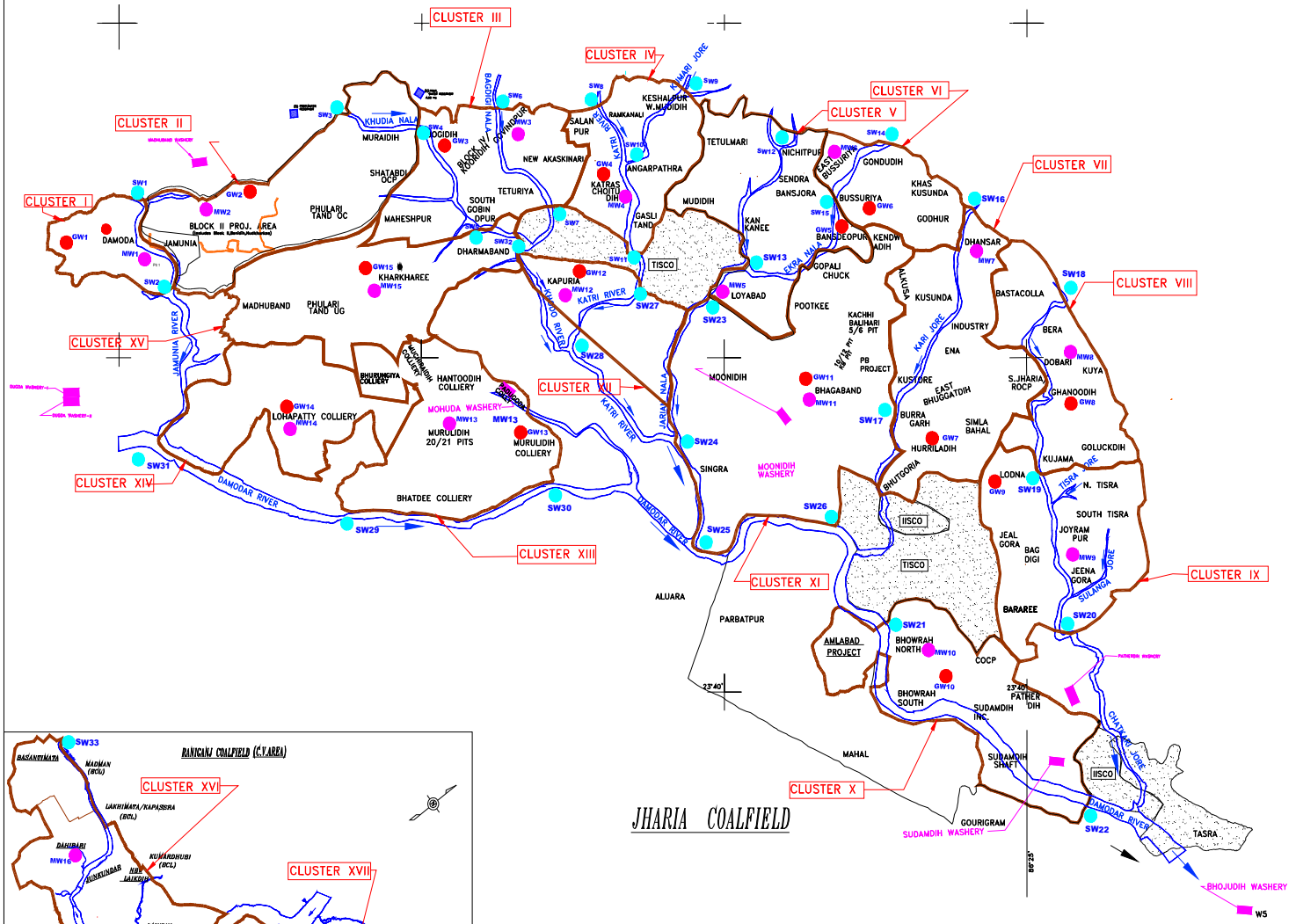
Noise Level Monitoring Location of Cluster XVI



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	Bhagaband h UGP	GW11	Bhagabandh
XII	SW27, SW28	Katri River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Murulidih (20/21)	GW13	Murulidih
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

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

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

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

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