ENVIRONMENTAL CLEARANCE COMPLIANCE OF CLUSTER-XIII (GRANTED VIDE LETTER NO.J-11015/11/2010-IA.II (M) DATED 06.06.2013

(OCT'17 – MARCH'18)

Sl. No.	A. Specific Conditions by MOEF:	Compliance
i.	**No mining shall be undertaken in/under the forestland until prior forestry clearance has been obtained under the provisions of FC Act 1980.**	Stage-I forest clearance of 6.41 ha of forest land of proposed Murulidih O/C mine has been issued by MOEF vide letter no.5-JHC188/2010-BHU dated 05.03.13. All the conditions of the above letters are compiled including the total online payment of Rs 8155592.17/- was done to MoEF through RTGS/NEFT. Awaited for Stage-II forest clearance for the same.
ii	**The EC is granted to Murulidih 20/21 Pits U/G of 0.18 MTPA and a peak production of 2.34 MTPA in an ML area of 571. 32 ha.**	Coal production from Murulidih 20/21 Pits U/G is temporary suspended from December 2015.
iii.	**The maximum production in the cluster shall not exceed beyond that for which environmental clearance has been granted for the cluster XIII as per given below:**	. Being implemented. (Presently there is not any producing mine under cluster XIII) **Annexure I**
iv.	**The measure identified in the environmental plan for cluster – XIII group of mine and the condition given in this environmental clearance letter shall be dovetailed to the implementation of Jharia Action Plan.**	Being Complied. Implementation of Jharia Action Plan is under process.
v.	**As there is no fire in cluster XIII but the measure should be adopted proponent to control spread of neighboring fire to this cluster XIII. The proponent shall prepare time series maps of Jharia Coal field through NRSA to monitor & prevent fire problems in this Jharia Coalfield by Isothermal mapping / imaging and monitoring temperatures of the coal seam (whether they are closed spontaneous ignition temperatures) and based on which, areas with potential fire problems shall be identified. Measures to prevent ingress of air (ventilation) in such areas, to prevent restart fresh/spread fire in other areas including in mines of cluster – XIV shall be undertaken.**	Work Order Issued to National Remote Sensing Center, ISRO for "Delineation of Surface Coal Fire and associated Land Subsidence in Jharia Coalfield, Jharkhand using satellite based remote – sensing techniques". Annexure - II
Vi.	**Underground mining should be taken up after completion of reclamation of O/C mine area after two years.**	Agreed.

vii.	**No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/check such fire including in old OB dump.**	It is being complied.
Viii	**There shall be no external OB dumps.OB from one patch OCP mine shall be backfilled. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.**	Being complied.
ix.	**A detailed calendar plan of production with plan for OB dumping and back filling (for open cast mines) and reclamation and final mine closure plan for each mine of cluster XIII shall be drawn up & implemented.**	Being implemented. Mine closure plan is approved.
x.	**The void in 5 ha. Area shall be converted in to a water reservoir of maximum depth of 15-20 mtr in post mining stage and shall be gently sloped and upper benches of the reservoir shall be stabilized with plantation and periphery of the reservoir fenced . The abandoned pits and voids should be backfilled with OB & biologically reclaimed with plantation and or may used for pisciculture.**	Will be Complied.
xi.	**Mining shall be carried out as per statutette 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 extend feasible and the embankment proposed along water body shall be strengthened with stone pitching.**	Complied and will be complied as per statute.
xii.	**Active OB dumps near water body and rivers should be rehandled for back filling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.**	There is no opencast project running in cluster XIII at present.

xiii.	**Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 91.75 ha would be reclaimed and afforested by planting native species in consultation with local DFO/Agriculture deptt. /Institutions with the relevant discipline. The density of the trees should be around 2500 plants per ha.**	It is being complied. Existing site for eco-restoration of 4.2 ha area over reclaimed area is developed and maintained at Murulidih (about 2500 plants per ha). Another eco-restoration of 1.5 ha area over OB dump at Murulidih is also maintained. Third site of 1.8 Ha. of land taken this year at Murulidih for eco-restoration where 1500 no. (Approx.) of sapling has been planted and maintained. 0.9 Ha Site taken for Eco-restoration work for year 2017-18.
Ha	**The roads should be provided with avenue plantation on both sides as trees act as sink of carbon and other pollutant.**	Agreed. Being complied.
xv.	**Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action Plan prepared for Dhanbad as a critically polluted are and relevant for Cluster XIII shall be implemented.**	Being Implemented.
xvi.	**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.**	Location of monitoring stations was already finalized. Source Apportionment Study:- Tender for conducting source apportionment study for BCCL was floated twice, however, none of the bidders qualified. Therefore, as per the MoU "Sustainable Coal Mining in Coal India Limited" entered between CIL and NEERI, NEERI Nagpur was approached for conducting Source Apportionment Study BCCL for compliance of EC conditions. The proposal regarding Conducting the Source Apportionment Study has been submitted by NEERI. Presently it has been submitted to CIL for further scrutiny and approval.
xvii.	**No ground water shall be used for mining activities. Additional water required, if any, shall be met from mine water or by recycling/ reused of the water from the existing activities and from rain water harvesting measures. The project authority shall meet water requirement of nearby village (s) in case the village wells go dry to dewatering of mine.**	Agreed. Being implemented.

xviii.	**Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity shall be dome four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board/SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.**	Sample has been collected for analysis by CMPDIL, DHANBAD. Locations and Design of Piezometer has been finalized by CMPDIL and the budget estimated has been done. E-Tender Notice was floated on 28.03.2017. The tender for installation of piezometer was opened on 05.05.2017 in which only one bidder has participated. The tender is under scrutiny.
xix.	**Mine discharge water shall be treated to meet standards prescribed standards before discharge into natural water courses/agriculture. The quality of the water discharged shall be monitored at the outlet points and proper records maintained thereof and uploaded regularly on the company website.**	Agreed. Being implemented. CMPDIL, Dhanbad is monitoring the same. **Annexure- III**
xx.	**ETP shall also be provided for workshop, and CHP, if any. Effluents shall be treated to confirm to prescribe standards in case discharge into the natural water course.**	There is no effluent discharge into natural water course. However there is arrangement for treatment of effluent discharge to prescribed standards. There is neither Open Cast mine running nor CHP nor such workshop from where effluent discharge is found.
xxi.	**Regular monitoring of subsidence movement on the surface over and around the working area and impact natural drainage pattern, water bodies, vegetation, structure, roads and surroundings shall be continued till movement ceases completely. In case observation of any high rate of subsidence movement, appropriate effective corrective measure shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil /suitable material.**	Being implemented. Subsidence study is being conducted by ISM Dhanbad before the start of panel. Extraction done in Non-Effective Width Method so that there is no subsidence on the surface.
xxii.	**Sufficient coal pillars shall be left un extracted around the air shaft (within subsidence influence area) to protect from any damage from subsidence, if any.**	Already complied. Subsidence monitoring is being done.
xxiii.	**High root density tree species shall be selected and planted over areas likely to be affected by subsidence.**	Plantation in BCCL is being done on 3-tier basis, in which both, Monocotyledonae (Monocots) such as grasses, bamboo etc and Dicotyledonae (Dicots) such as sheesham, mango etc are being planted for developing an extensive root system. The Monocots

		having fibrous root system helps in developing the root density at the topsoil level while, Dicots having the tap root system have a distributed root density in topsoil, subsoil and regolith layer of soil. These two root system together forms the high root density system.
Xxiv.	**Depression due to subsidence resulting in water accumulating within low lying areas shall be filled up or drained out by cutting drains.**	Complied.
Xxv.	**Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the road.**	Already complied as per statute.
xxvi.	**No depillaring operation shall be carried out below the township/colony.**	Depillaring operation are being carried out after getting written permission from DGMS which is statutory binding.
xxvii.	**The transportation plan for conveyor – cum – rail for cluster XIII should be dovetailed with Jharia Action Plan. Road transportation of coal during phase I should be by mechanically covered trucks, which should be introduced at the earliest. The plan for conveyor – cum – rail for cluster XIV should be dovetailed with Jharia Action Plan. The road transportation of coal during phase I should be by mechanically covered trucks.**	Will be Complied. Presently there is no producing mine under cluster-XIII.
xxviii.	**A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.**	Pollution load study report for has been submitted by CMPDI. **Annexure- IV**
.xxix.	**R & R of 2187 nos. of PAF's involved. They should be rehabilitated at cost of Rs. 11199.89 lakhs as per the approved Jharia Action Plan.**	PAF's /PAP's involved is being rehabilitated as per cost specified as per Jharia Action Plan.

Xxx.	**Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet for and submitted to Ministry.**	Being Complied. Will be submitted.

.Xxxi.	**A detailed CSR action plan shall be prepared for cluster XIII group of mines. Specific activities shall be identified for CSR of Rs. 20.25 / annum @of Rs.5/ton of coal production as recurring expenditure. The area within the cluster XIII ML that would be existing waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities . Third party evaluation shall be got carried out regularly for the proper implementation of activities under taken in the project area under CSR. Issue raised in the public hearing should also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village wise various activities and the expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the local youth, who are motivated to carry out the work in future.**	Agreed. Being implemented.
xxxii.	**For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MoEF and its Regional office at Bhubaneswar.**	Time series map of vegetation cover in the Jharia Coal field has been carried out through CMPDI in the year 2014 and 2017 **(which is enclosed as Annexure- V)**
xxxiii.	**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.**	Agreed .Eco-restoration sites (4 no. of total area 8.4 ha) using native species are maintained. Mine closer plan is approved for Murulidih 20/21 Pits Colliery.

xxxiv.	**A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the head of Company for implementing environment policy and socio – economic issues and the capacity building required in this regard.**	A full-fledged Environment Department, headed by a HOD (Environment) along with a suitable qualified multidisciplinary team of executives which includes Environment, Mining & Excavation, has been established in Headquarters. They are also trained in ecological restoration, sustainable development, rainwater Harvesting methods etc. At the project level, one Executive in each area has also been nominated as Project Nodal Officer (Environment) and is also entrusted with the responsibility of compliance and observance of the environmental Acts/ Laws including environment protection measures .The activities are monitored on regular basis at Area and at Headquarters levels. GM (Environment) at head quarter level, co-ordinates with all the Areas and reports to the Director (Technical) and in turn he reports to the CMD of the company. The team is multidisciplinary and very much motivated under the guidance of company's Director (Technical) and CMD. Further capacity building at both corporate and operating level is being done.
xxxv.	**Implementation of final mine closure plan for cluster XIII, subject to obtaining prior approval of the DGMS in regard to Mines Safety issues.**	Will be implemented.
Xxxvi.	**Corporate Environment Responsibility:**	Annexure- VI
a)	**The Company shall have a well laid down Environment Policy approved by the Board of Directors.**	Agreed.
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.**	Already prescribed.
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.**	Already complied.
d)	**To have proper checks and balances, the company shall have a well laid down system of Reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.**	Being followed.

Sl. No	B. General Conditions Conditions by MOEF:	Compliance
i.	**No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.**	Being complied.
ii.	**No change in the calendar plan of production for quantum of mineral coal shall be made.**	Being Followed.
iii.	**Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM 2.5, SO 2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.**	The locations of monitoring stations in the Jharia Coalfields has finalized in consultation with the Jharkhand State Pollution Control Board. The work of monitoring of ambient environment is being done through Central Mine Planning and Design Institute (CMPDI) having laboratory recognized under the EP Rules. Records for the same are maintained. Annexure - III
iv.	**Data on ambient air quality (PM 10, PM 2.5, SO 2 and NO x) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.**	Being complied. Monitoring done by CMPDIL.
v.	**Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with Ear plugs/muffs.**	Being Complied.
vi.	**Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.**	The work of monitoring of ambient environment done through Central Mine Planning and Design Institute RI-II (CMPDI), Dhanbad which is having laboratory recognized under the EP Rules. There is no effluent discharge from workshop due to one small u/g mine running. However there is arrangement for treatment of effluent discharge to prescribed standards. There is neither Open Cast mine running nor CHP nor such workshop from where effluent discharge is found. Very small quantity of burnt oil is generated which is used to lubricate the machines.
vii.	**Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered**	Already Complied.

	with tarpaulins and optimally loaded.	
viii.	**Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, 1986.**	It is being complied. Monitoring is done by CMPDIL.
ix.	**Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.**	Being Complied. Vocational training Centers under Separate Human Resource Development Deptt. is Conducting regular training programme on these issues.
x.	**Occupational health surveillance program me of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing**.	Initial Medical Examination (IME) and Periodical Medical Examination (PME) of all the personnel are carried out as per the Statutes and Director General of Mines Safety (DGMS) `s guideline.
xi.	**A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.**	A full-fledged Environment Department, headed by a HOD (Environment) along with a suitable qualified multidisciplinary team of executives which includes Environment, Mining, Excavation, have been established in Headquarters. They are also trained in ecological restoration, sustainable development, rainwater Harvesting methods etc. At the project level, one Executive in each area has also been nominated as Project Nodal Officer (Environment) and is also entrusted with the responsibility of compliance and observance of the environmental Acts/ Laws including environment protection measures .The activities are monitored on regular basis at Area and at Head quarters levels. GM (Environment) at head quarter level, co-ordinates with all the Areas and reports to the Director (Technical) and in turn he reports to the CMD of the company. The team is multidisciplinary and very much motivated under the guidance of company's Director (Technical) and CMD. Further capacity building at both

		corporate and operating level is being done.
xii.	**The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhubaneswar.**	It is being initiated to comply the same. Agreed to report the same.

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

xvi.	**The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM10, PM2.5, SO 2 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.
xvii.	**The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Office s of CPCB and the SPCB.**	Being complied.
xviii.	**The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.**	Agreed. Being and shall be complied.
xix.	**The Environmental statement for each financial year ending 31 March in For –V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed Under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEF by E-mail.**	Being complied. Agreed.
7	**The Ministry or any other competent authority may stipulate any further condition(s) for environmental protection.**	Agreed

8	**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
9	**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 remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.**	Agreed
10	**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

05.07.2018

Project officer,
Lohapatti colliery / 20/21 pits Murulidih colliery

Project Officer
Murlidih 20/21 PITS Colliery

ANNEXURE- I

A. Production from Oct'17 to March'18 of Cluster XIII mines

Month		Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	March'18	Total (Million ton)
Cluster XIII	Murulidih 20/21 pits	0	0	0	0	0	0	0
	Bhurungiya colliery	Nil						Nil
	Muchraidih colliery							
	Hantoodih Colliery							
	Padugora colliery							
	Murulidih colliery							
	Bhatdee colliery							
	Total (in Million ton)							0
	Remarks: - Murulidih 20/21 pits colliery temporarily closed for production from December-2015.							

ANNEXURE-II

(7)

Ph: 0326-2204933

झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद्

Jharkhand State Pollution Control Board

HIG-1, 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.

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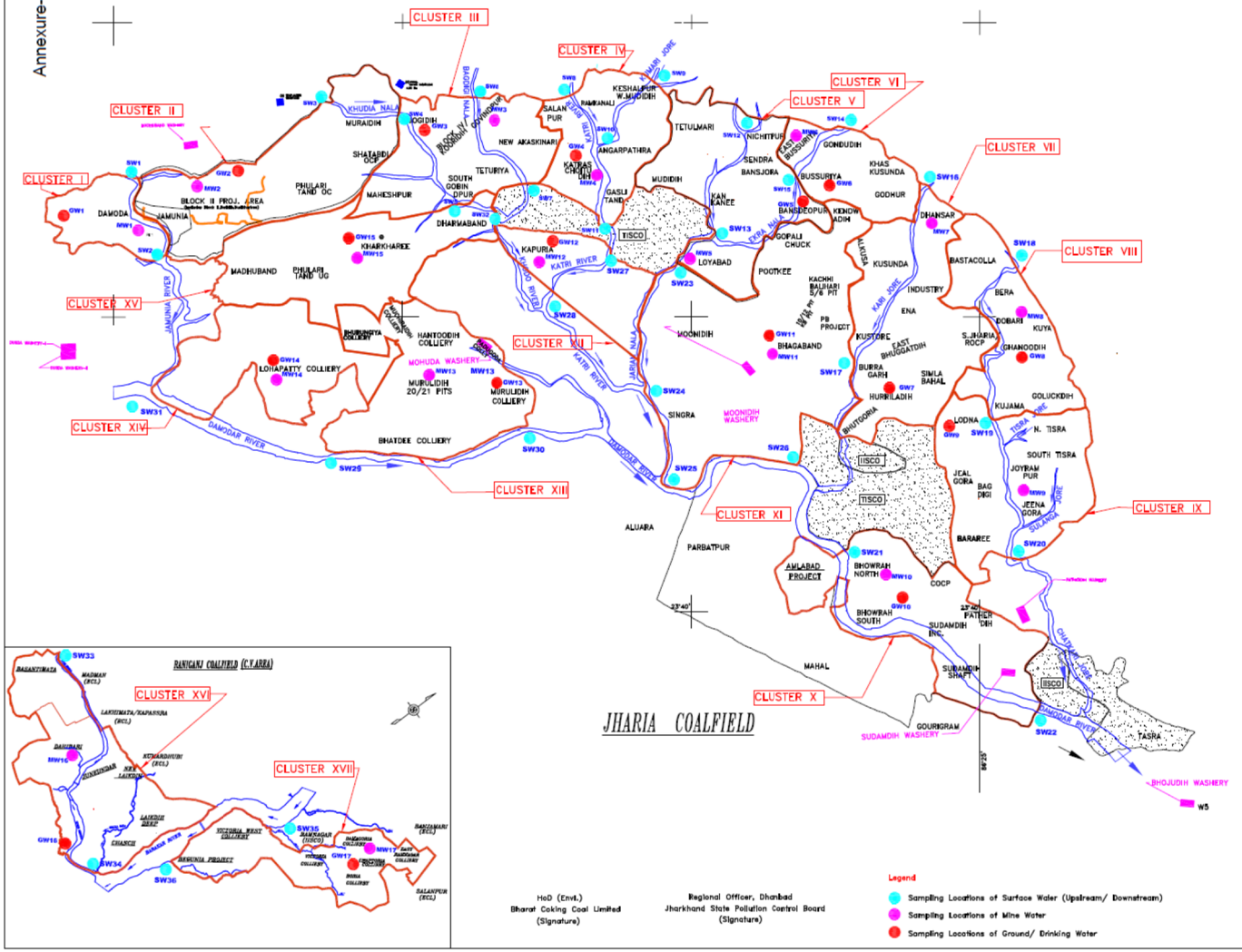
Water Sampling Locations in BCCL

Annexure-03



INDEX

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

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

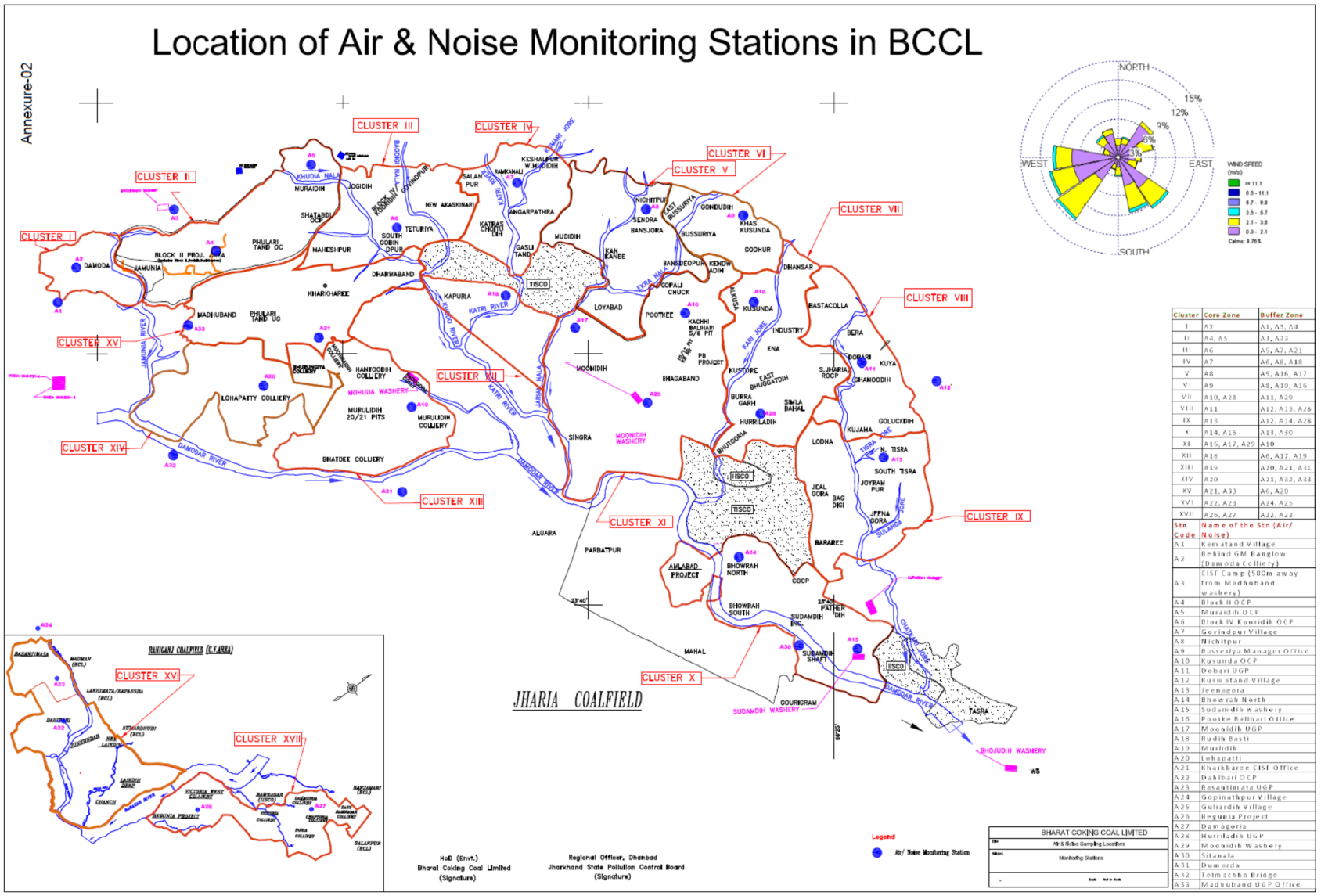
Regional Officer, Dhanbad
Jharkhand State Pollution Control Board
(Signature)

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

Name	BHARAT COKING COAL LIMITED
Title	WATER SAMPLING LOCATIONS
Subject	MONITORING STATIONS
Scale	Not to Scale

Location of Air & Noise Monitoring Stations in BCCL

Annexure-02



Cluster	Core Zone	Buffer Zone
I	A2	A1, A3, A4
II	A4, A5	A3, A33
III	A6	A5, A7, A21
IV	A7	A6, A8, A18
V	A8	A9, A16, A17
VI	A9	A8, A10, A16
VII	A10, A28	A11, A29
VIII	A11	A12, A13, A28
IX	A13	A12, A14, A28
X	A14, A15	A13, A30
XI	A16, A17, A29	A10
XII	A18	A6, A17, A19
XIII	A19	A20, A21, A31
XIV	A20	A21, A32, A33
XV	A21, A33	A6, A20
XVI	A22, A23	A24, A25
XVII	A26, A27	A22, A23

Stn Code	Name of the Stn (Air/ Noise)
A1	Kamatand Village
A2	Behind GM Banglow (Damoda Colliery)
A3	CISF Camp (500m away from Madhuband washery)
A4	Block II OCP
A5	Muraidih OCP
A6	Block IV Kooridih OCP
A7	Govindpur Village
A8	Nichitpur
A9	Basseriya Manager Office
A10	Kusunda OCP
A11	Dobari UGP
A12	Kusmatand Village
A13	Jeenagora
A14	Bhowrah North
A15	Sudamdih Washery
A16	Pootke Balihari Office
A17	Moonidih UGP
A18	Rudih Basti
A19	Murlidih
A20	Lohapatti
A21	Kharkharee CISF Office
A22	Dahibari OCP
A23	Basantimata UGP
A24	Gopinathpur Village
A25	Gullardih Village
A26	Barkunia Project
A27	Damagoria
A28	Hurriladih UGP
A29	Moonidih Washery
A30	Sitanala
A31	Dumerda
A32	Telmazhho Bridge
A33	Madhuband UGP Office

ANNEXURE-VI

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-VII

A. Training from Oct'17 to March'18

No of employees (Departmental & Contractual) received training in Cluster XIII (Oct'17 to March'18)	
Types of Training	**Numbers**
Basic Training	0
Refresher Training	29

ANNEXURE- II

भारत कोकिंग कोल लिमिटेड
एक मिनीरत्न कंपनी
(कोल इंडिया लिमिटेड का एक अंग)
पंजीक्रत 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

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

(FOR THE MONTH OCTOBER, 2017)

E. C. no. J-11015/11/2010-IA.II (M) dated 06.06.2013.

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

CONTENTS

EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine discharge water.

2.3 Noise level monitoring locations

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

3.0 Methodology of sampling and analysis

3.1 Ambient air quality

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

for sampling of $PM_{10,}$ SO_2, & NO_x and Fine Dust Sampler ($PM_{2.5}$ sampler) were used for sampling of $PM_{2.5}$ at 24 hours interval once in a fortnight and the same for the gaseous pollutants. The samples were analyzed in Environmental Laboratory of CMPDI, RI-II, Dhanbad.

3.2 Water quality

Water samples were collected as per standard practice. The Mine effluent samples were collected and analysed for four parameters on fortnightly basis. Thereafter the samples were preserved and analysed at the Environmental Laboratory of CMPDI, RI- II, Dhanbad.

3.3 Noise level monitoring

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

4.0 Results and interpretations

4.1 Air quality

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

4.2 Water quality

The test results indicate that the major parameters compared with MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines, are within permissible limits.

4.3 Noise Level

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

INTRODUCTION

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

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

1.1 The Cluster-XIII is in the Northern part of the Jharia coalfield. It includes a group of 7 Mines (viz. Murlidih**,** Bhurungiya**,** Mucharadih, Hantoodih, Padugora, Murlidih 20/21 Pits &Bhatdee. The Cluster – XIII is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – XIII 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 Katri River & Damodar River..

1.2 The Cluster-XIII is designed to produce 0.18 MTPA (normative) and 2.34 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forests and Climate Change (MoEF&CC) for a rated capacity 0.18 MTPA (normative) and 2.34 MTPA (peak) capacity of coal production vide letter no. J-11015/11/2010-IA.II (M) dated 06th June, 2013.

Ministry of Environment, Forests 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.

AMBIENT AIR QUALITY MONITORING

2.1 Location of sampling station and their rationale:

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

2.1.1 Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Murlidih (A19): Industrial Area

The location of the sampling station is 23º44'1.96'' N & 86º16'41.75''E. The sampler was placed at a height of approx. 1.5m above ground level at Project Office. The station was selected to represent the impact of mining activities of Western Jharia area, Coal washery, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

II. BUFFER ZONE Monitoring Location

i) Lohapatti (A20)

The location of the sampling station is 23º44'18.93'' N 86º13'37.75''E. The sampler was placed at a height of approx. 1.5m above ground level at Safety Office. The station was selected to represent the impact of mining activities of Western Jharia area, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

ii) Kharkharee CISF Office (A21)

The location of the sampling station is 23º44'14.99'' N 86º14'43.02''E. The sampler was placed at a height of approx. 1.5m above ground level at Project Office.

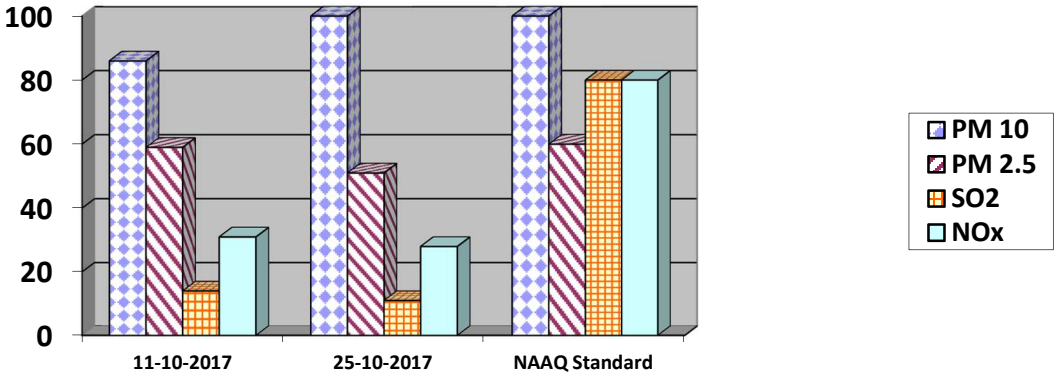
ii) Dumarda (A31)

The location was selected for studying the impact of the mining activity on the Dumarda village as it lies in the buffer zone for the Cluster XIII.

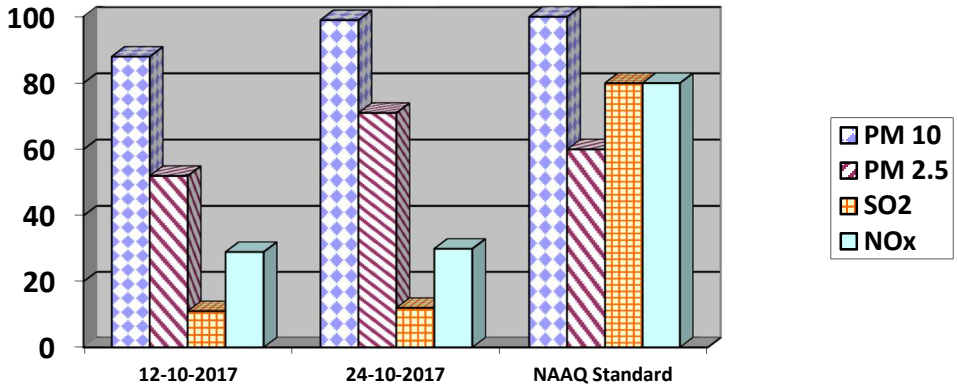
AMBIENT AIR QUALITY DATA

Cluster –XIII,Bharat Coking Coal limited Month: **October 2017** Year : **2017-18.**

Station Name: A19, Murlidih 20/21		Zone: Core		Category: Industrial	
Sl. No.	**Dates of sampling**	**PM 10**	**PM 2.5**	**SO_2**	**NO_x**
1	11-10-2017	86	59	14	31
2	25-10-2017	100	51	11	28
	NAAQ Standard	100	60	80	80



Station Name: A20, Lohapatti		Zone: Buffer		Category: Industrial	
Sl. No.	**Dates of sampling**	**PM 10**	**PM 2.5**	**SO_2**	**NO_x**
1	12-10-2017	88	52	11	29
2	24-10-2017	99	71	12	30
	NAAQ Standard	100	60	80	80

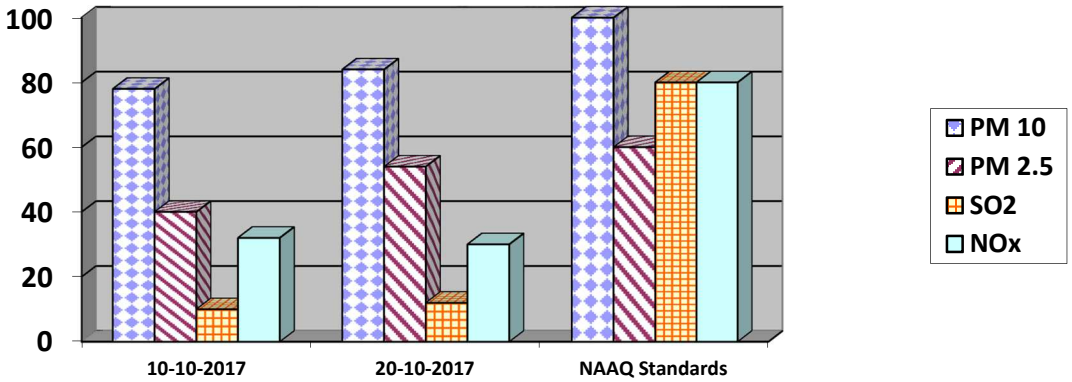


Analysed By
JSA/SA/SSA

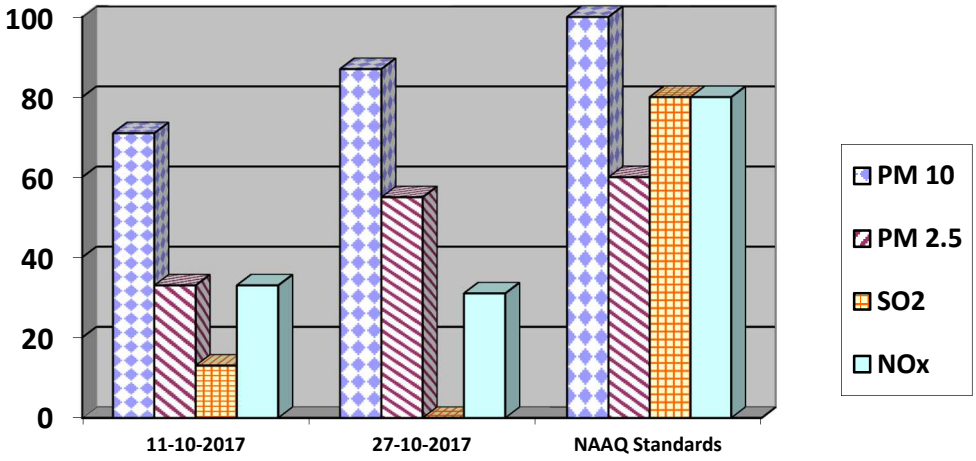
Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

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

Station Name: A21 Kharkharee		Zone: Buffer		Category: Industrial	
Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	10-10-2017	78	40	10	32
2	20-10-2017	84	54	12	30
	NAAQ Standards	100	60	80	80



Station Name: A31 Dumarda		Zone: Buffer		Category: Residential	
Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	11-10-2017	71	33	13	33
2	27-10-2017	87	55	<10.0	31
	NAAQ Standards	100	60	80	80



- *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

WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) **Mine Discharge of Murlidih 20/21 (MW13)**

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

3.2 Methodology of sampling and analysis

Water samples were collected as per standard practice. The effluent samples were collected and analyzed for four parameters on fortnightly basis at the Environmental Laboratory of CMPDI RI-II, Dhanbad.

3.3 Results & Interpretations

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

WATER QUALITY DATA

(EFFLUENT WATER- FOUR PARAMETERS)

Name of the Cluster: **Cluster -XIII**		Month: **October, 2017**	Name of the Station: **Mine Discharge of Murlidih 20/21**	
Sl. No.	**Parameters**	**MW13** First Fortnight	**MW13** Second Fortnight	**As per MOEF General Standards for schedule VI**
		11.10.2017	25.10.2017	
1	Total Suspended Solids	32	44	*100 (Max)*
2	pH	7.82	8.07	*5.5 - 9.0*
3	Oil & Grease	<2.0	<2.0	*10 (Max)*
4	COD	20	40	*250 (Max)*

All values are expressed in mg/lit unless specified.

Analysed By
JSA/SA/SSA

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

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

NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

i) **Murlidih (N19)**
ii) **Lohapatti (N20)**
iii) **Kharkharee CISF Office (N21)**
iv) **Dumarda (N31)**

4.2 Methodology of sampling and analysis

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

4.3 Results & Interpretations

Ambient noise levels were recorded during day time and the observed values were compared with standards prescribed by MoEFCC. The results of Noise levels recorded during day time on fortnightly basis are presented in tabular form along with the applicable standard permissible limits. The observed values in terms of L_{EQ} are presented**.** The observed values at all the monitoring locations are found to be within permissible limits.

NOISE LEVEL DATA

Name of the Project : **Cluster -XIII**			Month: **October , 2017**		
Sl. No.	**Station Name/Code**	**Category of area**	**Date**	**Noise level dB(A)LEQ**	***Permissible Limit of Noise level in dB(A)***
1	**Murlidih**	**Industrial area**	11-10-2017	58.8	*75*
2	**Lohapatti**	**Industrial area**	12-10-2017	61.7	*75*
3	**Kharkharee**	**Industrial area**	10-10-2017	64.1	*75*
4	**Dumarda**	**Residential area**	11-10-2017	51.4	*55*
5	**Murlidih**	**Industrial area**	25-10-2017	60.2	*75*
6	**Lohapatti**	**Industrial area**	24-10-2017	60.8	*75*
7	**Kharkharee**	**Industrial area**	20-10-2017	62.3	*75*
8	**Dumarda**	**Residential area**	27-10-2017	51.4	*55*

Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control) Rules, 2000.
*** Day Time: 6.00 AM to 10.00 PM,**

Analysed By
JSA/SA/SSA

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

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

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
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	250 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1.Improved west and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob &Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Note:

* Annual Arithmetic mean for the measurements taken in a year, following the guidelines for frequency of sampling laid down in clause2.

** 24hourly/8hourlyvaluesshallbemet92%ofthetimeinayear.However,8% of the time it may exceed but not on two consecutivedays.

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

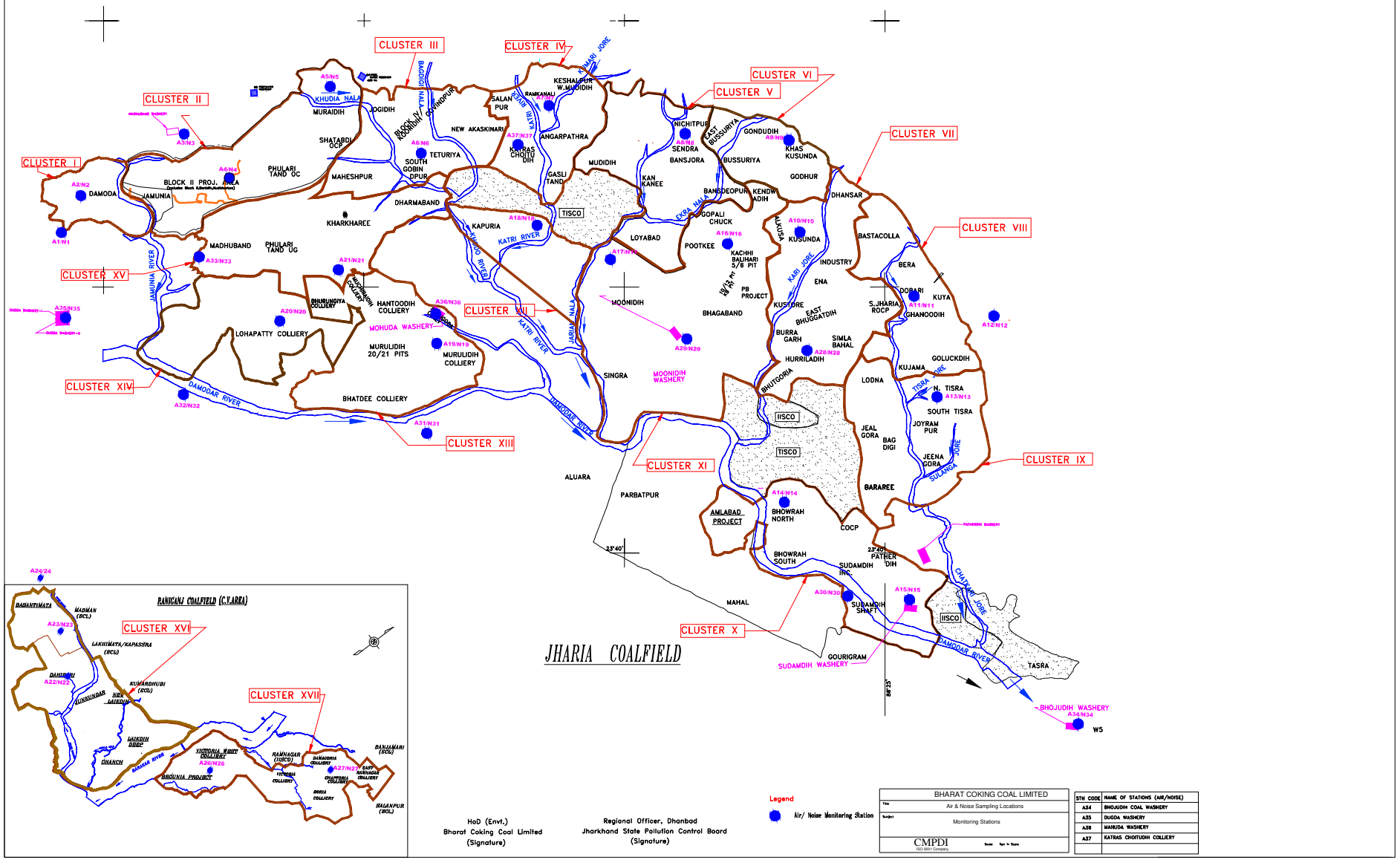
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO_2), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet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

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

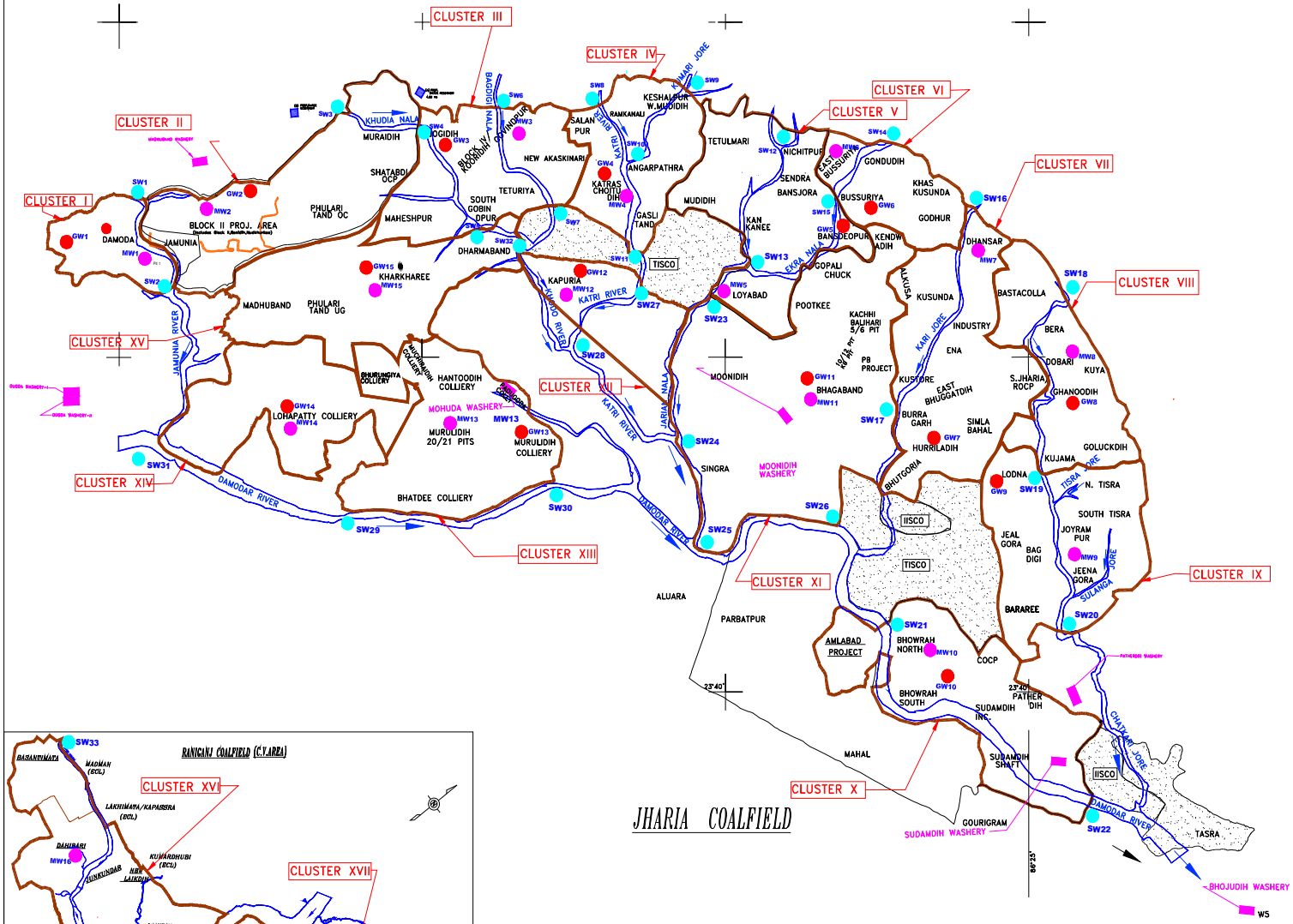
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

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

Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL



INDEX

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

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

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

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

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

ANNEXURE - III

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

(FOR THE MONTH NOVEMBER, 2017)

E. C. no. J-11015/11/2010-IA.II (M) dated 06.06.2013.

CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

CONTENTS

EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine discharge water.

2.3 Noise level monitoring locations

Noise levels vary depending on the various activities in mining areas. The monitoring of noise level in different locations will be helpful to take appropriate mitigating measures. The rationale has been based on the guidelines stipulated by MoEF&CC, consent letter of SPCB, as well as other statutory requirements.

3.0 Methodology of sampling and analysis

3.1 Ambient air quality

Parameters chosen for assessment of ambient air quality were Particulate Matter (PM_{10}), Fine Particulate Matter ($PM_{2.5}$), Sulphur Di-oxide

(SO_2) and Nitrogen Oxides (NO_X). Respirable Dust Samplers (RDS) were used for sampling of PM_{10}, SO_2, & NO_X and Fine Dust Sampler ($PM_{2.5}$ sampler) were used for sampling of $PM_{2.5}$ at 24 hours interval once in a fortnight and the same for the gaseous pollutants. The samples were analyzed in Environmental Laboratory of CMPDI, RI-II, Dhanbad.

3.2 Water quality

Water samples were collected as per standard practice. The Mine effluent samples were collected and analysed for four parameters on fortnightly basis. Thereafter the samples were preserved and analysed at the Environmental Laboratory of CMPDI, RI- II, Dhanbad.

3.3 Noise level monitoring

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

4.0 Results and interpretations

4.1 Air quality

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

4.2 Water quality

The test results indicate that the major parameters compared with MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines, are within permissible limits.

4.3 Noise Level

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

INTRODUCTION

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

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

1.1 The Cluster-XIII is in the Northern part of the Jharia coalfield. It includes a group of 7 Mines (viz. Murlidih**,** Bhurungiya**,** Mucharadih, Hantoodih, Padugora, Murlidih 20/21 Pits & Bhatdih. The Cluster – XIII is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – XIII 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 Katri River & Damodar River..

1.2 The Cluster-XIII is designed to produce 0.18 MTPA (normative) and 2.34 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forests and Climate Change (MoEF&CC) for a rated capacity 0.18 MTPA (normative) and 2.34 MTPA (peak) capacity of coal production vide letter no. J-11015/11/2010-IA.II (M) dated 06th June, 2013.

Ministry of Environment, Forests 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.

AMBIENT AIR QUALITY MONITORING

2.1 Location of sampling station and their rationale:

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

2.1.1 Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Murlidih 20/21 (A19): Industrial Area

The location of the sampling station is 23º44'1.96'' N & 86º16'41.75''E. The sampler was placed at a height of approx. 1.5m above ground level at Project Office. The station was selected to represent the impact of mining activities of Western Jharia area, Coal washery, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

II. BUFFER ZONE Monitoring Location

i) Lohapatti (A20)

The location of the sampling station is 23º44'18.93'' N 86º13'37.75''E. The sampler was placed at a height of approx. 1.5m above ground level at Safety Office. The station was selected to represent the impact of mining activities of Western Jharia area, poor roads condition, heavy public traffic, burning of coal by the surrounding habitants.

ii) Kharkharee CISF Office (A21)

The location of the sampling station is 23º44'14.99'' N 86º14'43.02''E. The sampler was placed at a height of approx. 1.5m above ground level at Project Office.

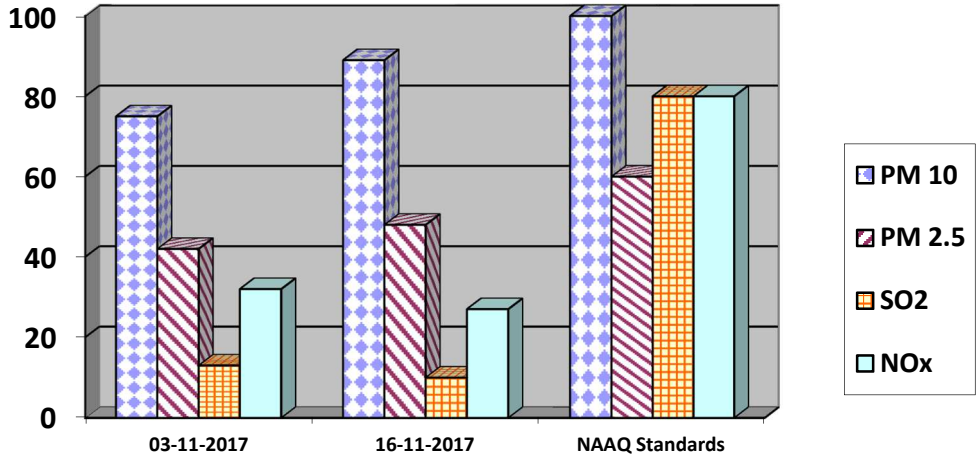
ii) Dumarda (A31)

The location was selected for studying the impact of the mining activity on the Dumarda village as it lies in the buffer zone for the Cluster XIII.

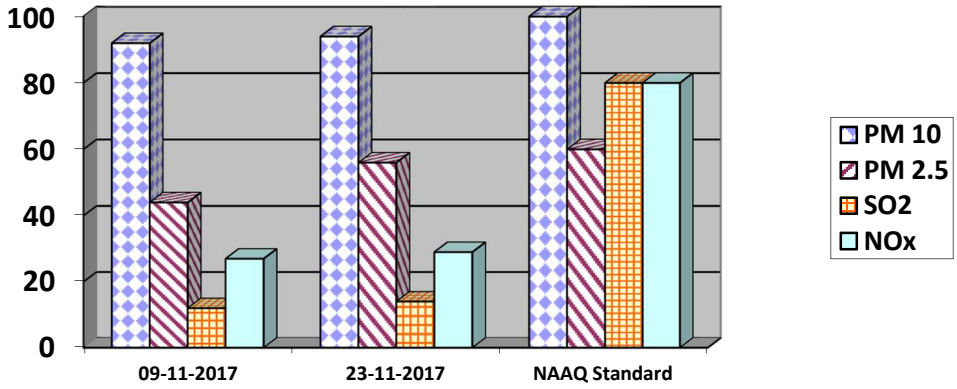
AMBIENT AIR QUALITY DATA

Cluster –XIII,Bharat Coking Coal limited Month:**November 2017** Year : **2017-18.**

Station Name: A19 – Murlidih 20/21		Zone: Buffer		Category: Industrial	
Sl. No.	**Dates of sampling**	**PM 10**	**PM 2.5**	**SO2**	**NOx**
1	03-11-2017	75	42	13	32
2	16-11-2017	89	48	10	27
	NAAQ Standards	100	60	80	80



Station Name: A20, Lohapatti		Zone: Buffer		Category: Industrial	
Sl. No.	**Dates of sampling**	**PM 10**	**PM 2.5**	**SO_2**	**NO_x**
1	09-11-2017	92	44	12	27
2	23-11-2017	94	56	14	29
	NAAQ Standard	100	60	80	80

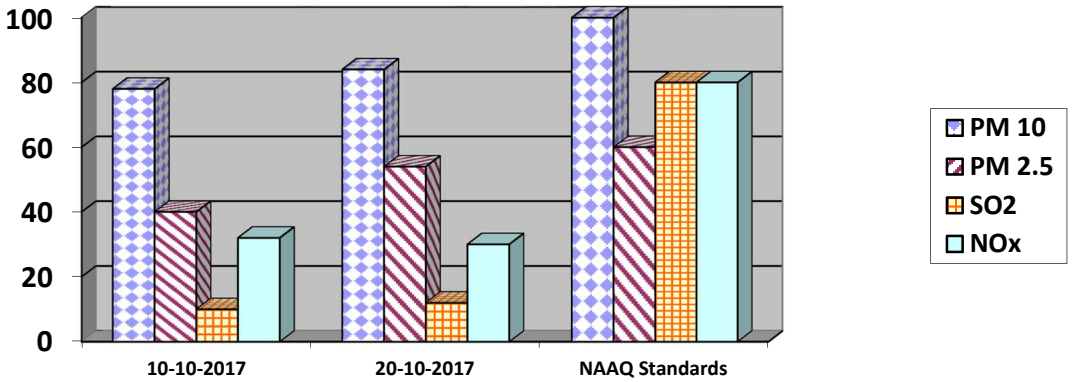


Analysed By
JSA/SA/SSA

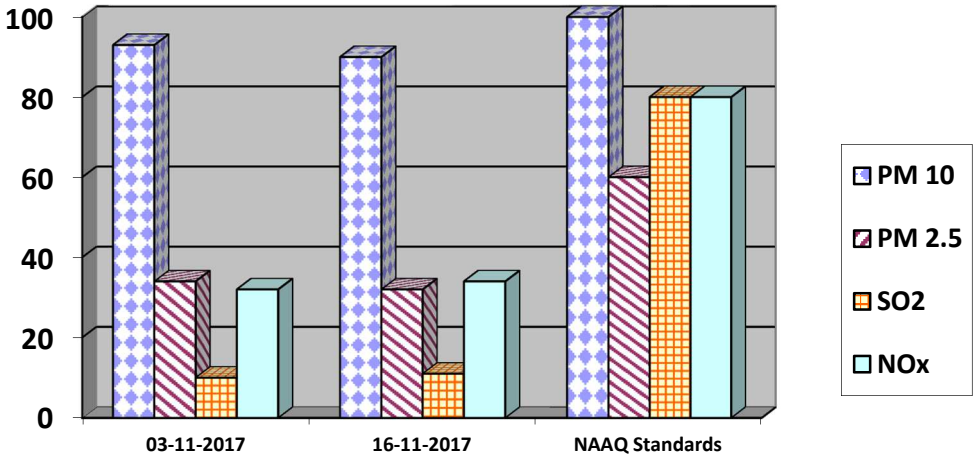
Checked By
Lab In Charge
RI-2, CMPDI, Dhanbad

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

Station Name: A21 Kharkharee		Zone: Buffer		Category: Industrial	
Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	10-10-2017	78	40	10	32
2	20-10-2017	84	54	12	30
	NAAQ Standards	100	60	80	80



Station Name: A31 Dumarda		Zone: Buffer		Category: Residential	
Sl. No.	Dates of sampling	PM 10	PM 2.5	SO2	NOx
1	03-11-2017	93	34	10	32
2	16-11-2017	90	32	11	34
	NAAQ Standards	100	60	80	80



- *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

WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) **Mine Discharge of Murlidih 20/21 (MW13)**

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

3.2 Methodology of sampling and analysis

Water samples were collected as per standard practice. The effluent samples were collected and analyzed for four parameters on fortnightly basis at the Environmental Laboratory of CMPDI RI-II, Dhanbad.

3.3 Results & Interpretations

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

WATER QUALITY DATA

(EFFLUENT WATER- FOUR PARAMETERS)

Name of the Cluster: **Cluster -XIII**		Month: **NOVEMBER, 2017**	Name of the Station: **Mine Discharge of Murlidih 20/21**	
Sl. No.	**Parameters**	**MW13** First Fortnight	**MW13** Second Fortnight	**As per MOEF General Standards for schedule VI**
		03-11-2017	16-11-2017	
1	Total Suspended Solids	36	42	*100 (Max)*
2	pH	8.43	8.62	*5.5 - 9.0*
3	Oil & Grease	<2.0	<2.0	*10 (Max)*
4	COD	28	44	*250 (Max)*

All values are expressed in mg/lit unless specified.

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JSA/SA/SSA

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

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

NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

i) **Murlidih (N19)**
ii) **Lohapatti (N20)**
iii) **Kharkharee CISF Office (N21)**
iv) **Dumarda (N31)**

4.2 Methodology of sampling and analysis

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

4.3 Results & Interpretations

Ambient noise levels were recorded during day time and the observed values were compared with standards prescribed by MoEFCC. The results of Noise levels recorded during day time on fortnightly basis are presented in tabular form along with the applicable standard permissible limits. The observed values in terms of L_{EQ} are presented**.** The observed values at all the monitoring locations are found to be within permissible limits.

NOISE LEVEL DATA

Name of the Project : **Cluster -XIII**			Month: **NOVEMBER, 2017**		
Sl. No.	**Station Name/Code**	**Category of area**	**Date**	**Noise level dB(A)LEQ**	***Permissible Limit of Noise level in dB(A)***
1	**Murlidih 20/21**	**Industrial area**	03-11-2017	59.9	*75*
2	**Lohapatti**	**Industrial area**	09-11-2017	62.4	*75*
3	**Kharkharee**	**Industrial area**	01-11-2017	59.6	*75*
4	**Dumarda**	**Residential area**	03-11-2017	53.2	*55*
5	**Murlidih**	**Industrial area**	16-11-2017	62.8	*75*
6	**Lohapatti**	**Industrial area**	23-11-2017	65.1	*75*
7	**Kharkharee**	**Industrial area**	21-11-2017	63.4	*75*
8	**Dumarda**	**Residential area**	16-11-2017	51.4	*55*

Permissible limits of Noise Level as per MOEF Gazette Notification No. GSR 742(E) dt. 25.09.2000 Standards for Coal Mines and Noise Pollution (Regulation and Control) Rules, 2000.
*** Day Time: 6.00 AM to 10.00 PM,**

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JSA/SA/SSA

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

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

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
	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.Improvedwest and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob &Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Note:

* Annual Arithmetic mean for the measurements taken in a year, following the guidelines for frequency of sampling laid down in clause2.

** 24hourly/8hourlyvaluesshallbemet92%ofthetimeinayear.However,8% of the time it may exceed but not on two consecutivedays.

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

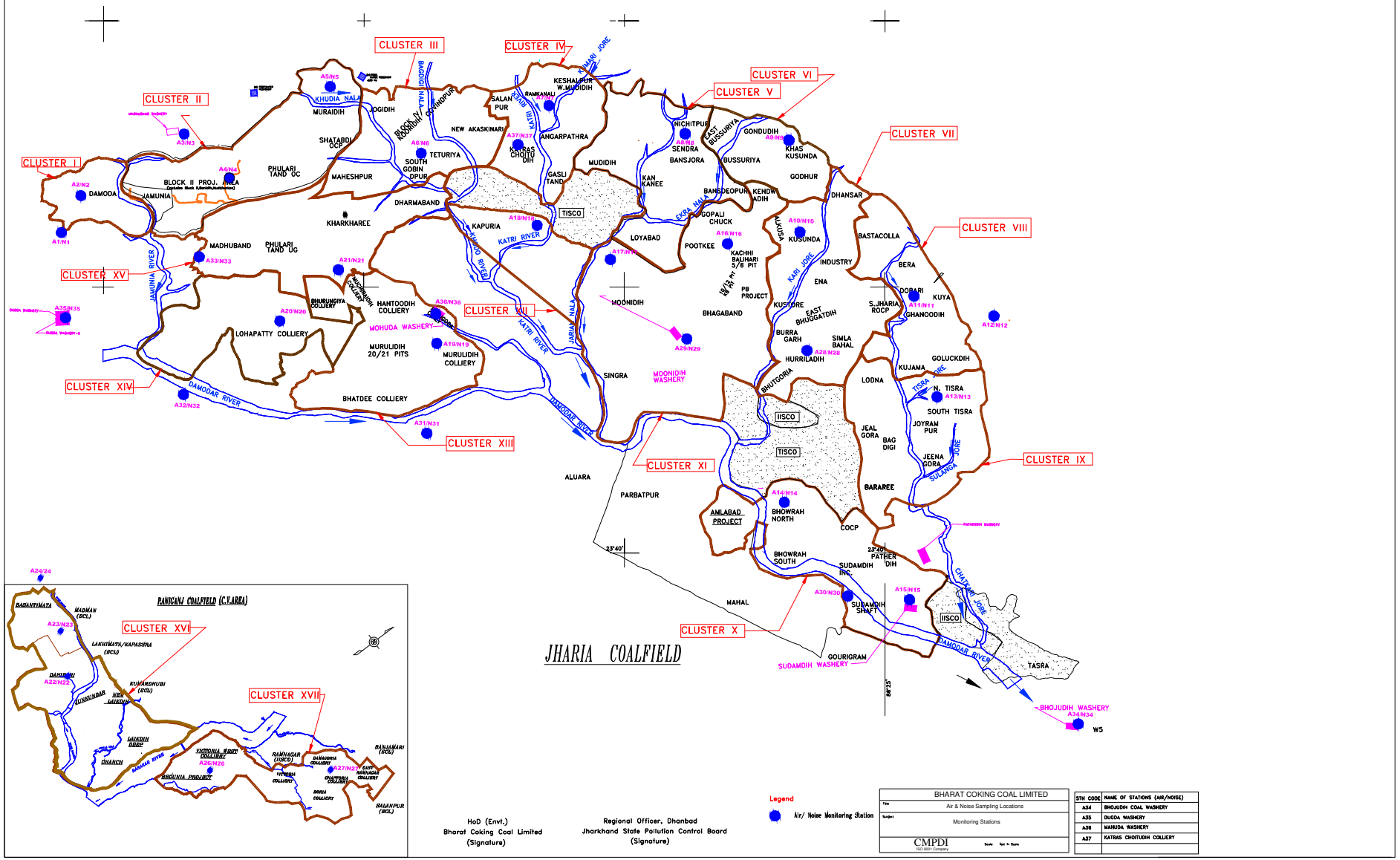
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO_2), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet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

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

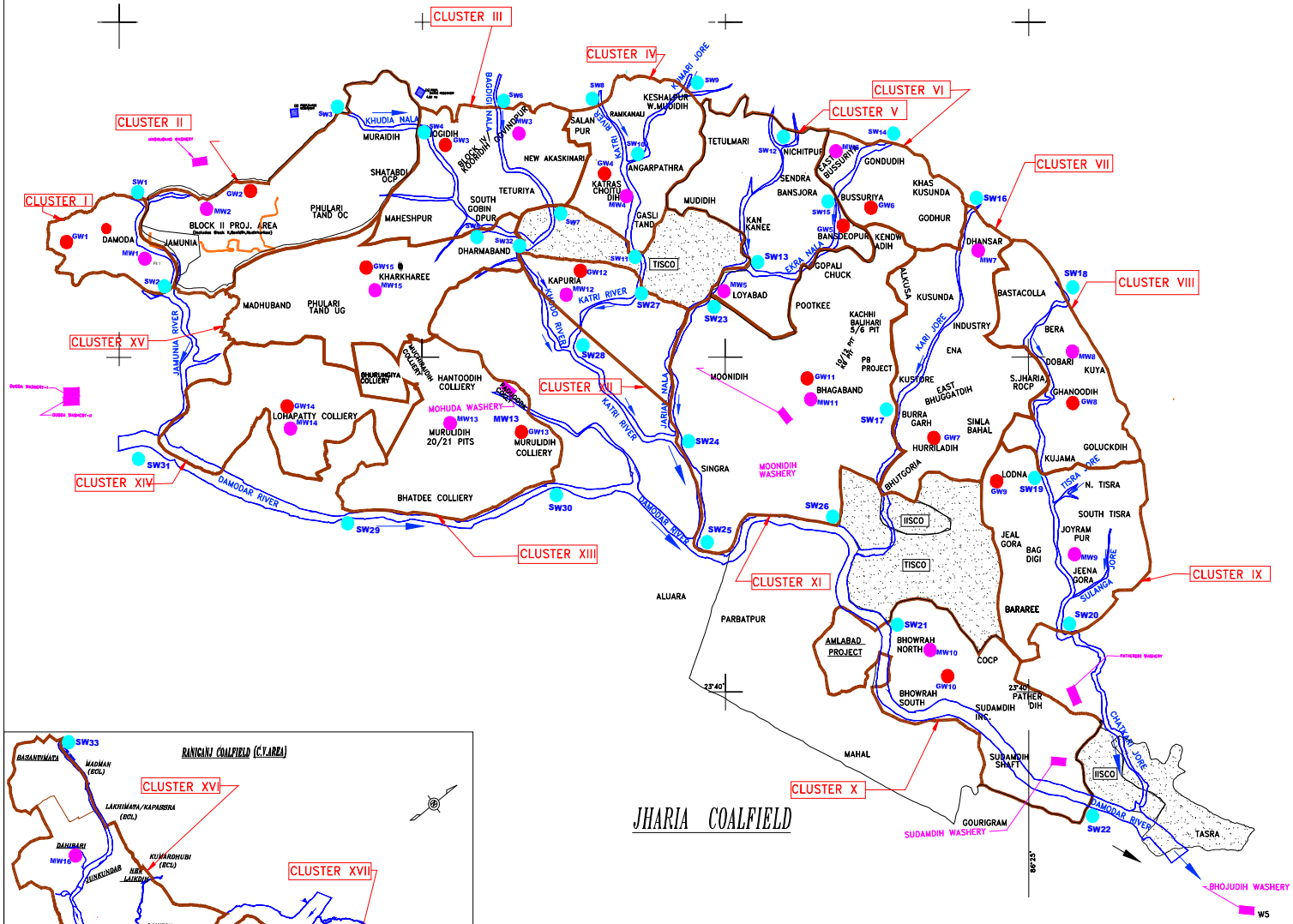
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

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

Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL



INDEX

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

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

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

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

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

ANNEXURE -IV

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Study to Analyze the Extent of Reduction of Pollution Load Every Year by reducing Coal Transportation by Road

CLUSTER XIII GROUP OF MINES

(Murulidih 20/21 pits, Bhurungia, Muchraidih, Hantoodih, Padugora, Murulidih and Bhatdih)

Normative Production : 0.18 MTPA
Peak Production : 0.234 MTPA
Lease Hold Area : 1898.62 Ha

Bharat Coking Coal Limited

(March, 2017)

Prepared by

Environment Division

Central Mine Planning & Design Institute Limited

CMPDI (HQ)

Gondwana Place

Kanke Road, Ranchi-834008

CONTENTS

Chapter – I

Introduction

1.1 Genesis:

MOEF provided Environmental Clearance to the various mines of the Cluster J-11015/ 11/ 2010-IA.II(M) dated 6 June 13.

As per the Environmental Clearance Conditions given by the Ministry of Environment & Forest "A study should be initiated to analyse extent of reduction in pollution load every year by reducing road transport of coal". Therefore the present study has been carried out to quantify the pollution load due to coal transportation.

1.2 Methodology:

In order to find out the pollution load due to coal transportation a Questionnaire was developed by the Environment Division of CMPDI Headquarter and Regional Institute –II, Dhanbad. The Questionnaire was circulated to the various mines of BCCL for collection of the requisite inputs for this study. The quantification of pollution load for PM-10 has been carried out on the basis of the field visit, data provided by BCCL officials and interaction with them.

1.3 General Information about the Cluster:

1.3.1 Brief Description:

Cluster XIII mines of BCCL consists of existing mine of Murulidih 20/21 pits and six closed mines (Bhurungia, Muchraidih, Hantoodih, Padugora, Murulidih and Bhatdih). This cluster of mines are located in the southwestern part of the Jharia coalfield in Mohuda basin. These mines are taken over by BCCL from private mine owners after nationalization through Coal Mines Nationalization Act, 1972-73. The Murulidih 20/21 pit mine is operating since pre-nationalisation period.

BCCL is the proponent of the cluster and it is under the administrative control of Coal India Limited.

1.3.2 Nature and Size of the Cluster:

Cluster-XIII group of mines of BCCL is a group of seven mines consisting of one underground mine and six abandoned/closed mines including one opencast mine of Western Jharia Area in Jharia Coalfield of the Bharat Coking Coal Limited in the Dhanbad District of Jharkhand state.

The details of the mines showing normative/ peak productions, lease hold areas and life are given in Table no. 1.1.

Table 1.1: Details of the Mines of Cluster –XIII

Sl No	Name of Mine	Production Capacity (MTY)		Lease Hold Area (Ha)
		Normative	Peak	
1	Murulidih 20/21 pits	0.18	0.234	571.32
2	Bhurungiya colliery	nil	nil	170.44
3	Muchraidih colliery	nil	nil	83.23
4	Hantoodih colliery	nil	nil	193.41
5	Padugora colliery	nil	nil	17.6
6	Murulidih colliery	nil	nil	315.62
7	Bhatdee colliery	nil	nil	547.00
	Total	0.18	0.234	1898.62

1.3.3 Impact of Fire Control on Ambient Air Quality:

Due to unscientific mining prior to nationalization there are unstable sites identified in the BCCL. Out of 595 unstable sites identified in the Master Plan , 15 sites consisting of 2187 no. of houses/families are affected .The affected families will be rehabilitated in adjacent non coal bearing area at a cost of Rs. 11199.89 lakhs.

1.3.4Impact of Resettlement on Ambient Air Quality:

As per Jharia Action Plan (JAP) household will be shifted for implementation of master plan. The reduction in number of households within the leasehold area of Cluster will lead to reduction in generation of air pollutants due to reduction in movement of man & materials apart from decrease in consumption of coal as a

domestic fuel. As per Jharia Action Plan (JAP) household will be shifted as per for implementation.

1.4 Meteorological Data

A meteorological data generated during 1st January 16 to 31st March 2016 has been presented in this report .The micro meteorological set up was established at the roof of BCCL Dugda Guest house and parameters like temperature, relative humidity, wind speed and directions, cloud cover and rainfall were recorded. The data were collected on hourly basis during the entire study period.

Generally, moderate winds prevailed throughout the study period. The wind velocity ranged between ≤ 0.5 m/s to 13.2 m/s. The seasonal average wind speed was observed to be 0.69 m/s. Wind-roses were made by using latest WRPLOT View of Lakes Environmental Software.

The analysis of wind pattern during the season showed that the predominant wind directions were from North-West & West followed by North-East having frequencies 15.71%, 11.45% & 4.67% respectively.The receptors located in the Downwind directions i.e. SE and East from the dust generating sources are likely to be affected. The dispersion of air borne dust during calm period (45% of time) will be very poor and buildup of pollutant concentration during this period will occur.

The maximum temperature recorded was 39.3^{0}C and the minimum was 6.2^{0}C. The daily average relative humidity values were in the range of 32.2 to 65.0%. The sky was mostly clear during the study period. The average atmospheric pressure value has been found to be around 732.3 mm Hg. Total 94.5mm rainfall was recorded during the study period. The average rainfall during the season was found to be 1.04 mm.

Table 1.2: SEASONAL WIND DISTRIBUTION

Period: 01st JAN.'2016 – 31stMAR.'2016

Wind Direction	Wind Velocity (m/s) & Duration (%)				
	< 0.5	0.6 -1.5	1.6 -3.5	>3.5	Total
N		1.61	0.78	0.00	2.38
NNE		0.83	0.37	0.00	1.19
NE		3.17	1.47	0.05	4.67
ENE		0.41	0.14	0.00	0.55
E		1.10	0.69	0.00	1.79
ESE		0.50	0.37	0.00	0.87
SE		1.28	0.41	0.05	1.74
SSE		0.64	0.18	0.00	0.82
S		0.41	0.09	0.00	0.50
SSW		0.28	0.05	0.00	0.32
SW		2.29	0.60	0.00	2.88
WSW		1.06	0.41	0.00	1.47
W		8.99	2.48	0.00	11.45
WNW		1.24	1.01	0.00	2.24
NW		11.47	4.22	0.05	15.71
NNW		2.11	0.73	0.00	2.84
CALM	48.40	-	-	-	48.40
Total	48.40	37.32	13.97	0.15	100

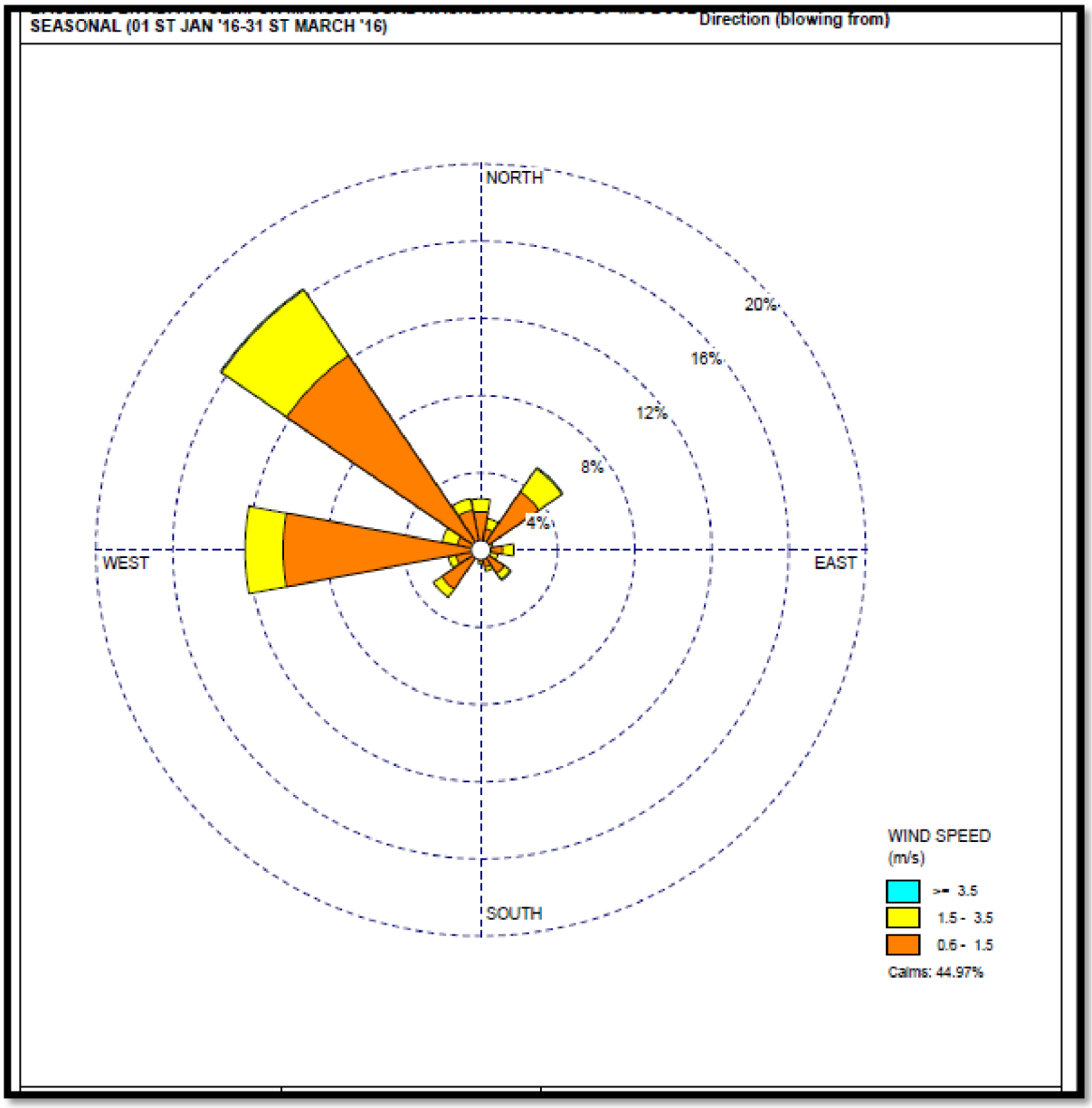

Figure No.-1.1 Wind Rose diagram for the period 1St Jan to 31St March 2016

Chapter – II

Fugitive Dust Generation Due To Movement of Coal

2.1 Introduction

The coal produced moves to the consumers via Road & Rail. Coal from the mine face is brought to the surface dumps and bulk of it goes to the nearby railway sidingsfor further movement to the consumer- end through rail. The journey from the mine face to the railway siding is covered by road. A portion of the coal produced by the mine directly goes to the consumers via road. Transportation of coal by rail is an environmentally better option than the road transportation. Road Transportation results in generation of fugitive dust from road surface apart from other pollutants released due to consumption of Diesel.

The fugitive dust generated due to coal transportation through road depend upon the following factors:

1. Speed and Weight of the moving vehicles.
2. Silt Content of the Road Dust (Particles less than 200 mesh size is considered as silt)
3. Silt loading of the road dust (Kg/m^2).
4. Moisture Content of the dust lying on the road surface.
5. Ambient Temperature, Humidity & wind velocity.

The dust generation will be lower if the quantity of dust (silt loading) lying on the road surface is minimum and the moisture content of the loose material lying on the road surface is high.

2.2 Movement of Coal

Distance travelled by coal and subsequent release of fugitive dust during its journey towards the consumer end has been describedand dust load has been worked out for the year 2013-14, 2014-15 and 2015-16.

2.2.1 Murulidih 20/21 pits Colliery :

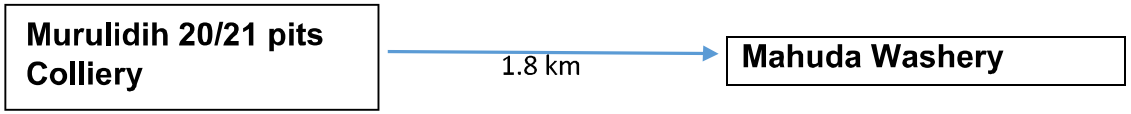

Table: 2.1 Dust Generation (Kg/day)

Dust generated per day (Kg/Day)										
Name of the Mine	**Year**	**Location**	**Distance from Face to Siding (Km)**	**Coal Transferred**	**Daily Coal Production (Te/Day)**	**Capacity of the Dumper**	**Vehicle Kilometer Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
Murulidih 20/21 pits Colliery	13-14	Mahuda washery	1.80	46687.85	141.00	20.00	25.38	0.53	13.451	
		Total for 13-14			**141.00**				**13.451**	0.10
	14-15	Mahuda washery	1.80	43670.23	132.00	20.00	23.76	0.53	12.593	
		Total for 14-15			**132.00**				**12.593**	0.10
	15-16	Mahuda washery	1.80	10425.59	32.00	20.00	5.76	0.53	3.053	
		Total for 15-16			**32.00**				**3.053**	0.10

* In terms of PM 10 expressed as kg/day, ** Average distance has been considered, *** Capacities of Dumpers used in transportation of coal from face to siding taken as 30Te, to Washery 20Te, and Outside Transport 15 Te. ..## Emission rate for PM_{10} has been taken from the S&T work (funded by MoC) carried out by CMPDI during 2002-2007.

2.3 Optimum Coal Transportation scheme in the Present Scenario:

Phase – I (for 10 + 05 Years)

As suggested by the Environmental Appraisal Committee, it is proposed to continue the existing Road–Rail transport network system in view of the implementation of the Jharia Action Plan(JAP) for 10 years and another 05 years gestation period after the completion of the JAP for consolidation of the backfilled dug out fire areas and unstable areas is required.Thus the period of 15 years, make the Phase – I. All mitigation measures like covered trucks, green belting on either side of the road, enhanced water sprinkling, proper maintenance of roads, removal of spilled materials etc shall be adopted for 15 years with the existing road – rails transport system.

2.4 Conceptual Plan of Proposed Integrated Coal Transportation Network forthe Cluster:

Phase – II (after 15 Years):

As suggested by the EAC Members, BCCL shall implement conveyor –cum-rail transport to avoid movement of trucks within the cluster for coal transportation in Phase –II. Loading of coal by pay–loaders shall be discontinued.

During 2015-16, the combined daily coal production of the Cluster was 10425.59 tones resulting in 1043 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.10 kg/te.

As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of 7090 kg/day for daily coal production of 70909 tonnes (0.234 MTY) during Phase –II.

Table 2.2: Proposed Infrastructure for Coal Transportation (phase – II)

Cluster	Mines in Operation in Phase - II	Production Capacity (MTY)	Proposed Transport Infrastructure in Phase – II
XIII	Murulidih 20/21 pits	0.234	**Coal transport by Conveyor to Railway Siding**
	Total	0.234= 70909 tonnes /Day	

2.5 Conclusion:

On the basis of the study undertaken to assess the impact of coal transportation on pollution load, the followings may be concluded:

Phase – I :(2013-14 to 2028 -29) :

1. During Phase – I, business as usual(BAU) scenario will prevail and the existing road cum rail transport network system will be used for coal dispatch to the consumers. During 2015-16, the combined daily coal production of the Cluster was 10425.59 tones resulting in 1043 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.10 kg/te.
2. The generation of fugitive dust due to transportation of coal by road can be further reduced by enforcing covering of loaded trucks, periodical removal of loose materials lying on the road surface and black topping of coal transportation roads.
3. Avenue plantation, effective wetting of the road surface and proper maintenance of roads will further result in mitigation of the impact of road generated dust on ambient air quality.
4. Better road condition, by the use of Mechanical Sweeper or vacuum cleaner dust generation may be minimized.

Phase – II :(From 2029-30 Onwards):

As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of

7090 kg/day for daily coal production of 70909 tonnes (0.234 MTY) during Phase –II.

1. During Phase –II, dust load will further reduce due to quenching of mine fire and domestic coal consumption after resettlement of general population dwelling within the command area of cluster, as a result of implementation of Jharia Action Plan. It will result in significant improvement in ambient air quality.

2. **Coal Production Vs. Dust Generation due to Road Transportation is presented below:**

Table2.3: Coal Production Vs. Dust Generation due to Road Transportation

Year	Coal Production (Te/day)	Dust Generation(Kg/Day)
2015-16 (By Road transportation)	10425	1043
2029-30 (By Road transportation)	70909	7090
2029-30(By Conveyor Transportation)	70909	0

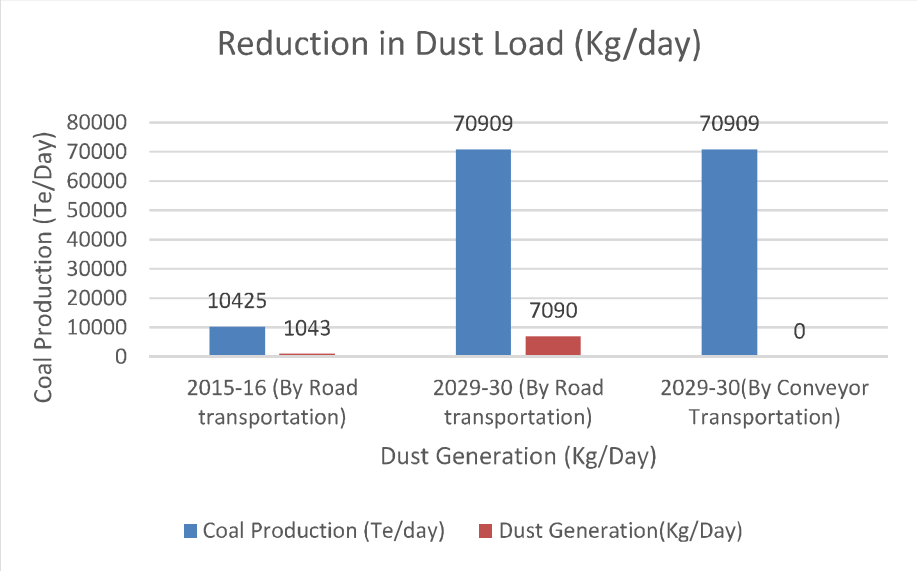

Figure 2.1: Presentation of reduction in dust generation due to replacement of Road transportation by Conveyor system.

ANNEXURE - V

Vegetation Cover Mapping of Jharia Coalfield based on Satellite Data of the Year- 2016

Submitted to

Bharat Coking Coal Ltd (BCCL)

Dhanbad

March 2017

cmpdi

A Mini Ratna Company

Vegetation Cover Mapping of Jharia Coalfield based on Satellite Data of the Year- 2016

March-2017

Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi

Document Control Sheet

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(8) Aim of the Report	To prepare Land use and vegetation cover map of Jharia Coalfield on 1:50000 scale based on satellite data for monitoring the impact of coal mining on land use pattern and vegetation cover & also to prepare cluster wise Land use/ Cover maps falling under Jharia Coalfield.
(9) Executing Unit	Remote Sensing Cell, Geomatics Division Central Mine Planning & Design Institute Limited, Gondwana Place, Kanke Road, Ranchi 834008
(10) User Agency	Coal India Ltd.(CIL) / Bharat Coking Coal Ltd.(BCCL)
(11) Authors	Ms Ayesha Parida, Assistant Manager (Remote Sensing)
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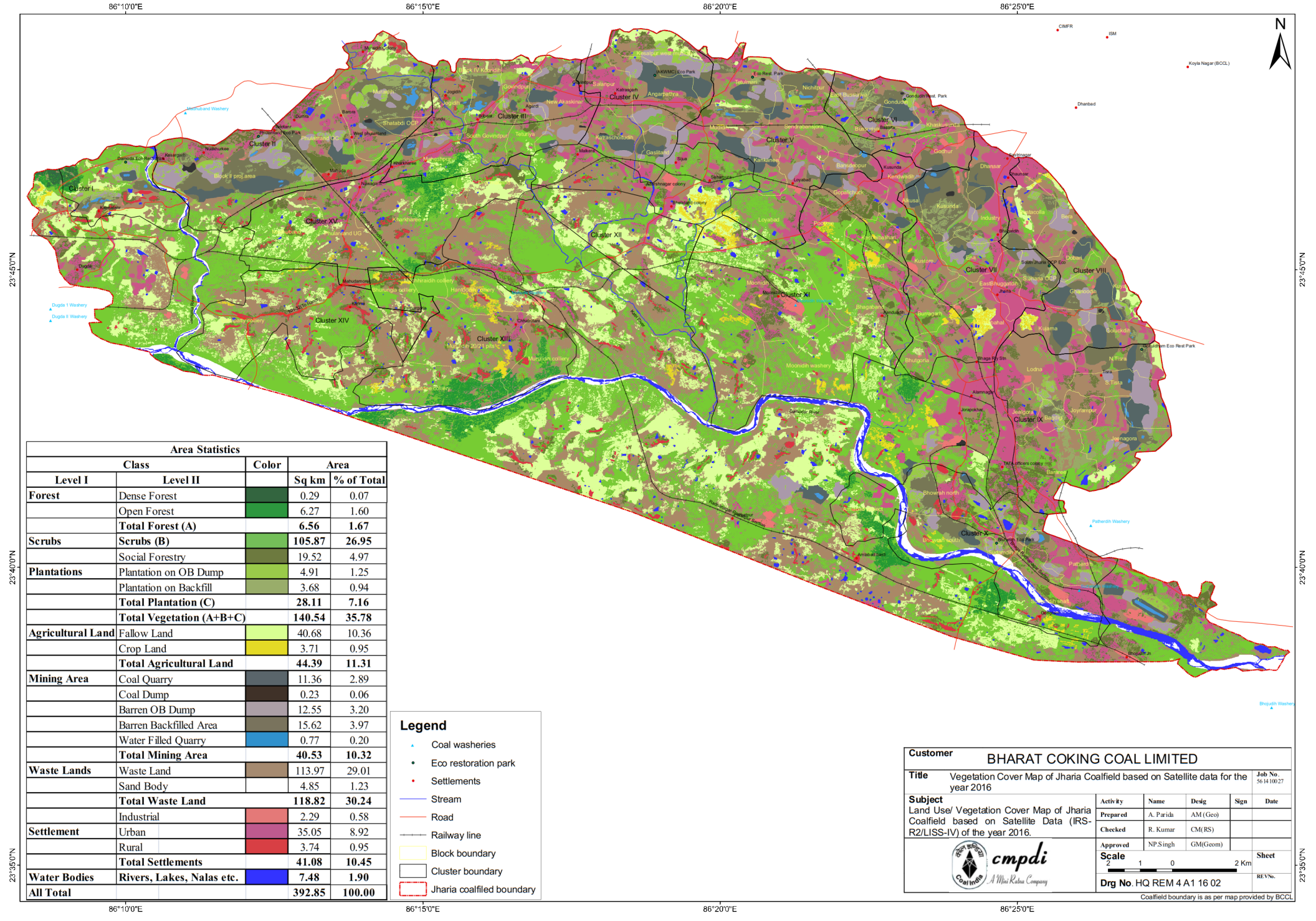

Area Statistics

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**

Legend

- Coal washeries
- Eco restoration park
- Settlements
- Stream
- Road
- Railway line
- Block boundary
- Cluster boundary
- Jharia coalfiled boundary

Customer BHARAT COKING COAL LIMITED

Title Vegetation Cover Map of Jharia Coalfield based on Satellite data for the year 2016

Job No. 56141002 7

Subject Land Use/ Vegetation Cover Map of Jharia Coalfield based on Satellite Data (IRS-R2/LISS-IV) of the year 2016.

Activity	Name	Desig	Sign	Date
Prepared	A. Parida	AM (Geo)		
Checked	R. Kumar	CM(RS)		
Approved	NP.Singh	GM(Geom)		

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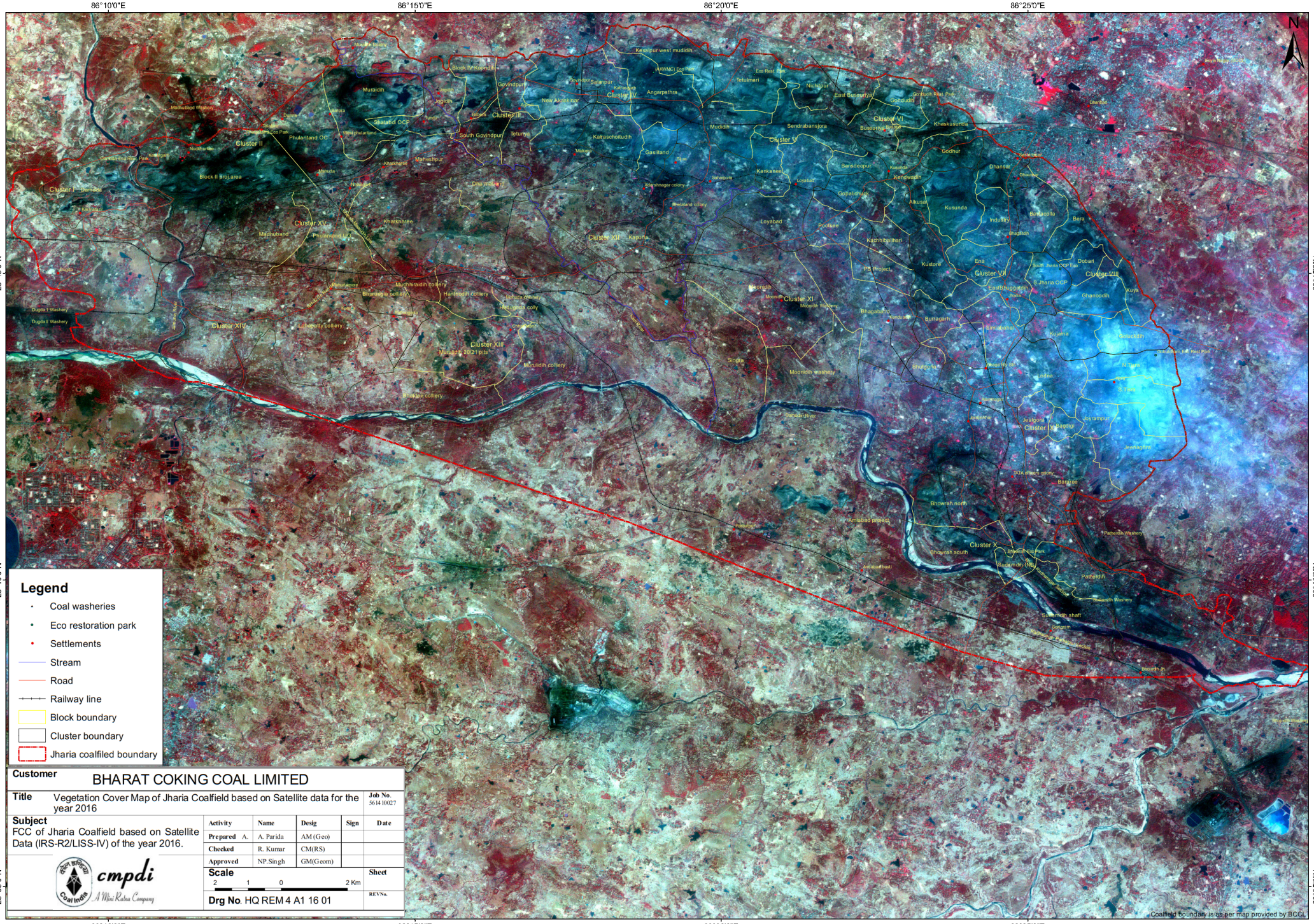
Scale 2 1 0 2 Km

Sheet REV No.

Drg No. HQ REM 4 A1 16 02

Coalfield boundary is as per map provided by BCCL



Customer	BHARAT COKING COAL LIMITED				
Title	Vegetation Cover Map of Jharia Coalfield based on Satellite data for the year 2016				**Job No.** 5614 I0027
Subject	FCC of Jharia Coalfield based on Satellite Data (IRS-R2/LISS-IV) of the year 2016.	**Activity**	**Name**	**Desig**	**Sign** / **Date**
		Prepared A.	A. Parida	AM (Geo)	
		Checked	R. Kumar	CM(RS)	
		Approved	NP.Singh	GM(Geom)	
	cmpdi — A Mini Ratna Company	**Scale** 2 1 0 2 Km			**Sheet**
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