BHARAT COKING COAL LIMITED

(A Subsidiary of Coal India Limited – A Maharatna Company)
Regd.Off: Koyla Bhawan, Koyla Nagar, Dhanbad-826005
CIN: U10101JH1972GOI000918

OFFICE OF THE GENERAL MANAGER
SIJUA AREA

Ref. No.–GM/SA/SPA/E-41/183. Dated:- 30.11.17.

To,
The Director(s)
Ministry of Environment, Forest & Climate Change
Govt. of India
Eastern-Central Regional Office (ECZ)
Bunglaw No. A-2, Shyamali Colony
Ranchi-834002

Subject- Half yearly compliance report of the Environmental Clearance Conditions for the period from 1st April, 2017 to 30th September, 2017 in respect of cluster V group of mines of Bharat Coking Coal Limited, Dhanbad for the EC Order No.- J-11015/01/2011-IA.II (M) Dated 11.02.2013

Dear Sir,

Please find enclosed herewith(Both Soft and the hard copies) the half yearly compliance report of the Environmental Clearance Conditions for the period from 1st Apr, 2017 to 30th Sept, 2017 in respect of cluster V group of mines i.e. Sijua Area of Bharat Coking Coal Limited, Dhanbad.

Hope you will find the same in order.

29/11/17

General Manager
Sijua Area

Cc:

1. Director, 1 A Monitoring Cell, Paryavaran Bhawan, CGO Complex, New Delhi-110003
2. Scientist & Incharge, Zonal Office, Central Pollution Control Board, Kolkata
3. Member Secretary, Jharkhand State Pollution Control Board
4. Dy. General Manager (Env.), Koyla Bhawan
5. Addl. General Manager, Sijua Area
6. All Project Officers- Nichitpur, Tetulmari, Kanakanee, Mudidih, Sendra Bansjora, Loyabad, Bansdeopur
7. Asst. Manager (Env.), Sijua Area
8. File

HALF YEARLY COMPLIANCE REPORT

OF

CLUSTER V

BHARAT COKING COAL LIMITED

FOR

THE ENVIRONMENTAL CLEARANCE

GRANTED VIDE EC Order No. J-11015/01/2011-IA.II (M) Dated 11.02.2013

Period: APR, 2017- SEPT, 2017

S. No.	Specific Condition	Compliance Status
1	*The maximum production shall not exceed beyond that for which the environmental clearance has been granted for the mine of cluster V.*	*The production from the mines of the cluster V and the cluster as a whole in the financial year 2016-17 was within the limit for which the environmental clearance has been granted.* ***Annexure 1- Mine wise Coal Production figure of Cluster V for the financial year 2016-17***
2	*The road transportation of coal during phase–I should be by mechanically covered trucks. The road used for coal transportation should be developed with avenue plantation on both sides.*	*Presently, road transportation is being done by covering vehicle with tarpaulin. It has been included in the Transportation agreement with the transporting agency.* *1320 Nos. of Gabion plantation has been done alongside road on both sides from Shakti Chowk to Mohlidih. Avenue Plantation is also present at Tetulmari Colliery.* *Due to dynamic features of mining operations and presence of coal-bearing area with underlying coal seams, avenue plantation along all the transportation routes is difficult. However, more avenue plantation will be carried out in a progressive manner whenever the land becomes available for plantation.* ***Plate 1- Avenue Plantation in Cluster V***
3	*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.*	*Training and awareness regarding ecological restoration and sustainable development activities* ***(Computer Skills, Stitching Skills, Handloom, Jharcraft, etc.)*** *are being imparted within the company and in the nearby population.* *Within Company, Training programs are being conducted at VTC, Sendra and HRD, BCCL regularly.* ***Plate 2-Capacity Building activities in Cluster V***
4	*The 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 form.*	*Complied.* ***Annexure 2- Transportation Booklet*** ***Annexure 3- CSR Booklet***

		Annexure 4- R&R Booklet
5	*A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.*	The study to analyze extent of reduction in pollution load every year by reducing road transport is being conducted by CMPDIL. Report for cluster V is awaited.
6	*The expertise available internationally should be utilized for control of fire in Jharia Coalfields and for their reclamation and to further minimize time for fire and subsidence control.*	*Presently Master Plan approved by Govt. of India is under implementation for this purpose. A Global EOI was floated for award of work to international experts for control of fire. However, no eligible bidder qualified.* *CIMFR has been requested to initiate a study to identify the extent of fire and suggest effective mitigation measures. The proposal is under approval of the competent authority.*
7	*The abandoned pits and voids should be backfilled with OB and reclaimed with plantation and or may be used for pisciculture.*	*The abandoned pits and voids are being backfilled with OB.* *Some of the abandoned pits are used as water reservoir by the surrounding community.*
8	*BCCL may consider setting up a separate management structure for implementing environment policy and socio-economic issues and the capacity building required in this regard.*	*BCCL has established a separate management structure for implementing environment policy and socio-economic issues and the capacity building from the headquarters up to the area and project level. The management structure is being further strengthened.* **Annexure5-*Environmental Management Structure at BCCL***
9	*The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board.*	*The locations of monitoring stations in cluster V have been finalized in consultation with the Jharkhand State Pollution Control Board.* ***Annexure 6- Plan and Letter ratified by the Regional Officer, Jharkhand State Pollution Control Board***
10	*The smoke/dust emissions vary from source to source (fuel wood, coal, fly ash from TPPs, silica from natural dust, etc) and a Source Apportionment Study should be carried out for the entire Jharia Coalfield.*	*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 for the 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 ***Annexure 7- Copy of the letter regarding conducting a Source Apportionment Study under the MoU on "Sustainable Coal Mining"***
11	*Mineralogical composition study should be undertaken on the composition of the suspended particulate matter (PM10 and PM 2.5) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.*	*Being compiled from the BCCL Headquarters Level for the entire Jharia Coalfields*
12	*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.*	*Work has been awarded to NRSA.* ***Annexure 8- Copy of the letter regarding work-order given to NRSC***
13	*Measures to prevent ingress of air (Ventilation) in such areas, to prevent restart fresh/spread fires in other areas including in mines of cluster V shall be undertaken.*	*Action is being taken as specified in EC and as per Jharia Master Plan. Further fire patches are under operation to dig out the fiery coal and combustible materials to save the coal from burning and to stop further spread of the fire.*
14	*Permanent /regular ambient air monitoring is required for CO, CO2, Methane and its homologues. Monitoring station, mobile monitoring, should be established at suitable location as the temp in the mine is high, in the presence of CH4, the coal may catch fire. Presence of Aromatic compounds should be investigated as most of the aromatic compounds are carcinogenic.*	*The samples of CO, CO2, CH4 and its homologues are collected and tested by the Mines Rescue team regularly.* ***Annexure 9- Report of the analysis at Tetulmari Colliery***
15	*Local institution/university should be contacted for such type of study. Exact measurement for the*	*Local institutions such as ISM and CIMFR are engaged as & when*

	presence of above gases and their potential danger/harmful effect on human should be assessed. ISM Dhanbad and any local university could be contacted for monitoring.	*required in the mines.* *ISM Dhanbad has been contacted for such study.* ***Annexure 10- Copy of the communication with IIT (ISM) Dhanbad for such study***
16	*The road transportation should be of bigger/high capacity trucks. The road should be strengthened to carry the load of high capacity trucks. Railway siding with silo loading will be completed by December, 2015 as informed by the proponents.*	*The road transportation is being done by high capacity trucks.* *The process of installing Silo loading system is in process.* ***Annexure 11- Copy of the work Order of Installation of Silo Loading***
17	*Master Plan for dealing with fire for next 12 year which is under implementation, Details of same from August 2011 till date year-wise should be provided. An Action Plan which is in progress should be submitted to the Ministry.*	*Govt. of India approved Master Plan and status of action taken is uploaded on the official website of BCCL - www.bcclweb.in.*
18	*Underground mining should be taken up after completion of reclamation of Opencast mine area after 15 years.*	*It shall be complied.*
19	*No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/ check such fire including in old OB dump areas where the fire could start due to presence of coal /shale with sufficient carbon content.*	*Action is being taken to control mine fires including in old OB dump areas as specified in Jharia Master Plan and the mining is being done as per the guidelines and permissions of Directorate General of Mines Safety (DGMS).*
20	*The rejects of washeries in Cluster –V should be sent to FBC based plant.*	*Coal washery does not exist in cluster V at present.*
21	*There shall be no external OB dumps. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.*	*Action is being taken as specified in EMP. At the end of the mining, there shall be no void and area will be re-vegetated and reclaimed with the proper eco-restoration techniques suggested by the experts available in BCCL and in external agencies i.e. FRI Dehradoon, CEMDE Delhi, etc. Reclamation of opencast mined out area is being progressively done.*
22	*There shall be no water body left at the end of mining.*	*It shall be complied.*
23	*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-V shall be drawn up and implemented.*	*Mining plans for two collieries, Sendra Bansjora and Kankanee, have been drafted. For the rest of the mines, mining plans are under draft by CMPDIL.* *Progressive Mine closure plans as per the guidelines of Ministry of Coal have*

		been prepared by Central Mine Planning and Design Institute (CMPDI) for five collieries and it is being implemented. *For the remaining two mines namely Bansdeopur and Kankanee, Progressive Mine Closure plan is in draft and approval stage.*
24	*The void shall be converted into a water reservoir of a maximum depth of 15-20 m and shall be gently sloped and the upper benches of the reservoir shall be stabilized 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.*	*Compliance to be done after final closure of mining activities. Mines in the cluster V are at present active and concurrent backfilling and reclamation is being done.*
25	*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.*	*Streams/Nalas flowing within the lease are being protected to the extent feasible. These are also maintained to keep the desired flow in the monsoon.* *OB dumps are being stabilized biologically so that the erosion of the loose materials can be minimized and the transportation of eroded material in the streams/nalas can be avoided.*
26	*Active OB dumps near water bodies and rivers should be rehandled for backfilling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.*	*Active OB dumps near nala will be rehandled for backfilling in the mine voids.* *Two OB dumps of 8 ha and 2.3 Ha areas have been biologically stabilized at Tetulmari. One dump of area 2.8 Ha at Nichitpur is being biologically reclaimed.* ***Plate 3- Biologically Stabilized OB Dumps at Tetulmari*** ***Plate 4- OB Dump being Biologically reclaimed at Nichitpur***
27	*Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 1957.08 ha area would be reclaimed. The total additional area under plantation would be 939.17 ha (green belt of 76 ha, Ext. OB dump 73.07 ha, backfilled area 300.35 ha, other undisturbed area 489.77 ha) by planting 1878380 plants in 939.19 ha at a total cost Rs 7202.46 lakhs.*	*Plantation is being carried out in available spaces for creation of thick green belt.* ***Plate 5- Plantation at Undisturbed area at Loyabad*** ***Plate 6- Plantation on external OB dump at Tetulmari*** ***Plate 7-Plantation near mine working boundary at Sendra Bansjora***

28	*The road should be provided with avenue plantation on both sides as trees act as sink of carbon and other pollutant.*	*1320 Gabion plantation has been done alongside road on both sides from Shakti Chowk to Mohlidih.* *Avenue Plantation is also present at Tetulmari Colliery.* *Due to dynamic features of mining operations and presence of coal-bearing area with underlying coal seams, avenue plantation along all the transportation routes is difficult. However more avenue plantation will be carried out in a progressive manner when the land becomes available for plantation*
29	*Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action Plan prepared for Dhanbad as a critically polluted area and relevant for Cluster V shall be implemented.*	*Cluster V is implementing the protocol points of Dhanbad Action Plan prepared by JSPCB and BCCL.* *Dhanbad has come out of the Critically Polluted Areas.* ***Plate 8- Water Sprinkling on mine roads***
30	*The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board. The Committee stated that smoke/dust emission vary from source to source (fuel wood, coal, fly ash from TPPs, silica from natural dust, etc) and a Source Apportionment Study should be got carried out for the entire Jharia Coalfields. Mineralogical composition study should be undertaken on the 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.*	*The locations of monitoring stations have been finalized in consultation with the Jharkhand State Pollution Control Board.* *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*
31	*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 due to dewatering of mine.*	*Groundwater is not being used for mining activities.* *Mine water is being used for industrial purposes (sprinkling on road, firefighting etc.) and for watering of plants.* *Water is also supplied to nearby*

		villages.
32	*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 & 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.*	*Complied.* ***Annexure 12-Groundwater Monitoring station map*** ***Annexure13-Groundwater Monitoring Report***
33	*Mine discharge water shall be treated to meet prescribed standards before discharge into natural water courses/agriculture. The quality of the water discharged shall be monitored at the outlet points and proper records maintained thereof and uploaded regularly on the company website.*	*Mine water discharge parameters are in compliance with the prescribed standards. The quality is monitored regularly and records maintained thereof.* *It is also uploaded on company website.* ***Annexure 14- Analysis report of Mine water discharge by CMPDIL at the monitoring point fixed in consultation with JSPCB***
34	*ETP shall also be provided for workshop and CHP, if any. Effluents shall be treated to confirm to prescribed standards in case discharge into the natural water course.*	*Oil & Grease Trap has been Constructed at Nichitpur Workshop to treat workshop effluents.* *Another conventional type Oil & Grease trap is in process of installation at Tetulmari Workshop.*
35	*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.*	*At present only development districts are operational at UG mines in Cluster V and no depillaring district is taken up. However regular monitoring of subsidence will be undertaken on commencement of depillaring districts.*
36	*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 statuettes and DGMS guidelines.*
37	*High root density tree species shall be selected and planted over areas likely to be affected by subsidence.*	*Identification of high root density Plant and its plantation in subsidence prone area will be taken-up at the*

		time of depillaring operations.
38	*Depression due to subsidence resulting in water accumulating within the low lying areas shall be filled up or drained out by cutting drains.*	*It shall be complied.*
39	*Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.*	*Sufficient barriers are left for saving the surface installation and infra structures as per the statute and DGMS guidelines.*
40	*No depillaring operation shall be carried out below the township/colony.*	*It is being complied.*
41	*The Transportation Plan for conveyor cum–rail for Cluster-V 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 V should be dovetailed with Jharia Action Plan. The road transportation of coal during phase–I should be by mechanically covered trucks.*	*Compliance in progress.* *Master Plan has been dovetailed with Environment Clearance Conditions. The system is to be installed in the 2nd phase i.e. after completion of Master Plan (10 years).* *By that time transportation is being done by covering vehicle with tarpaulin cover. Work for preparation of Transportation plan for conveyor-cum-rail has been awarded to CMPDIL.*
42	*A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.*	The study to analyze extent of reduction in pollution load every year by reducing road transport is being *Conducted by CMPDIL.* *Report for cluster V is awaited.*
43	*R&R of 5835 nos of PAFs involved. They should be rehabilitated at cost of shifting to safe areas at the cost of Rs 104024.9 Lakhs as per the approved Jharia Action Plan.*	*Compliance is in progress. Master Plan for rehabilitation is under implementation.*
44	*A detailed CSR Action Plan shall be prepared for Cluster V group of mines. Specific activities shall be identified for CSR the budget of Rs. 242.7 Lakhs per year@ Rs 5/T of coal as recurring expenditure. The 265.25 ha of area within Cluster V ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. In addition to afforesting 250.57 ha of are at the postmining stage, the waste land /barren land within Cluster V ML shall be rehabilitated/reclaimed as forest/agricultural land under CSR Plan in consultation with local communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary*	*Being Complied*

	provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website A detailed CSR Action Plan shall be prepared for Cluster V group of mines. Specific activities shall be identified for CSR the budget of Rs. 242.7 Lakhs per year@ Rs 5/T of coal as recurring expenditure. The 265.25 ha of area within Cluster V ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. In addition to afforesting 250.57 ha of are at the postmining stage, the waste land /barren land within Cluster V ML shall be rehabilitated/reclaimed as forest/agricultural land under CSR Plan in consultation with local communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website	
45	*Mine Closure Plan of Cluster –V is in draft stage, the same should be submitted to ministry*	*Mine closure plans for five collieries of cluster V have been prepared and approved by the company board. Mine closure plan for remaining two collieries, Kankanee and Bansdeopur, is in draft stage.*
46	*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: 50000) 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.*	*Land use pattern monitoring based on satellite data is being done by CMPDIL.* ***Annexure 15- Land use pattern monitoring Report of JCF for the year 2016***
47	*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.*	*Final Mine Closure Plan will be prepared 5 years before final closure of mines. The mines of cluster V has not reached the end stage yet.* *A roadmap for ecological restoration has been prepared by FRI.* ***Annexure16- Ecological Restoration Roadmap***
48	*A separate environmental management cell with*	*A full-fledged Environment*

	suitable qualified personnel shall be setup 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.	*Department, headed by a HoD (Environment) along with a suitable qualified multidisciplinary team of executives has been established at the Headquarters. At the area level, one Executive in each area has been nominated as Nodal Officer (Environment).Management Trainees/Asst.Manager(Environment) has also been deputed at area level The activities are monitored on regular basis at Area and at Headquarters levels.DGM (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.* *Further capacity building at both corporate and operating level is being done through regular training programmes conducted within company and at leading centres and institutes of the country.*
49	*Implementation of final mine closure plan for Cluster V, subject to obtaining prior approval of the DGMS in regard to mine safety issues*	*It will be Complied at the time of final closure of mines.*
50	*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 noncompliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.*	*A Corporate Environment Policy has been formulated and also uploaded on the website* ***Annexure17- Corporate Environment Policy.***
B	***General Conditions by MOEF:***	
1	*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 complied*
2	*No change in the calendar plan of production for quantum of mineral coal shall be made.*	*It is being complied*
3	*Four ambient air quality monitoring stations shall be*	*Complied.*

	established in the core zone as well as in the buffer zone for PM10, PM2.5, SO2 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.	
4	*Data on ambient air quality (PM10, PM 2.5, SO2 and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its 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.*	*Complied.* *Monitoring is being done by CMPDIL for Ambient air quality (PM10, PM 2.5, SO2 and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr.* ***Annexure18:-Environment Monitoring Report***
5	*Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.*	*Complied.* *Personnel operating near HEMMs, drilling machine comply with safety regulation and are equipped with Personal Protective Equipment.*
6	*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.*	*Complied.* *Mine water is being reused in mine for industrial purposes (sprinkling, cooling, fire control etc.)* *Wastewater is collected and discharged after proper settling / treatment.*
7	*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*
8	*Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, 1986*	*It is being Complied*
9	*Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.*	*Complied*
10	*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*	*Complied*

	to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.	
11	*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 has been established at the Headquarters. At the area level, one Executive in each area has been nominated as Nodal Officer (Environment).* Management Trainees/Asst. Manager (Environment) have also been deputed at arealevel.The activities are monitored on regular basis at Area and at Headquarters levels. DGM (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.
12	*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.*	*Complied.*
13	*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.*	*Complied.*
14	*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.*	*Complied.*
15	*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.*	*Complied.*

16	*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, SO2 and NOx (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.*	*Complied.*
17	*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.*	*Compliance Report is being submitted regularly on time both in hard copy and in soft copy.*
18	*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.*	*Complied*
19	*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*	*Complied regularly on time*
C	***Other Conditions by MOEF:***	
1	*The Ministry or any other Competent Authority may stipulate any further condition(s) for environmental protection.*	*Complied. Following additional measures as informed by MoEF and JSPCB from time to time*
2	*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*	*Agreed by PA*
3	*The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up*	*Agreed by PA*

	remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.	
4	*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 by PA*

ANNEXURE-1

Sl.	Name of Mine	Grade	Vend. Stock adapted by Accounts on 01.04.16	Mixed stock in Statistics 01.04.16	Production (In tones) **(April'16 to March'17)**
(1)	(2)	(3)	(4)	(5)	(6)
1	SENDRA BANSJORA	W-III	**0**	0	28165
		W-IV	**94628**	0	785319
		G-6	**5755**	0	18721
		TOTAL	**100383**	**0**	**832205**
2	NICHIT PUR (DEPT)	W-III	**0**	0	21623
		W-IV	**43643**	0	238653
	NICHIT PUR (HIRED)	W-III	**0**	0	20258
		W-IV	**11755**	0	371825
		TOTAL	**55398**	**0**	**652359**
3	KANKANEE	ST-II	**0**		572853
		TOTAL	**0**	**0**	**572853**
4	MUDIDIH	W-IV	**3522**	0	41358
		ST-II	**84667**	0	0
		W-II	**0**	0	
		TOTAL	**88189**	**0**	**41358**
5	TETULMARI	W-III	**0**	0	49945
		W-IV	**109655**	0	814795
		TOTAL	**109655**	**0**	**864740**
	SIJUA AREA (Cluster -V)	*W-III*	*0*	*0*	*119991*
		W-IV	*263203*	*0*	*2251950*
		W-II	*0*	*0*	*0*
		ST-II	*84667*	*0*	*572853*
		G-6	*5755*	*0*	*18721*
		TOTAL	***353625***	***0***	***2963515***

Annexure 2- Transportation Booklet

TRANSPORTATION BOOKLET

SIJUA AREA

CLUSTER V

2016-17

COAL TRANSPORTATION:

Coal produced in the mines of cluster V is dispatched in two modes-

1. ***Road Transport***
2. ***Rail Transport through Railway Sidings***

1. ***Road Transport:***

- *Coal from coal dumps is transported to washeries/consumers through road transportation.*

Coal is also transported up to railway sidings via Road route for loading in rakes for rail transportation

2. ***Rail Transport:***

- Due to suspension of rail movement on Dhanbad-Chandrapura rail line, coal is being transported through railway sidings located in area VI of Bharat Coking Coal Limited.

3. ***Coal transported in 2016-17 in Cluster V:***

The sector-wise off-take of Sijua Area for the year 2016-17 is provided as follows on the next page.

BHARAT COKING COAL LIMITED

(A Subsidiary of Coal India Limited)

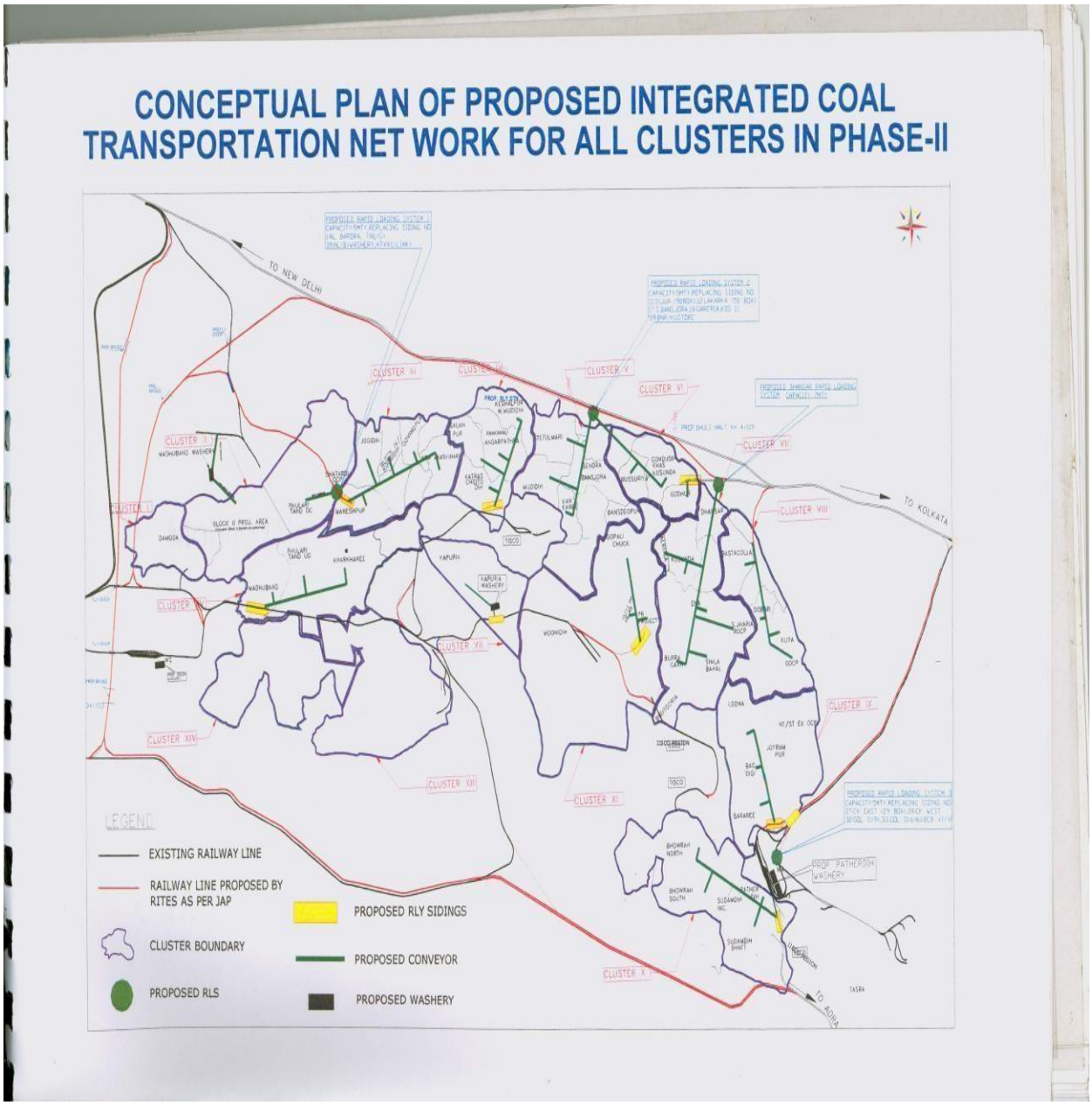
SECTORWISE OFF-TAKE (SIUA AREA) FOR THE YEAR 2016-2017

CONSUMERS	MUDIDIH COLLIERY				KANKANEE		SENDRA BANSJORA COLLIERY					TETULMARI COLLIERY			NICHITPUR COLLIERY			LOYABAD		TOTAL AREA	
	W - IV		W-II		STEEL-II		Stm-VIII	G-6		W-V		Stm-VIII	W-IV		Stm VIII	W-IV		H COKE	BREEZE		
	RAIL	ROAD	RAIL	ROAD	RAIL	ROAD	ROAD	RAIL	ROAD	RAIL	ROAD	ROAD	RAIL	ROAD	ROAD	RAIL	ROAD	ROAD	ROAD	RAIL	ROAD
A. STEEL																					
CHASNALA(WASHERY)																					
JAMADOBA(WASHERY)		5006.43																			
BHELATAND(WASHERY)																					5006.430
W.BOKARO(WASHERY)																					
JINDAL STEEL LIMITED						5.7															
TOTAL STEEL	0	5006.430	0	0	0	5.700	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0000	5.700
B. PVT. COKERIES(LW)																					
C. POWER HOUSES																					
CTPS	2054.280																				
MPL										9186.410			15504.780			6935.750					
DVC RAGHUNATHPUR								24476.100			52867.560			138538.770			3750.150			33681.220	
DTPS											7386.880			63951.230			105236.770				219632.580
HDJ	1101.610																				176574.880
FIC	322.600									6353.930			9901.050			7885.890				25242.480	
PNK										2189.400			3828.900			1468.800				7829.700	
PMRG										5875.090			10486.500			2629.110				18993.700	
ROPER																					
BUDGE BUDGE	4667.910																				
BTPS (BOKARO)										84577.750			105995.190			64208.530				259449.380	
LEHRA MOHABBAT										3502.000			4276.000			3320.000				11098.000	
JPSM (KANTI)																					
DADRI	272.300																				
KTPS	675.580									5465.180			4851.300			4286.110				14874.890	
UCHAHAR	636.600									11298.640			12500.040			8589.880				33064.140	
DSTPS	3853.520									7593.200			11608.630			6527.880				26366.310	
FARAKKA	1438.000									55960.900			67066.810			43203.720				170084.950	
PANIPAT										23638.600			28951.030			20249.110				74276.740	
PANIPAT/PDPK	262.600									469.560			1898.560			621.630				2989.750	
YAMUNANAGAR										2677.850			7060.980			4531.990				14533.420	
MTPS	19345.020									323.800			1904.300			1118.200				3346.300	
TOTAL POWER	34630.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24476.100	537111.500	60254.440	0.000	361666.000	202490.000	0.000	223813.270	108986.920	0.000	0.000	922823.480	
D. FERTILIZER													647503.070			399409.870				1618654.460	396207.460
BTI	418.200																				
NGL	410.940									8216.880			7601.690			9211.440				25448.210	
DIWANA	593.080									7786.120			6610.240			3456.860				18264.160	
OTHERS										12128.020			8069.530			5973.670				26763.700	
TOTAL FERTILIZER	1422.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28131.020	0.000	0.000	22281.460	0.000	0.000	18641.370	0.000	0.000	0.000	70476.070	0.000
E. BRK & OTHRS.																					
E_AUCTION		1137.270				2093.250	28165.350					49944.990			41881.040						123221.900
TOTAL BRK & OTHRS	0	1137.270	0	0		2093.250	28165.350	0	0	0	0	49944.990	0.000	0	41881.040	0	0.000		0.000	0.000	123221.900
F. OWN WASH.																					
MAHUDA						46258.730															46258.730
MOONIDIH						152994.950															152994.950
BHOJUDIH					228399.070															228399.070	
DUGDHA					167142.090															167142.090	
TOTAL OWN WASH.	0	0.000	0.000	0.000	395541.160	199253.680	0	0	0	0	0	0	0	0	0	0	0	0	0	395541.16	199253.68
G INT. CONSUMPTION																					
BOILER																					
DOMESTIC																					
INTER SUBSIDIARY (CCL)																					
INTER AREA LODNA																					
INTER AREA (KATRAS AREA)																					
SIUIA AREA (H/C)																		14.740			14.740
TOTAL INT. CONS.																		1.490			1.490
TOTAL OFFTAKE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.090			5.090
	36052.240	6143.700	0.000	0.000	395541.160	201352.630	28165.350	0.000	24476.100	565242.520	60254.440	49944.990	669784.530	202490.000	41881.040	418051.240	108986.920	21.320	0.000		21.320
																				2084671.690	723716.490
																					2808388.180

PREPARED By:

AREA MANAGER(SALES)
SIUIA AREA

<u>Proposed Integrated Coal Transportation Network for all clusters in phase II:</u>



Annexure 3- CSR Booklet

CSR BOOKLET

SIJUA AREA

CLUSTER V

2016-17

BHARAT COKING COAL LIMITED (BCCL)

Bharat Coking Coal Limited (BCCL) is a Public Sector Undertaking engaged in mining of coal and allied activities. It occupies an important place in as much as it produces bulk of the coking coal mined in the country. BCCL meets almost 50% of the total prime coking coal requirement of the integrated steel sector. BCCL was incorporated in January, 1972 to operate coking coal mines (214 Nos operating in the Jharia & Raniganj Coalfields, taken over by the Govt. of India on 16th Oct, 1971 to ensure planned development of the scarce coking coal resources in the country.

MAJOR CSR ACTIVITIES OF BCCL

Bharat Coking Coal Limited (BCCL) is committed to good corporate citizenship and makes constant efforts to build and nurture long lasting relationships with members of the society in general and its peripheral communities in particular.

The following activities have been carried out under the Corporation's CSR Programme.

***Drinking Water Facilities**: Provided deep bore wells, tube wells, pumps/motors, open wells, in the peripheral villages of BCCL. Water supply through pipeline, through water tanker is also provided to the villages.*

***Education:** BCCL adopts a multi-pronged approach to promote quality education in backward areas. The measures taken by BCCL comprise Construction, Extension, and Renovation of school buildings etc are done to promote quality education in the nearby villages. BCCL is Extending financial aid for educational facilities to Private Committee Managed schools. Measures are taken to promote women literacy and career development.*

***Health Care**: BCCL Conducts medical/health camps for dwellers of peripheral villages for rendering free medical consultancy. CSR Clinics, wellness clinics, artificial limbs centres are organised for the benefit of the needy section of*

the society. Mobile medical vans are deployed as special arrangement for medical services.

AIDS awareness *camps are organized as special drive to develop awareness and to render free consultancy.*

*"*Ek Jagaran Jeevan Shaili*"- A Life style Management Programme is being organised for de-addiction from ill habits of life style such as consuming tobacco, alcohol etc.*

Occupational health awareness programmes are organised.

Other Welfare Activities*: This includes Construction / renovation of Community Halls, construction / repair of roads, construction of Health-sub centres, construction of drain, construction of Chhat Ghat in the ponds, Construction of Boundary wall, providing Choupal for community gatherings, Installation of road side Water Kiosks during summer etc.*

During winter, Blankets are distributed among poor section of the society.

Sports & Cultural*: Various activities are organised to propagate sports and cultures. Sports/games items and instruments are also provided. To promote sports, children parks have been constructed.*

Village adoption: Lahbera, a SC/ST village in Dhanbad has been adopted for its all-round development and a number of development activities have been carried out.

SCOPE

As per **Schedule VII of New Companies Act 2013** the following should be the Scope of Activities under Corporate Social Activities:

i) Eradicating hunger, poverty and malnutrition, promoting healthcare including preventive health care and sanitation and making available safe drinking water.
ii) Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and differently abled and livelihood enhancement projects;
iii) Promoting gender equality, empowering women, setting up homes and hostels for women and orphans, setting up old age homes, day care

centres and such other facilities for senior citizens and measures for reducing inequalities faced by socially and economically backward groups;
iv) Ensuring environmental sustainability, ecological balance, protection of Flora and Fauna, animal welfare, agro-forestry, conservation of natural resources and maintaining quality of soil, air and water;
v) Protection of national heritage, art and culture including restoration of buildings and sites of historical importance and works of art; setting up public libraries, promotion and development of traditional arts and handicrafts;
vi) Measures for the benefit of armed forces veterans, war widows and their dependents
vii) Training to promote rural sports, nationally recognized sports, Paralympics sports and Olympic sports;
viii) Contribution to the Prime Minister's National Relief Fund or any other fund set up by the Central Government for socio-economic development and relief and welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women;
ix) Contributions or funds provided to technology incubators located within academic institutions which are approved by the Central Government;
x) Rural development projects

SOURCE OF FUND

The fund for the CSR should be allocated based on 2% of the average net profit of the Company for the three immediate preceding financial years or Rs. 2.00 per tonne of Coal Production of previous year whichever is higher.

ACTION PLAN FOR CORPORATE SOCIAL RESPONSIBILITY

As per the EC Granted to Cluster V:

"A detailed CSR Action Plan shall be prepared for Cluster V group of mines. Specific activities shall be identified for CSR the budget of Rs. 242.7 Lakhs per year@ Rs 5/T of coal as recurring expenditure. The 265.25 ha of area within Cluster V ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. In addition to afforesting 250.57 ha of area at the post-mining stage, the waste land /barren land within Cluster V ML shall be rehabilitated/reclaimed as forest/agricultural land under CSR Plan in consultation with local

communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the local youth, who are motivated to carry out the work in future. CSR should be Rs 4.6 Lakh for cluster-V for year 2012-13 and thereafter. Social Audit should be carried out for CSR for its actual implementation."

The EMP (Environment Management Plan) contained the following:

S.N	***HEAD OF WORKS***	***CSR expenditure to be done per year in Rs. lakhs***				
		2011-12	***2012-13***	***2013-14***	***2014-15***	***2015-16***
1	*Education facilities including grant of schools, providing education kits, running of schools etc.*	*40.00*	*45.00*	*35.00*	*40.00*	*40.00*
2	*Water Supply and rain water harvesting works, wells, ponds, hand pumps and tube wells*	*30.00*	*35.00*	*45.00*	*30.00*	*30.00*
3	*Health Care and vaccination, awareness camp, mobile medical camp, Immunization, medicine etc.*	*20.00*	*20.00*	*10.00*	*20.00*	*20.00*
4	*Environment Protection i.e. plantation etc.*	*8.25*	*8.25*	*18.25*	*8.25*	*8.25*
5	*Social Empowerment Like Community centre, Literacy drive, shopping complex.*	*10.00*	*10.00*	*10.00*	*10.00*	*10.00*

6	*Infrastructure Development like road, bridge, repairing of school, drains, electric line etc.*	*20.00*	*10.00*	*10.00*	*20.00*	*20.00*
7	*Sports Culture like village stadium village stadium, grant to village sports body, organizing sports meet*	*3.00*	*3.00*	*3.00*	*3.00*	*3.00*
8	*Grant to NGO for community development*	*5.00*	*6.30*	*6.30*	*5.00*	*5.00*

STATUS

Healthcare: Annual CSR (Healthcare) Activities for the year 2016-17

PD/345
20.2.17

BHARAT COKING COAL LIMITED
CSR Activity of Regional Hospital Loyabad/ Dispenciaries of Sijua Area-V,

Month	OPD under CSR Benf.	Date	Camp at RHL/Dispensaries	Beneficiaries
April-16	195	Date	NIL	NIL
May-2016	112	20.05.2016	Lipid profile camp at RHL	20
June-2016	173		Anti- Alcohal camp at Nichitpur community Hall	100
July-2016	257	07.07.2016	Diabetic camp at RHL	20
		20.07.2016	Lipid profile camp at RHL	15
Augst-2016	206	20.08.2016	Lipid profile camp at RHL	10
Sept-2016	196		NIL	NIL
Octb-2016	139	03.10.2016	Lipid profile camp at RHL	15
		28.10.2016	COPD+HBAIC	12
Nov-2016	147	28.11.2016	Diabetic camp at RHL	7
Jan-2017	193	14.12.2016	Ligation/Family planing camp at RHL	17
		16.12.2016	BMD Test (Ortho)	45
Feb-18.02.2017	178	24.01.2017	Ligation/Family planing camp at RHL	18

CMS/AMO
RHL, Sijua Area-V.
BCCL.

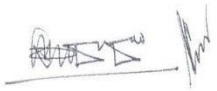
Education: Annual CSR Activities for the year 2016-17

EDUCATION

School Grants (2016-17)

	FINANCIAL ASSISTANCE TO PCM SHOOLS FOR THE PERIOD April to September 2016 (FY 2016-17)							
1	SIJUA		Rate of financial asst.& No. of teachers					
Sl.No.	Name & Location of Private Committee Managed Schools	No.of eligible Teachers for getting fin.assistance	Under Graduate Rs.5000/- PM/PT	Graduate Rs.5500/- PM/PT	Graduate with BT Rs.6500/- PM/PT	Graduate with B.Ed Rs.7000/- PM/PT	Total Amount of Fin.assist. For 2016-17	Amt.of 1st & 2nd Qr April-Sep 2016 of FY 2016-17
1	2	3	4	5	6	7	8	9
1	Adarsh Harijan Shishu Pathshala,Sendra-10	2	1	1	0	0	125000	63000
2	S.S.S. Gyan Kunj, Loyabad.	6	4	2	0	0	372000	186000
3	Saraswati Bal Vidya Mandir,Nichitpur.	2	2	0	0	0	120000	60000
4	Pandey Madhya Vidyalaya, Kankanee	5	2	3	0	0	318000	159000
5	Shishu Vidya Mandir,Tetulmari	5	4	1	0	0	306000	153000
6	Sarvodaya Shishu Mandir, Sendra Bansjora	4	4	0	0	0	240000	120000
7	Saraswati Sewa Sadan Vidyalaya. Kankanee,	3	0	3	0	0	198000	99000
8	Primary Janta School, Sendra No5	1	1	0	0	0	60000	30000
9	Laxmi Devi Vidya Mandir,Loyabad	4	2	2	0	0	252000	126000

	SIJUA Page -2-							
10	Panda Kanali Madhya Vidyalaya,Loyabad Coke Plant	2	2	0	0	0	120000	60000
11	Bangla Primary School, Loyabad	3	3	0	0	0	180000	90000
12	Urdu Primary School,Kankanee	1	1	0	0	0	60000	30000
13	Shishu Shiksha Niketan Loyabad,	3	3	0	0	0	180000	90000
14	Gandhi Smarak Primary School	4	4	0	0	0	240000	120000
15	Sarswati Vidya Mandir, Tetulmari	3	3	0	0	0	180000	90000
16	Janta janardan Bal Vidya Mandir,Tetulmari	3	2	1	0	0	186000	93000
17	Indira Gandhi Smarak Vidya Mandir,Tetulmari	3	3	0	0	0	180000	90000
TOTAL	17	54	41	13	0	0	3318000	1659000



<u>Other CSR activities in Sijua Area (Cluster V) in previous Years:</u>

<u>2013-2014:</u>

1. Revalidation: RE for construction of one library hall for Nehru Mahavidyalaya,Tetulmari

2. Construction of two classrooms for Nehru Balika Uchha Vidyalay, Tetulmari

3. Financial assistance for providing computer at Ambedkar School, Loyabad

4. Repair & Mainenanc- Balika Uchaa Vidyalay Mudidih, Sijua Area

<u>2014-2015:</u>

1. One day Sustainable Development Awareness programme at Sijua area

2015-2016:

1. Construction of toilets in various schools in Paschimi Singhbhum including subsequent maintenance of 5 years under **Swachh Vidyalaya Abhiyan** by BCCL under CSR

2. Construction of two classrooms of Saraswathi Shishu Vidya Mandir, Tetulmari

Annexure 4- R&R Booklet

REHABILITATION & RESETTLEMENT BOOKLET

SIJUA AREA

CLUSTER V

2016-17

REHABILITATION AND RESETTLEMENT PLAN

The cluster of mines will be dovetailed with the approved Jharia **Action Plan for** dealing with fire, subsidence and rehabilitation of people. **Master Plan** for dealing with fire, subsidence and rehabilitation within the leasehold area of BCCL has already been approved by Government of Jharkhand & Government of India.

As per EC granted to Cluster V, R&R of 5835 nos. of PAFs are involved. They should be rehabilitated to safe areas at the cost of Rs 104024.9 Lakhs as per the approved Jharia Action Plan.

Requirement of land at Resettlement site:

A) **For BCCL houses**

The BCCL houses will be resettled in satellite townships with equivalent type of houses in triple storey building. The weighted average plinth area of the houses proposed to be rehabilitated has been estimated at 48.09 sq m /house. Considering the amenities, infrastructure, internal roads etc. to be provided in the township, requirement of land for BCCL houses has been estimated at 34.30 Ha. (@ 160 m^2 /House)

B) **For Non BCCL Houses**

(i) Private (Authorized)

Head of every family will be provided a plot of land measuring 100 sq.m. Considering the amenities, infrastructure, internal roads etc to be provided in the township, requirement of land for private authorized houses has been estimated at 82.94 Ha. (@ 270 m^2/house)

(ii) Private Houses (Encroachers)

Encroachers will be provided with a house constructed on about 27 sq.m land in triple storied building in the resettlement site. However provision of 11 sq. m of land has been considered for construction of another room in future . Considering the amenities, infrastructure,

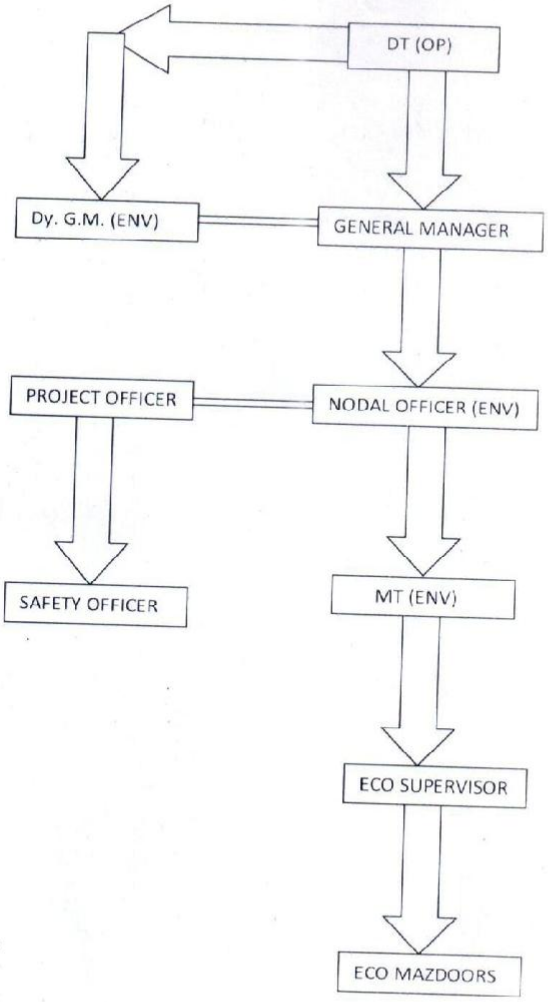
internal roads etc to be provided in the township, requirement of land for encroachers has been estimated at 22.74 Ha. (@ 130 m^2/house)

Annexure-5

ENVIRONMENTAL MANAGEMENT STRUCTURE OF SIJUA AREA

ANNEXURE-17

ENVIRONMENTAL MANAGEMENT STRUCTURE OF SIJUA AREA



Annexure-6

(7)

Ph: 0326-2204933

झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद्
Jharkhand State Pollution Control Board
HIG-I, Housing Colony, Dhanbad-826001

Letter No.....2650 Dated .....6/7/13.....

From,

Regional Officer,
Dhanbad

To,

HOD (Envt.),
M/s. B.C.C.L.,
Koyla Bhawan, Koyla Nagar,
Dhanbad.

Sub: **Fixing up monitoring station/Sampling location of Air, Water & Noise.**

Sir,

With reference to you letter no. GM(Env.)/F-JSPCB/2013/783, dt. 06.07.2013 We have approved Air, Water & Noise monitoring Station/Sampling location after verification and return a copy of the map.

Encl-A/a.

Your's faithfully,

6/7/13

(Dinesh Prasad Singh)
Regional Officer.

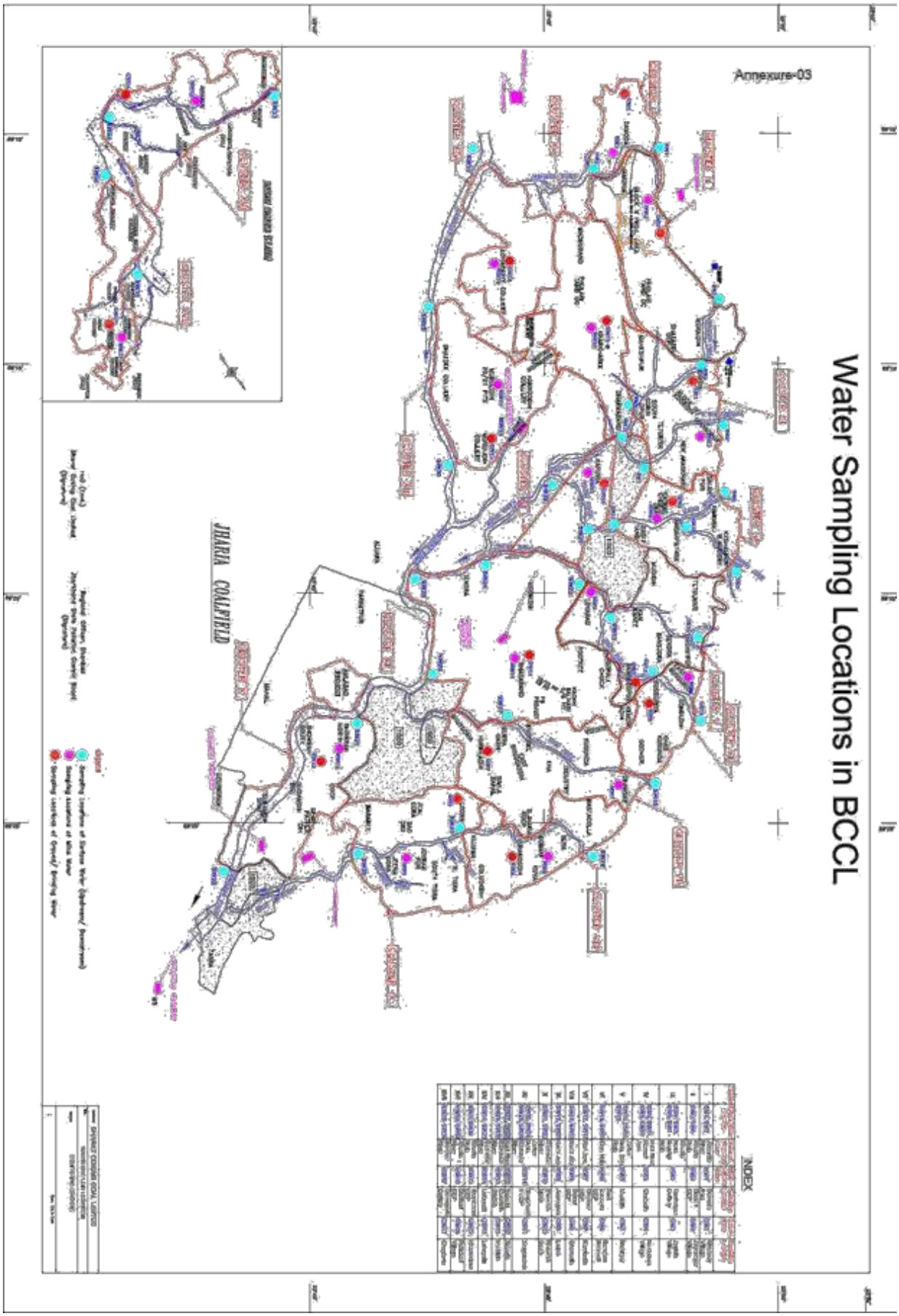
Memo..... Dhanbad, dated.....

Copy to: The Member Secretary, Jharkhand State Pollution Control Board for information & enclose a copy of the map for necessary action.

Encl-A/a.

(Dinesh Pd. Singh)
Regional Officer.

Printed by Sandip



Annexure 7- Copy of the letter regarding conducting a Source Apportionment Study under the MoU on "Sustainable Coal Mining"

भारत कोकिंग कोल लिमिटेड
(कोल इंडिया लिमिटेड का एक अंग)
कोयला भवन, कोयला नगर, धनबाद 826005
A Mini Ratna Company
पर्यावरण विभाग

Bharat Coking Coal Limited
(A Subsidiary of Coal India Limited)
Regd.Off:KoylaBhawan,Koyla Nagar
CIN: U10101JH1972GOI000918
Environment Department

पत्र सं-भाकोकोलि/उप महाप्रबंधक(पर्या)/फाइल-Env/17 दिनांक : 06-04-2017

To,
The Chief General Manager (Env),
Coal India Limited,
Kolkata

Subject: Reply to the queries raised regarding Source Apportionment Study by NEERI for BCCL under 'MoU' of CIL with NEERI

Dear Sir,

This has reference to you email dated 04th April 2017. The requirement for conducting Source Apportionment Study is a specific condition of EC granted to Clusters of BCCL (specimen copy attached as annexure I of EC of Cluster III). The condition has been stipulated in EC of Cluster I to XVI granted to BCCL. The copy of the proposal along with the details of the cost involved submitted by NEERI is attached herewith as Annexure II.

BCCL had explored for engaging with various Institutes before the MoU dated 3.12.2015 entered between CIL & NEERI for "Sustainable coal mining in Coal India limited".

- BCCL had explored for engaging institutes like NEERI (Nagpur), IIT (Kanpur), IIT(ISM), Dhanbad, CIMFR, Dhanbad and TERI, New Delhi and received offer proposals from NEERI(August 2013), ISM(February 2014), IIT Kanpur(February 2014), TERI(February 2014) & CIMFR(March 2014).
- It was advised to find out the prospective bidder, hence open tendering (through e-tendering) was done twice, on 20.01.2015 &. 31.03.2015
- Amongst M/S The automotive Research Association of India(ARAI),Pune, M/S The Energy and Research institute (TERI) New Delhi, M/S Bhagavathi Ana Labs Pvt Ltd Hyderabad & M/S ABC Techno Labs India Pvt. Ltd Chennai participating in tender, none of the Bidder was eligible for opening of price Bid.
- Further, it was advised by competent authority in August 2015 to get this work done through Govt. agencies / institutions namely; NEERI, Nagpur, ISM, Dhanbad, CIMFR, Dhanbad, IIT Kanpur, IIT Chennai, IIT Mumbai, ARAI, Pune on the only eligibility criteria that the Govt. agency / institution should have done the Source Apportionment Study successfully and submitted its report to the MoEFCC in the past.

- In the mean time CIL entered into an MOU with NEERI for "Sustainable coal mining in Coal India limited" on 03.12.2015, the copy of which was circulated to all subsidiaries vide letter no CIL/ENV/2015-2016/7000 dated 09.12.2015.
- Following this, CMD, BCCL instructed that as CIL has already got the MoU with NEERI, Nagpur for conducting such studies for betterment of environment and to meet statutory requirements; this study may also be taken up with CIL accordingly.
- Subsequently this matter was discussed with CGM(env), CIL in a meeting on 18.04.2016 and a requested to facilitate to take up the work of Source apportionment Study and advise BCCL to get it done under the existing MoU of CIL with NEERI vide letter no BCCL/Dy.GM(Env)/F-EMP/16/733-735(H).
- Following this, NEERI Nagpur was requested to take up the study of BCCL as per the spirit of MoU with an intimation to CIL office vide letter no CIL/ENV/7265 dated 03.05.2016.
- NEERI Nagpur submitted the proposal at a cost estimate for Rs.1.2 crores plus taxes on The proposal has been deliberated with BCCL's Finance Deptt. at length and it has been pointed out by them as per Clause No. 5 (a) & (b) of MoU between Coal India Limited and NEERI which is as follows :-
- 5. (a) Total cost of activities in connection with the projects under this MoU will be funded by CIL
- 5(b)CSIR/ NEERI will provide the project proposals and financial requirement time to time for the various activities under this MoU and will submit the same to CIL for approval.
- BCCL's Finance Deptt. has pointed out that the project is to be funded and approved by CIL as per the above clauses of the MoU. It may be brought to your notice that the financial position of BCCL is not sound and therefore the funding for this project may be arranged at CIL level.

A budget of Rs 9.50 Crore have been proposed for various consultancy/testing charges in the revenue budget of BCCL for compliance of EC Conditions in the year 2017-2018. The results of the Source Apportionment Study will act as a bench mark for the CIL as a whole and can be utilized for all the coalfields. Kindly consider the above matter.

Regards,

6/4/17

Dy.GM(Env)

Annexure-8

Copy of the letter regarding work-order given to NRSC

भारत कोकिंग कोल लिमिटेड
एक मिनीरत्न कंपनी
(कोल इंडिया लिमिटेड का एक अंग)
पंजीकृत कार्यालय कोयला भवन ,कोयला नगर ,
(धनबाद)झारखंड826005(
CIN:U10101JH1972GOI000918
Tele: 0326 2230174 FAX: 0326 2230176
ईमेल :cgmsafety@bccl.gov.in

Bharat Coking Coal Limited
A Miniratna Company
(A subsidiary of Coal India Ltd)
Office of GM I/C(S&R)
Koyla Bhawan, Koyla Nagar,
Dhanbad, Jharkhand-826005
CIN:U10101JH1972GOI000918
Tele: 0326 2230174 FAX: 0326 2230176 Email: cgmsafety@bccl.gov.in

पत्र संख्या भाकोकोलि/उप महाप्रबंधक(एस&आर)I/C/संचिका-MP/17 323 दिनांक-:07.04.2017

To,
Dr, Vinod Kumar,
Group Head, Geosciences group
National Remote Sensing Center
India Space Research Organization
Dept of Space, Govt of India,
Balanagar, Hyderabad - 500037

Sub:- Work –Order for " Delineation of Surface Coal Fire and associated Land Subsidence in Jharia Coalfield, Jharkhand using satellite based remote – sensing techniques"

Dear Sir,

Consequent upon competent approval of proposal on aforesaid subject and subsequent signing o MOU between BCCL and NRSC, the aforesaid work is awarded to NRSC for Rs.18,10500/- (Eighteen lac ten thousand five hundred) only, against 100% payment in advance subject to terms and conditions listed in MOU. As per agreed payment terms and Demand Note No. 07/2016-17,

You are therefore requested to initiate all necessary activities for commencing the subject work as early as possible.

Thanking you,

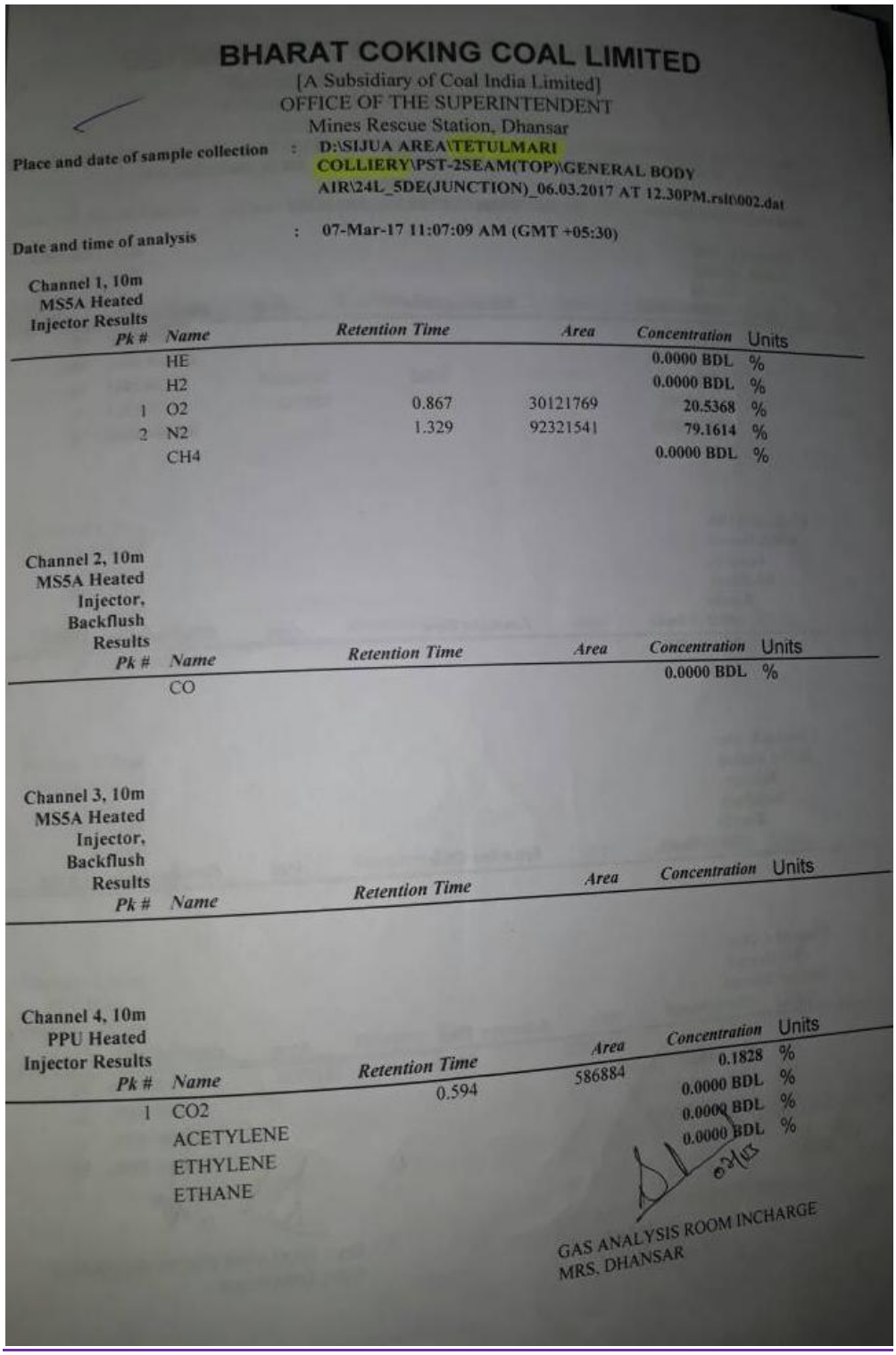
Yours faithfully,

7/4/17

General Manager I/C (S & R)

Cc to :
1. Director (T) P&P, BCCL- for kind information.
2. TS to CMD, BCCL – for kind information.
3. Sri Mithilesh Kumar, Sr.Mgr.(M),Safety.Deptt., KoylaBhawan

Annexure 9- Report of the analysis at Tetulmari Colliery



BHARAT COKING COAL LIMITED

[A Subsidiary of Coal India Limited]

OFFICE OF THE SUPERINTENDENT

Mines Rescue Station, Dhansar

Place and date of sample collection : D:\SIJUA AREA\TETULMARI COLLIERY\PST-2SEAM(TOP)\GENERAL BODY AIR\24L_5DE(JUNCTION)_06.03.2017 AT 12.30PM.rsl\002.dat

Date and time of analysis : 07-Mar-17 11:07:09 AM (GMT +05:30)

Channel 1, 10m MS5A Heated Injector Results

Pk #	Name	Retention Time	Area	Concentration	Units
	HE			0.0000 BDL	%
	H2			0.0000 BDL	%
1	O2	0.867	30121769	20.5368	%
2	N2	1.329	92321541	79.1614	%
	CH4			0.0000 BDL	%

Channel 2, 10m MS5A Heated Injector, Backflush Results

Pk #	Name	Retention Time	Area	Concentration	Units
	CO			0.0000 BDL	%

Channel 3, 10m MS5A Heated Injector, Backflush Results

Pk #	Name	Retention Time	Area	Concentration	Units

Channel 4, 10m PPU Heated Injector Results

Pk #	Name	Retention Time	Area	Concentration	Units
1	CO2	0.594	586884	0.1828	%
	ACETYLENE			0.0000 BDL	%
	ETHYLENE			0.0000 BDL	%
	ETHANE			0.0000 BDL	%

GAS ANALYSIS ROOM INCHARGE
MRS. DHANSAR

Annexure-10

BHARAT COKING COAL LIMITED
(A Mini Ratna Company)
(A Subsidiary of Coal India Limited – A Maharatna Company)
Regd.Off: Koyla Bhawan, Koyla Nagar, Dhanbad-826005
CIN: U10101JH1972GOI000918
OFFICE OF THE GENERAL MANAGER
SIJUA AREA

Ref. No. - GM/SPA/SA/F-41/2017/39. Date- 18.5.17.

To,
The HoD
Environment Department
Centre of Mine Environment
Indian Institute of Technology(ISM)
Dhanbad

Subject- Regarding Quotation for analysis of air sample

Dear Sir,

We are in requirement of getting analysis of air samples done for the parameters mentioned below at mines of Sijua Area (Area V), Bharat Coking Coal Limited from a certified laboratory. Therefore, we request you to confirm if the following analysis can be done at the laboratory at your centre and the quotation for the same if it's possible.

Details for analysis:

1. No. of locations of analysis - 7 (One for each mine namely- Nichitpur,Tetulmari, Sendra Bansjora, Mudidih, Kankanee, Bansdeopur, Loyabad)
2. No. of samples to be analyzed- 1 for each location (Total-7)
3. Parameters to be analyzed- CO,CO2,CH4 & its homologues and Benzene

We also request you to intimate the time required for the submission of the report of the analysis after the award of the work.

Regards

17/05/17
General Manager
Sijua Area

1. File

Annexure 11- Copy of the work Order of Installation of Silo Loading

C2

भा.को.को.लि.

भारत कोकिंग कोल लिमिटेड
एक मिनी रत्न कंपनी (कोल इण्डिया की इकाई)
पंजीकृत कार्यालय भवन कोयला :कोयला नगर,
धनबाद -826005
CIN : U10101JH1972GOI000918
संविदा प्रबन्धन प्रकोष्ठ
फोन/फैक्स-0326- 2230206
e-mail : cgmcmc@bccl.gov.in

पत्रांक – भा.को.को.लि./स. प्र. प्र./ एल.ओ.ए./ सी. एच. पी. / तेतुलमारी/2015/ 710 - 29 दिनांक-12.06.2015

SPEED-POST / FAX
Fax No. 0651-2401533
e-mail: vijaykumar1@heclltd.com
smustafi@heclld.com

सेवा में,
M/S Heavy Engineering Corporation Ltd.
Project Division, Plant Plaza Road, Dhurwa,
Ranchi, Jharkhand - 834004.

विषय- Letter of Acceptance for the work of "Planning, Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of Coal Handling Plant with silo loading arrangement (5 Mtpa) consisting of all Civil, Structural, Electrical and Mechanical Works and all other accessories and facilities required to make it complete in all respects on turnkey basis at Tetulamri, Sijua Area, BCCL".

प्रसंग-

(i) NIT No. BCCL/GM(CMC)/CHP/TETULMARI/2014/2266 Date: 28.05.2014.

(ii) Corrigendum No. BCCL/GM(CMC)/CHP/TETULMARI/2014/2505 Date: 07.07.2014

महाशय,

With reference to above, Competent Authority has approved award of work for the work of "Planning, Design, Engineering, Construction, Fabrication, Supply, Erection, Trial-run, Commissioning and Testing of Coal Handling Plant with silo loading arrangement (5 Mtpa) consisting of all Civil, Structural, Electrical and Mechanical Works and all other accessories and facilities required to make it complete in all respects on turnkey basis at Tetulamri, Sijua Area, BCCL" in your favour with financial involvement of Rs. 18408.76/- lakhs (Eighteen thousand four hundred eight point seventy six lakhs) inclusive of all duties, Taxes, other levies and Service Tax as per terms & conditions of NIT / Tender Document.

The period of completion of work will be 36 (thirty six) months.

You are advised to furnish Performance Security/Security Deposit in the Office of General Manager, Sijua Area, BCCL, in the form as detailed in clause 3.0 under heading "CONTRACT PERFORMANCE GURANTEE / SECURITY DEPOSITE" of "General Terms and Conditions of Contract" (Sub-Section 4.1) of Tender Document (Volume-I) within 28 (twenty eight) days from the date of receipt of this letter of

Vijay Kr 19/06/15

acceptance to enable General Manager, Sijua Area, BCCL, to issue formal work order to you and sign the contract.

This LOA is given to you in duplicate. You are advised to submit your consent by returning second copy of the letter of acceptance duly signed by you as a token of acceptance of the award of work within 7(seven) days from the date of receipt of this letter.

Failure to comply with the requirement as above shall constitute sufficient ground for cancellation of the award of work and forfeiture of the bid security.

धन्यवाद ।

भवदीय

Sd/-

GM (CMC)
Bharat Coking Coal Limited

Distribution:

1. Sri Naresh Chaturvedi, IAS (Retd.), Address :- CL-14, Sector-II, Salt Lake, Kolkata- 700091
2. CVO / D(T) OP /D(T) P&P /D(F) /D(P), BCCL.
3. CGM (Co-ordn.) / GM(F) I/C /GM (P&P) / GM(MM) /GM(E&M)I/C/ GM (Civil)/ GM (System), BCCL/ RD,CMPDI, RI-II.
4. Company Secretary, BCCL
5. Sr. ES to CMD for kind information of CMD.
6. General Manager, Sijua Area, BCCL: Copy of Resolution item no. 315.3.U of BCCL Board, all documents, i.e. complete original tender files, Bid documents submitted by the bidders, TCR , Approved estimate etc are to be collected from CMC deptt. for issuance of work order and execution of agreement after signing of Integrity Pact along with compliance of other formalities from your end.

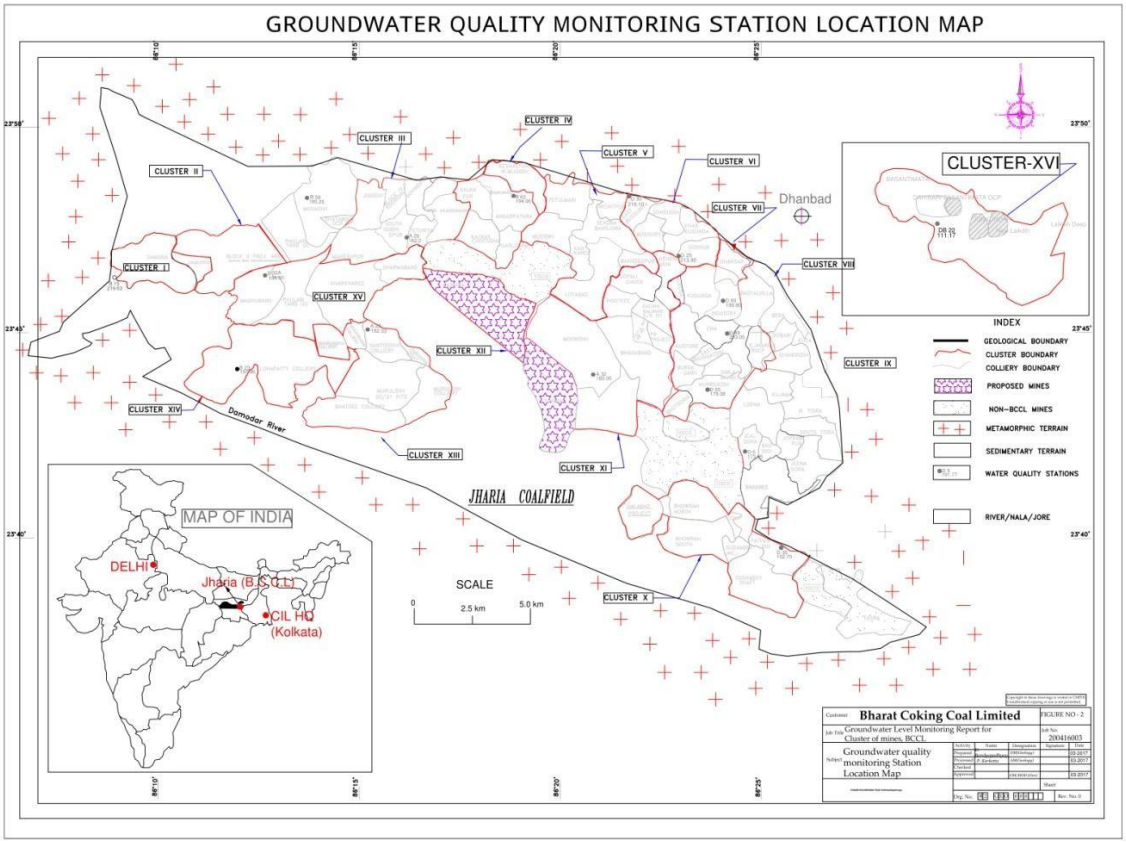
   M/S Heavy Engineering Corporation Ltd. have submitted EMD in form of B.G No. 0962014BG0000157 Date: 08.08.2014 for Rs 50,00,000/- (Fifty lakhs) issued by State Bank of India, SME Branch, Mecon Campus, Doranda, Ranchi- 834002. **Please note that the validity of the BG submitted by the Agency as Earnest Money will expire on 06.09.2015.** It is requested to kindly intimate the undersigned immediately in case Performance Security/Security Deposit is not submitted by the contractor within 28 days of receipt of LOA as per clause 3.0 under heading "CONTRACT PERFORMANCE GURANTEE / SECURITY DEPOSITE" of "General Terms and Conditions of Contract" (Sub-section 4.1) of Tender Document (Volume-I).

7. GM (Mining), Production / FPD, CIL, Coal Bhawan, Premise No. – 04 MAR, Plot No. – AF-III, Action Area – 1A, Newtown, Rajarhat, Kokata - 700156.
8. Sri R K Choubey, Sr. DEO, CMC Deptt. – For uploading this LOA in BCCL Website.

GM (CMC)
Bharat Coking Coal Limited

19/06/15

Annexure-12



Annexure-13

GROUNDWATER LEVEL & QUALITY

REPORT

FOR CLUSTER OF MINES, BCCL

(Assessment year - 2016)

[CLUSTER – I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XIII, XIV, XV & XVI]

JHARIA COALFIELD AND RANIGANJ COALFIELD (PART)

MARCH – 2017

Regional Institute – II

Central Mine Planning & Design Institute Ltd.

(An ISO 9001:2000 Company)

(A Subsidiary of Coal India Ltd.)

Koyla Bhawan Complex, Koyla Nagar

DHANBAD – 826005

CMPDI

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Annexure 14- Analysis report of Mine **water discharge by CMPDIL at the monitoring point fixed in consultation with JSPCB**

WATER QUALITY DATA

(EFFLUENT WATER- FOUR PARAMETERS)

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

Year : **2016-17.**

Name of the Cluster : **Cluster - V**

Month: **Oct, 2016.**

Name of the Stations & Code :

1. MW5- Mine Discharge of Mudidih

First Fortnight

Sl. No.	***Parameters***	***MW5*** *(Mine Discharge)* *04.10.2016*	***As per MOEF General Standards for schedule VI***
1	*Total Suspended Solids*	*32*	*100 (Max)*
2	*pH*	*8.26*	*5.5 - 9.0*
3	*Oil & Grease*	*<2.0*	*10 (Max)*
4	*COD*	*40*	*250 (Max)*

Second Fortnight

Sl. No.	***Parameters***	***MW5*** *(Mine Discharge)* *27.10.2016*	***As per MOEF General Standards for schedule VI***
1	*Total Suspended Solids*	*32*	*100 (Max)*
2	*pH*	*7.73*	*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

Approved 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 : **2016-17.**

Name of the Cluster : **Cluster - V** Month: **Nov, 2016.**

Name of the Stations & Code : **1. MW5- Mine Discharge of Mudidih**

First Fortnight

Sl. No.	***Parameters***	***MW5*** *(Mine Discharge)* *05.11.2016*	***As per MOEF General Standards for schedule VI***
1	*Total Suspended Solids*	*36*	*100 (Max)*
2	*pH*	*8.01*	*5.5 - 9.0*
3	*Oil & Grease*	*<2.0*	*10 (Max)*
4	*COD*	*40*	*250 (Max)*

Second Fortnight

Sl. No.	***Parameters***	***MW5*** *(Mine Discharge)* *28.11.2016*	***As per MOEF General Standards for schedule VI***
1	*Total Suspended Solids*	*36*	*100 (Max)*
2	*pH*	*7.81*	*5.5 - 9.0*
3	*Oil & Grease*	*<2.0*	*10 (Max)*
4	*COD*	*42*	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By

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

(EFFLUENT WATER- FOUR PARAMETERS)

Name of the Company: **Bharat Coking Coal Limited** Year : **2016-17.**

Name of the Cluster : **Cluster - V** Month: **Dec, 2016.**

Name of the Stations & Code : **1. MW5- Mine Discharge of Mudidih**

First Fortnight

Sl. No.	***Parameters***	***MW5*** *(Mine Discharge)* *13.12.2016*	***As per MOEF General Standards for schedule VI***
1	*Total Suspended Solids*	*76*	*100 (Max)*
2	*pH*	*8.50*	*5.5 - 9.0*
3	*Oil & Grease*	*<2.0*	*10 (Max)*
4	*COD*	*28*	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW5 (Mine Discharge) 17.12.2016	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	24	100 (Max)
2	pH	8.69	5.5 - 9.0
3	Oil & Grease	<2.0	10 (Max)
4	COD	32	250 (Max)

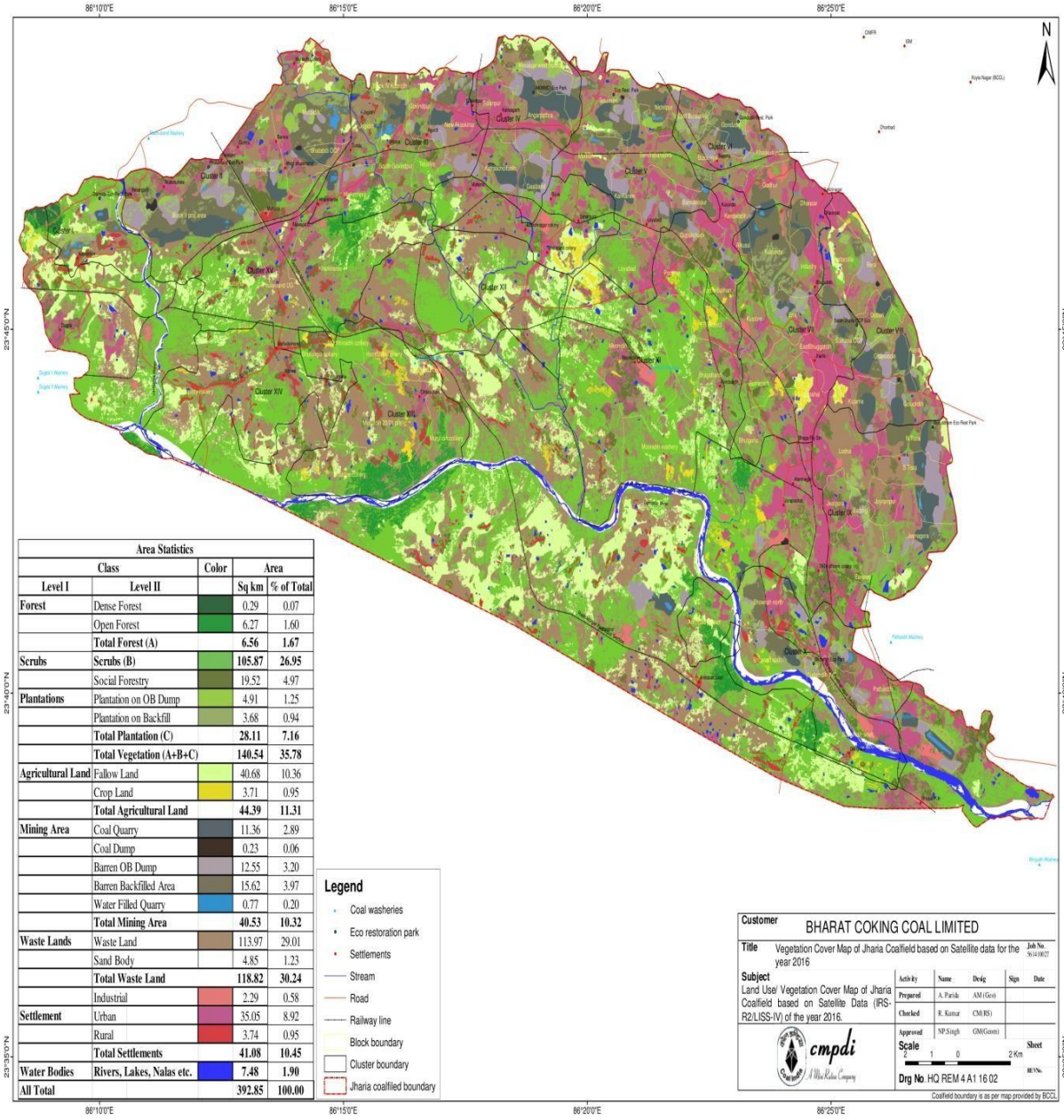
All values are expressed in mg/lit unless specified

Analysed By
JSA/SA/SSA

Checked By
Lab Incharge
Env. Lab, RI-2, CMPDI

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

Annexure 15- Land use pattern monitoring Report of JCF for the year 2016



Area Statistics				
Class		Color	Area	
Level I	Level II		Sq km	% of Total
Forest	Dense Forest		0.29	0.07
	Open Forest		6.27	1.60
	Total Forest (A)		**6.56**	**1.67**
Scrubs	Scrubs (B)		105.87	26.95
	Social Forestry		19.52	4.97
Plantations	Plantation on OB Dump		4.91	1.25
	Plantation on Backfill		3.68	0.94
	Total Plantation (C)		**28.11**	**7.16**
	Total Vegetation (A+B+C)		**140.54**	**35.78**
Agricultural Land	Fallow Land		40.68	10.36
	Crop Land		3.71	0.95
	Total Agricultural Land		**44.39**	**11.31**
Mining Area	Coal Quarry		11.36	2.89
	Coal Dump		0.23	0.06
	Barren OB Dump		12.55	3.20
	Barren Backfilled Area		15.62	3.97
	Water Filled Quarry		0.77	0.20
	Total Mining Area		**40.53**	**10.32**
Waste Lands	Waste Land		113.97	29.01
	Sand Body		4.85	1.23
	Total Waste Land		**118.82**	**30.24**
	Industrial		2.29	0.58
Settlement	Urban		35.05	8.92
	Rural		3.74	0.95
	Total Settlements		**41.08**	**10.45**
Water Bodies	Rivers, Lakes, Nalas etc.		7.48	1.90
All Total			392.85	100.00

Annexure16- Ecological Restoration Roadmap

Road Map for Ecorestoration of BCCL Mine Areas of Dhanbad, Jharkhand

Forest Ecology & Environment Division
Forest Research Institute
Indian Council of Forestry Research & Education
(Ministry of Environment & Forests, Govt. of India)
P.O. New Forest, Dehradun- 248006

Table17. Species Suggested for Plantation in Recreation Park

Sl.No.	Species	Family	Vernacular Name
1.	*Acacia farnesiana*	Mimosaceae	Fragrant acacia
2.	*Bamboosa striata*	Poaceae	Strip Bamboo
3.	*Bauhinia purpurea*	Caesalpiniaceae	Kachnar (purple)
4.	*Bauhinia variegata*	Caesalpiniaceae	Kachnar (white)
5.	*Butea monosperma*	Fabaceae	Plash
6.	*Callistemon viminalis*	Myrtaceae	Bottle brush
7.	*Cassia fistula*	Caesalpiniaceae	Amaltash
8.	*Cynodon dactylon*	Poaceae	Doob Grass
9.	*Delonix regia*	Caesalpiniaceae	Gulmohar
10.	*Dodonaea viscosa*	Sapindaceae	Vilayati Menhadi
11.	*Duranta goldiana*	Verbenaceae	Duranta
12.	*Ficus benghalensis*	Moraceae	Bargad
13.	*Grevilea robusta*	Proteaceae	Bulbul
14.	*Hibiscus rosa - sinensis*	Malvaceae	Gudhal
15.	*Mussaenda erythrophylla*	Rubiaceae	Dhoby Bush
16.	*Nerium indicum*	Apocynaceae	Red Kaner
17.	*Nyctanthes arbortris - tis*	Oleaceae	Harsingar
18.	*Plumeria rubra*	Magnoliaceae	Temple tree
19.	*Putranjiva roxburghii*	Putranjivaceae	Putranjiva
20.	*Thespesia populnea*	Malvaceae	Bhendi Pipal
21.	*Thevetia peruviana*	Apocynaceae	Pili kaner

Enrichment Planting in the Fringe Forest Areas.

A large chunk of land on the fringe areas is degraded either due to the various operations in the mining areas or because of biotic interference by local villagers. These areas need to be planted to enrich the density and diversity of the forests.

Discussion with local people and looking into the site conditions,particularly soil and moisture,a number of species have been selected that will not only improve the forest density but will also provide locals with different fruit,fodder and other benefits(Table18).

Degraded Forests /Village Areas

Table 18. Species for Degraded Forests /Village Areas

Species	Vernacular Name	Family	Requirement of Seeds gm./ha.
Trees			
Artocarpus heterophyllus Lam. Syn.	Kathal	Moraceae	250
Bauhinia retusa Roxb.	Semla	Caesalpiniaceae	100
Bauhinia variegata Linn.	Kachanr	Caesalpiniaceae	100
Cassia fistula Linn.	Sonari gach, Amaltas	Caesalpiniaceae	200.
Madhuca indica J.F Gmel.	Mahua	Sapotaceae	200
Mangifera indica Linn.	Aam	Anacardiaceae	500
Pithecellobium dulce Benth.	Jangle-jalebi, Vilayati imli	Mimosaceae	100
Pongamia pinnata Linn.	Karanja	Fabaceae	100
Schleichera oleosa (Lour.) Oken. Syn.	Kusum	Sapindaceae	100
Spondias pinnata Linn.	Amra	Anacardiaceae	200
Shrubs			
Alangium salvifolium (Linn. F.) Wang. Syn	Ankul	Alangiaceae	500
Dodonaea viscosa (Linn.) Jacq.	Sinatha, Mehndi,	Sapindaceae	1000
Murraya koenigii Linn.	Mitha Sur	Rutaceae	500

Table22. Financial Outlay of Mine Spoil Stabilization

S. No.	Mine spoil stabilization Measures	(Cost in Rs. /ha)*
1	Contour Trenching	8,000
2	Steep mined out slopes	15,000
3	**Geotextiles covered area (80 degree slope)	15,000
4	Gully plugging	10,000
5	Flat area (Waste land nearby village area)	8,000
6.	Average Cost/ha	11,200

*Includes Cost of labour, Cost of seed, Seed dispersal ,
**Exceeding Cost of geotextiles Rupees 50,000/ha

Restoration/afforestation has to be taken in two phase starting from 2011 planting season. In the first phase 100 hectare area is recommended for greening ,during Phase II,126 hectare area may be worked with.Details of area that would be available for restoration in different mines under BCCL is detailed in Table 23.

Table 23 area Available for Restoration During Next Five Years.

Sl.No.	Area of BCCL	Area available for Restoration (in ha)	Remarks
1.	Barora Area	25 ha	–
2.	Bastacolla Area	38 ha	–
3.	Block-II Area	32 ha	–
4.	Chanch Victoria Area	8 ha	–
5.	Eastern Jharia Area	22 ha	–
6.	Govindpur Area	15 ha	
7.	Katras Area	22 ha	Fit for Bamboo plantation
8.	Kuslore Area	15 ha	–
9.	Kusunda Area	20 ha	–
10.	Lodna Area	15 ha	–
11.	Sijua Area	10 ha	–
12.	Western Jharia Area	2 ha	–
13.	Western Washery Zone	2 ha	
	Total	226 ha	–

Phase I	Average cost of ecorestoration/ afforestation /ha	Rs. 11,200/-
	Total cost of ecorestoration /afforestation/100 ha	Rs.11.20 lakhs
Phase II	Total cost of ecorestoration /afforestation/126 ha	Rs.14,11,200
	Say	Rs.14.12 lakhs

Funding Mechanism

Substantial investment has to be provided by BCCL in terms of manpower and money for successful implementation of the project.

Execution Schedule

The total project needs to be implemented in two phases over a period of ten years.

Phase I 2011-16 Development of a model restoration plantation at one of the BCCL site by FRI, Dehradun on ten hectares of overburden dumps. Ninety hectares of the area to be restored by BCCL in their three mining sites based on this road map.

Phase II 2016-2021 Replication/expansion of proposed restoration models in the 126 hectares area spread over 13 mines of BCCL.

Annexure 17

BHARAT COKING COAL LIMITED

(A Subsidiary of Coal India Limited – A Maharatna Company)

CORPORATE ENVIRONMENTAL POLICY

Bharat Coking Coal Limited (BCCL), a subsidiary of Coal India Limited, is a Public Sector Undertaking engaged in mining of coal and allied activities. It is the only producer of Prime Coking Coal in India. BCCL was incorporated in 1972 to operate coking coal mines operating in the Jharia and Raniganj Coalfields. Currently, the Company operates 66 coal mines and 8 Coal Washeries.

Our mission is to produce the planned quantity of coal efficiently and economically with due regard to safety, conservation and quality. BCCL affirms its commitment for environment friendly mining with right mitigation of pollution, reclamation of the degraded land, preservation of biodiversity and proper disposal of waste following the best environmental practices including judicious use of the non-renewable energy on the path of continual improvement. Towards this commitment, BCCL shall endeavor to:

- Conduct mining and associated operations in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects.
- Design projects with due consideration of Sustainable Development by integrating sound environmental management practices in all our activities.
- Prevent pollution of surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.
- Ensure compliance of all applicable Environmental and Forest Clearance conditions and other statutory conditions issued by regulatory agencies.
- Implement the Environmental Management Plans in all our mines effectively to mitigate pollutions on air, water and noise; proper disposal of wastes and reclamation and ecological restoration of degraded land; and by also dovetailing the Jharia action/ Master Plan for dealing with Fires, Subsidence and Rehabilitation of affected people with the Environmental Management Plans under the Cluster Concept.
- Strive to conserve Bio-Diversity through Ecological restoration methods.
- Conserve natural resources through recycling of wastes on the principle of Reduce, Recycle and Reuse. Put special thrusts on efficient energy utilization as a measure to reduce carbon foot-print.
- Strive for continual improvement in our environmental performances by setting targets, measuring progress and taking corrective action.
- Create environmental awareness among the employees and the local communities through pro-active communication and training and encourage our business associates to adopt similar approach for environmental protection.

Place: Dhanbad
Date: 25.5.12

Chairman-cum-Managing Director

Chairman-cum-Mg. Director
BHARAT COKING COAL LIMITED
Koyla Bhawan, Dhanbad-826 005

Annexure 18

STRICTLY RESTRICTED FOR COMPANY USE ONLY RESTRICTED

The information given in this report is not to be communicated either directly or indirectly to the press or to any person not holding an official position in the CIL / GOVERNMENT.

ENVIRONMENTAL MONITORING REPORT OF

BHARAT COKING COAL LIMITED, CLUSTER – V

(FOR THE Q.E. JUNE, 2017)

October, 2017

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

CLUSTER - V

(FOR THE Q.E. June, 2017)

CONTENTS

STRICTLY RESTRICTED FOR COMPANY USE ONLY RESTRICTED

The information given in this report is not to be communicated either directly or indirectly to the press or to any person not holding an official position in the CIL / GOVERNMENT.

ENVIRONMENTAL MONITORING REPORT

OF

BHARAT COKING COAL LIMITED

CLUSTER – V

E. C. no. J-11015/01/2011-IA.II (M) dated 11.02.2013.

October, 2017

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

Sampling location and rationale

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.

Water sampling stations

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

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.

Methodology of sampling and analysis

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.

Water quality

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

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).

Results and interpretations

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 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 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.

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 with in permissible limits.

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.

CHAPTER - I

INTRODUCTION

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

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

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

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

The Cluster-V is in the Northern part of the Jharia coalfield. It includes a group of 7 Mines (viz. Nichitpur, OCP, Mudidih colliery (Mixed), Tetulmari colliery (Mixed), Sendra Bansjora colliery (Mixed), Kankanee colliery (Mixed), Bansdeopur colliery (Mixed) and Loyabad colliery. The Cluster – V is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – V 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 Jarian Nala and Ekra Nala.

The Cluster-V is designed to produce 4.854 MTPA (normative) and 6.311 MTPA (peak) capacity of coal. The average grade of coal W – III & W- IV.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 4.854 MTPA (normative) and 6.311 MTPA (peak) capacity of coal production vide letter no. J-11015/01/2010-IA.II (M) dated 11th 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

Location of sampling station and their rationale:

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

Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Nichitpur (A8): Industrial Area

The location of the sampling station is 23^0 48'20" N 86^0 21'30" E. The samplers were placed at a height of approx. 1.5m above ground level at Nichitpur. The station was selected to represent the impact of mining activities of Sijua area, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.s

II. BUFFER ZONE Monitoring Location

i) Basseriya Managers Office (A9) : industrial area

The location of the sampling station is 23^0 47'17" N & 86^0 22'12" E. The samplers were placed at a height of approx. 1.5m above ground level at Safety Office.

ii) Pootki Balihari Office (A16): Industrial Area

The location of the sampling station is 23^o40.977' N 86^o23.963'E. The samplers were placed at a height of approx. 1.5m above ground level at Project Office.

iii) Moonidih UGP (A17): Industrial Area

The location of the sampling station is 23^0 39'32" N & 86^0 26'13" E. The samplers were placed at a height of approx. 1.5m above ground level at project office.

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 analysed in Environmental Laboratory of CMPDI, RI-II, Dhanbad.

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:

Ambient air quality

Particulate Matter PM_{10}

*In **core zone** under **Industrial area** varies from 74 to 136 µ/m^3 In **buffer zone** in **Industrial area** varies from 79 to 191 µ/m^3*

Particulate Matter $PM_{2.5}$

*In **core zone** under **Industrial area** varies from 29 to 58 µ/m^3 In **buffer zone** in **Industrial area** varies from 37 to 75 µ/m^3*

Sulphur Dioxide:

*In **core zone** under **Industrial area** varies from 10 to 18 µ/m^3 In **buffer zone** in **Industrial area** varies from 10 to 16 µ/m^3*

Oxides of Nitrogen:

*In **core zone** under **Industrial area** varies from 26 to 32 µ/m^3 In **buffer zone** in **Industrial area** varies from 22 to 37 µ/m^3*

AMBIENT AIR QUALITY DATA

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

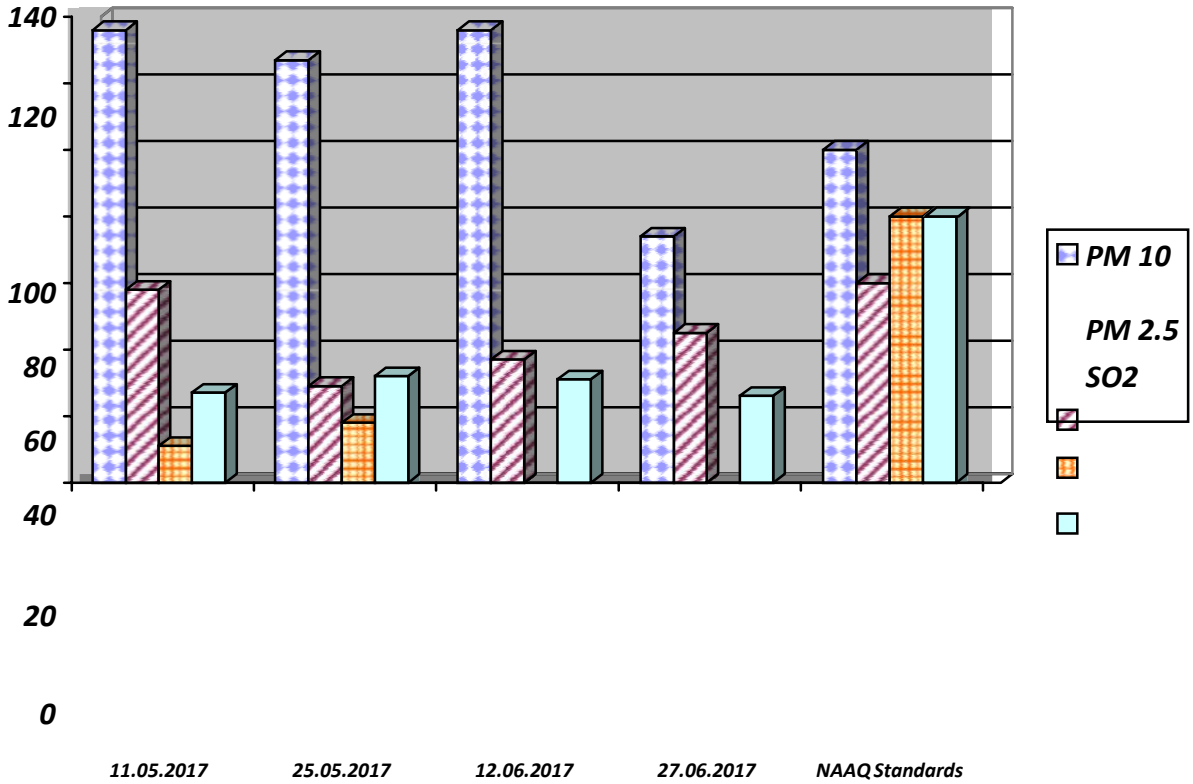
Name of the Cluster: ***Cluster – V*** *Q.E.:* ***June, 2017***

Station Code/Name: ***(a) A8 Nichitpur*** ***Category: Industrial.***

ZONE: ***Core***

(a). Station Code/Name: ***A8 – Nichitpur,*** ***Category: Industrial.***

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_X
1	11.05.2017	136	58	11	27
2	25.05.2017	127	29	18	32
3	12.06.2017	136	37	<10	31
4	27.06.2017	74	45	<10	26
	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	Checked By	Approved By
JSA/SA/SSA	Lab In Charge	HOD(Mining/Environment)
	RI-2, CMPDI, Dhanbad	RI-2, CMPDI, Dhanbad

AMBIENT AIR QUALITY DATA

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

Name of the Cluster: ***Cluster – V*** *Q.E.:* ***June, 2017***

Station Code/Name: (a) A9 Basseriya Managers Office ***Category: Industrial.***

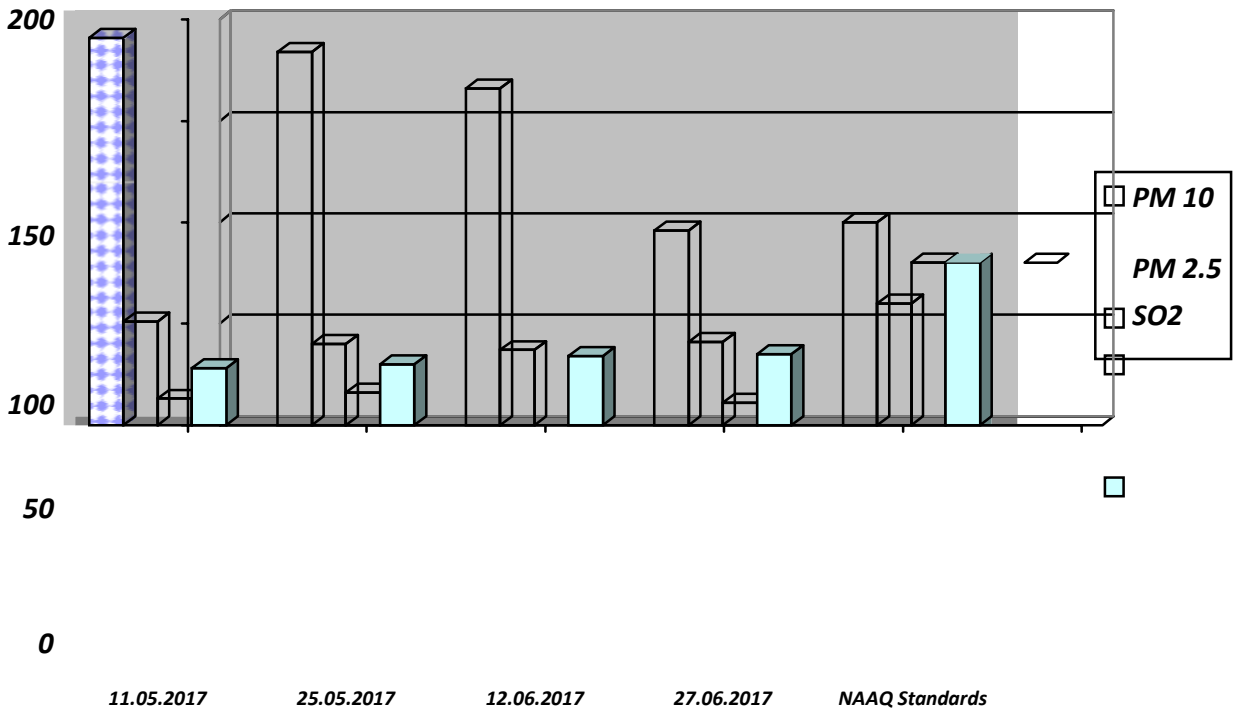
(b) A16 Pootki Balihari Office

(c) A17 Moonidih UGP

ZONE: BUFFER

(a). Station Code/Name: A9 – Basseriya Managers Office, Category: Industrial.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_X
1	11.05.2017	191	51	13	28
2	25.05.2017	184	40	16	30
3	12.06.2017	166	37	<10.0	34
4	27.06.2017	96	41	11	35
	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*

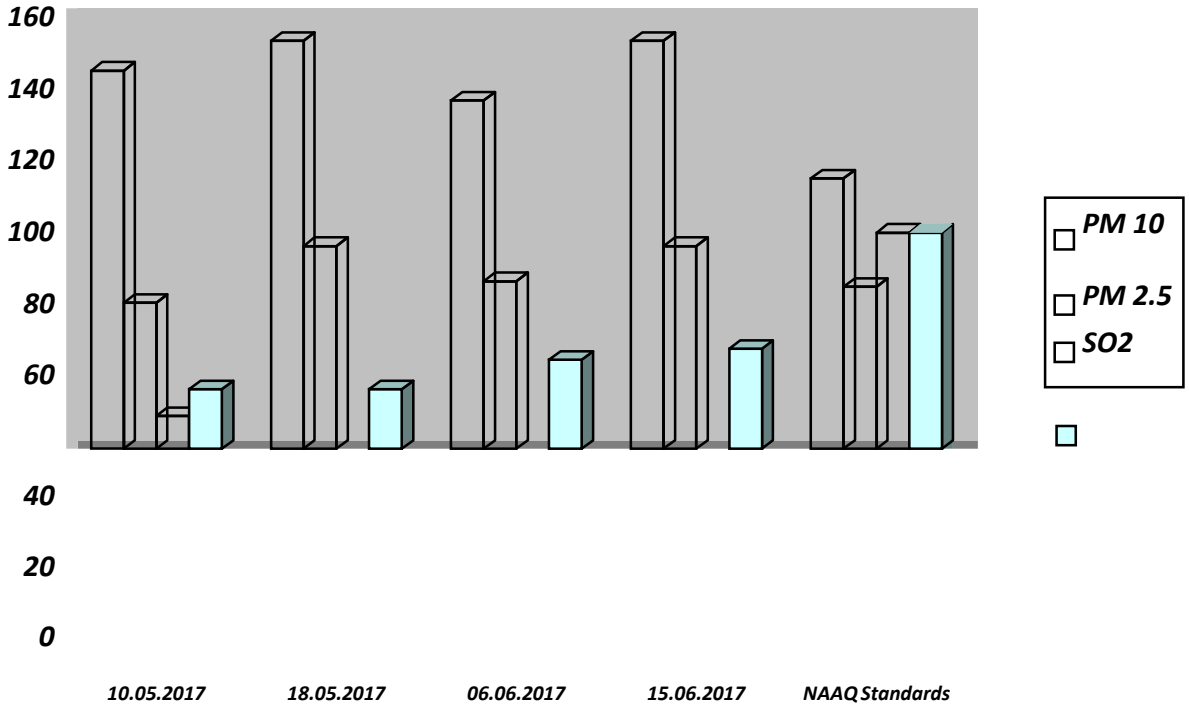
Analysed By
JSA/SA/SSA

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

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

(b). Station Code/Name: A16 – Pootki Balihari Office, Category: Industrial.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_X
1	10.05.2017	140	54	12	22
2	18.05.2017	151	75	<10.0	22
3	06.06.2017	129	62	<10.0	33
4	15.06.2017	151	75	<10.0	37
	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*

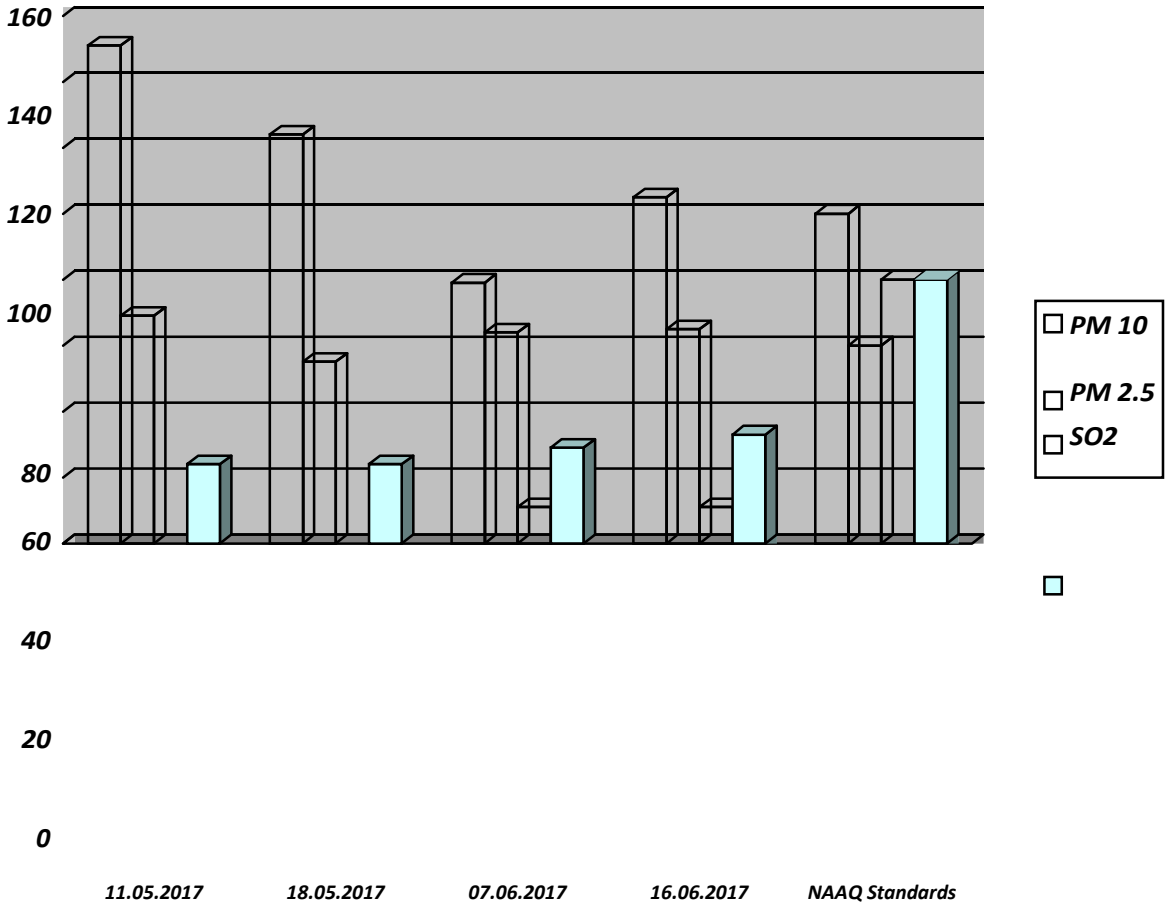
Analysed By
JSA/SA/SSA

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

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

(c). Station Code/Name: *A17 – Moonidih UGP, Category: Industrial.*

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_X
1	11.05.2017	151	69	<10.0	24
2	18.05.2017	124	55	<10.0	24
3	07.06.2017	79	64	11	29
4	16.06.2017	105	65	11	33
	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(μg/m^3)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

Note:

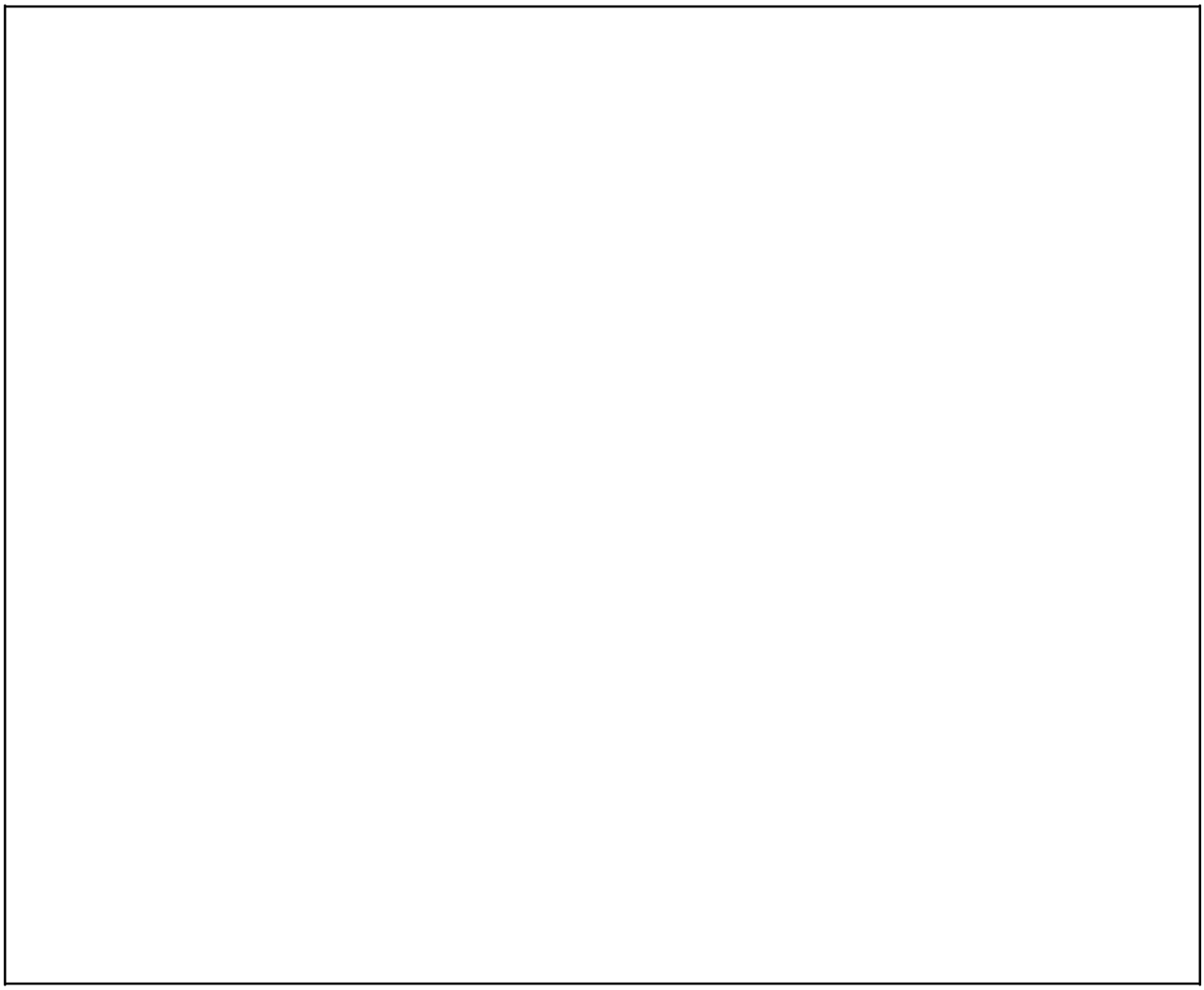
- *All values are expressed in microgram per cubic meter. 24 hours duration*

Analysed By
JSA/SA/SSA

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

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

Fig I: Ambient Air Monitoring Stations in Cluster-V in Core & Buffer Zones



Ambient Air Quality Standards for Jharia Coal Field

As per the Environment (Protection) Amendment Rules, 2000 notified vide notification G.S.R. 742(E), dated 25.9.2000.

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
III Coal mines located in the coal fields of • Jharia • Raniganj • Bokaro	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	500 µg/m^3 700 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1 m^3/minute)
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	250 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Improved west and Gaeke method 2. Ultraviolet fluorescence
	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/m^3	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO_2), µg/m^3	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/m^3	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
Particulate Matter (Size less than 2.5µm) or $PM_{2.5}$, µg/m^3	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
Ozone (O_3) , µg/m^3	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
Lead (Pb) , µg/m^3	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
Carbon Monoxide (CO), mg/m^3	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
Ammonia (NH_3), µg/m^3	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C_6H_6), µg/m^3	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m^3	Annual *	01	01	-Solvent extraction followed byHPLC/GC analysis
Arsenic (As), ng/m^3	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m^3	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

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

*** 24 hourly or 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

Location of sampling sites

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

i) **Mine Discharge of Mudidih (MW5)**

A sampling point is fixed to assess the effluent quality of Mine discharge. This location is selected to monitor effluent discharge in to Jarian Nala.

ii) *Ground Water quality at **Nichitpur (GW5)***

iii) *Surface Water quality at **U/S of Jarian Nala (SW12)***

iv) *Surface Water quality at **U/S of Ekra Nala (SW15)***

v) *Surface Water quality at **D/S of Ekra Nala & Jarian Nala (SW13)***

vi) ***Mine Discharge of Mudidih (MW5)**-27 Parameters.*

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. The effluent samples were collected and analysed for 27 parameters on half yearly basis. The ground and Surface water samples were collected & thereafter were preserved and analyzed for 25 and 17 parameters respectively, on quarterly basis analyzed at the Environmental Laboratory at CMPDI (HQ), Ranchi.

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 Cluster: ***Cluster - V*** *Month:* ***May, 2017.***

Name of the Stations & Code : ***1. MW5- Mine Discharge of Mudidih***

First Fortnight

Sl. No.	Parameters	MW5 (Mine Discharge) 09.05.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	24	*100 (Max)*
2	pH	8.45	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	56	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW5 (Mine Discharge) 15.05.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	28	*100 (Max)*
2	pH	8.95	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	36	*250 (Max)*

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 DATA

(EFFLUENT WATER- FOUR PARAMETERS)

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

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

Name of the Stations & Code: ***1. MW5- Mine Discharge of Mudidih***

First Fortnight

Sl. No.	Parameters	MW5 (Mine Discharge) 01.06.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	36	*100 (Max)*
2	pH	8.47	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	28	*250 (Max)*

Second Fortnight

Sl. No.	Parameters	MW5 (Mine Discharge) 28..06.2017	As per MOEF General Standards for schedule VI
1	Total Suspended Solids	28	*100 (Max)*
2	pH	7.75	*5.5 - 9.0*
3	Oil & Grease	<2.0	*10 (Max)*
4	COD	16	*250 (Max)*

Analysed By	Checked By	Approved By
JSA/SA/SSA	Lab In Charge	HOD(Mining/Environment)
	RI-2, CMPDI, Dhanbad	RI-2, CMPDI, Dhanbad

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

WATER QUALITY

(MINE EFFLUENT- ALL PARAMETERS)

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

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

Area: Mudidih ***Project: Mudidih Cluster V***

Stations: *Mine Discharge of Mudidih (MW5)* ***Date of Sampling:*** *28/06/2017*

Sl.No.	Parameter	Sampling Stations MW-5	Detection Limit	MOEF -SCH-VI STANDARDS Class 'A'	BIS Standard & Method
1	Ammonical Nitrogen, mg/l, Max	0.8	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	16	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	0.4	0.30	5.0	APHA, 22nd Edition Molybdovanadate
8	Fluoride (as F) mg/l, *Max*	0.94	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*	0.5	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*	<0.1	0.10	3.0	IS-3025/54:2003, AAS-Flame
15	Nitrate Nitrogen, mg/l, *Max*	1.4	0.50	10.0	APHA, 22nd Edition, UV-Spectrphotometric
16	Oil & Grease, mg/l, Max	<2.00	2.00	10.0	IS 3025/39:1991, R : 2003, Partition Gravimetric
17	Odour	Agreeable	Agreeable	Qualitative	Is-3015/5:1983/R:2012/Qualitative
18	pH value	7.75	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	0.006	0.005	2.0	APHA, 22nd Edition Methylene Blue
22	Temperature (° C)	31.6	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	1.4	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	28	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 - V*** *Period:* ***Q. E. June, 2017.***

Area : ***Mudidih*** ***Project: Mudidih Cluster V***

Stations: ***Date of Sampling:***

1. *Upstream in Jaria Nala SW-12* *29/05/2017*
2. *Downstream in Jaria Nala SW-13* *29/05/2017*
3. *Upstream in Ekra Nala SW-15* *29/05/2017*

Sl. No	Parameter	Sampling Stations				Detection Limit	IS:2296 – 1982 (Inland surface water) Class	BIS Standard & Method
		SW-12	SW-13	Sw-15	4			
1	Arsenic (as As), mg/l, Max	<0.002	<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	3.6	3.0	2.80		2.00	300	IS 3025 /44: 1993, R : 2003 3 day incubation at 27°C
3	Colour (Hazen Unit)	colourless	Colourless	Colourless		Qualitative	300	Physical/Qualitative
4	Chlorides (as Cl), mg/l, Max	28	31	31		2.00	600	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03		0.03	1.5	IS 3025 /42 : 1992 R : 2009, AAS-Flame
6	Disolved Oxygen, min.	5.1	5.0	4.2		0.10	4	IS 3025/381989, R : 2003, Winkler Azide
7	Fluoride (as F) mg/l, Max	0.32	0.37	0.56		0.02	1.5	APHA, 22nd Edition SPADNS
8	Hexavalent Chromium, mg/l, Max	<0.01	<0.01	<0.01		0.01	0.05	APHA, 22nd Edition, 1,5 - Diphenylcarbohydrazide
9	Iron (as Fe), mg/l, Max	0.026	<0.06	<0.06		0.06	50	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
10	Lead (as Pb), mg/l, Max	<0.005	0.092	<0.005		0.005	0.1	APHA, 22nd Edition AAS-GTA
11	Nitrate (as NO_3), mg/l, Max	9.18	18.88	24.39		0.50	50	APHA, 22nd Edition, UV-Spectrphotometric
12	pH value	7.76	8.06	7.72		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		0.002	0.0005	APHA, 22nd Edition 4-Amino Antipyrine
14	Selenium (as Se), mg/l, Max	<0.002	<0.002	<0.002		0.002	0.05	APHA, 22nd Edition AAS-GTA
15	Sulphate (as SO_4) mg/l, Max	31	38	36		2.00	400	APHA, 22nd Edition Turbidity
16	Total Dissolved Solids, mg/l, Max	307	371	344		25.00	1500	IS 3025 /16:1984 R : 2006, Gravimetric
17	Zinc (as Zn), mg/l, Max	0.979	0.206	0.270		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

(Ground WATER- ALL PARAMETERS)

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

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

Area : ***Mudidih*** ***Project: Mudidih Cluster V***

Stations: ***Date of Sampling:***

1. Ground Water from Nichitpur GW-5 *29/05/2017*

Sl.No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW-5	2	3			
1	Boron (as B), mg/l, Max	<0.20			0.20	0.5	APHA, 22nd Edition ,Carmine
2	Colour,in Hazen Units	3			1	5	APHA, 22nd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	66			1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	58			2.00	250	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03			0.03	0.05	IS 3025/42 : 1992 R : 2009, AAS-Flame
6	Fluoride (as F) mg/l, Max	1.00			0.02	1.0	APHA, 22nd Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	<0.02			0.02	0.2	APHA, 22nd Edition, DPD
8	Iron (as Fe), mg/l, Max	0.254			0.06	0.3	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
9	Lead (as Pb), mg/l, Max	0.190			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	15.36			0.5	45	APHA, 22nd Edition, UV-Spectrphotometric
12	Odour	Agreeable			Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	7.52			≥2.5	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.002			0.002	0.001	APHA, 22nd Edition,4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002			0.002	0.01	APHA, 22nd Edition, AAS-GTA
16	Sulphate (as SO_4) mg/l, Max	30			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	336			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	0.072			0.06	0.05	IS-3025/52:2003, AAS-Flame
21	Total Dissolved Solids, mg/l, Max	521			25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c_aco_3), mg/l, Max	200			4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	1			1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.023			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	Checked By	Approved By
JSA/SA/SSA	Lab In Charge	HOD(Mining/Environment)
	RI-2, CMPDI, Dhanbad	RI-2, CMPDI, Dhanbad

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

CHAPTER - IV

NOISE LEVEL QUALITY MONITORING

Location of sampling sites and their rationale

i) Nichitpur (N8)

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) Basseriya Manager's Office (N9)

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

iii) Pootki Balihari Office (N16)

To assess the noise level in the industrial area,.

iv) Moonidih UGP (N17)

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

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).

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 Cluster: ***Cluster -V*** *Month:* ***May, 2017.***

Name of the Stations & Code :

1. ***Nichitpur(N8)***
2. ***Basseriya Manager's Office (N9)***
3. ***Pootki Balihari Office (N16)***
4. ***Moonidih UGP(N17)***

(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	Nichitpur (N8)	Industrial area	11.05.2017	54.4	*75*
2	Basseriya Manager's Office (N9)	Industrial area	11.05.2017	57.2	*75*
3	Pootki Balihari office (N16)	Industrial area	10.05.2017	57.3	*75*
4	Moonidih UGP (N17)	Industrial area	11.05.2017	63.6	*75*

(b) Second Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	Nichitpur (N8)	Industrial area	25.05.2017	61.3	*75*
2	Basseriya Manager's Office (N9)	Industrial area	25.05.2017	59.6	*75*
3	Pootki Balihari office (N16)	Industrial area	18.05.2017	54.2	*75*
4	Moonidih UGP (N17)	Industrial area	18.05.2017	55.7	*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.***

Analysed By	Checked By	Approved By
JSA/SA/SSA	Lab In Charge	HOD(Mining/Environment)
	RI-2, CMPDI, Dhanbad	RI-2, CMPDI, Dhanbad

NOISE LEVEL DATA

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

Name of the Cluster: ***Cluster -V*** *Month:* ***JUNE, 2017.***

Name of the Stations & Code :

1. ***Nichitpur(N8)***
2. ***Baseriya Managers Office (N9)***
3. ***Pootki Balihari Office (N16)***
4. ***Moonidih UGP(N17)***

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	Nichitpur (N8)	Industrial area	12.06.2017	59.2	75
2	Basseriya Manager's Office (N9)	Industrial area	12.06.2017	63.7	75
3	Pootki Balihari office (N16)	Industrial area	06.06.2017	61.4	75
4	Moonidih UGP (N17)	Industrial area	07.06.2017	59.5	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	Nichitpur (N8)	Industrial area	27.06.2017	63.4	75
2	Basseriya Manager's Office (N9)	Industrial area	27.06.2017	64.8	75
3	Pootki Balihari office (N16)	Industrial area	15.06.2017	64.5	75
4	Moonidih UGP (N17)	Industrial area	16.06.2017	57.4	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.***

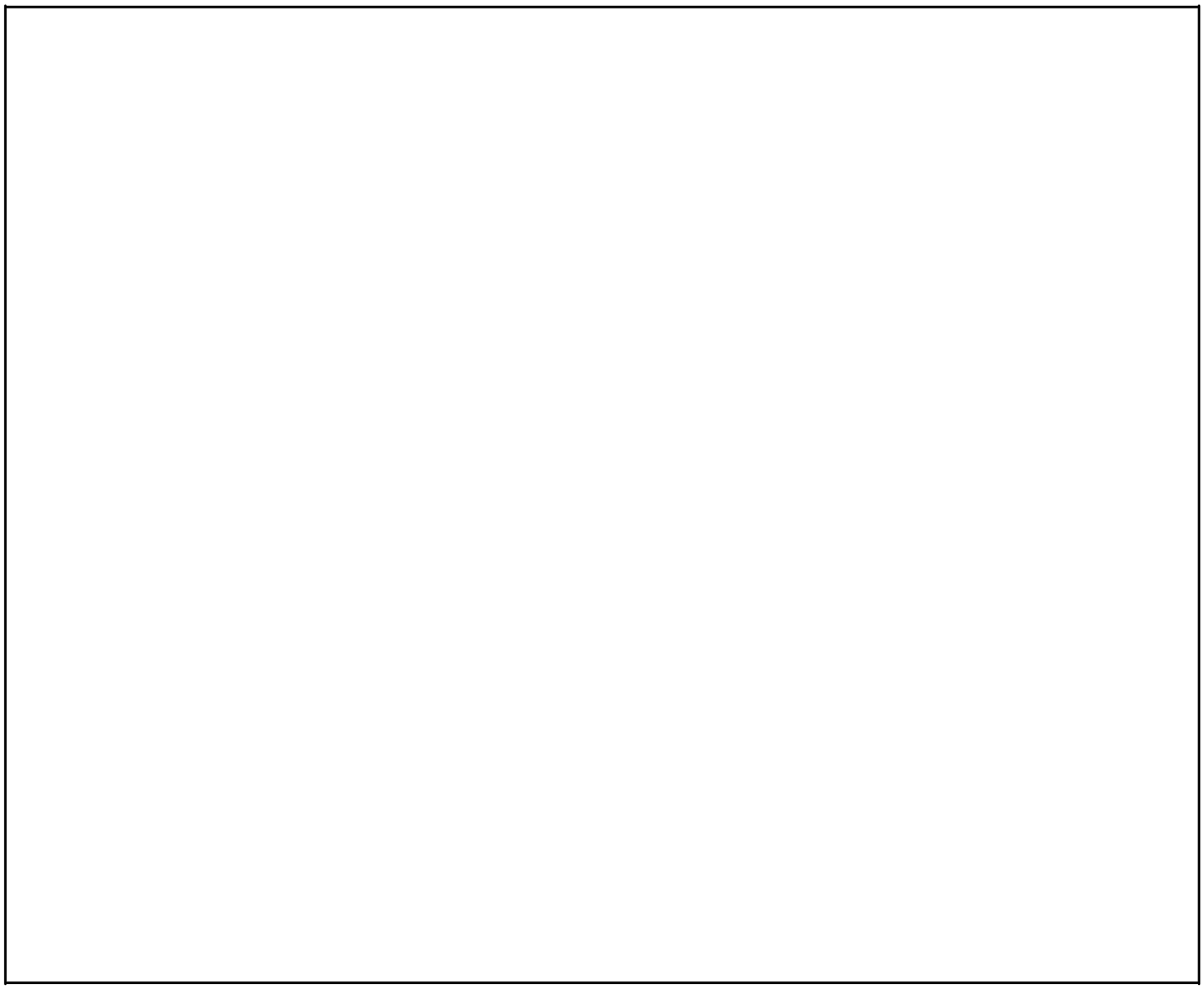
**** Day Time: 6.00 AM to 10.00 PM, +Night Time: 10.00 PM to 6.00 AM.***

Analysed By
JSA/SA/SSA

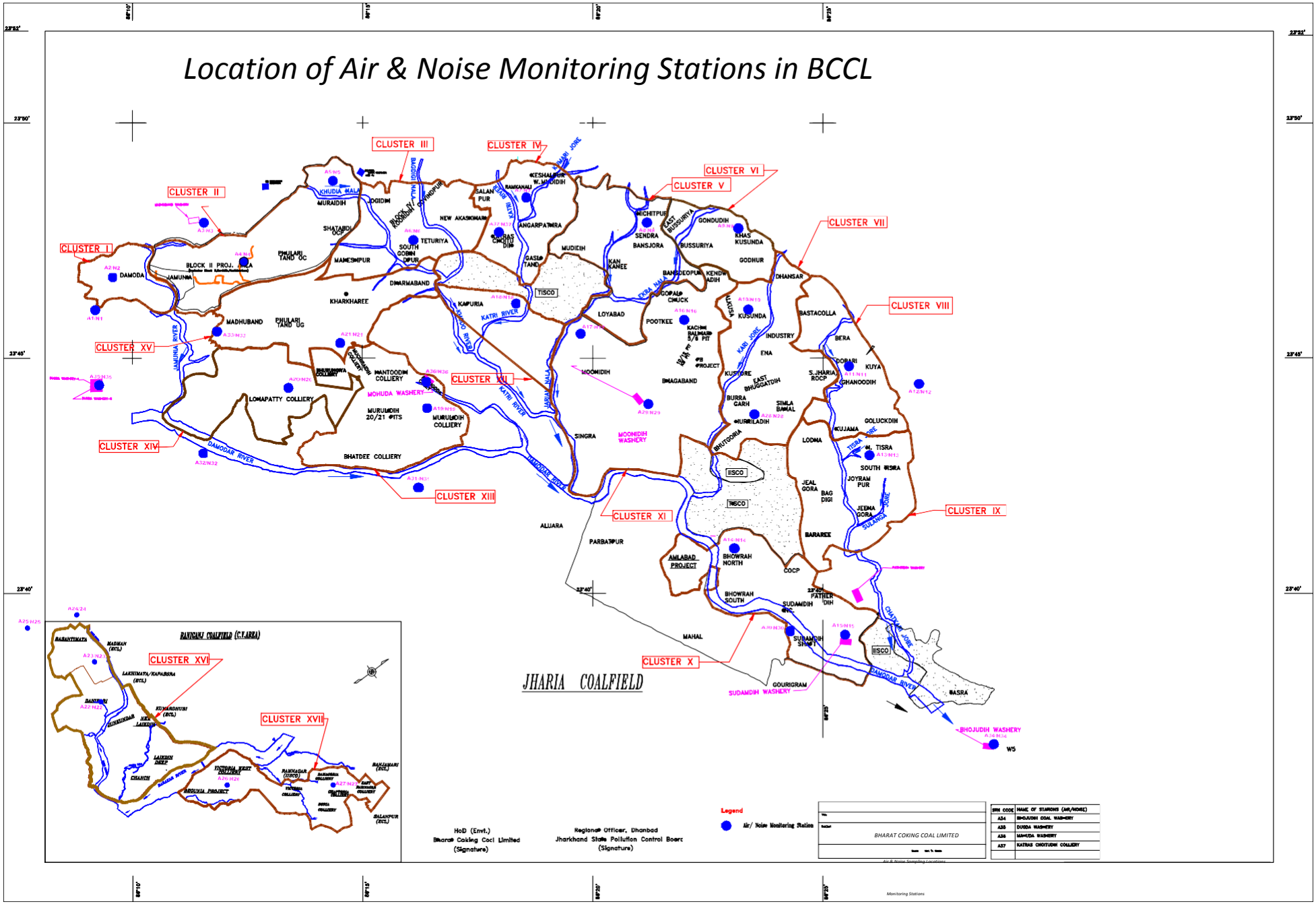
Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

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

Fig: Noise Level Monitoring Location of Cluster V



Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL

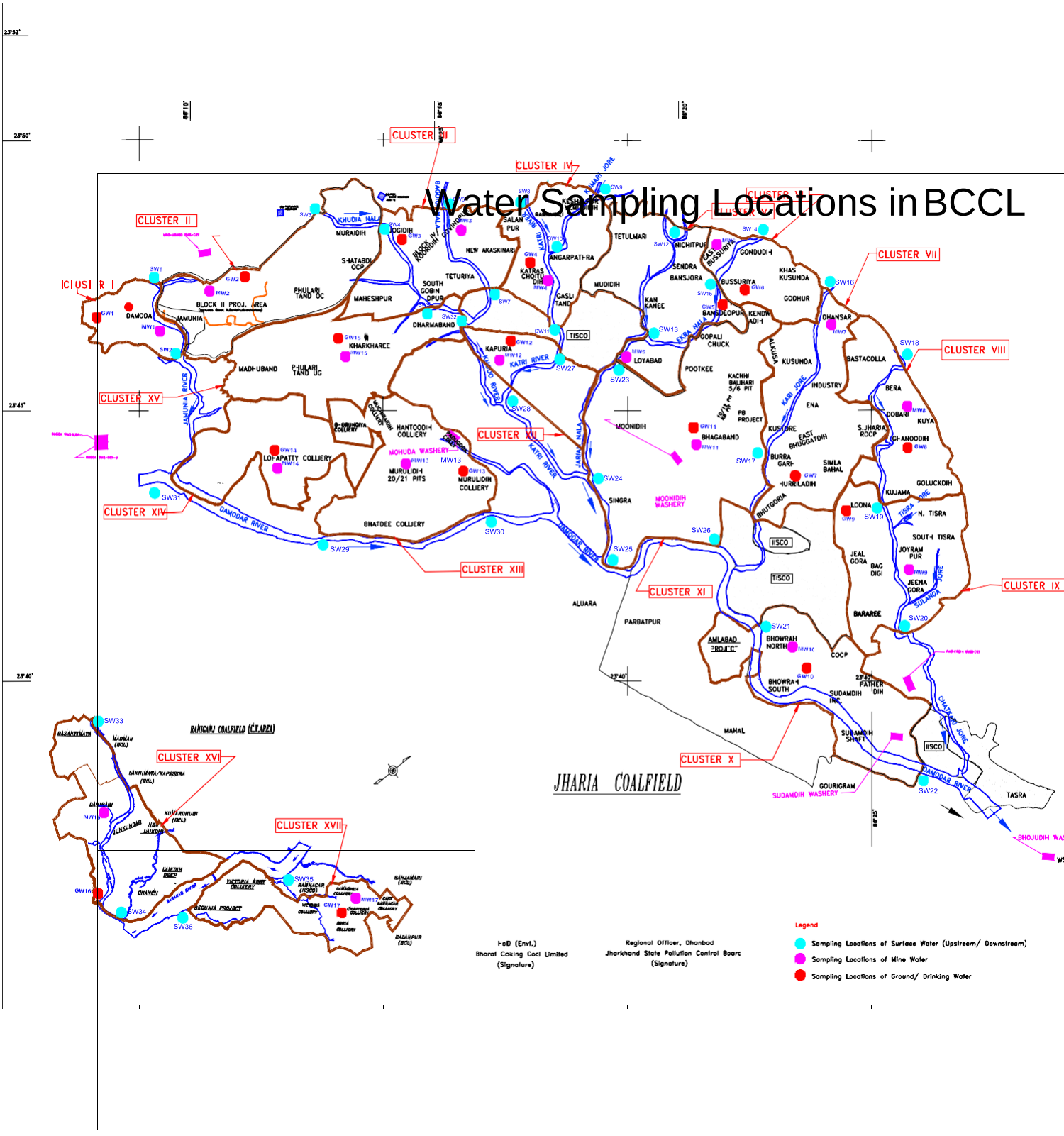


PLATE -1

Avenue Plantation at Tetulmari Colliery, Cluster V

PLATE -2

Capacity Building Activities in cluster V

Plate 3

Biologically Stabilized OB Dump at Tetulmari

Plate 4

OB Dump being Biologically reclaimed at Nichitpur

Plate 5

Plantation at Undisturbed area at Loyabad

Plate 6

Plantation on external OB dump at Tetulmari

Plate 7

Plantation near mine working boundary at Sendra Bansjora

Plate 8

Plate 8- Water sprinkling on mine roads