



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

Ref: BCCL/GM/B-II/ENV/22-23/21

Date: 01.12.2022

To
The Director
Ministry of Environment, Forest & CC
Integrated Regional Office (ECZ)
2nd Floor, HQ-Jharkhand State Housing Board
Harmu Chowk, Ranchi, Jharkhand-834002

Sub: Six monthly EC compliance reports for the period from April 2022 to September 2022 in respect of Cluster –II group of mines of BCCL.

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

Dear Sir,

Kindly find enclosed herewith the Six monthly EC compliance report for the period April 2022 to September 2022 in respect of Cluster –II group of mines of BCCL.
Hope you will find the same in order.

Yours faithfully,

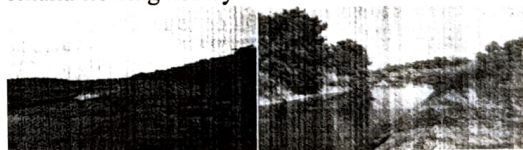
General Manager
Block-II Area

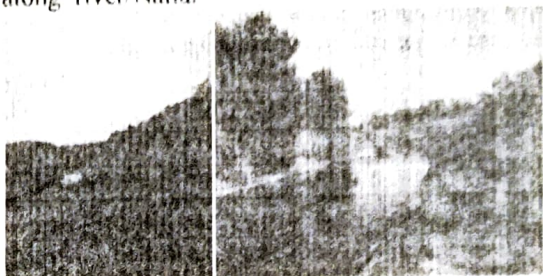
Encl: as above

C.C to

1. The Director, 1A monitoring cell
Paryavaran Bhawan CGO Complex, New Delhi-110003
2. The Regional Officer, JSPCB, HIG- I, Housing colony
Dhanbad-826001
3. Dy.G.M (Env.) BCCL Koyla Bhawan, Dhanbad.

(01.04.2022 to 30.09.2022) 0000000000000000 April '22 to Sept '22

Sl. no.	A. Specific Conditions by MOEF:	Compliance										
i	The maximum production by opencast mining shall not exceed beyond that for which environmental clearance has been granted for the 5 mine of Cluster- II .	The production from the Cluster is within limit for which environment clearance has been granted. <table><tr><th>Mine Cluster II</th><th>Coal (MTPA)</th><th>2019-20</th><th>2020-21</th><th>2021-22</th></tr><tr><td></td><td></td><td>5.36</td><td>5.05</td><td>5.18</td></tr></table>	Mine Cluster II	Coal (MTPA)	2019-20	2020-21	2021-22			5.36	5.05	5.18
Mine Cluster II	Coal (MTPA)	2019-20	2020-21	2021-22								
		5.36	5.05	5.18								
ii	The measure to identify in the Environmental Plan for Cluster- II groups of mine and the conditions given in this environmental clearance letter shall be dovetailed to the implementation of the Jharia Action Plan.	Master Plan is dovetailed with environmental clearance condition. Action like trench cutting & water flushing is being taken to control, mine fires including old OB dump & areas as specified in Jharia Master Plan										
iii	The proponent shall prepare time -series maps of the Jharia Coalfields through NRSA to monitor and prevent fire problems in the Jharia Coalfields by Isothermal mapping /imaging and monitoring temperatures of the coal seams (whether they are close to spontaneous ignition temperatures) and based on which, areas with potential fire problems shall be identified. Measures to prevent ingress of air (Ventilation) in such areas, to prevent restart fresh/spread fires in other areas including in mines of cluster II shall be undertaken. Expertise available internationally could also be utilized for control of fire in Jharia Coalfields and for their reclamation and to further minimize time for fire and subsidence control. Monitoring of fire should be carried out regularly.	Time -series maps of the Jharia Coalfields is prepared by NRSA for 2012 &17 and will continue. As per study conducted by NRSA, the western flank (Shatabdi and Muraidih) show diminished fire presence compared to 2012. (Copy of NRSA report is enclosed as Annexure-I)										
iv	Underground mining should be taken up after completion of reclamation of Opencast mine area.	Agreed. Underground mining will be taken up after the completion of reclamation of Opencast mine area.										
v	The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilized with plantation so as to withstand the peak water flow and prevent mine inundation.	Strong stony embankment is present along river &nalla flowing nearby. 										
vi	The rejects of washeries in Cluster –II should be send to FBC based plant.	No washery is present in cluster.										
vii	No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/ check such fire including in old OB dump areas where the fire could start due to presence of coal /shale with sufficient carbon content.	Mining is being carried out as per the guidelines of DGMS. Sufficient precaution like trench cutting and water flushing is being taken to guard against fire.										
viii	There shall be no external OB dumps. OB produce from the whole cluster will be 484.89Mm ³ . OB from 3 OCP and 2 patches in mixed mine shall be backfilled. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.	OB produced is used in back-filling. Ecological restoration practices is being carried out at the stable OB dumps & decoalded area and grass seed are also spread on the slopes of the dumps for slope stability.										

ix	A detailed calendar plan of production with plan for OB dumping and backfilling (for OC mines) and reclamation and final mine closure plan for each mine of cluster-II shall be drawn up and implemented.	Calendar tree species has been prepared. Mine closure plan as per the guidelines of Ministry of Coal have been prepared by CMPDI and is being implemented. Calendar plan for OC mines of Cluster -II for next 3 yrs is:- <table><tr><td></td><td>2022-23</td><td>2023-24</td><td>2024-25</td></tr><tr><td>Coal(MTe)</td><td>7.63</td><td>9.1</td><td>9.9</td></tr><tr><td>OB (MM³)</td><td>22.93</td><td>24.96</td><td>26.26</td></tr></table>		2022-23	2023-24	2024-25	Coal(MTe)	7.63	9.1	9.9	OB (MM ³)	22.93	24.96	26.26
	2022-23	2023-24	2024-25											
Coal(MTe)	7.63	9.1	9.9											
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x	Mining shall be carried out as per statute from the streams/nalas flowing within the lease and maintaining a safe distance from the Nalas flowing along the lease boundary. A safety barrier of a minimum 60m width shall be maintained along the nalas/water bodies. The small water bodies in OC shall be protected to the extent feasible and the embankment proposed along water body shall be strengthened with stone pitching taking into account the highest flood level, based on past data, so as to guard against mine inundation. The slope of the embankment shall at least 2:1 towards the ML. The height of the embankment shall be at least 3 m higher than the HFL. The embankment to be constructed by OB /solid waste shall be strengthened with stone pitching. Slope stability of the embankment shall be done by planting suitable grass and shrubs using native species selected from the study area.	It is being followed. More than 60 m distance is being maintained from nearby river/nalla. Strong stony embankment with plantation is present along river/Nalla.  The height of the embankment of Jamunia river is 8 m higher than the HFL.												
xi	Active OB dumps near water bodies and rivers should be re-handled for backfilling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.	There is no active OB dumps near water bodies and rivers.												
xii	Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. A total area of 1237.48ha shall be reclaimed and afforested.	It is being complied. Total area of 202.5 ha has been planted. A total area of 16.5 ha & 500 gabion is taken for plantation in 2021-23 & being eco-restored.												
xiii	The road should be provided with avenue plantation on both side as trees act as sink of carbon and other pollutant.	400 no of sapling planted along connecting and transportation road. 2 nos. of Plantation sites are present along road (approx 400 m) connecting mine to state govt road and also there are 2-3 plantation site along permanent road in mines. Most of the coal is being transported through railway siding. Road transport is being carried out through existing network of NH/SH where avenue plantation already exist. 												
xiv	Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action Plan prepared for	Dhanbad Action Plan is being implemented. The salient actions of this area:												

	Dhanbad as a critically polluted are and relevant for Cluster- II shall be implemented.	1. Covered transportation of Coal. 2. Water sprinkling. 3. Plantation. 4. Utilization of surplus mine water.																																																					
XV	The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board. The Committee stated that smoke/dust emission vary from source to source (fuel wood, coal, fly ash from TPPs, silica from natural dust, etc) and a Source Apportionment Study should be got carried out for the entire Jharia Coalfields. Mineralogical composition study should be undertaken on the composition of the suspended particulate matter (PM ₁₀ and PM _{2.5}) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.	Establishment of ambient environment quality monitoring stations has been finalized in consultation with the JSPCB. The work of source apportionment was awarded to NEERI, Nagpur on 12.05.2018. NEERI Nagpur has submitted the final report The result report is attached.																																																					
XVI	The Transportation Plan for conveyor-cum-rail for Cluster-II should be dovetailed with Jharia Action Plan. Road transportation of coal during Phase-I should be by mechanically covered trucks, which should be introduced at the earliest.	CMPDIL RI-II has been requested to conduct study and prepare the plan in this regarding. No OEM is provided for mechanically covered trucks. transportation is being done by covering vehicle with Tarpaulin.																																																					
XVII	R&R of 1137 nos of PAF's involved. They should be rehabilitated at cost of Rs 45.08 Crores as per the approved Jharia Action Plan.	Implementation of master plan has already been started through Jharkhand Rehabilitation and Development Authority, Dhanbad. Survey of affected site by JRDA has done.																																																					
XVIII	Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be dome four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board/SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.	Groundwater level and quality is being regularly monitored by CMPDIL. Tender has been cancelled thrice. The estimate is being revised in association with CMPDI for re-tendering. Water level monitoring at 5 hydrograph stations has been done in the months of May, August & November'2021 & Jan 2022 and the Ground water level data is enclosed in the table below: <table><tr><th rowspan="2">Sl No</th><th rowspan="2">Well No.</th><th rowspan="2">Location</th><th colspan="4">Water level (bgl in meters)</th></tr><tr><th>May '21</th><th>Aug' 21</th><th>Nov '21</th><th>Jan' 22</th></tr><tr><td>1</td><td>B-1</td><td>Muraidih</td><td>2.58</td><td>0.58</td><td>1.19</td><td>2.03</td></tr><tr><td>2</td><td>B-59</td><td>Khodoval y</td><td>5.49</td><td>0.30</td><td>0.90</td><td>0.95</td></tr><tr><td>3</td><td>B-60</td><td>Bahiyardi h</td><td>11.26</td><td>1.33</td><td>2.23</td><td>6.53</td></tr><tr><td>4</td><td>B-61A</td><td>Kesargora</td><td>4.42</td><td>0.47</td><td>0.97</td><td>0.97</td></tr><tr><td>5</td><td>B-62A</td><td>Sadiyardih</td><td>6.87</td><td>1.35</td><td>4.50</td><td>4.60</td></tr><tr><td colspan="3">Average WL (bgl)</td><td>6.12</td><td>0.81</td><td>2.10</td><td>3.02</td></tr></table> (Soft copy of report is enclosed as Annexure II)	Sl No	Well No.	Location	Water level (bgl in meters)				May '21	Aug' 21	Nov '21	Jan' 22	1	B-1	Muraidih	2.58	0.58	1.19	2.03	2	B-59	Khodoval y	5.49	0.30	0.90	0.95	3	B-60	Bahiyardi h	11.26	1.33	2.23	6.53	4	B-61A	Kesargora	4.42	0.47	0.97	0.97	5	B-62A	Sadiyardih	6.87	1.35	4.50	4.60	Average WL (bgl)			6.12	0.81	2.10	3.02
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xix	Regular monitoring of subsidence movement on the surface over and around the working area and impact on natural drainage pattern, water bodies, vegetation, structure, roads, and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate effective corrective measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.	As the area is having O/C mines, hence no subsidence is there.
xx	Sufficient coal pillars shall be left unextracted around the air shaft (within the subsidence influence area) to protect from any damage from subsidence, if any.	Presently only OCP working exist.
xxi	High root density tree species shall be selected and planted over areas likely to be affected by subsidence.	As the area is having O/C mines, hence no subsidence is there.
xxii	Depression due to subsidence resulting in water accumulating within the low lying areas shall be filled up or drained out by cutting drains.	As the area is having O/C mines, hence no subsidence is there.
xxiii	Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.	As the area is having O/C mines, hence no subsidence is there.
xxiv	No depillaring operation shall be carried out below the township/colony.	Presently only OCP working exist in this cluster.
xxv	A detailed CSR Action Plan shall be prepared for Cluster II group of mines. Specific activities shall be identified for CSR for the budget of Rs 77.50 Lakhs per year @ Rs 5/T of coal provided for CSR for 2012-2013 and Rs. 5/T of coal as recurring expenditure. The 416.98 ha of area within Cluster II ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. In addition to afforesting 1237.48 ha of area at the post-mining stage, the 122.18ha of fallow/abandoned land and 416.98 ha waste land /barren land within Cluster- II mining lease area shall be rehabilitated/reclaimed as forest/agricultural land under CSR Plan in consultation with local communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the local youth, who are motivated to carry out the work in future.	BCCL is implementing CSR activities, as per Govt. norms with a CSR Committee being evaluated by Tata Institute of Social Science. Rs. 191.67 lakhs spend for Construction and maintenance of toilets for 5years in Government schools in Gumla District under Swachh Vidyalaya Abhiyan. 125 toilets in 69 schools were constructed. All welfare/ CSR activities are also uploaded in Company web site. Work undertaken as per issue raised(Road, electricity, water availability, pond creation & cleaning etc) is given in Annexure III A (Expenditure under CSR is given in CSR Booklet enclosed as Annexure III)
xxvi	Details of transportation, CSR, R&R and implementation of environmental action plan for the clusters-II should be brought out in a booklet form within a year and regularly updated.	Booklet form is being maintained. (Soft copy of booklet is enclosed as Annexure III.) Environmental action plan is formulated and implementation is initiated.

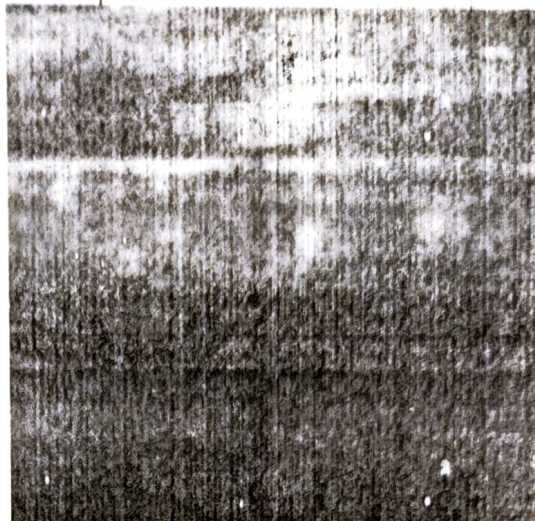
xxvii	Mine discharge water shall be treated to meet standards prescribed standards before discharge into natural water courses/agriculture. The quality of the water discharged shall be monitored at the outlet points and proper records maintained thereof and uploaded regularly on the company website.	Mine discharge water is being allowed to settle down in the mine sumps and is being used for domestic purpose after treatment through Pressure Filter. Regular monitoring of Water Quality Parameters is being carried out by CMPDIL and reports are being uploaded regularly on company website. Max. value of parameters of mine discharge is given in the table below: <table><tr><td>Total Suspended Solids</td><td>31</td></tr><tr><td>pH</td><td>8.10</td></tr><tr><td>Oil & Grease</td><td><2</td></tr><tr><td>COD</td><td>20</td></tr></table> (Soft copy of monitoring report is enclosed as Annexure IV)	Total Suspended Solids	31	pH	8.10	Oil & Grease	<2	COD	20																																													
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xxviii	No groundwater shall be used for the mining activities. Additional water required, if any, shall be met from mine water or by recycling/reuse of the water from the existing activities and from rainwater harvesting measures. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry to dewatering of mine.	It is being complied and mine water is being used for the industrial purpose. Further mine water is also utilized for the community and irrigation purposes. Following action has been taken by the Company: 1. Utilization of surplus mine water for irrigation, pisciculture purpose.																																																					
xxix	The void shall be converted into a water reservoir of a maximum depth of 15-20 m and shall be gently sloped and the upper benches of the reservoir shall be stabilised with plantation and the periphery of the reservoir fenced. The abandoned pits and voids should be backfilled with OB and reclaimed with plantation and or may be used for pisciculture.	The void will be converted into the water body as specified in EMP at the end of the mining.																																																					
xxx	Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be dome four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board/SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.	Groundwater level and quality is being regularly monitored by CMPDIL. Water level monitoring at 5 hydrograph stations has been done in the months of May, August & November'2020 & Jan 2021 and the Ground water level data is enclosed in the table below: <table><tr><th rowspan="2">Sl No</th><th rowspan="2">Well No.</th><th rowspan="2">Location</th><th colspan="4">Water level (bgl in meters)</th></tr><tr><th>May '21</th><th>Aug' 21</th><th>Nov '21</th><th>Jan' 22</th></tr><tr><td>1</td><td>B-1</td><td>Muraidih</td><td>2.58</td><td>0.58</td><td>1.19</td><td>2.03</td></tr><tr><td>2</td><td>B-59</td><td>Khodovaly</td><td>5.49</td><td>0.30</td><td>0.90</td><td>0.95</td></tr><tr><td>3</td><td>B-60</td><td>Bahiyardih</td><td>11.26</td><td>1.33</td><td>2.23</td><td>6.53</td></tr><tr><td>4</td><td>B-61A</td><td>Kesargora</td><td>4.42</td><td>0.47</td><td>0.97</td><td>0.97</td></tr><tr><td>5</td><td>B-62A</td><td>Sadiyardih</td><td>6.87</td><td>1.35</td><td>4.50</td><td>4.60</td></tr><tr><td colspan="3">Average WL (bgl)</td><td>6.12</td><td>0.81</td><td>2.10</td><td>3.02</td></tr></table> (Soft copy of report is enclosed as Annexure II)	Sl No	Well No.	Location	Water level (bgl in meters)				May '21	Aug' 21	Nov '21	Jan' 22	1	B-1	Muraidih	2.58	0.58	1.19	2.03	2	B-59	Khodovaly	5.49	0.30	0.90	0.95	3	B-60	Bahiyardih	11.26	1.33	2.23	6.53	4	B-61A	Kesargora	4.42	0.47	0.97	0.97	5	B-62A	Sadiyardih	6.87	1.35	4.50	4.60	Average WL (bgl)			6.12	0.81	2.10	3.02
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xxxi	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.	Oil & grease Trap for workshop is provided																																																					
xxxii	The location of monitoring stations in the Jharia coalfield should be finalized in consultation with Jharkhand State Pollution Control Board.	The location of monitoring stations in the Jharia Coalfield has been finalized with the Jharkhand State pollution Control Board.																																																					

XXXIII	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 50000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneswar.	Presently a time series map of vegetation cover in the Jharia Coal Field is being carried out through CMPDI, Ranchi using satellite imagery for every 3 years & it has been uploaded on the official website of company. Also CIL issued a work order to CMPDI for monitoring of land reclamation status of all the OC coal mines having production capacity of more than 5MM3 /Annum(coal+ OB) regularly on annual basis and for monitoring of less than 5 MM3/ Annum at an interval of 3 years. With a total leasehold area of 16.32 Km ² , two projects, Block-II and Muraidih were considered for land reclamation monitoring based on satellite data during 2019-20. Total excavated area is only 5.77 Km ² , of which 0.85 Km ² area (14.73%) has been planted, 3.82 Km ² area (66.20%) is under backfilling and 1.10 Km ² area (19.06%) is under active mining. It is evident from the analysis that 80.94% of total area of the two OC projects has come under reclamation and balance 19.06% area is under active mining. (Soft copy of land reclamation report is enclosed as Annexure V)
XXXIV	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests five year before mine closure for approval. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem, which were conserved in-situ and ex-situ in an identified area within the lease for reintroduction in the mine during mine reclamation and at the post mining stage for habitat restoration.	BCCL is being depositing the amount in ESCROW account as specified in the progressive mine closure Plan. A Final Mine Closure Plan along with details of Corpus Fund will be submitted to the Ministry of Environment & Forests five year before mine closure for approval. Native species (Sheesham, sirish, Arjuna, grass etc) are being used in mine reclamation. (Details of amount deposited enclosed as Annexure VI)
XXXV	A separate management structure for implementing environment policy and socio-economic issues and the capacity building required in this regard.	A full-fledged Environment cell, with a suitable qualified multidisciplinary team of executives has been established. 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. Socio economic issues and capacity building are being evaluated by Tata Institute of Social Science.
XXXVI	(A) Corporate Environment Responsibility:	

	a) The Company shall have a well laid down Environment Policy approved by the Board of Directors. b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions. c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished. d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.	A well-defined Corporate Environment Policy has already been laid down and approved by the Board of Directors. This is also posted on BCCL website. Complied. A hierarchical system of the company to deal with environmental issues from corporate level to mine level already exists. Being complied.
B	General Conditions by MOEF:	
i	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	Mining is being done by shovel-dumper combination.
ii	No change in the calendar plan of production for quantum of mineral coal shall be made.	Noted.
iii	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM ₁₀ , PM _{2.5} , SO ₂ and NO _x monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc. carried out at least once in six months.	The location of monitoring stations in Jharia Coal Field has been finalized in consultation with the Jharkhand State Pollution Control Board. Ambient air quality along with heavy metals such as Hg, As, Ni, Cd, Cr, etc., is carried out at least once in six months by CMPDIL. (Soft copy of monitoring report is enclosed as Annexure IV)
iv	Data on ambient air quality (PM ₁₀ , PM _{2.5} , SO ₂ and NO _x 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.	Data on ambient air and other monitoring data is being regularly submitted to the Ministry & Pollution Control Board along with compliance report. (Soft copy of report is enclosed as Annexure IV)
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.	Noise level varies from 51.1 dBA (Madhuband UGP) to 62.7 dBA (Madhuband Washery) Regular maintenance of vehicles and other machineries are being practiced for control of noise level. Ear plugs/muffs are provided (250 Nos in 2020-21) to the persons engaged in blasting and drilling operations, operation of HEMM, etc. (Soft copy of monitoring report is enclosed as Annexure IV)
vi	Industrial waste water (workshop and waste water from	Oil and grease trap is installed for treatment of

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.

Workshop effluents.



(Oil & Grease trap)

Excess mine water is being stored at old quarries and ponds for community use. This will help to recharge the ground water.

vii	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.	Regular pollution under control check-up is being done. Regular maintenance of vehicle is being practiced to kept vehicular emission under control. Coal is being transported in tarpaulin covered trucks. (Pollution under control certificate of vehicles are enclosed as Annexure VII)
viii	Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, 1986.	It is being done by CMPDIL, Ranchi having NABL accreditation.
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.	540 Nos. of dust maskswas provided in 2019-20 to personnel working in dusty areas. Vocational training center under separate Human Resource Development Deptt. is conducting regular training programme on these issues. More than 300 nos of employee got training at VTC Barora in FY 2020-21 (Training list enclosed as Annexure VIII)
x	Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.	Initial Medical Examination (IME) and Periodical Medical Examination (PME) of all the personnel are carried out as per the Statutes and Director General of Mines Safety (DGMS) guideline. Medical examination of outsourcing Manpower is also being done.
xi	A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.	A full-fledged Environment cell, with a suitable qualified multidisciplinary team of executives has been established. 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. Socio economic issues and capacity building are being evaluated by Tata Institute of Social Science.
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.	Separate head "plantation" & "environment" is there for recurring expenditure and used for eco-restoration, environmental protection measures, statutory payments etc. In 2020-21 approx Rs. 40 lakhs expenditure incurred on plantation, eco-restoration & environmental monitoring. (Excluding the cost of manpower & Diesel consumed in water spraying tanker)
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. Advertisement in local newspaper has been given. 
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.	Being complied. Clearance letter has been displayed on Company web site. Also Clearance letter has been sent to Mukhya of different Panchayat. (Soft copy of letters are enclosed as Annexure IX)
xv	A copy of the environmental clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.	Complied.
xvi	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM ₁₀ , PM _{2.5} , SO ₂ and NO _x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.	Clearance letter has been displayed on Company web site and updated regularly. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM ₁₀ , PM _{2.5} , SO ₂ and NO _x (ambient) and critical sectoral parameters is being displayed at the entrance of the project premises and Area office.
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	Being submitted.

xviii	CPCB and the SPCB. The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.	Noted.
xix	The Environmental statement for each financial year ending 31 March in Form-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 submitted on time.

L. Kumar
30/11/22
General Manager
Block-II Area

Udit Kumar
30/11/22
Area Manager (Env)
Block-II Area

Project Officer
30/11/22
ABOCP Mine

Anur
30/11/22
General Manager
Barora Area

Haiswal
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Barora Area

Anur
30/11/22
Project Officer
AMP Colliery

**DELINEATION OF SURFACE COAL FIRE AND
LAND SUBSIDENCE IN THE JHARIA
COALFIELD, DHANBAD, JHARKHAND FROM
REMOTE SENSING DATA**

**GEOSCIENCES GROUP
REMOTE SENSING APPLICATIONS AREA
NATIONAL REMOTE SENSING CENTRE
INDIAN SPACE RESEARCH ORGANISATION
DEPT. OF SPACE, GOVT. OF INDIA
HYDERABAD-500 037**



JANUARY, 2018

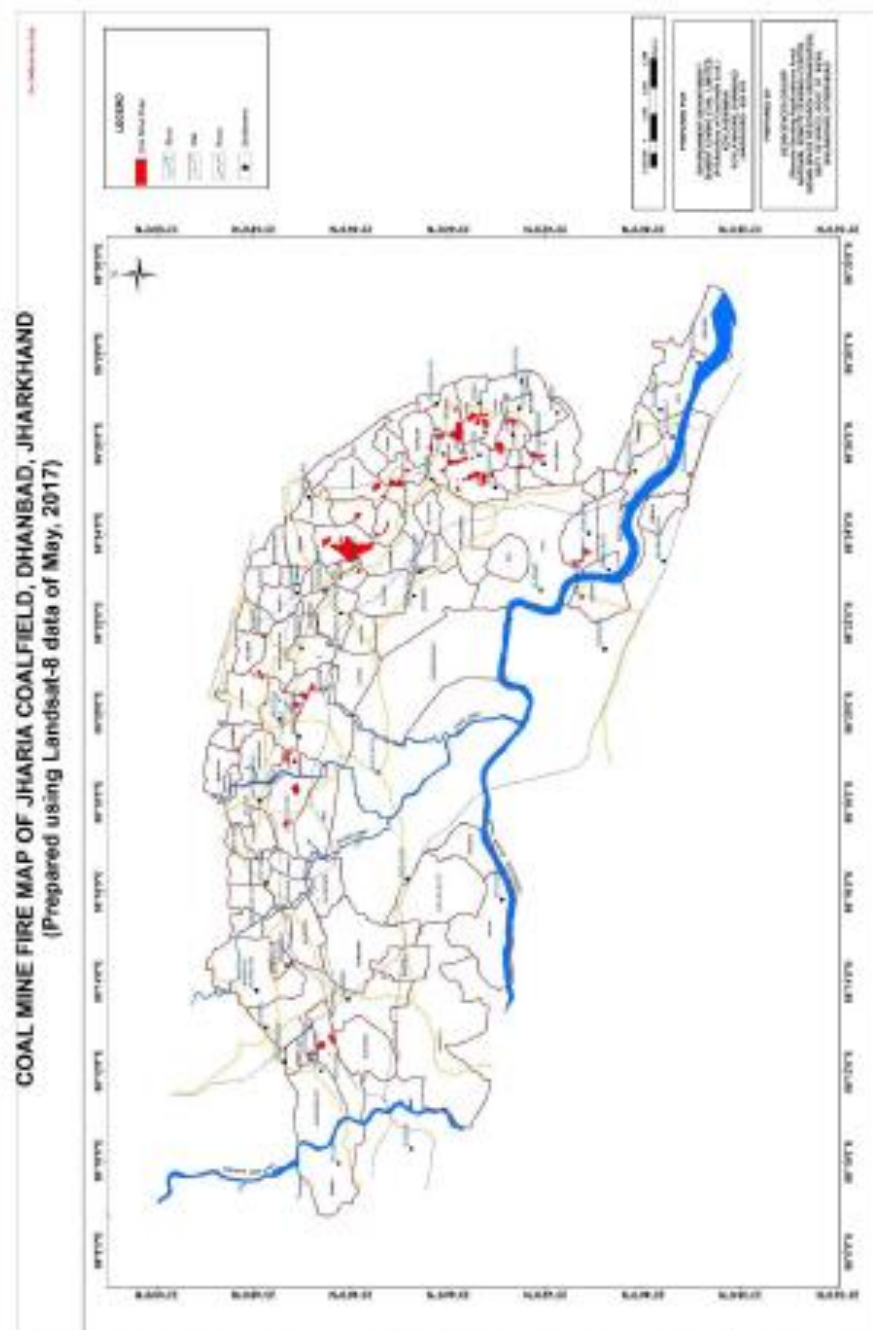


Figure 5: Coal mine fire map (May, 2017) of Iharia coal field, Dhanbad. The fire areas shown in this map have been verified in the field as per field points in figure 13.

SL. NO.	COLLIERY AREA NAME	FIRE AREA 2012 (SQ. KM.)	FIRE AREA 2017 (SQ. KM.)	AREA CHANGE (SQ. KM.)	Increase/Decrease
1	DAMODA	0.0000	0.0000	0.000	NO FIRE
2	TISCO (west)	0.0000	0.0000	0.000	NO FIRE
3	IISCO	0.0000	0.0000	0.000	NO FIRE
4	TISCO (north)	0.0885	0.0153	-0.073	DECREASE
5	NUDKHURKEE OCP	0.0000	0.0000	0.000	NO FIRE
6	BENEDIH OCP	0.0530	0.0453	-0.008	DECREASE
7	BLOCK-II OCP	0.0530	0.1353	0.082	INCREASE
8	MURAIH OCP	0.1478	0.0022	-0.146	DECREASE
9	SHATABDI OCP	0.0378	0.0361	-0.002	DECREASE
10	TETURIA	0.0000	0.0000	0.000	NO FIRE
11	S.GOVINDPUR	0.0000	0.0000	0.000	NO FIRE
12	KORIDIH BLOCK-IV OCP	0.0000	0.0000	0.000	NO FIRE
13	JOGIDIH	0.0000	0.0000	0.000	NO FIRE
14	DHARAMABAND	0.0000	0.0000	0.000	NO FIRE
15	MAHESHPUR	0.0000	0.0000	0.000	NO FIRE
16	PHULARITAND	0.0133	0.0205	0.007	INCREASE
17	MADHUBAND	0.0000	0.0000	0.000	NO FIRE
18	AKASH KINARI	0.0000	0.0000	0.000	NO FIRE
19	GOVINDPUR	0.0000	0.0000	0.000	NO FIRE
20	E. KATRAS	0.0133	0.0000	-0.013	DECREASE
21	KATRAS-CHOITUDIH	0.1021	0.1368	0.035	INCREASE
22	KESHALPUR	0.0000	0.0013	0.001	INCREASE
23	RAMKANALI	0.0000	0.0000	0.000	NO FIRE
24	NICHITPUR	0.0000	0.0000	0.000	NO FIRE
25	E. BASURIA	0.0000	0.0000	0.000	NO FIRE
26	KHAS KUSUNDA	0.0000	0.0000	0.000	NO FIRE
27	GONDUDIH	0.0000	0.0000	0.000	NO FIRE
28	W. GODHAR	0.0012	0.0000	-0.001	DECREASE
29	BASURIA	0.0000	0.0000	0.000	NO FIRE
30	TETULMARI	0.0223	0.0220	0.000	DECREASE
31	DHANSAR	0.0000	0.0000	0.000	NO FIRE
32	GODHAR	0.1073	0.0000	-0.107	DECREASE
33	INDUSTRY	0.0119	0.0513	0.039	INCREASE
34	KUSUNDA	0.4243	0.7398	0.315	INCREASE
35	SENDRA-BANSJORA	0.0796	0.0275	-0.052	DECREASE
36	BASTACOLLA	0.0663	0.0810	0.015	INCREASE
37	BERA	0.0000	0.0000	0.000	NO FIRE
38	KUYA	0.0000	0.0000	0.000	NO FIRE
39	GOLUCKDIH	0.0301	0.1122	0.082	INCREASE
40	KUJAMA	0.0398	0.2404	0.201	INCREASE

41	S. JHARIA-R. OCP	0.0244	0.1118	0.087	INCREASE
42	DOBARI	0.0000	0.0000	0.000	NO FIRE
43	GONHOODIH	0.0398	0.0322	-0.008	DECREASE
44	SIMLABAHAL	0.0000	0.0000	0.000	NO FIRE
45	HURRILADIIH&STD	0.0000	0.0000	0.000	NO FIRE
46	ENA	0.0918	0.0432	-0.049	DECREASE
47	BURRAGARH	0.0000	0.0000	0.000	NO FIRE
48	N. TISRA	0.0098	0.1802	0.170	INCREASE
49	LODNA	0.0000	0.3527	0.353	INCREASE
50	S. TISRA	0.0000	0.1015	0.102	INCREASE
51	BARAREE	0.1037	0.1074	0.004	INCREASE
52	AMLABAD	0.0000	0.0000	0.000	NO FIRE
53	PATHERDIH	0.0000	0.0000	0.000	NO FIRE
54	SUDAMDIH	0.0000	0.0000	0.000	NO FIRE
55	SITANALA	0.0000	0.0000	0.000	NO FIRE
56	MURULIDIIH 20/21 PIT	0.0000	0.0000	0.000	NO FIRE
57	MURULIDIIH	0.0000	0.0000	0.000	NO FIRE
58	BHATDIH	0.0000	0.0000	0.000	NO FIRE
59	LOHAPATTY	0.0000	0.0000	0.000	NO FIRE
60	IISCO	0.0000	0.0000	0.000	NO FIRE
61	TASRA-IISCO	0.0000	0.0000	0.000	NO FIRE
62	KENDUADIIH	0.0610	0.0000	-0.061	DECREASE
63	BULLIHARY	0.0000	0.0000	0.000	NO FIRE
64	GOPALICHUCK	0.0000	0.0000	0.000	NO FIRE
65	POOTKEE	0.0000	0.0000	0.000	NO FIRE
66	BHURUNGIA	0.0000	0.0000	0.000	NO FIRE
67	KHARKHAREE	0.0000	0.0000	0.000	NO FIRE
68	GASLITAND	0.1194	0.1215	0.002	INCREASE
69	KANKANEE	0.0530	0.0525	-0.001	DECREASE
70	MUDIDIIH	0.1141	0.1104	-0.004	DECREASE
71	W. MUDIDIIH	0.0171	0.0000	-0.017	DECREASE
72	LOYABAD	0.0133	0.0063	-0.007	DECREASE
73	BHAGABAND	0.0000	0.0000	0.000	NO FIRE
74	MOONIDIIH PROJECT	0.0000	0.0000	0.000	NO FIRE
75	E.BHUGGATDIH	0.0022	0.0214	0.019	INCREASE
76	ALKUSHA	0.0326	0.0294	-0.003	DECREASE
77	KUSTORE	0.0524	0.0463	-0.006	DECREASE
78	ANGARAPATRA	0.1331	0.0149	-0.118	DECREASE
79	SALANPUR	0.0000	0.0000	0.000	NO FIRE
80	BHOWRAH. N	0.0133	0.0980	0.085	INCREASE
81	BHOWRAH. S	0.0000	0.0000	0.000	NO FIRE
82	BAGDIGI	0.0000	0.0209	0.021	INCREASE
83	JEALGORA	0.0000	0.0067	0.007	INCREASE
84	JEENAGORA	0.0000	0.0470	0.047	NO FIRE

85	JOYRAMPUR	0.0099	0.1042	0.094	INCREASE
86	CHANDAN OCP	0.0000	0.0000	0.000	NO FIRE
87	BANSDEOPUR	0.0000	0.0000	0.000	NO FIRE
TOTAL AREA		2.18	3.28	1.10	INCREASE

Table 6: Colliery wise break-up of change in fire area from 2012 to 2017

Note:

- 1) "NO FIRE" implicates that the fire has not been identified satellite data (*either absent or below sensor resolution*)
- 2) "INCREASE" implies, increase in fire area OR emergence of fire areas not identified in 2012 study.
- 3) "DECREASE" implies, decrease in fire area OR fire areas of 2012, which are not identified in present study (*either absent or below sensor resolution*).
- 4) Estimations of fire extent (in terms of sq.km.) both 2012 and in present 2017 study are pixel based. They do not represent the actual ground area under fire. These estimations are made for comparative purpose only, to indicate the increase or decrease of areal disposition of fire. Hence, they should not be quoted as fire area on the ground.



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GROUNDWATER LEVEL & QUALITY REPORT FOR CLUSTER OF MINES, BCCL

(Assessment year – 2021-22)

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

JHARIA COALFIELD AND RANIGANJ COALFIELD (PART)

**For
(BHARAT COKING COAL LIMITED)**

(A Subsidiary of Coal India Limited)

KOYLA BHAWAN (DHANBAD)

**Prepared by
Hydrogeology Department
Exploration Division
CMPDI (HQ), Ranchi**

MARCH – 2022



cmpdi
A Mini Ratna Company

**GROUNDWATER LEVEL & QUALITY REPORT
FOR CLUSTER OF MINES, BCCL**

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MARCH – 2022

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(Accredited Groundwater Professional Institutions by CGWA)

(Accredited as a GWCO by QCI-NABET)

(Accredited by NABL, CMPDI, RI-II, Lab)

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DETAILS OF THE REPORT

SI No.	ITEMS	INFORMATIONS
1	Geographical Area	Jharia Coalfield (JCF): 453 sq. km. Raniganj Coalfield (RCF part): 19.64 sq. km. (Cluster-XVI area only)
2	Major Physiographic Units	Dissected Pediplain with surface Reduced Level (RL) varies from 160 m to 220 m above mean sea level (AMSL) in JCF and 100 m to 140 m AMSL in RCF.
3	Drainage System	Damodar River is the master drainage flowing along western boundary of the JCF. Jamunia River, Khudia River, Katri River, Jarian Nala, Ekra Jore, Kari Jore, Kashi Jore, Chatkari Jore and their tributaries are flowing through the JCF area. Damodar River, Barakar River is the master drainage of the part of RCF area (CV Area).
4	Annual Rainfall (IMD-report)	Jharkhand State: 1264.10 mm Rainfall data given in Annexure-IV .
5	Geological Formations	Gondwana Formation (Talchir Formation, Barakar Formation, Barren Measure Formation & Raniganj Formation)
6	Aquifer System	Unconfined/Phreatic Aquifer – thickness 25 m (Avg.) Semi-confined to confined Aquifer – thickness from 25 m upto 650 m
7	Hydrogeological properties (Aquifer Pump Test)	Unconfined Aquifer (Damoda BJ Section & Block-II): Hydraulic Conductivity – upto 0.50 m/day Transmissivity – 10 - 42 m ² /day Semi-confined to confined Aquifer (Sitnala & Kumari Block): Hydraulic Conductivity – 0.0006-1.44 & 0.05-0.0027 m/day Transmissivity – 0.06 – 0.573 m ² /day
8	Groundwater Level Monitoring Network	Out of total 252 nos. of monitoring stations 64 nos located within core mining area and rest comes within Buffers zone. 60 Nos. of Groundwater monitoring well (Dug Wells) network established by CMPDI to record groundwater level data in and around the Core Zone of JCF and 4 Nos. of Groundwater monitoring well (Dug Wells) in RCF (CV Area).
9	Groundwater Levels Below Ground Level (bgl)	JCF area: Pre-monsoon – 0.62 to 11.26 m (Avg. 5.23 m bgl) in '2021-22 Post-monsoon – 0.05 to 7.62 m (Avg. 2.28 m bgl) in '2021-22 RCF area (part): Pre-monsoon – 2.0 to 6.20 m (Avg. 3.34 m bgl) in '2021-22 Post-monsoon – 1.10 to 5.25 m (Avg. 2.44 m bgl) in '2021-22
10	Groundwater Quality	Potable as per GEC-2015 Norms (Annexure- VIII)
11	Proposed Piezometers	Proposed piezometers (23 nos.) to monitor impact of coal mining on groundwater regime within the coalfield area (JCF & part of RCF) for maximum depth upto 290 m.
12	Stage of Groundwater Development (CGWB)	Dhanbad District-76.30% (GWRE-2017)

GROUNDWATER LEVEL & QUALITY REPORT FOR CLUSTER OF MINES OF BCCL

1.0 INTRODUCTION

1.1 LOCATION DETAILS AND BRIEF ABOUT THE PROJECT

The 15 nos. Cluster of mines (Cluster-I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XIII, XIV, XV and XVI) of BCCL is located in the Jharia coalfield in Bokaro district of and Dhanbad district of Jharkhand and part of Raniganj coalfield of Dhanbad district of Jharkhand.

The area of Jharia Coalfield (JCF) is 453 sq. km. and Raniganj Coalfield (RCF part) is 19.64 sq. km. (Cluster-XVI area only). Located about 3.0 km south-west of Dhanbad town and 10.0 km north-east of Bokaro town. The coalfield bounded by Jamunia River in the west, Damodar river in the south, and metamorphics (hard rock) in the north and east side. **(Plate-I)**.

1.2 OBJECTIVE OF THE STUDY:

The objective of the report is to conducting hydrogeological study by quarterly monitoring of groundwater level and quality of the Jharia coalfield and Raniganj coalfield (part) within BCCL command area for 15 nos. Cluster of mines of BCCL. The data collected shall submitted to the MoEF&CC, CPCB & SPCB within stipulated timeframe. The work being done yearly and require d to be continued as per the specific condition mentioned invariably in Environmental Condition (EC) for all of the Clusters of BCCL.

1.3 SCOPE OF THE STUDY:

The following scope has taken into account for hydro-geological investigation of the study area.

- i) The monitoring of the groundwater levels done four times/year during (May, August, Nov and Jan).
- ii) The monitoring of the groundwater quality done during May including Arsenic and Fluoride.
- iii) To evaluate the status of ground water level condition in the area.
- iv) To study the ground water flow direction in the mining areas.
- v) To study the depth to ground water level condition in the mining areas.
- vi) To study the ground water quality data and interpretation in the mining areas.

File No. 08HBDD/JRRI/BCCL/ENV/0003/2018-BD Divn.-CMPDI (Computer No. 68378)
Receipt No : 188686/2018/O/e HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ
भारत कोकिंग कोल लिमिटेड

एक मिनी रत्न कंपनी
(कोल इंडिया लिमिटेड का एक अंग)
कोयलाभवन, कोयलानगर, धनबाद -826005



Bharat Coking Coal Limited
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
Regd.Off: Koyla Bhawan, Koyla Nagar

CIN: U10101JH1972GOI000918
Environment Department

पत्र संख्या भाकोकोलि/उप महाप्रबंधक(पर्या0)/संचिका-18/1086- दिनांक : 14.06.2018
1088/14)

सेवा में,
महाप्रबंधक
व्यापार विकास

सीएमपीडीआई - कांके रोड रांची ८३४०३१-

Sub: For work of Ground water level and quality monitoring

महोदय,

This is with reference to earlier letter ref no. BCCL/HOD(Env)/F-Env/13/161 dated 11.02.2014 regarding conducting hydrological study by quarterly monitoring of groundwater level and quality of the study to be carried out by establishing a network of existing wells. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) season and for quality including Arsenic and Fluoride during month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to Central Pollution Control Board/SPCB quarterly within one month of monitoring.

The above work is being done yearly and required to be continued as per the specific condition mentioned invariably in Environment Clearance order of all clusters of BCCL.

This is for your kind information and further necessary action

भवदीय

14/6/18
उप-महाप्रबंधक (पर्यावरण)

Copy To:

१ महाप्रबंधक (गवेषण), कांके रोड रांची ८३४०३१-

1.4 TOPOGRAPHY AND DRAINAGE

Northern part of the JCF area covered with hills and thin forest. In general, the altitude varies from 220 m AMSL in Barora area (Cluster-I) to 160 m above mean sea level (AMSL) in Sudamdih area (Cluster-X). Pediplains developed over sedimentary rocks or Gondwana formation consisting of Sandstone, Shale, coal, etc. Dissected pediplains developed over Gondwana formations found in Jharia, Baghmara, Katras areas etc. However, in RCF (part) areas the altitude varies from 100 m to 140 m AMSL (Cluster-XVI). The general slope of the topography is towards south, i.e. Damodar River.

The drainage pattern of the area is dendritic in nature. The drainage system of the area is the part of Damodar sub-basin. All the rivers that originate or flow through the coalfield area have an easterly or southeast course and ultimately joins Damodar River, the master drainage. The drainage of the JCF is mainly controlled by Jamuniya River (5th order), Khudia nala (3rd order), Katri River (4th) and Chatkari nala (3rd order) flowing from north to south and joins Damodar River. Whereas, Barakar River and Khudia River are controlling the drainage pattern of RCF (part) and joins Damodar River in the south. Damodar River is the main drainage channel and flows from west to east along the southern boundary of JCF and RCF.

The drainage map of the JCF and part of RCF has been prepared on topographic map of scale 1:50,000 (**Plate-I**). The watershed of all tributary rivers (Jamuniya River to Barakar River) falls within the north-western part of Damodar sub-basin which comes under Lower Ganga Basin.

Besides, a large number of ponds/tanks distributed in and around JCF, out of which one prominent lake is located at Topchanchi in the north-west part. Two reservoirs, Maithon dam in Barakar River and Panchet dam in Damodar River near to Chanch Victoria Area of BCCL (part of RCF) are the main source of water supply to the nearby area. Jharia Water Board, Damodar Water Supply Scheme and Mineral Area Development Authority (MADA) are supplying water.

1.5 DETAILS REGARDING WETLANDS

A **wetland** is a distinct ecosystem that flooded by water, either permanently or seasonally. The primary factor that distinguishes **wetlands** from other landform or water bodies is the characteristic vegetation of aquatic plants. Wetland are protective ecosystem as per new guidelines of CGWA & MoEF&CC. There are no Wetlands in and around the area (Jharia coalfield and Raniganj coalfield) as per the list given on official website of MoEF&CC, Govt. of India. The list enclosed as **Annexure-III**.

1.6 CLIMATE & RAINFALL

The Jharia Coalfield (JCF) and part of Raniganj Coalfield (RCF) area in Dhanbad District belongs to sub-humid tropical climatic region. The maximum temperature during summer shoots upto 45° C and falls between 10° C to 5° C in winter. The maximum rainfall occurs during the period between June and September. Rainfall data of IMD Dhanbad and Mine Rescue Station Dhanbad given in **Annexure-IV**.

In Jharkhand state, Daily Rainfall data from 1989 to 2018 considered for analysis of trend variability and mean rainfall patterns. From the daily rainfall data, monthly rainfall series of each stations computed and then monthly district rainfall series has constructed by considering arithmetic average of all the station rainfall values within the district. The monthly rainfall series of the state has computed by using area weighted rainfall values of all the districts within the state. The objective of the analysis is to:

1. Identify the spatial pattern of the mean rainfall
2. Understand district wise observed rainfall trend and variability in annual and SW monsoon season (June, July, august and September).

Daily station rainfall data utilized for identification of the mean spatial patterns and rainfall intensity trends. From mean and standard deviation (SD), the coefficient of variation (CV) calculated as follows: Coefficient of variation (CV) = [Standard Deviation / Mean] × 100

The analysis has done in two parts. For identification of the spatial pattern mean rainfall and variability and observed trends we have used district rainfall series and results have been brought out for four southwest monsoon months viz. June, July, August, September, for the southwest monsoon season and also for annual.

Table shows the mean rainfall (mm) and coefficient of variation of the state for the monsoon months, southwest monsoon season and annual during the period 1989-2018. It can see that the state gets highest rainfall (31%) of southwest monsoon rainfall in July month while the August month get 28% of the southwest monsoon rainfall. June and September receive 19% and 22% of southwest monsoon rainfall. Also more than 84% of annual rainfall receives during the southwest monsoon season only. The variability of monsoon or annual rainfall is also very less.

Jharkhand State

	June	July	August	September	Sub-total	Annual
Mean	190.3	313.9	289.2	225.7	1019.1	1211.4
CV	44.4	29.0	24.8	37.0	18.7	16.9

Dhanbad District

	June	July	August	September	Sub-total	Annual
Mean	203.9	327.7	302.5	271.5	1105.6	1332.2
CV	41.0	35.0	33.5	48.7	20.8	19.4

Fig. 1 and 2 show the time series of rainfall in mm for the months of June, July, August, September and southwest monsoon season, annual respectively. The trend lines displayed for each of the series. Neither monthly rainfall nor seasonal rainfall shows any significant increasing/decreasing trend while annual rainfall shows significant decreasing trend. In the monthly rainfall June, July, August, September and seasonal rainfall shows decreasing trend. During the last 30 years highest rainfall of 390.3 mm received in June in the year 1994, 492.1 mm received in June in the year 2017, 431.5 mm received in August in the year 1997, while highest rainfall of 395.2 in September received in the year 1995. Highest annual rainfall of 1587.9 mm received in the year 1999 and highest southwest monsoon rainfall of 1364.6 mm received in the year 1994 (Climate Research and Services, IMD, Ministry of Earth Sciences, Pune, Jan'2020).

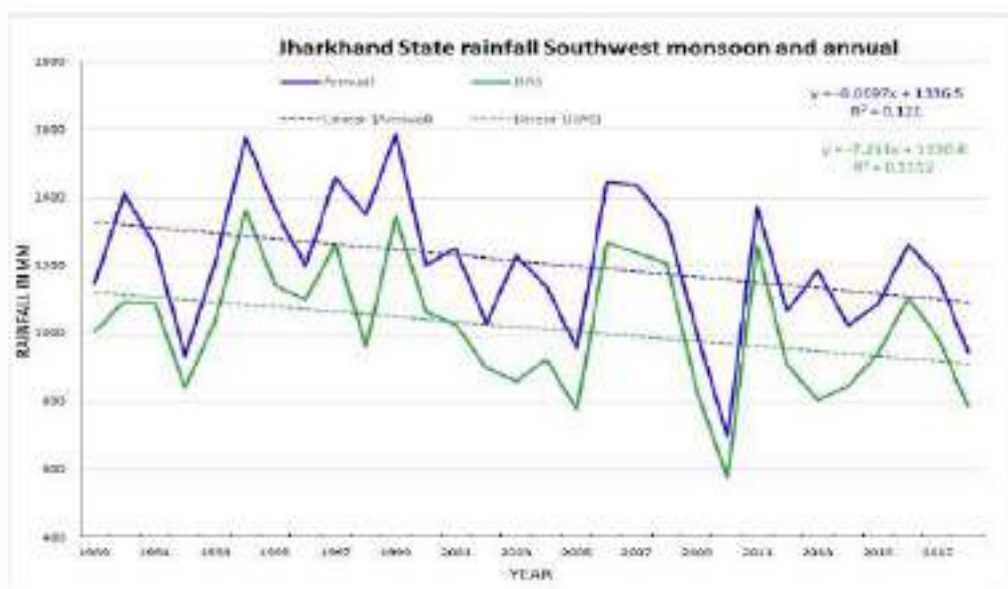


Fig-1.

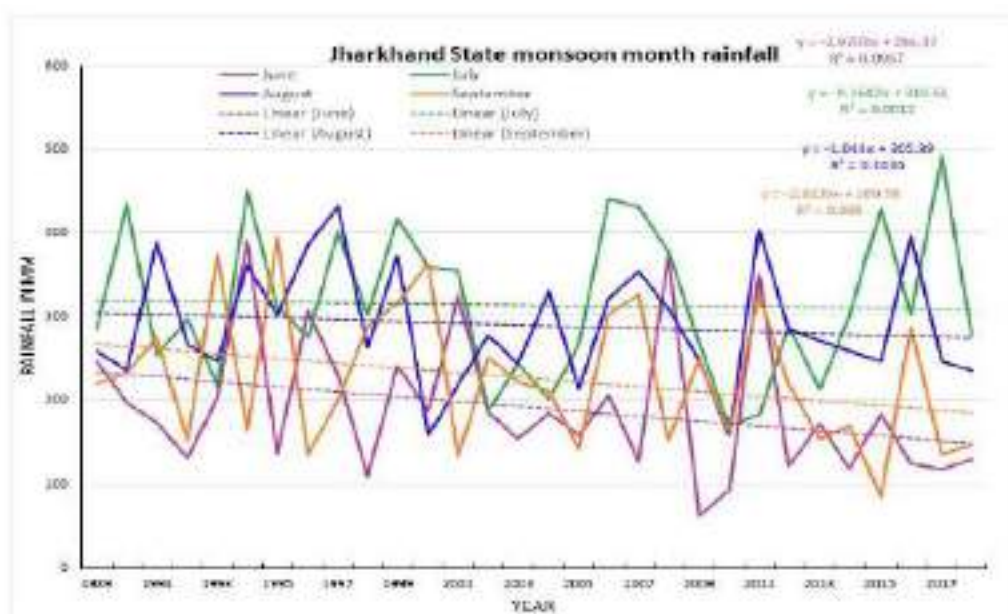


Fig-2.

2.0 GEOLOGY AND HYDROGEOLOGICAL SETUP OF THE AREA

2.1 REGIONAL GEOLOGY

The Jharia Coalfield covers an area of 453 sq. km. located in Dhanbad District, Jharkhand. The non-coal bearing Talchir Formation exposed in patches along the northern fringe of the Coalfield. The Barakar Formation overlies the Talchir is covering the most part of the Jharia Coalfield and having an area of 218 sq. km. This successively overlain by the non-coal bearing Barren Formation mainly exposed in the central part of the Coalfield. This, in turn, overlain by the Raniganj formation (Coal Bearing horizon) in the south-west part of the Coalfield and covers an area of 54 sq. km.

Chanch-Victoria Area is located in the western part of Raniganj Coalfield. The Raniganj coalfield represents the eastern most coal basin in the Damodar Valley Region, located in the border of Dhanbad District of Jharkhand and Bardhaman District of West Bengal. The Coalfield is almost elliptical in shape and covers an area of about 1530 sq. km. out of which only 35 sq. km. comes under leasehold area of BCCL out of which 19.64 sq. km is the study area (Cluster-XVI only). The coal bearing formations of the area belongs to Barakar Formation of the Lower Gondwana in **Table-1**.

Table – 1: Regional Geological Succession of Jharia Coalfield in the area

Geological Formations		Age
Quaternary/Recent	Soil cover/Weathered mantle	Recent
Post-Gondwana	Dolerite	Upper Cretaceous
	Lamprophyres	Jurassic
Damoda Group	Raniganj Formation	Upper Permian
	Barren Measures Formation	Middle Permian
	Barakar Formation	Lower Permian
	Karharbari	
	Talchir Formaton	Upper Carboniferous
-----Unconformity-----		
Metamorphics		Proterozoic

2.2 HYDROGEOLOGICAL SET- UP

The permeable formations mainly composed of sandstone behave as aquifer units. The coal seam and shales developed in the area act as impermeable beds i.e. aquiclude. The aquifer materials of Gondwana Formation constituted of fine to coarse grain sandstone having primary porosity of intergranular void space. The secondary porosity formed due to presence of faults, fracture, joints, etc. Sandstone of Gondwana formations in JCF and RCF are very hard, compact and cemented sandstone and forming less potential aquifer, particularly the deeper aquifer system. The secondary porosity along with primary porosity forms a conduit system making these formations good aquifers for movement and storage of ground water.

2.3 AQUIFERS DESCRIPTION

The aquifer system for shallow and deeper aquifer has established through hydrogeological studies, exploration, surface and subsurface geophysical studies in the JCF and RCF (part) covering all geological formations. The aquifer can be divided into two zones – Un-confined/Phreatic (shallow) and Semi-confined to confined (deeper) aquifer.

PHREATIC/UN-CONFINED AQUIFER

The top aquifer occurred above the top most coal seam/shale bed called un-confined or water table aquifer and it consists of relatively permeable formation such as weathered sandstone and loose soil. The thickness of the un-confined aquifer is varying from few meters to 50 m. This un-confined aquifer is potential than semi-confined to confined aquifer.

SEMI-CONFINED TO CONFINED AQUIFER

The semi-confined to confined aquifer consisting of sandstone bed is sandwiched with coal seams/shale beds and multiple aquifer system developed due to presence of multiple numbers of coal seams/shale beds. With the presence of intercalated shale and carbonaceous shale beds and reduction in permeability with depth, the lower aquifers are poor in potential.

Table –2 Generalized Hydrogeological Units developed in the study Area

Sl. No.	Type of Aquifer	Depth range (m)	Core zone (within 2 km)	Buffer zone (within 10 km)
1.	Unconfined	0 – 50 (Avg. 25)	Alluvium, weathered sandstone	Alluvium, weathered sandstone
2.	Semiconfined/ confined	Beyond 25 upto 650 m	Multiple Sandstone horizons in Barakar formation	Multiple Barakar, sandstone, Barren Measure, Raniganj sandstone and Talchir shale

2.4 GENERAL AQUIFER PARAMETERS

PHREATIC/UN-CONFINED AQUIFER

The wells tested by CMPDI for determination of aquifer parameters in Damuda (BJ Section) and Block-III area of JCF. The hydraulic conductivity of the un-confined aquifer is 0.50 m/day as computed from pumping tests on the wells. The transmissivity of the unconfined aquifer ranges from 10.68 m² /day to 41.48 m² /day.

SEMI-CONFINED TO CONFINED AQUIFER

The un-confined aquifer, the sandstone partings in-between impervious layers of shale and coal seams designated as semi-confined / confined aquifers. The sandstones in these aquifers are fine to coarse grained, hard and compact with very low porosity. Mostly groundwater occurs in the weak zones formed due to weathering, fracture, faults, which create the secondary porosity. The hydrogeological parameter has determined by CMPDI in Sitanala Block by conducting aquifer performance test (APT). The hydraulic conductivity (K) of semi-confined aquifer in Barakar Formation ranges from 0.0006 m/day to 1.44 m/day. The hydrogeological parameter has also been determined at Kumari OCP Block in the central JCF by conducting aquifer performance test. The hydraulic conductivity (K) of semi-confined aquifer in Barakar Formation in this area ranges from 0.0027 m/day to 0.05 m/day.

Table – 3: Aquifer parameters considered for the study Area

Hydraulic Parameter	Unconfined aquifer Site: Damuda (BJ Section) and Block-III area	Semi-confined aquifer Site: (1): Sitanala Block (2): Kumari Block
Transmissivity (m ² /d)	10.68 – 41.48	0.0621 – 0.573
Hydraulic conductivity (m/d)	0.5	0.05 – 0.0027
Specific yield	0.03 to 0.04 (as per GEC recommended values)	

3.0 GROUND WATER LEVEL MONITORING

To collect the representative groundwater levels in the study area, CMPDI has established a monitoring network of total 252 monitoring stations out of which 64 located within core zone and rest comes within Buffer zone. Total 60 nos. dug well within JCF and 04 nos. dug well within RCF (part) area (Details of the Hydrograph stations & water level given in **Annexure-V, VA & VB**) spread over the entire BCCL leasehold area, **Plate-I**. Water level monitoring in all hydrograph stations has been done in pre-monsoon as well as in post monsoon whereas in 64 stations monitoring done in quarterly (May'21, Aug'21, Nov'21 and Jan'22) basis.

Depth to water level of the water table depict the inequalities in the position of water table with respect to ground surface and is useful in delineating recharge / discharge areas, planning of artificial recharge structure and shows the overall status of the groundwater level in the area. Historical groundwater level (GWL) of entire JCF and part of RCF with fluctuation, GWL of Non-mining / Mining areas and GWL of the Cluster of Mines of BCCL are shown in this report to assess the effect of Coal mining activity in the groundwater regime in and around the Coalfield area.

Mining is a dynamic phenomenon. The mining activity creates dis-equilibrium in environmental scenario of the area and disturbs the groundwater conditions/regime in particular. The impact on shallow water regime due to mining activity can broadly viewed as under:

- Historical GWL with annual fluctuation over the years
- GWL scenario in Non-mining and Mining area (OC/UG mines)
- GWL scenario of Cluster of mines of BCCL

3.1 HISTORICAL GROUNDWATER LEVEL (GWL)

Historical GWL of JCF and part of RCF given from 2005 to 2021 of CMPDI monitoring stations (total 64 stations within Coalfield area). Pre-monsoon and Post-monsoon GWL with Fluctuation has been mentioned below in the table.

Table – 4: Historical Groundwater Level

Period		(Water level in metre below ground level)								
		Pre-Monsoon (April/May)			Post-Monsoon (Nov/Dec)			Fluctuation		
		From	To	Average	From	To	Average	From	To	Average
JCF	2005	0.07	19.08	6.29	0.84	12.13	3.20	0.12	12.45	3.21
	2007	0.40	19.27	5.66	0.35	8.21	2.87	0.02	16.15	2.96
	2008	0.45	18.35	5.42	0.35	14.20	3.62	0.03	9.22	2.45
	2010	0.85	14.47	5.24	0.10	15.88	4.48	0.02	5.55	1.54
	2012	1.27	18.68	5.58	0.15	7.80	2.72	0.08	13.45	2.96
	2013	0.70	19.20	5.65	0.45	8.35	2.77	0.29	15.88	3.17
	2014	0.70	16.28	4.92	0.75	14.98	3.27	0.25	10.15	2.17
	2015	1.38	17.20	6.00	0.45	14.58	3.92	0.28	7.62	2.15
	2016	0.78	16.73	5.64	0.30	12.43	3.19	0.23	6.35	2.88
	2017	0.67	16.28	5.61	0.15	6.97	2.41	0.10	12.10	3.25
	2018	1.20	14.58	5.55	0.40	7.17	2.83	0.20	9.45	2.68
	2019	0.95	15.88	5.46	0.45	5.95	2.34	0.20	13.40	3.05
	2020	0.80	16.25	4.95	0.75	10.10	3.26	0.25	11.05	2.15
	2021	0.62	11.26	5.23	0.05	7.62	2.28	0.15	9.03	2.94
RCF (part)	2008	5.02	10.50	7.59	2.85	4.90	3.71	1.82	6.60	3.87
	2010	2.20	8.85	4.74	2.78	9.58	4.63	0.68	1.10	0.89
	2011	3.57	8.02	4.98	2.50	6.21	3.75	0.55	1.90	1.23
	2012	3.10	7.34	4.59	1.55	7.00	3.66	0.05	2.78	0.94
	2013	1.70	9.87	6.54	2.90	8.85	4.71	1.02	5.54	2.84
	2014	3.27	6.48	4.57	2.13	3.03	2.63	0.54	3.45	1.94
	2015	3.38	9.52	5.33	2.68	8.20	5.11	1.06	1.32	1.81
	2016	3.61	10.65	6.24	0.90	6.50	3.18	1.63	4.40	3.06
	2017	1.93	5.80	3.25	1.63	3.78	2.47	1.63	3.78	0.78
	2018	2.34	8.70	4.35	1.75	5.70	2.75	0.41	2.55	1.59
	2019	1.60	9.35	5.29	0.80	3.88	2.10	0.80	5.47	3.20
	2020	2.30	9.70	4.30	1.75	5.50	2.70	0.40	2.75	1.60
	2021	2.00	6.20	3.34	1.10	5.25	2.44	0.80	0.95	0.90

3.2 GROUNDWATER LEVEL SCENARIO IN NON-MINING/MINING AREA

Depth to water level (DTW) range in different formations with respect of mining and non-mining areas summarized in the Table-5.

Table – 5: Depth to water table

Formation	Area		DTW (bgl, m) [Year-2021-22]		Average GWL (m)	
			Pre-monsoon (Apr/May)	Post-monsoon (Nov/Dec)	Pre-monsoon	Post-monsoon
Sedimentary (Gondwana)	Non-mining		1.45-8.20	0.35-3.70	5.10	2.00
	Mining	OC	1.40-10.35	0.84-5.65	4.66	2.15
		UG	1.09-10.13	0.55-7.62	5.75	2.80
Metamorphics (Hard rock)	Peripheral part of the Coalfield		0.62-11.75	0.50-7.45	6.80	3.60

The study revealed that water table is in shallow depth and there is no significant stress in the water table due to coal mining activity. Mining and Non-mining areas shows barely any difference in water table condition in the JCF and RCF (part) area. The average hydraulic gradient of the water table within mining and non-mining areas given in Table-6. There is no significant change in hydraulic gradient observed. Relatively steep gradient near active opencast mining areas w.r.t., Non-Mining, Underground mines and Metamorphics areas observed.

Table – 6: Average hydraulic gradient

Sl. No	Formation	Area		Average hydraulic gradient
1	Sedimentary (Gondwana)	Non-Mining		1.0×10^{-3} to 3.25×10^{-3}
		Mining	OC	1.0×10^{-2} to 4.0×10^{-3}
			UG	1.0×10^{-2} to 3.0×10^{-3}
2	Metamorphics (Hard rock)	Peripheral part of the Coalfield		1.0×10^{-3} to 3.5×10^{-3}

3.3 GROUND WATER LEVEL DATA OF THE CLUSTER OF MINES OF BCCL

A GROUND WATER LEVEL OF CLUSTER-I

Cluster-I (Damuda Group of Mines) consisting of (Cluster-I consisting of Damoda UG, Albion OCP, Proposed BJ Section OCP and Abandoned Gutway OCP) of Barora area, BCCL is located in the western most part of Jharia coalfield in Bokaro district of Jharkhand. The life of the project works out upto 15 years considering annual target production of 1.17 MTPA. It is located in the extreme western part of JCF in Bokaro district of Jharkhand (Toposheet no – 73 I/1).

The present leasehold area of Cluster-I is 575.0 Ha. The Damoda block area marked by more or less flat and gently undulating topography. The RL varies from 179 m to 208 m AMSL and the general slope of topography is towards east. Jamuniya River, Kari Jore, Podo Jore and its tributaries are controlling the drainage system of the area. The area comes under the watershed of Jamuniya River.

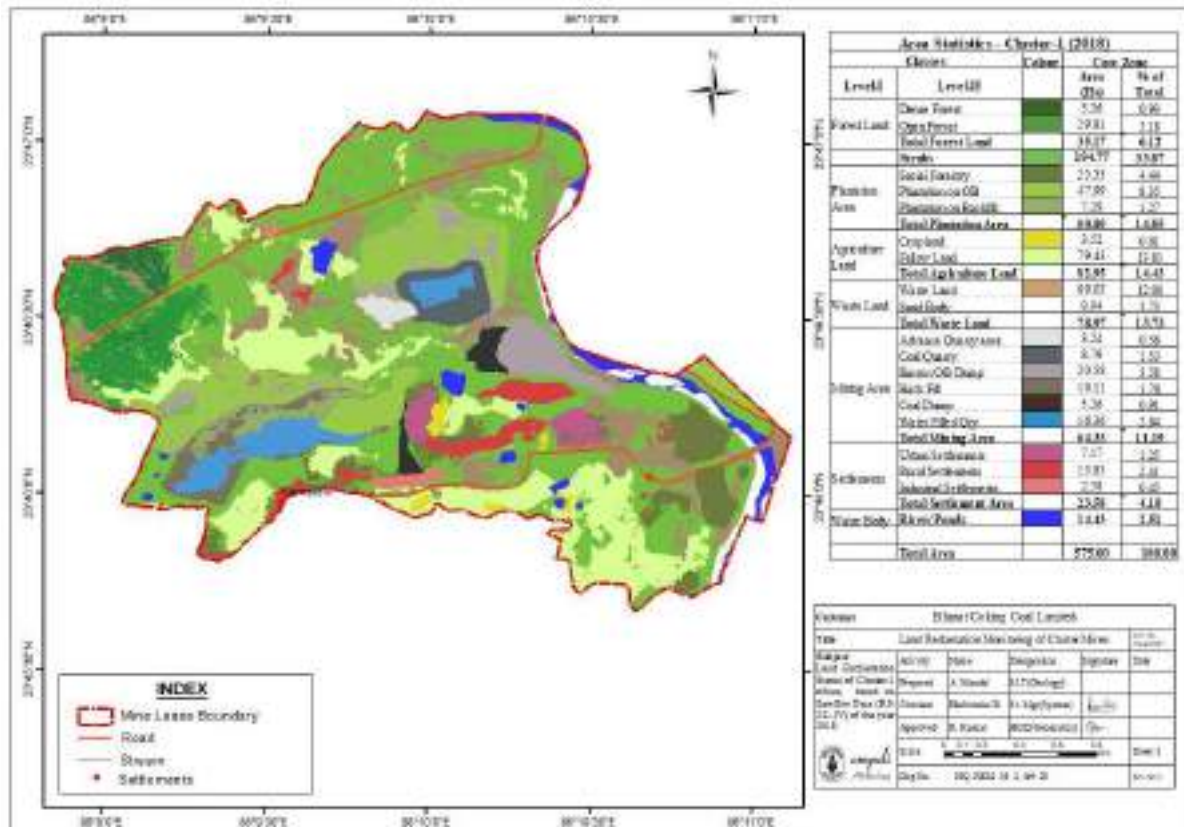
Monitoring stations (**B-15, B-21A, B51 and B-53**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'21, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	B-15	Bera Basti	1.46	0.25	0.35	1.01	3.70	0.15	1.47	1.70	1.90	0.45	1.65	2.65
2	B21A	Dugdha	8.38	2.5			10.00	4.15	5.80	6.70	9.45	1.90	-	-
3	B-51	Taranga	5.70	0.90	1.00	4.88	5.00	0.88	2.10	3.00	5.10	1.10	2.70	2.90
4	B-53	Karmatanr	4.85	1.52	1.87	2.87	3.12	1.07	1.40	1.92	3.22	0.97	1.42	2.12
Average WL (bgl)			5.10	1.29	1.07	2.92	3.70	0.15	1.47	1.70	4.92	1.11	1.92	2.56

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.46 m Max – 10.00 m
Post-monsoon GW Level (m): Min – 0.35 m Max – 5.80 m

LAND USE / LAND COVER MAP OF THE CLUSTER-I MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	393.69 x 10 ⁴	0.0	393.69 x 10 ⁴
2	Open Land	204.89 x 10 ⁴	0.0	204.89 x 10 ⁴
3	Road/ Paved Area	09.0 x 10 ⁴	0.0	09.0 x 10 ⁴
4	Rooftop area of building/ sheds	14.58 x 10 ⁴	0.0	14.58 x 10 ⁴
5	Total	575.00 x 10 ⁴	0.0	575.00 x 10 ⁴

B. GROUND WATER LEVEL OF CLUSTER-II

Cluster-II consists of seven mines namely; (Block II Mixed mines (OCP & UGP), Jamunia OCP, Shatabdi OCP, Muraidih Mixed mines (OCP & UGP), and Phularitand OCP of BCCL is located in the western most part of Jharia coalfield in Bokaro district and Dhanbad district of Jharkhand. The life of the project works out upto 30 years considering annual target production of 20.215 MTPA. It is located in the extreme western part of Jharia Coalfield in Dhanbad district of Jharkhand (Toposheet no- 73 I/1 and I/5).

The present leasehold area of Cluster-II is 2260.54 Ha. The Damoda block area marked by more or less flat and gently undulating topography. The RL varies from 176 m to 235 m AMSL. Jamuniya River, Khudia River and its tributaries are controlling the drainage system of the area. The area comes under the watershed of Jamuniya River and Khudia River.

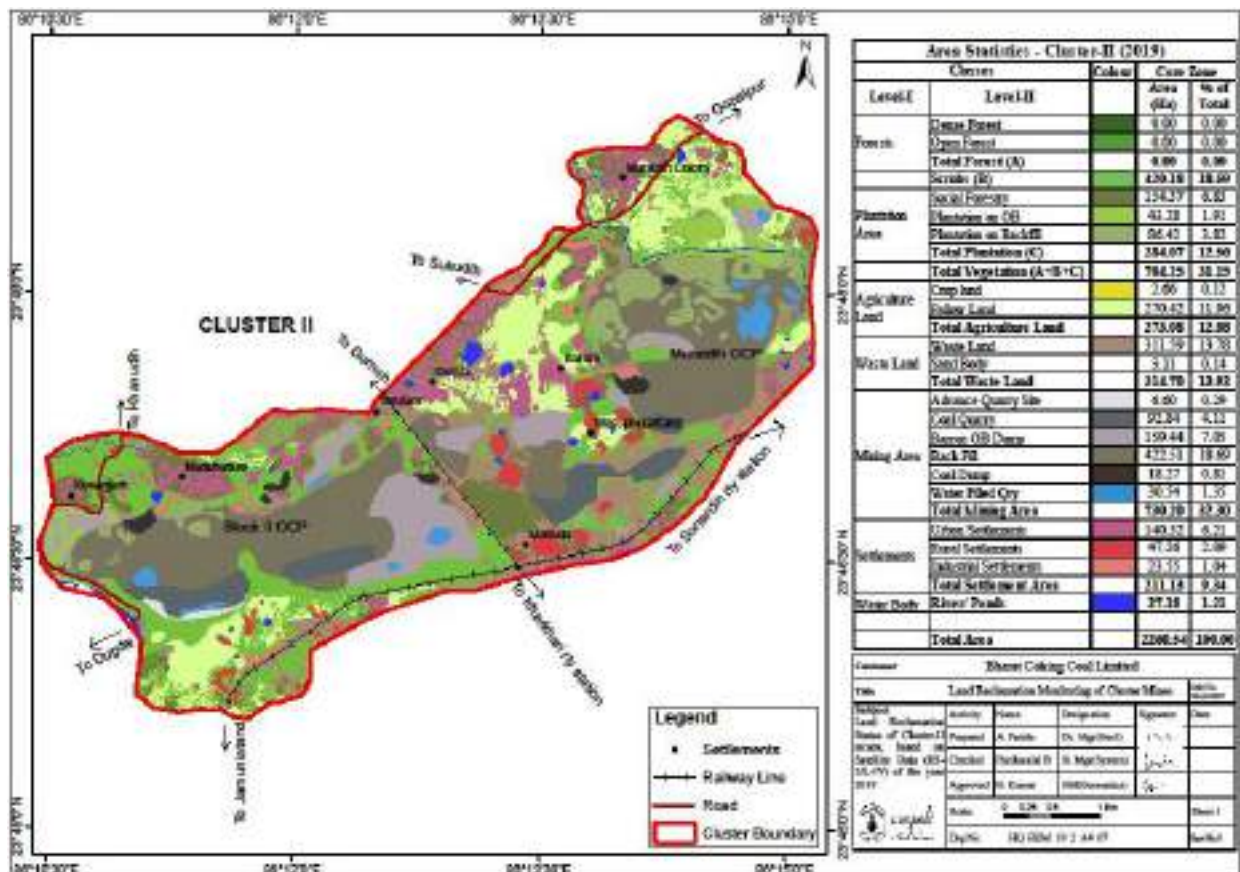
Monitoring stations (**B-1, B-59, B-60, B-61A and B-62A**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	B-1	Muraidih	2.58	0.58	1.91	2.03	3.28	0.73	1.63	1.73	3.18	1.33	1.73	1.98
2	B-59	Khodovaly	5.49	0.30	0.90	0.95	5.25	0.67	1.40	2.10	6.20	0.80	0.90	1.20
3	B-60	Bahiyardih	11.26	1.33	2.23	6.53	10.33	0.91	3.21	6.13	8.13	1.23	3.23	4.93
4	B61A	Kesargora	4.42	0.47	0.97	0.97	3.32	0.85	1.60	2.07	3.32	1.39	0.52	1.12
5	B62A	Sadiyardih	6.87	1.35	4.50	4.60	6.95	2.77	3.00	4.95	7.55	2.80	3.25	4.95
Average WL (bgl)			6.12	0.81	2.10	3.02	5.83	1.19	2.17	3.40	5.68	1.51	1.93	2.84

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 2.57 m Max – 11.26 m
Post-monsoon GW Level (m): Min – 0.52 m Max – 4.50 m

LAND USE / LAND COVER MAP OF THE CLUSTER-II MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	977.33 x 10 ⁴	0.0	977.33 x 10 ⁴
2	Open Land	1072.08 x 10 ⁴	0.0	1072.08 x 10 ⁴
3	Road/ Paved Area	140.32 x 10 ⁴	0.0	140.32 x 10 ⁴
4	Rooftop area of building/ sheds	70.81 x 10 ⁴	0.0	70.81 x 10 ⁴
5	Total	2260.54 x 10 ⁴	0.0	2260.54 x 10 ⁴

C. GROUND WATER LEVEL OF CLUSTER-III

Cluster-III consists of nine mines namely, Jogidih UG, Govindpur UG, Maheshpur UG, Kooridih/Block-IV Mixed Mine, New Akashkinaree Mixed Mine, South Govindpur UG (closed), and Teturiya UG (closed) mines. It is located in the western most part of Jharia coalfield in Dhanbad district of Jharkhand. The life of the project works out upto 60 years considering annual target production of 3.60 MTPA. This Cluster of mines is located in western part of Jharia Coalfield in Dhanbad district of Jharkhand (Toposheet no – 73 I/5).

The present leasehold area of Cluster-III is 1552.53 Ha. The area is plain with gentle undulation with RL varies from 160 m to 208.80 m AMSL. The general slope of the area is towards south. Khudia River, Baghdihi Jore, Katri River and its tributaries are controlling the drainage system of the area. The area comes under the watershed of Khudia River.

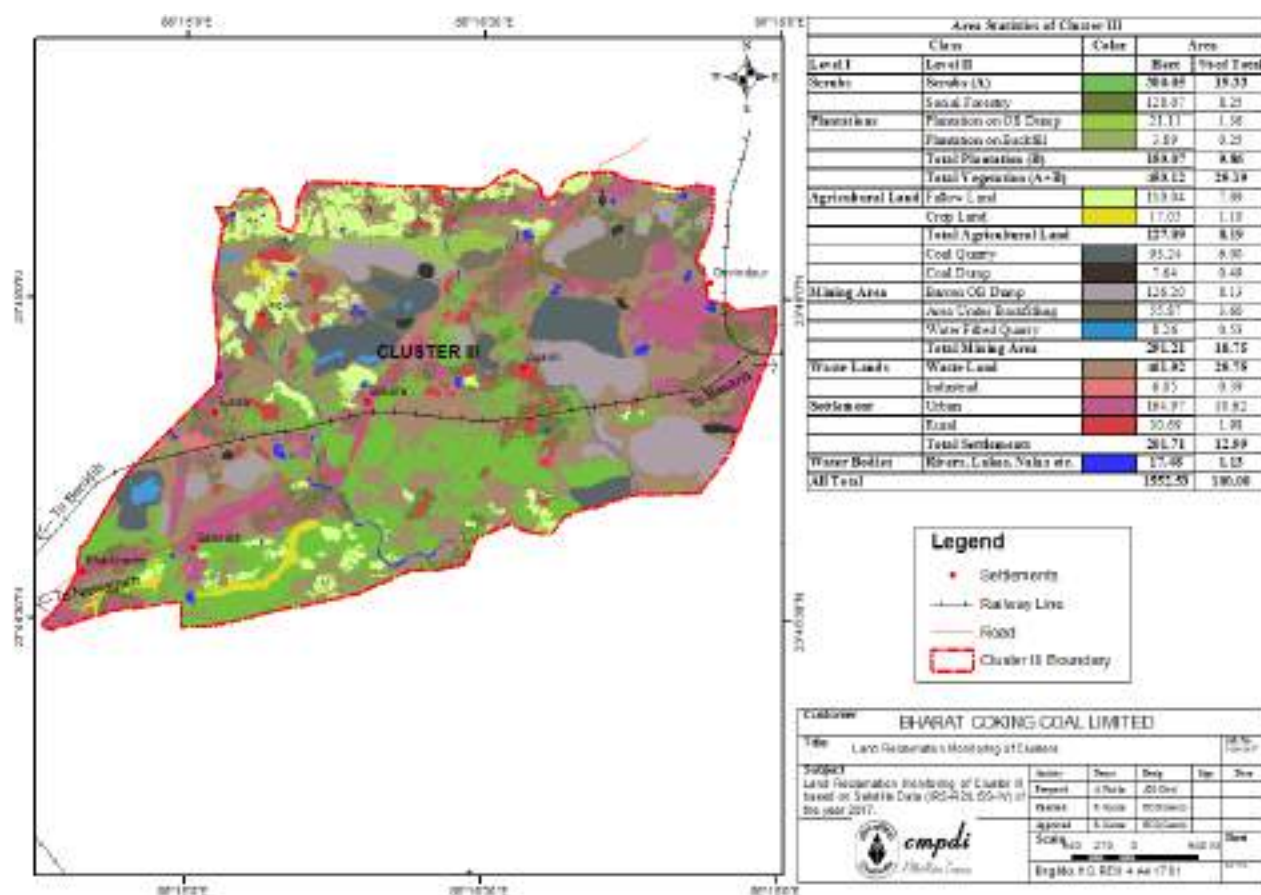
Monitoring stations (**A-12, A-25, A-29, B-14 and B-60**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A12	Jamua	1.92	0.50	1.10	1.72	2.60	0.32	0.50	1.20	2.10	0.29	0.45	0.75
2	A25	Sinidih	5.78	1.73	2.43	2.53	2.98	1.30	1.83	2.53	6.08	1.43	1.93	2.48
3	A29	Dharmaband	6.49	2.90	5.90	6.65	6.20	1.21	3.20	3.25	4.85	1.20	3.40	3.65
4	B14	Mathadih	2.84	0.24	2.04	2.10	2.44	0.32	1.04	1.69	2.24	0.54	0.94	2.04
5	B60	Sonardih	11.26	1.33	2.23	6.53	10.33	0.91	3.21	6.13	8.13	1.23	3.23	4.93
Average WL (bgl)			5.66	1.34	2.74	3.91	4.91	0.81	1.96	2.96	4.68	0.94	1.99	2.77

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.92 m Max – 11.26 m
Post-monsoon GW Level (m): Min – 0.45 m Max – 5.90 m

LAND USE / LAND COVER MAP OF THE CLUSTER-III MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	580.21 x 10 ⁴	0.0	580.21 x 10 ⁴
2	Open Land	770.61 x 10 ⁴	0.0	770.61 x 10 ⁴
3	Road/ Paved Area	164.97 x 10 ⁴	0.0	164.97 x 10 ⁴
4	Rooftop area of building/ sheds	36.74 x 10 ⁴	0.0	36.74 x 10 ⁴
5	Total	1552.53 x 10 ⁴	0.0	1552.53 x 10 ⁴

D. GROUND WATER LEVEL OF CLUSTER-IV

Cluster-IV consists of six mines namely, Amalgamated Keshalpur & West Mudidih colliery, Amalgamated Angarpathra & Ramkanali colliery, Katras-Choitudih Colliery, Salanpur colliery and Gaslitand colliery of Katras area, BCCL. It is located in the north-central part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out more than 30 years considering annual target production of 9.55 MTPA (Toposheet no – 73 I/5).

The present leasehold area of Cluster-IV is 1123.79 Ha. The area has a general undulating topography, with an overall gentle south-west slope. The RL varies from 182 m to 216 m AMSL. Katri River, Kumari Jore and its tributaries are controlling the drainage pattern of the area. The area comes under the watershed of Katri River.

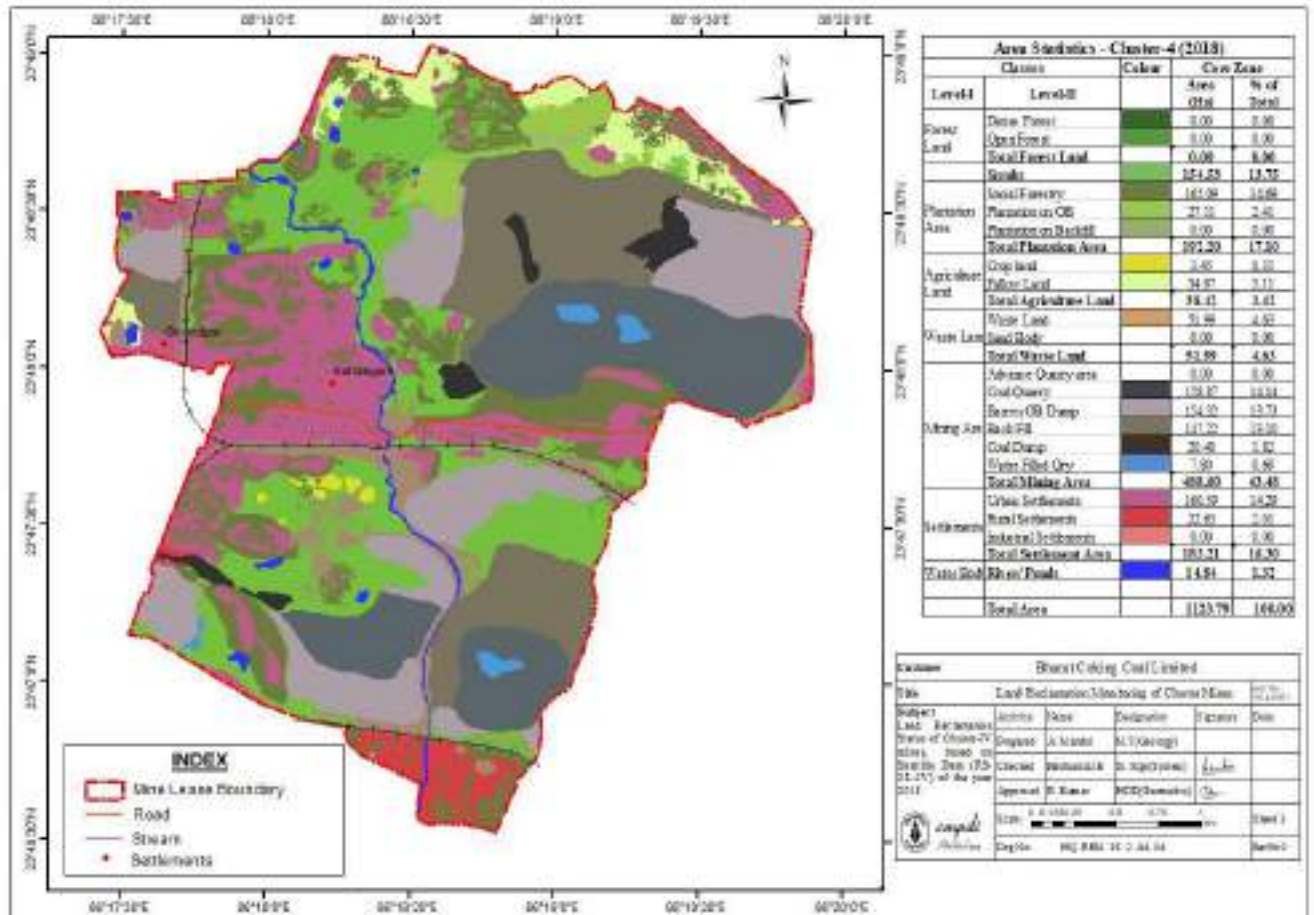
Monitoring stations (**A-26, A28A, B-64 and B-65A**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A-26	Malkhera	6.70	2.10	2.73	3.63	6.98	2.69	3.18	4.78	6.58	2.23	3.33	3.83
2	A28A	Lakarka	6.23	0.53	3.75	4.47	4.00	1.33	3.03	3.35	2.45	1.25	3.15	3.60
3	B-64	Keshalpur	2.35	0.30	0.95	1.00	1.85	0.93	0.50	1.37	0.95	0.30	0.45	1.20
4	B65A	Jhinjipahari	9.03	0.45	1.42	2.80	9.25	0.03	2.30	4.10	11.05	1.85	0.95	2.95
Average WL (bgl)			6.08	0.85	2.21	2.98	5.52	1.25	2.25	3.40	5.26	1.41	1.97	2.90

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 0.95 m Max – 11.05 m
Post-monsoon GW Level (m): Min – 0.45 m Max – 3.75 m

LAND USE / LAND COVER MAP OF THE CLUSTER-IV MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	385.15 x 10 ⁴	0.0	385.15 x 10 ⁴
2	Open Land	555.43 x 10 ⁴	0.0	555.43 x 10 ⁴
3	Road/ Paved Area	160.59 x 10 ⁴	0.0	160.59 x 10 ⁴
4	Rooftop area of building/ sheds	22.63 x 10 ⁴	0.0	22.63 x 10 ⁴
5	Total	1123.79 x 10 ⁴	0.0	1123.79 x 10 ⁴

E. GROUND WATER LEVEL OF CLUSTER-V

Cluster-V consists of twelve mines namely; Tetulmari OC & UG mines, Mudidih OC & UG mines, Nichitpur OC mine, Sendra Bansjore OC & UG mines, Bansdeopur OCP (proposed) & UG Mines, Kankanee OC & UG mines and Loyabad UG mine (closed) of Sijua area, BCCL. This Cluster of mines is located in northern part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out more than 30 years considering annual target production of 6.311 MTPA (Toposheet no – 73 I/6).

The present leasehold area of Cluster-V is 1724.52 Ha. The area has a general undulating topography, with an overall gentle south-west slope. The RL varies from 210 m to 170 m AMSL. Jarian Nala, Nagri Jore, Ekra Jore and its tributaries are controlling the drainage pattern of the area. The area comes under the watershed of Jarian Nala and Ekra Jore.

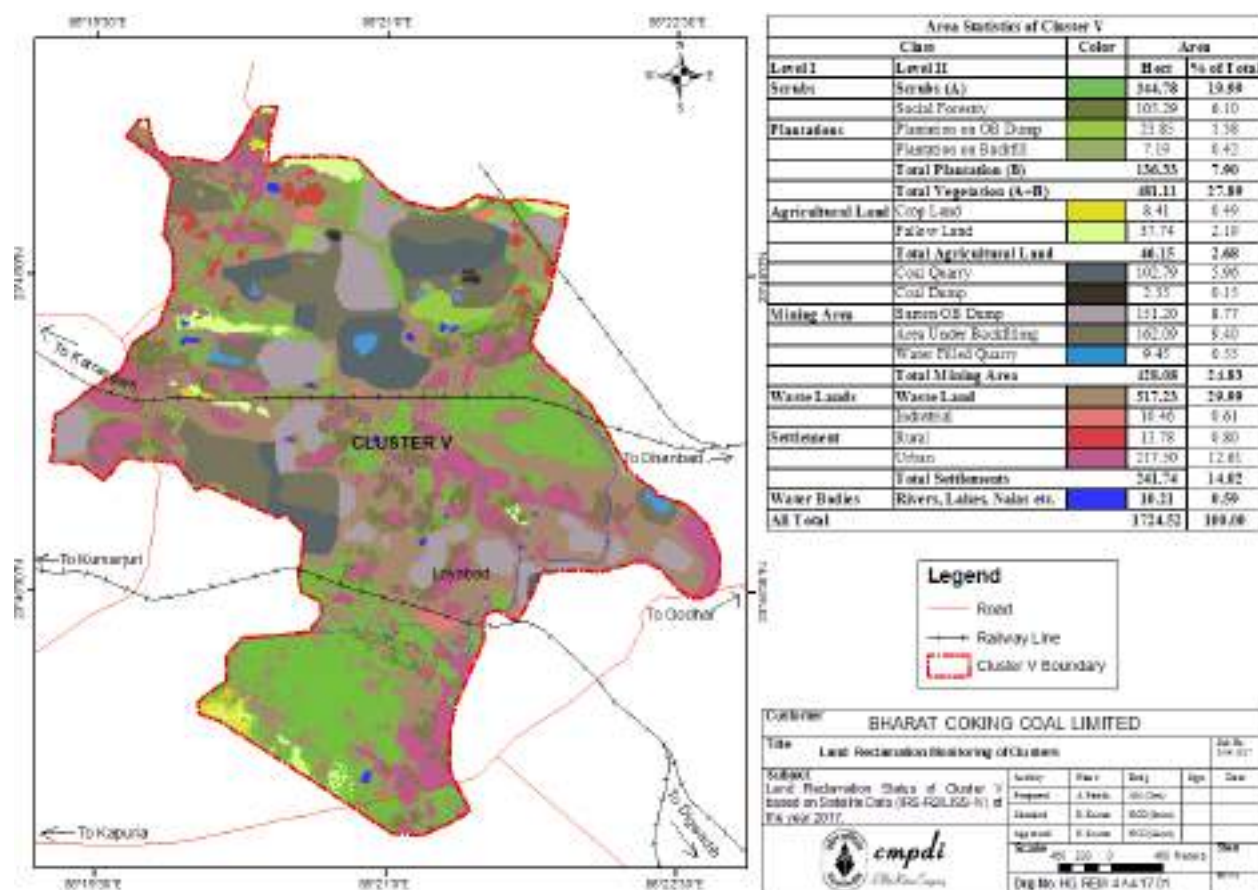
Monitoring stations (**A-3, A-16, A-27 and D-23**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A-3	Sijua	0.62	0.07	0.05	0.07	1.57	0.02	0.47	0.77	3.47	0.32	0.47	0.62
2	A-16	Ekra	3.45	1.90	2.00	3.00	7.15	1.34	1.75	3.20	5.45	1.65	1.95	4.55
3	A-27	Tetulmari	1.67	0.80	0.90	1.13	2.40	0.03	1.10	1.90	2.40	0.15	0.92	1.30
4	D-23	Jogta	5.43	1.87	1.60	1.65	5.60	1.69	3.35	3.70	4.70	1.65	1.40	1.50
Average WL (bgl)			2.79	1.16	1.14	1.46	4.18	0.77	1.67	2.39	4.01	0.94	1.19	1.99

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 0.62 m Max – 5.60 m
Post-monsoon GW Level (m): Min – 0.05 m Max – 3.35 m

LAND USE / LAND COVER MAP OF THE CLUSTER-V MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	527.26 x 10 ⁴	0.0	527.26 x 10 ⁴
2	Open Land	973.52 x 10 ⁴	0.0	973.52 x 10 ⁴
3	Road/ Paved Area	217.50 x 10 ⁴	0.0	217.50 x 10 ⁴
4	Rooftop area of building/ sheds	24.24 x 10 ⁴	0.0	24.24 x 10 ⁴
5	Total	1724.52 x 10 ⁴	0.0	1724.52 x 10 ⁴

F. GROUND WATER LEVEL OF CLUSTER-VI

Cluster-VI consists of four coalmines; East Bassuriya opencast (OC), Bassuriya underground (UG), Gondudih Khas-Kusunda OC and Godhur Mixed Mines (OC and UG) of BCCL. This Cluster of mines is located in central part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out more than 30 years considering annual target production of 7.631 MTPA (Toposheet no – 73 I/6).

The present leasehold area of Cluster-VI is 831.83 Ha. The area has a general undulating topography with general slope towards south. The RL varies from 180 m to 240 m AMSL. Ekra Jore, Kari Jore and their tributaries are controlling the drainage pattern of the area. The area comes under the watershed of Ekra Jore and Kari Jore.

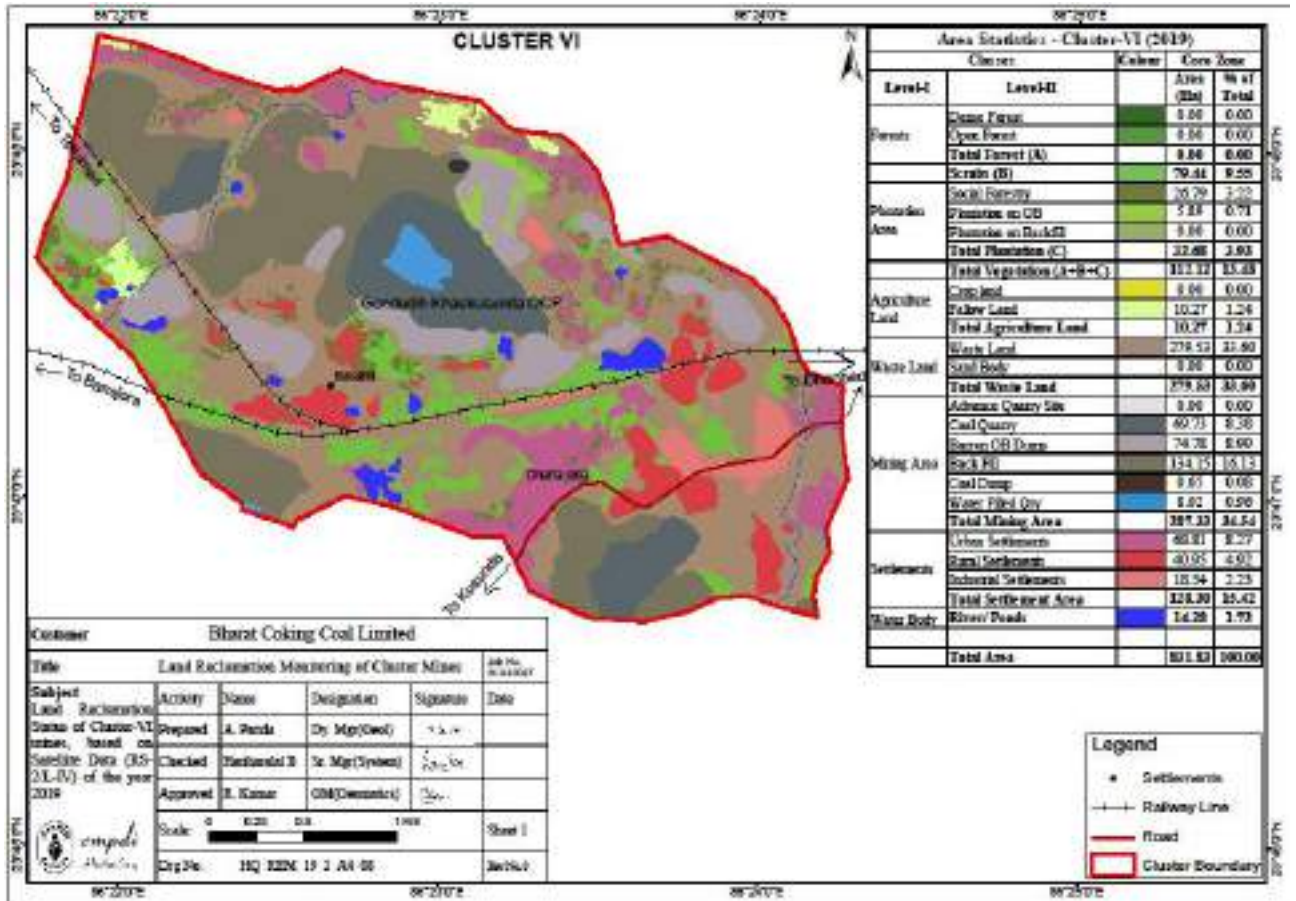
Monitoring stations (**D-25 and D-30**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	D25	Godhur	10.50	2.90	3.80	4.40	10.50	2.28	5.62	6.40	9.90	4.35	5.38	5.50
2	D30	Borkiboa	4.23	0.60	0.84	1.80	4.50	1.65	1.35	2.40	4.60	0.38	0.75	1.95
Average WL (bgl)			7.37	1.75	2.32	3.10	7.50	1.97	3.49	4.40	7.25	2.37	3.07	3.73

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 4.23 m Max – 10.50 m
Post-monsoon GW Level (m): Min – 0.75 m Max – 5.62 m

LAND USE / LAND COVER MAP OF THE CLUSTER-VI MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	122.39 X 10 ⁴	0.0	122.39 X 10 ⁴
2	Open Land	581.14 X 10 ⁴	0.0	581.14 X 10 ⁴
3	Road/ Paved Area	68.81 X 10 ⁴	0.0	68.81 X 10 ⁴
4	Rooftop area of building/ sheds	59.49 X 10 ⁴	0.0	59.49 X 10 ⁴
5	Total	831.83 X 10 ⁴	0.0	831.83 X 10 ⁴

G. GROUND WATER LEVEL OF CLUSTER-VII

Cluster-VII consists of fourteen mines namely; Kusunda Area, Bastacolla Area and PB Area B.C.C.L (Jharia Coalfield) is located in Dhanbad district of Jharkhand. Cluster-VII consists of coal mines; Dhansar UG, Dhansar OCP, Kusunda OCP and Viswakarma OCP (proposed) are under the administrative control of Kusunda Area and Industry UG (closed), Alkusa UG, Ena OCP, S.Jharia/Rajapur OCP, Burragarh UG, Simlabahal UG, Huriladih UG, Bhutgoria UG (Re-opening), Kustore UG (closed) and E.Bhuggatdih UG (closed) are under Bastacolla and PB Area of BCCL. This Cluster of mines is located in east central part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out more than 30 years considering annual target production of 8.226 MTPA (Toposheet no – 73 I/6).

The present leasehold area of Cluster-VII is 2127.70 Ha. The area has a general undulating topography with general slope towards south. The RL varies from 172 m to 221 m above M.S.L. Kari Jore, Chatkari Jore and its tributaries are controlling the drainage pattern of the area. The area comes under the watershed of Kari Jore and Chatkari Jore.

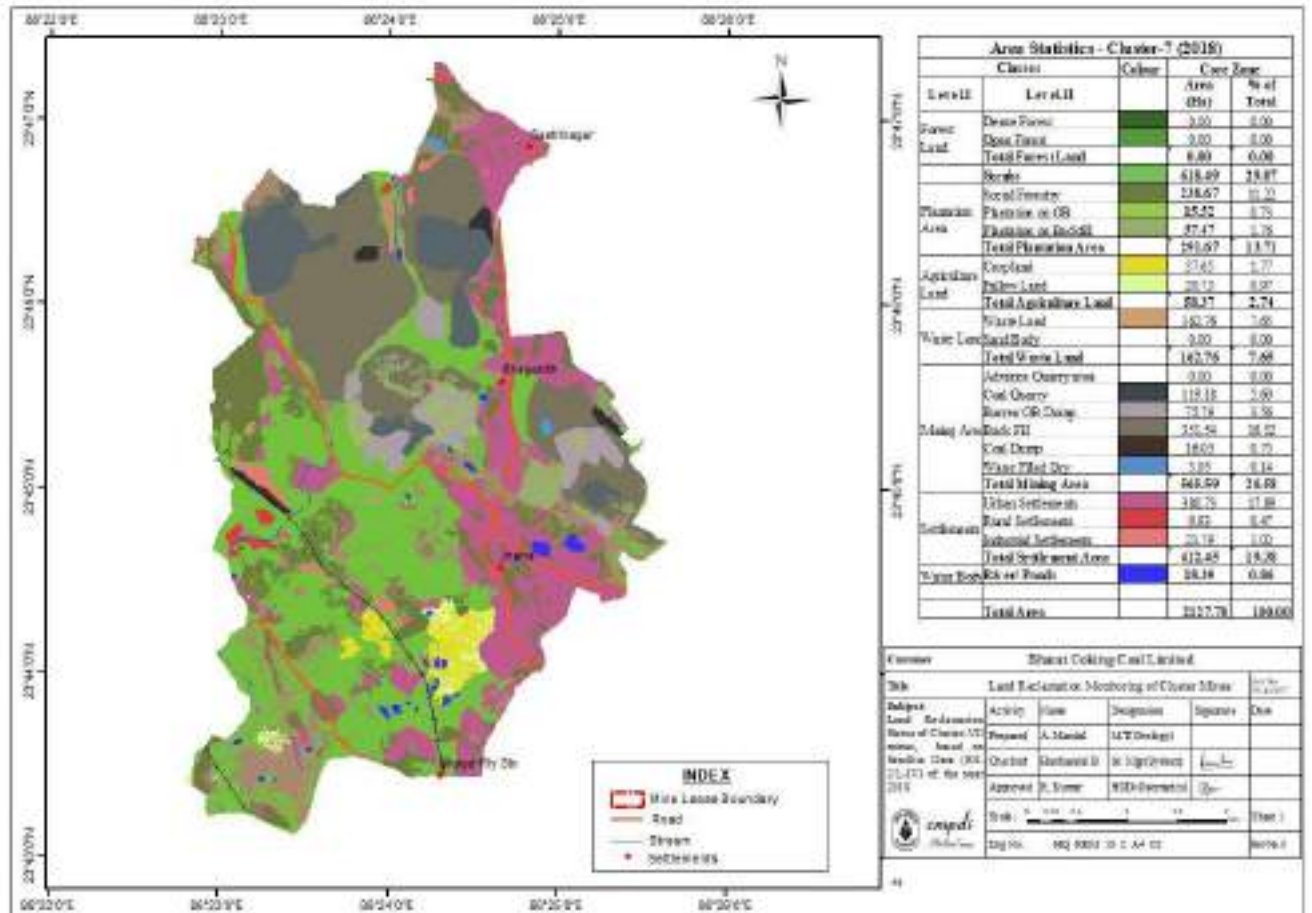
Monitoring stations (**D-3, D-4, D-33, D-34, D-47, D-55 and D-80**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	D-3	Dhansar	3.41	0.80	0.85	1.30	5.40	0.56	1.38	1.90	1.75	1.05	1.30	1.45
2	D-4	Jharia	3.01	1.41	1.16	1.61	3.41	0.51	1.41	2.26	2.81	1.16	1.71	2.16
3	D33	Kustore	1.75	0.62	0.85	1.60	3.65	0.48	1.45	1.80	2.35	0.25	1.65	2.35
4	D34	Kusunda	3.78	2.05	2.90	2.95	3.30	2.00	2.80	2.95	4.75	2.10	2.40	2.55
5	D47	Parastanr	4.05	3.22	2.45	4.88	9.45	3.41	5.45	5.83	4.55	1.90	4.35	4.20
6	D55	Hariladih	9.52	5.62	7.62	9.02	9.42	3.88	8.60	8.62	8.42	2.97	5.47	8.62
7	D80	Bastacolla	7.10	2.17	2.55	3.10	4.30	2.08	4.90	5.00	5.00	2.30	3.05	3.80
Average WL (bgl)			4.66	2.27	2.63	3.49	5.56	1.85	3.71	4.05	4.23	1.68	2.85	3.59

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.75 m Max – 9.52 m
Post-monsoon GW Level (m): Min – 0.85 m Max – 8.60 m

LAND USE / LAND COVER MAP OF THE CLUSTER-VII MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	968.53 x 10 ⁴	0.0	968.53 x 10 ⁴
2	Open Land	746.72 x 10 ⁴	0.0	746.72 x 10 ⁴
3	Road/ Paved Area	380.73 x 10 ⁴	0.0	380.73 x 10 ⁴
4	Rooftop area of building/ sheds	31.71 x 10 ⁴	0.0	31.71 x 10 ⁴
5	Total	2127.70 x 10 ⁴	0.0	2127.70 x 10 ⁴

H. GROUND WATER LEVEL OF CLUSTER-VIII

Cluster - VIII of B.C.C.L mines under administrative control of Bastacolla Area of B.C.C.L (Jharia Coalfield) is located in Dhanbad district of Jharkhand. Cluster-VIII consists of ten mines namely; Bastacolla mixed mines (OC & UG), Bera mixed mines (OC&UG), Dobari UG, Kuya mixed mines (OC&UG), Proposed Goluckdih (NC) OC mine, Ghanoodih OC mine and Kujama OC mine are under Bastacolla Area of BCCL is located in the west part of Jharia Coalfield. All above the mines are contiguous in nature and the environmental impact is overlapping in ambient environment due to cumulative effect of the mining activities. The life of the project works out upto 25 years considering annual target production of 6.383 MTPA (toposheet no. 73 I/5 and I/6).

The present leasehold area of Cluster-VIII is 1331.95 Ha. The area has a general undulating topography with general slope towards south and south-west. The ground elevation in the area ranges from 175 m to 221 m AMSL. Chatkari Jore, Tisra Jore and its tributaries controlling the drainage pattern of the area. The area comes under the watershed of Chatkari Jore.

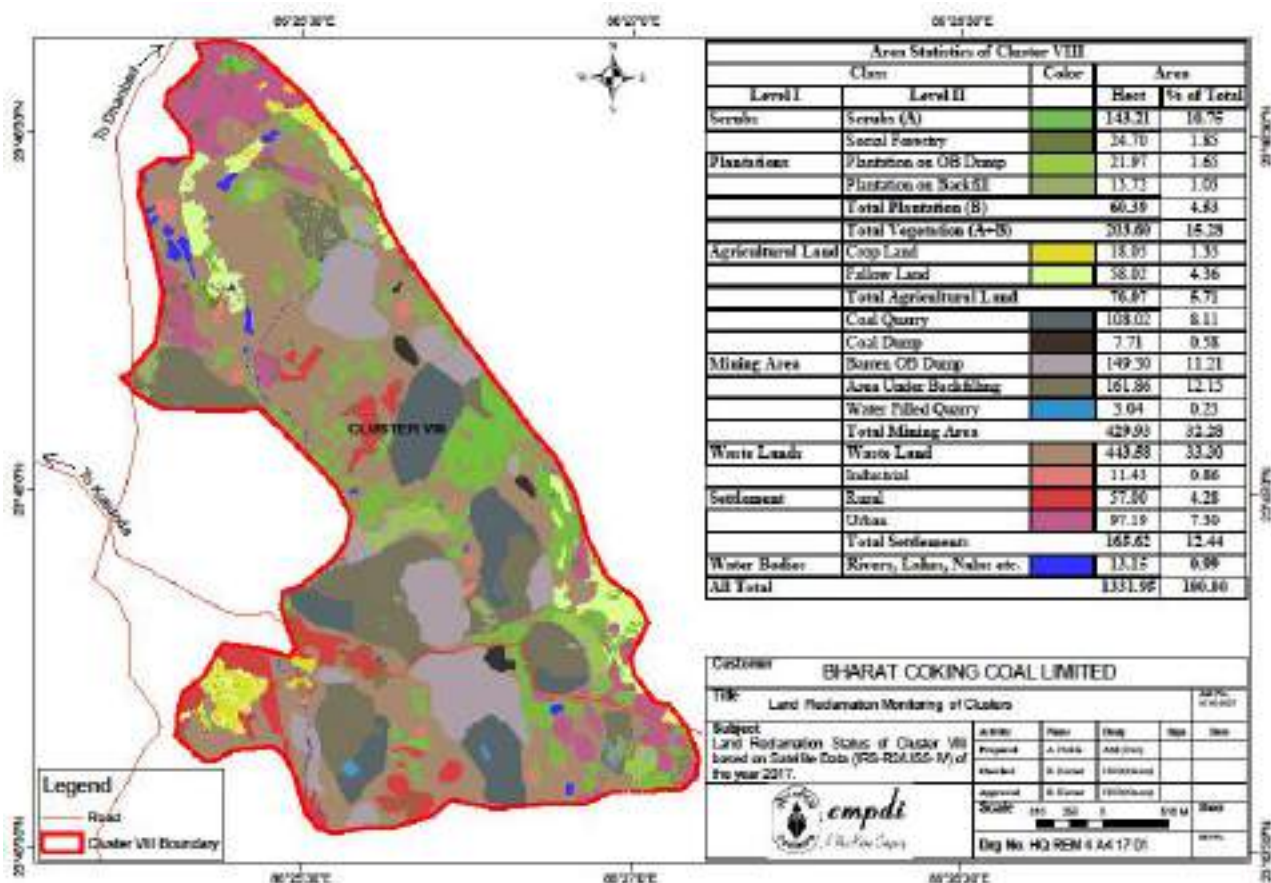
Monitoring stations (**D-8, D-43, D-49 and D-51**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	D-8	Alokdiha	4.55	1.85	2.27	3.20	5.83	1.70	2.75	3.20	4.80	1.95	2.85	4.25
2	D43	Alagdih	4.65	2.40	2.60	3.35	6.60	2.31	2.55	3.05	7.35	3.55	2.70	4.25
3	D49	Galucdih	1.40	0.73	0.85	1.00	3.25	1.41	1.65	1.98	1.75	0.60	1.50	1.25
4	D51	Chankuiya	9.43	5.65	5.65	7.50	8.45	6.03	5.70	7.35	9.95	8.05	5.75	7.75
Average WL (bgl)			5.01	2.66	2.84	3.76	6.03	2.86	3.16	3.90	5.96	3.54	3.20	4.38

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.40 m Max – 9.95 m
Post-monsoon GW Level (m): Min – 0.85 m Max – 5.75 m

LAND USE / LAND COVER MAP OF THE CLUSTER-VIII MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	279.69 x 10 ⁴	0.0	279.69 x 10 ⁴
2	Open Land	886.66 x 10 ⁴	0.0	886.66 x 10 ⁴
3	Road/ Paved Area	97.19 x 10 ⁴	0.0	97.19 x 10 ⁴
4	Rooftop area of building/ sheds	68.43 x 10 ⁴	0.0	68.43 x 10 ⁴
5	Total	1331.95 x 10 ⁴	0.0	1331.95 x 10 ⁴

I. GROUND WATER LEVEL OF CLUSTER-IX

Cluster - IX of B.C.C.L mines under administrative control of Lodna Area of B.C.C.L (Jharia Coalfield) is located in Dhanbad district of Jharkhand. Cluster- IX consists of eight mines namely; North Tisra/South Tisra OCP, Jeenagora OCP, North Tisra UG, Lodna UG, Bagdigi UG, Bararee UG, Joyrampur UG and Jealgora UG (closed) are under the administrative control of Lodna Area of Bharat Coking Coal Limited (B.C.C.L - A Subsidiary of Coal India Limited). Among them N. Tisra/S. Tisra OCP, Jeenagora OCP and N. Tisra UG mine will be amalgamated and will form North Tisra/South Tisra Expansion OCP. North Tisra/South Tisra Expansion OCP, Lodna UG, Bagdigi UG, Bararee UG and Joyrampur UG are under Lodna Area of BCCL is located in the west part of Jharia Coalfield. All above the mines are contiguous in nature and the environmental impact is overlapping in ambient environment due to cumulative effect of the mining activities. The life of the project works out upto 30 years considering annual target production of 8.513 MTPA (toposheet no. 73 I/6).

The present leasehold area of Cluster-IX is 1967.22 Ha. The topography of the area is undulating with gentle slope towards south. The RL varies from 221 m to 188.44 m AMSL. Chatkari Jore, Tisra Jore, Sulunga Jore and its tributaries controlling the drainage pattern of the area. The area comes under the watershed of Chatkari Jore.

Monitoring stations (**D-5, D-7, D-39, D-40A, D-41 and D-74**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	D-5	Jiyalgora	7.28	3.35	4.00	6.40	8.60	3.20	7.70	7.90	8.25	2.90	4.85	8.20
2	D-7	Golden Pahari	6.08	2.38	2.63	3.88	7.33	2.56	5.13	5.35	8.23	1.88	3.28	4.86
3	D-39	Tilaboni	10.70	4.60	5.10	8.15	9.40	3.35	6.05	6.78	12.60	4.00	5.95	12.45
4	D40A	Khapa Dhawra	1.95	1.35	1.80	2.35	1.95	0.30	1.43	6.78	1.85	1.50	1.45	1.95
5	D-41	Joyrampur	1.95	1.34	1.38	1.45	3.30	1.43	1.45	1.60	2.30	0.70	1.25	1.40
6	D-74	BhulanBararee	6.93	3.20	2.90	3.70	4.30	2.58	3.93	4.00	5.80	2.35	3.57	4.95
Average WL (bgl)			5.82	2.70	2.97	4.32	5.81	2.24	4.28	4.54	6.51	2.22	3.39	5.64

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.85 m Max – 12.60 m
Post-monsoon GW Level (m): Min – 1.25 m Max – 7.70 m

Area Statistics of Cluster IX

Level I	Level II	Color	Hect	% of Total
Scrub	Scrub (A)		339.84	17.24
	Social Forestry		148.58	8.57
	Plantation on OB Dump		41.79	2.12
Plantation	Plantation on Backfill		8.88	0.35
	Total Plantation (B)		217.17	11.94
Total Vegetation (A+B)			597.69	28.32
Agricultural Land	Fallow Land		44.49	2.28
	Total Agricultural Land		44.49	2.28
	Coal Quarry		178.55	9.08
Mining Area	Barren OB Dump		172.19	8.72
	Area Under Backfilling		17.55	3.04
	Coal Dump		8.87	0.46
Waste Lands	Water Filled Quarry		3.35	0.17
	Total Mining Area		44.24	22.43
	Waste Land		414.64	21.24
Settlement	Industrial		8.13	0.46
	Rural		47.79	2.43
	Urban		232.31	11.81
Total Settlement			289.23	14.70
Water Bodies	Rivers, Lakes, Nalas etc.		20.59	1.05
All Total			1967.22	100.00

Legend

- +—+—+ Railway Line
- Cluster IX Boundary

Scale

0 1000 M

Map No. HQ/REH/4.44/17/01

Map Date 20/11/2017

Map Scale 1:50,000

Map Projection UTM

Map Datum WGS 84

Map Contour Interval 5 M

Map Contour Elevation 100 M

Map Contour Color Brown

Map Contour Line Width 0.5 mm

Map Contour Label 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000

Map Contour Label Color Brown

Map Contour Label Font Sans-serif

Map Contour Label Size 10

Map Contour Label Spacing 100 M

Map Contour Label Orientation Horizontal

Map Contour Label Placement Inside

Map Contour Label Offset 0

Map Contour Label Angle 0

Map Contour Label Rotation 0

Map Contour Label Skew 0

Map Contour Label Stretch 0

Map Contour Label Scale 1

Map Contour Label Units M

Map Contour Label Precision 0

Map Contour Label Rounding 0

Map Contour Label Truncation 0

Map Contour Label Zeros 0

Map Contour Label Commas 0

Map Contour Label Thousands 0

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Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	601.52 x 10 ⁴	0.0	601.52 x 10 ⁴
2	Open Land	1076.47 x 10 ⁴	0.0	1076.47 x 10 ⁴
3	Road/ Paved Area	232.31 x 10 ⁴	0.0	232.31 x 10 ⁴
4	Rooftop area of building/ sheds	56.92 x 10 ⁴	0.0	56.92 x 10 ⁴
5	Total	1967.22 x 10 ⁴	0.0	1967.22 x 10 ⁴

J. GROUND WATER LEVEL OF CLUSTER-X

Cluster-X consists of Bhowrah North OC & UG, Bhowrah South OC & UG, Amalgamated Sudamdih Patherdih, Sudamdih Shaft, Amlabad UG (Closed) and Sudamdih Coal Washery comes under the administrative control of Eastern Jharia Area of Bharat Coking Coal Limited (B.C.C.L - A Subsidiary of Coal India Limited). This cluster of mines is located in eastern part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out is more than 30 years considering annual target production of 2.289 MTY.

Cluster-X mine involves leasehold area of about 2057.47 Ha of land. It covered in Survey of India toposheet no. 73 I/6. The area of Bhowrah North OC & UG, Bhowrah South OC & UG, Amalgamated Sudamdih Patherdih, Sudamdih Shaft, Amlabad UG (Closed) are 280.83 Ha, 571.58 Ha, 498.61 Ha, 391.50 Ha and 386.95 Ha respectively.

The present leasehold area of Cluster-X is 2057.47 Ha. The area has an undulating topography with gentle slope towards south and south-east. The RL varies from 185 m to 150.0 m AMSL. Gaurkuthi Nala and few seasonal streams are controlling the drainage pattern of the area. The area comes under the watershed of Damodar River.

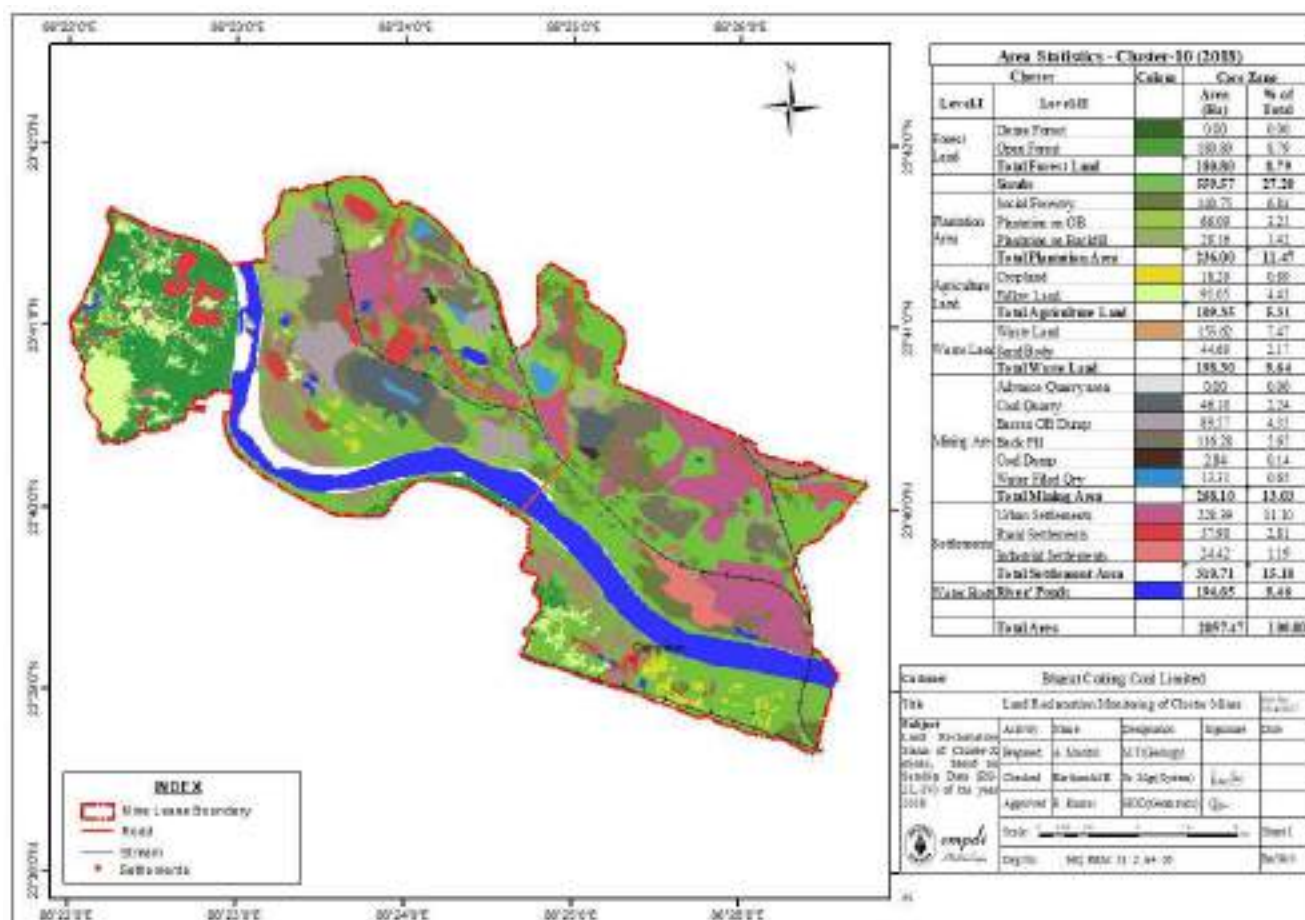
Monitoring stations (**A-19, D-35, D-36 and D-77**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A-19	Bhowrah	3.30	1.95	1.90	2.20	6.05	2.30	3.25	3.70	4.85	0.95	3.43	4.95
2	D-35	Patherdih	6.60	2.70	2.90	4.30	8.20	2.98	5.40	5.62	8.00	3.15	3.80	5.90
3	D-36	Sudamdih	2.02	0.45	0.55	0.55	2.10	0.06	1.00	1.15	1.20	0.10	0.55	0.65
4	D-77	Amlabad	5.98	2.60	4.69	5.60	6.40	5.90	3.50	4.25	6.40	2.80	3.20	4.50
Average WL (bgl)			4.48	1.93	2.51	3.16	5.69	2.81	3.29	3.68	5.11	1.75	2.75	4.00

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.20 m Max – 8.20 m
Post-monsoon GW Level (m): Min – 0.55 m Max – 4.69 m

LAND USE / LAND COVER MAP OF THE CLUSTER-X MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	1085.72 x 10 ⁴	0.0	1085.72 x 10 ⁴
2	Open Land	661.04 x 10 ⁴	0.0	661.04 x 10 ⁴
3	Road/ Paved Area	228.39 x 10 ⁴	0.0	228.39 x 10 ⁴
4	Roof top area of building/ sheds	82.32 x 10 ⁴	0.0	82.32 x 10 ⁴
5	Total	2057.47 x 10 ⁴	0.0	2057.47 x 10 ⁴

K. GROUND WATER LEVEL OF CLUSTER-XI

Cluster–XI consists of eight coal mines; Moonidih UG, Gopalichak UG Project, Kachi Balihari 10/12 Pit UG, Pootkee Balihari Project UG, Bhagaband UG, Kendwadih UG (closed), Pootkee UG (closed), Kachi Balihari 5/6 Pit UG (closed) are under the administrative control of Western Jharia Area of Bharat Coking Coal Limited (B.C.C.L - A Subsidiary of Coal India Limited). The Cluster- XI is located in central part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out about upto 50 years considering annual target production of 6.604 MTPA (toposheet no. no. 73 I/5 7 73 I/6).

The present leasehold area of Cluster-XI is 3527.58 Ha. The area has an undulating topography with gentle slope towards south. The RL varies from 201 m to 166 m AMSL. Katri River, Jarian Nala, Ekra Jore and Kari Jore are controlling the drainage of the area. The area comes under the watershed of Katri River and Kari Jore.

Monitoring stations (**A-17, A-18, A-20 and A-32**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

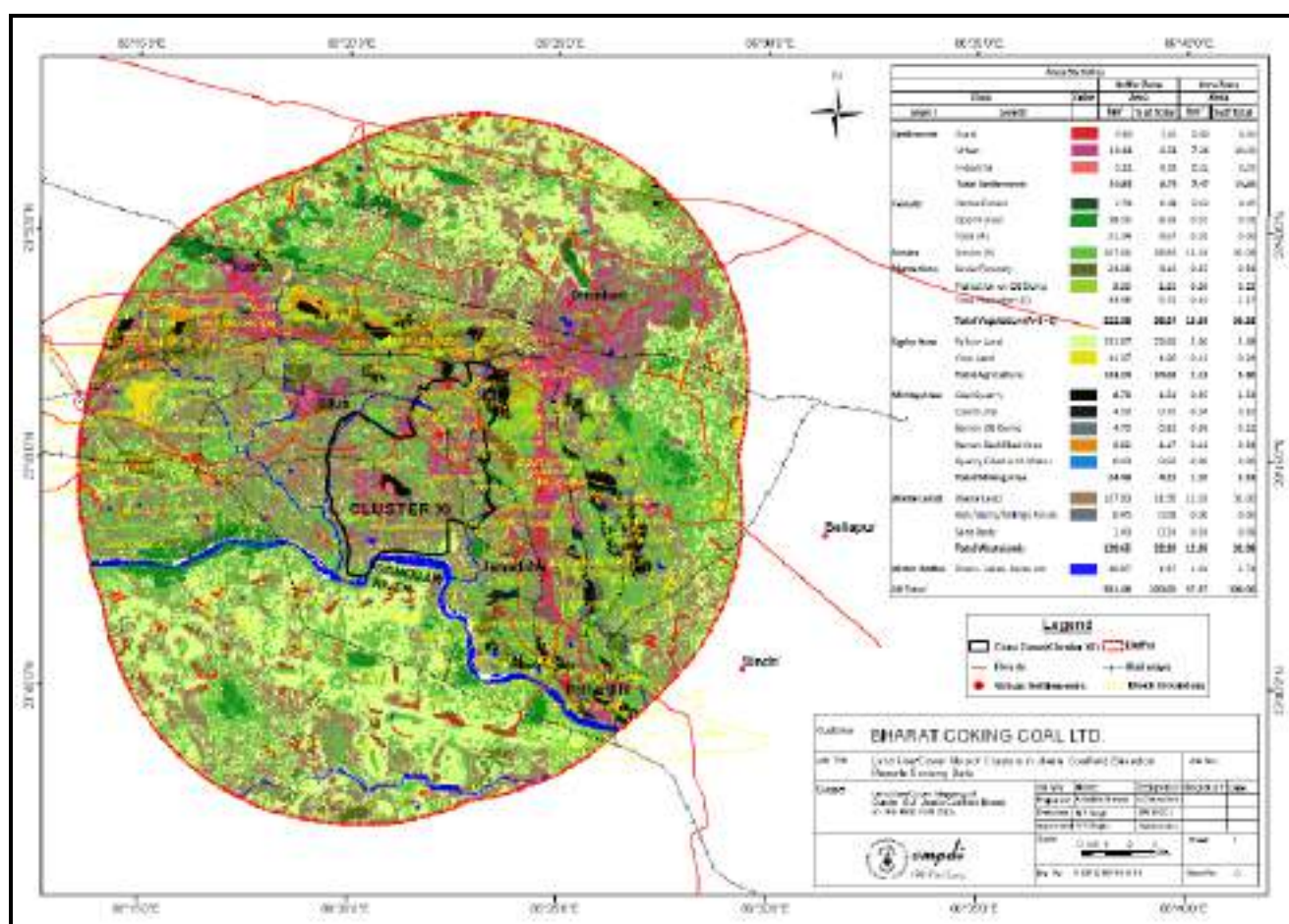
Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A-17	Kachi Balihari	3.36	1.62	2.37	2.54	2.14	0.64	1.69	1.79	2.94	0.34	2.24	2.42
2	A-18	Baghaband	1.09	0.54	0.57	0.74	1.09	0.39	0.34	0.89	2.29	1.09	0.69	1.09
3	A-20	Gorbudih	5.47	1.47	2.02	3.07	8.47	1.44	3.87	4.42	4.57	3.32	1.82	4.02
4	A-32	Baludih	2.35	0.73	0.96	1.50	1.90	0.36	1.75	1.80	2.75	0.62	0.95	1.65
Average WL (bgl)			3.07	1.09	1.48	1.96	3.40	0.71	1.91	2.23	3.14	1.34	1.43	2.30

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.09 m Max – 8.47 m

Post-monsoon GW Level (m): Min – 0.34 m Max – 3.87 m

LAND USE / LAND COVER MAP OF THE CLUSTER-XI MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	1060.61 x 10 ⁴	0.0	1293.46 x 10 ⁴
2	Open Land	1518.33 x 10 ⁴	0.0	1509.06 x 10 ⁴
3	Road/ Paved Area	171.08 x 10 ⁴	0.0	171.08 x 10 ⁴
4	Roof-top area of building/ sheds	777.56 x 10 ⁴	0.0	563.06 x 10 ⁴
5	Total	3527.58 x 10 ⁴	0.0	3527.58 x 10 ⁴

L. GROUND WATER LEVEL OF CLUSTER-XIII

Cluster-XIII, consists of one running mine (Murulidih 20/21 pit UG mine) and six abandoned mines i.e. Bhurungiya colliery, Muchraidih colliery, Hantoodih colliery, Padugora colliery, Murulidih colliery and Bhatdee colliery of Western Jharia area, BCCL is located in the south-western part of Jharia coal field in Dhanbad district of Jharkhand. The area is covered by Survey of India toposheet no. 73 I/6. The life of the project works out about 15 years considering annual target production of 0.234 MTPA.

The present leasehold area of Cluster-XIII is 1898.62 Ha. The area has an undulating topography with gentle slope towards south-east. The maximum RL is 224 m AMSL in the north-western part of the area whereas the minimum RL is 179 m AMSL at southern part. The area comes under the watershed area of Jamunia River and Katri River.

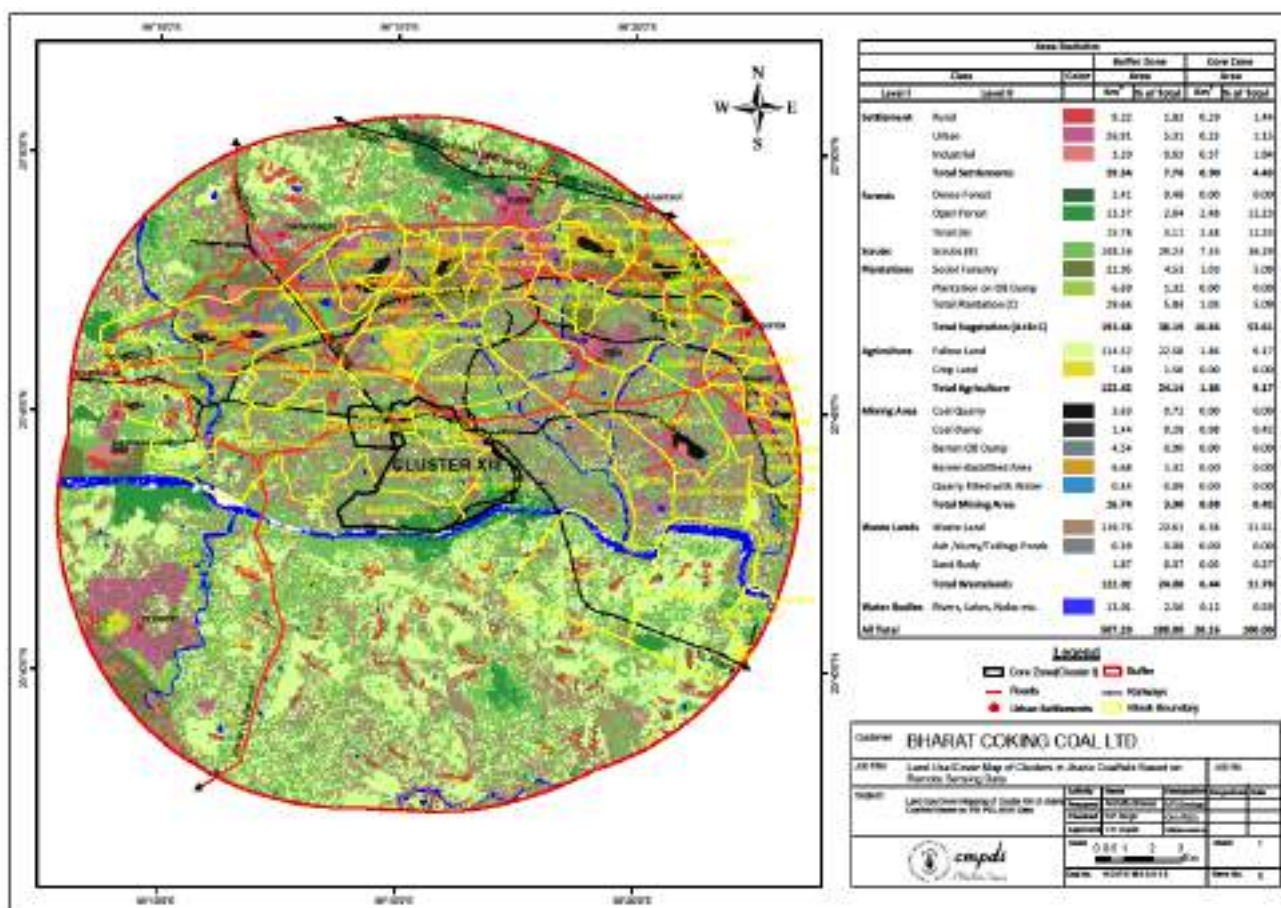
Monitoring stations (**A-22, A-23, A-33, A-34, B-25 and B-48**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A22A	Nagdah	2.90	0.40	1.10	1.50	2.90	0.20	1.98	2.00	2.60	1.75	2.00	2.85
2	A-23	Machhayara	9.52	1.87	2.82	4.82	8.92	1.12	5.62	7.12	11.97	5.37	3.77	6.57
3	A-33	Mahuda Wa	2.85	0.80	0.85	1.33	4.55	0.38	1.85	2.85	3.65	0.55	1.25	1.55
4	A-34	Mahuda vil.	5.20	1.83	3.55		8.35	3.43	3.45	5.35	6.35	3.45	3.95	5.45
5	B-25	Mahuda more	5.10	1.98	2.58	3.30	7.90	3.02	2.55	3.45	4.80	1.38	1.40	3.50
6	B-48	Mahuda	7.23	2.28	6.05	6.60	8.20	3.37	3.85	4.51	7.05	2.85	4.35	5.45
Average WL (bgl)			5.47	1.53	2.83	3.51	6.80	1.92	3.22	4.21	6.07	2.56	2.79	4.23

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 2.85 m Max – 11.97 m
Post-monsoon GW Level (m): Min – 0.85 m Max – 6.05 m

LAND USE / LAND COVER MAP OF THE CLUSTER-XIII MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	1484.41 x 10 ⁴	0.0	1570.48 x 10 ⁴
2	Open Land	183.28 x 10 ⁴	0.0	97.22 x 10 ⁴
3	Road/ Paved Area	71.84 x 10 ⁴	0.0	71.83 x 10 ⁴
4	Rooftop area of building/ sheds	159.09 x 10 ⁴	0.0	159.09 x 10 ⁴
5	Total	1898.62 x 10 ⁴	0.0	1898.62 x 10 ⁴

M. GROUND WATER LEVEL OF CLUSTER-XIV

Cluster-XIV of B.C.C.L mines under administrative control of Western Jharia Area of B.C.C.L (Jharia Coalfield) is located in Dhanbad district of Jharkhand. Lohapatty UG and Lohapatty OC patch (proposed) are under the administrative control of Western Jharia Area of Bharat Coking Coal Limited (B.C.C.L - A Subsidiary of Coal India Limited). The Cluster- XIV is located in western part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out upto 08 years considering annual target production of 0.526 MTPA. Cluster-XIV mine involves leasehold area of about 1418.25 Ha of land. It covered in Survey of India toposheet no. 73 I/2.

The present leasehold area of Cluster-XIV is 1418.25 Ha. The topography of the area is undulating with slope towards south west. The maximum RL is 224 m in the north-eastern part whereas the minimum RL is 170 m above mean sea level on the south-western part of the area. Jamunia River and its tributaries are controlling the drainage of the area. The area comes under the watershed area of Jamunia River.

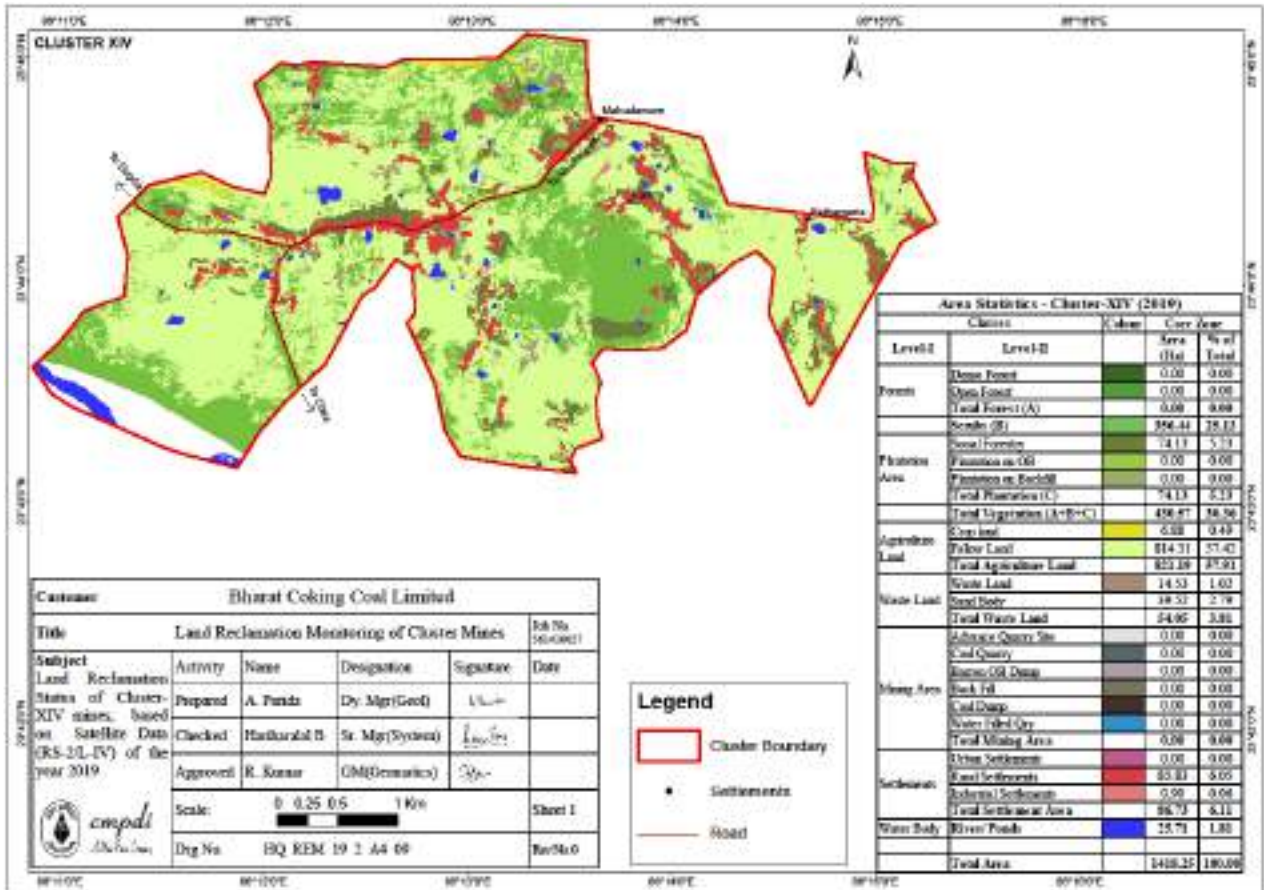
Monitoring stations (**B-23, B-24 and B-67**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	B-23	Lohapatti	4.12	1.24	1.44	1.81	3.24	0.77	1.76	2.69	2.84	1.12	1.34	2.24
2	B-24	Telmuchu	5.68	1.55	2.08	3.07	5.48	1.13	3.53	4.38	4.58	1.23	2.33	3.63
3	B-67	Simatanr	8.95	2.45	2.95	3.65	7.55	1.83	3.95	5.90	8.57	3.37	4.35	4.65
Average WL (bgl)			6.25	1.75	2.16	2.84	5.42	1.24	3.08	4.32	5.33	1.91	2.67	3.51

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 2.84 m Max – 8.95 m
Post-monsoon GW Level (m): Min – 1.34 m Max – 4.35 m

LAND USE / LAND COVER MAP OF THE CLUSTER-XIV MINES, BCCL



Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	1251.76 x 10 ⁴	0.0	1251.76 x 10 ⁴
2	Open Land	79.76 x 10 ⁴	0.0	79.76 x 10 ⁴
3	Road/ Paved Area	85.83 x 10 ⁴	0.0	85.83 x 10 ⁴
4	Roof top area of building/ sheds	0.90 x 10 ⁴	0.0	0.90 x 10 ⁴
5	Total	1418.25 x 10 ⁴	0.0	1418.25 x 10 ⁴

N. GROUND WATER LEVEL OF CLUSTER-XV

Cluster - XV of B.C.C.L mines under administrative control of Govindpur Area and barora Area of B.C.C.L (Jharia Coalfield) is located in Dhanbad district of Jharkhand. Cluster-XV consists of four coal mines; Kharkharee UG (underground mine) and Dharmaband UG are under the administrative control of Govindpur Area and Madhuband UG & Phularitand UG are under the administrative control of Barora Area of Bharat Coking Coal Limited (B.C.C.L - A Subsidiary of Coal India Limited). The Cluster-XV is located in western part of Jharia Coalfield in Dhanbad district of Jharkhand. The life of the project works out upto 30 years considering annual target production of 0.423 MTPA. Cluster-XV mine involves leasehold area of about 1696.55 Ha of land. It covered in Survey of India toposheet no. 73 I/1 and 73 I/5.

The present leasehold area of Cluster-XV is 1696.55 Ha. The topography of the area is undulating with slope towards south-west. The maximum RL is 235 m in the Kharkharee mine area whereas the minimum RL is 165 m AMSL on the eastern & western part of the Cluster. Jamunia River and Khudia River are controlling the drainage of the area. The area comes under the watershed area of both Jamunia River and Khudia River.

Monitoring stations (**A-24, B-32A and B-61A**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A24	Pipratn	10.13		2.78	4.55	4.88	-	4.28	4.68	15.88	1.73	2.48	4.08
2	B32A	Madhuband	5.60	1.34	1.70	2.30	3.30	1.18	2.00	2.21	5.55	1.25	1.70	2.35
3	B61A	Kesargora	4.42	0.47	0.97	0.97	3.32	0.85	1.60	2.07	3.35	1.39	0.52	1.12
Average WL (bgl)			6.72	0.91	1.82	2.61	3.83	1.02	2.63	2.99	5.39	7.97	3.63	4.27

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 3.32 m Max – 15.88 m
Post-monsoon GW Level (m): Min – 0.52 m Max – 4.28 m

LAND COVER MAP OF CLUSTER XV, CHAUDHARY BUGGA

Legend

- Cluster Boundary
- Block Boundary
- Road
- Water Body
- Urban Settlements
- Block Boundary

Scale

0 500 1000 Meters

Cluster XV Land Cover Data

Class	Code	Area (Hectares)	Percentage (%)
Forest	1	15.45	1.54
Forest	2	20.07	2.01
Forest	3	2.25	0.23
Total Forest		37.77	3.78
Agriculture	4	4.08	0.41
Agriculture	5	4.76	0.48
Total Agriculture		8.84	0.89
Mining Area	6	33.87	3.39
Mining Area	7	4.34	0.44
Total Mining Area		38.21	3.83
Water Bodies	8	30.09	3.02
Water Bodies	9	4.35	0.44
Total Water Bodies		34.44	3.46
Urban Settlements	10	20.07	2.01
Urban Settlements	11	4.76	0.48
Total Urban Settlements		24.83	2.49
Other Land	12	1.54	0.16
Other Land	13	1.54	0.16
Total Other Land		3.08	0.31
Total		1000.00	100.00

Sl no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	365.18 x 10 ⁴	0.0	957.34 x 10 ⁴
2	Open Land	1130.53 x 10 ⁴	0.0	538.37 x 10 ⁴
3	Road/ Paved Area	101.67 x 10 ⁴	0.0	101.67 x 10 ⁴
4	Rooftop area of building/ sheds	99.17 x 10 ⁴	0.0	99.17 x 10 ⁴
5	Total	1696.55 x 10 ⁴	0.0	1696.55 x 10 ⁴

O. GROUND WATER LEVEL OF CLUSTER-XVI

Cluster - XVI of B.C.C.L mines under administrative control of Chanch Victoria Area of B.C.C.L (Raniganj Coalfield) is located in Dhanbad district of Jharkhand. The Cluster-XVI (Dahibari-Basantimata Group of mines) is located on the western part of the Raniganj Coalfield and falls within Dhanbad district of Jharkhand. There are total five collieries within this Clusture- XVI (Dahibari-Basantimata OC, Basantimata UG, New Laikdih OC, Laikdih Deep UG and Chanch UG Colliery). All above the mines are contiguous in nature and the environmental impact is overlapping in ambient environment due to cumulative effect of the mining activities. The life of the project works out upto 24 years considering annual target production of 1.963 MTPA. Cluster-XVI mine involves leasehold area of about 2008.40 Ha of land. It covered in Survey of India toposheet no. 73 I/14.

The present leasehold area of Cluster-XVI is 2008.40 Ha. The topography of the area is undulating with slope towards south-west. The area is plain with gently undulating with elevation varying from 100 m to 140 m AMSL. The general slope of the area is towards southeast. Barakar River and Khudia River are controlling the drainage of the area. The area comes under the watershed area of Barakar River.

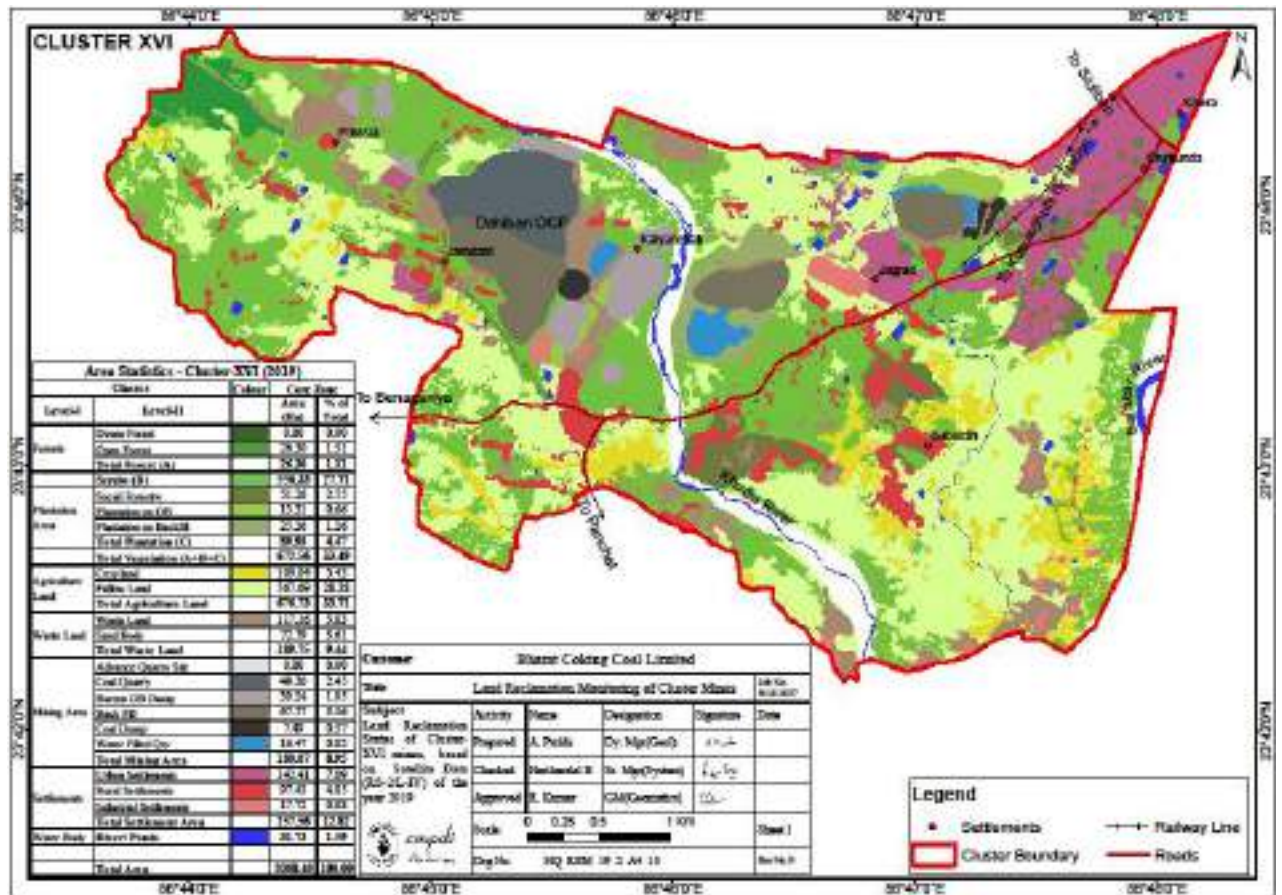
Monitoring stations (**DB-22, DB-23, DB-24 & DB-25**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has done in the months of May'21, August'21, and Nov'21 and January'22, the Ground water level data enclosed in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2021-22				2020-21				2019-20			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	DB22	Dahibari, Basti	2.31	1.55	1.38	1.57	2.63	1.30	2.25	2.38	4.93	1.38	1.63	1.73
2	DB23	Dahibari OC	2.00	1.05	1.10	1.70	2.50	0.70	1.95	2.17	1.60	0.88	0.80	1.00
3	DB24	Dahibari	6.20	4.20	5.25	5.80	3.60	1.57	5.70	5.90	9.35	3.20	3.88	4.80
4	DB25	Basantimata UG	2.83	1.01	2.03	2.63	3.98	1.19	2.63	2.68	-	-	-	-
Average WL (bgl)			3.34	1.95	2.44	2.93	3.18	1.19	3.13	3.28	4.53	1.82	2.10	2.51

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.60 m Max – 9.35 m
Post-monsoon GW Level (m): Min – 0.80 m Max – 5.70 m

LAND USE / LAND COVER MAP OF THE CLUSTER-XVI MINES, BCCL



SI no	Land Use Details	Existing (sq. meter)	Proposed (sq. meter)	Grand Total (sq. meter)
1	Green Belt Area	1349.29 x 10 ⁴	0.0	1349.29 x 10 ⁴
2	Open Land	401.55 x 10 ⁴	0.0	401.55 x 10 ⁴
3	Road/ Paved Area	142.41 x 10 ⁴	0.0	142.41 x 10 ⁴
4	Rooftop area of building/ sheds	115.15 x 10 ⁴	0.0	115.15 x 10 ⁴
5	Total	2008.40 x 10 ⁴	0.0	2008.40 x 10 ⁴

4.0 GROUND WATER LEVEL SCENARIO

The summarized water level data of all clusters given in **Table – 7**.

Table –7: Groundwater level data Cluster-wise

Sl. No.	Cluster of BCCL	No. of Monitoring Wells	Water level fluctuation Below ground level (May, Aug, Nov'21 & Jan'22)	Avg. Fluctuation (in meters) during 2021-22	Geological Formation
1	I	4 nos.	0.25 to 8.38 m	2.93 m	Barakar
2	II	5 nos.	0.30 to 11.26 m	4.02 m	Barakar
3	III	5 nos.	0.24 to 11.26 m	2.92 m	Barakar
4	IV	4 nos.	0.30 to 9.03 m	3.87 m	Barakar
5	V	4 nos.	0.07 to 5.43 m	1.66 m	Barakar
6	VI	2 nos.	0.60 to 10.50 m	5.05 m	Barakar
7	VII	7 nos.	0.62 to 9.52 m	2.03 m	Barakar
8	VIII	4 nos.	0.73 to 9.43 m	2.17 m	Barakar
9	IX	6 nos.	1.34 to 10.70 m	2.85 m	Barakar
10	X	4 nos.	0.45 to 6.60 m	1.97 m	Barakar
11	XI	4 nos.	0.54 to 5.47 m	1.80 m	Barakar & Barren Measure
12	XIII	6 nos.	0.40 to 9.52 m	2.64 m	Raniganj
13	XIV	3 nos.	1.24 to 8.95 m	4.09 m	Raniganj
14	XV	3 nos.	0.47 to 10.13 m	4.90 m	Barakar & Barren Measure
15	XVI	3 nos.	1.01 to 6.20 m	0.90 m	Barakar

Depth to water level (in bgl) values described that water level goes down to maximum 11.26 m during pre-monsoon'2021 and maximum upto 7.62 m during post-monsoon'2021. Un-confined aquifer affected around 20 m to 30 m maximum close to active opencast mining areas, showing steep gradient towards mine void. Other than that, there is no mining effect in the water level within JCF area and RCF area (part). Historical water level data and hydrograph of permanent observation stations from CGWB shown in **Annexure–VI**. Water Table contour map and Depth to water level map shown in **Plate-IV & V**.

Monitoring groundwater (quantity & quality) to assess the present condition and resource has done regularly in the coalfield areas. Well hydrographs (**Annexure–VI**) are prepared and studied to identify long-term trends. Hydrograph trend analysis of CGWB monitoring wells and observation well reveals increasing groundwater level trends in most of the Cluster of mines. However, decline trends in both Pre

and Post-monsoon GW level in Cluster-I, Cluster-V, Cluster-VI and Cluster-VII is recorded but no significant decline trend (>1.0 m/year) of water level is noticed in any particular area for the last 10 years within the coalfield area. Regarding quality monitoring, the water sample location map (**Plate-II**) with collection points details (dug wells) given in **Annexure-V** and Quality is given in **Annexure-VII**.

5.0 GROUND WATER QUALITY

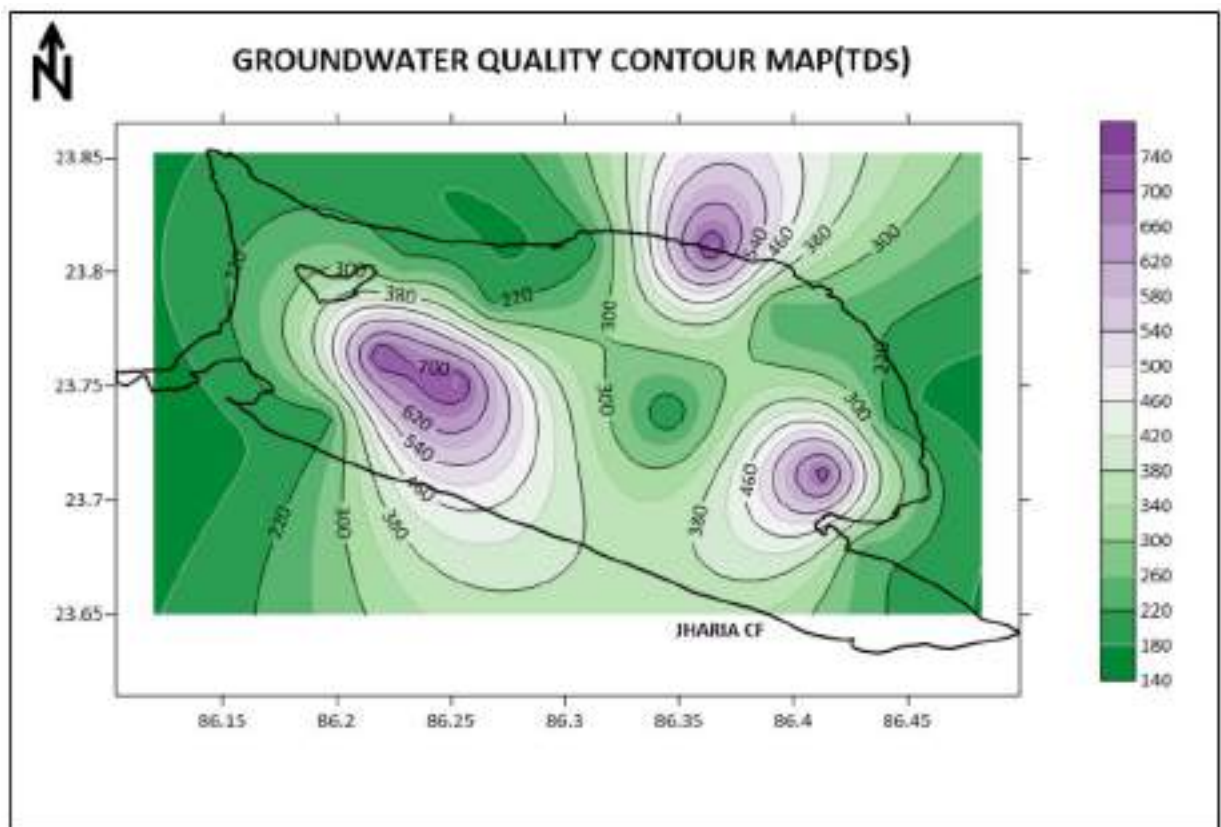
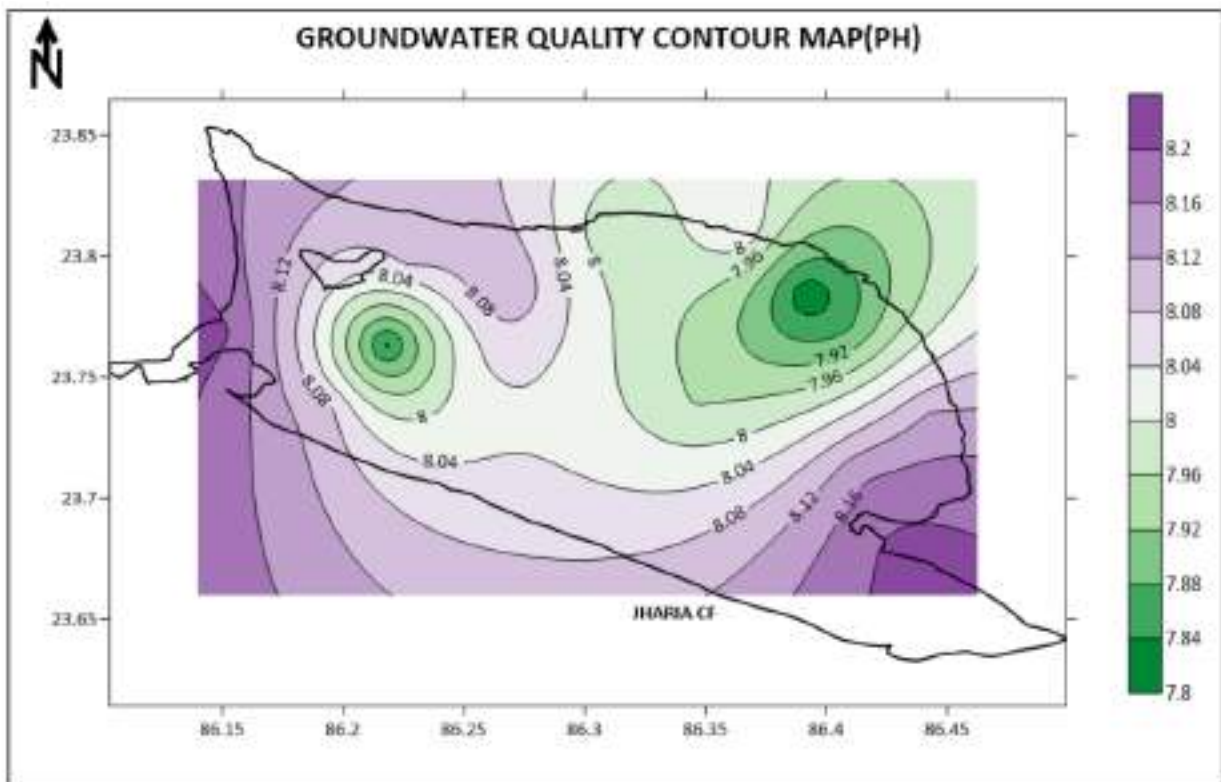
The ground water sample of the study area (15 nos. of Cluster of mines, BCCL) collected from dug wells and analyzed. Fifteen ground water samples (GW-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15 & 16) analyzed during the month of June'2021 at CMPDI, RI-II, Dhanbad. The water sampling details given in **Annexure-V** and Water sample locations shown in **Plate-II**. The water quality data enclosed in **Annexure-VII**.

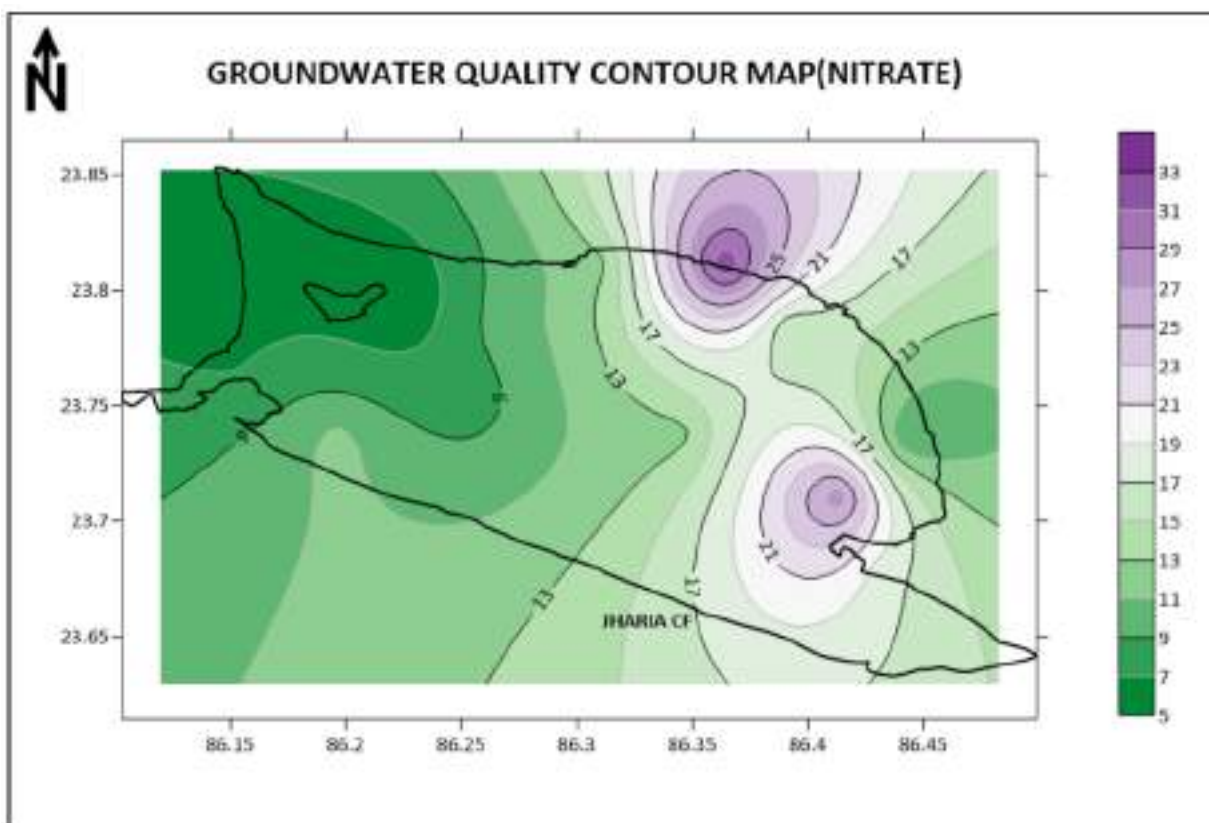
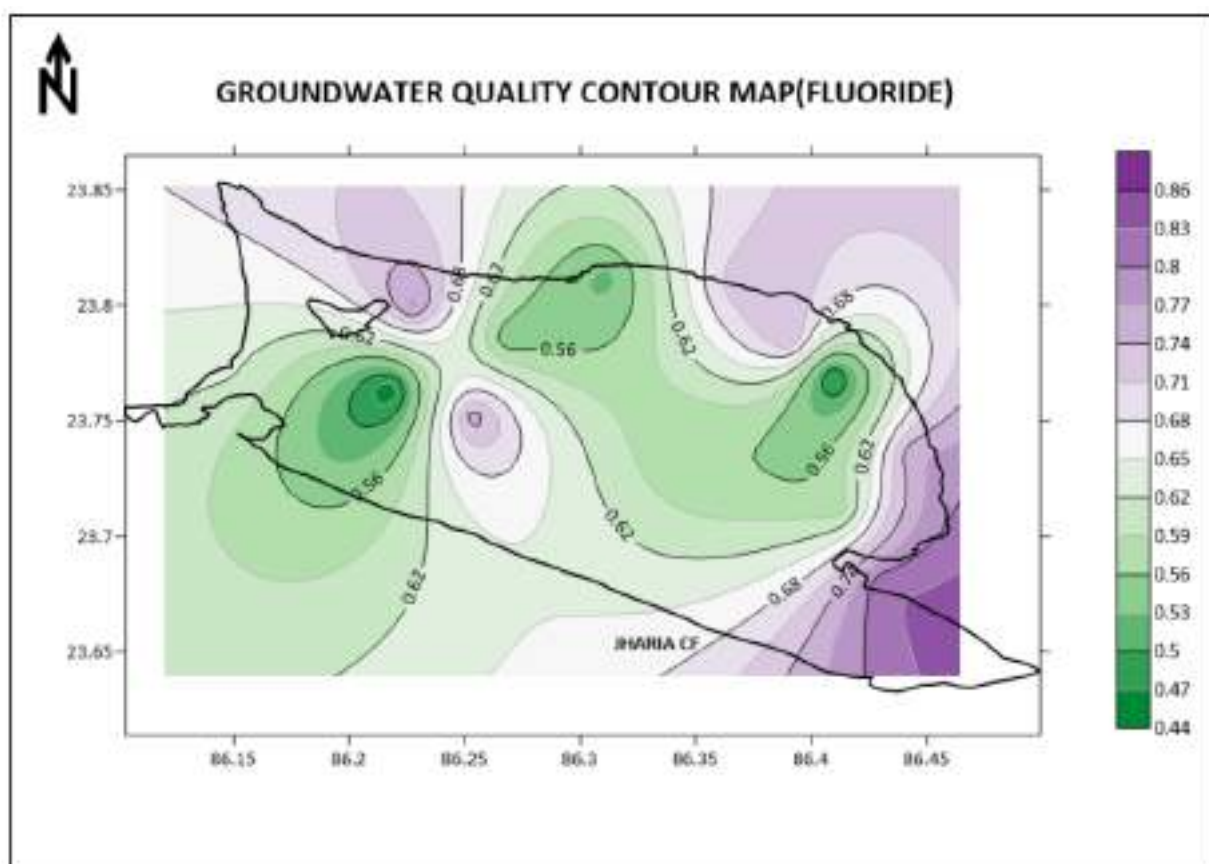
The study of the variations in water quality parameters described below:

The pH of the groundwater samples varies between 7.65 (GW-5) to 8.15 (GW-11), the pH is within the IS 10500 limit of drinking water standard.

The mineral constituents dissolved in water constitute the dissolved solids. The total dissolve solids vary from 425 (GW-1) to 889 mg/l (GW-9), the TDS values ranges slightly above the IS 10500:2012 standards limits of drinking water.

The alkalinity of the water samples varies from 101 (GW-14) to 182 mg/l (GW-7) and are within the stipulated standard of (200 mg/l) drinking water. The concentrations of calcium in the water samples vary from 41 (GW-1) to 158 mg/l (GW-13) and are **slightly above** the permissible limit (75 mg/l) of drinking water standards. The total hardness ranges between 226 (GW-8) to 638 mg/l (GW-5) and the value of total hardness in water samples are **above** the permissible limit (200 mg/l). The sulphate ranges between 31 (GW-1) to 187 mg/l (GW-16) and the value of sulphate in water sample are within the permissible limit (200 mg/l). The Iron, Copper, Manganese, Lead, Zinc and Chromium concentration in the water samples found to be below the upper ISI limits for drinking water.





6.0 STAGE OF GROUNDWATER EXTRACTION

The groundwater mainly utilized for domestic needs and for irrigation purposes. The groundwater abstraction is mainly through dug wells and bore wells. The stage of groundwater development in Dhanbad District is 76.30% (as per 2017 GWRE). The highest stage of development is in Jharia Block (127.0%) & Dhanbad Block (107.50%) and lowest stage of development is in Baliapur Block (78.24%) as per GWRE-2013. The Gondwana sandstones in general, known to constitute good aquifers at many places. However, the yield potential of the area adjoining to active mines in the coal belt is poor. The active mines often act as groundwater “sinks”. In contrast, the water logged abandoned mines and pits act as potential sources of groundwater. As per the assessment by Central Ground Water Board (CGWB), Patna in 2017, Block wise data of Dhanbad District given below:

Table–8A: Block wise Stage of Groundwater development

SI No.	Administrative Unit		Stage of GW Development	Category (GWRE-2013)	Category (GWRE-2017)
	District	Block			
1	Bokaro	Bermo	156.30%	Over- exploited	Over- exploited
2	Dhanbad	Baghmara	91.74%	Critical	Critical
3	Dhanbad	Baliapur	78.24%	Semi- Critical	Semi- Critical
4	Dhanbad	Dhanbad	107.50%	Over- exploited	Over- exploited
5	Dhanbad	Jharia	127.0%	Over- exploited	Over- exploited
6	Dhanbad	Topchachi	98.45%	Critical	Critical

- **Dynamic Groundwater Resource Assessment, CGWB as per 2013 & 2017.**

Table-8B: Cluster wise Groundwater development scenario

Cluster/ Area	Adminis- trative Blocks/Stage Of GW Extraction	Total Water demand (cum/day)				Avg. GW level (bgl in m) 2021-22		GW level declining trend 2005-2021		Remarks
		Mine Discharge + BH pumping	Surface Water Source	Total Use (Domestic + Industrial)	Excess Or other use	Pre- monsoon	Post- monsoon	Pre- monsoon	Post- monsoon	
Cluster-I	Bermo (SOD: Over- exploited)	2173 (2065+108)	NIL	2112 (1698+414)	61	5.10	1.07	YES	YES	Recharge structure needed
Cluster-II	Baghmara (SOD: Critical)	8350	Jamunia river	6737 (2755+3982)	1613	6.12	2.10	NO	NO	Excess mine water needed to be utilized
Cluster-III		12760 (10960+1800)	NIL	8946 (7849+1097)	3814	5.66	2.74	NO	NO	
Cluster-IV		5900	MADA	5100 (3605+1495)	800	6.08	2.21	NO	NO	
Cluster-V		12690 (11025+1665)	MADA	11063 (5710+5353)	1897	2.80	1.15	YES	YES	
Cluster-VI	Dhanbad	4150	MADA	4150 (1664+2486)	0.0	7.37	2.32	YES	NO	--
Cluster-VII	(SOD: Over- exploited)	21565	MADA	20826 (17596+3230)	739	4.66	2.63	YES	YES	Excess mine water needed to be utilized water
Cluster-VIII	Jharia (SOD: Over- exploited)	9320	MADA	5294 (3730+1564)	4026	5.01	2.84	NO	NO	
Cluster-IX		12980	MADA	9358 (4549+4809)	3622	5.82	2.97	NO	NO	
Cluster-X		11825	Damodar river	6201 (4255+1946)	5624	4.48	2.51	YES	NO	
Cluster-XI	Dhanbad (SOD: Over- exploited)	24960	MADA & DVC	19425 (14015+5410)	5535	2.82	1.48	NO	NO	
Cluster-XIII	Baghmara	750	Damodar river	692	58.0	5.47	2.83	NO	NO	--
Cluster-XIV	(SOD: Critical)	943	NA	668	275	6.25	2.16	NO	NO	--
Cluster-XV		6200	NA	5941 (4600+1341)	259	6.72	1.82	NO	NO	--
Cluster-XVI	Nirsa (SOD:Safe)	1910	DVC (Barakar river)	1730 (1380+350)	180	3.34	2.44	NO	NO	--

MADA – Mineral Area Development Authority, Jharkhand, Dhanbad (payment basis).

DVC – Damodar Valley Corporation, Maithon/Panchet, Jharkhand (payment basis).

7.0 IMPACT OF MINING ON GROUND WATER REGIME

7.1 GENERAL CONSEQUENCES OF COAL MINES ON AMBIENT HYDROGEOLOGICAL REGIME

Mining of coal either by opencast or underground method is bound to incise one or more water bearing strata (aquifers) which in turn may result in depletion or draw down in water levels and a corresponding inflow of water into the mine workings. The potential effects of coal mining operations on the hydrogeological regime are as under:

- ❖ Creates disruption in formation/aquifer
- ❖ Dewatering of aquifers
- ❖ Change in hydraulic gradient
- ❖ Modification of recharge to aquifers
- ❖ Change in groundwater flow pattern

The general need in mine planning from the hydrogeological point of view is the estimation of make of water (ground water seepage) into the mine, its rate, the mine pumping capacity to meet the storm rainwater accumulation, extent of depression of water surface and management of mine effluent (mine water). It is also desirable that the consequences of mining operation on the groundwater regime be determined in advance. However, the mine pumping in most of the cases are passive dewatering for the safety of the mine pit, active mine dewatering is done in few cases for very high potential aquifers.

7.2 POTENTIAL CONSEQUENCES OF OPENCAST AND UNDERGROUND COAL MINES OF JHARIA COALFIELD ON HYDROGEOLOGICAL REGIME

Generally, in the opencast and underground mines of Jharia Coalfield, alluvium and overlying weathered mantle are the first to excavate followed by upper Barakar Formation / Aquifer. Since these formations vary in thickness, compaction and their constituents over the area, their aquifer properties also vary.

The porosity and the compactness in the sandstone controls the discharge from these aquifers. The alluvium and weathered Formation wherever loose and fragile possess more porosity and this has high groundwater potential. Due to the mine cut, the depression in the water table created. The initial discharges due to this depression is large in amount due to concentration of flow to that region. In the top zones, water table condition prevails and away from the opening in the stratified section, semi-confined conditions exist. With progress of mine operations, there is an increase in the depth of incision as a result; the semi-confined aquifers are also punctured.

During mining the hydraulic gradients generally, steepens down near mine i.e. within the mine influence area. In the up-dip region, only un-confined aquifer punctured through the mining process and thus only it

affected whereas in the down-dip region both un-confined and semi-confined aquifers may be affected. The confined aquifers of lower Barakar Formation in the mining area not punctured as it lies below the working coal seams and hence normally there is no noticeable effect in the aquifer related to this formation.

7.3 ESTIMATION OF RADIUS OF MINE INFLUENCE ZONE

Radius of Influence can be defined as the radial distance from the center of the borehole to the point where there is no lowering of groundwater table/potentiometric surface.

The radius of influence (R) for Opencast and UG Mines within Jharia CF calculated by using Sichardt's formula based on present mining scenario.

$$R_0 = C \cdot (H-h) \cdot \sqrt{K}$$

Where, R_0 - Radius of influence (m), C - Constant = 3000,

(H-h) - Drawdown (m), K - Hydraulic conductivity (m/s).

Here, K has used for Barakar Formations i.e. 0.05 m/d or 5.7×10^{-7} m/sec.

It may be appropriate to mention here that the presence of prominent boundaries/water bodies, faults or interfringing of sandstone and shale beds may restrict propagation of the drawdown cone. With the presence of low permeable beds such as clay/shale and younger coal seams in the formation, laying above the working seams the water level in the phreatic aquifer not directly affected. During the working of board and pillar method, subsidence takes place during the extraction of total coal (depillaring), both the phreatic and semi-confined aquifers get affected. Surface vigilance and filling up subsided zone, if any, has to constantly be in view. The effect on groundwater level for most of the coalmine in Jharia coalfield has been observed in the down-dip side, generally within a distance upto 500 m and becomes milder/negligible thereafter.

8.0 CONSERVATION MEASURES & FUTURE STRATEGY

- BCCL has installed 25 Pressure Filter Plant of total capacity of 4.16 MGD to meet drinking water requirement nearby the area. At present 63 Water Treatment Plants are operational having capacity of 16.16 MGD within Jharia Coalfield area. Further installation of 28 more Pressure Filter Plants with the capacity of 5.84 MGD are in progress.

- BCCL participated in development of low cost technology for drinking water in a CSIR project along with CIMFR, Dhanbad and a pilot plant of 4000 Liters/hour is functional at PB Project site of BCCL. Similar plant has proposed at other sites of BCCL.
- A scheme entitled 'Scheme for multi-purpose utilization of surplus mine water of Barora Area, Block II and Govindpur Area of BCCL' was prepared with a view to harness the excess water discharge to take care of the persistence problem of water scarcity in the nearby villages. In the scheme, two water reservoirs of capacity 27 MG and 17 MG have been proposed in the non-coal bearing area for storage of 3250 GPM and 2000 GPM surplus mine water which will be fed through pipe line by mine discharge at mines of Barora, Block-II and Govindpur Area.
- Rooftop rainwater harvesting (RWH) will took up in the project area using the administrative buildings. 138 no. of quarters having roof-top area of about 14950 sq. m. is already prepared to harvest rainwater and around 13150 cum/annum of water is going to be recharged the nearby groundwater system through RWH structures. Proposal already made to facilitate this kind of RWH structure at suitable locations i.e. Lodna Area, Kusunda Area (Jawahar Nagar, Matkuria, Coal Board Colony), Sijua Area (Nichitpur and Tetulmari Colony) within Jharia Coalfield to augment groundwater recharge.
- After cessation of mining, with plenty rainfall and abundant ground water recharge, the water levels will recoup and attain normalcy. Thus, the impact of mining on groundwater system may considered as a temporary phenomenon. The abandoned mine workings (UG) behave as water pool and improves the resources availability in the coalfield area.
- Utilization of treated mine water discharge by both industry and local people in the mine influence area. The excess mine water can be used to recharge groundwater system through connecting pipeline to abandoned dug wells. Utilization of mine water for irrigation use will also enhance the ground water recharge potential through artificial recharge in the area.
- Increase vegetative cover by plantation in the mine area under land amelioration measures. This will contain the surface run-off and increase the groundwater recharge.
- Creation of awareness among workers and local peoples about Rainwater harvesting and artificial recharge will have priority. This aspect usually covered during the Environmental Week celebrated every year (5 to 12 June).
- 23 nos. of Piezometer proposed to install within JCF and RCF to monitor GW level (**Plate-III**).

Monitoring of water quality of mine water discharge, local River/nala and domestic water source (dug well/hand pump wells) will continued under routine monitoring (May, August, November & Jan).

9.0 EXISTING/PROPOSED RAINWATER HARVESTING STRUCTURES IN BCCL COAL MINES

Fig-3 to 4.



Proposed Rain Water Harvesting Site GVTC, Cluster-I, Barora Area



Proposed Rain Water Harvesting Site Nehru Balika Vidhalaya, Cluster-I, Barora Area

Fig-5 to 6.



Proposed Rain Water Harvesting Site Barora Area Guest House, Cluster-I, Barora Area



Proposed Rain Water Harvesting Site Regional Hospital Baghmara, Cluster-I, Barora Area

Fig-7 to 8.



Proposed Rain Water Harvesting Site – Barora Area Office, Cluster-I, Barora Area

RECHARGE POND / ABANDONDED IN THE JCF MINE AREA

Fig-9 to 10.



RECHARGE POND / ABANDONDED IN THE JCF MINE AREA



RECHARGE POND / ABANDONDED IN THE JCF MINE AREA

Fig-11 to 12.



RECHARGE POND / ABANDONDED IN THE JCF MINE AREA



RECHARGE POND / ABANDONDED IN THE JCF MINE AREA

Fig-13 to 14.



RECHARGE POND / ABANDONDED IN THE JCF MINE AREA



FILTER PLANT IN THE MINE AREA

Fig-15.



Government of India
Ministry of Environment, Forest and Climate Change
Wetlands Division

List of Ramsar Sites in India

S. No	Name of Ramsar site	State	Area in hectares	Date of designation	Coordinates
1.	Ashtamudi Wetland	Kerala	6,140	19/08/2002	08°57'N 076°34'E
2.	Beas Conservation Reserve	Punjab	6,429	26/09/2019	31°23'N 075°11'E
3.	Bhitarkanika Mangroves	Odisha	65,000	19/08/2002	20°39'N 086°54'E
4.	Bhoj Wetland	Madhya Pradesh	3,201	19/08/2002	23°13'N 077°19'E
5.	Chandertal Wetland	Himachal Pradesh	49	08/11/2005	32°28'N 077°36'E
6.	Chilika Lake	Odisha	116,500	01/10/1981	19°42'N 085°21'E
7.	Deepor Beel	Assam	4,000	19/08/2002	26°07'N 091°39'E
8.	East Calcutta Wetlands	West Bengal	12,500	19/08/2002	22°27'N 088°27'E
9.	Harike Lake	Punjab	4,100	23/03/1990	31°13'N 075°12'E
10.	Hokera Wetland	Jammu & Kashmir	1,375	08/11/2005	34°04'N 074°42'E
11.	Kanjli	Punjab	183	22/01/2002	31°25'N 075°22'E
12.	Keoladeo National Park (MR)	Rajasthan	2,873	01/10/1981	27°13'N 077°31'E
13.	Keshopur-Miani Community Reserve	Punjab	344	26/09/2019	32°05'N 075°23'E
14.	Kolleru Lake	Andhra Pradesh	90,100	19/08/2002	16°37'N 081°12'E
15.	Loktak Lake (MR)	Manipur	26,600	23/03/1990	24°25'N 093°49'E
16.	Nalsarovar	Gujarat	12,000	24/09/2012	22°46'N 072°02'E
17.	Nandur Madhameshwar	Maharashtra	1,437	21/06/2019	20°01'N 074°06'E
18.	Nangal Wildlife Sanctuary	Punjab	116	26/09/2019	31°23'N 076°22'E
19.	Nawabganj Bird Sanctuary	Uttar Pradesh	225	19/09/2019	26°36'N 080°39'E
20.	Parvati Arga Bird Sanctuary	Uttar Pradesh	722	02/12/2019	26°56'N 082°09'E
21.	Point Calimere Wildlife and Bird Sanctuary	Tamil Nadu	38,500	19/08/2002	10°19'N 079°37'E
22.	Pong Dam Lake	Himachal Pradesh	15,662	19/08/2002	32°01'N 076°04'E
23.	Renuka Wetland	Himachal Pradesh	20	08/11/2005	31°37'N 077°27'E
24.	Ropar	Punjab	1,365	22/01/2002	31°01'N 076°30'E
25.	Rudrasagar Lake	Tripura	240	08/11/2005	23°28'N 091°16'E
26.	Saman Bird Sanctuary	Uttar Pradesh	526	02/12/2019	27°00'N 079°10'E
27.	Samaspur Bird Sanctuary	Uttar Pradesh	799	03/10/2019	25°59'N 081°23'E
28.	Sambhar Lake	Rajasthan	24,000	23/03/1990	27°00'N 075°00'E
29.	Sandi Bird Sanctuary	Uttar Pradesh	309	26/09/2019	27°18'N 079°58'E
30.	Sarsai Nawar Jheel	Uttar Pradesh	161	19/09/2019	26°58'N 079°15'E

Annexure – IV**Rainfall Data (in mm) At Dhanbad Observatory Station, IMD (Source: WRIS Website data)**

Year	January	February	March	April	May	June	July	August	Sep	Oct	Nov	Dec	Annual
1994	26.5	20.0	3.3	23.5	4.5	289.5	245.5	240.0	134.0	40.5	0.0	0.0	1027.3
1995	15.0	18.3	20.0	0.0	34.5	122.0	140.1	257.0	446.0	0.0	34.0	5.5	1092.4
1996	12.5	12.5	5.2	0.0	0.0	210.5	138.5	400.0	214.0	24.0	0.0	0.0	1017.2
1997	10.5	17.5	2.8	63.5	41.5	231.5	599.3	621.1	196.8	16.5	34.0	16.0	1851.0
1998	20.5	21.0	160.0	18.0	40.0	80.0	347.0	409.0	123.0	120.5	11.0	0.0	1350.0
1999	0.0	0.0	0.0	0.0	64.0	150.0	511.0	336.0	510.5	124.0	0.0	0.0	1695.5
2000	2.0	15.0	0.0	20.0	68.0	452.5	270.5	89.0	234.5	-	0.0	0.0	1151.5
2001	0.0	0.0	34.0	13.0	104.0	448.7	552.5	121.0	107.0	126.5	0.0	0.0	1506.7
2002	12.0	10.0	26.0	0.0	32.5	185.0	150.0	125.5	310.0	64.0	0.0	0.0	915.0
2003	6.0	58.5	38.5	40.0	24.0	-	366.1	279.0	145.1	151.6	0.0	2.3	1111.1
2004	18.45	2.13	1.55	53.93	9.53	95.95	408.57	261.07	174.01	63.01	51.10	12.85	1152.15
2005	44.49	23.11	26.16	17.90	28.95	272.26	388.86	158.86	69.03	117.63	0.09	1.67	1149.01
2006	0.00	0.00	3.11	12.64	86.68	113.20	505.72	316.06	339.51	9.80	3.73	0.00	1390.45
2007	0.00	58.69	35.76	21.08	25.33	139.60	666.30	416.85	363.93	43.63	1.57	0.00	1772.74
2008	16.44	1.96	6.27	6.78	37.26	180.58	422.25	275.33	198.31	27.64	0.00	0.00	1172.82
2009	0.00	0.26	5.81	0.19	105.82	78.32	232.20	370.39	429.16	68.56	11.31	0.98	1303.00
2010	0.59	19.64	7.62	38.24	93.72	146.68	157.31	198.97	239.75	78.76	5.26	40.53	1027.07
2011	0.00	1.60	18.25	12.81	102.58	294.61	174.35	445.43	214.88	30.35	0.69	0.00	1295.55
2012	18.45	2.13	1.55	53.93	9.53	95.95	408.57	261.07	174.01	63.01	51.10	12.85	1152.15
2013	0.07	17.62	0.79	15.24	105.51	176.77	170.14	276.70	135.76	304.46	0.00	0.00	1203.06
2014	9.27	35.71	21.21	8.16	62.77	112.58	283.73	223.38	214.48	30.30	0.00	0.00	1001.59
2015	12.06	3.33	26.71	45.73	32.91	162.96	385.21	239.38	71.34	15.62	0.00	0.61	995.86
2016	6.16	17.59	1.73	1.33	73.90	197.34	248.86	395.33	424.81	30.45	0.00	0.00	1397.50
2017	5.12	0.00	34.96	59.89	81.01	141.66	502.58	168.84	111.95	274.18	0.64	4.12	1384.95
2018	0.00	0.06	2.90	159.52	31.22	202.84	344.59	211.91	153.63	16.31	0.04	20.99	1144.01
2019	0.00	25.18	7.24	46.99	109.43	109.11	292.02	234.65	327.95	199.63	0.10	5.13	1357.43
2020	21.14	5.94	74.96	27.94	71.32	218.12	187.01	258.74	196.87	52.23	1.23	0.00	1115.50

Annexure – IV**Rainfall Data (in mm) At Dhansar (Rescue station) Observatory Station
State Sec Deptt of Coord, BCCL**

Year	January	February	March	April	May	June	July	August	Sep	Oct	Nov	Dec	Annual
2005	34.20	22.80	41.80	32.20	33.00	193.00	542.00	107.80	185.60	39.20	0.00	2.00	1233.60
2006	0.00	0.00	34.40	33.80	87.60	214.20	477.70	246.30	172.00	0.00	1.00	0.00	1267.00
2007	0.00	22.00	37.80	0.00	78.70	167.20	545.00	426.40	351.40	52.00	0.00	0.00	1680.50
2008	5.80	4.80	17.80	18.40	18.00	216.10	433.48	183.80	297.80	85.80	0.00	0.00	1281.78
2009	0.00	0.00	1.60	2.20	112.00	72.80	269.20	192.80	333.00	98.20	10.20	0.00	1092.00
2010	0.00	12.20	7.60	9.20	64.30	206.20	199.40	212.60	230.10	45.30	3.4	----	991.90
2011	7.60	0.00	18.0	11.40	121.60	344.20	163.40	452.0	374.0	41.80	0.00	0.00	1534.20
2012	17.6	13.4	1.0	9.0	6.60	52.0	328.20	315.10	367.70	11.60	61.60	18.0	1201.80
2013	0.0	32.0	3.0	33.90	190.40	244.20	192.80	364.40	304.70	233.60	0.0	0.0	1599.0
2014	12.40	36.80	21.80	2.60	79.80	217.60	305.30	315.60	178.0	6.40	0.0	0.0	1176.0
2015	23.80	0.0	6.20	76.20	35.80	122.10	407.60	244.40	145.20	25.60	0.0	6.20	1093.10
2016	3.0	20.60	5.50	0.0	99.40	181.60	248.80	456.70	443.60	50.40	0.0	0.0	1509.60
2017	8.80	0.0	3.80	17.90	33.20	120.0	533.40	284.70	247.40	207.70	3.40	0.0	1460.30
2018	0.0	0.0	0.0	102.90	76.30	270.60	382.30	338.80	159.50	38.90	2.40	37.90	1346.60
2019	0.0	49.60	10.20	54.20	132.0	188.0	319.10	343.60	403.10	156.40	3.20	10.80	1667.00
2020	22.0	7.60	77.80	76.80	86.20	214.10	296.80	351.40	214.0	92.0	0.0	0.0	1438.70

Location of Hydrograph Stations (Dug Wells)

Well No	Latitude	Longitude	Well No	Latitude	Longitude
A-3	23°47'53.35" N	86°19'55.14" E	B-64	23°48'43.14" N	86°18'44.25" E
A-12	23°48'20.31" N	86°16'51.64" E	B-65A	23°48'53.65" N	86°18'11.82" E
A-16	23°46'57.00" N	86°21'38.57" E	B-67	23°43'30.70" N	86°14'01.45" E
A-17	23°45'09.44" N	86°22'16.35" E	D-3	23°46'46.31" N	86°24'49.30" E
A-18	23°44'37.65" N	86°22'58.90" E	D-4	23°44'29.37" N	86°24'42.88" E
A-19	23°41'12.86" N	86°23'55.27" E	D-5	23°42'20.05" N	86°24'86.06" E
A-20	23°44'56.64" N	86°19'55.35" E	D-7	23°43'12.08" N	86°27'11.89" E
A-22	23°43'06.65" N	86°14'48.53" E	D-8	23°44'06.13" N	86°27'20.72" E
A-23	23°45'06.38" N	86°15'12.69" E	D-23	23°47'20.89" N	86°20'09.96" E
A-24	23°45'20.44" N	86°13'45.12" E	D-25	23°47'03.28" N	86°23'29.56" E
A-25	23°47'06.20" N	86°15'27.79" E	D-30	23°48'36.10" N	86°21'50.07" E
A-26	23°46'49.24" N	86°18'12.12" E	D-33	23°45'34.62" N	86°23'18.50" E
A-27	23°48'42.55" N	86°20'21.80" E	D-34	23°45'36.50" N	86°23'02.45" E
A-28A	23°47'34.74" N	86°18'04.18" E	D-35	23°40'46.54" N	86°25'46.33" E
A-29	23°47'08.02" N	86°16'02.72" E	D-36	23°40'19.26" N	86°25'18.98" E
A-32	23°44'15.56" N	86°20'43.80" E	D-39	23°43'28.50" N	86°26'0.10" E
A-33	23°44'32.58" N	86°16'58.28" E	D-40A	23°43'20.18" N	86°25'45.70" E
A-34	23°42'58.63" N	86°15'19.31" E	D-41	23°42'40.00" N	86°26'17.20" E
B-1	23°48'48.06" N	86°14'16.87" E	D-43*	NA	NA
B-14	23°48'00.81" N	86°16'25.88" E	D-47	23°45'20.59" N	86°24'34.86" E
B-15	23°46'06.92" N	86°08'59.30" E	D-49	23°44'08.96" N	86°26'32.71" E
B-21A	23°45'10.50" N	86°09'36.38" E	D-51	23°44'20.86" N	86°27'11.37" E
B-23	23°44'13.05" N	86°11'46.56" E	D-55	23°43'58.37" N	86°24'07.45" E
B-24	23°44'26.80" N	86°13'09.38" E	D-74	23°41'33.66" N	86°25'06.10" E
B-25	23°44'44.98" N	86°13'57.80" E	D-77	23°41'00.74" N	86°22'25.55" E
B-32A	23°45'49.18" N	86°13'03.64" E	D-80	23°46'09.46" N	86°24'33.08" E
B-48	23°44'35.09" N	86°16'38.30" E	DB-22	23°43'38.81" N	86°45'09.00" E
B-51	23°47'40.20" N	86°09'11.90" E	DB-23	23°43'44.24" N	86°45'06.39" E
B-53	23°45'55.25" N	86°09'35.44" E	DB-24	23°43'53.00" N	86°45'03.88" E
B-59	23°47'59.87" N	86°13'37.97" E	DB-25	23°44'10.75" N	86°44'35.84" E
B-60	23°48'7.87" N	86°15'37.12" E			
B-61A	23°45'59.85" N	86°11'40.80" E			
B-62A	23°45'44.15" N	86°11'27.80" E			

Details of Hydrograph Stations (Dug Wells)

Well No	Location	M.P. (agl) in m	Well Dia in m	Well Depth (m bmp)	R.L. (G.L) (m)	Formation	Owner	Utility
A-3	Sijua	0.53	3.00	5.20	203	Barakar	Govt.	Domestic
A-12	Jamua	0.80	1.90	3.30	202	Barakar	Govt.	Domestic
A-16	Ekra, Kalali	0.45	3.10	6.50	205	Barakar	Govt.	Domestic
A-17	Kachi Balihari	0.56	1.60	5.30	182	Barakar	Govt.	Domestic
A-18	Bhagabandh	0.61	1.45	3.37	182	Barakar	Govt.	Domestic
A-19	Bhaura	0.54	3.15	11.65	162	Barakar	Govt.	Domestic
A-20	Gorbhudih	0.43	3.30	8.30	181	BM	Govt.	Domestic
A-22	Nagdah, Niche	0.00	1.40	9.50	171	Raniganj	Govt	Irrigation
A-23	Machhyara	0.43	1.85	12.40	203	Raniganj	Govt	Domestic
A-24	Pipra Tanr	0.22	1.80	19.55	208	Raniganj	Govt	Domestic
A-25	Sinidih	0.22	2.00	11.30	203	Barakar	Govt	Domestic
A-26	Pasitanr	0.32	1.80	9.65	198	Barakar	Govt	Domestic
A-27	Chandor	0.60	2.50	5.50	221	Barakar	Govt	Domestic
A-28A	Lakarka 6 no.	0.65	1.30	5.25	199	Barakar	BCCL	Domestic
A-29	Aambagan	0.10	2.60	9.15	186	Barakar	Govt	Domestic
A-32	Baludih	0.55	2.30	6.85	182	BM	Govt	Domestic
A-33	Mahuda	0.75	2.00	10.80	195	BM	BCCL	Domestic
A-34	Bhatdih	0.55	3.50	24.50	162	Raniganj	BCCL	Domestic
B-1	Muraidih	0.47	1.80	5.35	212	Talchir	Govt	Domestic
B-14	Mathadih	0.76	2.15	3.75	201	Barakar	Govt	Domestic
B-15	Bera Basti	0.55	1.60	2.50	221	Talchir	Dhanu Roy	Domestic
B-21A	Dugdha	0.55	2.10	10.35	220	Metamorphics	Govt	Domestic
B-23	Lohapati	0.26	3.60	10.85	204	Raniganj	Govt	Domestic
B-24	Telmuchu	0.67	4.35	10.83	207	Raniganj	Govt	Domestic
B-25	Mahuda More	0.10	2.45	8.45	205	Raniganj	Govt	Domestic
B-32A	Madhuband	0.80	4.30	8.60	205	Barakar	BCCL	Domestic
B-48	Mahuda	0.65	2.10	11.50	181	Raniganj	Mosque	Domestic
B-51	Taranga	0.00	2.50	5.75	215	Metamorphics	Bisun	Irrigation
B-53	Karmatanr	0.58	2.70	13.25	195	Barakar	Govt	Domestic
B-59	Khodovaly	0.60	2.40	9.30	202	Barakar	BCCL	Domestic
B-60	Bahiyardi	0.77	3.00	15.60	196	Barakar	BCCL	Domestic
B-61A	Kesargora	0.48	2.00	11.20	201	Barakar	BCCL	Domestic
B-62A	Sadariyadi	0.15	3.10	9.50	188	Barakar	Govt	Domestic

Details of Hydrograph Stations (Dug Wells)

Well No	Location	M.P. (agl) in m	Well Dia in m	Well Depth (m bmp)	R.L. (G.L) (m)	Formation	Owner	Utility
B-64	Keshalpur	0.65	1.10	3.40	195	Barakar	BCCL	Domestic
B-65A	Jhinjipahari	0.95	2.20	12.40	196	Barakar	Shiv Temple	Domestic
B-67	Simatanr	0.55	2.20	11.80	198	Raniganj	Govt	Domestic
D-3	Dhansar	0.60	1.70	8.70	217	Barakar	Govt	Domestic
D-4	Jharia	0.59	1.90	5.73	218	Barakar	Govt	Domestic
D-5	Jiyalgora	0.70	2.80	10.55	183	Barakar	Govt	Domestic
D-7	Golden Pahari	0.67	2.85	10.05	201	Barakar	BCCL	Domestic
D-8	Alokdiha	0.35	1.75	7.57	201	Metamorphics	BCCL	Domestic
D-23	Jogta (Sindra)	0.40	3.10	7.25	205	Barakar	BCCL	Domestic
D-25	Godhar More	0.60	2.75	5.60	219	Barakar	Govt	Domestic
D-30	Borkiboa	0.70	2.00	5.60	221	Talchir	H.Kumbhakar	Domestic
D-33	Kustore-4	0.55	1.85	3.45	196	Barakar	BCCL	Domestic
D-34	Kusunda-7	0.60	1.50	3.45	201	Barakar	BCCL	Domestic
D-35	Patherdih	0.40	2.00	11.20	160	Barakar	BCCL	Domestic
D-36	Sudamdih	0.90	2.00	6.20	141	Barakar	BCCL	Domestic
D-39	Tilabani	0.85	2.00	5.90	178	Barakar	BCCL	Domestic
D-40A	Khapra Dhaora	0.55	1.95	3.70	180	Barakar	Panchayat	Domestic
D-41	Joyrampur	0.50	1.80	4.00	180	Barakar	BCCL	Domestic
D-43	Alagdihi	0.45	2.20	8.90	200	Metamorphics	Govt	Domestic
D-47	Parastanr	0.45	3.20	23.80	206	Barakar	BCCL	Domestic
D-49	Goluckdih	0.55	1.80	6.15	192	Barakar	BCCL	Domestic
D-51	Chankuiya	0.55	3.70	11.90	197	Barakar	BCCL	Domestic
D-55	Hariladih	0.48	2.80	11.80	184	Barakar	Govt	Domestic
D-74	Bhulan Barari	0.10	1.60	12.80	173	Barakar	Govt	Domestic
D-77	Rohoniatanr	0.40	3.15	6.70	156	Barakar	Govt	Domestic
D-80	Bastacolla	0.70	2.50	24.95	219	Barakar	Govt	Domestic
DB-22	Nichebasti	0.67	2.40	10.65	121	Barakar	Govt	Domestic
DB-23	Dahibari OC	0.70	2.30	8.00	-	Barakar	BCCL	Domestic
DB-24	Dahibari	0.60	3.60	13.70	125	Barakar	BCCL	Domestic
DB-25	Palasya	0.37	1.55	5.25	127	Barakar	Govt	Domestic

MP: Measuring Point
Abn.: Abandoned
G.L.: Ground Level

R.L.: Reduced Level **W.L.: Water Level m: Meter**
b.g.l.: Below Ground Level **a.g.l.: Above Ground Level**
bmp: Below Measuring Point **BM: Barren Measure**

Historical Water Level data of Hydrograph Stations

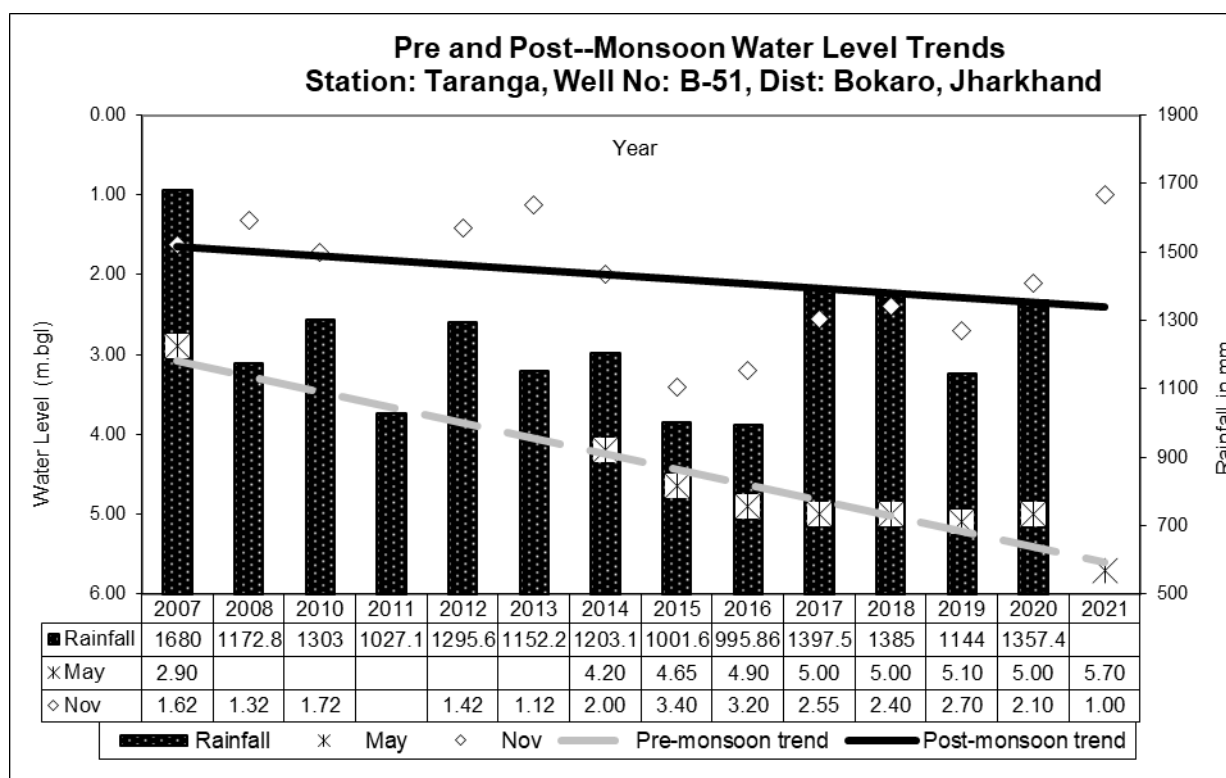
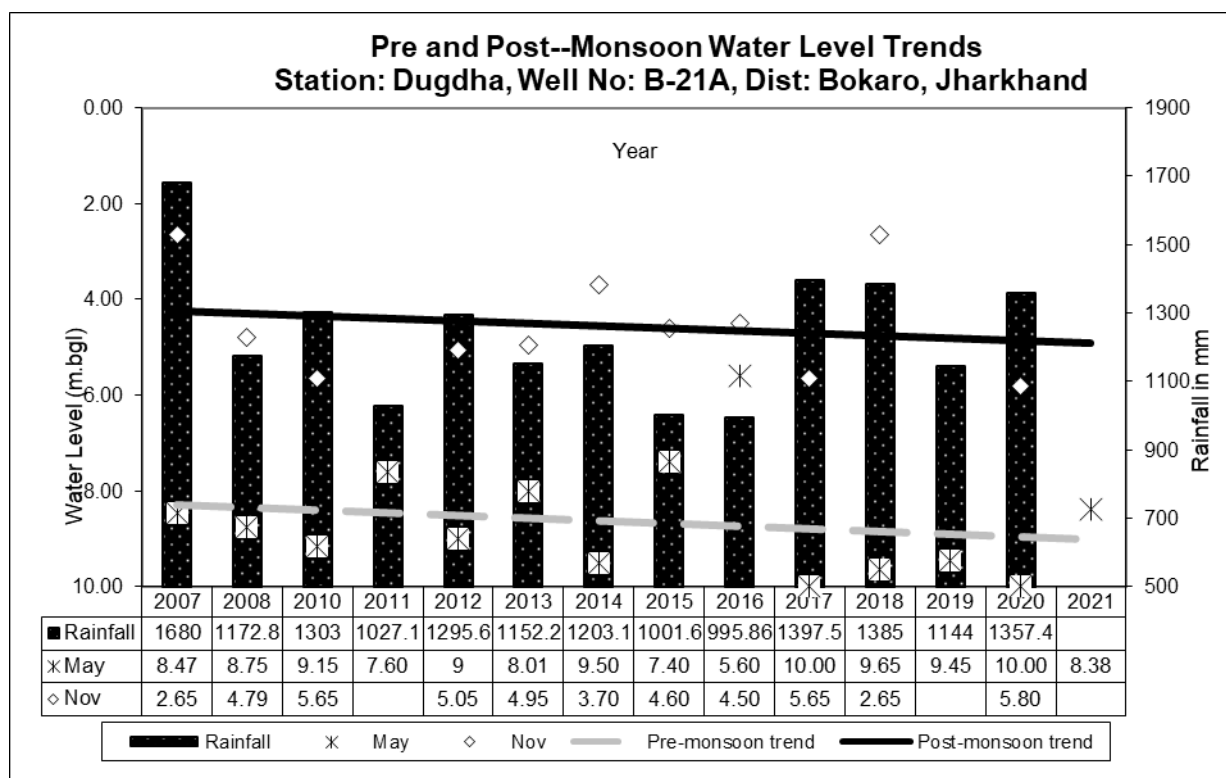
Well No	Water level below ground level (bgl) in meters															
	May 14	Nov 14	May 15	Nov 15	May 16	Nov 16	May 17	Nov 17	May 18	Nov 18	May 19	Nov 19	May 20	Nov 20	May 21	Nov 21
A-3	4.67	2.37	3.70	3.42	4.87	0.47	0.67	0.77	1.27	0.47	3.47	0.47	1.57	0.47	0.62	0.05
A-12	2.45	1.4	3.00	2.68	2.50	0.70	2.55	0.85	2.80	1.0	2.10	0.45	2.60	0.50	1.92	1.10
A-16	5.5	2.9	5.55	4.17	5.85	3.15	3.65	2.20	4.30	3.65	5.45	1.95	7.15	1.75	3.45	2.00
A-17	2.19	1.91	3.79	2.64	2.44	2.69	2.44	2.24	3.34	2.84	2.94	2.24	2.14	1.69	3.36	2.37
A-18	1.76	1.19	2.84	1.29	1.14	0.89	1.29	0.99	1.24	0.99	2.29	0.69	1.09	0.34	1.09	0.57
A-19	3.00	2.75	3.05	2.75	7.81	4.11	6.37	2.45	5.55	2.45	4.85	3.43	6.05	3.25	3.30	1.90
A-20	3.97	2.55	4.59	2.93	7.49	3.50	4.27	1.77	4.57	2.57	4.57	1.82	8.47	3.87	5.47	2.02
A22A	1.50	2.0	3.20	1.96	3.25	1.75	4.27	1.77	3.35	1.30	2.60	2.00	2.90	1.98	2.90	1.10
A-23	8.76	6.82	11.3	9.37	11.87	8.13	6.40	1.50	11.15	7.17	11.97	3.77	8.92	5.62	9.52	2.82
A-24	16.28	14.98	17.2	14.5	16.62	12.43	11.87	6.97	14.58	6.88	15.88	2.48	*4.88	4.28	10.13	2.78
A-25	7.03	5.28	7.78	5.85	7.43	4.58	6.38	2.88	6.63	3.13	6.08	1.93	2.98	1.83	5.78	2.43
A-26	7.71	4.58	7.73	3.18	8.93	4.48	5.28	2.53	6.23	3.88	6.58	3.33	6.98	3.18	6.70	2.73
A-27	1.63	1.55	4.40	3.95	4.85	1.80	2.90	1.25	2.90	1.0	2.40	0.92	2.40	1.10	1.67	0.90
A28A	3.29	1.91	4.35	3.60	3.35	1.47	4.30	1.55	4.15	2.51	2.45	3.15	4.00	3.03	6.23	3.75
A-29	3.3	2.35	4.55	4.60	5.92	6.96	4.40	1.30	6.45	2.10	4.85	3.40	6.20	3.20	6.49	5.90
A-32	3.15	2.45	4.41	2.13	4.75	2.10	3.15	1.55	2.80	0.70	2.75	0.95	1.90	1.75	2.35	0.96
A-33	4.08	1.57	4.91	1.97	5.75	2.60	6.45	1.55	4.07	2.35	3.65	1.25	4.55	1.85	2.85	0.85
A-34	4.45	4.45	8.40	4.81	4.75	4.45	12.45	4.45	5.90	3.70	6.35	3.95	8.35	3.45	5.20	3.55
B-1	2.43	1.81	3.28	2.75	3.58	1.93	2.33	0.85	2.88	2.08	3.18	1.73	3.28	1.63	2.58	1.91
B-14	3.24	4.44	2.94	2.29	2.44	0.47	2.94	1.84	3.64	2.84	2.24	0.94	2.44	1.04	2.84	2.04
B-15	0.95	1.45	1.50	0.45	1.85	0.55	4.85	0.15	1.85	0.85	1.90	1.65	3.70	1.47	1.46	0.35
B21A	9.54	3.7	7.37	4.65	5.55	4.50	8.85	5.65	9.65	2.65	9.45	-	10.00	5.80	8.38	-
B-23	6.57	2.74	7.86	4.29	6.81	2.41	7.74	2.14	6.64	2.14	2.84	1.34	3.24	1.76	4.12	1.44
B-24	9.40	2.21	10.0	5.78	10.63	4.28	10.03	4.03	9.28	4.33	4.58	2.33	5.48	3.53	5.68	2.08
B-25	5.82	5.15	6.88	-	7.05	1.70	6.70	1.40	5.90	3.70	4.80	1.40	7.90	2.55	5.10	2.58
B32A	8.33	2.05	7.55	3.32	6.95	3.07	6.95	2.80	6.75	3.90	5.55	1.70	3.30	2.00	7.23	6.05
B-48	6.38	4.35	7.90	5.42	9.35	4.60	7.70	4.15	7.33	3.97	7.05	4.35	8.20	3.85	7.23	6.05
B-51	2.09	1.98	4.65	3.40	4.90	3.18	4.98	2.55	5.02	2.42	5.10	2.70	5.00	2.10	5.70	1.0
B-53	3.39	-	5.58	2.82	4.70	1.45	4.02	1.92	3.92	1.42	3.22	1.42	3.12	1.40	4.85	1.87
B-59	2.65	1.0	4.12	1.60	4.40	0.50	5.40	0.60	5.47	1.10	6.20	0.90	5.25	1.40	5.49	0.90
B-60	9.82	4.59	9.21	5.28	10.33	5.03	13.23	3.18	13.68	4.23	8.13	3.23	10.33	3.21	11.26	2.23
B61A	6.93	3.57	6.15	4.52	6.58	3.87	2.57	0.82	2.57	2.02	3.32	0.52	3.32	1.60	4.42	0.97
B62A	8.83	5.85	9.10	5.21	9.30	4.95	8.15	4.35	8.27	4.78	7.55	3.25	6.95	3.00	6.87	4.50

Historical Water Level data of Hydrograph Stations

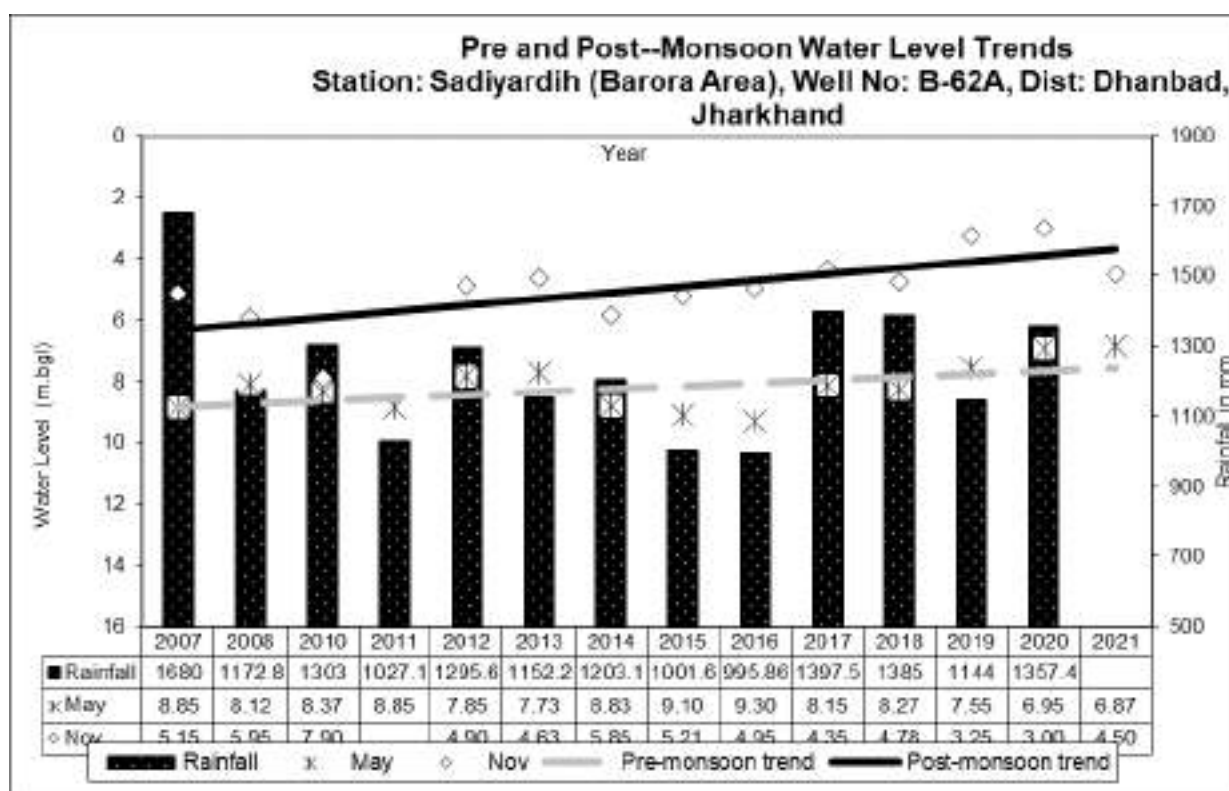
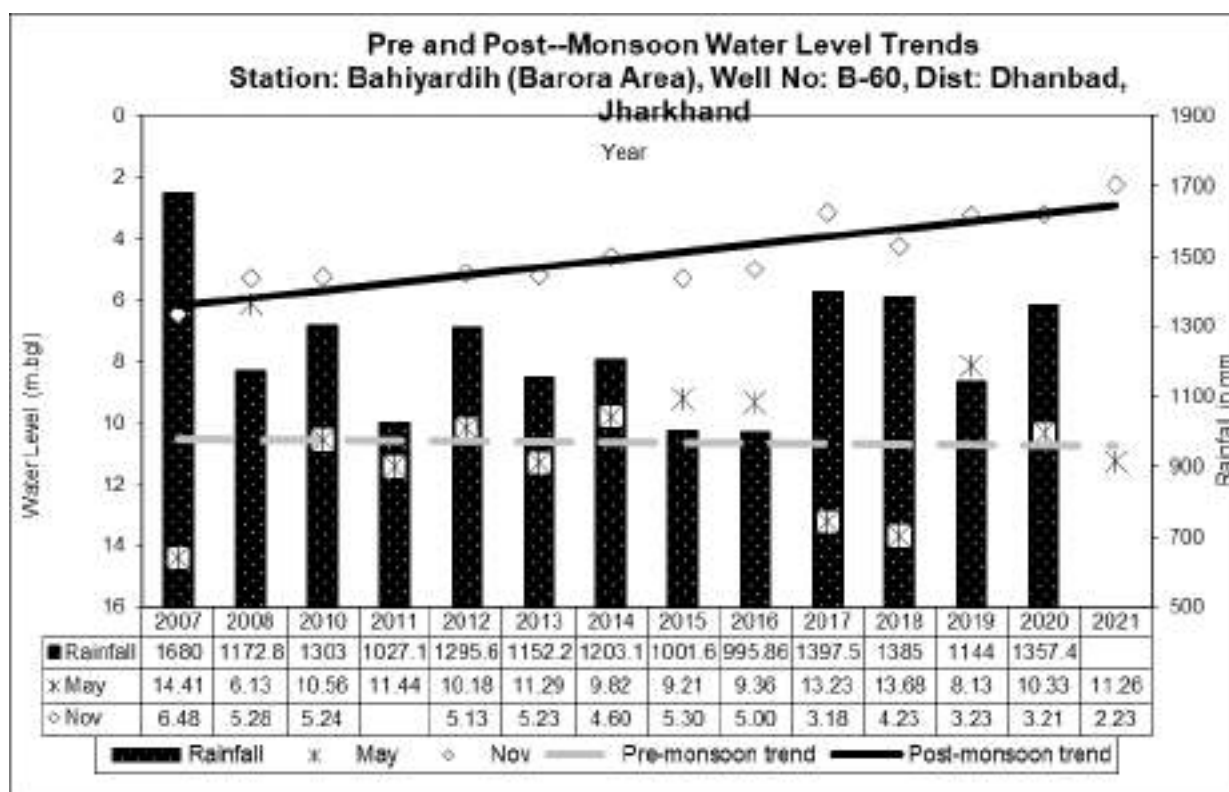
Well No	Water level below ground level (bgl) in meters															
	May 14	Nov 14	May 15	Nov 15	May 16	Nov 16	May 17	Nov 17	May 18	Nov 18	May 19	Nov 19	May 20	Nov 20	May 21	Nov 21
B-64	0.7	1.15	1.38	0.95	2.35	0.55	1.25	0.85	2.15	1.85	0.95	0.45	1.85	0.50	2.35	0.95
B65A	10.45	2.4	7.82	5.87	7.15	2.68	9.05	1.25	10.03	2.40	11.05	0.95	9.25	2.30	9.03	1.42
B-67	9.80	3.72	9.23	5.53	9.53	4.30	10.00	2.15	9.55	4.0	8.57	4.35	7.55	3.95	8.95	2.95
D-3	2.54	2.11	4.25	2.25	2.35	1.90	2.15	2.30	3.43	2.45	1.75	1.30	5.40	1.38	3.41	0.85
D-4	1.23	0.91	2.41	1.27	1.21	1.36	1.21	1.46	1.91	1.56	2.81	1.71	3.41	1.41	3.01	1.16
D-5	9.0	7.8	9.37	8.33	9.40	6.40	7.90	5.20	7.80	5.30	8.25	4.85	8.60	7.70	7.28	4.00
D-7	5.28	5.53	8.25	5.61	7.53	4.03	7.33	2.88	7.53	2.83	8.23	3.28	7.33	5.13	6.08	2.63
D-8	7.73	-	6.24	4.38	8.00	3.43	5.15	1.85	5.65	1.85	4.80	2.85	5.83	2.75	4.55	2.27
D-23	6.38	2.4	6.55	3.48	5.70	1.63	2.80	2.98	4.40	3.40	4.70	1.40	5.60	3.35	5.43	1.60
D-25	4.42	2.9	4.48	2.45	2.40	1.90	2.40	1.20	2.60	2.40	*9.90	*5.38	10.50	5.62	10.50	3.80
D-30	4.17	3.3	4.55	3.15	4.45	3.20	4.40	1.25	4.58	1.10	4.60	0.75	4.50	1.35	4.23	0.84
D-33	1.72	0.35	2.25	1.10	2.50	1.95	0.75	0.75	2.85	0.95	2.35	1.65	3.65	1.45	1.75	0.85
D-34	2.80	0.30	2.55	1.45	2.30	0.30	0.80	0.55	2.80	0.45	4.75	2.40	3.30	2.80	3.78	2.90
D-35	6.94	6.15	9.80	7.90	9.52	6.45	8.80	3.60	8.40	4.45	8.00	3.80	8.20	5.40	6.60	2.90
D-36	1.82	0.75	1.66	1.13	0.78	0.95	1.30	0.70	1.20	0.60	1.20	0.55	2.10	1.00	2.02	0.55
D-39	5.03	2.25	5.00	2.61	2.18	2.65	6.17	4.75	4.95	4.35	*12.60	*5.95	9.40	6.05	10.70	5.10
D40A	2.35	2.45	3.07	2.45	1.40	0.85	1.45	1.35	2.10	1.40	1.85	1.45	1.95	1.43	1.95	1.80
D-41	3.20	1.35	2.65	2.32	1.30	1.52	1.40	1.20	1.59	1.32	2.30	1.25	3.30	1.45	1.95	1.38
D-43	6.0	4.75	6.61	5.05	8.20	3.35	7.50	3.60	7.15	3.45	7.35	2.70	6.60	2.55	4.65	2.60
D-47	8.0	2.37	9.60	3.60	3.18	2.95	3.15	2.85	5.33	2.55	4.55	4.35	9.45	5.45	4.05	2.45
D-49	2.51	1.65	3.55	2.35	2.45	1.72	2.70	2.05	3.45	2.45	1.75	1.50	3.25	1.65	1.40	0.85
D-51	9.60	9.05	10.48	9.15	11.15	6.45	10.45	5.43	10.93	7.10	9.95	5.75	8.45	5.70	9.43	5.65
D-55	1.95	2.07	6.15	1.57	2.52	3.62	6.42	2.37	8.42	1.57	8.42	5.47	9.42	8.60	9.52	7.62
D-74	5.0	4.0	10.05	7.20	7.73	5.00	9.25	3.85	8.60	4.80	5.80	3.57	4.30	3.93	6.93	2.90
D-77	6.23	6.0	6.44	5.60	4.60	2.90	6.50	4.90	6.30	5.20	6.40	3.20	6.40	3.50	5.98	4.69
D-80	13.3	3.15	10.97	3.35	6.55	4.15	8.65	3.70	9.35	4.20	5.00	3.05	4.30	4.90	7.10	2.55
RCF (part)	May 14	Nov 14	May 15	Nov 15	May 16	Nov 16	May 17	Nov 17	May 18	Nov 18	May 19	Nov 19	May 20	Nov 20	May 21	Nov 21
DB22	6.48	3.03	4.59	3.53	5.38	3.33	1.93	1.63	2.34	1.93	4.93	1.63	2.63	2.25	2.31	1.38
DB23	3.95	2.13	3.38	6.04	5.30	0.90	2.05	1.90	2.85	1.75	1.60	0.80	2.50	1.95	2.00	1.10
DB24	-	8.45	9.52	8.20	10.65	6.50	5.80	3.78	8.25	5.70	9.35	3.88	5.70	3.60	6.20	5.25
DB25	3.27	2.73	3.83	2.68	3.61	1.98	3.23	2.58	3.93	1.63	-	-	3.98	2.63	2.83	2.03

*New well

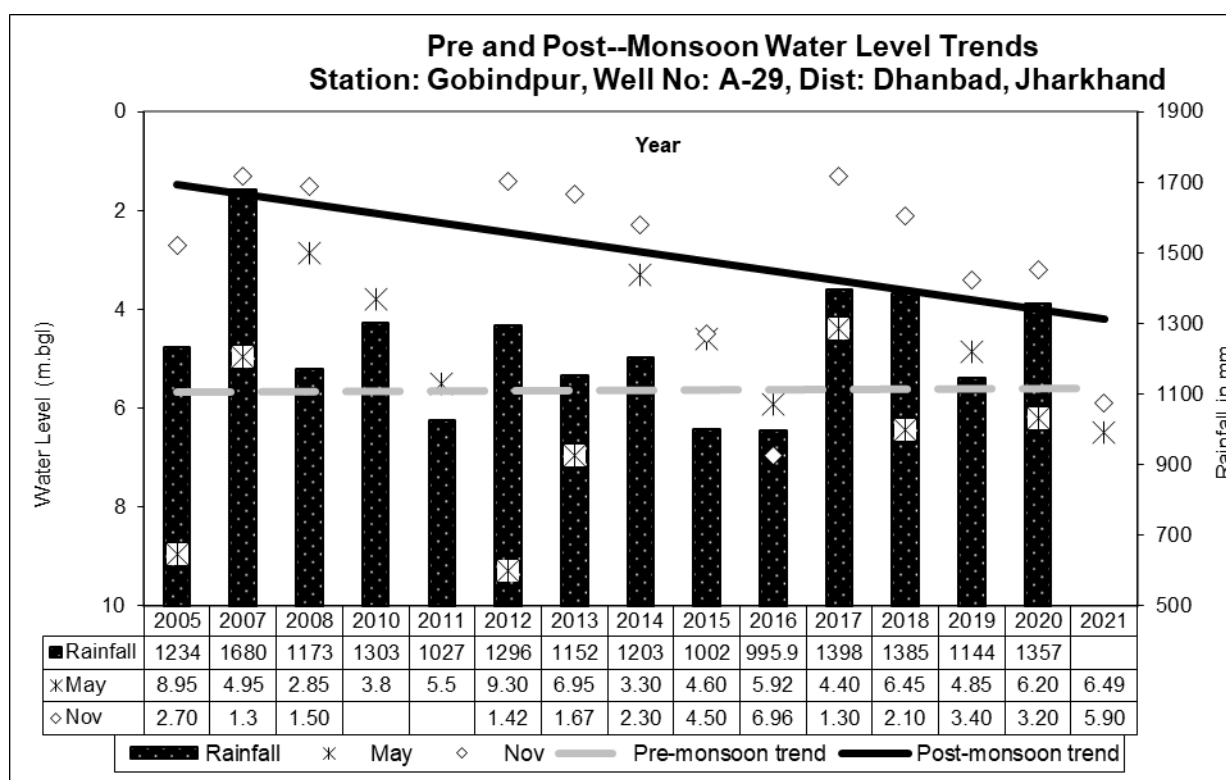
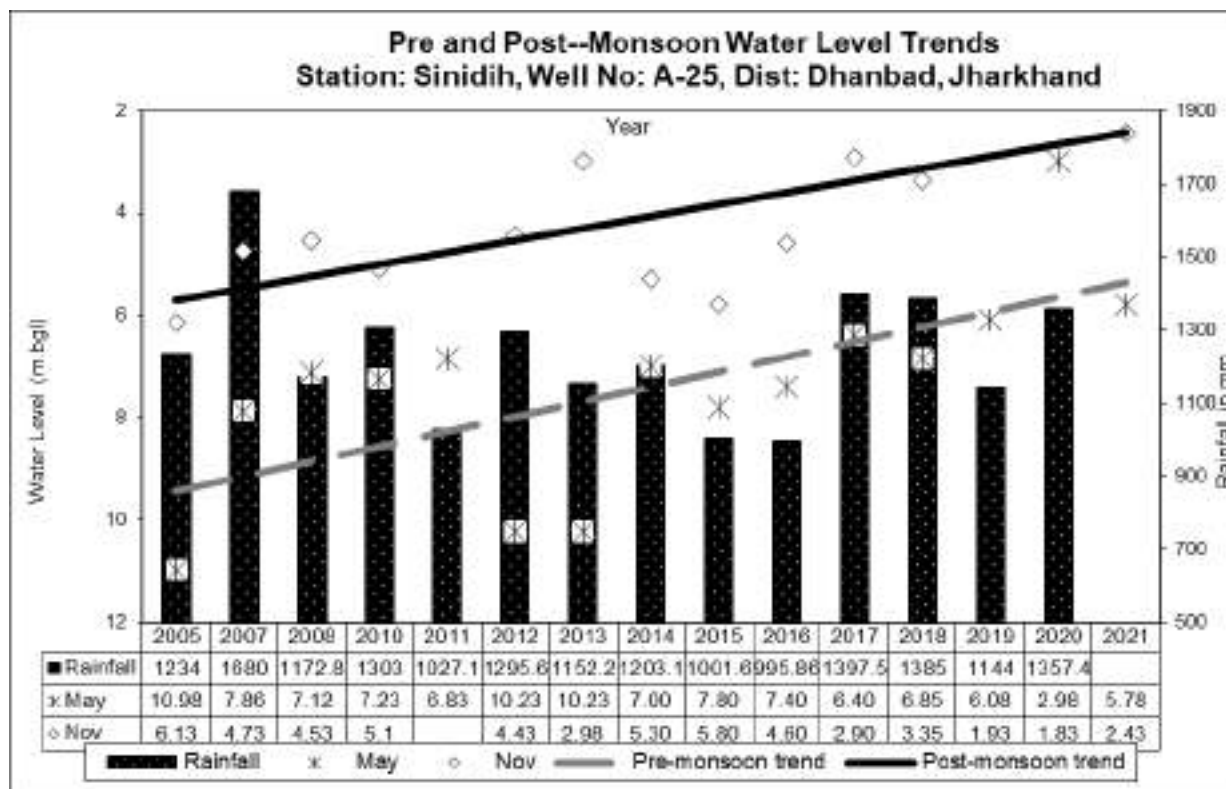
HYDROGRAPHS OF CLUSTER-I



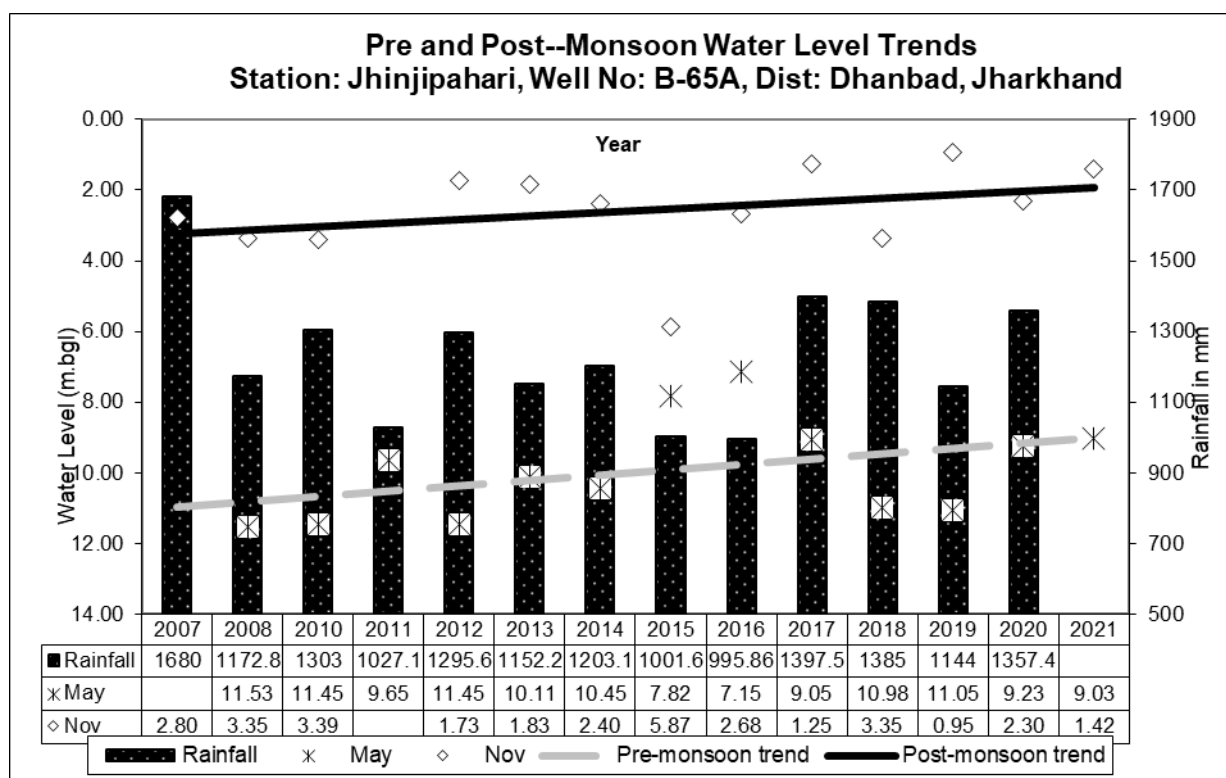
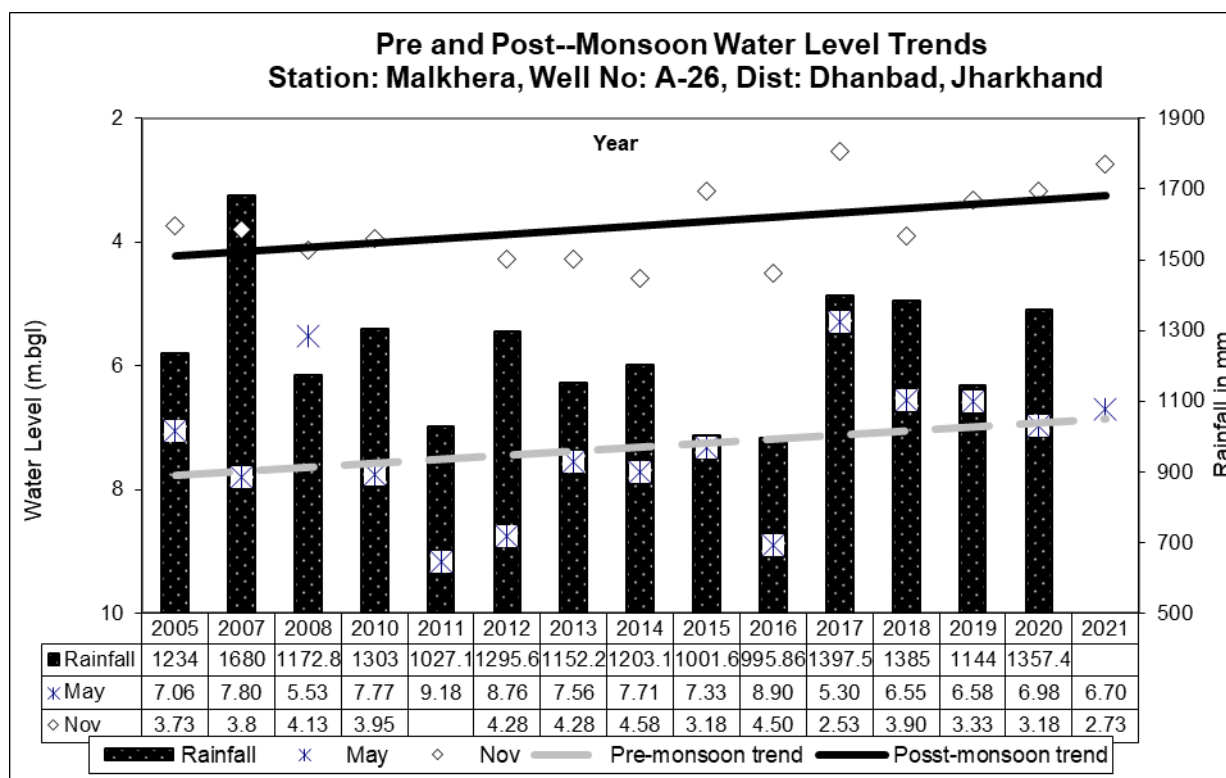
HYDROGRAPHS OF CLUSTER-II



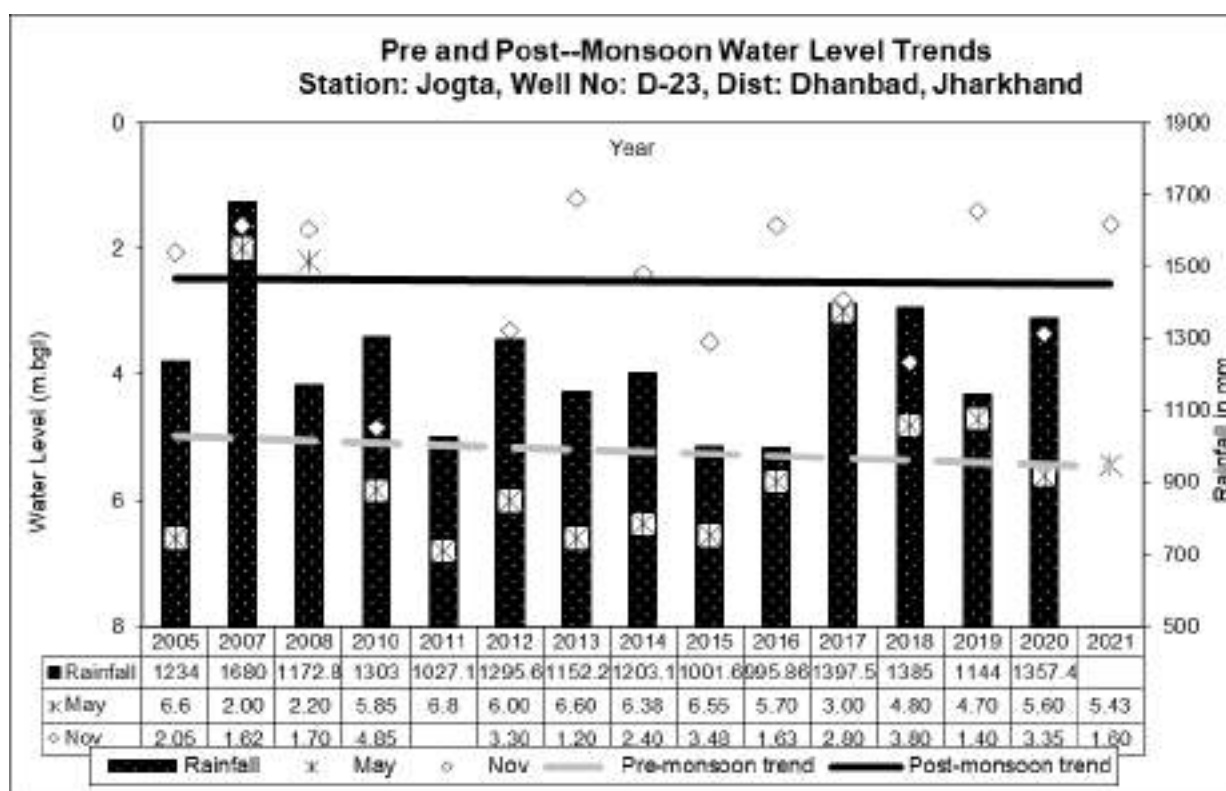
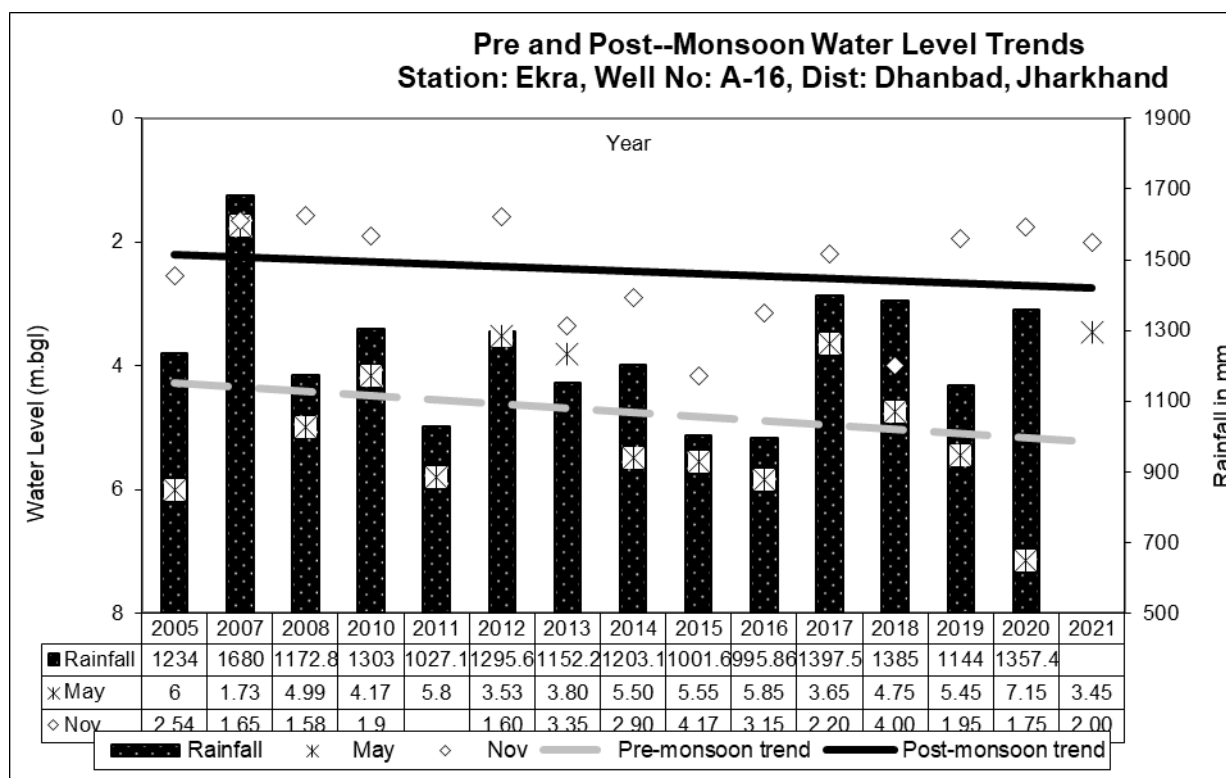
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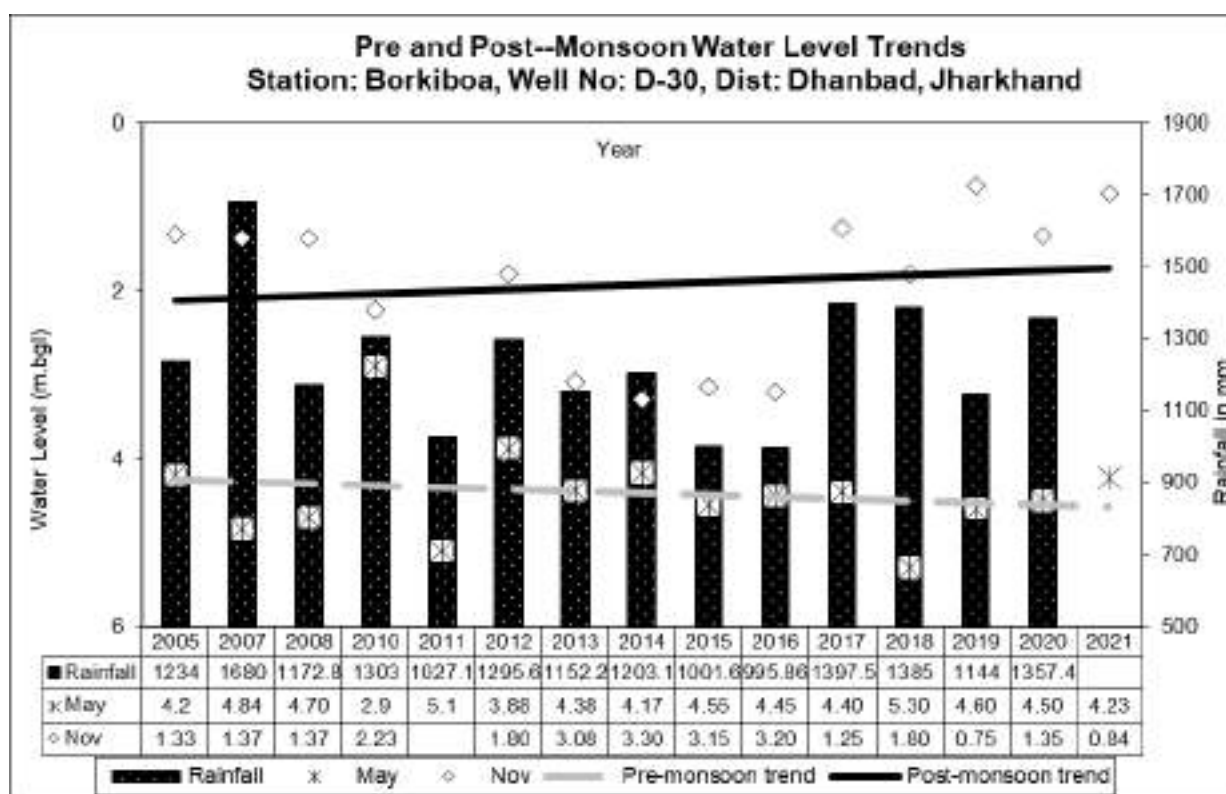
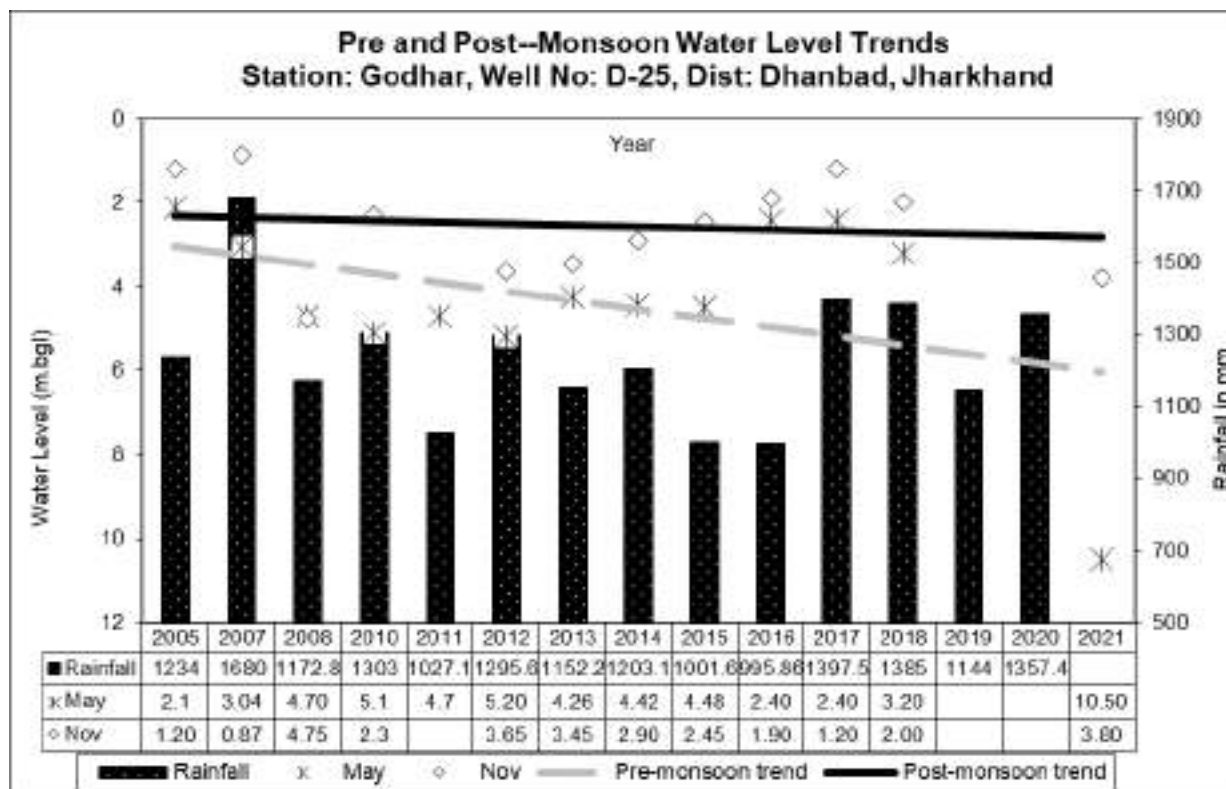
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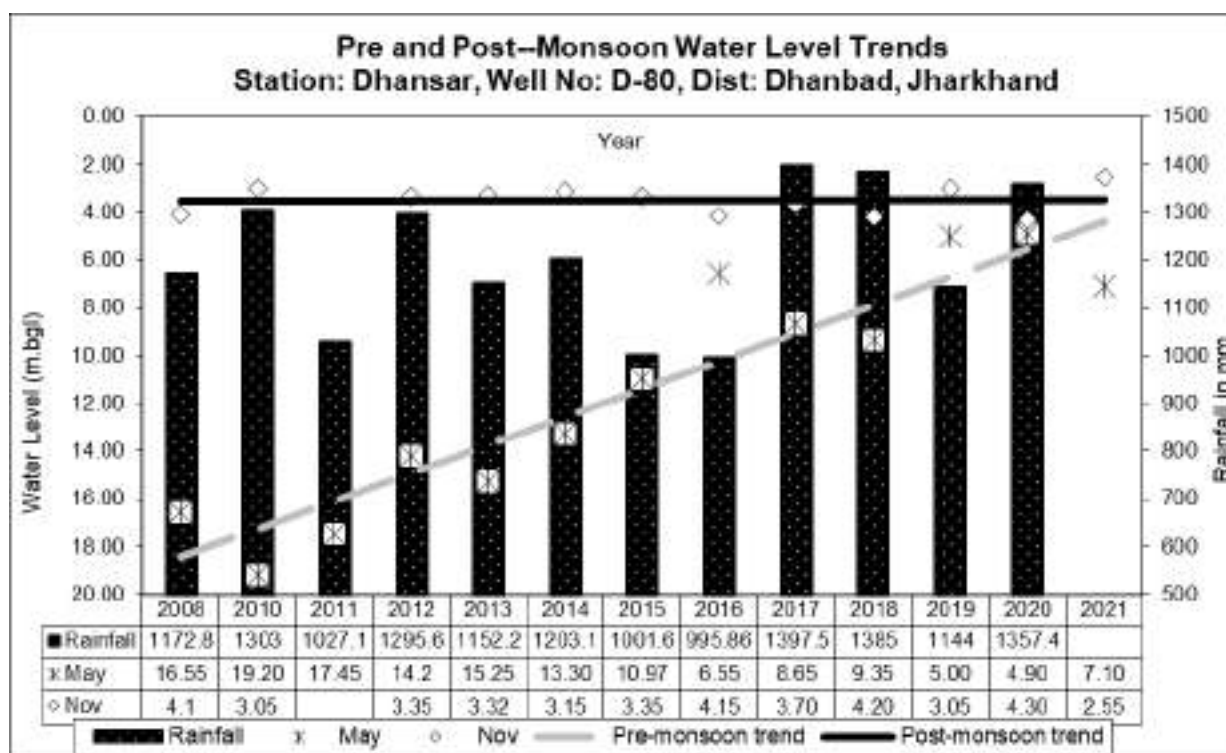
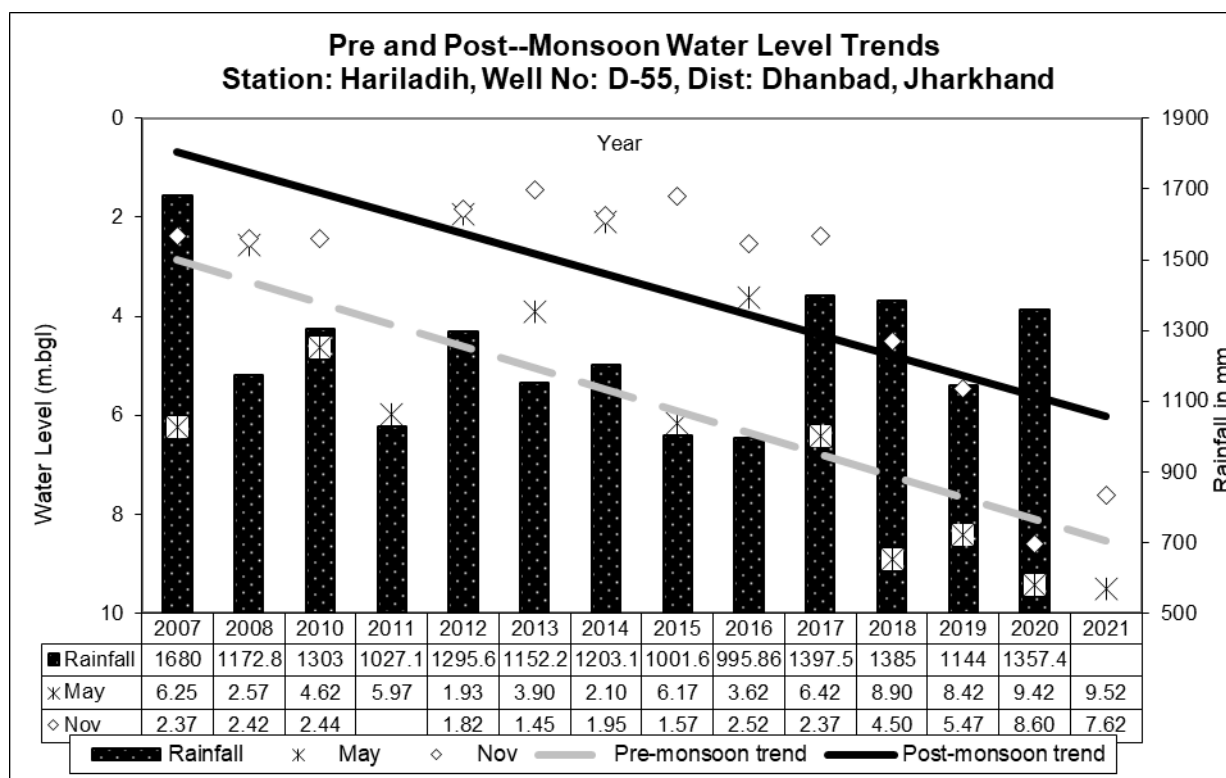
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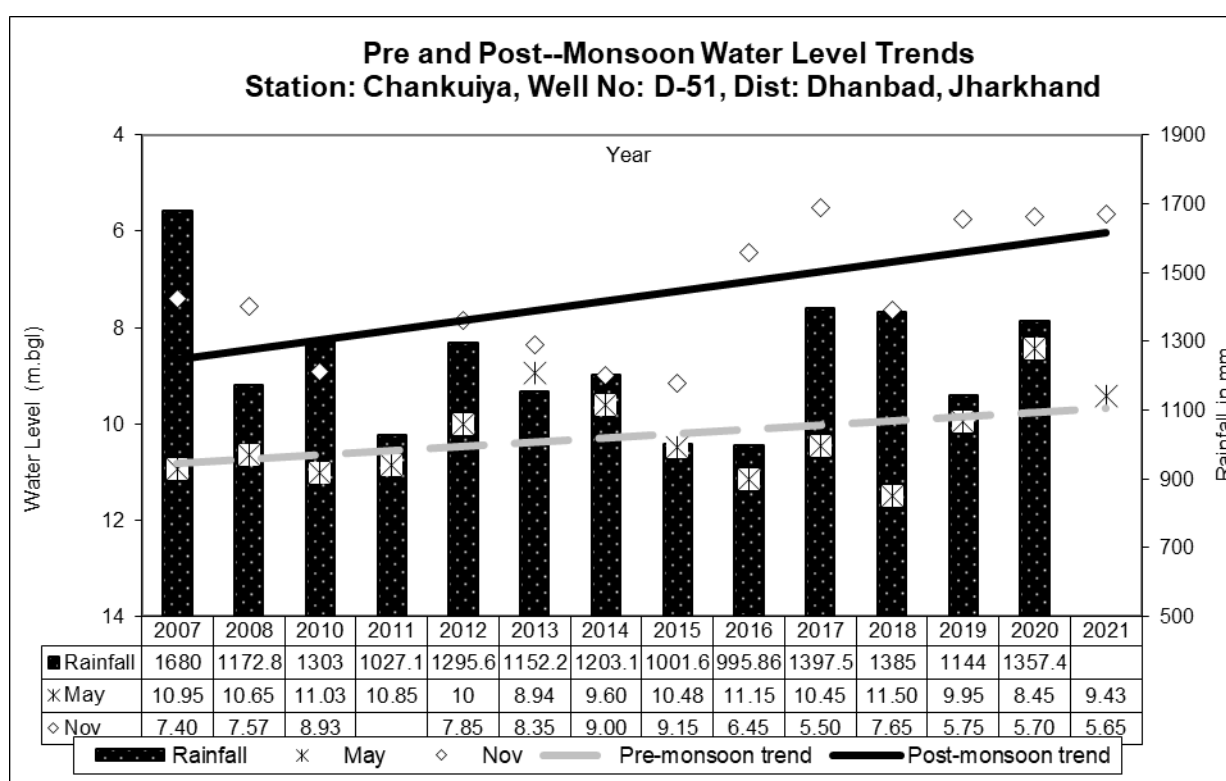
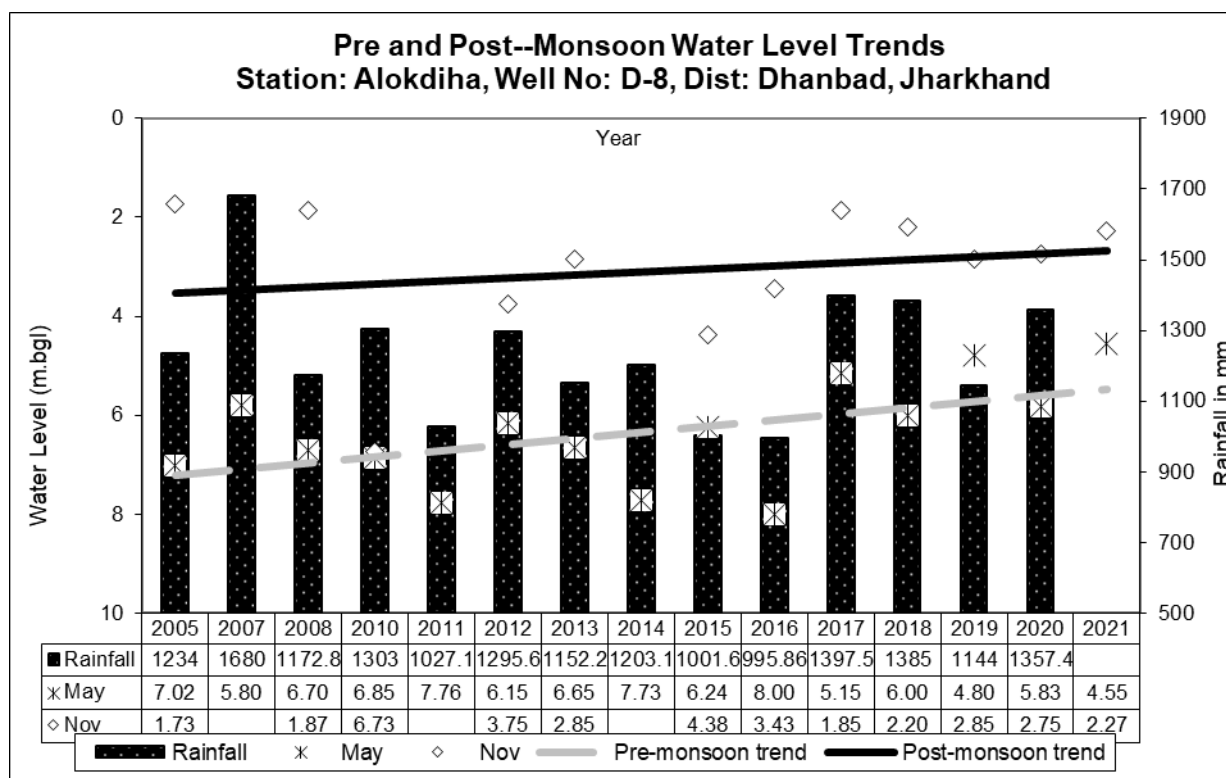
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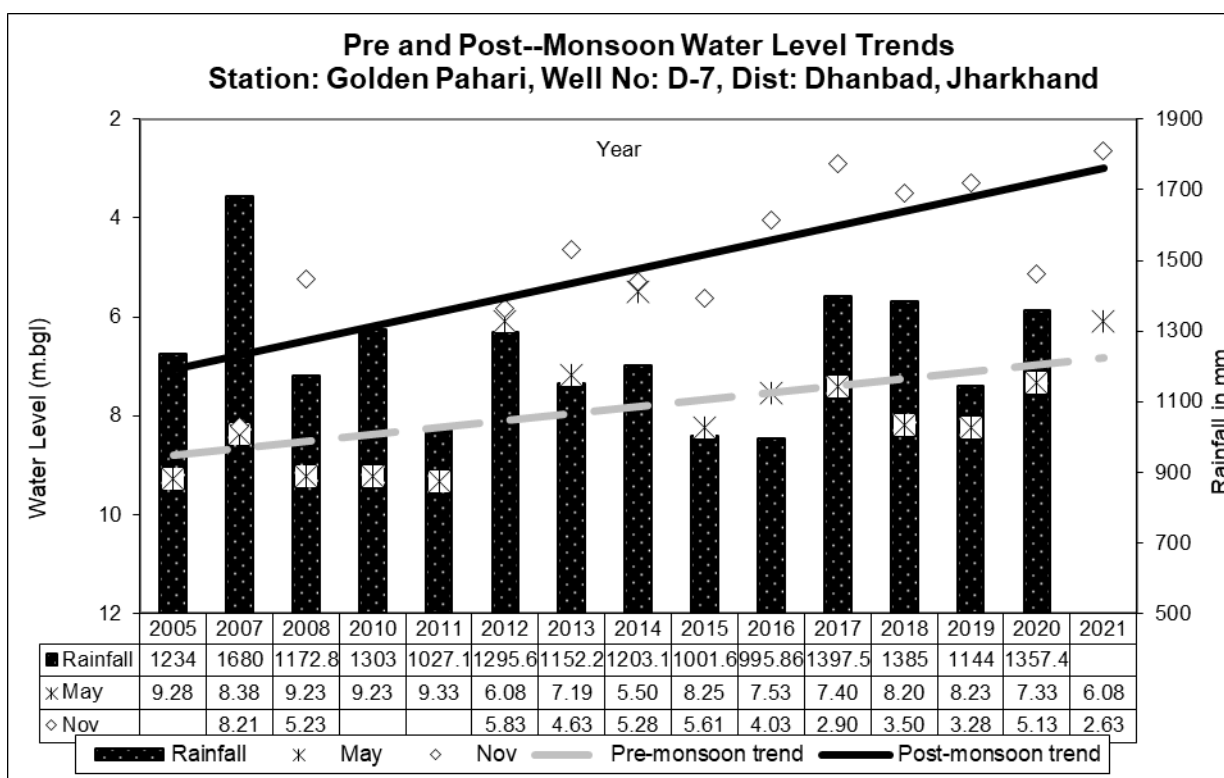
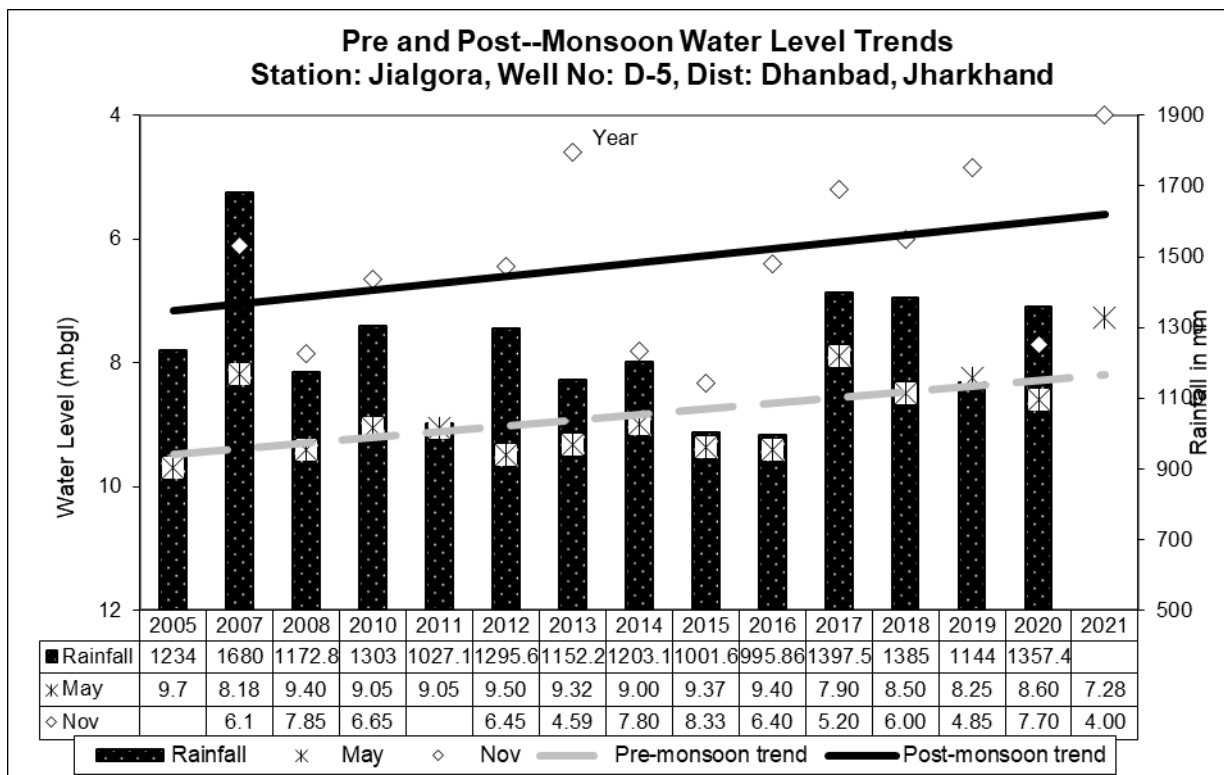
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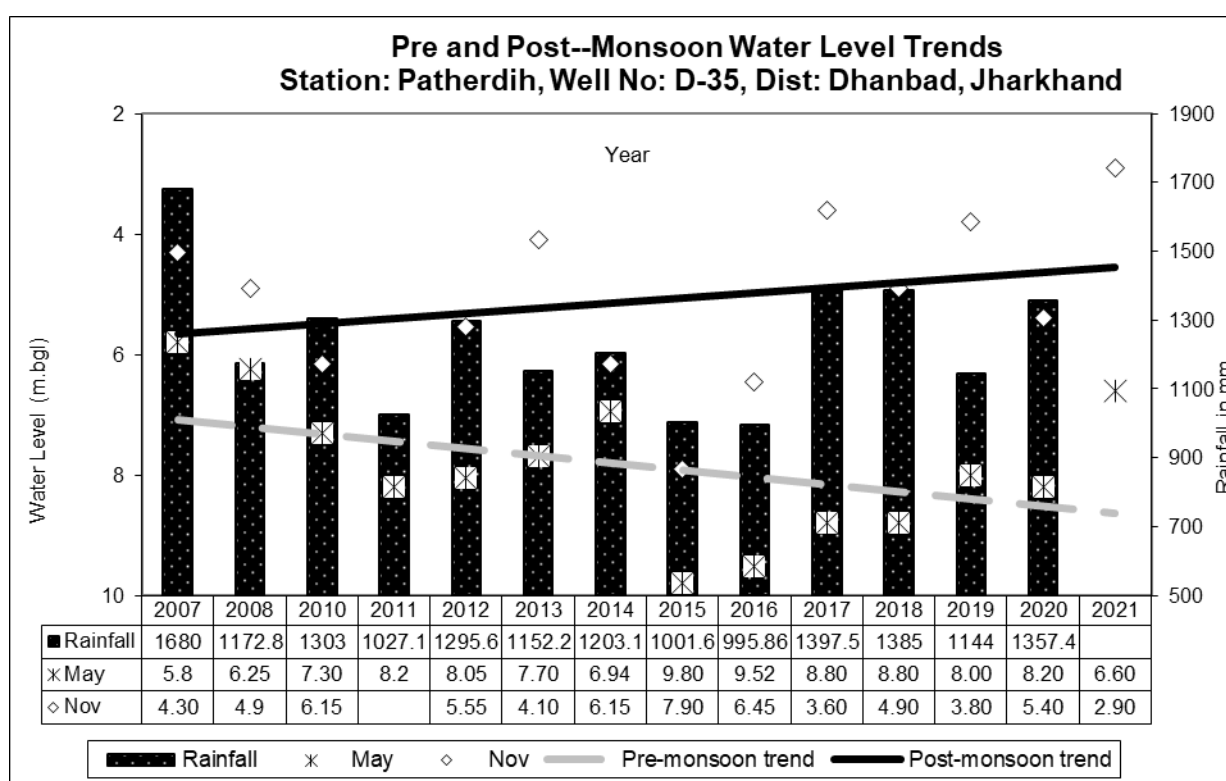
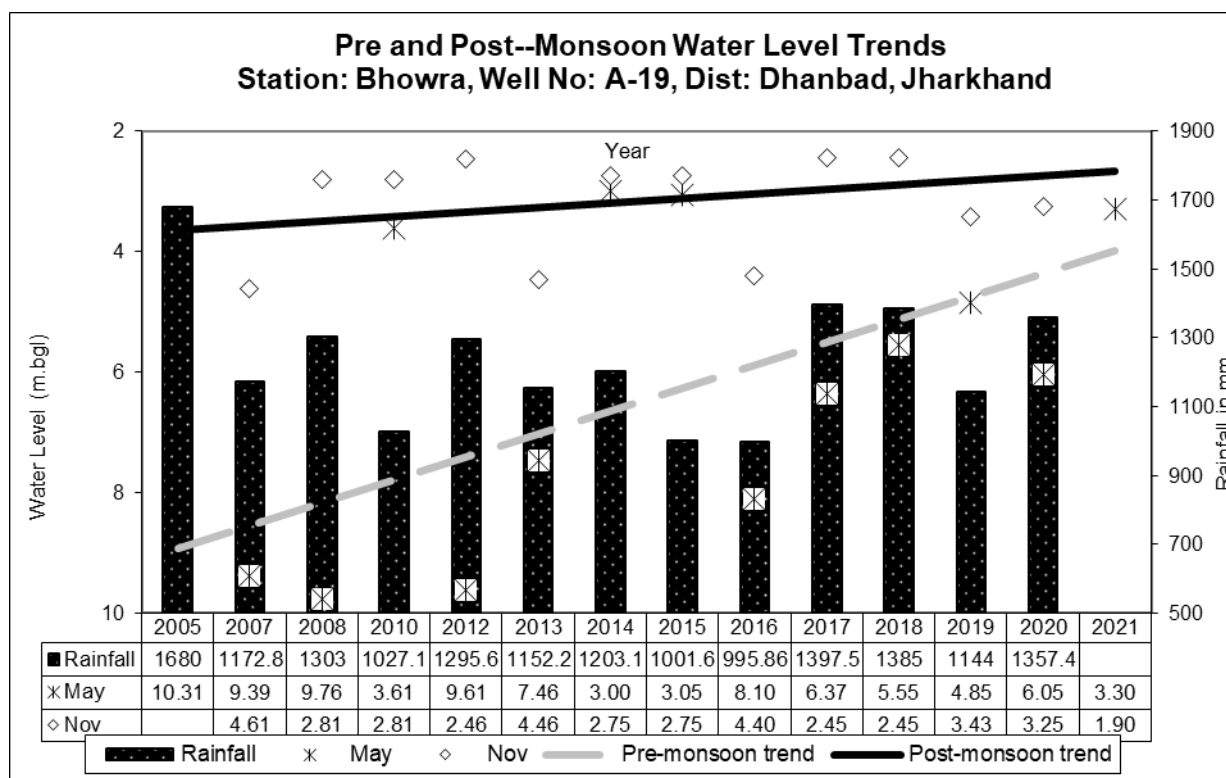
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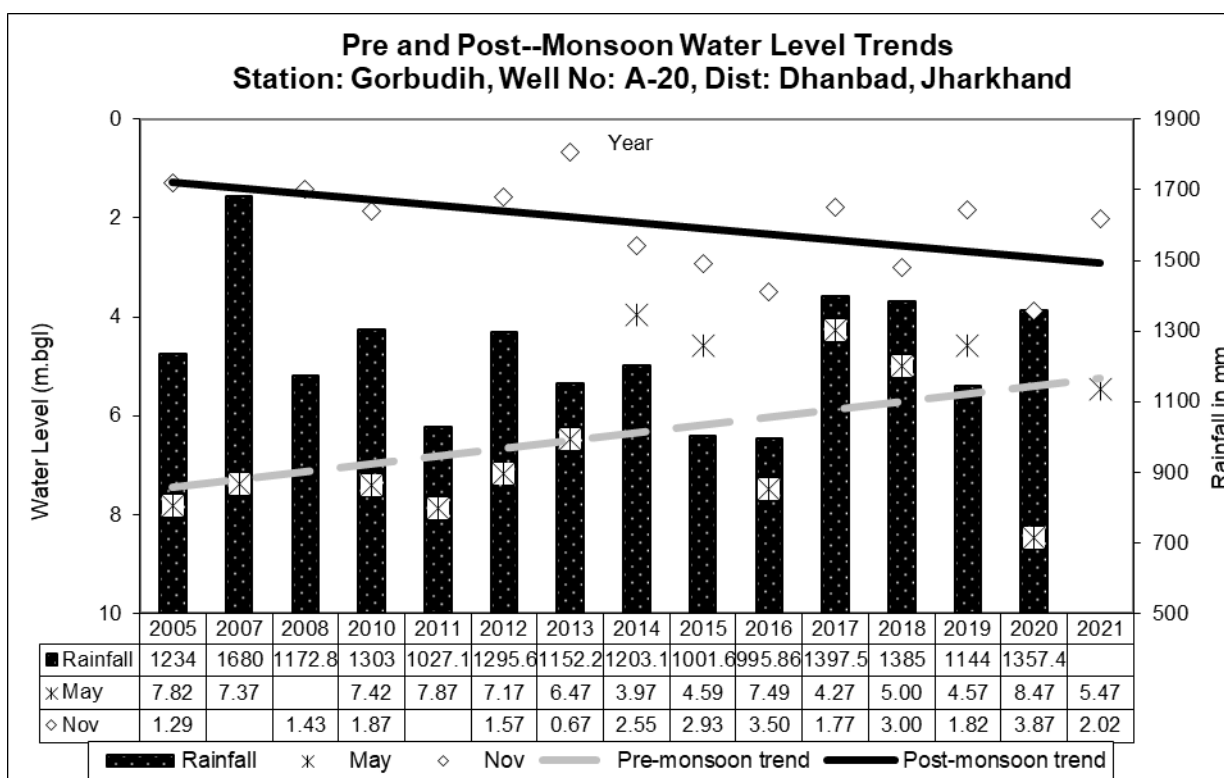
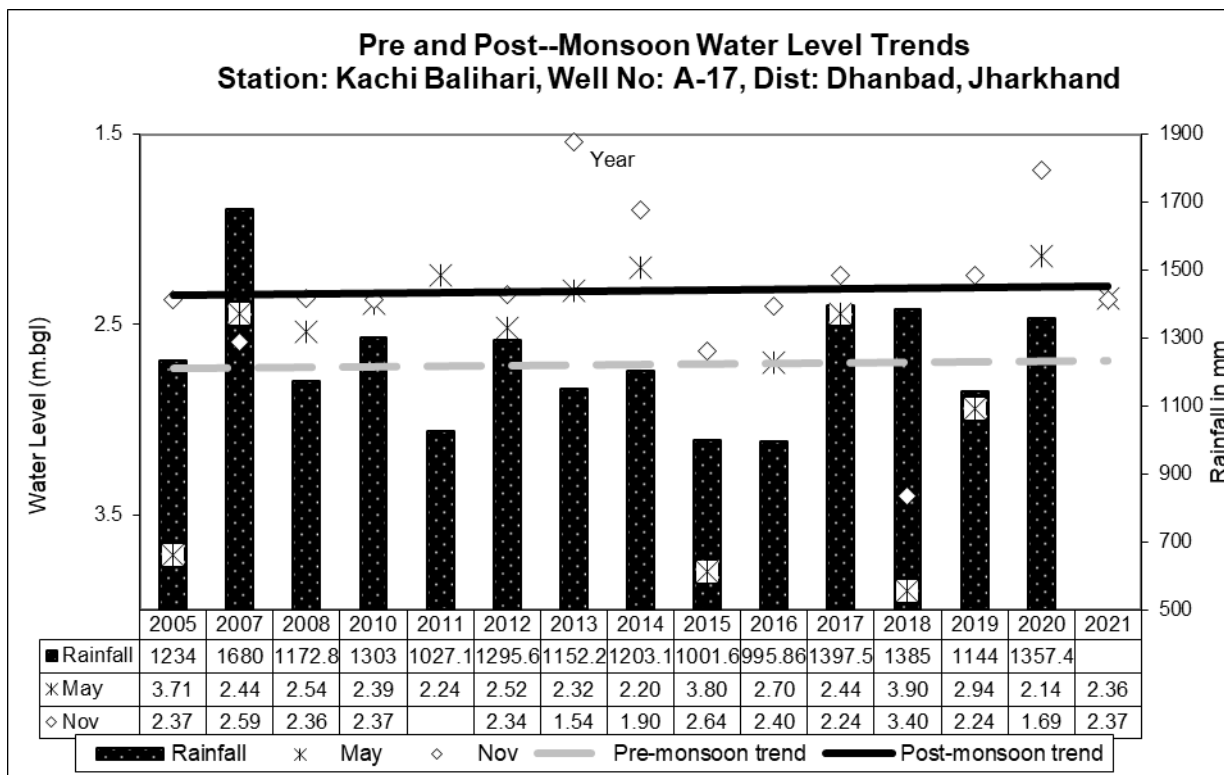
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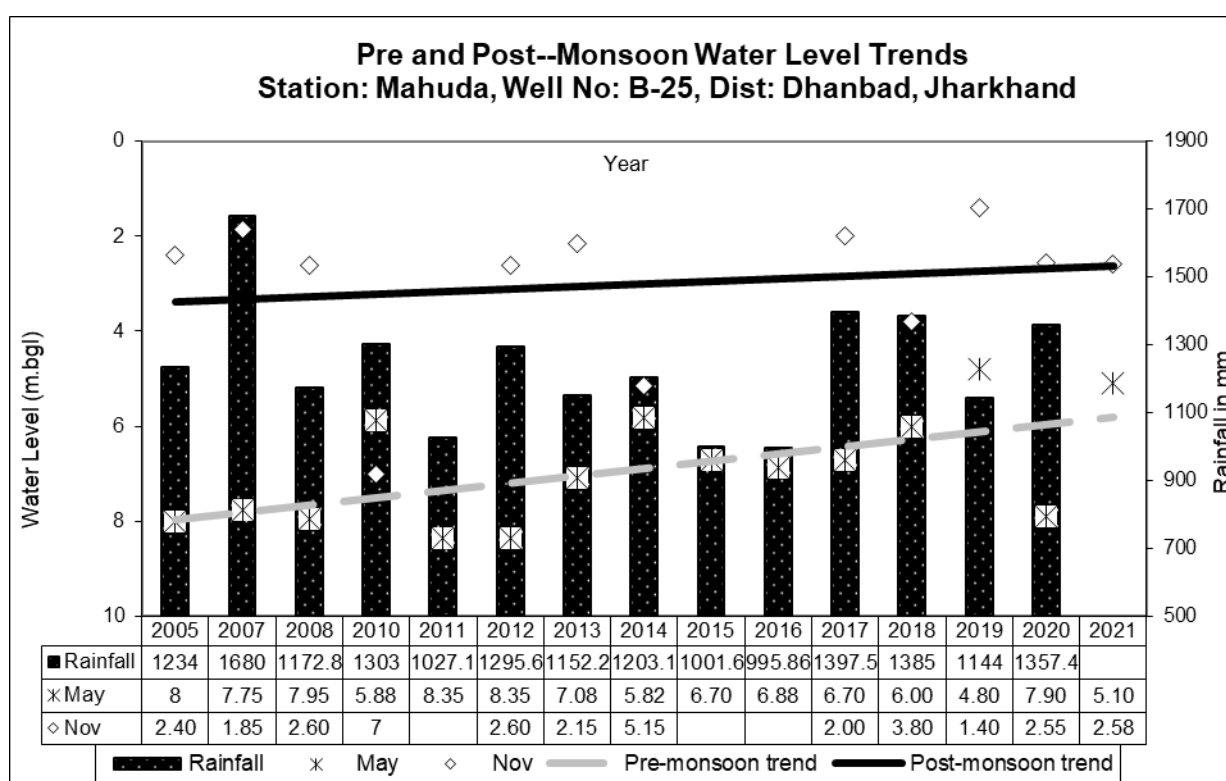
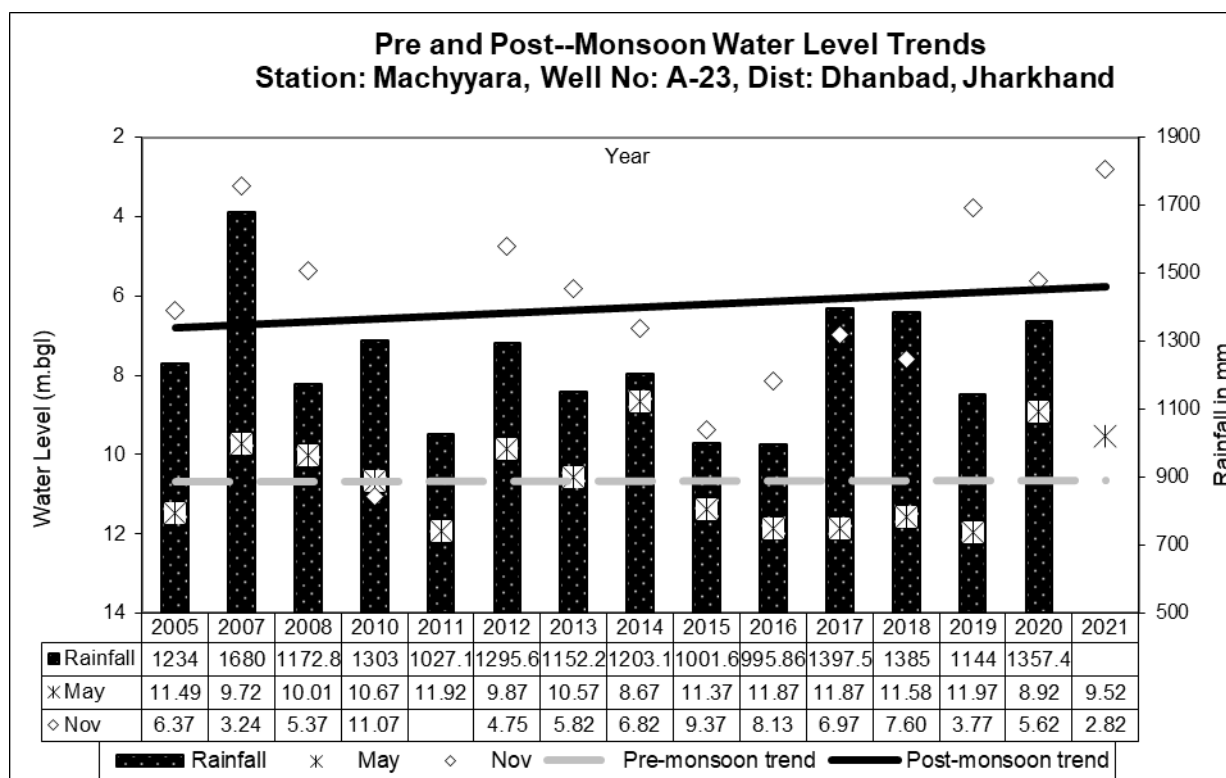
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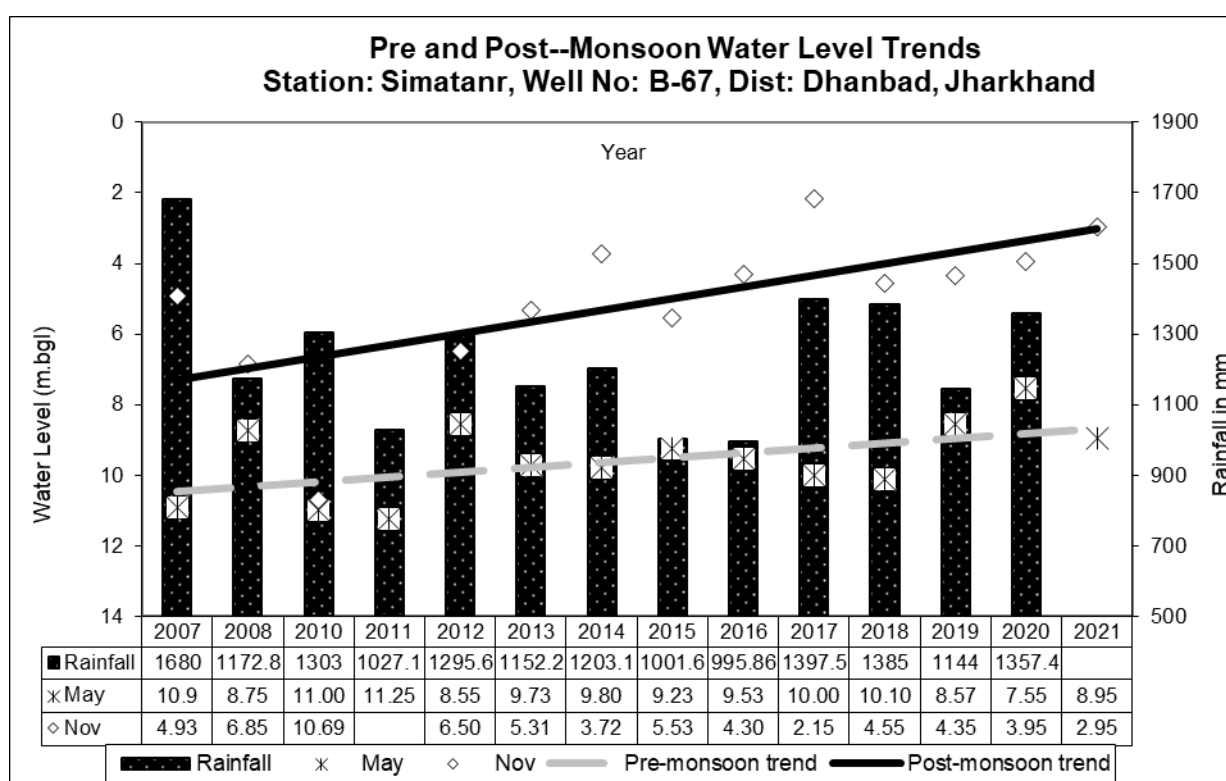
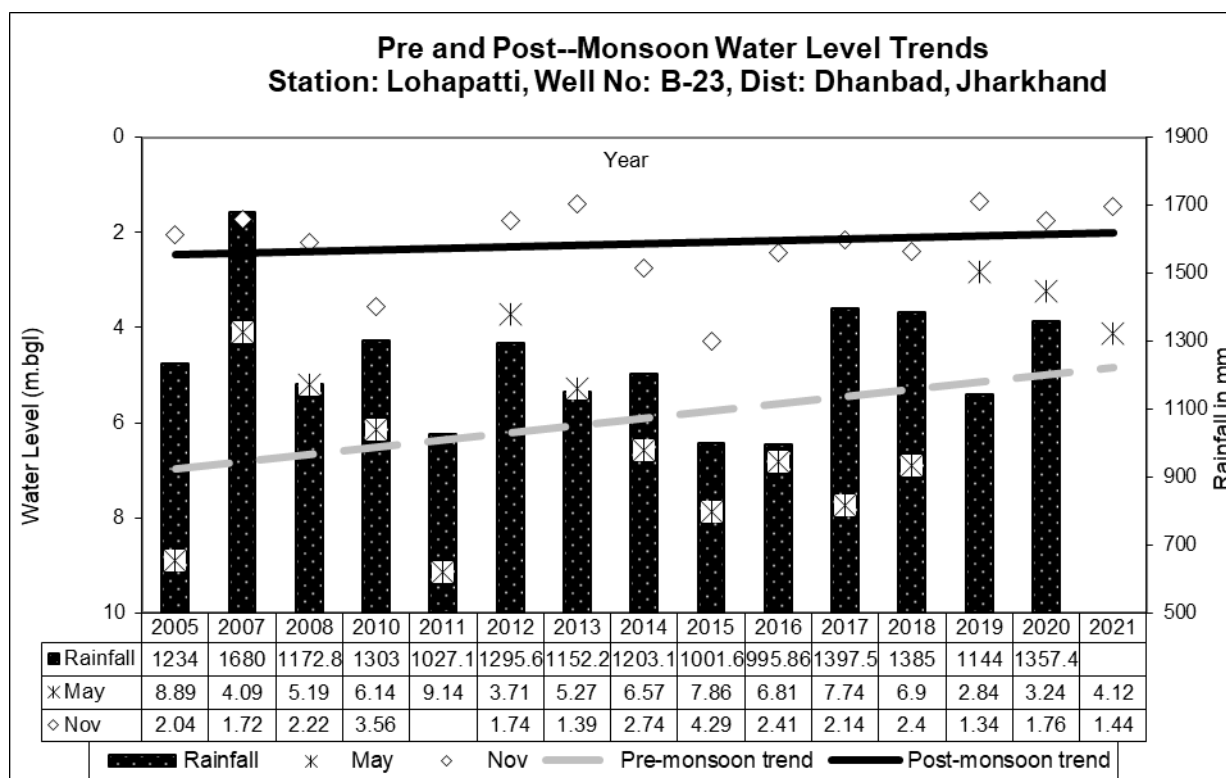
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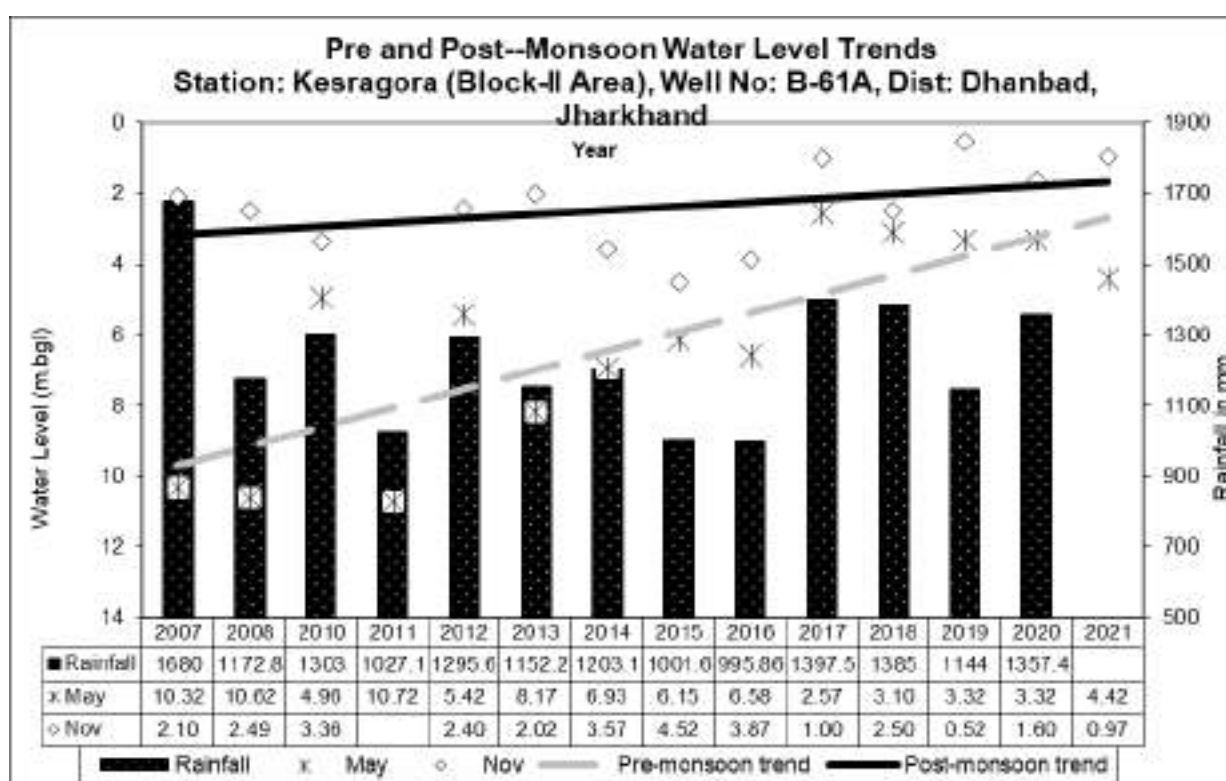
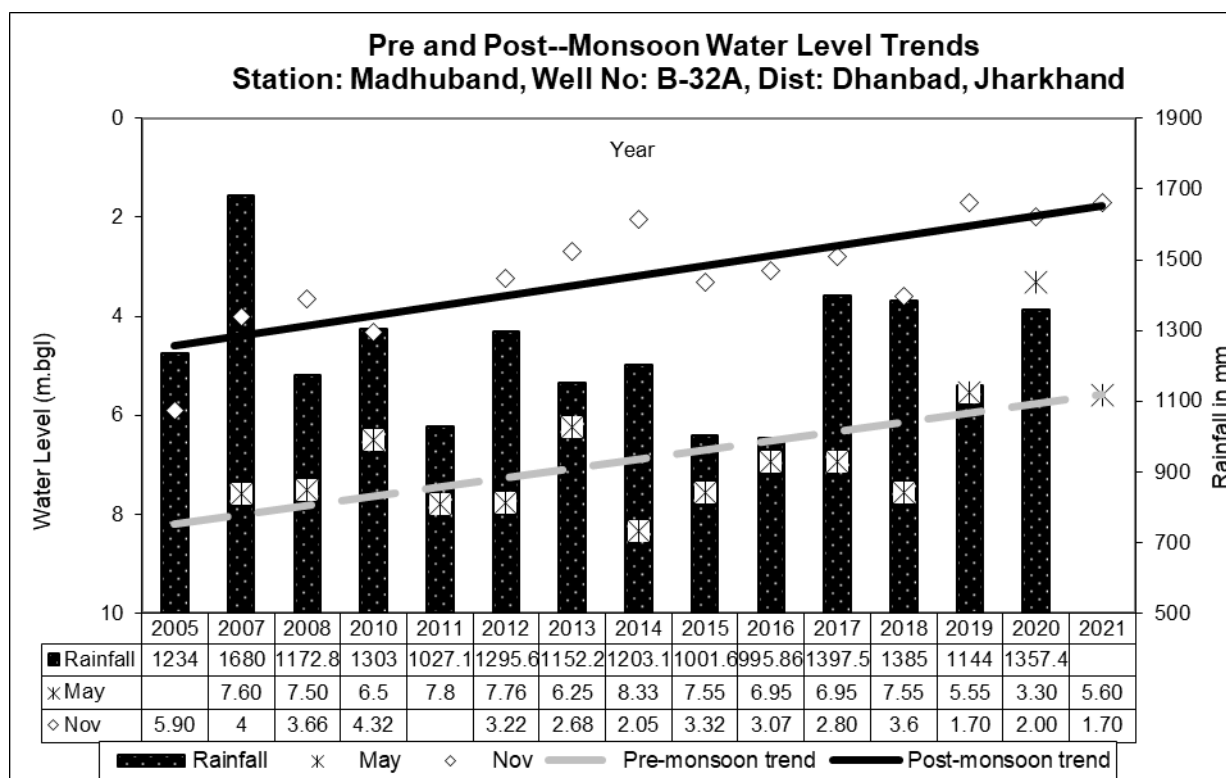
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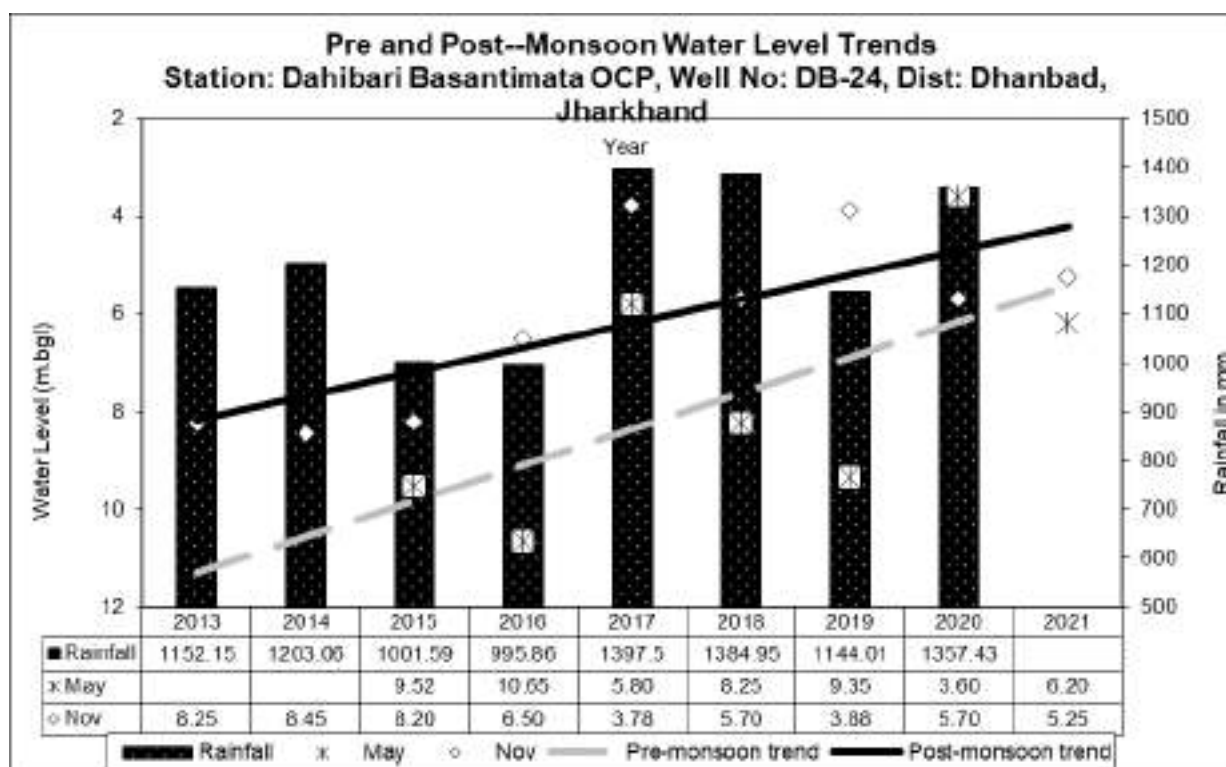
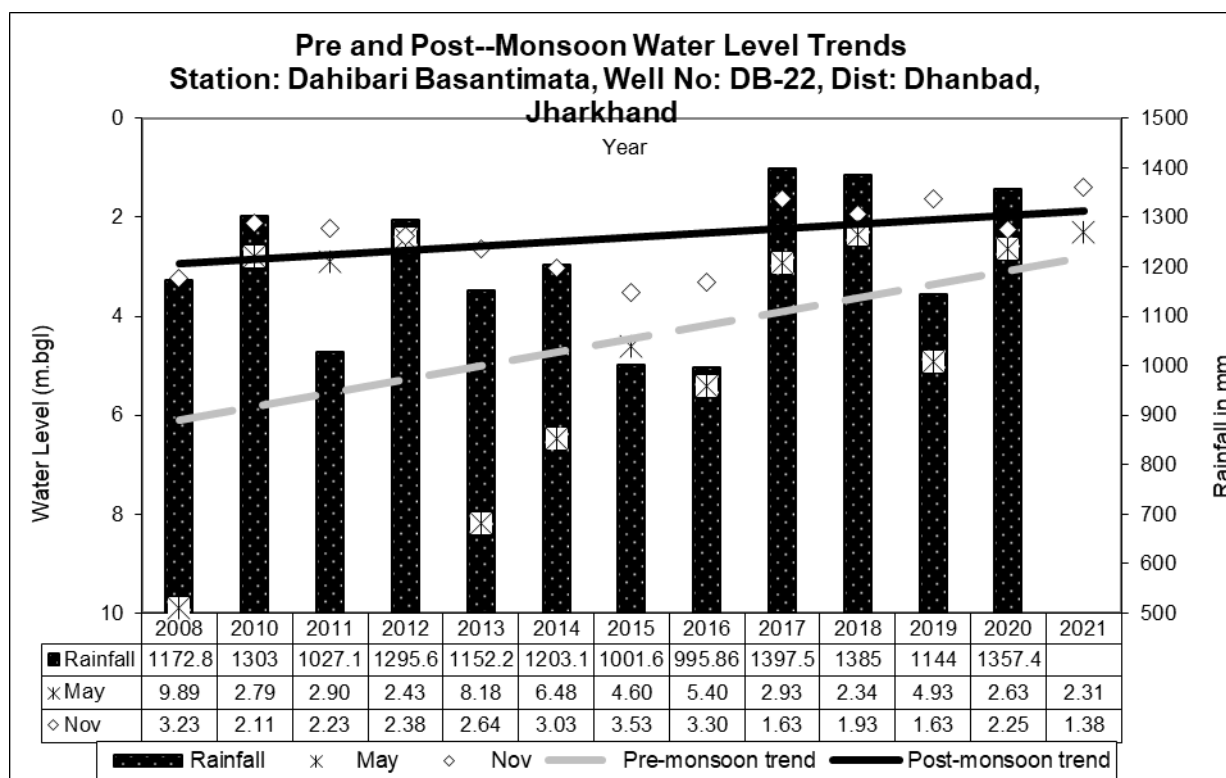
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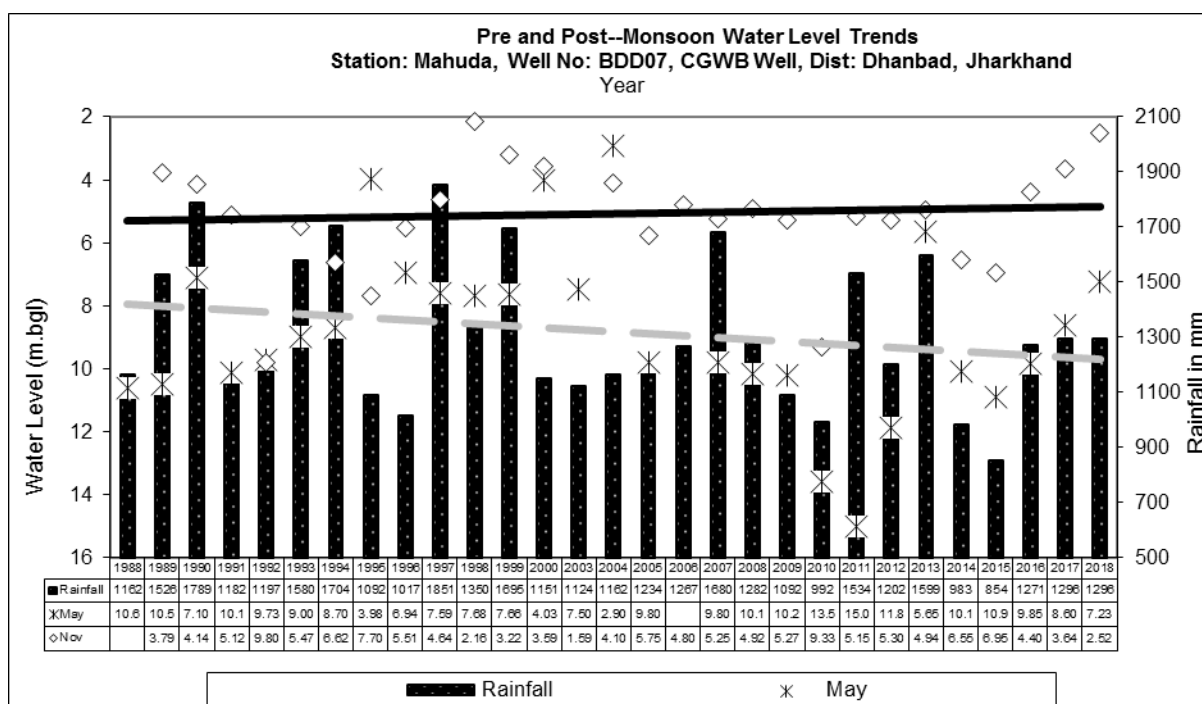
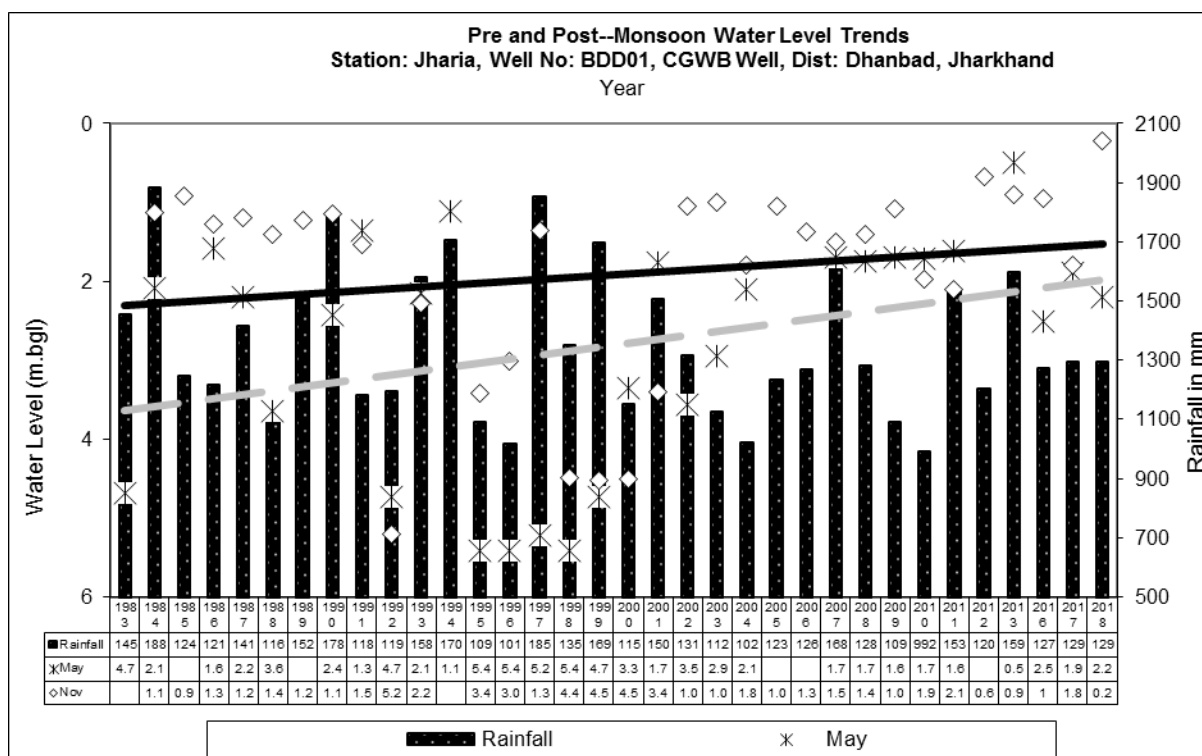
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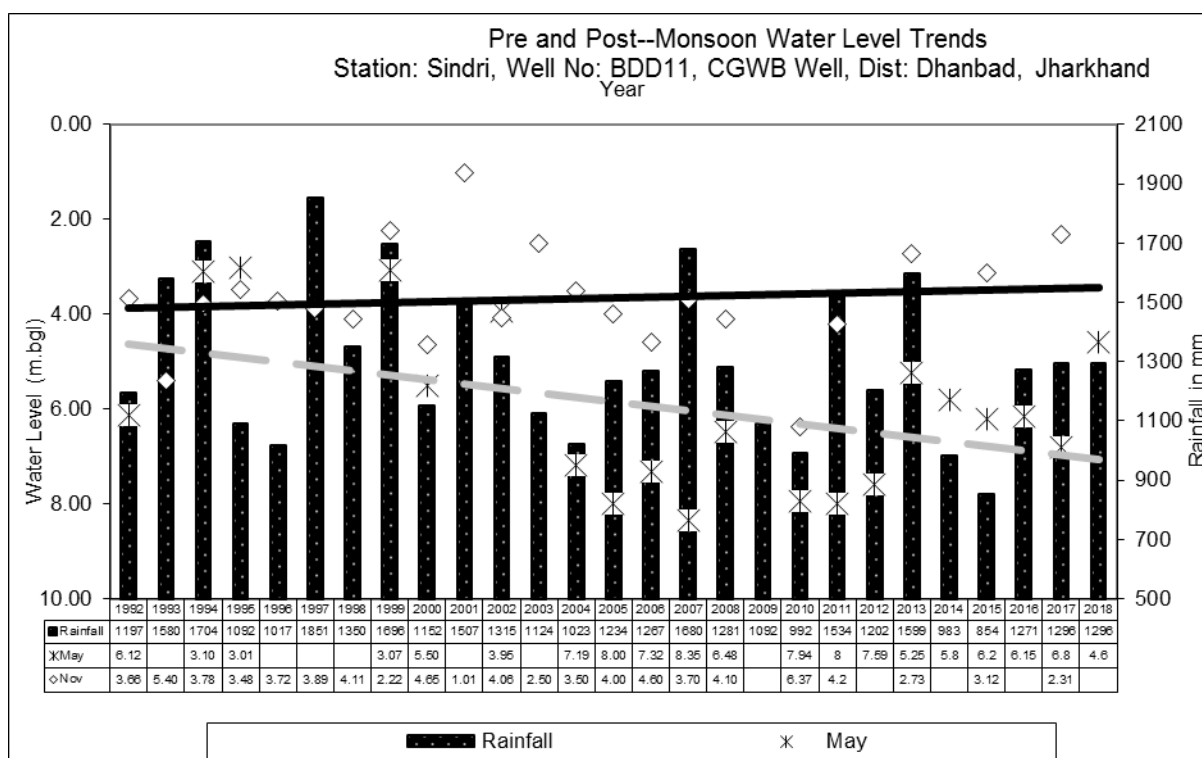
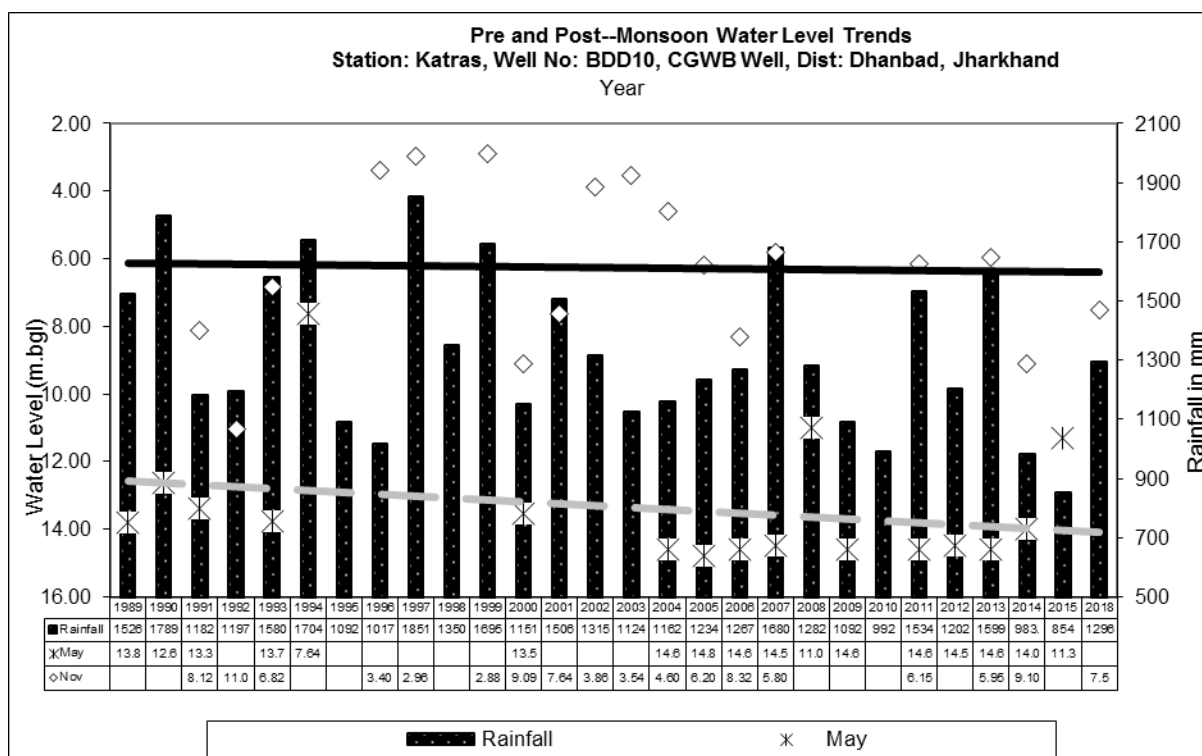
HYDROGRAPHS OF CLUSTER-XVI



HYDROGRAPHS OF CGWB PERMANENT OBSERVATION STATIONS



HYDROGRAPHS OF CGWB PERMANENT OBSERVATION STATIONS



GROUNDWATER SAMPLE LOCATION DETAILS

Sampling month: June month of the assessment year of 2021-22

SI No	Name of Cluster	Ground Water Sample	Dug well (CMPDI)	Location	Sampling Date
					June'2021
1	CLUSTER-I	GW-1	B-15	BERA VILLAGE	16.06.2021
2	CLUSTER-II	GW-2	B-59	KHODOVALY VILLAGE	16.06.2021
3	CLUSTER-III	GW-3	A-29	GOVINDPUR,AMBAGAN VILLAGE	16.06.2021
4	CLUSTER-IV	GW-4	B-64	KESHALPUR, BATIGHAR	16.06.2021
5	CLUSTER-V	GW-5	D-30	BORKIBOA VILLAGE	16.06.2021
6	CLUSTER-VI	GW-6	D-25	GODHUR MORE	16.06.2021
7	CLUSTER-VII	GW-7	D-80	DHANSAR MINE RESCUE STN.	16.06.2021
8	CLUSTER-VIII	GW-8	D-49	NEAR GHANOODIH OC	15.06.2021
9	CLUSTER-IX	GW-9	D-5	JEALGORA, NEAR P.O.	15.06.2021
10	CLUSTER-X	GW-10	D-35	PATHERDIH RLY. COLONY	15.06.2021
11	CLUSTER-XI	GW-11	A-32	MONNIDIH BAZAR	16.06.2021
12	CLUSTER-XIII	GW-13	A-23	MACHHAYARA	16.06.2021
13	CLUSTER-XIV	GW-14	B-23	LOHAPATTI VILLAGE	16.06.2021
14	CLUSTER-XV	GW-15	B-32A	MADHUBAND VILLAGE	16.06.2021
15	CLUSTER-XVI	GW-16	DB-22	DAHIBARI,NICHE BASTI	15.06.2021

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Year: 2020-21

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW1 16.06.2021	GW2 16.06.2021	GW3 16.06.2021			
1	Boron (as B), mg/l, Max	<0.2	<0.2	<0.2	0.2	0.5	APHA, 23 rd Edition ,Carmin
2	Colour,in Hazen Units	1	2	2	1	5	APHA, 23 rd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	41	84	127	1.6	75	IS 3025, Part 40: 1991 R 2019 EDTA Method
4	Chloride (as Cl), mg/l, Max	47	78	124	2	250	IS-3025/32:1988, R-2019 Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03	0.03	0.05	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA, 23 rd Edition, AAS-GTA
6	Fluoride (as F) mg/l, Max	0.77	0.71	0.59	0.2	1.0	APHA, 23 rd Edition, Page 4-90 to , 4500 -F- D (SPADNS Method)
7	Free Residual Chlorine, mg/l, Min	<0.004	<0.004	<0.004	0.04	0.2	APHA, 23 rd Edition , 4500-Cl ⁻ B. (Iodometric Method-I)
8	Iron (as Fe), mg/l, Max	0.28	0.2	0.2	0.2	1.0	IS 3025 Part 53 : 2003, R : 2019 , AAS-Flame Method
9	Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	0.005	0.01	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 23 rd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	0.24	<0.02	<0.02	0.02	0.1	APHA, 23 rd Edition, 3111B, Direct Air Acetylene Flame AAS-Flame
11	Nitrate (as NO ₃), mg/l, Max	9.62	7.03	14.76	0.5	45	APHA, 23 rd Edition, P-4-127, 4500 - NO ₃ ⁻ B , UV-Spectrophotometric Screening Method
12	Odour	Aggreable	Aggreable	Aggreable	Qualitative	Agreeable	APHA, 23 rd Edition , 2150-C
13	pH value	7.72	7.85	7.91	0.2	6.5-8.5	IS 3025, Part 11 : 1983 R 2017 Electrometric method
14	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.001	0.002	APHA, 22 nd Edition, 4-Amino Autipyrine
15	Selenium, mg/l, Max	<0.007	<0.007	<0.007	0.007	0.01	IS -3025,part 56:2003,R-2019/APHA 23 rd Edition, AAS-VGA
16	Sulphate (as SO ₄) mg/l, Max	31	64	42	10	200	APHA -23 rd Edition. P-4-199, 4500 SO ₄ ²⁻ E
17	Taste	Acceptable	Acceptable	Acceptable	Qualitative	Acceptable	APHA, 23 rd Edition, 2160-C Flavour Rating Assesment
18	Total Alkalinity (CaCO ₃), mg/l, Max	105	121	137	4	200	IS 3025, Part 23: 1986 R 2019 Titration Method
19	Total Arsenic (as As), mg/l,Max	<0.006	<0.006	<0.006	0.006	0.01	IS-3025, part 37:1988,R-2019/APHA23 rd Edition AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.004	<0.004	<0.004	0.04	0.05	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 23 rd Edition, AAS-GTA
21	Total Dissolved Solids, mg/l, Max	425	510	622	25	500	IS 3025, Part 16: 1984 R 2017 Gravimetric method
22	Total Hardness (CaCO ₃), mg/l, Max	226	384	487	4	200	IS 3025, Part 21, 2009 R 2019 EDTA Method
23	Turbidity, NTU, Max	2	2	3	1	5	IS 3025, Part 10 : 1984 R 2017 Nephelometric Method
24	Zinc (as Zn), mg/l, Max	<0.1	<0.1	<0.1	0.1	5	IS 3025 Part 49 : 1994,R : 2019, AAS-Flame
25	Nickel as Ni, mg/l Max	<0.01	<0.01	<0.01	0.01	0.02	IS 3025 Pat 54 : 2003,R : 2019, AAS-Flame APHA 23 rd Edition, AAS-GTA

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Year: 2021-22

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW4 16.06.2021	GW5 16.06.2021	GW6 16.06.2021			
1	Boron (as B), mg/l, Max	<0.2	<0.2	<0.2	0.2	0.5	APHA, 23 rd Edition ,Carmine
2	Colour,in Hazen Units	1	3	3	1	5	APHA, 23 rd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	49	122	78	1.6	75	IS 3025, Part 40: 1991 R 2019 EDTA Method
4	Chloride (as Cl), mg/l, Max	74	132	60	2	250	IS-3025/32:1988, R-2019 Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03	0.03	0.05	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA, 23 rd Edition, AAS-GTA
6	Fluoride (as F) mg/l, Max	0.50	0.83	0.80	0.2	1.0	APHA, 23 rd Edition, Page 4-90 to , 4500 -F- D (SPADNS Method)
7	Free Residual Chlorine, mg/l, Min	<0.04	<0.04	<0.04	0.04	0.2	APHA, 23 rd Edition, , 4500-Cl ⁻ B. (Iodometric Method-I)
8	Iron (as Fe), mg/l, Max	0.41	<0.2	0.32	0.2	1.0	IS 3025 Part 53 : 2003, R : 2019 , AAS-Flame Method
9	Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	0.005	0.01	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 23 rd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	<0.02	<0.02	0.16	0.02	0.1	APHA, 23 rd Edition, 3111B, Direct Air Acetylene Flame AAS-GTA
11	Nitrate (as NO ₃), mg/l, Max	11.32	29.01	14.21	0.5	45	APHA, 23 rd Edition, P-4-127, 4500 - NO ₃ - B , UV-Spectrophotometric Screening Method
12	Odour	Agreeable	Agreeable	Agreeable	Qualitative	Agreeable	APHA, 23 rd Edition, , 2150-C
13	pH value	8.03	7.65	7.77	0.2	6.5-8.5	IS 3025, Part 11 : 1983 R 2017 Electrometric method
14	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.001	0.002	APHA, 22 nd Edition, 4-Amino Autipyrine
15	Selenium, mg/l, Max	<0.007	<0.007	<0.007	0.007	0.01	IS -3025,part 56:2003,R-2019/APHA 23 rd Edition, AAS-VGA
16	Sulphate (as SO ₄) mg/l, Max	54	148	58	2	200	APHA –23 rd Edition. P-4-199, 4500 SO ₄ ²⁻ E
17	Taste	Acceptable	Acceptable	Acceptable	Qualitative	Acceptable	APHA,23 rd Edition, 2160-C Flavour Rating Assesment
18	Total Alkalinity (CaCO ₃), mg/l, Max	103	119	139	4	200	IS 3025, Part 23: 1986 R 2019 Titration Method
19	Total Arsenic (as As), mg/l,Max	<0.006	<0.006	<0.006	0.006	0.01	IS-3025, part 37:1988,R-2019/APHA23 rd Edition AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04	<0.04	<0.04	0.04	0.05	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 23 rd Edition, AAS-GTA
21	Total Dissolved Solids, mg/l, Max	455	659	522	25	500	IS 3025, Part 16: 1984 R 2017 Gravimetric method
22	Total Hardness (CaCO ₃), mg/l, Max	281	531	329	4	200	IS 3025, Part 21, 2009 R 2019 EDTA Method
23	Turbidity, NTU, Max	4	2	2	1	5	IS 3025, Part 10 : 1984 R 2017 Nephelometric Method
24	Zinc (as Zn), mg/l, Max	<0.1	<0.1	0.18	0.1	5	IS 3025 Part 49 : 1994,R : 2019, AAS-Flame
25	Nickel as Ni, mg/l Max	<0.01	<0.01	<0.01	0.01	0.02	IS 3025 Pat 54 : 2003,R : 2019, AAS-Flame APHA 23 rd Edition, AAS-GTA

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Year: 2021-22

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW7 16.06.2021	GW8 15.06.2021	GW9 15.06.2021			
1	Boron (as B), mg/l, Max	<0.2	<0.2	<0.2	0.2	0.5	APHA, 23 rd Edition ,Carmine
2	Colour,in Hazen Units	2	2	3	1	5	APHA, 23 rd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	117	65	139	1.6	75	IS 3025, Part 40: 1991 R 2019 EDTA Method
4	Chloride (as Cl), mg/l, Max	97	85	124	2	250	IS-3025/32:1988, R-2019 Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03	0.03	0.05	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA,23 rd Edition, AAS-GTA
6	Fluoride (as F) mg/l, Max	0.44	0.68	0.75	0.2	1.0	APHA, 23RD Edition, Page 4-90 to , 4500 -F- D (SPADNS Method)
7	Free Residual Chlorine, mg/l, Min	<0.04	<0.04	<0.04	0.04	0.2	APHA, 23rd Edition, , 4500-Cl ⁻ B. (Iodometric Method-I)
8	Iron (as Fe), mg/l, Max	<0.2	0.2	<0.2	0.2	1.0	IS 3025 Part 53 : 2003, R : 2019 , AAS-Flame Method
9	Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	0.005	0.01	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 23 rd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	<0.02	<0.02	<0.02	0.02	0.1	APHA, 23 rd Edition, 3111B, Direct Air Acetylene Flame AAS-GTA
11	Nitrate (as NO ₃), mg/l, Max	16.27	11.81	25.78	0.5	45	APHA, 23rd Edition, P-4-127, 4500 - NO ₃ ⁻ B , UV-Spectrophotometric Screening Method
12	Odour	Agreeable	Agreeable	Agreeable	Qualitative	Agreeable	APHA, 23rd Edition, , 2150-C
13	pH value	7.71	7.35	7.86	0.2	6.5-8.5	IS 3025, Part 11 : 1983 R 2017 Electrometric method
14	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.001	0.002	APHA, 22 nd Edition,4-Amino Autipyrine
15	Selenium, mg/l, Max	<0.007	<0.007	<0.007	0.007	0.01	IS -3025,part 56:2003,R-2019/APHA 23 rd Edition, AAS-VGA
16	Sulphate (as SO ₄) mg/l, Max	75	35	159	2	200	APHA –23rd Edition. P-4-199, 4500 SO ₄ ²⁻ E
17	Taste	Acceptable	Acceptable	Acceptable	Qualitative	Acceptable	APHA,23rd Edition, 2160-C Flavour Rating Assesment
18	Total Alkalinity (CaCO ₃),, mg/l, Max	182	115	135	4	200	IS 3025, Part 23: 1986 R 2019 Titration Method
19	Total Arsenic (as As), mg/l,Max	<0.006	<0.006	<0.006	0.006	0.01	IS-3025, part 37:1988,R-2019/APHA23rd Edition AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04	<0.04	<0.04	0.04	0.05	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 23 rd Edition, AAS-GTA
21	Total Dissolved Solids, mg/l, Max	783	724	889	25	500	IS 3025, Part 16: 1984 R 2017 Gravimetric method
22	Total Hardness (CaCO ₃), mg/l, Max	440	309	554	4	200	IS 3025, Part 21, 2009 R 2019 EDTA Method
23	Turbidity, NTU, Max	1	5	2	1	5	IS 3025, Part 10 : 1984 R 2017 Nephelometric Method
24	Zinc (as Zn), mg/l, Max	<0.1	<0.1	0.1	0.1	5	IS 3025 Part 49 : 1994,R : 2019, AAS-Flame
25	Nickel as Ni, mg/l Max	<0.01	<0.01	<0.01	0.01	0.02	IS 3025 Pat 54 : 2003,R : 2019, AAS-Flame APHA 23 rd Edition, AAS-GTA

WATER QUALITY

(GROUND WATER- ALL PARAMETERS)

Year: 2021-22

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW10 15.06.2021	GW11 16.06.2021	GW13 16.06.2021			
1	Boron (as B), mg/l, Max	<0.2	<0.2	<0.2	0.2	0.5	APHA, 23 rd Edition ,Carmine
2	Colour,in Hazen Units	3	2	3	1	5	APHA, 23 rd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	82	54	158	1.6	75	IS 3025, Part 40: 1991 R 2019 EDTA Method
4	Chloride (as Cl), mg/l, Max	80	39	103	2	250	IS-3025/32:1988, R-2019 Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03	0.03	0.05	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA,23 rd Edition, AAS-GTA
6	Fluoride (as F) mg/l, Max	0.54	0.60	0.43	0.2	1.0	APHA, 23 rd Edition, Page 4-90 to , 4500 -F- D (SPADNS Method)
7	Free Residual Chlorine, mg/l, Min	<0.04	<0.04	<0.04	0.04	0.2	APHA, 23 rd Edition, , 4500-Cl ⁻ B. (Iodometric Method-I)
8	Iron (as Fe), mg/l, Max	<0.2	<0.2	0.2	0.2	1.0	IS 3025 Part 53 : 2003, R : 2019 , AAS-Flame Method
9	Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	0.005	0.01	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 23 rd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	<0.02	<0.02	0.18	0.02	0.1	APHA, 23 rd Edition, 3111B, Direct Air Acetylene Flame AAS-GTA
11	Nitrate (as NO ₃), mg/l, Max	17.24	11.47	9.23	0.5	45	APHA, 23 rd Edition, P-4-127, 4500 - NO ₃ ⁻ B , UV-Spectrophotometric Screening Method
12	Odour	Agreeable	Agreeable	Agreeable	Qualitative	Agreeable	APHA, 23 rd Edition, , 2150-C
13	pH value	7.75	8.15	8.05	0.2	6.5-8.5	IS 3025, Part 11 : 1983 R 2017 Electrometric method
14	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.001	0.002	APHA, 22 nd Edition,4-Amino Autipyrine
15	Selenium, mg/l, Max	<0.007	<0.007	<0.007	0.007	0.01	IS -3025,part 56:2003,R-2019/APHA 23 rd Edition, AAS-VGA
16	Sulphate (as SO ₄) mg/l, Max	99	44	183	2	200	APHA -23 rd Edition. P-4-199, 4500 SO ₄ ²⁻ E
17	Taste	Acceptable	Acceptable	Acceptable	Qualitative	Acceptable	APHA,23 rd Edition, 2160-C Flavour Rating Assesment
18	Total Alkalinity (CaCO ₃),, mg/l, Max	119	178	115	4	200	IS 3025, Part 23: 1986 R 2019 Titration Method
19	Total Arsenic (as As), mg/l,Max	<0.006	<0.006	<0.006	0.006	0.01	IS-3025, part 37:1988,R-2019/APHA23 rd Edition AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04	<0.04	<0.04	0.04	0.05	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 23 rd Edition, AAS-GTA
21	Total Dissolved Solids, mg/l, Max	666	578	782	25	500	IS 3025, Part 16: 1984 R 2017 Gravimetric method
22	Total Hardness (CaCO ₃), mg/l, Max	356	246	566	4	200	IS 3025, Part 21, 2009 R 2019 EDTA Method
23	Turbidity, NTU, Max	3	1	1	1	5	IS 3025, Part 10 : 1984 R 2017 Nephelometric Method
24	Zinc (as Zn), mg/l, Max	0.1	<0.1	<0.1	0.1	5	IS 3025 Part 49 : 1994,R : 2019, AAS-Flame
25	Nickel as Ni, mg/l Max	<0.01	<0.01	<0.01	0.01	0.02	IS 3025 Pat 54 : 2003,R : 2019, AAS-Flame APHA 23 rd Edition, AAS-GTA

WATER QUALITY **(GROUND WATER- ALL PARAMETERS)**

Year: 2021-22

Sl. No	Parameter	Sampling Stations			Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW14 16.06.2021	GW15 16.06.2021	GW16 15.06.2021			
1	Boron (as B), mg/l, Max	<0.2	<0.2	<0.2	0.2	0.5	APHA, 23 rd Edition ,Carminc
2	Colour,in Hazen Units	3	2	2	1	5	APHA, 23 rd Edition ,Pt-Co. Method
3	Calcium (as Ca), mg/l, Max	52	101	154	1.6	75	IS 3025, Part 40: 1991 R 2019 EDTA Method
4	Chloride (as Cl), mg/l, Max	54	136	119	2	250	IS-3025/32:1988, R-2019 Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	<0.03	0.03	0.05	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA,23 rd Edition, AAS-GTA
6	Fluoride (as F) mg/l, Max	0.61	0.78	0.55	0.2	1.0	APHA, 23 rd Edition, Page 4-90 to , 4500 –F- D (SPADNS Method)
7	Free Residual Chlorine, mg/l, Min	<0.04	<0.04	<0.04	0.04	0.2	APHA, 23 rd Edition, , 4500-Cl ⁻ B. (Iodometric Method-I)
8	Iron (as Fe), mg/l, Max	<0.2	<0.2	0.2	0.2	1.0	IS 3025 Part 53 : 2003, R : 2019 , AAS-Flame Method
9	Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	0.005	0.01	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 23 rd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	<0.02	0.10	<0.02	0.02	0.1	APHA, 23 rd Edition, 3111B, Direct Air Acetylene Flame AAS-GTA
11	Nitrate (as NO ₃), mg/l, Max	14.83	9.44	15.73	0.5	45	APHA, 23 rd Edition, P-4-127, 4500 - NO ₃ ⁻ B , UV-Spectrophotometric Screening Method
12	Odour	Agreeable	Agreeable	Agreeable	Qualitative	Agreeable	APHA, 23 rd Edition, , 2150-C
13	pH value	8.06	7.95	7.86	0.2	6.5-8.5	IS 3025, Part 11 : 1983 R 2017 Electrometric method
14	Phenolic compounds (as C ₆ H ₅ OH), mg/l, Max	<0.001	<0.001	<0.001	0.001	0.002	APHA, 22 nd Edition,4-Amino Autipyrine
15	Selenium, mg/l, Max	<0.007	<0.007	<0.007	0.007	0.01	IS -3025,part 56:2003,R-2019/APHA 23 rd Edition, AAS-VGA
16	Sulphate (as SO ₄) mg/l, Max	58	142	187	2	200	APHA –23 rd Edition. P-4-199, 4500 SO ₄ ²⁻ E
17	Taste	Acceptable	Acceptable	Acceptable	Qualitative	Acceptable	APHA,23 rd Edition, 2160-C Flavour Rating Assesment
18	Total Alkalinity (CaCO ₃), mg/l, Max	101	127	155	4	200	IS 3025, Part 23: 1986 R 2019 Titration Method
19	Total Arsenic (as As), mg/l,Max	<0.006	<0.006	<0.006	0.006	0.01	IS-3025, part 37:1988,R-2019/APHA23 rd Edition AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04	<0.04	<0.04	0.04	0.05	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 23 rd Edition, AAS-GTA
21	Total Dissolved Solids, mg/l, Max	569	766	807	25	500	IS 3025, Part 16: 1984 R 2017 Gravimetric method
22	Total Hardness (CaCO ₃), mg/l, Max	309	539	638	4	200	IS 3025, Part 21, 2009 R 2019 EDTA Method
23	Turbidity, NTU, Max	2	3	3	1	5	IS 3025, Part 10 : 1984 R 2017 Nephelometric Method
24	Zinc (as Zn), mg/l, Max	<0.1	0.1	0.84	0.1	5	IS 3025 Part 49 : 1994,R : 2019, AAS-Flame
25	Nickel as Ni, mg/l Max	<0.01	<0.01	<0.01	0.01	0.02	IS 3025 Pat 54 : 2003,R : 2019, AAS-Flame APHA 23 rd Edition, AAS-GTA

Abbreviations

AMSL: Above mean sea level

Avg.: Average

APT: Aquifer Pumping Test

BCCL: Bharat Coking Coal Ltd.

bgl: Below Ground Level

Buffer zone: periphery of the 10 km radius from the project boundary

Core zone: Project / mine / colliery boundary (leasehold area)

CMPDI: Central Mine Plan & Design Institute

DVC: Damodar Valley Corporation

DTW: Depth to water level

GW: Groundwater

IMD: Indian Meteorological Division

JCF: Jharia Coalfield

RCF: Raniganj Coalfield

MADA: Mineral Area Development Authority

MCM: Million Cubic Meter

MGD: Million Gallon per day

NTU: Nephelometric Turbidity unit

OC / UG: Opencast / Underground

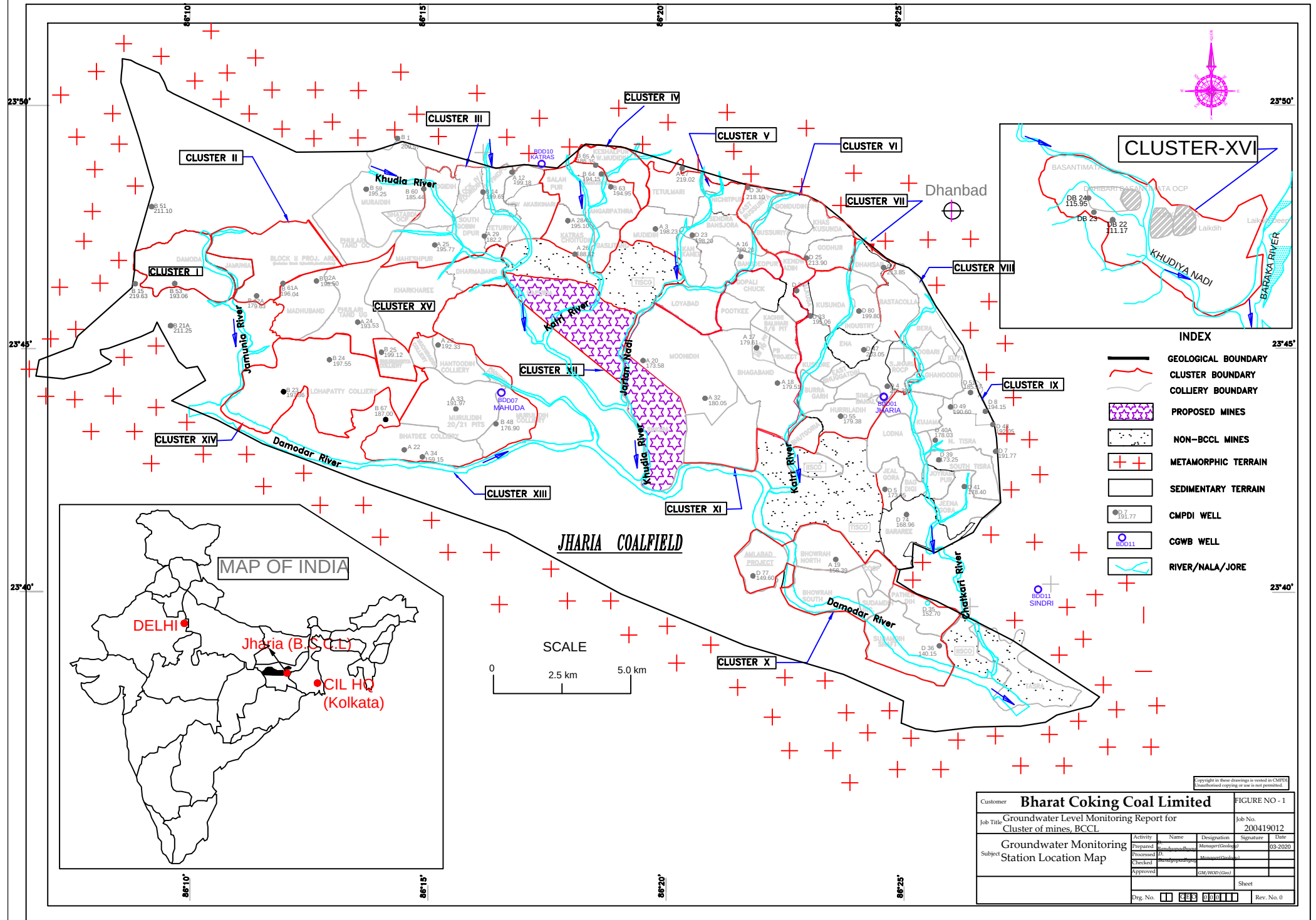
OCP / UGP: Opencast Project / Underground Project

RL: Reduced Level

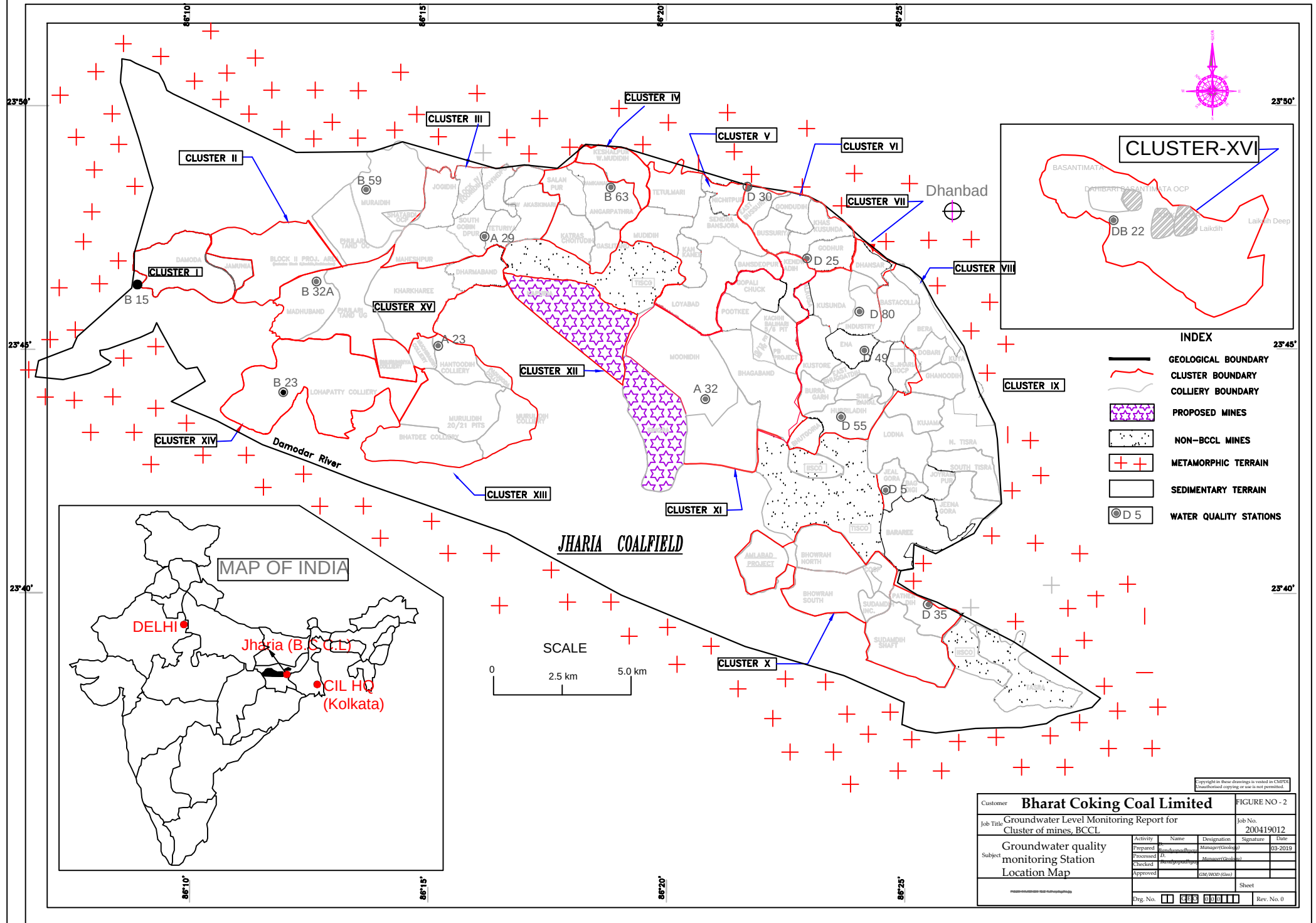
RWH: Rainwater Harvesting

FF: Fire Fighting

GROUNDWATER MONITORING STATION LOCATION MAP

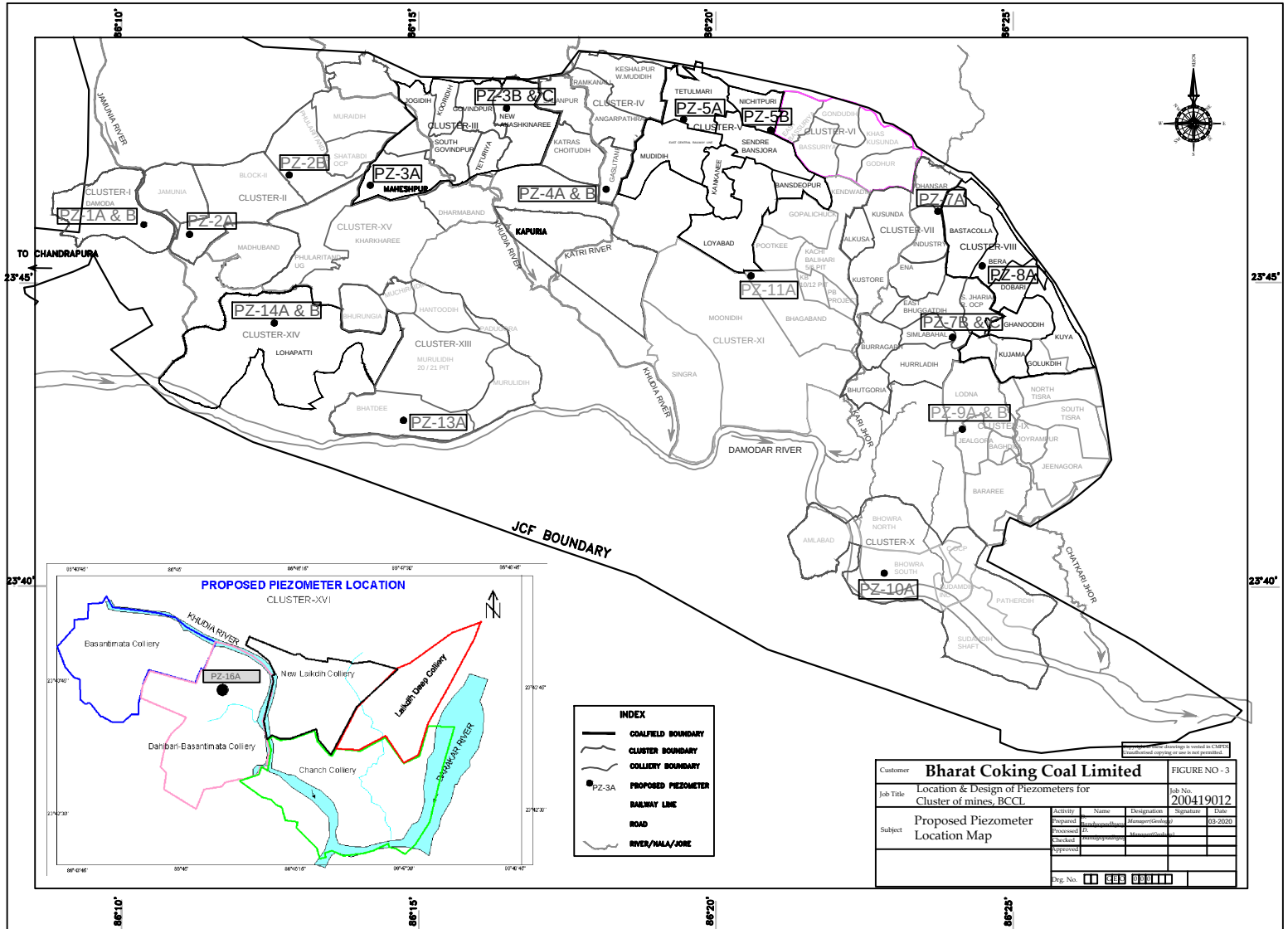


GROUNDWATER QUALITY MONITORING STATION LOCATION MAP



Customer Bharat Coking Coal Limited		FIGURE NO - 2	
Job Title Groundwater Level Monitoring Report for Cluster of mines, BCCL		Job No. 200419012	
Subject Groundwater quality monitoring Station Location Map	Activity	Name	Designation
	Prepared	<i>[Signature]</i>	Manager (Geology)
	Processed	<i>[Signature]</i>	Manager (Geology)
	Checked	<i>[Signature]</i>	Manager (Geology)
Approved		GM (H/O) (Geo)	
Prg. No. 000 000 000		Rev. No. 0	

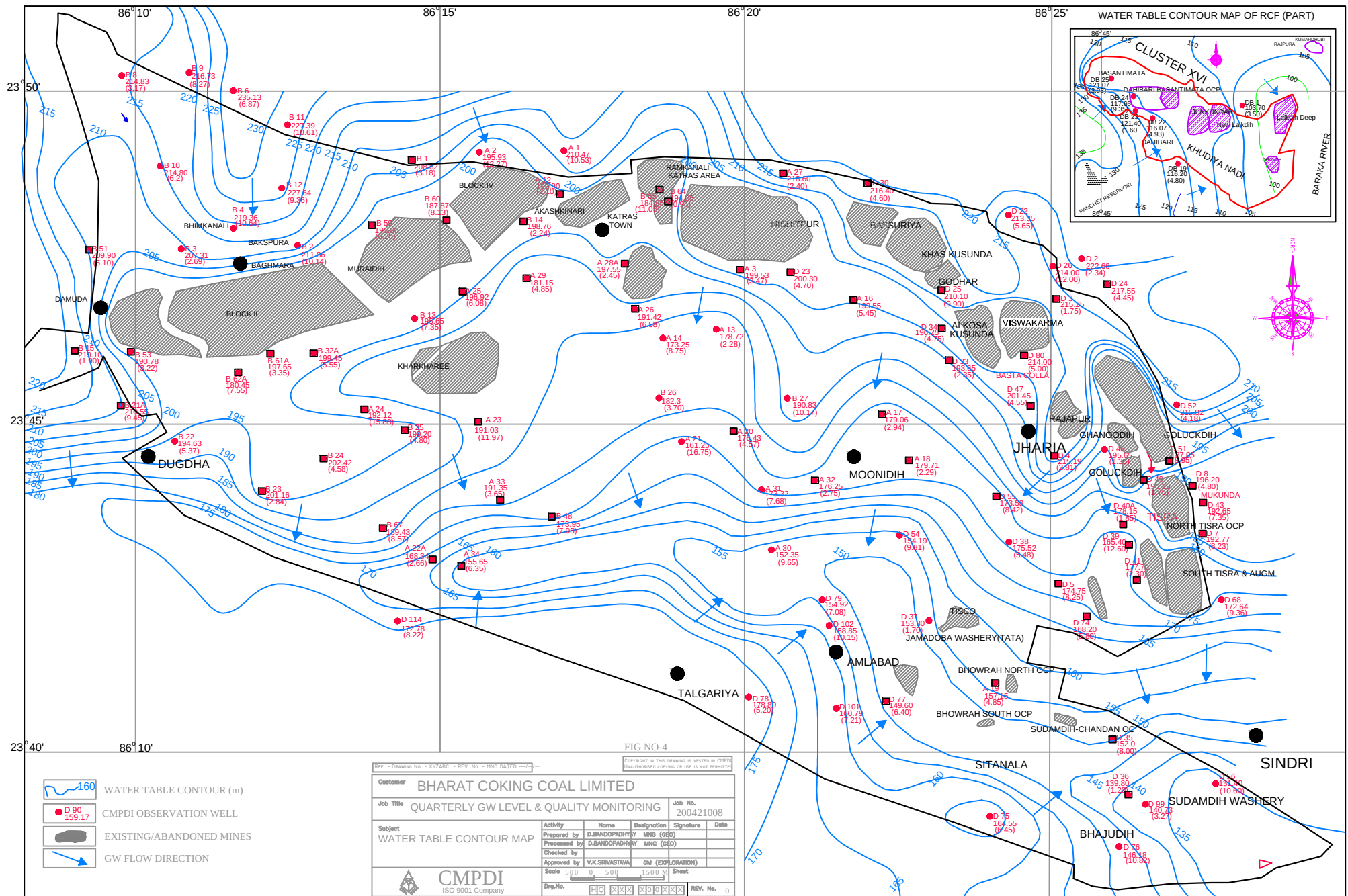
PROPOSED PIEZOMETER LOCATION MAP, JCF & RCF (part)



WATER TABLE CONTOUR MAP OF RCF (PART)

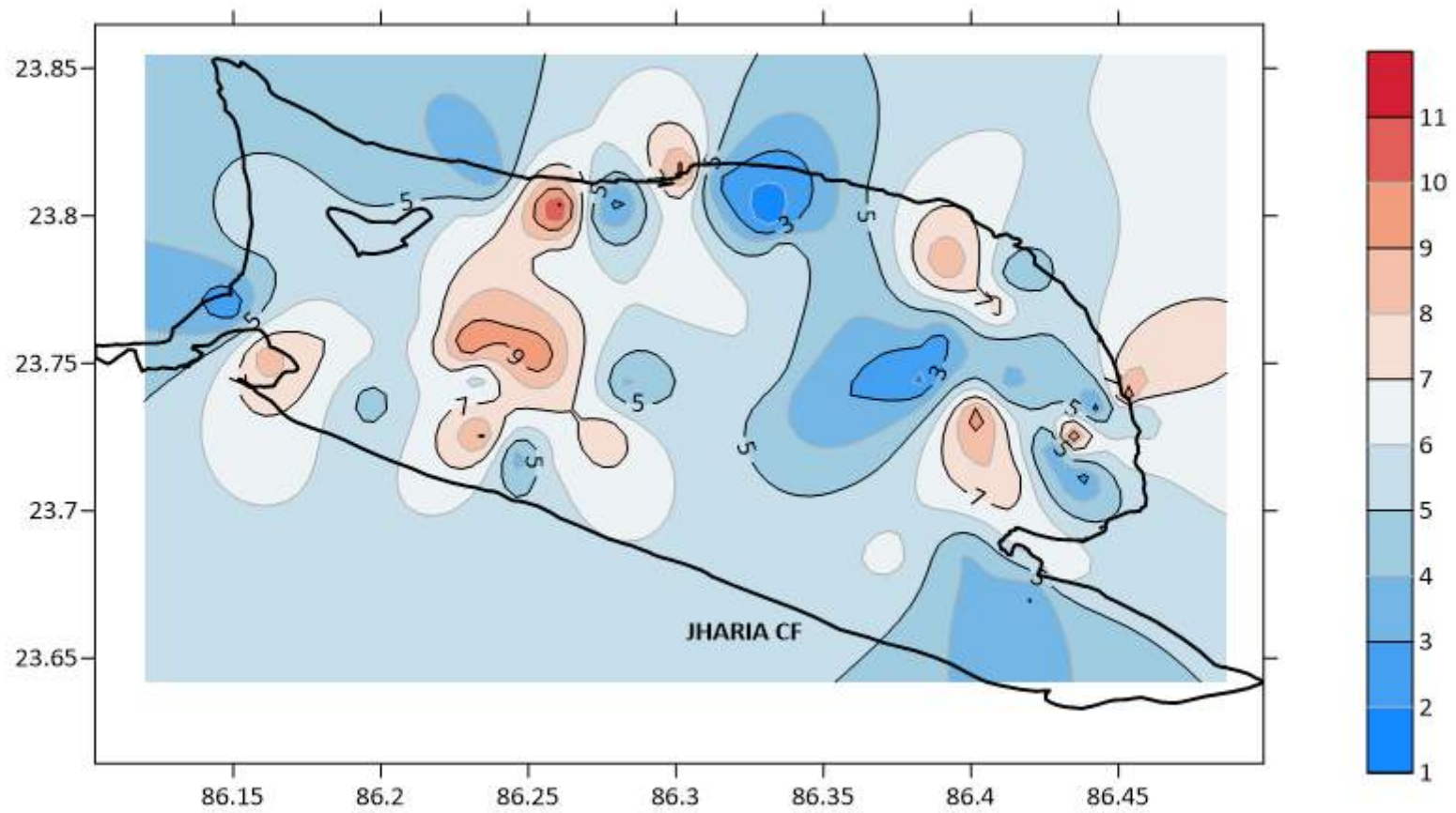
The map displays the water table contours for Cluster XVI. Key features include:

- Geographical Features:** BASANTIMATA, KHUDIYA NADI, BARAKA RIVER, JANKI, Laksh Deep, and DANIBARI.
- Water Table Contours:** Contour lines are labeled with elevations such as 120, 110, 100, 90, and 80.
- Infrastructure:** A road network is shown, with specific points marked as DB 24, DB 25, DB 26, DB 27, DB 28, DB 29, DB 30, DB 31, DB 32, DB 33, DB 34, DB 35, DB 36, DB 37, DB 38, DB 39, DB 40, DB 41, DB 42, DB 43, DB 44, DB 45, DB 46, DB 47, DB 48, DB 49, DB 50, DB 51, DB 52, DB 53, DB 54, DB 55, DB 56, DB 57, DB 58, DB 59, DB 60, DB 61, DB 62, DB 63, DB 64, DB 65, DB 66, DB 67, DB 68, DB 69, DB 70, DB 71, DB 72, DB 73, DB 74, DB 75, DB 76, DB 77, DB 78, DB 79, DB 80, DB 81, DB 82, DB 83, DB 84, DB 85, DB 86, DB 87, DB 88, DB 89, DB 90, DB 91, DB 92, DB 93, DB 94, DB 95, DB 96, DB 97, DB 98, DB 99, DB 100.
- Other Markers:** A pink star symbol is located near the center of the map, and a pink circle is located near the top right.



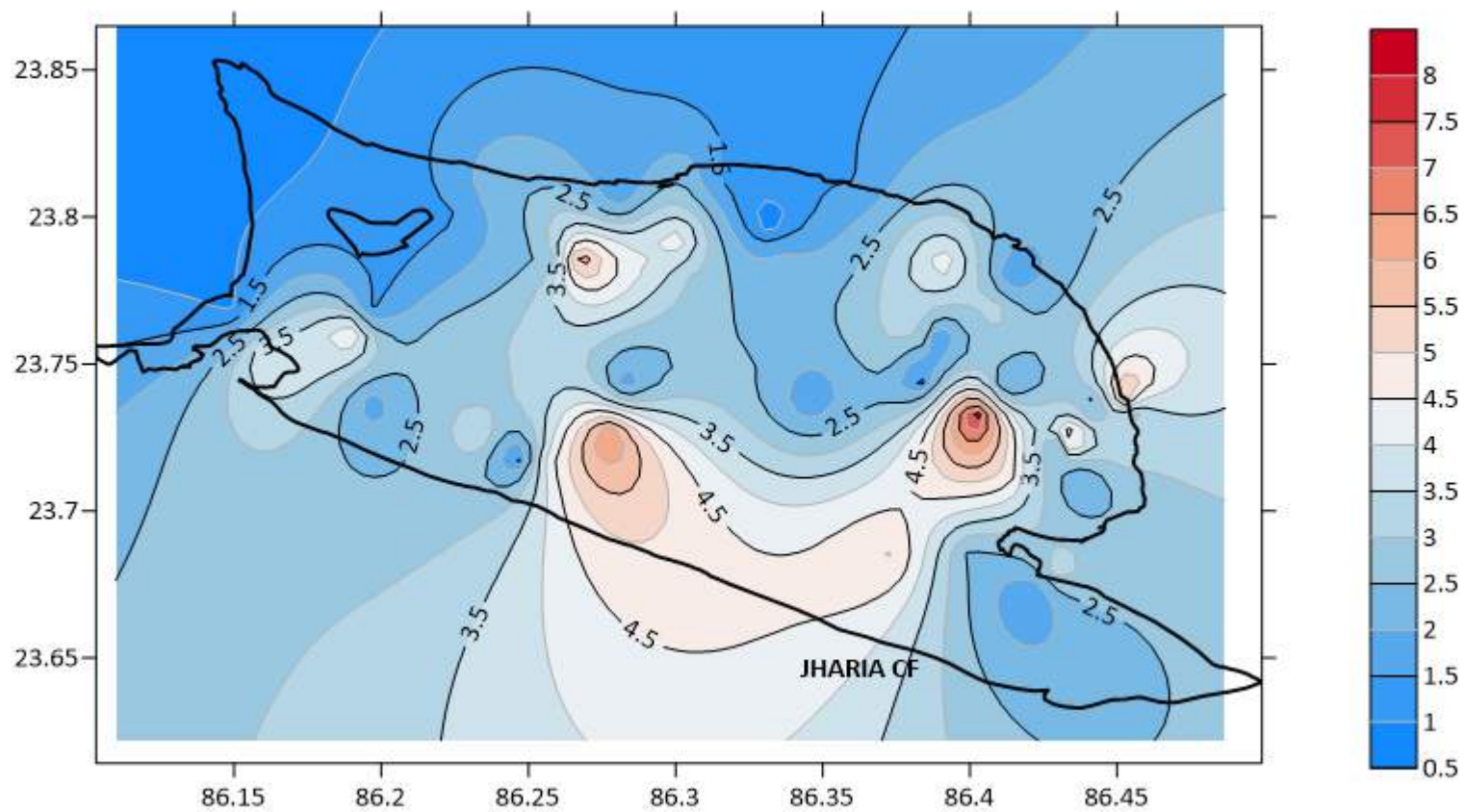


DEPTH TO WATER LEVEL MAP (PRE-MONSOON)





DEPTH TO WATER LEVEL MAP(POST-MONSOON)





Accreditation Board of CGWA

Certificate of Accreditation

*M/s. Central Mine Planning and Design Institute Ltd. (CMPDIL)
Ranchi, Jharkhand*

*Has been accredited as a Ground Water Professionals to prepare reports in the
Functional Areas of*

- Hydrogeological conditions in mining projects.*

Valid from : 15.02.2021

Certificate No. : CGWA/RGI/013

Valid thru : 14.02.2026

Dated : 07.07.2021

क्षेत्रीय निदेशक
Regional Director
आरजीएनजीडब्ल्यूटीआरआई
RGNGWT&RI

सदस्य
Member
आरजीएनजीडब्ल्यूटीआरआई
RGNGWT&RI



भारत सरकार
Government of India
जल शक्ति मंत्रालय
Ministry of Jal Shakti

E-877816
15.11.21



जल ससाधन, नदी विकास और गंगा संरक्षण विभाग
Department of Water Resources, River Development & Ganga Rejuvenation

केन्द्रीय भूमि जल बोर्ड / Central Ground Water Board

राजीव गांधी राष्ट्रीय भूमि जल प्रशिक्षण एवं अनुसंधान संस्थान

Rajiv Gandhi National Ground Water Training & Research Institute

फोन / Phone No. 07712220701

ई-मेल / E-mail: rgi-cgwb@nic.in

वेबसाइट / Website: cgwb.gov.in / ngwtri.org

सेक्टर 23, तुता, अटल नगर, नया रायपुर 492016 (छ.ग.)

Sector - 23, Tuta, Atal Nagar, Naya Raipur 492016 (C.G.)

File No. 29/TS/RGI/Accreditation/20-21 - 295

Date 02.08.2021

To,

The CMPDIL

Gondwana Place, Kanke Road

Ranchi, (Jharkhand)

PIN- 834031

Sub: - Accreditation Certificate – Reg.

Sir,

Please find enclosed the Certificate of Accreditation in respect of The CMPDIL for the period 2021-2026.

Please acknowledge the receipt of the Certificate

Encl : As Above

Yours Faithfully

(Satish Kumar)

Regional Director
RGNGWTRI, Raipur



Quality Council of India
National Accreditation Board for Education and Training
ITPI Building, 6th Floor, 4 - A, Ring Road, I P Estate, New Delhi - 110002



CERTIFICATE OF ACCREDITATION

**Under the QCI-NABET Scheme
for
Ground Water Consultant Organisation**



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

CMPDI, GONDWANA PLACE, KANKE ROAD, RANCHI, JHARKHAND -834031

S.No.	SCOPE COVERAGE		
	Industrial Use	Mining Projects	Infrastructure Projects
1	Hydrogeological report: Comprehensive report on groundwater condition/situation		
2	Impact Assessment Reports without modelling studies		

Note: Names of approved Project Coordinators and Technical Area Experts are mentioned in IA AC Minutes dated Oct 14, 2021 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/GWCO/21/57 dated Oct 27, 2021. The accreditation needs to be renewed before the expiry date by Oct 13, 2026 following due process of assessment.

Sr. Director, NABET
Issue Date : Oct 27, 2021



Certificate No.
NABET/GWCO/IA/GW021

Valid Upto
Oct 13, 2026



Ref. No. - QCI/NABET/ENV/GWCO/ACO/21/57

October 27, 2021

To,

M/s Central Mine Planning and Design Institute Limited
Gondwana Place, Kanke Road,
Ranchi, Jharkhand- 834031

Sub: Accreditation under NABET Scheme of Ground Water Consultant Organization (GWCO)

Ref.: With reference to your application No. QCI/NABET/GWCO/0011/IA dated October 22, 2020.

Dear Sir

QCI-NABET is hereby pleased to accredit 'Central Mine Planning and Design Institute Limited' for the scope coverage as mentioned in the Certificate of Accreditation.

The validity of accreditation is subject to continued compliance to the Scheme and the terms & conditions mentioned in **Annexure I to IV**.

NABET always look forward for your association and continued support.

With best regards,


A K Jha
Senior Director
QCI- NABET

Annexure-I**Ref. No.:** QCI/NABET/ENV/GWCO/ACO/21/57**Date** October 27, 2021**Name of organization:** Central Mine Planning and Design Institute Limited**Accreditation of Ground Water Consultant Organization (GWCO) under NABET Scheme****Marks obtained in various aspect of Initial Assessment**

Sl. No.	Aspect	Marks Scored	Out of
1.	Quality and performance of personnel		
	i. Project Coordinator/s	18.29 (Average)	25
	ii. Technical Area Expert/s	13.29 (Average)	20
2.	Infrastructure and software and hardware	13.20	15
3.	Field Invest. & Laboratory system	13.80	20
4.	Quality Management System	10.88	15
5.	Organizational Commitment	4.20	5
	Total	73.66	100
	Overall Score	73.66%	

The organization has scored 73.66% overall and awarded 3-Star (★★★)

Criteria for Star Rating:

S. No	Overall Score	Star Rating
1	40% to 60%	★
2	61% to 70%	★★
3	71% and Above	★★★



National Accreditation Board for
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

**ENVIRONMENT LABORATORY, REGIONAL INSTITUTE -II,
CMPDI DHANBAD**

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

CMPDIL, RI-2, KOYLABHAWAN, KOYLANAGAR, DHANBAD, JHARKHAND, INDIA

in the field of

TESTING

Certificate Number: TC-10122

Issue Date: 07/12/2021

Valid Until: 06/12/2023

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : CENTRAL MINE PLANNING AND DESIGN INSTITUTE LTD.

Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer

REGISTERED OFFICE

Gondwana Place, Kanke Road
Ranchi - 834 031
(Jharkhand)

REGIONAL INSTITUTES

क्षेत्रीय संस्थान - I

वेस्ट एंड, जी.टी.रोड
असोल - 713 301
(पश्चिम बंगाल)

क्षेत्रीय संस्थान - II

कोयला भवन, कोयला नगर
धनबाद - 826 005
(झारखंड)

क्षेत्रीय संस्थान - III

गोंदवाना प्लेस, कान्के रोड
राँची - 834 031
(झारखंड)

क्षेत्रीय संस्थान - IV

जरीपटका, कास्तूरबा नगर
नागपुर - 440 014
(महाराष्ट्र)

क्षेत्रीय संस्थान - V

सीपाट रोड
बिलासपुर - 495 001
(छत्तीसगढ़)

क्षेत्रीय संस्थान - VI

पोस्ट जयंत कोलिरी,
जिला : सिंगरौली
पिन नं० - 486 890
(मध्य प्रदेश)

क्षेत्रीय संस्थान - VII

गृह निर्माण भवन
सचिवालय मार्ग
भुवनेश्वर - 751001
(उड़ीसा)

Regional Institute - I

West End, G.T Road
Asansol - 713 301
(West Bengal)

Regional Institute - II

Koila Bhawan, Koila Nagar
Dhanbad - 826 005
(Jharkhand)

Regional Institute - III

Gondwana Place, Kanke Road
Ranchi - 834 031
(Jharkhand)

Regional Institute - IV

Jaripathka, Kasturba Nagar
Nagpur - 440 014
(Maharashtra)

Regional Institute - V

Seepat Road
Bilaspur - 495 001
(Chattisgarh)

Regional Institute - VI

P.O Jayant Colliery
Dist. - Singrauli
PIN - 486 890
Madhya Pradesh

Regional Institute - VII

Grih Nirman Bhawan
Sachivalaya Marg
Bhubneswar - 751 001
(Orissa)

सेन्ट्रल माईन प्लानिंग एंड डिजाइन इन्स्टीच्यूट लिमिटेड

(कोल इंडिया की अनुबंधी कंपनी)

एक मिनी रत्न कंपनी

Central Mine Planning & Design Institute Limited

(A Subsidiary of Coal India Limited)

A Mini Ratna Company

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क्षेत्रीय संस्थान - I

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आसनसोल - 713 301
(पश्चिम बंगाल)

क्षेत्रीय संस्थान - II

कोयला भवन, कोयला नगर
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बिलासपुर - 495 001
(छत्तीसगढ़)

क्षेत्रीय संस्थान - VI

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जिला : सिंगरौली
पिन नं० - 486 890
(मध्य प्रदेश)

क्षेत्रीय संस्थान - VII

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Regional Institute - V

Seepat Road
Bilaspur - 495 001
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Regional Institute - VI

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Regional Institute - VII

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CSR Booklet

Cluster-II

Bharat Coking Coal Limited

As per EC condition (Specific Condition : 27) The Details of transportation, CSR, R&R and implementation of environmental action plan for the clusters-II should be brought out in a booklet form within a year and regularly updated.

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1.0 INTRODUCTION

Coal India has adopted CSR as a strategic tool for sustainable growth. For Coal India in the present context, CSR means not only investment of funds for Social Activity but also Integration of Business processes with Social processes. Even much before the issue of CSR became global concern; Coal India was aware of its Corporate Social Responsibility and was fulfilling the aspiration of the Society through well-defined “Community Development Policy” within the periphery of 8 Kms. of the Project sites. This has resulted into a harmonious relationship between Coal India and the peripheral Communities. Coal India has identified land outsee, PAP and those staying within the radius of 25 Kms of the Project as primary beneficiaries. Poor and needy section of the society living in different parts of India is second beneficiaries. For carrying out CSR activities, 80% of the budgeted amount are be spent within the radius of 25 Km of the Project Site/Mines/Area HQ/Company HQ and 20% of the budget to be spent within the States in which operating.

2.0 SCOPE

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

- 1) Eradicating hunger, poverty and malnutrition, promoting healthcare including preventive health care and sanitation and making available safe drinking water.
- 2) Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and differently able and livelihood enhancement projects.
- 3) Promoting gender equality, empowering women, setting up homes and hostels for women and orphans, setting up old age homes, day care centers and such other facilities for senior citizens and measures for reducing inequalities faced by socially and economically backward groups.
- 4) Ensuring environmental sustainability, ecological balance, protection of Flora and Fauna, animal welfare, agro-forestry, conservation of natural resources and maintaining quality of soil, air and water.
- 5) Protection of national heritage, art and culture including restoration of buildings and sites of historical importance and works of art; setting up public libraries, promotion and development of traditional arts and handicrafts.
- 6) Measures for the benefit of armed forces veterans, war widows and their dependents
- 7) Training to promote rural sports, nationally recognized sports, Paralympics sports and Olympic Sports.
- 8) Contribution to the Prime Minister’s National Relief Fund or any other fund set up by the Central Government for socio-economic development and relief and welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women.
- 9) Contributions or funds provided to technology incubators located within academic institutions which are approved by the Central Government.
- 10) Rural development projects.

3.0 SOURCE OF FUND

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

4.0 ACTION PLAN FOR CORPORATE SOCIAL RESPONSIBILITY

CSR activities are mainly taken at corporate level.

5.0 STATUS OF CSR ACTIVITIES

5.1 Details of CSR expenditure made at M/s BCCL Level:

FY	Expenditure (In Cr.)
2020-21	6.21
2019-20	6.46
2018-19	1.43
2017-18	2.74

5.2 Details of Civil work ,Medical Camps, CSR Clinics & Awareness Programme under taken at area level:

Civil work

S. N.	Details	Award value (In Lac)	Remarks
1	Construction of PCC road at Gonduadih west under Mohanpur village (from Khalil Mahto home to Primary school).	3.98	25.01.2015 to 24.03.2015 (60 days)
2	Construction of Janaja shed at Ramakunda west under Amtand village	3.15	15.10.2014 to 14.12.2014 (60 days)
3	Construction of 1 no. chhathh ghat at Muraidih colony, Hirak road river side	3.01	15.10.2014 to 14.12.2014 (60 days)
4	Construction of Janaja shed at Muraidih colony near river of Hirak road	0.46	31.03.2014 to 29.04.2014 (30 days)
5	PCC Road jhunu Rajwar House to Tarkeswar Gope House at Bakaspura Village Luti Pahari (Jhunu Tarkeshwar) Road Length:-	2.30	This is benefiting to approx. 200 families in this locality by all-weather connectivity.
6	Making PCC Path from Manoj Matha House to Sahabuddin Ansari house at Ghunghusa Village (Mahato Shabbhuddin)	1.85	This is benefiting to approx. 300 families in this locality by all-weather connectivity
7	Steps for Ghat at sarbandh near hirak chowk under B-II Area	2.67	This will ease in performing rituals by local villages of Dumara ,harina & Bada pandeydih.
8	Cutting of earth from pond at Chaudhary bandh at Harina Basti, under B-II Area	19.22	This is benefiting to approx 5000 persons in this locality. This pond is used for multipurpose like irrigation, water for

			households drinking water for animals etc.it will also maintain the water level in locality.
9	Drinking Water pipe line works in hadi basti at Bhamkanali.	0.44	This is benefiting to approx. 150 families in this locality
10	Rep/Maint of Hand pump at Bara pandeydih (08 Nos).	0.26	This is benefiting to approx. 500 persons in this locality
11	Development work at rehabilitation site at Bhimkanali.	6.45	This is benefiting to approx. 500 persons in this locality
12	Construction of community hall at Bara Pandeydih Village Under Block-II Area	11.9	This is benefiting to approx. 1000 persons in this locality
13	Rep. Of Main road & Drain at Bakashpura rehabilitation site.	9.71	This is benefiting to approx. 1500 persons in this locality
14	Engagement of tankers for drinking water supply in nearby villages of B-II Area	1.9	This is benefiting to approx. 2000 families in Viallages like Benidih Baghmara, Luttipahadi, Harina, Kessurgarh, Rathand, Nudkhurkee,Pinalgarhia,Mandra.
15	Engagement of departmental tankers for drinking water supply in nearby villages of B-II Area as on need bais.	-	This is benefiting to approx. 2000 families in Viallages like Benidih Baghmara, Luttipahadi Kessurgarh, Madhuban Etc.

S.N.	Details	Award value (In Lac)	Remarks
1	Construction and maintenance for 5 years of toilets in Government schools in Gumla District under Swachh Vidyalaya Abhiyan. 125 toilets in 69 schools were constructed.	191.67	This is benefiting to approx. 7500 students
2	Construction and maintenance for 5 years of toilets in Government schools in Bokaro District under Swachh Vidyalaya Abhiyan. 179 toilets in 181 schools were constructed.	1702.98	This is benefiting to approx. 10000 students

Health: Medical Camps, CSR Clinics & Awareness Programme:

Medical Camps	Beneficiaries	Amount (in Rs.)
2014-15	5144	58095.75
2015-16	3397	38352.13
2016-17	595	30320.00
2018-19	789	30320.00
2019-20	310	-

CSR Clinic:

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Total no patients	1660	1301	1895	1293	1305	810	910

SN	Health Awareness Programme	Amount (in Rs.)
1	Nasa Mukti Abhiyan	10000.00
2	Blood Pressure Detection	5000.00
4	Aids Awareness Programme	5000.00
5	Eye Checkup camp	25000.00

5.3 COVID Prevention related Activities (2020-21):

Type	No of beneficiaries	Hand wash	Mask
Hand wash and Mask Distribution	500	450	500
Blood sugar strips	124	NA	NA

6.0 COAL TRANSPORTATION PLAN: Cluster-II consists of mines of Block-II Area and Barora Area.

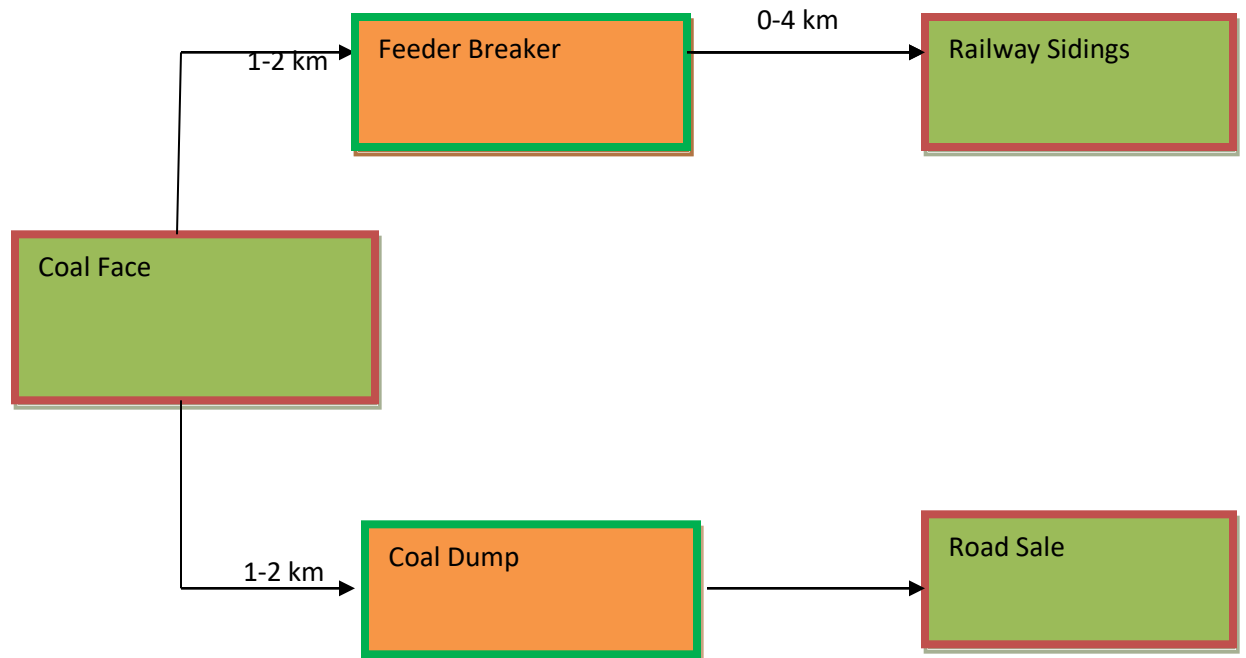


Fig: Coal transportation route

7.0 REHABILITATION AND RESETTLEMENT PLAN:

REHABILITATION AND RESETTLEMENT POLICY OF COAL INDIA LTD 2012.

Preamble

The location and quality of coal reserves, and their distance from major consumers determines to a great extent the selection of mine sites. For reserves that are close to the surface, opencast mining has proven to be the most efficient mining method. Opencast mines require relatively large areas of land. Population growth, particularly in India's eastern region, has made it increasingly difficult for the subsidiary coal companies to acquire the land they need for expanding their operations under the present Resettlement and Rehabilitation policy, 2008 of Coal India.

The resettlement and rehabilitation policies followed by the subsidiary companies have evolved over time and undergone numerous changes in response to changing circumstances. As and when the Central or State Governments enact amendments to the Land Acquisition Act, issue new guidelines for resettlement and rehabilitation, as per its requirement Coal India reviews and modifies its resettlement and rehabilitation policy taking into account the changing conditions in coal producing areas.

In addition to compensation for land coal companies provide Rehabilitation and Resettlement (R&R) package for project affected persons to compensate for loss of livelihood. Apart from compensation for house site, house, trees, cow shed, cost of shifting etc., employment is also provided to land oustees. In addition to this, efforts are made to rehabilitate them by construction of houses, building roads, streets, schools, providing water etc. wherever feasible. However, demand for both more land compensation and better R&R package has been raised by project affected persons and has been highlighted in various Parliamentary Committees. Coal Companies often have to face representations and agitations by these land oustees who obstruct the smooth working of existing mines and come in the way of expansion of new projects.

In the past, subsidiaries found it relatively easy to acquire land, if they were able to offer employment. Partly because of this practice, subsidiaries have built up a largely unskilled labour force beyond their needs. This has contributed to the heavy losses and many mines are incurring and has also affected their efficiency and viability. The subsidiaries may still need to hire people in selected locations and continue to give preference to those whose livelihood will be affected by coal mining operations. However, increasingly subsidiaries will need to develop other ways and means to compensate land owners and others adversely affected by their projects and give them the option to choose which method of compensation best suits their needs. Greater emphasis will also need to be given to community requirements like schools, hospitals etc. Only proper resettlement and rehabilitation will elicit the required cooperation of project affected people, and make it possible for Coal India to acquire the land it needs to fulfill the ever increasing demand of coal for the economic development of the Country.

- 1 -

The purpose of the Resettlement and Rehabilitation Policy 2012 is to revise and provide greater flexibility to the basic principles for the resettlement and rehabilitation of people affected by coal mining projects i.e. Project Affect People (PAPs). It attempts to consolidate the different resettlement and rehabilitation practices that are being followed by subsidiaries as per the different State land Acquisition Acts and various decisions of the Coal India Board and to modify the Policy of 2008 so as to give the Board of the subsidiary Companies greater flexibility to deal more effectively with resettlement and rehabilitation issues and determine the rehabilitation packages best suited to local needs in line with this policy. The provisions of the National Rehabilitation and Resettlement Policy, 2007 and the Land Acquisition, Rehabilitation & Resettlement Bill, 2011 have also been kept in mind while framing the policy.

While Coal India's basic philosophy for compensating land-losers and other project-affected people remains substantially unchanged, the revised policy emphasizes the need to cultivate and maintain good relationships with the people affected by Coal India's projects starting as early as possible; it also underscores that the subsidiaries have a responsibility towards the land oustees whose livelihood is often taken away. On the other hand, subsidiaries need to protect themselves more effectively against unjustified claims, redundant manpower and swelling Wage Bills. To this end, the statement proposes that subsidiaries prepare detailed resettlement and rehabilitation action plans (RAPs) that clearly identify, at an early stage, the entitlements of the people affected by coal projects and enables them to exercise a choice between various options. The concept of Annuity in lieu of compensation/employment is also being introduced to mitigate, if not eliminate the ever dependence of Project Affected Families (PAFs) on CIL for provision of employment.

(1) The revised Resettlement & Rehabilitation Policy, 2012 is based on the deliberations of the inter Ministerial Committee set up vide O.M. 490191/2011-PR/W-I dated 01-07-2011 of Ministry of Coal, deliberations of the CMDs meet held on 05/03/2012 at New Delhi and has been approved by the CIL Board in its 278th meeting held on 12th and 13th March, 2012.

(2) Objectives and general principles of Coal India's Resettlement and Rehabilitation Policy- 2012

- A. To re-visit CIL's existing R&R policy 2008 and evolve a PAP friendly policy by incorporating such provisions of the National Policy and The Draft Land Acquisition, Rehabilitation and Resettlement Bill-2011 as considered suitable in light of the growing difficulties many subsidiaries face in land acquisition.
- B. To accord the highest priority for avoiding or minimizing disturbance of the local population while taking decisions to open new mines or expand existing ones too (exploring alternative sites and project designs) and to ensure that wherever people are likely to be adversely affected by a project, the subsidiaries will prepare resettlement and rehabilitation action plans for the project.
- C. To ensure a humane, participatory, informed consultative and transparent process for land acquisition for coal mining and allied activities with the least disturbance to the owners of the land and other affected families.
- D. To provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition and make

adequate provisions for loss of livelihood of such affected persons including their rehabilitation and resettlement.

- E. To ensure that the cumulative outcome of compulsory acquisition should be that the affected persons become partners in development leading to an improvement in their post acquisition social and economic status and matters connected therewith or incidental thereto.
- F. Through the preparation of resettlement and rehabilitation action plans, subsidiaries will safeguard that project-affected people improve or at least regain their former standard of living and earning capacity after a reasonable transition period. The transition period is to be kept to a minimum. However, the involvement of subsidiaries in resettlement and rehabilitation activities may continue until all the actions specified in the rehabilitation plan have been completed.
- G. Involuntary resettlement is conceived and executed as a development programme with project-affected people being provided sufficient resources and opportunities to share in a project's benefits. The efforts of subsidiaries are complementary to the Government's schemes in rural development and the concurrence, approvals and support from concerned Government authorities will be sought.
- H. In parallel, subsidiaries will work closely with non-governmental organizations of proven repute which are legally constituted and recognized and also have the confidence of the project-affected people, in the preparation and implementation of rehabilitation plans.
- I. Corporate Social Responsibility (CSR) : Activities shall be intensified in and around the villages where land is being acquired in accordance with the CSR Policy of Coal India.
- J. Actual implementation of R&R package must follow a detailed survey of the project-affected villages to formulate the list of persons/families affected by the project, nature of the affect, the likely loss of income, etc. For this purpose, if necessary, the services of a reputed NGO with an impressive record of integrity and performance may be engaged.

3. SCOPE:

This Policy may be called "Rehabilitation and Resettlement Policy of Coal India Limited-2012". It extends to the Coal India Limited and its subsidiary companies in India. It shall come into force from the date of its approval by the CIL Board and is applicable to all cases in which land is taken after the date of approval by the CIL Board. While implementing the policy it is to be ensured that the provisions of the concerned Acts applicable and Rules mentioned there under shall not be violated.

4. Definitions

(a) "**affected family**" means:

- (i) a family whose primary place of residence or other property or source of livelihood is adversely affected by the acquisition of land (including direct negotiation) for a project or involuntary displacement for any other reason; or

- (ii) any tenure holder, tenant, lessee or owner of other property, who on account of acquisition of land (including plot in the abadi or other property) in the affected area or other wise, has been involuntarily displaced from such land or other property; or
 - (iii) any agricultural or non-agricultural labourer, landless person (not having homestead land, agricultural land, or either homestead or agricultural land), rural artisan, small trader or self-employed person, who has been residing or engaged in any trade, business, occupation or vocation continuously for a period of not less than three years preceding the date of declaration of the affected area, and who has been deprived of earning his livelihood or alienated wholly or substantially from the main source of his trade, business, occupation or vocation because of the acquisition of land in the affected area or being involuntarily displaced for any other reason.
- (b) **"family"** includes a person, his/her spouse, son including minor sons, dependant daughters, minor brothers, unmarried sisters, father, mother residing with him or her and dependent on him/her for their livelihood; and includes **"nuclear family"** consisting of a person, his/her spouse and minor children. Provided that where there are no male dependants, the benefit due to a land loser may devolve on dependent daughter nominated by the land loser.
- (c) **"land owner"** includes any person—
- (i) whose name is recorded as the owner of the land or part thereof, in the records of the concerned authority; or
 - (ii) who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or
 - (iii) who has been declared as such by an order of the court or District Collector;
- (d) **Displaced person** - means and includes any person who is deprived of his homestead on account of acquisition. Provided that the person/family who does not ordinarily reside in the homestead land acquired for the project can be termed "Displaced" but he will be eligible for compensation only for homestead and not for livelihood.
- (e) **Ordinarily resides** shall mean residing in the homestead / acquired land for a period more than 6 months every year for at least the preceding 5 years.

5. Socio-economic Survey and preparation of RAP.

A baseline socioeconomic survey will be carried out to identify the PAPs who are enlisted to receive benefits in line with Coal India's Resettlement and Rehabilitation Policy. This survey will be conducted within two months of notification under the relevant land acquisition Acts by the subsidiaries with the help of reputed independent institutional agencies, who are well versed with the social matrix of the area.

The basic objective of the socio-economic study will be to generate baseline data on the social and economic status of the population who are likely to lose their means of livelihood or homestead due to the acquisition of the land for the project. The data base will be used to formulate a viable and practical Rehabilitation Action Plan (RAP) for the affected persons in line with their entitlements. Digital Satellite Maps would also be prepared of the project Area freezing the dwelling units and habitations existing at the time of negotiation for Land Acquisition wherever feasible. The RAP will also address the following-

(A) Implementation, Monitoring and Evaluation, Dispute Mechanism

The rehabilitation action plan will address the following:

- (i) The project design, including an analysis of alternative designs aimed at avoiding or minimizing resettlement;
- (ii) Socio-economic survey and activities to ensure restoration of incomes of PAPs in line with Coal India's Resettlement and Rehabilitation Policy;
- (iii) Description of the institutional and other mechanisms for provision of entitlements;
- (iv) Time table for the acquisition and preparation of the resettlement site(s);
- (v) The cost and budgets for the resettlement and rehabilitation of PAFs;
- (vi) Project-specific arrangements to deal with grievances of PAFs; and
- (vii) Time tables, benchmarks and arrangements for monitoring the resettlement and rehabilitation effort.

The RAP will be formulated in consultation with PAPs and State government.

(B). Environment Impact Assessment (EIA) will be conducted as per any law, rule and regulation of the locality in which the land has been acquired.

6. Eligibility Criteria -

(A) Eligibility Criteria for Economic Rehabilitation Benefits

This benefit shall accrue only to Entitled Project Affected Person. Entitled Project Affected Person shall be one from the following categories.

- (i) Persons from whom land is acquired including tribals cultivating land under traditional rights
- (ii) Persons whose homestead is acquired.
- (iii) Sharecroppers, land lessees, tenants & day labourers.
- (iv) Tribal dependent on forest produce as certified by the District Forest Officer/Revenue Authorities.

(B) Eligibility Criteria for Resettlement Benefits

1. Only a 'Displaced' family / person shall be eligible for resettlement benefits.
2. A family/person shall be termed 'displaced' and hence eligible for resettlement benefits if such family/person has been a permanent resident and ordinarily residing in the project area on the date of publication of notification U/S 9 of CBA(A&D) 1957 / U/S 11 of LA Act, 1894/ Or both/ on the date of the land vested with the State/ Central government as the case may be.
and
(a) on account of acquisition of his/her homestead land / structure is displaced from such areas
or
(b) He/she is a homesteadless or landless family/person who has been/is required to be displaced.

7. Census & Identification of displaced families:

1. Within two months of publication of notice U/S 4(1) of the Land Acquisition Act or U/S 7(1) of CBA (A.D) Act 1957 for acquisition of land for the project a census would be undertaken in the manner to be decided by the Collector / project authority for identification of displaced families and for preparing their socio-economic profile and list of eligible persons for the purpose of receiving Rehabilitation & Resettlement Benefits.

2. A photo identity card to each Entitled Project Affected Person shall be issued under the signature of the Collector / project authority concerned indicating the following particulars:

- (a) Name of the village/GP/PS :
- (b) Name, Father's name and address of the head of the family :
- (c) Category of entitlement :
- (d) Whether S.C./S.T./O.B.C./General :
- (e) Age, Sex, educational qualification of the members of the family :

8. Types of Compensation and Rehabilitation Entitlement

Option to the land losers regarding Rehabilitation & Resettlement Benefit - The land losers shall have the option for Rehabilitation and Resettlement benefits in accordance with the awards for each affected family in terms of the entitlements passed by the Concerned Collector of the State or as per this Policy with the consent of the concerned Collector.

8.1 Eligibility and Compensation

The table below shows the compensation and rehabilitation benefits will be offered by the subsidiaries for each Project Affected Person or family, affected by one of their projects. Evidence to the effect that a person is a legitimate PAP will need to be provided in the form of a written legal document, or reference to a record, such as a revenue officer certificate, electoral roll, ration card or school record.

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option
	Provisions
(i) Persons (including tribals cultivating land under traditional rights) from whom land is acquired.	All land owners with titles will receive monetary compensation for the land acquired from them. The value of the land is determined on the basis of prevailing legal norms. <i>In respect of tribals cultivating land under traditional rights, authentication of land held under traditional rights by state authorities will be necessary.</i> In addition to above the following shall apply.

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option
	Provisions
	A). Land Compensation - Land compensation shall be paid as per the provisions of the concerned Act or State Govt. notification. Where no notification of the State Govt. is available the concerned subsidiary Board may decide on the rate of compensation keeping in view the compensation provided by the neighboring states. Authentication of land held under traditional rights by state authorities will be necessary. In addition to above Solatium will be paid as per provisions of the concerned Act / as imposed by the Concerned State Govt. Escalation of land compensation – Escalation will be paid as per provisions of the concerned Act / as imposed by the Concerned State Govt. or Escalation at the rate of 12% per annum for a maximum period of three years. (B): Employment provision: Apart from payment of the land compensation, employment may be given in the following manner – 1) The maximum total number of employments that may be provided to the land losers would be limited to the total no. of acres of land acquired divided by two. However employments will be released in proportion to the land possessed. 2) For every two acres of land one employment can be considered; 3) Subsidiaries of CIL may give an option to the Land losers having less than two acres of land to club together their land to the extent of two acres and nominate one of the land losers among the groups or their dependent for employment under package deal or employment under Descending order system by preparing the list of eligible land oustees in the descending order of land lost subject to the cut off equivalent to the total number of permissible employments or any other method with the approval of the respective Board of the subsidiary. 4) The land loser must be a domiciled resident/Mool Niwasi and the certificate to this effect shall be issued by the concerned State Authority 5) The modalities for offering employment shall be such as may be approved by the Board of the Subsidiary companies as per the unique conditions of the subsidiary provided that - a) The initial employment shall be given with pay of Category-I pay scale of NCWA, with training period of 6 months. b) In the seniority list, the seniority of the appointee should be reflected in appropriate manner in order to keep the senior most as senior. c) The land loser trainees shall be posted as per requirement, including underground duties.

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option
	Provisions
	(C): Lumpsum Monetary Compensation – 1. All the land losers who are not eligible for employment as above shall be entitled to receive monetary compensation in lieu of employment at the rate of Rs.5,00,000/- (Five Lakhs) for each acre of land on pro-rata basis. 2. Land losers who are offered employment as per principle specified in point No (6.(i)B) above will have the option either to opt for employment or to forego employment and opt for monetary compensation at the rate of Rs.5,00,000/- (Five lakhs) for each acre of land on pro-rata basis with minimum of Rs. 50,000 (Fifty thousands) provided that the employment thus surrendered shall not be available for offer to any other person and will stand lapsed from the total sanctioned number of employments as specified in point No.(8.(i)B1). 3. The Land losers who have clubbed their land in Package Deal can claim employment for only one land loser of the clubbed two acres of land and remaining land losers of the package cannot claim either employment or lump sum monetary compensation in lieu of the land contributed by them. 4. Annuity – All land losers who are entitled to get lump sum monetary compensation may opt for payment of compensation amount in the form of annuity made payable to the land losers monthly, annually or at such intervals (not less than one year) as may be opted for by him. The annuity be paid for a maximum period extending to 60 years of age or the life of the project for which the land has been acquired, whichever is earlier. Note: A person receiving a job forgoes all claims to above compensation and a person receiving above compensation forgoes all claims to employment.
(ii) Person whose homestead is acquired	I. Compensation for homestead shall be paid as per the standard valuation method of the L.A Act, of the concerned State Govt. II. One time lump sum payment of Rs.3,00,000/- (three lakhs), shall be paid in lieu of alternate House site, Assistance in designing Shifting Allowance, compensation for construction of cattle shed . Monetary compensation for construction of work shed etc. The compensation shall be paid to displaced persons only after vacation and demolition of the homestead/ work shed etc. III. Subsistence allowance :Each affected displaced family will get subsistence allowance at the rate of 25 days (Minimum Agricultural Wage) per month for one year.

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option
	Provisions
(iii) Sharecroppers, land lessees, tenants and day labourers	The subsidiary will assist PAP to take-up non farm self employment through petty contracts or formation of cooperatives. If such co-operatives will not be entitled for awarding work as per Manual for lack of experience, the said co-operative will be facilitated by awarding small jobs to acquire experience after relaxation of the provisions of the Manual pertaining to experience with approval of the Subsidiary Boards. Subsequent jobs may be awarded after getting report of the timely completion / quality / of the awarded jobs from the concerned Department or contractors. Contractors will also be persuaded to give job to eligible PAPs on a preferential basis, where feasible as per terms of contract.
(iv) Landless tribals, Tribal dependant on forest produce	The subsidiary will assist PAP to establish non farm self employment through the provision of infrastructure, petty contracts or formation of cooperatives and encourage provisions of Jobs with contractors. Contractors will be persuaded to give jobs to eligible PAPs on preferential basis, where feasible. - In addition, the subsidiaries will shift the tribal community as a unit and provide facilities to meet the specific needs of the tribal community that will allow them to maintain their unique cultural identity. - Tribal affected family will be given one time financial assistance of 500 days of MAW for loss of customary right or usages of forest produce. Loss of customary rights needs to be authenticated by the district authority. - Tribal affected families resettled out of the district shall be given 25% higher rehabilitation and resettlement benefit.

9. Resettlement & Rehabilitation Committee - A Committee will be constituted at project Level under the chairmanship of the Collector to be called the Rehabilitation and Resettlement Committee with the following objectives to monitor and review the progress of implementation of the Rehabilitation and Resettlement scheme and to carry out post-implementation social audits in consultation with the village panchayat in rural areas and municipality in urban areas in the manner will be decided by the concerned State Govt.

- I. To approve the list of land losers and other PAPs;
- II. To approve the list of persons eligible to be offered employment as per R&R Policy;
- III. To approve the detailed Rehabilitation Plan for the project in consultation with the displaced persons and Gram Sabhas;
- IV. To expedite issue of domicile certificates and other necessary documentation required for State Authorities;
- V. To monitor and review the progress of the Rehabilitation Scheme, grant of benefits and handing over of possession of land in a smooth manner;
- VI. To facilitate the land acquisition process in any other manner as may be required including resolution of disputes;
- VII. To carry out post implementation social audit in consultation with the authorities.

10. Community facilities - The subsidiary will provide at the resettlement site a school, road with street light, pucca drain, pond, dugwell and/or tubewell for drinking water supply, community center, place of worship, dispensary, grazing land for cattle and play ground. Similar infrastructural facility, if necessary, will be extended to the host locality. The community facilities and services would be available to all residents of the area, including PAPs and the host population.

The approach for operation of community facilities would be flexible and all efforts will be made to involve the State and local self Government / Panchayat for operating the facilities. To achieve this, subsidiaries will pursue with these agencies to ensure the same. The planning of the community facilities and their construction should be undertaken in consultation with the affected community.

11. Corporate Social Responsibilities - This should be as per Company's Corporate Social Responsibility (CSR) Policy.

12. Monitoring and Evaluation Mechanism.

The RAP will be monitored and evaluated periodically after the completion of the land acquisition process.

- I. The resettlement and rehabilitation activities are the responsibility of a separate group, both at the projects and corporate level, which will be constituted for planning, implementation, monitoring and evaluation of the Rehabilitation Action Plan. At the corporate level the group will be headed by a senior manager, whereas at the project, an executive of the rank of manager will head the group. The project group should have at least one member with social science qualification / experience and skills.

- II. The project group will closely interact with the state authorities during the implementation of the RAP. Although the subsidiaries will develop the plots and infrastructural facilities in the resettlement colony and actively implement the RAP, assistance of State authorities will be taken for administrative services such as allotment of land. Implementation will be planned, monitored and corrective measures will be incorporated in the RAP, if needed. In addition to the State Government, the PAPs, the village leaders including the Pradhans and NGOs will be consulted and associated with the implementation of the RAP.
- III. The Resettlement and Rehabilitation Cell at the corporate level will evaluate the implementation of the RAP after its completion.

13. Flexibility to the Subsidiary Companies – The Subsidiary Companies Boards have been authorised to approve necessary modifications in the R&R Policy with reference to unique conditions prevailing at the concerned Subsidiaries as the policy is not exhaustive.

(The above list is only indicative and not exhaustive)

Annexure-III (A)

Sl no.	Issue raised in PH	Implementation status
1.	Employment, Water supply and electricity, medical Facility, road etc. for nearby population	Employment is given as per R&R policy of CIL and Norms of 1 employment / 2 Acre of land. Details of work done related with water, health facility, roads etc is given below:
2.	Care for the environment & plantation	Covered transportation and water spraying is being practiced along-with plantation in phase-wise manner.

Details of work done related with water, health facility, roads etc:

Civil work

S. N.	Details	Award value (In Lac)	Remarks
1	Construction of PCC road at Gonduadih west under Mohanpur village (from Khalil Mahto home to Primary school).	3.98	25.01.2015 to 24.03.2015 (60 days)
2	Construction of Janaja shed at Ramakunda west under Amtand village	3.15	15.10.2014 to 14.12.2014 (60 days)
3	Construction of 1 no. chhathh ghat at Muraidih colony, Hirak road river side	3.01	15.10.2014 to 14.12.2014 (60 days)
4	Construction of Janaja shed at Muraidih colony near river of Hirak road	0.46	31.03.2014 to 29.04.2014 (30 days)
5	PCC Road jhunu Rajwar House to Tarkeswar Gope House at Bakaspura Village Luti Pahari (Jhunu Tarkeshwar) Road Length:-	2.30	This is benefiting to approx. 200 families in this locality by all-weather connectivity.
6	Making PCC Path from Manoj Matha House to Sahabuddin Ansari house at Ghunghusa Village (Mahato Shabbhuddin)	1.85	This is benefiting to approx. 300 families in this locality by all-weather connectivity
7	Steps for Ghat at sarbandh near hirak chowk under B-II Area	2.67	This will ease in performing rituals by local villages of Dumara, harina & Bada pandeydih.
8	Cutting of earth from pond at Chaudhary bandh at Harina Basti, under B-II Area	19.22	This is benefiting to approx 5000 persons in this locality. This pond is used for multipurpose like irrigation, water for households drinking water for animals etc. it will also maintain the water level in locality.
9	Drinking Water pipe line works in hadi basti at Bhamkanali.	0.44	This is benefiting to approx. 150 families in this locality
10	Rep/Maint of Hand pump at Bara pandeydih (08 Nos).	0.26	This is benefiting to approx. 500 persons in this locality
11	Development work at rehabilitation site at Bhimkanali.	6.45	This is benefiting to approx. 500 persons in this locality

12	Construction of community hall at Bara Pandeydih Village Under Block-II Area	11.9	This is benefiting to approx. 1000 persons in this locality
13	Rep. Of Main road & Drain at Bakashpura rehabilitation site.	9.71	This is benefiting to approx. 1500 persons in this locality
14	Engagement of tankers for drinking water supply in nearby villages of B-II Area	1.9	This is benefiting to approx. 2000 families in Viallages like Benidih Baghmara, Luttipahadi, Harina, Kessurgarh, Rathtand, Nudkhurkee, Pinalgarhia, Mandra.
15	Engagement of departmental tankers for drinking water supply in nearby villages of B-II Area as on need bais.	-	This is benefiting to approx. 2000 families in Viallages like Benidih Baghmara, Luttipahadi Kessurgarh, Madhuban Etc.

Health: Medical Camps, CSR Clinics & Awareness Programme

Medical Camps	Beneficiaries	Amount (in Rs.)
2014-15	5144	58095.75
2015-16	3397	38352.13
2016-17	595	30320.00
2018-19	789	30320.00
2019-20	310	-

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Total no patients	1660	1301	1895	1293	1305	810	910

SN	Health Awareness Programme	Amount (in Rs.)
1	Nasa Mukti Abhiyan	10000.00
2	Blood Pressure Detection	5000.00
4	Aids Awareness Programme	5000.00
5	Eye Checkup camp	25000.00

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

(FOR THE MONTH JULY, 2022)

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



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

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 (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM_{2.5}

sampler) were used for sampling of PM₁₀, SO₂, & 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 analysed 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 PM₁₀, PM_{2.5}, SO₂ 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 PM₁₀& 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.

The following preventive and suppressive mitigative measures can be undertaken to contain the pollution level within prescribed level:-

- Wet drilling and controlled blasting should be practice.
- Explosive used should be optimised to restrict the dust generation.
- Transportation roads should be permanently asphalted free of ruts, potholes etc.
- Water should be sprayed on coal transportation road, service road more frequently and at regular interval.
- Dust from roads should be removed physically or mechanically.
- Greenbelts around industrial sites, service building area besides Avenue plantation along roads should be created.
- Coal dust should be suppressed by using fixed sprinklers.
- Regular maintenance of plant and machinery should be undertaken.

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 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.

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

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

- 1.1 The Cluster II is in the westernmost part of the Jharia coalfield. The Cluster – II is situated at a distance of about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.
- 1.2 The Cluster II is designed to produce 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal. The average grade of coal W-II to W-IV.

The Project is being worked by deploying shovel dumper combination.

The Project has been granted Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal production vide letter no **E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that “ Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM₁₀, PM_{2.5}, SO₂, NO_x monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, other conditions regarding water / effluent and noise level monitoring in consultation with the State Pollution Control Board.”

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB 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) Block II OCP (A4): Industrial Area

The location of the sampling station is 23°47'2.00"N & 86°11'15.00"E. The sampler was placed at an elevated platform of approx. height 1.5m above ground level near water treatment plant of Block II OCP.

ii) Muraidih OCP (A5): Industrial Area

The sampler was placed at a height of 1.5 m from the ground level at Muraidih project office.

II. BUFFER ZONE Monitoring Location

i) Madhuband Washery (A3) : Industrial area

The location of the sampling station is at 23°47'24.01"N & 86°11'32.00"E in the Washery premises. The sampler was placed at a height of approx. 1.5m above ground level.

ii) Madhuband UGP (A33) : Industrial area

The location of the sampling station is at 23°46'5.60"N & 86°12'27.50"E at the Project office. The sampler was placed at a height of approx. 1.5m above ground level near the project office.

AMBIENT AIR QUALITY DATA

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in					
Test Report for Ambient Air Samples											
Month & Year		06/2022		Cluster		Cluster II		Report No.		RI-II/AIR/2022-23/03	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		07.10.2022	
Project				Sample Ref. No.		REM/BCCL/2022/06		Sampling Method		CMPDI/RI-II/LPM 13 , (IS 5182)	
Sampling Stations		i		Block II OCP		Date of Sampling		13.07.22		26.07.22	
Sl. No.		Parameter		Method of Analysis		Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing		LDL	
						1st FN 2nd FN					
										MoEF Standards Notification dated 25th September, 2000 (GSR 742 E) NAAQS, 2009	
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	78	120	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100			
2	PM _{2.5}	IS -5182(Part 24):2019	38	52	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60			
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	12	12	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80			
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	27	20	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80			
<i>**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average, * LDL indicates Lower Detection Limit,</i>											
 ANALYSED BY				 CHECKED BY				 HOD's Signature			
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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDI, RI-II
KOYLA BHAWAN COMPLEX
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Test Report for Ambient Air Samples

Month & Year		07/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/04	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.10.2022	
Project				Sample Ref. No.	REM/BCCL/2022/07	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Muraidih OCP		Date of Sampling	07.07.22	28.07.22	Zone of Station:	Core Zone
Sl. No.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		99	87	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		53	46	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		11	10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		20	19	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

* LDL indicates Lower Detection Limit,

**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,

[Signature]

ANALYSED BY

[Signature]

(Gaurav Kant)
CHECKED BY

[Signature]

(Amit Raj Mishra)
HOD's Signature

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Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

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Test Report for Ambient Air Samples

Month & Year		07/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/04	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.10.2022	
Project				Sample Ref. No.	REM/BCCL/2022/07	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Madhuband Washery		Date of Sampling	14.07.22	27.07.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		138	77	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		53	36	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		<10	10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		14	17	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**


ANALYSED BY


(Gaurav Kant)
CHECKED BY


(Amit Raj Mishra)
HOD's Signature

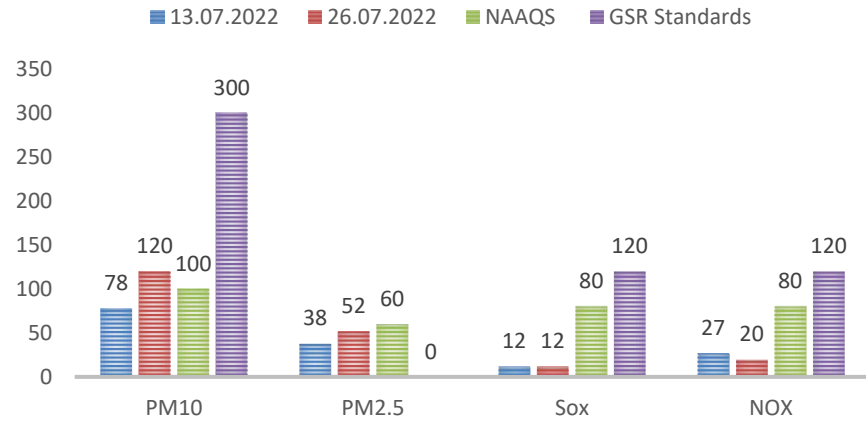
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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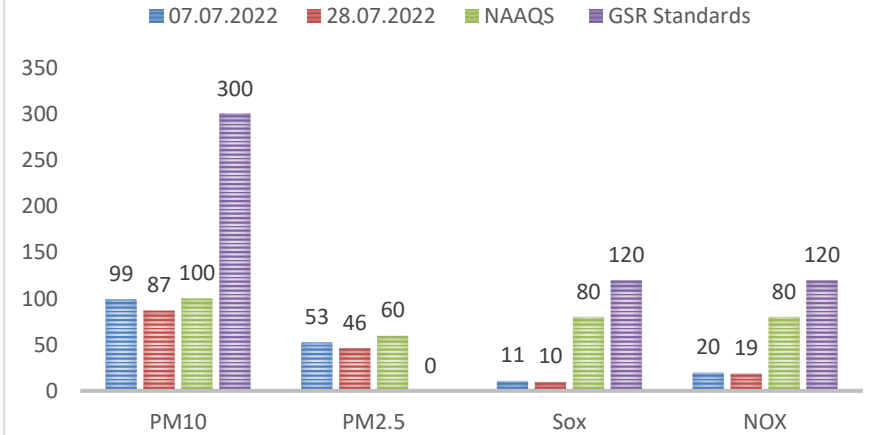
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  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report								
Test Report for Ambient Air Samples										
Month & Year		07/2022		Cluster		Cluster II		Report No.	RI-II/AIR/2022-23/04	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	07.10.2022	
Project				Sample Ref. No.		REM/BCCL/2022/07		Sampling Method		
								CMPDI/RI-II/LPM 13, (IS 5182)		
Sampling Stations		i	Madhuband UGP		Date of Sampling		06.07.22	20.07.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September, 2000 (GSR 742 E)	NAAQS, 2009		
			1st FN	2nd FN						
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	90	114	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100		
2	PM _{2.5}	IS -5182(Part 24):2019	55	60	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60		
3	SO ₂	IS-5182(Part-2): 2001, R-2017	13	11	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80		
4	NO ₂	IS-5182 (Part-6): 2006, R-2017	23	22	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80		
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,										
 ANALYSED BY		 CHECKED BY		 HOD's Signature						
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.										
---- End of Report ----										
Page -1 of 1										

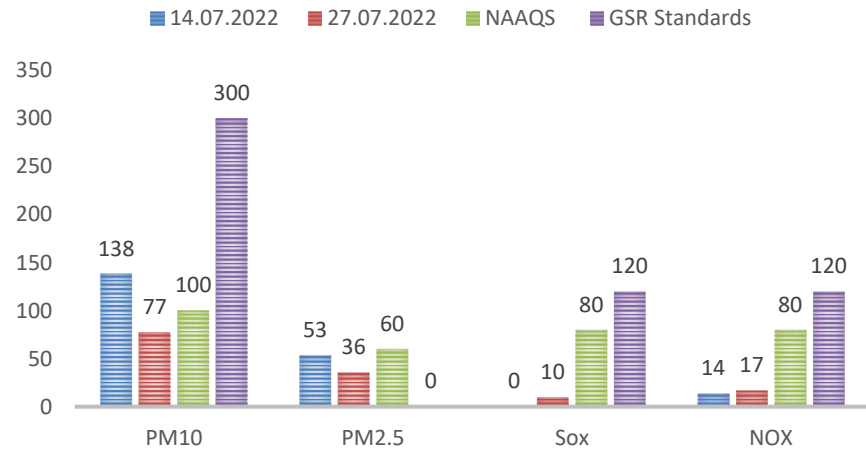
AMBIENT AIR QUALITY AT BLOCK II OCP



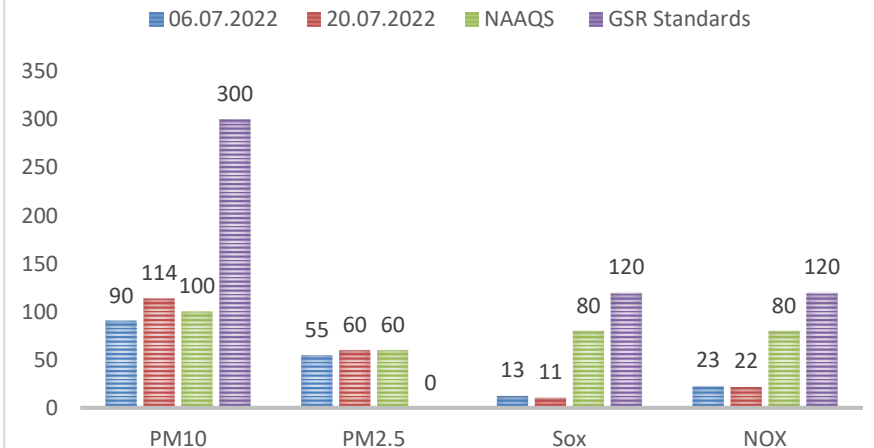
AMBIENT AIR QUALITY AT MURAIIDIH OCP



AMBIENT AIR QUALITY AT MADHUBAND WASHERY



AMBIENT AIR QUALITY AT MADHUBAND UGP



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Block II (MW2)

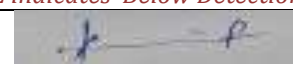
A sampling point is fixed to assess the effluent quality of Mine discharge. This location is selected to monitor effluent discharge in to Khudia Nala.

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.

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II MINE EFFLUENT TEST REPORT				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
TC-10122		Test Report for Mine Effluent samples						email: rdri2cmpdi@coalindia.in	
Month & Year	07/2022	Cluster	Cluster II		Report No.	RI-II/water/2022-23/04			
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.10.2022		
Project		Sampling Ref. No.	REM/BCCL/2022/07		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Block II	Sample Collected in 2.5 Ltr Jerricane, Color as observed is transparent				Period of Analysis	july 2022	
			Date of Sampling		11.07.22	25.07.22			
Sl. No.	Parameter	Method of Analysis	Observed Values		STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)		LDL		
			First Fortnight	Second Fortnight					
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	58	55	100 (Max)		10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.17	7.94	5.5 - 9.0		0.2		
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)		2		
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	48	32	250 (Max)		4		
<i>**Grab sampling carried out for water samples. **All units in mg/L unless specified otherwise *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,</i>									
 ANALYSED BY		 (Kumar Vaibhav) CHECKED BY				 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
---- End of Report ----									
Page -1 of 1									

NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- i) **Block II OCP (N4)**
- ii) **Muraidih OCP (N5)**
- iii) **Madhuband Washery (N3)**
- iv) **Madhuband UGP (N33)**

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.



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

CMPDI, RI-II
 KOYLA BHAWAN COMPLEX
 DHANBAD. -826005
 Phone:0326-223-850
 email: rdri2cmpdi@coalindia.in

Month & Year	07/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/04
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	07.10.2022
Project			Sample Ref. No.	REM/BCCL/2022/07		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Block II OCP		Date of Sampling	13.07.22	26.07.22	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	51.4	51.2	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	54.1	53.3					
3		08:00 - 09:00	55.4	57.4					
4		09:00 - 10:00	62.9	62.3					
5		10:00 - 11:00	64.4	65.1					
6		11:00 - 12:00	65.3	65.5					
7		12:00 - 13:00	66.1	67.6					
8		13:00 - 14:00	67.4	69.0					
9		14:00 - 15:00	62.3	63.0					
10		15:00 - 16:00	61.2	62.0					
11		16:00 - 17:00	59.9	61.4					
12		17:00 - 18:00	59.4	59.5					
13		18:00 - 19:00	58.5	57.4					
14		19:00 - 20:00	57.4	56.4					
15		20:00 - 21:00	56.3	55.1					
16		21:00 - 22:00	52.3	52.3					
		Leq DAY	62.0	62.8					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.5	46.1	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.9	44.5					
3		00:00- 01:00	43.1	43.7					
4		01:00-02.00	42.9	43.1					
5		02.00-03.00	41.1	41.5					
6		03.00-04.00	40.9	40.8					
7		04.00-05.00	40.0	41.3					
8		05:00-06:00	39.8	40.0					
		Leq NIGHT	42.8	43.1					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report					CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
Month & Year	07/2022	Cluster	Cluster II				Report No.	RI-II/NOISE/2022-23/04		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)									
Project		Sample Ref. No.	REM/BCCL/2022/07			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Muridih OCP	Date of Sampling	07.07.22	28.07.22	Zone Category of Station:	Core Zone			
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards		
								Zones	Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	45.1	45.6	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	46.2	48.1						
3		08:00 - 09:00	51.2	50.6						
4		09:00 - 10:00	52.3	53.1						
5		10:00 - 11:00	55.2	55.6						
6		11:00 - 12:00	58.2	66.5						
7		12:00 - 13:00	61.2	62.3						
8		13:00 - 14:00	63.2	63.0						
9		14:00 - 15:00	62.3	61.9						
10		15:00 - 16:00	60.7	60.9						
11		16:00 - 17:00	55.1	52.9						
12		17:00 - 18:00	53.3	47.8						
13		18:00 - 19:00	50.4	43.7						
14		19:00 - 20:00	46.5	42.2						
15		20:00 - 21:00	42.3	42.0						
16		21:00 - 22:00	42.1	41.1						
		Leq DAY	57.2	58.8						
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.6	45.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	42.3	43.5						
3		00:00- 01:00	41.9	43.2						
4		01:00-02:00	41.5	41.8						
5		02:00-03:00	41.2	40.2						
6		03:00-04:00	40.6	40.0						
7		04:00-05:00	40.3	39.8						
8		05:00-06:00	40.2	39.6						
		Leq NIGHT	42.1	42.1						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
Month & Year	07/2022	Cluster	Cluster II			Report No.	RI-II/NOISE/2022-23/04		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.10.2022		
Project		Sample Ref. No.	REM/BCCL/2022/07		Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Madhuband Washery		Date of Sampling	14.07.22	27.07.22	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	50.4	50.4	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	52.6	53.0					
3		08:00 - 09:00	56.6	56.7					
4		09:00 - 10:00	55.5	53.9					
5		10:00 - 11:00	62.3	63.8					
6		11:00 - 12:00	63.9	65.5					
7		12:00 - 13:00	67.1	67.6					
8		13:00 - 14:00	68.1	69.0					
9		14:00 - 15:00	68.2	63.0					
10		15:00 - 16:00	61.2	62.0					
11		16:00 - 17:00	58.8	61.4					
12		17:00 - 18:00	59.4	60.9					
13		18:00 - 19:00	58.5	57.9					
14		19:00 - 20:00	57.4	56.9					
15		20:00 - 21:00	56.3	56.0					
16		21:00 - 22:00	52.3	52.9					
		Leq DAY	62.5	62.5					
1	Noise Level dB(A)Leq -Night	22:00-23:00	46.5	46.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	45.6	44.9					
3		00:00- 01:00	44.4	43.8					
4		01:00-02:00	42.1	42.5					
5		02:00-03:00	41.8	42.1					
6		03:00-04:00	40.9	41.2					
7		04:00-05:00	40.3	40.8					
8		05:00-06:00	40.1	40.6					
		Leq NIGHT	43.4	43.3					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

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CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
mail: rdri2cmpdi@coalindia.in

*LDL indicates Lower Detection Limit

****All noise measurements are integrated for a 01 hour period, All units in dB(A)**

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.

---- End of Report ----

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

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	2	3	4	5
III Coal mines located in the coal fields of • Jharia • Raniganj • Bokaro	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	500 µg/m ³ 700 µg/m ³	- High Volume Sampling (Average flow rate not less than 1.1 m ³ /min)
	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 fluorescence
	Oxide of Nitrogen as NO ₂	Annual Average * 24 hours **	80 µg/m ³ 120 µg/m ³	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemiluminescence

Note:

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

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 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 NOVEMBER 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect.

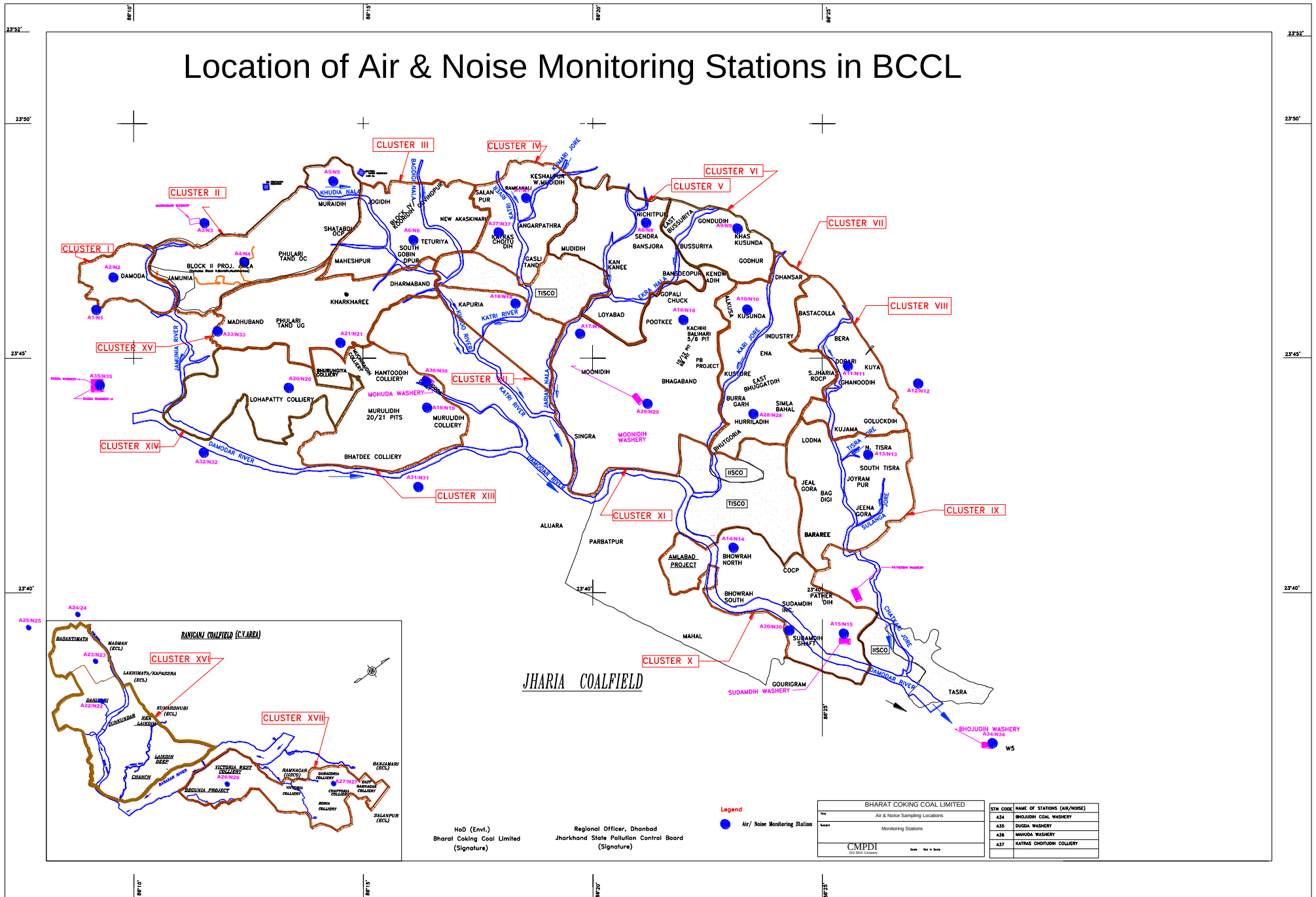
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO₂), 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 PM₁₀, 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 (O₃) , 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 (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), 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.

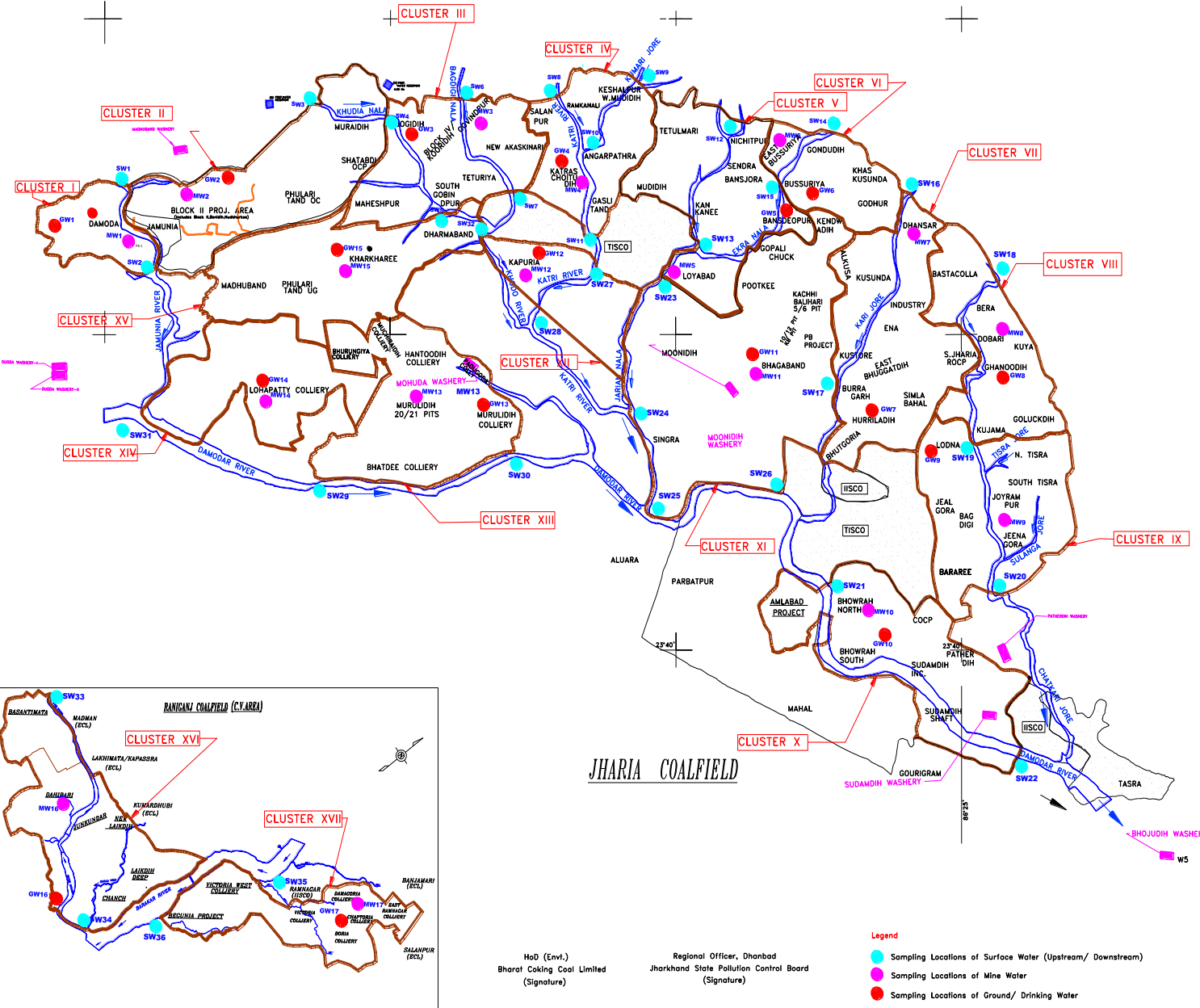
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they JUNE exceed the limits but not on two consecutive days of monitoring.

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	Surface Water (U/S, D/S)	Name of River Nala / Jore	Mineral Effluent Water	Sampling Location	Ground Water	Sampling Location
I	SW1, SW2	Jamunia River	MW1	Damoda Area	GW1	Chutway Village
II	SW3, SW4	Khudra Nala	MW2	Block II OCP	GW2	Joyrampur Village
III	SW4, SW5, SW6, SW7	Khudra Nala, Bagdigi Nala	MW3	Govindpur Colliery	GW3	Jogdih Village
IV	SW8, SW11, SW9, SW10	Kan River, Kurnai Jore	MW4	Chotudih	GW4	Kankane Village
V	SW12, SW13, SW15	Jarian Nala, Ekra Nala	MW5	Mudidi	GW5	Nichitpur
VI	SW14, SW15	Ekra Nala	MW6	East Bassuria UGP	GW6	Bansjora Sorewell
VII	SW16, SW17	Kan Jore	MW7	Doban UGP	GW7	Humridih
VIII	SW18, SW19	Kan Jore	MW8	Doban UGP	GW8	Gharudih
IX	SW19, SW20	Kan Jore	MW9	Jemagora	GW9	Lodna
X	SW21, SW22	Damodar River	MW10	Bhowrah North	GW10	Bhowrah South
XI	SW23, SW24, SW25, SW26	Jarian Nala, Damodar River	MW11	Bhagband UGP	GW11	Bhagband
XII	SW27, SW28	Kan River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Muridih	GW13	Muridih
XIV	SW31, SW32	Damodar River	MW14	Lohapatti	GW14	Lohapatti
XV	SW33, SW34	Khudra Nala	MW15	Kharkharee UGP	GW15	Kharkharee
XVI	SW35, SW36	Khudra River	MW16	Bahabari OCP	GW16	Pallabani Village
XVII	SW37, SW38	Barakar River	MW17	Damagoria Colliery	GW17	Chaptoria

HoD (Env.)
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

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

STRICTLY RESTRICTED
FOR COMPANY USE ONLY RESTRICTED

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

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

(FOR THE MONTH JUNE, 2022)

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



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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2.	CHAPTER-II	INTRODUCTION	6
3.	CHAPTER-III	RESULTS	7-19
4.	CHAPTER-IV	STANDARDS AND PLANS	20-21

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°37' N to 23°52' N latitudes and 86°09' E to 86°30' E longitude occupying an area of 450 Sq.km. BCCL has awarded Environmental monitoring work of Jharia Coalfield (JCF) to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per the conditions laid down by the MoEF&CC while granting environmental clearance of project, consent letter issued by the respective SPCB, and other statutory requirements.

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

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 (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM_{2.5}

sampler) were used for sampling of PM₁₀, SO₂, & 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 analysed 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 PM₁₀, PM_{2.5}, SO₂ 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 PM₁₀& 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.

The following preventive and suppressive mitigative measures can be undertaken to contain the pollution level within prescribed level:-

- Wet drilling and controlled blasting should be practice.
- Explosive used should be optimised to restrict the dust generation.
- Transportation roads should be permanently asphalted free of ruts, potholes etc.
- Water should be sprayed on coal transportation road, service road more frequently and at regular interval.
- Dust from roads should be removed physically or mechanically.
- Greenbelts around industrial sites, service building area besides Avenue plantation along roads should be created.
- Coal dust should be suppressed by using fixed sprinklers.
- Regular maintenance of plant and machinery should be undertaken.

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 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.

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

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

- 1.1 The Cluster II is in the westernmost part of the Jharia coalfield. The Cluster – II is situated at a distance of about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.
- 1.2 The Cluster II is designed to produce 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal. The average grade of coal W-II to W-IV.

The Project is being worked by deploying shovel dumper combination.

The Project has been granted Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal production vide letter no **E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that “ Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM₁₀, PM_{2.5}, SO₂, NO_x monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, other conditions regarding water / effluent and noise level monitoring in consultation with the State Pollution Control Board.”

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB 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) Block II OCP (A4): Industrial Area

The location of the sampling station is 23°47'2.00"N & 86°11'15.00"E. The sampler was placed at an elevated platform of approx. height 1.5m above ground level near water treatment plant of Block II OCP.

ii) Muraidih OCP (A5): Industrial Area

The sampler was placed at a height of 1.5 m from the ground level at Muraidih project office.

II. BUFFER ZONE Monitoring Location

i) Madhuband Washery (A3) : Industrial area

The location of the sampling station is at 23°47'24.01"N & 86°11'32.00"E in the Washery premises. The sampler was placed at a height of approx. 1.5m above ground level.

ii) Madhuband UGP (A33) : Industrial area

The location of the sampling station is at 23°46'5.60"N & 86°12'27.50"E at the Project office. The sampler was placed at a height of approx. 1.5m above ground level near the project office.

AMBIENT AIR QUALITY DATA

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report				CMPDI, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in					
Test Report for Ambient Air Samples											
Month & Year		06/2022		Cluster		Cluster II		Report No.		RI-II/AIR/2022-23/03	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		07.09.2022	
Project				Sample Ref. No.		REM/BCCL/2022/06		Sampling Method		CMPDI/RI-II/LPM 13, (IS 5182)	
Sampling Stations		i		Block II OCP		Date of Sampling		07.06.22		21.06.22	
Sl. No.		Parameter		Method of Analysis		Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing		LDL	
						1st FN		2nd FN			
										MoEF Standards Notification dated 25th September, 2000 (GSR 742 E)	
										NAAQS, 2009	
1		PM ₁₀		IS -5182(Part 23):2006, R-2017		94		126		10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	
2		PM _{2.5}		IS -5182(Part 24):2019		54		65		10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	
3		SO ₂		IS-5182(Part-2): 2001, R-2017		<10		12		10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	
4		NO ₂		IS-5182 (Part-6): 2006, R-2017		18		19		06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average, * LDL indicates Lower Detection Limit,											
 ANALYSED BY				 CHECKED BY				 HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.											
---- End of Report ---- Page -1 of 1											



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDI, RI-II
 KOYLA BHAWAN COMPLEX
 DHANBAD. -826005
 Phone:0326-223-850
 email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		06/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/03	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.09.2022	
Project				Sample Ref. No.	REM/BCCL/2022/06	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Muraidih OCP		Date of Sampling	08.06.22	24.06.22	Zone of Station:	Core Zone
Sl. No.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		94	91	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		56	50	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		11	<10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		21	22	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

* LDL indicates Lower Detection Limit,

**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,

ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
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email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		06/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/03	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.09.2022	
Project				Sample Ref. No.	REM/BCCL/2022/06	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Madhuband Washery		Date of Sampling	08.06.22	23.06.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method of Analysis	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	132	90	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	69	54	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	10	11	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	20	21	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**

ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

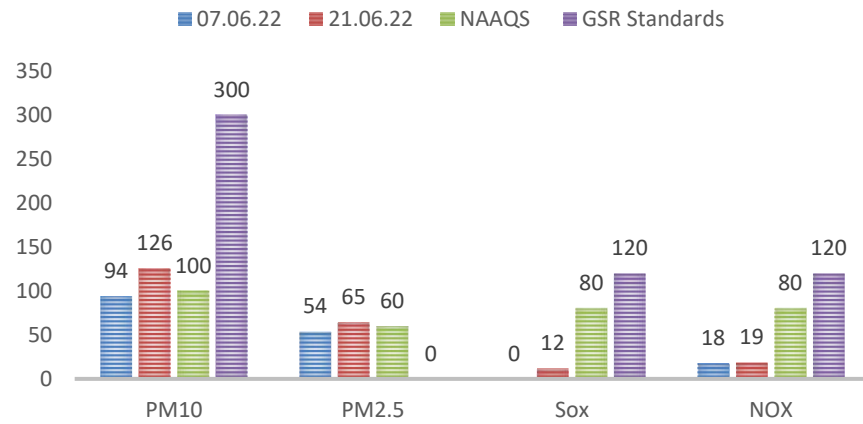
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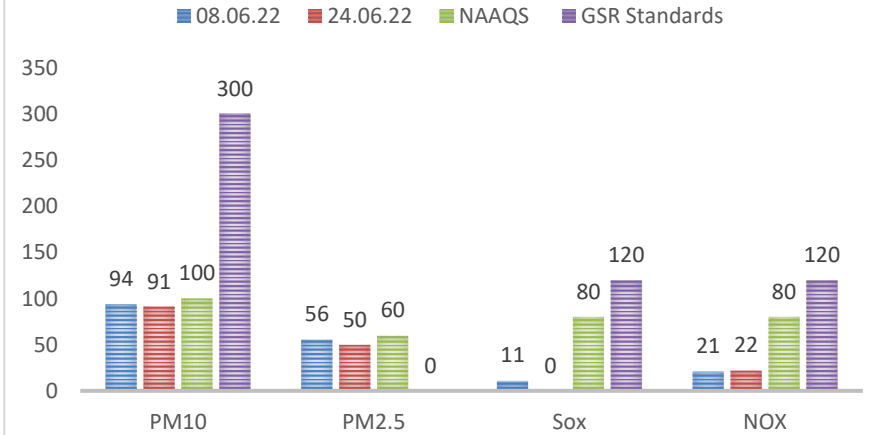
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  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report								
Test Report for Ambient Air Samples										
Month & Year		06/2022		Cluster		Cluster II		Report No.	RI-II/AIR/2022-23/03	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	07.09.2022	
Project				Sample Ref. No.		REM/BCCL/2022/06		Sampling Method		
								CMPDI/RI-II/LPM 13, (IS 5182)		
Sampling Stations		i	Madhuband UGP		Date of Sampling		10.06.22	29.06.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September, 2000 (GSR 742 E)	NAAQS, 2009		
			1st FN	2nd FN						
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	96	119	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100		
2	PM _{2.5}	IS -5182(Part 24):2019	57	63	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60		
3	SO ₂	IS-5182(Part-2): 2001, R-2017	13	12	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80		
4	NO ₂	IS-5182 (Part-6): 2006, R-2017	29	27	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80		
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,										
 ANALYSED BY		 CHECKED BY		 HOD's Signature						
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.										
---- End of Report ----										
Page -1 of 1										

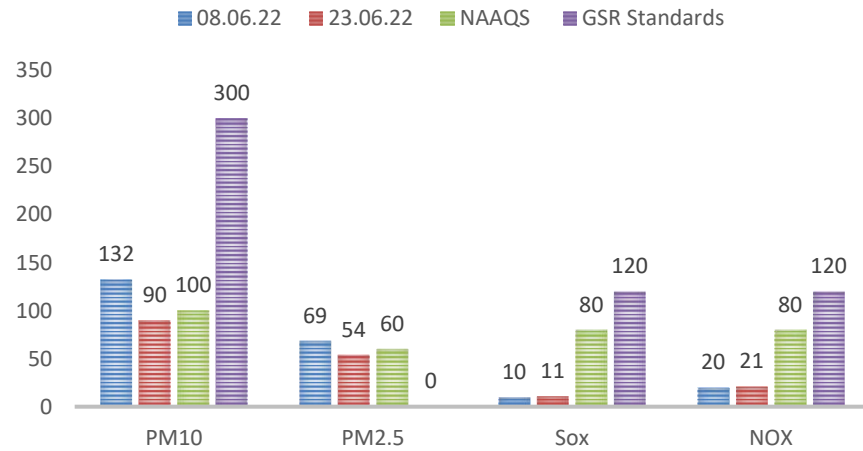
AMBIENT AIR QUALITY AT BLOCK II OCP



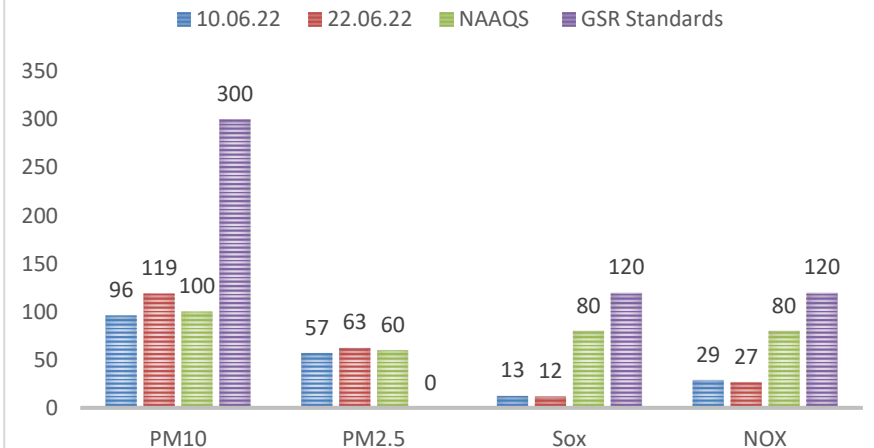
AMBIENT AIR QUALITY AT MURAIIDIH OCP



AMBIENT AIR QUALITY AT MADHUBAND WASHERY



AMBIENT AIR QUALITY AT MADHUBAND UGP



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Block II (MW2)

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

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.

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II MINE EFFLUENT TEST REPORT				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
TC-10122		Test Report for Mine Effluent samples						email: rdri2cmpdi@coalindia.in	
Month & Year	06/2022	Cluster	Cluster II		Report No.		RI-II/water/2022-23/03		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	07.09.2022	
Project		Sampling Ref. No.	REM/BCCL/2022/06		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Block II	Sample Collected in 2.5 Ltr Jerricane, Color as observed is transparent				Period of Analysis	MAY-JUNE 2022	
			Date of Sampling		13.06.2022	27.06.2022			
			Observed Values		STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)		LDL		
Sl. No.	Parameter	Method of Analysis	First Fortnight	Second Fortnight					
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	55	52	100 (Max)		10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.18	7.96	5.5 - 9.0		0.2		
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)		2		
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	52	28	250 (Max)		4		
**Grab sampling carried out for water samples. **All units in mg/L unless specified otherwise *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,									
 ANALYSED BY		 (Kumar Vaibhav) CHECKED BY				 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
---- End of Report ----									
Page -1 of 1									

NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- i) **Block II OCP (N4)**
- ii) **Muraidih OCP (N5)**
- iii) **Madhuband Washery (N3)**
- iv) **Madhuband UGP (N33)**

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.



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

CMPDI, RI-II
 KOYLA BHAWAN COMPLEX
 DHANBAD. -826005
 Phone:0326-223-850
 email: rdri2cmpdi@coalindia.in

Month & Year	06/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/03
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	07.09.2022
Project			Sample Ref. No.	REM/BCCL/2022/06		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Block II OCP		Date of Sampling	15.06.22	27.06.22	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	58.3	50.7	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	64.1	54.7					
3		08:00 - 09:00	62.3	57.5					
4		09:00 - 10:00	68.1	63.7					
5		10:00 - 11:00	63.1	68.2					
6		11:00 - 12:00	67.9	70.1					
7		12:00 - 13:00	61.6	66.9					
8		13:00 - 14:00	63.2	68.1					
9		14:00 - 15:00	67.1	65.7					
10		15:00 - 16:00	63.0	61.7					
11		16:00 - 17:00	59.1	60.5					
12		17:00 - 18:00	57.5	64.8					
13		18:00 - 19:00	59.2	59.1					
14		19:00 - 20:00	63.4	61.5					
15		20:00 - 21:00	61.1	57.7					
16		21:00 - 22:00	61.1	58.2					
		Leq DAY	63.7	64.4					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.5	44.8	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	43.1	44.1					
3		00:00- 01:00	41.3	43.6					
4		01:00-02.00	40.6	43.0					
5		02:00-03.00	43.0	44.0					
6		03:00-04.00	45.1	44.2					
7		04:00-05.00	42.4	41.4					
8		05:00-06:00	42.4	41.7					
		Leq NIGHT	43.2	43.5					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850		
Month & Year	06/2022	Cluster	Cluster II			Report No.	RI-II/NOISE/2022-23/03	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	07.09.2022	
Project		Sample Ref. No.	REM/BCCL/2022/06		Sampling Method	CMPDI/RI-II/LPM 13		
Sampling Stations	i	Muridih OCP	Date of Sampling	08.06.22	24.06.22	Zone Category of Station:	Core Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	46.1	46.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence 75 65 55 50
2		07:00 - 08:00	46.4	48.6				
3		08:00 - 09:00	49.3	51.2				
4		09:00 - 10:00	54.6	56.6				
5		10:00 - 11:00	56.7	54.1				
6		11:00 - 12:00	54.6	57.1				
7		12:00 - 13:00	49.6	50.6				
8		13:00 - 14:00	51.5	55.5				
9		14:00 - 15:00	58.0	58.4				
10		15:00 - 16:00	50.9	53.9				
11		16:00 - 17:00	52.3	53.4				
12		17:00 - 18:00	48.6	48.1				
13		18:00 - 19:00	49.2	45.4				
14		19:00 - 20:00	49.1	48.8				
15		20:00 - 21:00	45.2	50.0				
16		21:00 - 22:00	44.2	45.0				
		Leq DAY	52.2	53.3				
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.8	45.3	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence 70 55 45 50
2		23:00- 00:00	44.3	44.4				
3		00:00- 01:00	43.6	43.3				
4		01:00-02:00	42.4	41.9				
5		02:00-03:00	43.2	42.1				
6		03:00-04:00	44.1	43.5				
7		04:00-05:00	40.9	39.9				
8		05:00-06:00	40.1	40.0				
		Leq NIGHT	43.4	42.9				

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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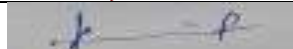
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  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850				
Month & Year	06/2022	Cluster	Cluster II			Report No.	RI-II/NOISE/2022-23/03			
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)								Date of Issue	07.09.2022
Project		Sample Ref. No.	REM/BCCL/2022/06			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Madhuband Washery		Date of Sampling	08.06.22	23.06.22	Zone Category of Station:	Buffer Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB		
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	53.0	53.3	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	55.4	56.2						
3		08:00 - 09:00	63.5	59.6						
4		09:00 - 10:00	64.5	61.3						
5		10:00 - 11:00	69.3	69.2						
6		11:00 - 12:00	70.2	72.0						
7		12:00 - 13:00	67.8	64.2						
8		13:00 - 14:00	68.9	63.6						
9		14:00 - 15:00	66.5	66.6						
10		15:00 - 16:00	62.9	65.4						
11		16:00 - 17:00	60.8	62.2						
12		17:00 - 18:00	61.5	61.4						
13		18:00 - 19:00	59.9	59.5						
14		19:00 - 20:00	61.9	62.0						
15		20:00 - 21:00	59.1	61.3						
16		21:00 - 22:00	59.0	62.6						
		Leq DAY	65.1	64.8						
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.4	46.3	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	44.5	45.8						
3		00:00- 01:00	43.1	45.2						
4		01:00-02:00	42.0	44.8						
5		02:00-03:00	43.8	46.6						
6		03:00-04:00	44.5	47.0						
7		04:00-05:00	40.4	42.3						
8		05:00-06:00	40.9	41.8						
		Leq NIGHT	43.4	45.3						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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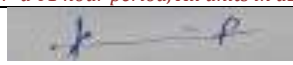
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Page -1 of 1

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report				CMPDI, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in				
Month & Year	06/2022	Cluster	Cluster II			Report No.	RI-II/NOISE/2022-23/03			
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)								Date of Issue	07.09.2022
Project		Sample Ref. No.	REM/BCCL/2022/06			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Madhuband UGP		Date of Sampling	10.06.22	22.06.22	Zone Category of Station:	Buffer Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards		
								Zones	Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	49.4	46.7	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	47.1	48.9						
3		08:00 - 09:00	54.6	51.3						
4		09:00 - 10:00	50.2	51.9						
5		10:00 - 11:00	55.0	58.3						
6		11:00 - 12:00	71.3	70.1						
7		12:00 - 13:00	61.8	62.4						
8		13:00 - 14:00	64.5	63.9						
9		14:00 - 15:00	66.5	66.6						
10		15:00 - 16:00	54.5	54.9						
11		16:00 - 17:00	49.2	54.4						
12		17:00 - 18:00	45.9	52.5						
13		18:00 - 19:00	44.0	50.0						
14		19:00 - 20:00	43.5	51.6						
15		20:00 - 21:00	43.4	46.3						
16		21:00 - 22:00	43.4	44.7						
		Leq DAY	61.7	61.2						
1	Noise Level dB(A)Leq -Night	22:00-23:00	44.7	45.7	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	43.9	44.7						
3		00:00- 01:00	44.1	44.0						
4		01:00-02:00	41.2	43.3						
5		02:00-03:00	44.0	46.1						
6		03:00-04:00	44.2	45.1						
7		04:00-05:00	40.6	41.1						
8		05:00-06:00	40.1	40.5						
		Leq NIGHT	43.2	44.2						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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---- End of Report ----

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 clause 2.

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

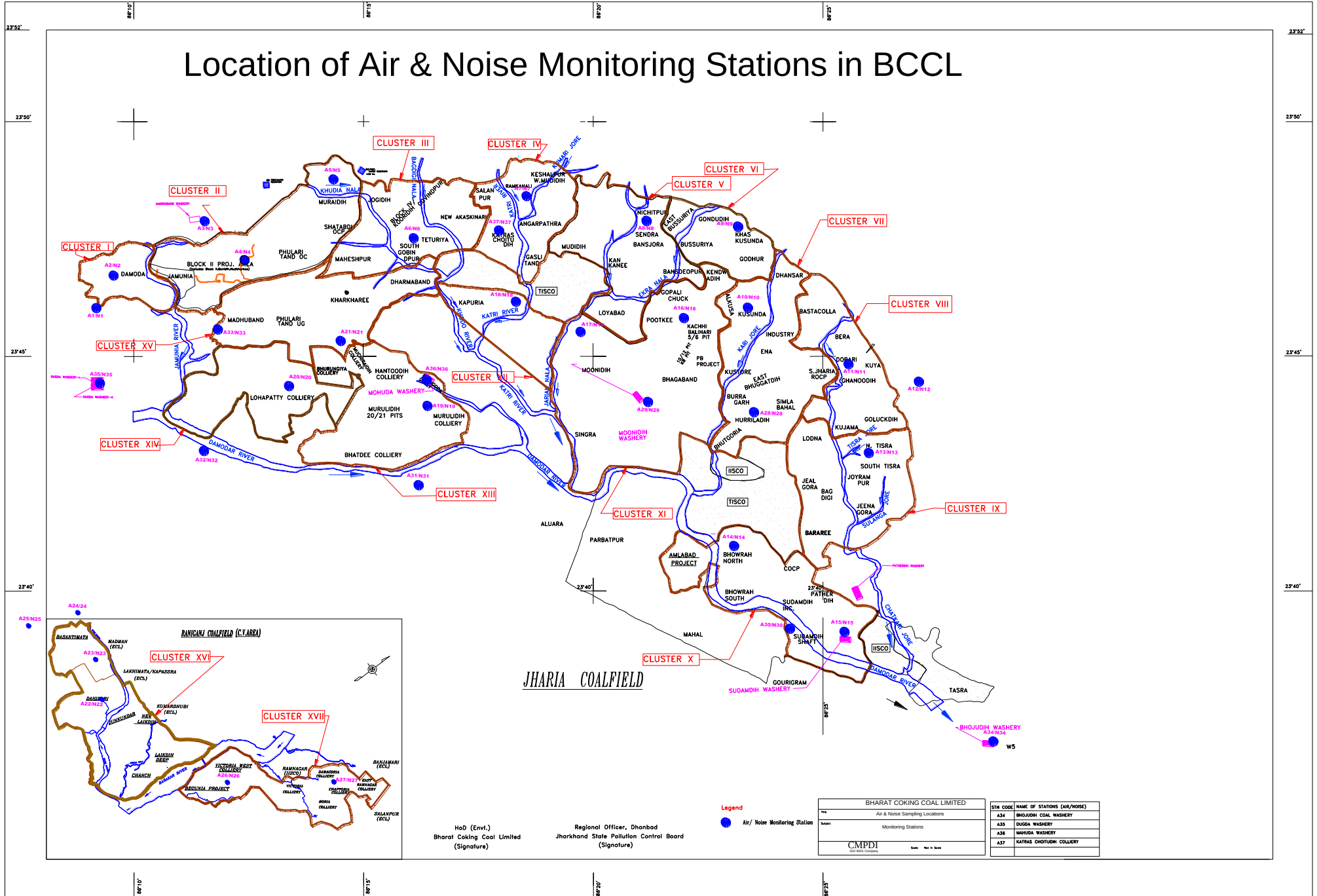
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO₂), 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 PM₁₀, 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 (O₃) , 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 (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), 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.

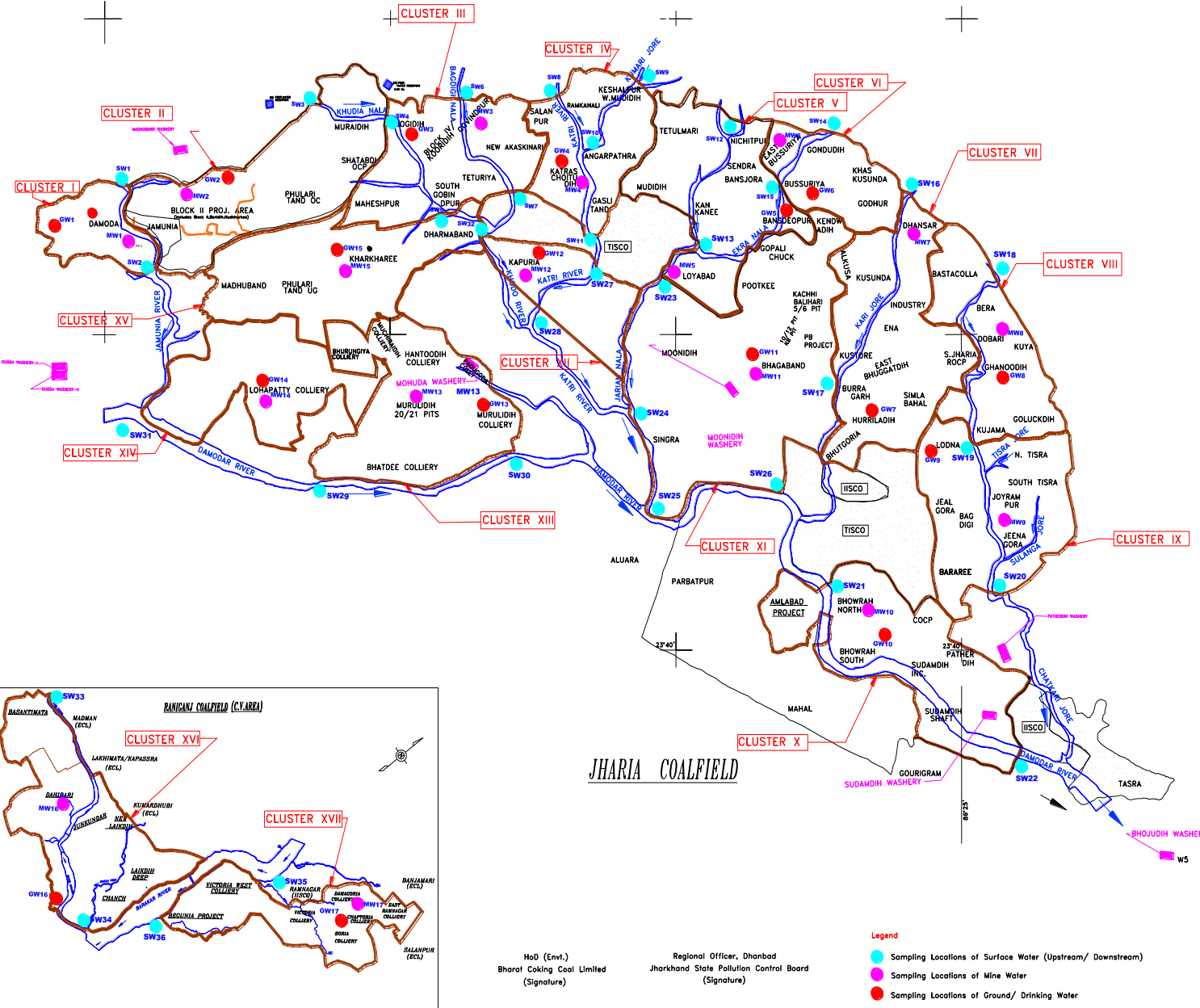
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they JUNE exceed the limits but not on two consecutive days of monitoring.

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	Surface Water (U/S, D/S)	Name of River Nala / Jore	Minel Effluent Water	Sampling Location	Ground Water	Sampling Location
I	SW1, SW2	Bahmuna River	MW1	Damoda Area	GW1	Chutway Village
II	SW3, SW4	Khudra Nala	MW2	Block II OCP	GW2	Joyrampur Village
III	SW4, SW5, SW6, SW7	Khudra Nala, Bagdigi Nala	MW3	Govindpur Colliery	GW3	Jogdih Village
IV	SW8, SW11, SW9, SW10	Kan River, Kuman Jore	MW4	Chotudih	GW4	Kankane Village
V	SW12, SW13, SW15	Jarian Nala, Ekra Nala	MW5	Mudidi	GW5	Nichitpur
VI	SW14, SW15	Ekra Nala	MW6	East Bassuria UGP	GW6	Bansora Sorewell
VII	SW16, SW17	Kan Jore	MW7	Doban UGP	GW7	Humadih
VIII	SW18, SW19	Kan Jore	MW8	Doban UGP	GW8	Ghanudih
IX	SW19, SW20	Kan Jore	MW9	Jemagrah	GW9	Lodna
X	SW21, SW22	Damodar River	MW10	Bhowrah North	GW10	Bhowrah South
XI	SW23, SW24, SW25, SW26	Jarian Nala, Damodar River	MW11	Bhagband UGP	GW11	Bhagband
XII	SW27, SW28	Kan River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Muridih (20/21)	GW13	Muridih
XIV	SW31, SW32	Damodar River	MW14	Lohapatti	GW14	Lohapatti
XV	SW33, SW34	Khudra Nala	MW15	Kharkharee UGP	GW15	Kharkharee
XVI	SW35, SW36	Khudra River	MW16	Bahmuna OCP	GW16	Pallabani Village
XVII	SW37, SW38	Barakar River	MW17	Damodaria Colliery	GW17	Chaptoria

Legend

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

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

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

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

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

(FOR THE MONTH MAY, 2022)

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



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

CONTENTS

SL. NO.	CHAPTER	PARTICULARS	PAGE NO.
1.	CHAPTER - I	EXECUTIVE SUMMARY	3-5
2.	CHAPTER-II	INTRODUCTION	6
3.	CHAPTER-III	RESULTS	7-19
4.	CHAPTER-IV	STANDARDS AND PLANS	20-21

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°37' N to 23°52' N latitudes and 86°09' E to 86°30' E longitude occupying an area of 450 Sq.km. BCCL has awarded Environmental monitoring work of Jharia Coalfield (JCF) to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per the conditions laid down by the MoEF&CC while granting environmental clearance of project, consent letter issued by the respective SPCB, and other statutory requirements.

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

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 (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM_{2.5}

sampler) were used for sampling of PM₁₀, SO₂, & 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 analysed 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 PM₁₀, PM_{2.5}, SO₂ 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 PM₁₀& 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.

The following preventive and suppressive mitigative measures can be undertaken to contain the pollution level within prescribed level:-

- Wet drilling and controlled blasting should be practice.
- Explosive used should be optimised to restrict the dust generation.
- Transportation roads should be permanently asphalted free of ruts, potholes etc.
- Water should be sprayed on coal transportation road, service road more frequently and at regular interval.
- Dust from roads should be removed physically or mechanically.
- Greenbelts around industrial sites, service building area besides Avenue plantation along roads should be created.
- Coal dust should be suppressed by using fixed sprinklers.
- Regular maintenance of plant and machinery should be undertaken.

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 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.

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

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

- 1.1 The Cluster II is in the westernmost part of the Jharia coalfield. The Cluster – II is situated at a distance of about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.
- 1.2 The Cluster II is designed to produce 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal. The average grade of coal W-II to W-IV.

The Project is being worked by deploying shovel dumper combination.

The Project has been granted Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal production vide letter no **E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that “ Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM₁₀, PM_{2.5}, SO₂, NO_x monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, other conditions regarding water / effluent and noise level monitoring in consultation with the State Pollution Control Board.”

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB 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) Block II OCP (A4): Industrial Area

The location of the sampling station is 23°47'2.00"N & 86°11'15.00"E. The sampler was placed at an elevated platform of approx. height 1.5m above ground level near water treatment plant of Block II OCP.

ii) Muraidih OCP (A5): Industrial Area

The sampler was placed at a height of 1.5 m from the ground level at Muraidih project office.

II. BUFFER ZONE Monitoring Location

i) Madhuband Washery (A3) : Industrial area

The location of the sampling station is at 23°47'24.01"N & 86°11'32.00"E in the Washery premises. The sampler was placed at a height of approx. 1.5m above ground level.

ii) Madhuband UGP (A33) : Industrial area

The location of the sampling station is at 23°46'5.60"N & 86°12'27.50"E at the Project office. The sampler was placed at a height of approx. 1.5m above ground level near the project office.

AMBIENT AIR QUALITY DATA

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in					
Test Report for Ambient Air Samples											
Month & Year		05/2022		Cluster		Cluster II		Report No.		RI-II/AIR/2022-23/02	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		10.08.2022	
Project				Sample Ref. No.		REM/BCCL/2022/05		Sampling Method		CMPDI/RI-II/LPM 13 , (IS 5182)	
Sampling Stations		i		Block II OCP		Date of Sampling		7.05.22		25.05.22	
Sl. No.		Parameter		Method of Analysis		Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing		LDL	
						1st FN 2nd FN					
										MoEF Standards Notification dated 25th September,2000 (GSR 742 E) NAAQS, 2009	
1		PM ₁₀		IS -5182(Part 23):2006, R-2017		128		96		10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	
2		PM _{2.5}		IS -5182(Part 24):2019		68		54		10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	
3		SO ₂		IS-5182(Part-2): 2001 , R-2017		11		12		10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	
4		NO ₂		IS-5182 (Part-6): 2006 , R-2017		20		21		06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	
* LDL indicates Lower Detection Limit,											
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,											
 ANALYSED BY				 CHECKED BY (Gaurav Kant)				 HOD's Signature (Amit Raj Mishra)			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.											
---- End of Report ---- Page -1 of 1											



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A Mini Ratna Company

CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		05/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/02	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	10.08.2022	
Project				Sample Ref. No.	REM/BCCL/2022/05	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Muraidih OCP		Date of Sampling	11.05.22	27.05.22	Zone of Station:	Core Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	82	93	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	52	52	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	13	11	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	24	28	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

* LDL indicates Lower Detection Limit,

**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,

[Signature]

ANALYSED BY

[Signature]

CHECKED BY

[Signature]

HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

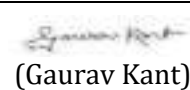
CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		05/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/02	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	10.08.2022	
Project				Sample Ref. No.	REM/BCCL/2022/05	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations	i	Madhuband Washery			Date of Sampling	12.05.22	26.05.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	135	92	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	72	54	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	12	10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	18	20	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**


ANALYSED BY


(Gaurav Kant)
CHECKED BY


(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.

---- End of Report ----

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDI, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		05/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/02	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	10.08.2022	
Project				Sample Ref. No.	REM/BCCL/2022/05	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Madhuband UGP		Date of Sampling	06.05.22	21.05.22	Zone of Station:	Buffer Zone
Sl. N o.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		92	114	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		53	62	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		12	13	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		28	26	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**


ANALYSED BY


(Gaurav Kant)
CHECKED BY

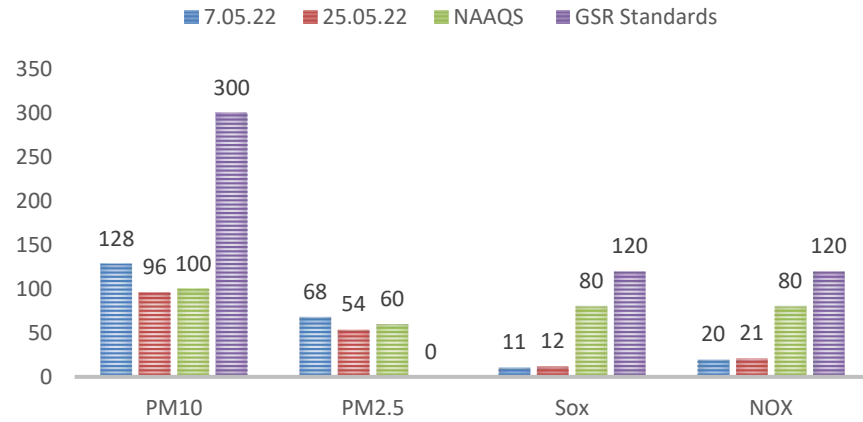

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.

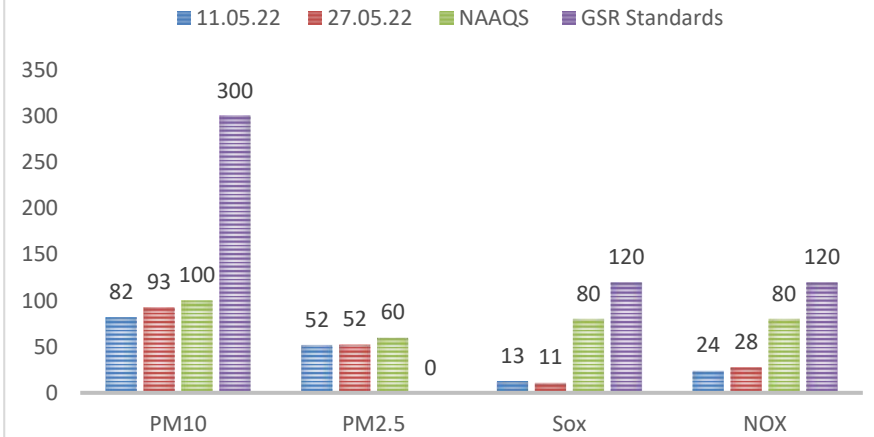
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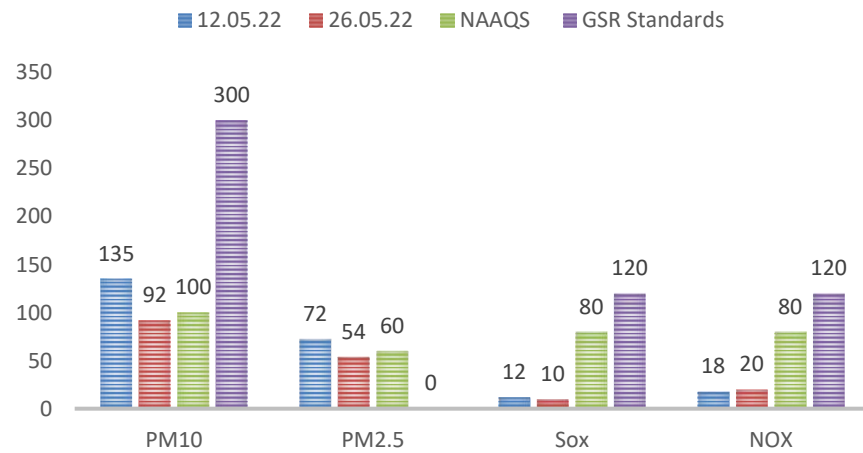
AMBIENT AIR QUALITY AT BLOCK II OCP



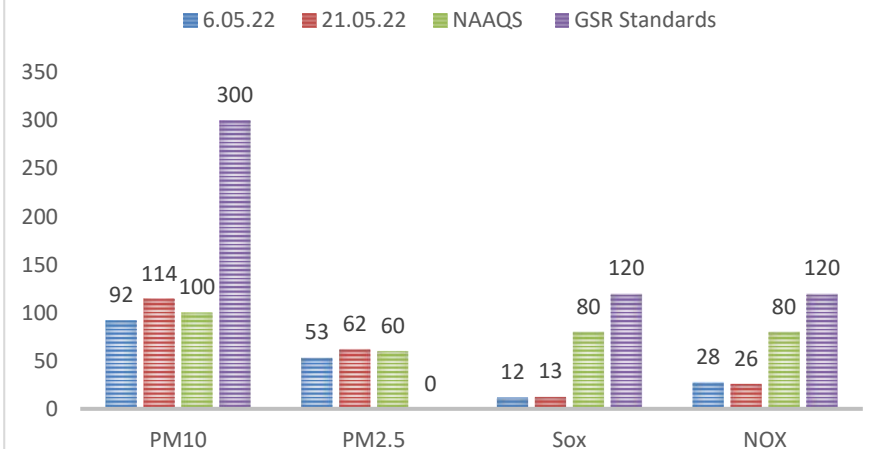
AMBIENT AIR QUALITY AT MURAIIDIH OCP



AMBIENT AIR QUALITY AT MADHUBAND WASHERY



AMBIENT AIR QUALITY AT MADHUBAND UGP



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Block II (MW2)

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

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.

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II MINE EFFLUENT TEST REPORT				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
TC-10122		Test Report for Mine Effluent samples						email: rdri2cmpdi@coalindia.in	
Month & Year	05/2022	Cluster	Cluster II		Report No.		RI-II/water/2022-23/02		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	10.08.2022	
Project		Sampling Ref. No.	REM/BCCL/2022/05		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Block II	Sample Collected in 2.5 Ltr Jerricane, Color as observed is transparent				Period of Analysis	MAY-JUNE 2022	
			Date of Sampling		09.05.2022	30.05.2022			
			Observed Values		STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)		LDL		
Sl. No.	Parameter	Method of Analysis	First Fortnight	Second Fortnight					
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	65	47	100 (Max)		10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.22	7.99	5.5 - 9.0		0.2		
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)		2		
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	40	28	250 (Max)		4		
**Grab sampling carried out for water samples. **All units in mg/L unless specified otherwise *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,									
 ANALYSED BY		 (Kumar Vaibhav) CHECKED BY				 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
---- End of Report ----									
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NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- i) **Block II OCP (N4)**
- ii) **Muraidih OCP (N5)**
- iii) **Madhuband Washery (N3)**
- iv) **Madhuband UGP (N33)**

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.



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

CMPDI, RI-II
 KOYLA BHAWAN COMPLEX
 DHANBAD. -826005
 Phone:0326-223-850
 email: rdri2cmpdi@coalindia.in

Month & Year	05/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/02
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	10.08.2022
Project			Sample Ref. No.	REM/BCCL/2022/05		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Block II OCP		Date of Sampling	05.05.22	24.05.22	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	58.0	51.4	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	64.2	54.8					
3		08:00 - 09:00	62.0	57.4					
4		09:00 - 10:00	68.2	63.8					
5		10:00 - 11:00	60.2	65.3					
6		11:00 - 12:00	62.5	64.5					
7		12:00 - 13:00	61.5	66.8					
8		13:00 - 14:00	63.2	68.3					
9		14:00 - 15:00	63.6	62.2					
10		15:00 - 16:00	62.5	61.3					
11		16:00 - 17:00	59.8	60.7					
12		17:00 - 18:00	57.0	64.2					
13		18:00 - 19:00	59.3	59.3					
14		19:00 - 20:00	60.1	58.2					
15		20:00 - 21:00	61.0	57.6					
16		21:00 - 22:00	60.5	57.6					
		Leq DAY	62.4	62.8					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.3	44.6	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	43.2	44.2					
3		00:00- 01:00	41.2	43.5					
4		01:00-02.00	40.5	43.1					
5		02.00-03.00	41.0	42.0					
6		03.00-04.00	41.5	41.0					
7		04.00-05.00	42.3	41.3					
8		05:00-06:00	42.5	41.8					
		Leq NIGHT	42.5	42.9					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report					CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
Month & Year	05/2022	Cluster	Cluster II				Report No.	RI-II/NOISE/2022-23/02		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)									
Project		Sample Ref. No.	REM/BCCL/2022/05			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Muridih OCP	Date of Sampling	03.05.22	27.05.22	Zone Category of Station:	Core Zone			
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards		
								Zones	Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	45.9	46.3	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	46.5	48.7						
3		08:00 - 09:00	49.2	51.1						
4		09:00 - 10:00	55.9	56.7						
5		10:00 - 11:00	54.1	51.6						
6		11:00 - 12:00	50.2	52.5						
7		12:00 - 13:00	49.5	50.5						
8		13:00 - 14:00	51.6	55.6						
9		14:00 - 15:00	55.0	55.4						
10		15:00 - 16:00	50.5	53.5						
11		16:00 - 17:00	52.3	54.0						
12		17:00 - 18:00	48.2	47.7						
13		18:00 - 19:00	49.3	45.5						
14		19:00 - 20:00	46.5	46.2						
15		20:00 - 21:00	45.1	49.9						
16		21:00 - 22:00	43.9	44.5						
		Leq DAY	51.0	52.1						
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.6	45.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	44.5	44.5						
3		00:00- 01:00	43.5	43.2						
4		01:00-02:00	42.5	41.8						
5		02:00-03:00	41.2	40.2						
6		03:00-04:00	40.6	40.0						
7		04:00-05:00	40.8	39.8						
8		05:00-06:00	40.2	40.1						
		Leq NIGHT	42.8	42.3						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850

Month & Year	05/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/02
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	10.08.2022
Project			Sample Ref. No.	REM/BCCL/2022/05		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Madhuband Washery		Date of Sampling	11.05.22	25.05.22	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL)	RULES, 2000 Standards
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	52.8	53.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	55.5	56.4					
3		08:00 - 09:00	63.5	59.5					
4		09:00 - 10:00	64.6	61.4					
5		10:00 - 11:00	66.2	66.0					
6		11:00 - 12:00	64.6	66.2					
7		12:00 - 13:00	67.7	62.9					
8		13:00 - 14:00	69.2	63.7					
9		14:00 - 15:00	63.1	63.1					
10		15:00 - 16:00	62.4	64.9					
11		16:00 - 17:00	61.5	62.9					
12		17:00 - 18:00	61.0	60.8					
13		18:00 - 19:00	60.1	59.6					
14		19:00 - 20:00	59.1	60.4					
15		20:00 - 21:00	59.0	61.2					
16		21:00 - 22:00	58.4	62.0					
		Leq DAY	63.6	62.5					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.2	46.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.5	45.9					
3		00:00- 01:00	43.0	45.1					
4		01:00-02:00	42.1	44.9					
5		02:00-03:00	41.8	44.5					
6		03:00-04:00	40.9	43.2					
7		04:00-05:00	40.3	42.2					
8		05:00-06:00	41.0	41.9					
		Leq NIGHT	42.7	44.5					

****All noise measurements are integrated for a 01 hour period, All units in dB(A)**

(Amit Raj Mishra)
HOD's Signature

---- End of Report ----

Page -1 of 1

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
mail: rdri2cmpdi@coalindia.in

Month & Year	05/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/02
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	10.08.2022
Project			Sample Ref. No.	REM/BCCL/2022/05		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Madhuband UGP		Date of Sampling	05.05.22	20.05.22	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	49.2	46.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	47.2	49.0					
3		08:00 - 09:00	54.5	51.2					
4		09:00 – 10:00	50.3	52.0					
5		10:00 - 11:00	52.5	55.6					
6		11:00 - 12:00	65.6	64.5					
7		12:00 - 13:00	61.7	62.3					
8		13:00 - 14:00	64.6	64.0					
9		14:00 - 15:00	63.0	63.1					
10		15:00 - 16:00	54.1	54.5					
11		16:00 - 17:00	49.8	55.0					
12		17:00 - 18:00	45.5	52.0					
13		18:00 - 19:00	44.1	50.1					
14		19:00 - 20:00	41.2	48.8					
15		20:00 - 21:00	43.3	46.2					
16		21:00 - 22:00	43.0	44.2					
		Leq DAY	58.4	58.3					
1	Noise Level dB(A)Leq -Night	22:00-23:00	44.5	45.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.0	44.8					
3		00:00- 01:00	43.2	43.9					
4		01.00-02.00	41.3	43.4					
5		02.00-03.00	42.0	44.0					
6		03.00-04.00	40.7	41.5					
7		04.00-05.00	40.5	41.0					
8		05:00-06:00	40.2	40.6					
		Leq NIGHT	42.3	43.4					

***All noise measurements are integrated for a 01 hour period, All units in dB(A)*

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.

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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 clause 2.

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

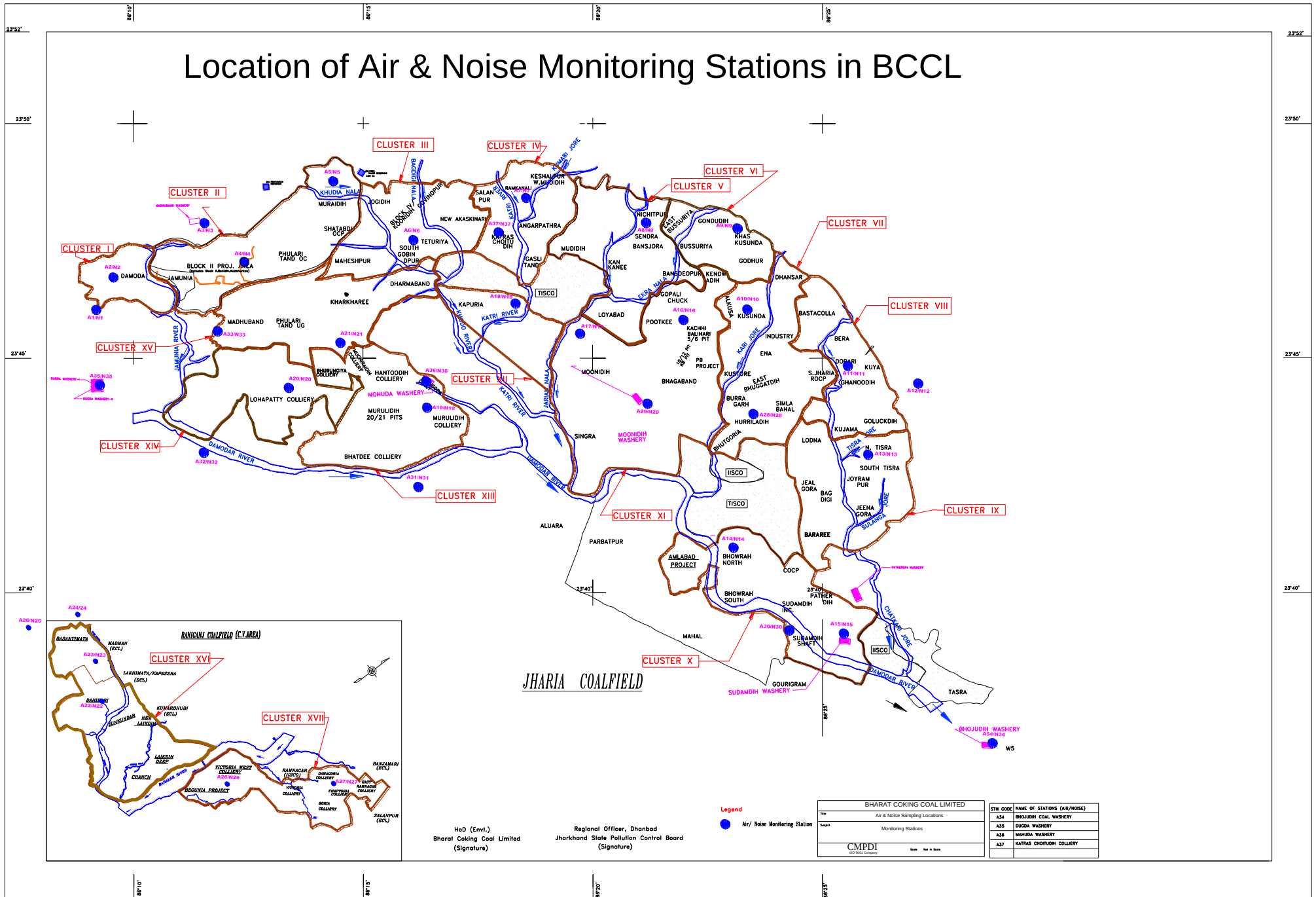
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO₂), 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 PM₁₀, 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 (O₃) , 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 (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), 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.

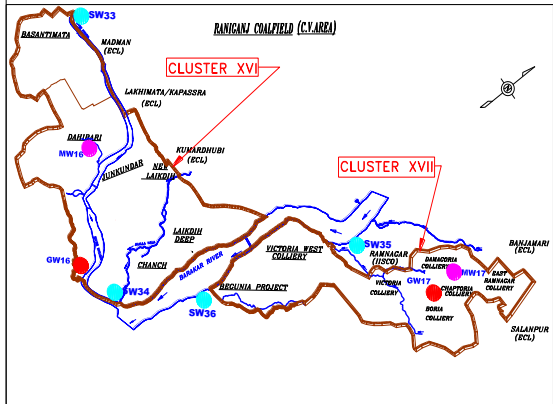
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they JUNE exceed the limits but not on two consecutive days of monitoring.

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



JHARIA COALFIELD



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

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

STRICTLY RESTRICTED**FOR COMPANY USE ONLY RESTRICTED**

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

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

(FOR THE MONTH AUGUST, 2022)

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



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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4.	CHAPTER-IV	STANDARDS AND PLANS	20-21

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°37' N to 23°52' N latitudes and 86°09' E to 86°30' E longitude occupying an area of 450 Sq.km. BCCL has awarded Environmental monitoring work of Jharia Coalfield (JCF) to Central Mine Planning & Design Institute Limited (CMPDIL). The environmental monitoring has been carried out as per the conditions laid down by the MoEF&CC while granting environmental clearance of project, consent letter issued by the respective SPCB, and other statutory requirements.

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

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 (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM_{2.5}

sampler) were used for sampling of PM₁₀, SO₂, & 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 analysed 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 PM₁₀, PM_{2.5}, SO₂ 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 PM₁₀& 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.

The following preventive and suppressive mitigative measures can be undertaken to contain the pollution level within prescribed level:-

- Wet drilling and controlled blasting should be practice.
- Explosive used should be optimised to restrict the dust generation.
- Transportation roads should be permanently asphalted free of ruts, potholes etc.
- Water should be sprayed on coal transportation road, service road more frequently and at regular interval.
- Dust from roads should be removed physically or mechanically.
- Greenbelts around industrial sites, service building area besides Avenue plantation along roads should be created.
- Coal dust should be suppressed by using fixed sprinklers.
- Regular maintenance of plant and machinery should be undertaken.

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 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.

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

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

- 1.1 The Cluster II is in the westernmost part of the Jharia coalfield. The Cluster – II is situated at a distance of about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.
- 1.2 The Cluster II is designed to produce 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal. The average grade of coal W-II to W-IV.

The Project is being worked by deploying shovel dumper combination.

The Project has been granted Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal production vide letter no **E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that “ Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM₁₀, PM_{2.5}, SO₂, NO_x monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, other conditions regarding water / effluent and noise level monitoring in consultation with the State Pollution Control Board.”

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB 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) Block II OCP (A4): Industrial Area

The location of the sampling station is 23°47'2.00"N & 86°11'15.00"E. The sampler was placed at an elevated platform of approx. height 1.5m above ground level near water treatment plant of Block II OCP.

ii) Muraidih OCP (A5): Industrial Area

The sampler was placed at a height of 1.5 m from the ground level at Muraidih project office.

II. BUFFER ZONE Monitoring Location

i) Madhuband Washery (A3) : Industrial area

The location of the sampling station is at 23°47'24.01"N & 86°11'32.00"E in the Washery premises. The sampler was placed at a height of approx. 1.5m above ground level.

ii) Madhuband UGP (A33) : Industrial area

The location of the sampling station is at 23°46'5.60"N & 86°12'27.50"E at the Project office. The sampler was placed at a height of approx. 1.5m above ground level near the project office.

AMBIENT AIR QUALITY DATA

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in					
Test Report for Ambient Air Samples											
Month & Year		08/2022		Cluster		Cluster II		Report No.		RI-II/AIR/2022-23/05	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		26.10.2022	
Project				Sample Ref. No.		REM/BCCL/2022/08		Sampling Method		CMPDI/RI-II/LPM 13 , (IS 5182)	
Sampling Stations		i		Block II OCP		Date of Sampling		11.08.22		24.08.22	
Sl. No.		Parameter		Method of Analysis		Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing		LDL	
						1st FN 2nd FN					
										MoEF Standards Notification dated 25th September,2000 (GSR 742 E) NAAQS, 2009	
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	73	118	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100			
2	PM _{2.5}	IS -5182(Part 24):2019	38	64	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60			
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	10	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80			
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	24	22	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80			
<i>**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average, * LDL indicates Lower Detection Limit,</i>											
 ANALYSED BY				 CHECKED BY				 HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.											
---- End of Report ---- Page -1 of 1											



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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		08/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/05	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	26.10.2022	
Project				Sample Ref. No.	REM/BCCL/2022/08	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Muraidih OCP		Date of Sampling	12.08.22	23.08.22	Zone of Station:	Core Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	81	68	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	43	32	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	<10	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	22	26	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80	

* LDL indicates Lower Detection Limit,

**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,

[Signature]

ANALYSED BY

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HOD's Signature

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Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		08/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/05	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	26.10.2022	
Project				Sample Ref. No.	REM/BCCL/2022/08	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Madhuband Washery		Date of Sampling	12.08.22	24.08.22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		117	66	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		65	36	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		<10	14	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		20	22	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**

ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

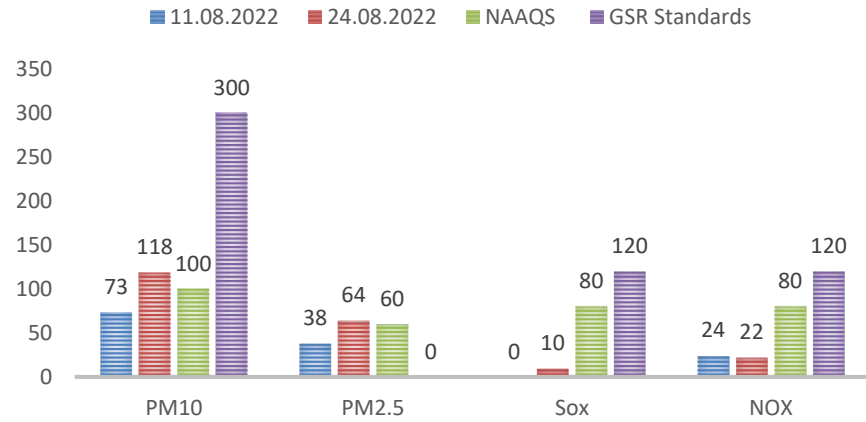
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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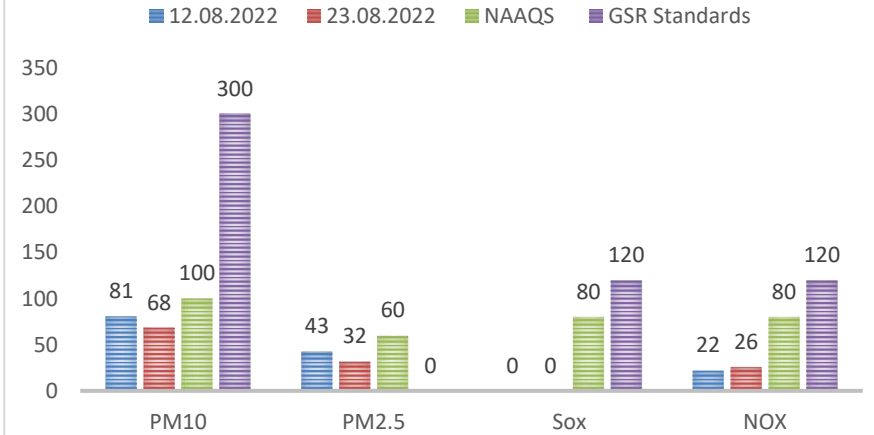
Page -1 of 1

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report							
Test Report for Ambient Air Samples									
Month & Year		08/2022		Cluster		Cluster II		Report No.	RI-II/AIR/2022-23/05
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	26.10.2022
Project				Sample Ref. No.		REM/BCCL/2022/08		Sampling Method	
								CMPDI/RI-II/LPM 13, (IS 5182)	
Sampling Stations		i		Madhuband UGP		Date of Sampling		03.08.22	
								19.08.22	
Zone of Station:								Buffer Zone	
MoEF Standards Notification dated 25th September, 2000 (GSR 742 E)									
NAAQS, 2009									
Sl. No.	Parameter	Method Analysis	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing	LDL			
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	77	97	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300		100
2	PM _{2.5}	IS -5182(Part 24):2019	36	39	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified		60
3	SO ₂	IS-5182(Part-2): 2001, R-2017	10	<10	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120		80
4	NO ₂	IS-5182 (Part-6): 2006, R-2017	17	20	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120		80
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,									
 ANALYSED BY		 CHECKED BY				 HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.									
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Page -1 of 1									

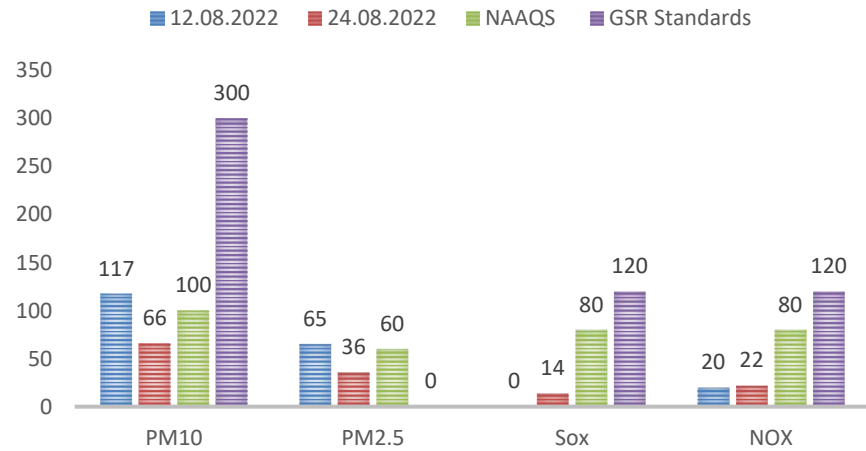
AMBIENT AIR QUALITY AT BLOCK II OCP



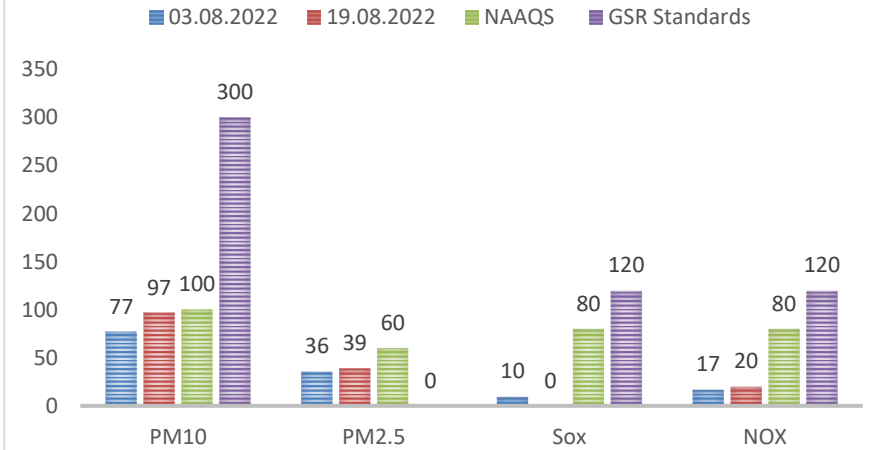
AMBIENT AIR QUALITY AT MURAIIDIH OCP



AMBIENT AIR QUALITY AT MADHUBAND WASHERY



AMBIENT AIR QUALITY AT MADHUBAND UGP



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Block II (MW2)

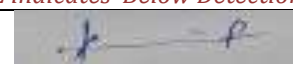
A sampling point is fixed to assess the effluent quality of Mine discharge. This location is selected to monitor effluent discharge in to Khudia Nala.

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.

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II MINE EFFLUENT TEST REPORT				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
TC-10122		Test Report for Mine Effluent samples						email: rdri2cmpdi@coalindia.in	
Month & Year	08/2022	Cluster	Cluster II		Report No.		RI-II/water/2022-23/05		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	26.10.2022	
Project		Sampling Ref. No.	REM/BCCL/2022/08		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Block II	Sample Collected in 2.5 Ltr Jerricane, Color as observed is transparent				Period of Analysis	july 2022	
			Date of Sampling		08.08.22	29.08..22			
Sl. No.	Parameter	Method of Analysis	Observed Values		STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)	LDL			
			First Fortnight	Second Fortnight					
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	53	50	100 (Max)	10			
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.14	7.92	5.5 - 9.0	0.2			
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)	2			
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	44	32	250 (Max)	4			
<i>**Grab sampling carried out for water samples. **All units in mg/L unless specified otherwise *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,</i>									
 ANALYSED BY		 (Kumar Vaibhav) CHECKED BY				 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
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Page -1 of 1									

NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- i) **Block II OCP (N4)**
- ii) **Muraidih OCP (N5)**
- iii) **Madhuband Washery (N3)**
- iv) **Madhuband UGP (N33)**

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.



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

CMPDI, RI-II
 KOYLA BHAWAN COMPLEX
 DHANBAD. -826005
 Phone:0326-223-850
 email: rdri2cmpdi@coalindia.in

Month & Year	08/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/05
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	26.10.2022
Project			Sample Ref. No.	REM/BCCL/2022/08		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Block II OCP		Date of Sampling	11.08.22	24.08.22	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	49.3	51.8	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	53.5	52.4					
3		08:00 - 09:00	56.1	57.1					
4		09:00 - 10:00	62.3	63.5					
5		10:00 - 11:00	63.5	65.0					
6		11:00 - 12:00	62.3	62.7					
7		12:00 - 13:00	65.3	66.5					
8		13:00 - 14:00	66.7	66.5					
9		14:00 - 15:00	60.8	67.9					
10		15:00 - 16:00	57.9	61.0					
11		16:00 - 17:00	59.3	60.4					
12		17:00 - 18:00	58.8	59.9					
13		18:00 - 19:00	57.9	59.0					
14		19:00 - 20:00	56.6	57.9					
15		20:00 - 21:00	56.7	52.7					
16		21:00 - 22:00	56.3	57.4					
		Leq DAY	60.9	62.5					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.5	46.1	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.9	44.5					
3		00:00- 01:00	43.1	43.7					
4		01:00-02:00	42.9	43.1					
5		02:00-03:00	41.1	41.5					
6		03:00-04:00	41.0	40.8					
7		04:00-05:00	40.0	40.9					
8		05:00-06:00	39.8	40.0					
		Leq NIGHT	42.8	43.0					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY

(Gaurav Kant)
CHECKED BY

(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

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Month & Year	08/2022	Cluster	Cluster II				Report No.	RI-II/NOISE/2022-23/05		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)									
Project		Sample Ref. No.	REM/BCCL/2022/08			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Muridih OCP	Date of Sampling		12.08.22	23.08.22	Zone Category of Station:	Core Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards		
								Zones	Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	46.1	47.0	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	48.6	47.3						
3		08:00 - 09:00	50.9	51.8						
4		09:00 - 10:00	54.2	57.6						
5		10:00 - 11:00	57.9	60.4						
6		11:00 - 12:00	56.5	57.6						
7		12:00 - 13:00	59.2	60.3						
8		13:00 - 14:00	59.2	61.6						
9		14:00 - 15:00	60.0	56.2						
10		15:00 - 16:00	54.3	56.3						
11		16:00 - 17:00	53.8	54.8						
12		17:00 - 18:00	53.3	54.3						
13		18:00 - 19:00	52.5	53.5						
14		19:00 - 20:00	51.6	52.5						
15		20:00 - 21:00	51.4	50.1						
16		21:00 - 22:00	51.1	47.6						
		Leq DAY	55.4	56.4						
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.6	45.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	42.3	43.5						
3		00:00- 01:00	41.9	43.2						
4		01:00-02:00	41.5	41.8						
5		02:00-03:00	41.2	40.2						
6		03:00-04:00	40.6	40.5						
7		04:00-05:00	41.0	39.8						
8		05:00-06:00	40.2	39.6						
		Leq NIGHT	42.1	42.1						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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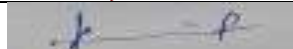
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Month & Year	08/2022	Cluster	Cluster II	Report No.	RI-II/NOISE/2022-23/05					
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)								Date of Issue	26.10.2022
Project		Sample Ref. No.	REM/BCCL/2022/08		Sampling Method	CMPDI/RI-II/LPM 13				
Sampling Stations	i	Madhuband Washery		Date of Sampling	12.08.22	24.08.22	Zone Category of Station:	Buffer Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB		
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	51.5	51.4	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	54.2	54.8						
3		08:00 - 09:00	56.8	57.4						
4		09:00 - 10:00	62.3	63.8						
5		10:00 - 11:00	64.5	65.3						
6		11:00 - 12:00	63.0	64.5						
7		12:00 - 13:00	66.1	66.8						
8		13:00 - 14:00	67.5	68.3						
9		14:00 - 15:00	67.5	62.2						
10		15:00 - 16:00	60.5	61.3						
11		16:00 - 17:00	60.0	60.7						
12		17:00 - 18:00	59.5	64.2						
13		18:00 - 19:00	58.6	59.3						
14		19:00 - 20:00	58.1	58.2						
15		20:00 - 21:00	57.5	57.6						
16		21:00 - 22:00	57.0	57.6						
		Leq DAY	62.5	62.8						
1	Noise Level dB(A)Leq -Night	22:00-23:00	46.5	46.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	45.6	44.9						
3		00:00- 01:00	44.4	43.8						
4		01:00-02:00	42.1	42.5						
5		02:00-03:00	42.0	42.1						
6		03:00-04:00	40.9	42.3						
7		04:00-05:00	40.3	40.8						
8		05:00-06:00	40.1	40.6						
		Leq NIGHT	43.4	43.4						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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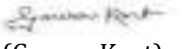
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Month & Year	08/2022	Cluster	Cluster II				Report No.	RI-II/NOISE/2022-23/05		
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)								Date of Issue	26.10.2022
Project		Sample Ref. No.	REM/BCCL/2022/08			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Madhuband UGP		Date of Sampling	03.08.22	19.08.22	Zone Category of Station:	Buffer Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards		
								Zones	Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	47.0	47.7	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	49.5	50.2						
3		08:00 - 09:00	51.8	52.6						
4		09:00 - 10:00	57.6	56.3						
5		10:00 - 11:00	58.9	59.8						
6		11:00 - 12:00	57.6	58.4						
7		12:00 - 13:00	60.3	61.2						
8		13:00 - 14:00	61.6	63.2						
9		14:00 - 15:00	56.2	57.0						
10		15:00 - 16:00	55.3	56.1						
11		16:00 - 17:00	54.8	55.6						
12		17:00 - 18:00	54.3	55.1						
13		18:00 - 19:00	53.5	54.4						
14		19:00 - 20:00	52.5	53.3						
15		20:00 - 21:00	52.5	53.0						
16		21:00 - 22:00	52.0	52.8						
		Leq DAY	56.3	57.2						
1	Noise Level dB(A)Leq -Night	22:00-23:00	46.2	45.5	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	44.0	44.8						
3		00:00- 01:00	43.2	43.9						
4		01:00-02:00	41.3	42.6						
5		02:00-03:00	41.9	40.4						
6		03:00-04:00	40.7	40.2						
7		04:00-05:00	40.5	40.1						
8		05:00-06:00	40.2	40.6						
		Leq NIGHT	42.7	42.8						

*LDL indicates Lower Detection Limit
**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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---- End of Report ----

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 clause 2.

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

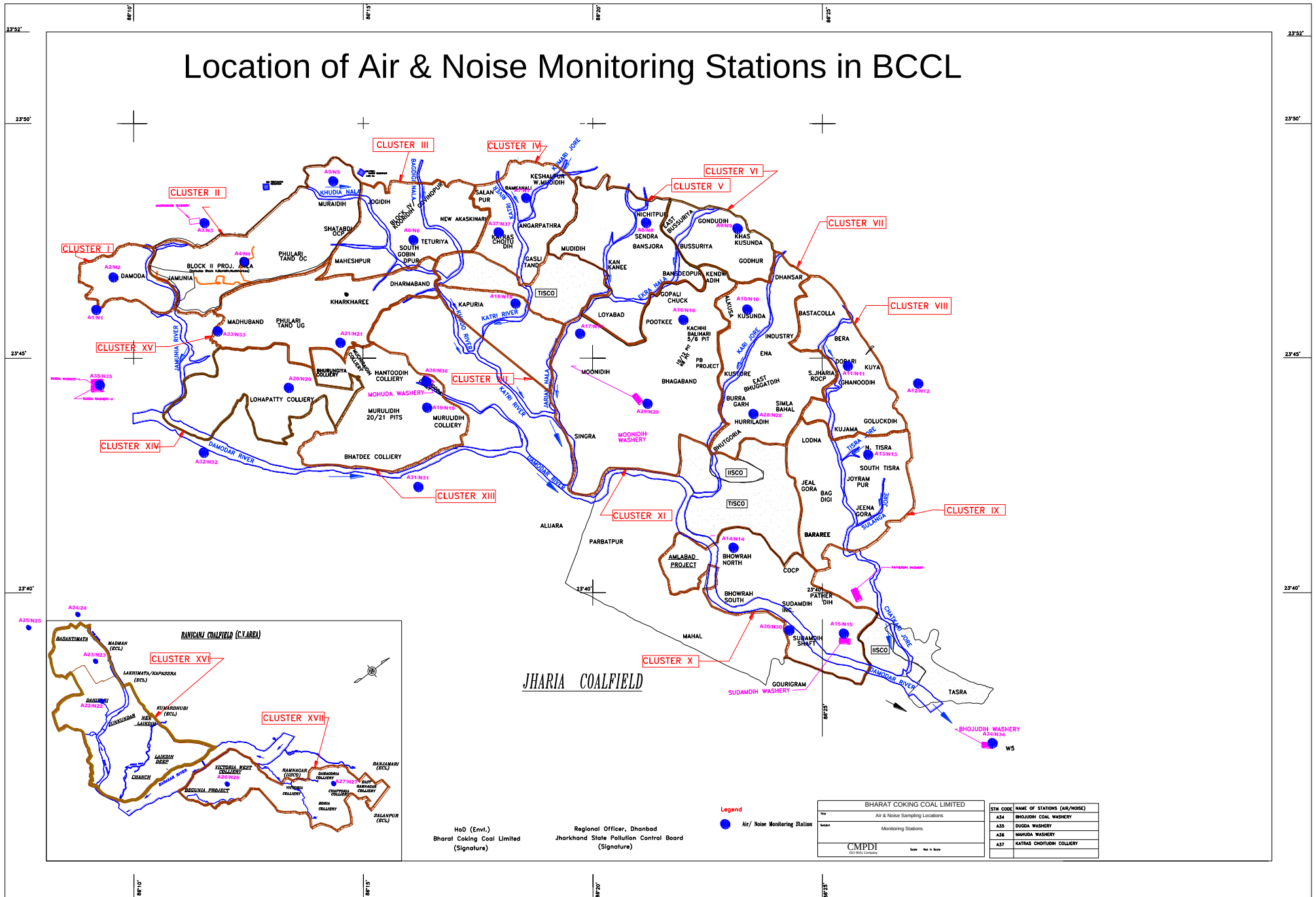
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO₂), 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 PM₁₀, 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 (O₃) , 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 (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), 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.

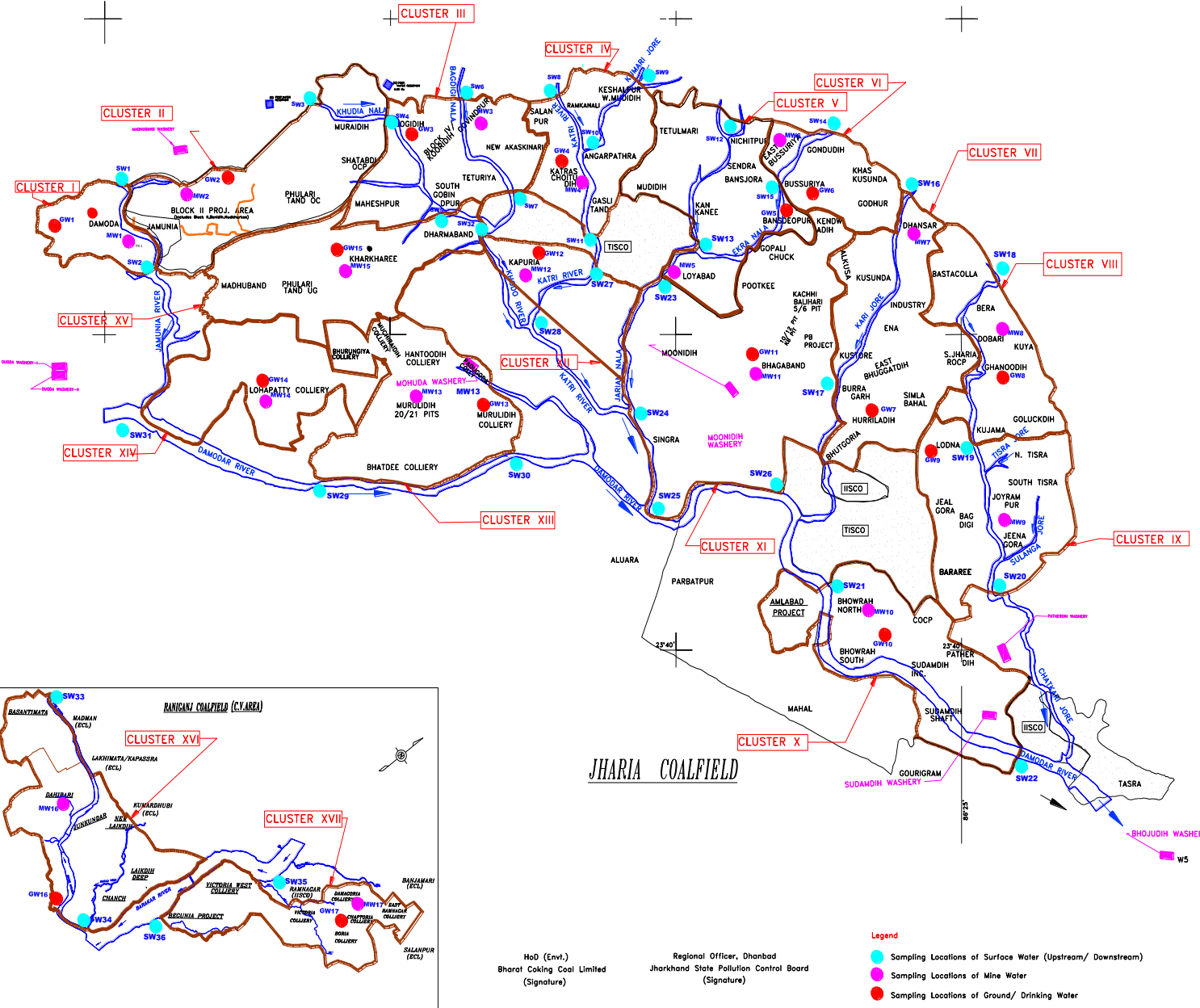
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they JUNE exceed the limits but not on two consecutive days of monitoring.

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	Surface Water (U/S, D/S)	Name of River/Nala/Jore	Minel Effluent Water	Sampling Location	Ground Water	Sampling Location
I	SW1, SW2	Jamunia River	MW1	Damoda Area	GW1	Chutway 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	Jogdih Village
IV	SW8, SW11, SW9, SW10	Kan River, Kurnai Jore	MW4	Chotudih	GW4	Kankanees Village
V	SW12, SW13, SW15	Jarian Nala, Ekra Nala	MW5	Mudidih	GW5	Nichitpur
VI	SW14, SW15	Ekra Nala	MW6	East Bassuria UGP	GW6	Bansara Sorewell
VII	SW16, SW17	Kan Jore	MW7	Doban UGP	GW7	Humridih
VIII	SW18, SW19	Kashi Jore	MW8	Doban UGP	GW8	Ghanudih
IX	SW19, SW20	Kashi Jore	MW9	Jemagora	GW9	Lodna
X	SW21, SW22	Damodar River	MW10	Bhowrah North	GW10	Bhowrah South
XI	SW23, SW24, SW25, SW26	Jarian Nala, Damodar River	MW11	Bhagband UGP	GW11	Bhagbandh
XII	SW27, SW28	Kan River	MW12	Kapuria	GW12	Kapuria
XIII	SW29, SW30	Damodar River	MW13	Muridih (20/21)	GW13	Muridih
XIV	SW31, SW32	Damodar River	MW14	Lohapatti	GW14	Lohapatti
XV	SW5, SW32	Kharkharee UGP	MW15	Kharkharee	GW15	Kharkharee
XVI	SW33, SW34	Khudia River	MW16	Dahibani OCP	GW16	Pallabani Village
XVII	SW35, SW36	Barakar River	MW17	Damagoria Colliery	GW17	Chaptoria

Legend

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

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

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

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

STRICTLY RESTRICTED**FOR COMPANY USE ONLY RESTRICTED**

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

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

(FOR THE MONTH SEPTEMBER, 2022)

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



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

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 (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust Sampler (PM_{2.5}

sampler) were used for sampling of PM₁₀, SO₂, & 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 analysed 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 PM₁₀, PM_{2.5}, SO₂ 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 PM₁₀& 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.

The following preventive and suppressive mitigative measures can be undertaken to contain the pollution level within prescribed level:-

- Wet drilling and controlled blasting should be practice.
- Explosive used should be optimised to restrict the dust generation.
- Transportation roads should be permanently asphalted free of ruts, potholes etc.
- Water should be sprayed on coal transportation road, service road more frequently and at regular interval.
- Dust from roads should be removed physically or mechanically.
- Greenbelts around industrial sites, service building area besides Avenue plantation along roads should be created.
- Coal dust should be suppressed by using fixed sprinklers.
- Regular maintenance of plant and machinery should be undertaken.

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 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.

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

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

- 1.1 The Cluster II is in the westernmost part of the Jharia coalfield. The Cluster – II is situated at a distance of about 40 - 45 kms from Dhanbad Railway Station. The mines of this cluster are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Khudia Nala.
- 1.2 The Cluster II is designed to produce 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal. The average grade of coal W-II to W-IV.

The Project is being worked by deploying shovel dumper combination.

The Project has been granted Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity of 0.9 MTPA (normative) and 1.17 MTPA peak capacity of coal production vide letter no **E. C. no. J-11015/35/2011-IA.II (M) dated 06.02.2013.**

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that “ Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM₁₀, PM_{2.5}, SO₂, NO_x monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, other conditions regarding water / effluent and noise level monitoring in consultation with the State Pollution Control Board.”

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & JSPCB 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) Block II OCP (A4): Industrial Area

The location of the sampling station is 23°47'2.00"N & 86°11'15.00"E. The sampler was placed at an elevated platform of approx. height 1.5m above ground level near water treatment plant of Block II OCP.

ii) Muraidih OCP (A5): Industrial Area

The sampler was placed at a height of 1.5 m from the ground level at Muraidih project office.

II. BUFFER ZONE Monitoring Location

i) Madhuband Washery (A3) : Industrial area

The location of the sampling station is at 23°47'24.01"N & 86°11'32.00"E in the Washery premises. The sampler was placed at a height of approx. 1.5m above ground level.

ii) Madhuband UGP (A33) : Industrial area

The location of the sampling station is at 23°46'5.60"N & 86°12'27.50"E at the Project office. The sampler was placed at a height of approx. 1.5m above ground level near the project office.

AMBIENT AIR QUALITY DATA

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report				CMPDI, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in					
Test Report for Ambient Air Samples											
Month & Year		09/2022		Cluster		Cluster II		Report No.		RI-II/AIR/2022-23/09	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		29.11.2022	
Project				Sample Ref. No.		REM/BCCL/2022/09/04		Sampling Method		CMPDI/RI-II/LPM 13 , (IS 5182)	
Sampling Stations		i		Block II OCP		Date of Sampling		06.09..22		20.09..22	
Sl. No.		Parameter		Method of Analysis		Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing		LDL	
						1st FN 2nd FN					
										MoEF Standards Notification dated 25th September,2000 (GSR 742 E) NAAQS, 2009	
1		PM ₁₀		IS -5182(Part 23):2006, R-2017		90 114		10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$		10 $\mu\text{g}/\text{m}^3$	
2		PM _{2.5}		IS -5182(Part 24):2019		48 86		10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$		10 $\mu\text{g}/\text{m}^3$	
3		SO ₂		IS-5182(Part-2): 2001 , R-2017		<10 11		10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$		10 $\mu\text{g}/\text{m}^3$	
4		NO ₂		IS-5182 (Part-6): 2006 , R-2017		23 25		06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$		06 $\mu\text{g}/\text{m}^3$	
<i>**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average, * LDL indicates Lower Detection Limit,</i>											
 ANALYSED BY				 (Gaurav Kant) CHECKED BY				 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.											
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Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		09/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/09	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	29.11.2022	
Project				Sample Ref. No.	REM/BCCL/2022/09/05	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Muraidih OCP		Date of Sampling	01.09.22	22.09.22	Zone of Station:	Core Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	99	83	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	65	47	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	11	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	19	25	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

* LDL indicates Lower Detection Limit,

**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,

[Signature]

ANALYSED BY

[Signature]

(Gaurav Kant)
CHECKED BY

[Signature]

(Amit Raj Mishra)
HOD's Signature

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Environment Laboratory, Regional Institute-II
Ambient Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Test Report for Ambient Air Samples

Month & Year		09/2022	Cluster	Cluster II			Report No.	RI-II/AIR/2022-23/09	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	29.11.2022	
Project				Sample Ref. No.	REM/BCCL/2022/09/03	Sampling Method	CMPDI/RI-II/LPM 13 , (IS 5182)		
Sampling Stations		i	Madhuband Washery		Date of Sampling	02.09..22	21.09..22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis	of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
				1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017		92	89	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019		60	56	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017		13	10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017		26	27	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

****All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,**

[Signature]

ANALYSED BY

[Signature]

**(Gaurav Kant)
CHECKED BY**

[Signature]

**(Amit Raj Mishra)
HOD's Signature**

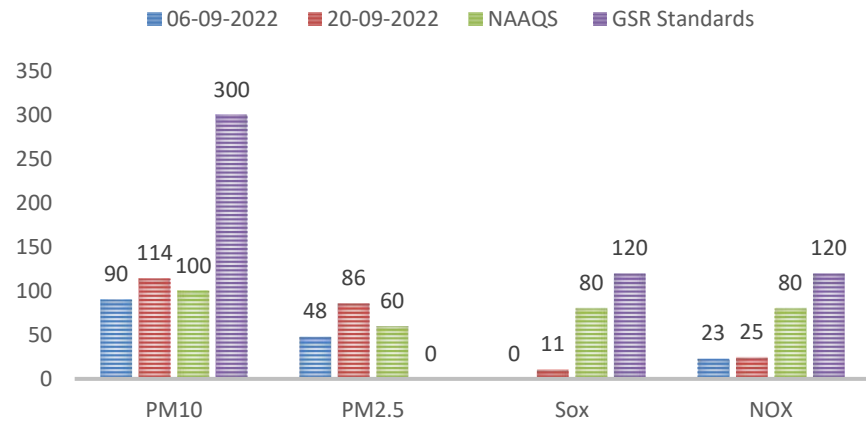
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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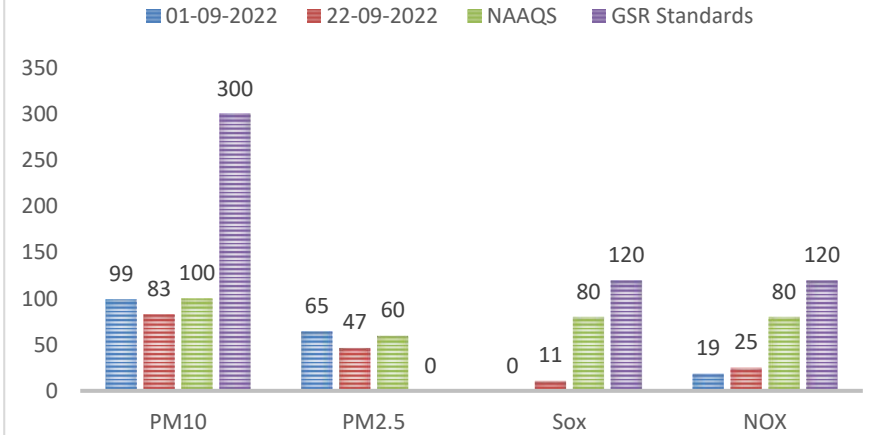
Page -1 of 1

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report							
Test Report for Ambient Air Samples									
Month & Year		09/2022		Cluster		Cluster II		Report No.	RI-II/AIR/2022-23/09
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	29.11.2022
Project				Sample Ref. No.	REM/BCCL/2022/09/33	Sampling Method		CMPDI/RI-II/LPM 13, (IS 5182)	
Sampling Stations		i	Madhuband UGP		Date of Sampling	07.09.22	22.09..22	Zone of Station:	Buffer Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September, 2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	75	98	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	37	43	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001, R-2017	<10	11	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80	
4	NO ₂	IS-5182 (Part-6): 2006, R-2017	20	23	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80	
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average * LDL indicates Lower Detection Limit,									
 ANALYSED BY			 (Gaurav Kant) CHECKED BY				 (Amit Raj Mishra) HOD's Signature		
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
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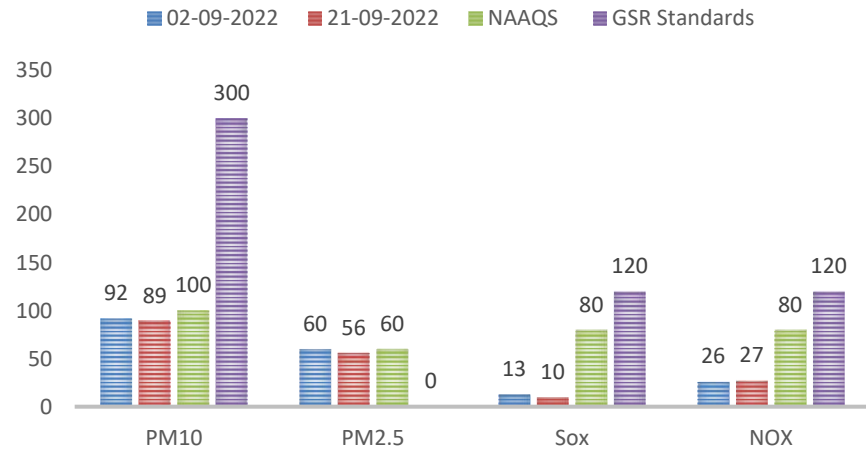
AMBIENT AIR QUALITY AT BLOCK II OCP



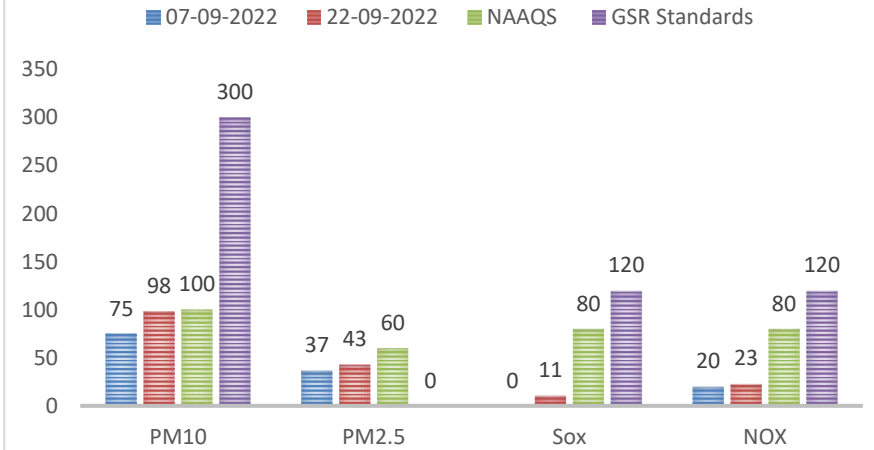
AMBIENT AIR QUALITY AT MURAIIDIH OCP



AMBIENT AIR QUALITY AT MADHUBAND WASHERY



AMBIENT AIR QUALITY AT MADHUBAND UGP



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Block II (MW2)

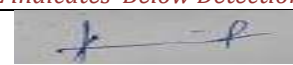
A sampling point is fixed to assess the effluent quality of Mine discharge. This location is selected to monitor effluent discharge in to Khudia Nala.

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.

  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II MINE EFFLUENT TEST REPORT				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
TC-10122		Test Report for Mine Effluent samples						email: rdri2cmpdi@coalindia.in	
Month & Year	09/2022	Cluster	Cluster II		Report No.	RI-II/water/2022-23/09			
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	29.11.2022		
Project		Sampling Ref. No.	REM/BCCL/2022/09/02		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Block II	Sample Collected in 2.5 Ltr Jerricane, Color as observed is transparent				Period of Analysis	july 2022	
			Date of Sampling		05.09.22	19.09..22			
Sl. No.	Parameter	Method of Analysis	Observed Values		STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)		LDL		
			First Fortnight	Second Fortnight					
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	59	52	100 (Max)		10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.11	8.05	5.5 - 9.0		0.2		
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)		2		
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	44	40	250 (Max)		4		
<i>**Grab sampling carried out for water samples. **All units in mg/L unless specified otherwise *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,</i>									
 ANALYSED BY			 (Kumar Vaibhav) CHECKED BY			 (Amit Raj Mishra) HOD's Signature			
Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env), CMPDI, RI-II.									
---- End of Report ----									
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NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- i) **Block II OCP (N4)**
- ii) **Muraidih OCP (N5)**
- iii) **Madhuband Washery (N3)**
- iv) **Madhuband UGP (N33)**

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.



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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

CMPDI, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmpdi@coalindia.in

Month & Year	09/2022	Cluster	Cluster II					Report No.	RI-II/NOISE/2022-23/09
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	29.11.2022
Project			Sample Ref. No.	REM/BCCL/2022/09/04		Sampling Method		CMPDI/RI-II/LPM 13	
Sampling Stations	i	Block II OCP		Date of Sampling	06.09.22	20.09..22	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	52.7	51.2	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	55.4	56.5					
3		08:00 - 09:00	56.7	59.2					
4		09:00 - 10:00	64.5	65.8					
5		10:00 - 11:00	66.1	66.2					
6		11:00 - 12:00	64.5	65.8					
7		12:00 - 13:00	69.0	68.9					
8		13:00 - 14:00	67.4	70.4					
9		14:00 - 15:00	63.0	64.2					
10		15:00 - 16:00	62.0	63.3					
11		16:00 - 17:00	60.5	62.6					
12		17:00 - 18:00	60.9	62.0					
13		18:00 - 19:00	60.0	61.1					
14		19:00 - 20:00	58.9	60.0					
15		20:00 - 21:00	57.4	58.4					
16		21:00 - 22:00	56.7	58.3					
		Leq DAY	63.1	64.4					
1	Noise Level dB(A)Leq -Night	22:00-23:00	45.5	46.1	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.9	44.5					
3		00:00- 01:00	43.1	43.7					
4		01:00-02:00	42.9	43.1					
5		02:00-03:00	41.1	41.5					
6		03:00-04:00	41.0	40.8					
7		04:00-05:00	40.0	40.9					
8		05:00-06:00	39.8	40.0					
		Leq NIGHT	42.8	43.0					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY


(Gaurav Kant)
CHECKED BY


(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

  cmpdi <i>A Mini Ratna Company</i> CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850										
Month & Year	09/2022	Cluster	Cluster II	Report No.	RI-II/NOISE/2022-23/09					
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)								Date of Issue	29.11.2022
Project		Sample Ref. No.	REM/BCCL/2022/09/05			Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Muridih OCP		Date of Sampling	01.09..22	22.09.22	Zone Category of Station:	Core Zone		
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB		
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	50.8	51.8	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50	
2		07:00 - 08:00	53.4	52.4						
3		08:00 - 09:00	55.6	57.1						
4		09:00 - 10:00	62.2	63.5						
5		10:00 - 11:00	63.7	65.0						
6		11:00 - 12:00	62.2	62.7						
7		12:00 - 13:00	66.7	66.5						
8		13:00 - 14:00	62.5	60.7						
9		14:00 - 15:00	60.7	61.2						
10		15:00 - 16:00	59.7	61.0						
11		16:00 - 17:00	59.1	60.4						
12		17:00 - 18:00	56.1	52.6						
13		18:00 - 19:00	55.9	52.9						
14		19:00 - 20:00	55.3	50.3						
15		20:00 - 21:00	55.2	50.1						
16		21:00 - 22:00	55.2	47.6						
		Leq DAY	60.4	60.5						
1	Noise Level dB(A)Leq -Night	22:00-23:00	39.7	40.1	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50	
2		23:00- 00:00	39.8	39.9						
3		00:00- 01:00	38.8	38.9						
4		01:00-02:00	40.7	41.0						
5		02:00-03:00	35.1	36.6						
6		03:00-04:00	36.5	37.8						
7		04:00-05:00	36.5	36.5						
8		05:00-06:00	35.2	35.5						
		Leq NIGHT	38.3	38.7						

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY


(Gaurav Kant)
CHECKED BY


(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

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  		CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report				CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850			
Month & Year	09/2022	Cluster	Cluster II		Report No.	RI-II/NOISE/2022-23/09			
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)				Date of Issue	29.11.2022			
Project		Sample Ref. No.	REM/BCCL/2022/09/03		Sampling Method	CMPDI/RI-II/LPM 13			
Sampling Stations	i	Madhuband Washery		Date of Sampling	02.09.22	21.09.22	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	61.5	60.8	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	61.0	60.3					
3		08:00 - 09:00	60.1	59.4					
4		09:00 - 10:00	59.1	58.4					
5		10:00 - 11:00	59.0	58.3					
6		11:00 - 12:00	58.4	57.7					
7		12:00 - 13:00	66.1	66.8					
8		13:00 - 14:00	67.5	68.3					
9		14:00 - 15:00	67.5	62.2					
10		15:00 - 16:00	60.5	61.3					
11		16:00 - 17:00	60.0	60.7					
12		17:00 - 18:00	59.5	64.2					
13		18:00 - 19:00	58.6	59.3					
14		19:00 - 20:00	58.1	58.2					
15		20:00 - 21:00	57.5	57.6					
16		21:00 - 22:00	57.0	57.6					
		Leq DAY	62.2	62.1					
1	Noise Level dB(A)Leq -Night	22:00-23:00	51.2	50.9	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	47.9	48.2					
3		00:00- 01:00	47.3	47.2					
4		01:00-02:00	46.9	46.8					
5		02:00-03:00	46.4	46.4					
6		03:00-04:00	45.5	45.4					
7		04:00-05:00	48.8	50.1					
8		05:00-06:00	52.2	53.0					
		Leq NIGHT	48.9	49.2					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants ANALYSED BY	 (Gaurav Kant) CHECKED BY	 (Amit Raj Mishra) HOD's Signature
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Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

Page -1 of 1

  cmpdi <i>A Mini Ratna Company</i> CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Noise Level Test Report CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD. -826005 Phone:0326-223-850 email: rdri2cmpdi@coalindia.in									
Month & Year	09/2022	Cluster	Cluster II	Report No.	RI-II/NOISE/2022-23/09				
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)				Date of Issue	29.11.2022			
Project		Sample Ref. No.	REM/BCCL/2022/09/33	Sampling Method	CMPDI/RI-II/LPM 13				
Sampling Stations	i	Madhuband UGP		Date of Sampling	07.09.22	22.09.22	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones Limits in dB	
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	46.6	47.7	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence 75 65 55 50	
2		07:00 - 08:00	49.0	50.2					
3		08:00 - 09:00	51.4	52.6					
4		09:00 - 10:00	57.0	56.3					
5		10:00 - 11:00	58.4	59.8					
6		11:00 - 12:00	57.6	56.5					
7		12:00 - 13:00	60.3	59.2					
8		13:00 - 14:00	61.6	60.5					
9		14:00 - 15:00	56.2	58.5					
10		15:00 - 16:00	55.3	54.3					
11		16:00 - 17:00	54.8	53.8					
12		17:00 - 18:00	53.3	55.1					
13		18:00 - 19:00	52.5	54.4					
14		19:00 - 20:00	52.1	53.3					
15		20:00 - 21:00	51.6	53.0					
16		21:00 - 22:00	51.1	52.8					
		Leq DAY	56.0	56.1					
1	Noise Level dB(A)Leq -Night	22:00-23:00	56.5	57.2	CPCB, Protocol for Ambient Level Noise Monitoring -2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence 70 55 45 50	
2		23:00- 00:00	63.8	64.8					
3		00:00- 01:00	49.0	48.8					
4		01:00-02:00	58.5	59.5					
5		02:00-03:00	62.8	64.5					
6		03:00-04:00	50.1	50.4					
7		04:00-05:00	50.3	50.0					
8		05:00-06:00	45.6	45.5					
		Leq NIGHT	58.6	59.8					

*LDL indicates Lower Detection Limit

**All noise measurements are integrated for a 01 hour period, All units in dB(A)

Sampling Assistants
ANALYSED BY


(Gaurav Kant)
CHECKED BY


(Amit Raj Mishra)
HOD's Signature

Note: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.

---- End of Report ----

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 clause 2.

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

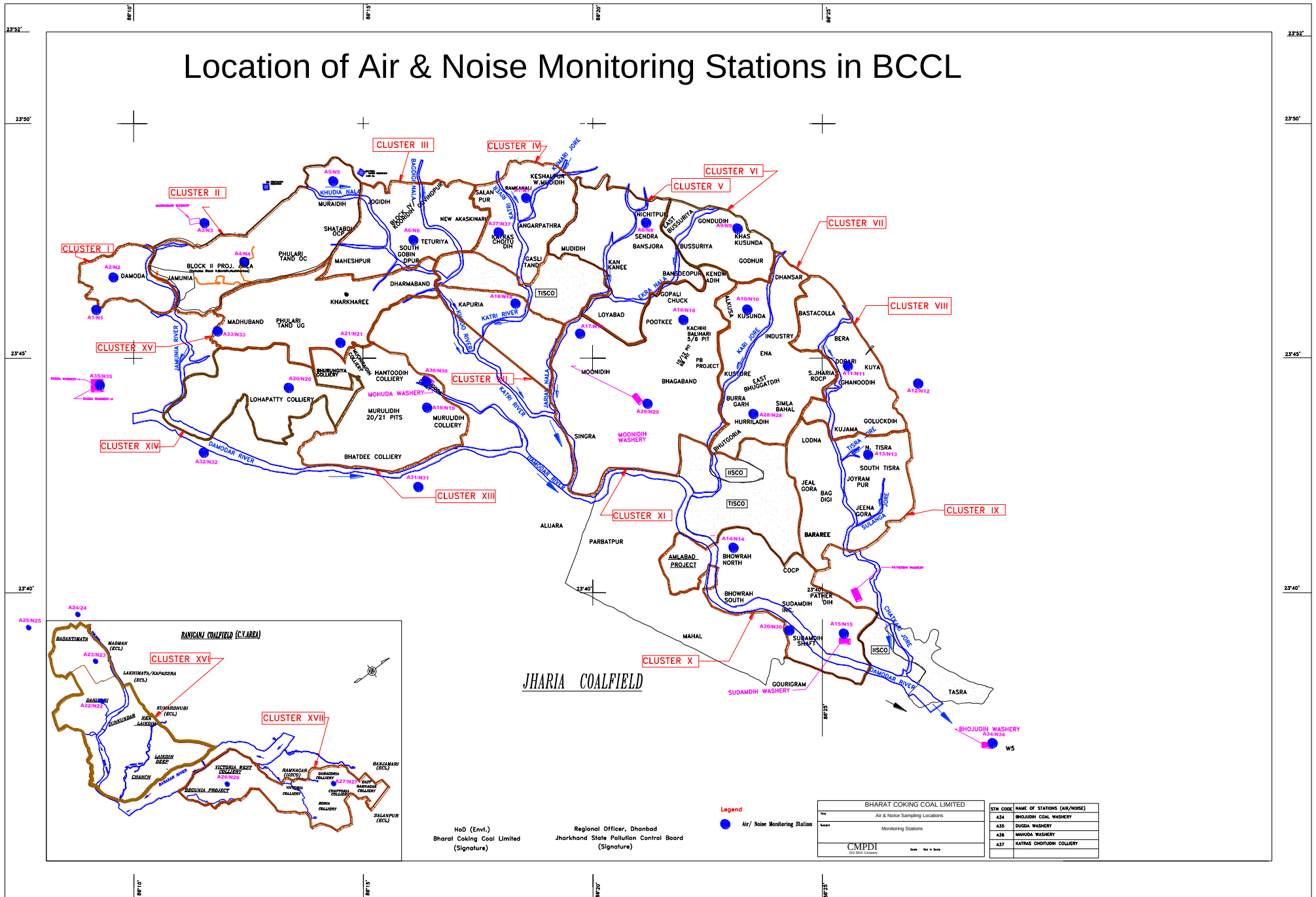
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO₂), 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 PM₁₀, 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 (O₃) , 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 (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), 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.

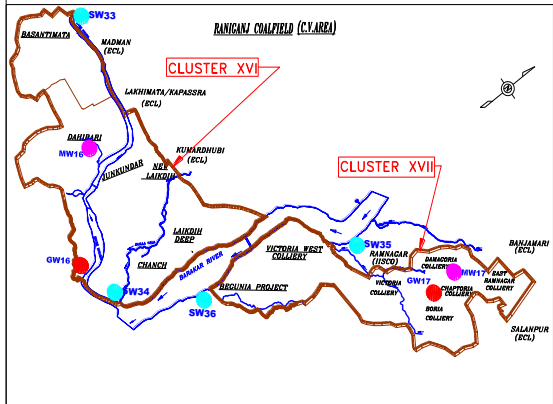
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they JUNE exceed the limits but not on two consecutive days of monitoring.

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



JHARIA COALFIELD

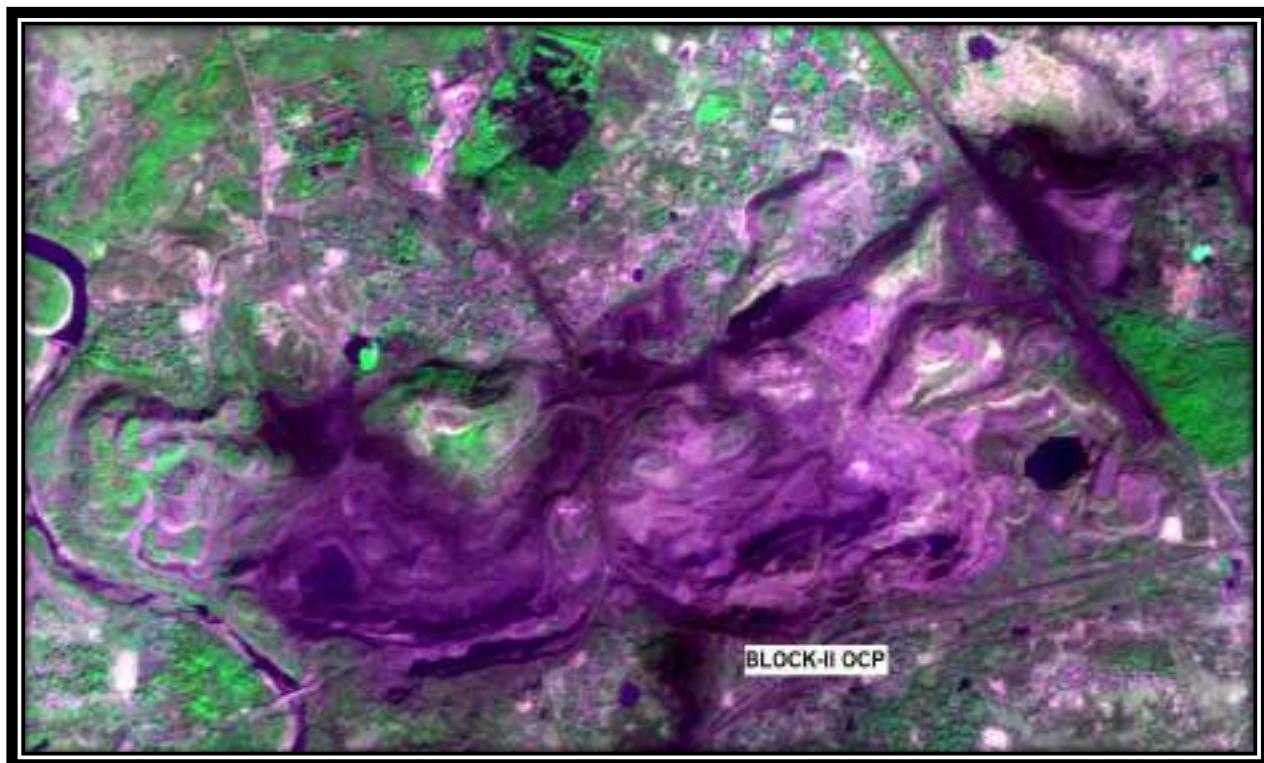


Customer	BHARAT COKING COAL LIMITED
Title	WATER SAMPLING LOCATIONS
Subject	MONITORING STATIONS
 Scanned with CamScanner	

Legend

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

**Land Reclamation/ Restoration Monitoring of Open Cast Coal Mines
of Bharat Coking Coal Limited producing more than 5 million cu. m
(Coal+OB) based on Satellite Data of the Year 2019**



Submitted to
Bharat Coking Coal Limited



cmpdi
A Mini-Ratna Company

**Land Reclamation/ Restoration Monitoring of Opencast Coal Mines of
Bharat Coking Coal Limited producing more than 5 million cu. m
(Coal+OB) based on Satellite Data of the Year 2019**

March-2020



**Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi**

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Executive Summary

- 1.0 Project** Land reclamation/ restoration monitoring of two opencast coal mines of Bharat Coking Coal Ltd. (BCCL) producing more than 5 million cu. m. of (Coal + OB) per year based on satellite data, regularly on annual basis.
- 2.0 Objective** Objective of the land reclamation/ restoration monitoring is to assess the areas of backfilled, plantation, social forestry, active mining, water bodies, and distribution of wasteland, agricultural land and forest area in the leasehold area of the project. This will help in assessing the progressive status of mined land reclamation and to take up remedial measures, if any, required for environmental protection.
- 3.0 Salient Findings**
- With a total leasehold area of 16.32 Km², two projects, Block-II and Muraidih were considered for land reclamation monitoring based on satellite data during 2019-20. Total excavated area is only 5.77 Km², of which 0.85 Km² area (14.73%) has been planted, 3.82 Km² area (66.20%) is under backfilling and 1.10 Km² area (19.06%) is under active mining. It is evident from the analysis that 80.94% of total area of the two OC projects has come under reclamation and balance 19.06% area is under active mining. Project wise details of reclamation are given in Table-1 & Fig -1.
 - On comparing the status of land reclamation for the year 2019 with respect to the year 2018, it is evident from the analysis that the area of land reclamation has increased from 4.48 Km² (Yr. 2018) to 4.67 Km² (Yr. 2019). This increase of an area of 0.19 Km² in land reclamation is the result of the efforts of the coal company taken up towards environmental protection. The area of plantation over backfilled area also increased by 17 ha. Of the two projects of BCCL considered for monitoring, Block - II has achieved land reclamation of 75.24% and Muraidih has 87.98%.

Table-1
Status of Land Reclamation in Bharat Coking Coal Limited based on Satellite Data for the Year 2019

(Projects producing more than 5 mcm of Coal+OB annually)

(Area in Sq. Kms.)

Sl. No.	Project	Total Leasehold Area	Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold Area)		Total Area under Reclamation	
					Biological Reclamation		Other Plantations											
			Area under Backfilling	Plantation on Excavated / Backfilled Area		Plantation on External Over Burden Dumps		Social Forestry, Avaneue Plantation Etc.										
1	2	3	4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
			2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
1	Block-II	9.07	2.18	2.22	0.16	0.18	0.1	0.14	0.57	0.59	0.84	0.79	3.18	3.19	0.83	0.91	2.34	2.40
			68.55%	69.59%	5.03%	5.64%					26.42%	24.76%			9.15%	10.03%	73.58%	75.24%
2	Muraidih	7.25	1.62	1.6	0.52	0.67	0.27	0.3	0.31	0.34	0.33	0.31	2.47	2.58	1.10	1.31	2.14	2.27
			65.59%	62.02%	21.05%	25.97%					13.36%	12.02%			15.17%	18.07%	86.64%	87.98%
	TOTAL	16.32	3.80	3.82	0.68	0.85	0.37	0.44	0.88	0.93	1.17	1.10	5.65	5.77	1.93	2.22	4.48	4.67
			67.26%	66.20%	12.04%	14.73%					20.71%	19.06%			11.83%	13.60%	79.29%	80.94%

(% is calculated with respected to Total Excavated Area as applicable)

Note In reference of the above Table-1, different parameters are classified as follows:

- 1 Area under **Biological Reclamation** includes Area under Plantation done on Backfill only
- 2 Area under **Technical Reclamation** includes Area under Backfilling only
- 3 Area under **Active Mining** includes Coal Quarry, Quarry filled with water & Advance Quarry Site, if any. Coal dump is excluded
- 4 Social Forestry and Plantation on External OB dumps are not included in Biological Reclamation, and are put under separate categories
- 5 (%) calculated in the above table is in respect of total excavated area except for "Total area under plantation" where % is in terms of leasehold area.

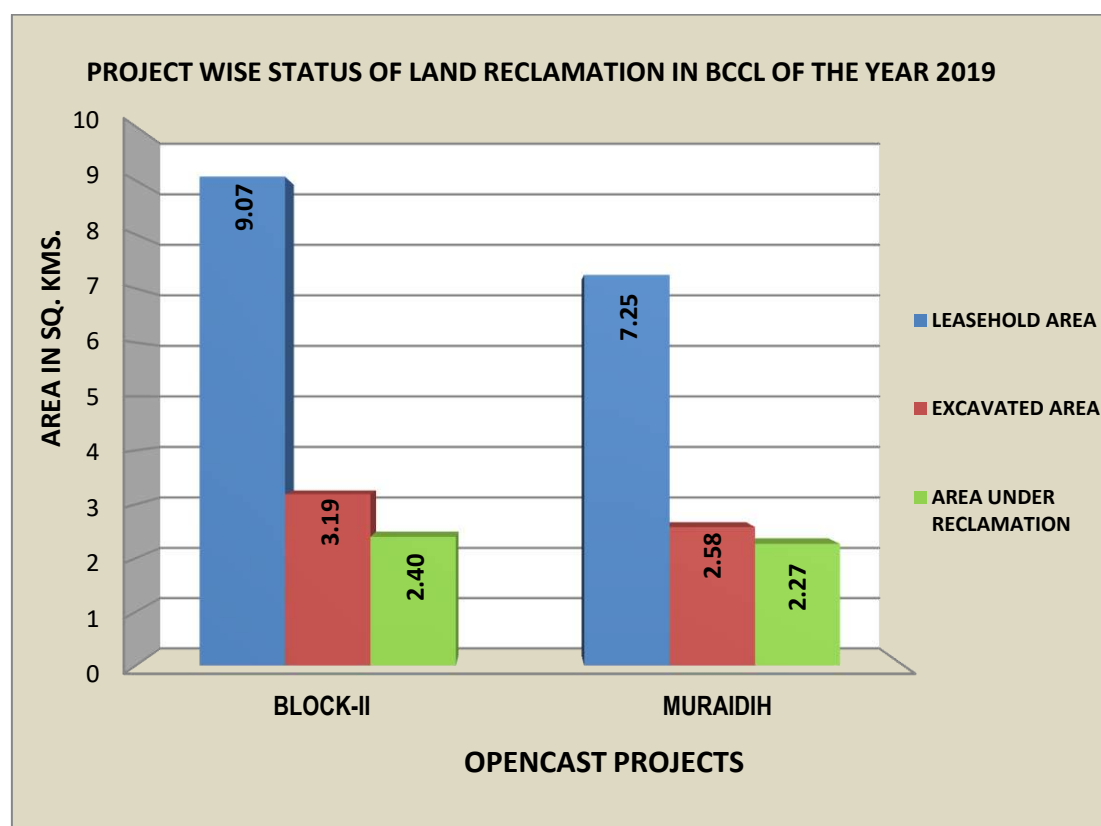


Fig. 1 Project wise Land Reclamation Status for the Year 2019

1.0 Background

- 1.1** Land is the most important natural resource which embodies soil, water, flora fauna and total ecosystem. All human activities are based on the land, which is a scarce natural resource in our country. Mining is a site specific industry and it could not be shifted anywhere else from the location where mineral occurs. It is a fact that surface mining activities do effect the land environment due to ground breaking. Therefore, there is an urgent need to reclaim and restore the mined out land for its productive use for sustainable development of mining. This will not only mitigate environmental degradation, but would also help in creating a more congenial environment for land acquisition by coal companies in future.
- 1.2** Keeping the above in view, M/s. Coal India Ltd. (CIL) issued a work order vide letter no. CIL/WBP/ENV/2011 dated 12.10.2012 to Central Mine Planning & Design Institute (CMPDI), Ranchi, for monitoring of land reclamation status of all the opencast coal mines having production of more than 5 million m³ per annum (Coal + OB taken together per annum) regularly on annual basis, and for monitoring of less than 5 million m³ per annum capacity (Coal +OB) projects at an interval of three years, based on remote sensing satellite data for sustainable development of mining. The work order was renewed vide letter no. CIL/WBP/ENV/2017/DP/8477 dated 21.09.2017 for a period of 5 more years from 2017-18 to 2021-22. The result of land reclamation status of all such mines are to be put on the website of CIL, (www.coalindia.in), CMPDI (www.cmpdi.co.in) and the concerned coal companies in public domain. Detailed report has to be submitted to Coal India and respective subsidiary companies.
- 1.3** Land reclamation monitoring of all opencast coal mining projects would also comply the statutory requirements of Ministry of Environment Forest & Climate Change (**MoEF&CC**). Such monitoring would not only facilitate in taking timely mitigation measures against environmental degradation, but would also enable coal companies to utilize the reclaimed land for larger socio-economic benefits in a planned way.

- 1.4** Present report is embodying the finding of the study based on satellite data of the year 2019 carried out for all the OC projects producing more than 5 mcm (Coal + OB) for Bharat Coking Coal Ltd. Satellite data of 13-01-2019 of ResourceSat-2, LISS-4, multispectral, 5 mtr. resolution was used for the present monitoring study.

2.0 Objective

Objective of the land reclamation/ restoration monitoring is to assess the area of backfilled, plantation, OB dumps, social forestry, active mining area, settlements and water bodies, distribution of wasteland, agricultural land and forest land in the leasehold area of the project. This is an important step taken up for assessing the progressive status of mined land reclamation and for taking up remedial measures, if any, required for environmental protection.

3.0 Methodology

There are number of steps involved between raw satellite data procurement and preparation of final map. National Remote Sensing Centre (NRSC) Hyderabad, being the nodal agency for satellite data supply in India, provides only raw digital satellite data, which needs further digital image processing for extracting the information and map preparation before uploading the same in the website. Methodology for land reclamation monitoring is given in fig 2. Following steps are involved in land reclamation /restoration monitoring:

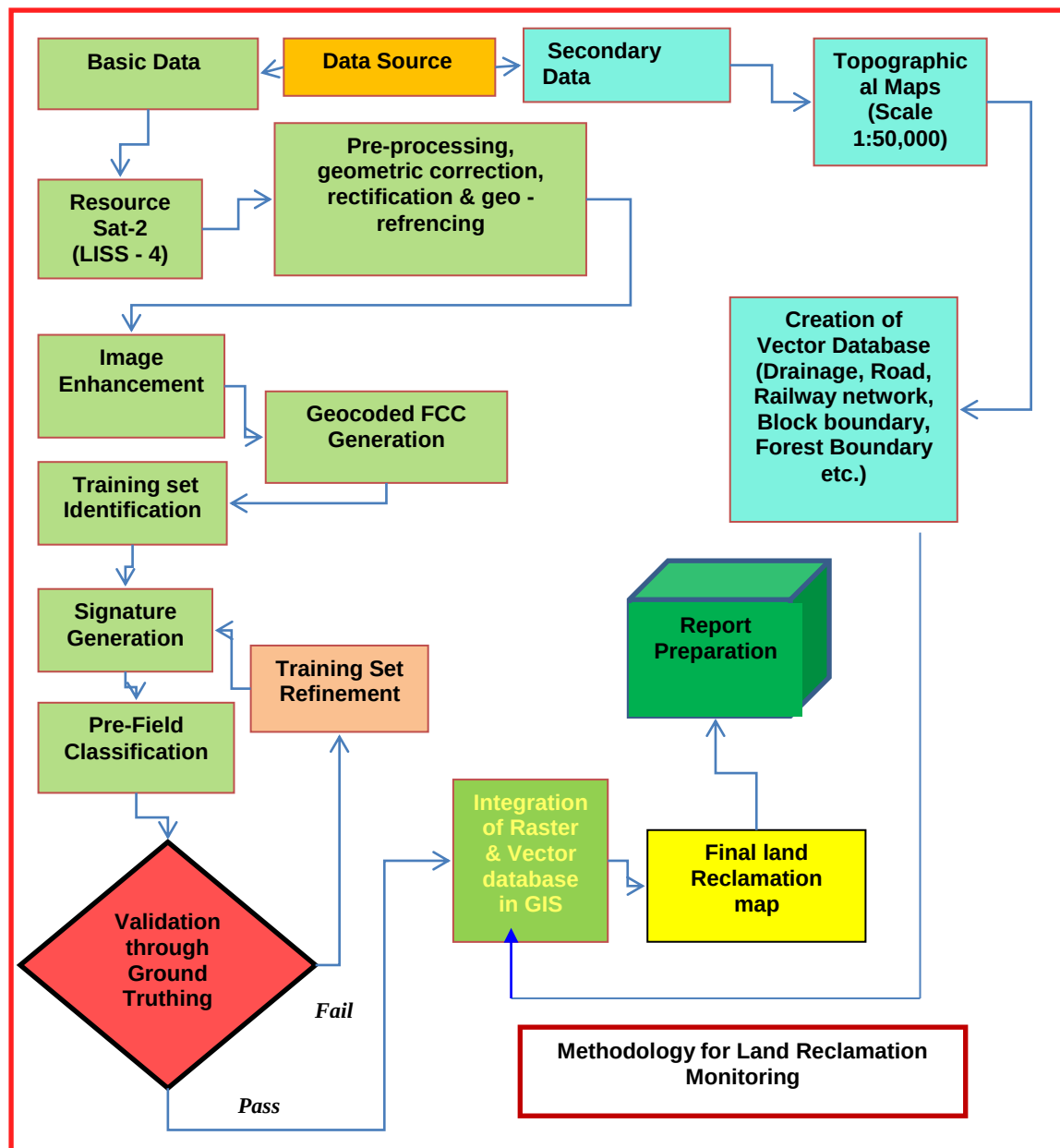


Fig. 2 *Methodology of Land Reclamation Monitoring*

3.1 Data Procurement: After browsing the data quality and date of pass on internet, supply order for data is placed to NRSC. Secondary data like leasehold boundary, topo sheets are procured for creation of vector database.

3.2 Satellite Data Processing: Satellite data are processed using ERDAS IMAGINE image processing s/w. Methodology involves the following major steps:

- **Rectification & Geo-referencing:** Inaccuracies in digital imagery may occur due to 'systematic errors' attributed to earth curvature and rotation as well as 'non-systematic errors' attributed to satellite receiving station itself. Digital images may contain geometric distortions, which make them unusable as maps. Therefore, geo-referencing / correction is required for correction of image data using ground control points (GCP) to make it compatible with the new series WGS-84 compatible Sol topo-sheet.
- **Image enhancement:**

To improve the interpretability of the raw data, image enhancement is necessary. Local operations modify the value of each pixel based on brightness value of neighbouring pixels using ERDAS IMAGINE 14.0 s/w. and enhance the image quality for interpretation.
- **Training set selection**

Training set requires to be selected, so that software can classify the image data accurately. The image data are analysed based on the interpretation keys. These keys are evolved from certain fundamental image-elements such as tone/colour, size, shape, texture, pattern, location, association and shadow. Based on the image-elements and other geo-technical elements like land form, drainage pattern and physiography; training sets were selected/identified for each land use/cover class. Field survey was carried out by taking selective traverses in order to collect the ground information (or reference data) so that training sets are selected accurately in the image. This was intended to serve as an aid for classification.
- **Classification and Accuracy assessment**

Image classification is carried out using the maximum likelihood algorithm. The classification proceeds through the following steps: (a) calculation of statistics [i.e. signature generation] for the identified training areas, and (b) the decision boundary of maximum probability based on the mean vector, variance, covariance and correlation matrix of the pixels. After evaluating the

statistical parameters of the training sets, reliability test of training sets is conducted by measuring the statistical separation between the classes that resulted from computing divergence matrix. The overall accuracy of the classification was finally assessed with reference to ground truth data.

- **Area calculation**

The area of each land use class in the leasehold area is determined using ERDAS IMAGINE 14.0 s/w.

- **Overlay of Vector data base**

Vector database is created based on secondary data. Vector layer like drainage, railway line, leasehold boundary, forest boundary etc. are superimposed on the image as vector layer in the Arc GIS 10.2 database.

- **Pre-field map preparation**

Pre-field map is prepared for validation of the classification result

3.3 Ground Truthing:

Selective ground verification of the land use classes are carried out in the field and necessary corrections if required, are incorporated before map finalization.

3.4 Land reclamation database on GIS:

- Land reclamation database is created on GIS platform to identify the temporal changes identified from satellite data of different cut - of dates. The database, boundary shape files (.shp), kml files and the Maps thus prepared confirm to the WGS-84 datum and UTM projected co-ordinated system.

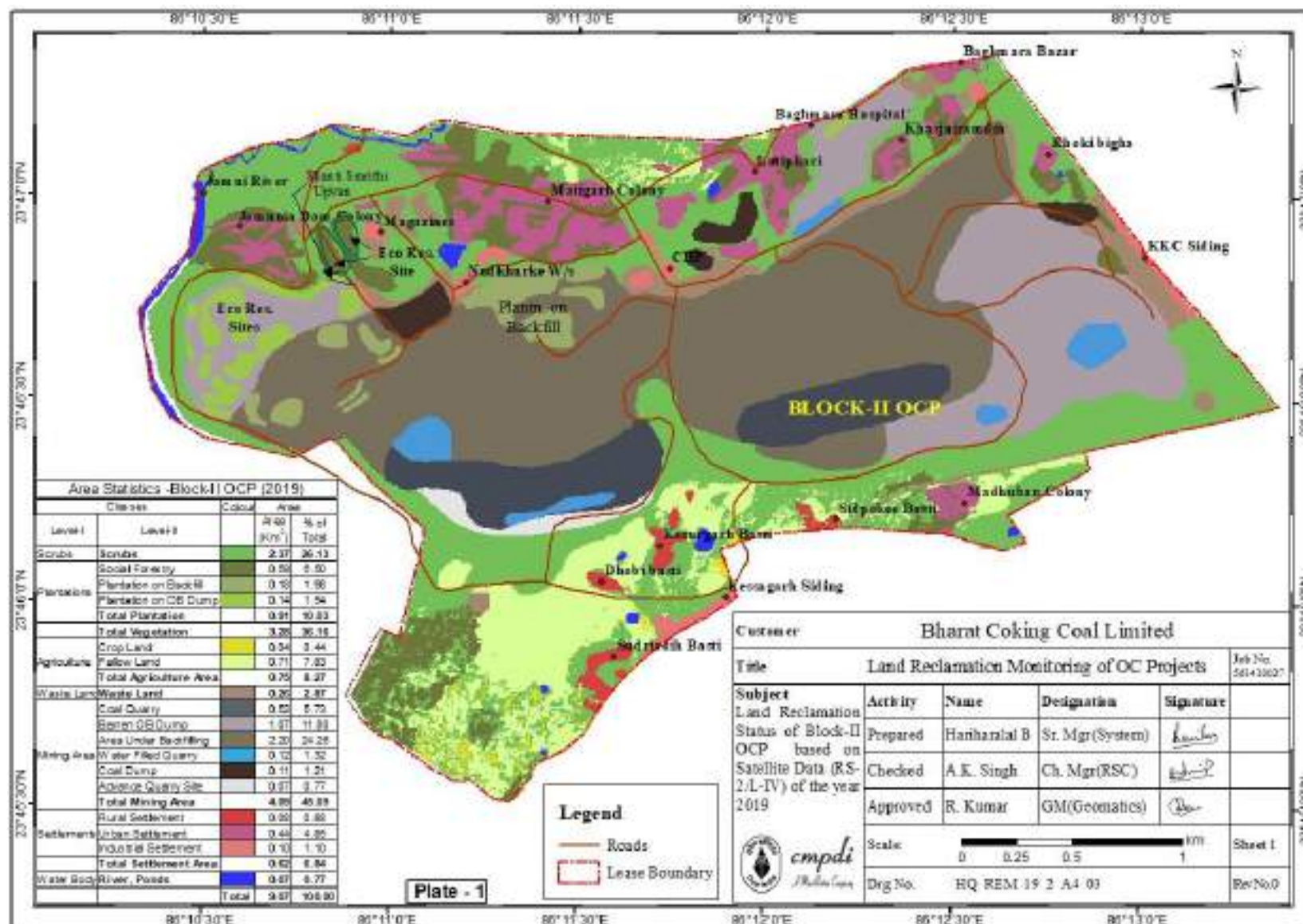
4.0 Land Reclamation Status in Bharat Coking Coal Ltd.

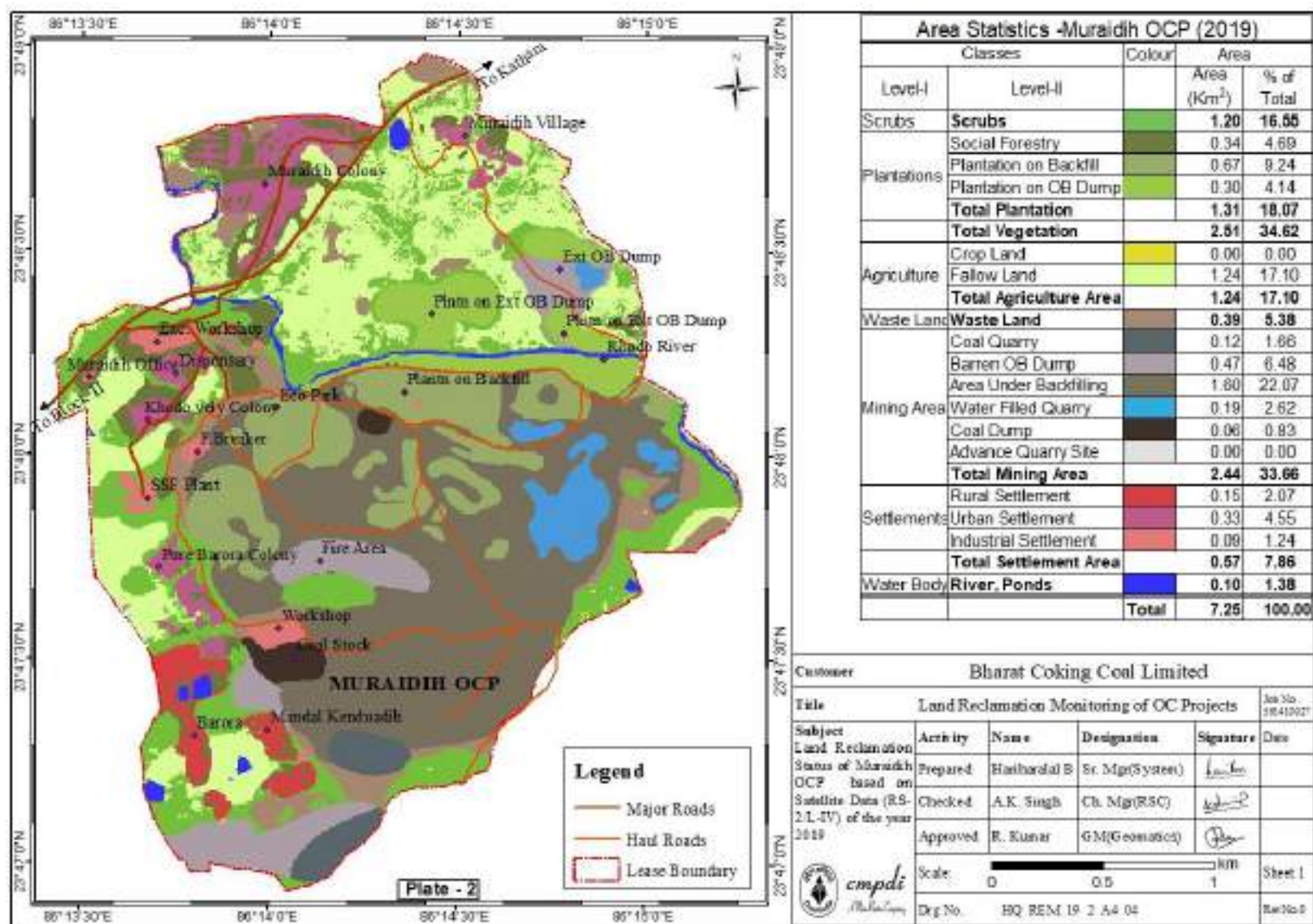
- 4.1 Following two OC projects of Bharat Coking Coal Ltd producing more than 5 million cubic m. (Coal + OB together) have been taken up for land reclamation monitoring in 2019, using satellite data, on annual basis:

Block-II and Muraidih

- 4.2 Project wise Land Reclamation status in BCCL for the year 2019 is given in Table-1 and also shown graphically in Fig-1. Area statistics of different land use classes present in the OC projects in the year 2019 is given in Table 2. Land use maps derived from the satellite data are given in Plate no. 1 & 2. Changes in land use status are shown in Fig. 3 & 4.
- 4.3 Study reveals that **80.94%** of total excavated area has come under reclamation by BCCL in the above two projects, out of which **14.74%** area has been re-vegetated, and 66.20% area is under backfilling.
- 4.4 After analyzing the satellite data of year 2019 vs. 2018, it is seen (from Table-1) that the plantation carried out on backfilled area, OB dumps as well as social forestry has increased from 1.93 Km² (11.83%) to 2.22 Km² (13.60%). Together, an increase of **0.29 Km²** area in social forestry/ backfilled area/ OB plantation, underlines the efforts taken up by the coal company (BCCL) towards plantation activities for land reclamation and environmental protection. With an eco-restoration park of **3.6 ha.** started in 2015-16, a new eco restoration area of **3.2 ha** is also developed by the company from 2018, over OB dump behind the coal stock yard of Block-II OCP.
- 4.5 An area of **6.5 ha.** developed by BCCL in 2016 in collaboration with The Energy and Resources Institute (**TERI**), Delhi, for bio-diversity through forest landscape restoration, over backfilled area of Muraidih OCP, is also maintained and growing well, which is a commendable job.

TABLE - 2								
Status of Land Use / Reclamation in OC Mines(>5m.cu.m) of Bharat Coking Coal Ltd. based on Satellite data of the Year 2019								
(Area in Sq Km)								
			BLOCK-II		MURAI DIH		TOTAL	
			Area	%	Area	%	Area	%
PLANTATION	Scrubs(A)		2.31	25.47	1.20	16.55	3.51	21.51
	Social Forestry		0.59	6.50	0.34	4.69	0.93	5.70
	Plantation on OB Dump		0.14	1.54	0.3	4.14	0.44	2.70
	Plantation on Backfill(Biological Reclamation)		0.18	1.98	0.67	9.24	0.85	5.21
	Total Plantation (B)		0.91	10.03	1.31	18.07	2.22	13.60
	Total Vegetation (A+B)		3.22	35.5	2.51	34.62	5.73	35.11
ACTIVE MINING	Coal Quarry		0.57	6.28	0.12	1.66	0.69	4.23
	Advance Quarry Site		0.10	1.10	0.00	0.00	0.10	0.61
	Quarry Filled With Water		0.12	1.32	0.19	2.62	0.31	1.90
	Area under Active Mining (D)		0.79	8.70	0.31	4.28	1.10	6.74
E	Coal Dump		0.11	1.21	0.06	0.83	0.17	1.04
	Barren OB Dump		1.07	11.80	0.47	6.48	1.54	9.44
	Area Under Backfilling(Technical Reclamation)		2.22	24.48	1.60	22.07	3.82	23.41
	Total Area under Mining Operation (D+E)		4.19	46.20	2.44	33.66	6.63	40.63
WASTELAND	Waste Lands		0.26	2.87	0.39	5.38	0.65	3.98
	Fly Ash Pond / Sand Body		0.00	0.00	0.00	0.00	0.00	0.00
WATERBODIES	Total Wasteland		0.26	2.87	0.39	5.38	0.65	3.98
	Reservoir, Nallah, Ponds		0.07	0.77	0.10	1.38	0.17	1.04
	Total Waterbodies		0.07	0.77	0.10	1.38	0.17	1.04
AGRICULTURE	Crop Lands		0.04	0.44	0.00	0.00	0.04	0.25
	Fallow Lands		0.67	7.39	1.24	17.1	1.91	11.70
	Total Agriculture		0.71	7.83	1.24	17.1	1.95	11.95
SETTLEMENTS	Urban Settlement		0.44	4.85	0.33	4.55	0.77	4.72
	Rural Settlement		0.08	0.88	0.15	2.07	0.23	1.41
	Industrial Settlement		0.10	1.10	0.09	1.24	0.19	1.16
	Total Settlement		0.62	6.84	0.57	7.86	1.19	7.29
	Grand Total		9.07	100.00	7.25	100.00	16.32	100.00





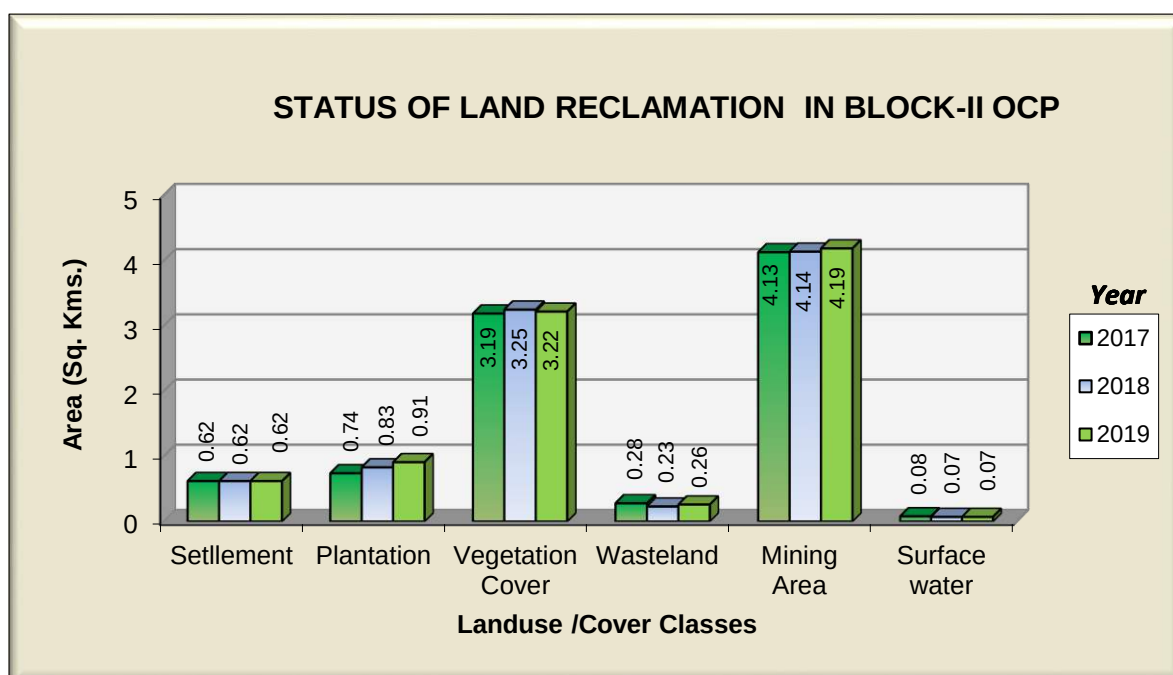


Figure 3 Status of Land Reclamation in Block-II OCP

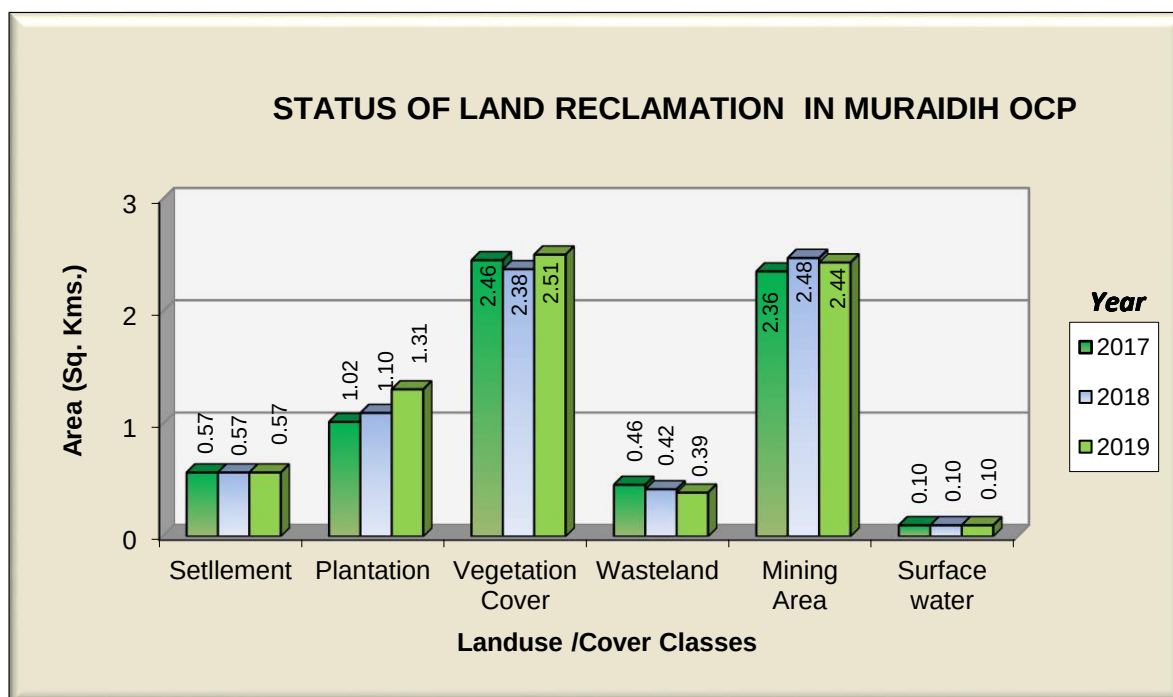


Figure 4 Status of Land Reclamation in Muraidih OCP



Photo-1. Eco Restoration Park (3.2 ha.) in Block-II OCP



Photo-2. Plantation carried out on backfilled area in Muraidih OCP



cmpdi
A Mini-Ratna Company

Central Mine Planning & Design Institute Ltd.

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Deposit in Escrow Accounts with Bank of Baroda/Union Bank of India

Rs. In lakhs

Sr No	ESCROW ACCOUNT AT BOB	A/C No	Deposit										Interest											G Total
			2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total		
1	MURADIDH,SHATBDI GRP.OF MINES	00150100008816	270.79	284.33	298.55	313.48	329.15	345.61	-	-	-	1,841.91	10.30	26.70	50.67	63.11	81.78	109.71	141.91	138.81	67.79	690.77	2,532.68	
2	PHULARITAND MIXED MINES	00150100009052	184.48	193.70	203.39	213.56	224.24	235.45	-	-	-	1,254.82	-	17.44	34.05	53.37	53.81	70.57	96.43	94.28	44.76	464.71	1,719.53	
3	DAMODA GRP OF MINES	00150100008869	109.74	115.22	120.99	127.03	133.39	140.06	147.06	233.90	44.75	1,172.14	3.33	10.59	20.44	28.14	33.23	44.40	57.63	72.89	46.39	317.03	1,489.17	
4	AMAL MURADIDH PHULARITAND PART	00150100012014							-	608.79	406.75	1,015.54						-	4.53	19.91	24.44	1,039.98		
5	MADHUBAND UG MINE	46940380000280							227.89	12.65	17.77	258.31							0.07	12.21	13.55	25.82	284.13	
	TOTAL		565.01	593.26	622.92	654.07	686.77	721.12	374.95	855.35	469.27	5,542.72	13.63	54.72	105.16	144.62	168.81	224.68	296.03	322.72	192.40	1,522.77	7,065.49	
6	AMAL BLOCK II MINE	00150100009044	207.40	217.77	228.65	240.09	252.09	264.70	199.23	227.86	319.32	2,157.10	-	19.60	38.28	60.00	60.50	79.34	108.44	120.70	68.87	555.73	2,712.83	
	TOTAL		207.40	217.77	228.65	240.09	252.09	264.70	199.23	227.86	319.32	2,157.10	-	19.60	38.28	60.00	60.50	79.34	108.44	120.70	68.87	555.73	2,712.83	
8	MAHESHPUR COLLIERY	00150100008836	38.40	15.84	16.63	17.46	18.34	19.25	20.22	21.23	22.29	189.66	1.46	3.73	5.09	5.47	6.46	8.18	10.16	12.47	7.36	60.37	250.03	
9	KHARKHAREE COLLIERY	00150100008824	16.02	16.82	17.66	18.54	19.47	20.44	21.46	22.53	23.66	176.60	0.61	1.56	3.00	3.75	4.84	6.49	8.40	10.62	8.61	47.88	224.48	
10	JOGIDIH COLLIERY	00150100008823	39.85	8.58	9.01	9.46	9.94	10.43	10.96	11.50	12.08	121.81	1.52	3.87	4.61	4.55	5.05	6.12	7.34	8.77	6.79	48.62	170.43	
11	GOVINDPUR UG	00150100008835	20.58	21.61	22.68	23.82	25.01	26.26	27.58	28.96	30.40	226.90	0.78	2.00	3.85	4.82	6.21	8.34	10.79	13.65	8.24	58.68	285.58	
12	BLOCK IV /KOORIDIH MINE	00150100008834	100.83	105.87	111.16	116.72	122.56	128.68	135.12	141.88	148.97	1,111.79	3.84	9.80	18.85	23.62	30.45	40.85	52.86	60.69	34.82	275.77	1,387.56	
13	NAKC	00150100008831	60.59	63.62	66.80	70.14	73.65	77.34	81.19	85.26	89.52	668.11	2.31	5.89	11.33	14.19	18.30	24.55	31.77	36.47	20.93	165.72	833.83	
	TOTAL		276.27	232.34	243.94	256.14	268.97	282.40	296.53	311.36	326.92	2,494.87	10.51	26.85	46.72	56.41	71.30	94.51	121.31	142.67	86.75	657.04	3,151.91	
14	AKWMC	00150100009051	189.04	198.50	208.42	218.84	133.38	140.05	147.05	154.40	162.12	1,551.80	-	17.87	34.89	54.69	55.14	66.54	85.62	93.34	52.38	460.48	2,012.27	
15	AARC	00150100009053	51.05	19.48	20.45	21.48	97.27	102.13	107.24	112.60	118.23	649.91	-	4.82	6.48	8.62	7.47	14.42	23.00	32.32	20.43	117.55	767.46	
16	SALANPUR UG MINE	00150100009050	84.13	20.08	21.09	22.14	44.47	46.69	49.02	51.47	54.05	393.13	-	7.95	9.65	12.05	10.61	13.91	19.03	24.10	14.17	111.48	504.61	
17	KATRAS CHAITUDIH	00150100010086	-	82.12	86.23	90.54	114.64	120.37	126.39	132.71	-	752.99	-	-	6.09	14.12	22.62	33.77	37.45	49.05	30.03	193.11	946.10	
18	GASLITAND COLLIERY	00150100011048	-	-	-	-	99.98	104.98	110.22	115.74	121.52	552.44	-	-	-	-	0.02	5.77	13.71	22.62	15.48	57.60	610.03	
	TOTAL		324.22	320.18	336.19	352.99	489.73	514.21	539.92	566.92	455.92	3,900.27	-	30.64	57.12	89.48	95.85	134.40	178.81	221.43	132.48	940.22	4,840.49	
19	NICHTPUR COLLIERY	00150100008825	99.66	104.64	109.88	115.37	121.14	127.20	133.56	67.81	71.20	950.46	3.79	9.68	18.64	23.35	30.09	40.37	52.25	63.18	35.46	276.81	1,227.27	
20	TETULMARI COLLIERY	00150100008833	129.16	135.62	142.40	149.52	156.99	164.84	173.09	181.74	190.83	1,424.19	4.91	12.55	24.15	30.26	39.00	52.32	67.71	80.28	48.32	359.52	1,783.71	
21	SENDRA BANSJORA COLLIERY	00150100008832	52.96	55.61	58.39	61.31	63.51	66.69	70.02	73.52	77.20	579.21	2.02	5.15	9.90	12.41	15.99	21.40	27.65	30.81	18.46	143.78	722.99	
22	MUDDIH COLLIERY	00150100008829	118.24	124.15	130.36	136.87	143.72	150.90	158.45	166.37	174.69	1,303.75	4.50	11.49	22.11	27.70	35.70	47.90	61.99	78.43	47.37	337.19	1,640.94	
23	LOYABAD COLLIERY	00150100008826	83.75	19.73	20.72	21.75	22.84	23.98	25.18	26.44	27.76	272.15	3.19	8.14	9.82	9.80	10.98	13.37	16.12	19.33	11.19	101.94	374.09	
24	KANKANEE COLLIERY	00150100010973	-	-	-	-	161.44	169.51	177.99	186.88	196.23	892.05	-	-	-	-	0.02	9.59	22.16	36.10	25.21	93.09	985.14	
25	BANSDEOPUR COLLIERY	00150100011831							125.28	91.36	95.93	312.57							0.02	7.20	12.57	19.79	332.36	
	TOTAL		483.77	439.75	461.75	484.82	669.64	703.12	863.56	794.12	833.84	5,734.37	18.41	47.01	84.63	103.51	131.79	184.96	247.90	315.33	198.58	1,332.13	7,066.49	
26	KUSUNDA OCP	00150100008870	103.82	109.01	114.46	120.18	126.19	132.50	139.13	146.08	153.39	1,144.77	3.15	10.01	19.34	26.62	31.43	42.01	54.52	68.96	41.43	297.47	1,442.24	
27	EAST BASSURIYA OC	00150100008876	48.31	50.72	53.26	55.92	58.72	61.65	64.73	67.97	71.37	532.65	1.47	4.66	9.00	12.39	14.63	19.54	25.37	32.09	19.27	138.41	671.05	
28	DHANSAR(ADIC)	00150100008939	92.02	96.62	101.45	106.52	111.85	49.21	46.36	48.68	51.11	703.83	1.40	8.80	17.11	24.60	27.68	35.75	43.74	50.99	28.25	238.30	942.13	
29	GODHUR GRP OF MINES	00150100009048	55.23	57.99	60.89	63.94	67.13	70.49	74.01	77.72	81.60	609.01	-	5.22	10.19	15.98	15.98	21.12	28.87	37.01	21.49	155.87	764.88	
30	BASSURIYA UG MINE	00150100008944	151.88	5.91	6.21	6.52	6.85	7.19	7.55	7.92	8.32	208.35	2.30	14.52	15.03	15.18	13.60	14.47	16.87	18.98	10.18	121.13	329.48	
31	GONDUDIH/KHAS KUSUNDA OC	00150100008875	134.40	141.12	148.18	155.59	163.37	171.53	180.11	189.12	198.57	1,481.98	4.08	12.96	25.04	34.46	40.69	54.38	70.58	89.28	53.63	385.10	1,867.08	
32	ENA OCP	00150100008938	47.67	50.05	52.55	55.18	57.94	62.08	65.19	68.45	71.87	530.97	0.72	4.56	8.86	12.74	14.34	18.52	25.04	31.76	18.86	135.40	666.37	
	TOTAL		633.33	511.43	537.00	563.85	592.04	554.66	577.08	605.94	636.23	5,211.55	13.11	60.73	104.57	141.97	158.35	205.79	264.99	329.07	193.10	1,471.68	6,683.23	
33	PB GRP OF MINES	00150100009045	84.91	34.30	36.02	37.82	39.71	41.70	43.78	45.97	48.27	412.47	-	8.03	10.95	14.69	13.58	16.77	22.00	27.01	15.49	128.51	540.98	
34	BURRAGARIH UG	00150100008821	6.67	7.00	7.35	7.72	8.11	8.51	8.94	9.38	9.85	73.53	0.25	0.65	1.25	1.56	2.01	2.64	3.31	4.18	3.56	19.42	92.95	
35	HURRLADIH UG	00150100008820	8.49	7.22	7.58	7.96	8.35	8.77	9.21	9.67	10.16	77.41	0.32	0.83	1.44	1.56	2.20	2.85	3.55	4.46	3.79	20.99	98.40	
36	BHUTGORIA UG	00150100008818	7.43	7.80	8.19	8.60	9.03	9.48	9.95	10.45	10.97	81.												

Deposit in Escrow Accounts with Bank of Baroda/Union Bank of India

Rs. In lakhs

Sr No	ESCROW ACCOUNT AT BOB	A/C No	Deposit										Interest										G Total
			2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total	
41	BERA COLLIERY	00150100008873	48.69	51.13	53.69	56.37	20.92	21.97	23.06	-	-	275.83	1.48	4.83	9.08	12.50	14.75	17.29	20.32	22.56	11.66	114.48	390.30
42	DOBARI COLLIERY	00150100008935	5.50	5.78	172.22	180.83	189.87	99.88	155.83	163.62	180.26	1,153.77	0.08	0.53	1.02	14.83	22.69	36.07	47.41	54.07	32.84	209.56	1,363.32
43	GANHOODIH OCP	00150100008936	78.35	82.27	86.38	90.70	95.23	99.99	104.99	-	-	637.91	1.19	7.49	14.57	20.94	23.57	30.44	41.03	46.01	23.05	208.27	846.19
44	SIMLABAHAL COLLIERY	00150100008822	11.27	8.42	8.84	9.28	9.75	364.76	127.50	133.87	140.57	814.25	0.43	1.10	1.82	2.15	2.69	3.54	27.57	38.67	25.11	103.07	917.32
45	KUYA GRP OF MINES	00150100008874	165.03	173.29	181.95	191.05	200.60	138.22	145.13	152.38	160.00	1,507.65	5.01	15.92	30.74	42.32	49.97	66.77	81.95	94.48	54.65	441.80	1,949.45
46	RAJAPUR S/HARIA OCP	00150100008937	73.81	77.50	81.37	85.44	89.72	94.20	150.17	175.24	231.15	1,058.60	1.12	7.05	13.73	19.73	22.20	28.68	38.66	46.46	29.10	206.72	1,265.32
	TOTAL		403.29	420.04	607.19	637.55	631.16	845.35	734.33	769.17	888.24	5,936.32	9.93	38.92	74.80	117.76	142.11	191.14	267.77	315.95	188.49	1,346.87	7,283.19
47	NT-ST-JEENAGORA GRP OF MINES	00150100009046	387.56	406.94	427.29	448.65	471.09	494.64	519.37	545.34	572.61	4,273.48	-	36.63	71.53	112.12	113.05	148.26	202.67	222.21	129.54	1,036.01	5,309.50
48	JOYRAMPUR UG MINE	00150100009049	18.86	6.75	7.09	7.45	-	-	-	-	-	40.15	-	1.78	2.36	3.11	2.84	3.01	3.28	3.59	2.69	22.65	62.81
49	BARAREE COLLIERY	00150100008940	163.59	25.04	26.29	27.60	-	-	-	-	-	242.52	2.48	15.64	17.79	19.44	18.55	19.24	21.81	23.89	12.48	151.32	393.84
50	LODNA COLLIERY	00150100008942	61.64	17.80	18.69	19.62	-	-	-	-	-	117.75	0.93	5.89	7.42	8.71	8.74	9.09	10.30	11.28	8.06	70.43	188.18
51	KUJAMA COLLIERY	00150100008941	45.50	47.77	50.16	52.67	55.30	58.06	60.97	64.02	67.22	501.65	0.69	4.35	8.46	12.16	13.68	17.68	23.82	30.14	17.87	128.85	630.50
52	AMALGAMATED JOYRAMPUR OC	00150100011026	-	-	-	-	560.98	585.04	614.29	645.01	677.26	3,082.58	-	-	-	-	0.09	36.92	76.97	125.13	86.33	325.44	3,408.02
	TOTAL		677.15	504.30	529.52	555.99	1,087.36	1,137.74	1,194.63	1,254.36	1,317.08	8,258.14	4.11	64.29	107.56	155.54	156.95	234.18	338.86	416.24	256.97	1,734.71	9,992.84
53	SUDAMDHI INC MINES	00150100008872	64.31	5.33	5.59	5.87	6.17	6.48	-	-	-	93.74	1.95	6.20	6.66	6.66	6.36	7.28	8.37	9.17	6.55	59.21	152.95
54	BHOWRA(N) GRP OF MINES	00150100008868	136.22	143.03	150.18	6.88	7.23	7.59	7.97	73.21	-	532.28	4.13	13.14	25.37	34.93	31.88	34.97	38.70	35.25	19.93	238.30	770.59
55	BHOWRA(S) GRP OF MINES	00150100008830	563.49	211.98	87.57	91.95	96.55	40.85	190.13	124.22	130.43	1,537.17	21.44	54.76	72.88	68.24	72.74	85.13	95.39	107.17	59.00	636.74	2,173.91
56	PATHERDHI GRP OF MINES	00150100008871	57.22	60.08	63.09	66.24	69.55	73.03	-	-	-	389.22	1.74	5.52	10.66	14.67	17.33	23.15	30.04	32.90	17.42	153.42	542.64
57	AMALGAMATED SUDAMDHI PATHERDHI	00150100011524						-	13.60	50.08	52.58	116.26						-	0.00	0.86	3.94	4.80	121.07
58	SUDAMDHI SHAFT MINES	00150100011673							174.22	-	-	174.22							0.03	10.60	10.95	21.58	195.80
	TOTAL		821.23	420.42	306.43	170.95	179.50	127.94	385.92	247.51	183.01	2,842.89	29.26	79.62	115.57	124.50	128.31	150.53	172.52	195.95	117.80	1,114.06	3,956.95
59	MOONIDIH UG PROJECT	00150100008943	82.18	86.29	90.60	95.13	99.89	104.88	54.44	85.69	89.97	789.08	1.25	7.85	15.28	22.33	24.35	31.93	43.02	48.32	27.51	221.84	1,010.92
60	MURLIDIH 2021 PIT COLLIERY	00150100009047	31.41	32.98	34.63	36.36	38.18	40.09	42.09	44.20	46.41	346.35	-	2.97	5.80	9.09	9.16	12.02	16.43	20.79	12.21	88.46	434.81
61	LOHAPATTY COLLIERY	00150100009043	267.70	281.08	140.03	147.03	154.38	162.10	170.21	178.72	187.65	1,688.89	-	25.30	49.41	64.37	59.75	76.88	90.27	109.53	64.17	539.67	2,228.56
	TOTAL		381.28	400.35	265.26	278.53	292.45	307.07	266.74	308.60	324.03	2,824.32	1.25	36.13	70.48	95.78	93.27	120.82	149.72	178.63	103.89	849.97	3,674.28
62	BASANTIMATA COLLIERY	00150100008827	121.88	28.90	30.34	31.86	33.45	35.12	36.88	38.72	40.66	397.81	4.64	12.02	14.33	14.30	16.02	19.53	23.55	28.25	16.35	148.98	546.79
63	DAHIBARI BASANTIMATA OCP	00150100008828	128.57	135.00	141.75	148.84	156.28	164.09	172.30	180.91	189.96	1,417.70	4.89	12.49	24.04	30.12	38.82	52.09	67.41	73.91	44.29	348.06	1,765.76
64	KALYANESHWARI GRP OF MINES	00150100009042	209.61	220.09	231.09	242.65	254.78	234.28	246.00	458.54	481.46	2,578.50	-	19.79	38.68	60.64	60.69	80.16	107.41	117.37	71.96	556.69	3,135.19
65	BEGUNIA COLLIERY	00150100011365					-	110.92	-	-	-	110.92						0.04	6.80	7.47	6.91	21.22	132.15
	TOTAL		460.06	383.99	403.18	423.35	444.51	544.42	455.18	678.17	712.08	4,504.93	9.53	44.30	77.05	105.06	115.54	151.81	205.17	227.00	139.51	1,074.96	5,579.89
	GRAND TOTAL		5,416.00	4,511.20	4,612.78	4,692.61	5,721.18	6,192.78	6,087.63	6,828.89	6,685.96	50,749.01	113.47	520.36	905.26	1,222.04	1,351.30	1,810.27	2,406.08	2,858.39	1,732.75	12,919.92	63,668.94

Note: In 2018-19, the amount deposited in Dobari Colliery is difference of amount provided in MCP approved in Board in Feb 2018 and amount deposited upto March 2018 as per MCP approved in July 2015.

ANNEXURE-VII

GVTC Performance report for the month of March- 2021

Name of GVTC: - GVTC Barora, Barora Area

Combined Report of Barora and Block- 2 Areas

1. Training as per MVT Rules, 1966 :-

Types of Training (Departmental)	Duration (in Days)	This Month		Cumulative	
		Target	Achievement (Training Completed)	Target	Achievement (Training Completed)
Basic / Initial	12 / 18/48	APNE	00	APNE	24
Refresher	12	38	32	511	552

2. Special Training as per MVT Rules: -

Types of Training	Duration In Days	This Month		Cumulative	
		Target	Achievement	Target	Achievement
Reorientation	12	-----	00		00
Trg. on handling Explosives	12	----	00		25
Trg. on Gas Testing	01		00		27
Trg. for change of job	12	-----	04		24
First Aid	01		00		27

3. Training as per Safety Conference Recommendation: -

Name of the Training Programme	Duration In days	Target	Achievement (This month)					Total Cumulative
			Exe.	O/M	M/S	F/M	Worker	
St. Trg. for Tech. Supervisors.	01		00	00	00	00	00	27
Fire Fighting	01		00	00	00	00	00	47
Roof Support	01							00
Solid Blasting	01		00	00	00	00	00	25
Workmen Inspector			00	00	00	00	00	28
Safety Committee Member	01		00	00	00	00	00	28
Air Borne Dust Survey			00	00	00	00	00	26
HEMM Workers	01		00	00	00	00	00	47
Contractors' Workers	12/18/48						01	159
Training of qualified employees for Mining Sirdar Exam	01							10
Need based Special Training Programme for Operation, Maintenance and Repairing of "BE 1000-1 Excavator"	01		00	0	0	0	00	27
Need base training for "PPE & Safety Gadgets" used in Mines	01		00	00	00	00	00	26
Need based training on Worklife balance and leadership development for female employees (8March)							36	36

A D 31.03.2021

Group Training Officer

GVTC Barora.

Details of Refresher Training, March-2021

Name of GVTC: - GVTC Barora, Name of Area: - Barora Area

1. Specific categories of Open Cast Workers / Supervisors: -

Types of training	Duration In days	This month		Cumulative	
		Target	Achievement	Target	Achievement
Drillers	12		03		13
Blasting Crew	12		01		06
Dumper Operators	12		04		65
Shovel Operators	12		02		18
Dozer Operators	12		00		11
Dragline Operators	12		00		01
Fitter / Mechanics	12		07		133
Electricians	12		00		18
Auto Electricians	12		03		15
Others	12		11		131
Total (Open Cast)			31		411

1. Specific Categories of Underground Workers / Supervisors: -

Types of Training	Duration in days	This Month		Cumulative	
		Target	Achievement	Target	Achievement
Trammer	12		00		27
Track Layers	12		00		06
Drillers	12		00		05
Support Personnel	12		00		16
Persons handling Explosive	12		00		10
Fitter / Mechanics	12		00		06
Electricians	12		00		00
Machine Operators/Drivers	12		00		18
Welders & Gas Cutters	12		00		00
Ventilation Gang	12		00		00
Fan Attendants	12		00		00
Winding Engine Drivers	12		00		00
Banksman / Onsetter	12		00		00
Others	12		01		53
Total (Underground)			01		141

31.03.2021

Group Training Officer
GVTC Barora, Barora Area

Additional Monthly Report (Ref.:- G.R.I. Guideline) for the Month of March- 2021

Name of GVTC: GVTC Barora, Barora Area				Month: March		Year: 2021		
(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)
Course Name	From --To	No. of Days	Nos. of Participants	Male Participants	Female Participants	Total Man days (272)		Total Training Hours
All trainings	01.03.2021 To 31.03.2021	26	73	37	36	Male	Female	2036
						236	36	

(9)		(10)		(11)		(12)				(13)	
Total Training Hours		Executive Participants		Non-Executive Participants		S/C Participants		S/T Participants		OBC Participants	
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1748	288	00	Nil	37	36	06	10	03	1	18	19

-----0-----0-----0-----

Training of Contractual Workers:

Surface		Opencast		UG		Mandays	
This Month	Cumulative	This Month	Cumulative	This Month	Cumulative	This Month	Cumulative
00	00	00	Trainees-75	01 (Basic MINOP)	84	UG = 20	2815

Total Training Completed and Certificate issued up to March 2021 = 159

S. N.	Type of Training	SC	ST	OBC	General	Male	Female	Total This Month	Cumulative
1	Initial	00	01	00	00	01	00	01	115
2	Refresher	00	00	00	00	00	00	00	44

A2
31.03.2021

Group Training Officer
GVTC Barora, Barora Area

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 01/Oct/2021

Certificate No.: JH01002580000108
 Registration No.: JH100K3506
 Owner Name: SANJAY UDYOG PVT LTD
 Chassis No.: MBKMC5AE9JN020210
 Engine No.: 6DJA27911
 Type of Vehicle: Goods Carrier
 Make: MAN TRUCKS INDIA PVT. LTD.
 Model: AAKN0054F01_LF20_16_TYM
 Vehicle Category: HEAVY GOODS VEHICLE
 Date of Registration: 05/Feb/2018
 Emission Norms: BHARAT STAGE IV
 Fuel: DIESEL
 Date of Testing: 02/Oct/2020
 Test Equipment: Netel (India) Ltd
 Manufacturer Name: NPM-SM-111B
 Test Equipment: 2052
 Serial No.: 2052

DIESEL DRIVEN VEHICLES
Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	1.10334

Date of Testing: 11:16:34
 Fee Charged: Rs. 300.00
 Fee Charged: (three hundred rupees only)
 In case of any complaint Please write to Transport Commissioner Jharkhand
 Auto Emission Testing Centre Code: JH0100258
 Testing Centre Name: M/S SRI RAM AUTO POLLUTION CENTRE
 Centre Address: BHIKHRAJPUR KARMATAND, BALIAPUR, 826004
 Test Conducted By: SURESH KUMBHAKAR

**TEST RESULT FOR DIESEL VEHICLE**

	Idle RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	75.0	731.0	2.53	0.0
TEST 2	557.0	6631.0	0.46	0.0
TEST 3	285.0	6578.0	0.32	0.0
AVG	305.66667	4646.66667	1.10334	0.0

This is a computer generated certificate and does not require signature

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 27/Feb/2022

DIESEL DRIVEN VEHICLES

Certified that the vehicle conforms to the standards
prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	0.71667

Reg. No. JH01000580000061
No. JH10AL8011
Name BAIKUNTH SAHU
MAT448062D3F*****
B591803231F633*****
Vehicle Goods Carrier
TATA MOTORS LTD
LPK2518
Category HEAVY GOODS VEHICLE
Registration 30/Aug/2013
Status BHARAT STAGE III/IV
Fuel DIESEL
Expiry 28/Feb/2021
Owner Naman Electronics
Owner Name
Owner Model NAMTECH SM S4
Owner Serial 2019/NAM/09-715

Time 13:25:59
Fee Rs.300.0
Fee (three hundred rupees only)
Any complaint Please write to Transport
Department Jharkhand
Auto Emission Testing Centre Code: JH0100058
Testing Centre Name: M/S
RADHASWAMI FUELS
Centre Address: DUMRA
NAWAGARH, BAGHMARA
DHANBAD, 828201
Test Conducted By: NIGAM KUMAR



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
ST 1	790.0	2360.0	0.75	72.0
ST 2	805.0	2350.0	0.7	72.0
ST 3	805.0	2415.0	0.7	72.0
VG	800.0	2375.0	0.71667	72.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100058 manually, Please visit RTO and correct norms

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:

Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 23/Sep/2021

Sl. No.: JH01000720000166
Registration No.: JH10AJ9171
Owner Name: RAM KISHUN SAH
Chassis No.: MAT448062D2C*****
Engine No.: B591803231C633*****
Type of Vehicle: Goods Carrier
Manufacturer: TATA MOTORS LTD
Model: LPK2518
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 18/May/2013
Emission Norms: BHARAT STAGE III
Fuel: DIESEL
Date of Testing: 24/Mar/2021
C Equipment: I3SYS
Manufacturer Name: I3SYS
C Equipment: ECM1601
Manufacturer Model: ECM1601
C Equipment Serial: C0481



DIESEL DRIVEN VEHICLES
Certified that the vehicle conforms to the standards
prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	2.45	0.155

Date of Testing: 10:47:12
Fees Charged: Rs.300.0
Fees Charged:
(three hundred rupees
only)
In case of any complain Please write to Transport
Commissioner Jharkhand

Auto Emission Testing Centre Code:
JH0100072
Testing Centre Name: DUMRA PETROL
SERVICE STATION
Centre Address: DUMRA, BAGHMARA,
POST-NAWAGARH, DHANBAD, 828306
Test Conducted By: SUBHASH KUMAR
AGARWAL



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	609.0	1803.0	0.133	27.0
TEST 2	633.0	1888.0	0.166	27.0
TEST 3	794.0	1901.0	0.166	27.0
AVG	678.66667	1864.0	0.155	27.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100072 manually, Please visit RTO and correct norms

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:

Transport Department, Government of Jharkhand

**TEST RESULT : PASS**
VALID TILL: 28/Jun/2021**DIESEL DRIVEN VEHICLES**

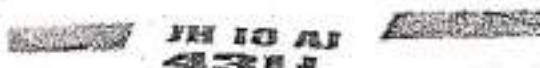
Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	0.51234

Vehicle SL No.: JH01000650000114
Registration No.: JH10AJ4311
Owner Name: SANJAY KUMAR
Owner Address: JALSWAL
Chassis No.: MAT448117D3C06570
Engine No.: B591803231C63316769
Type of Vehicle: Goods Carrier
Manufacturer: TATA MOTORS LTD
Model: LPK2518
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 16/Apr/2013
Emission Norms: BHARAT STAGE III/IV
Fuel Type: DIESEL
Date of Testing: 29/Jun/2020
Testing Equipment: Naman Electronics
Manufacturer Name: Naman Electronics
Testing Equipment: Naman Electronics
Manufacturer Model: NAMTECH SM 54
Vehicle Name: NAMTECH SM 54
Testing Equipment Serial: 2019/NAM/09-714

Date of Testing: 09:05:21
Charged: Rs.300.0
Charged: (three hundred rupees only)
In case of any complaint Please write to Transport Commissioner, Jharkhand

Auto Emission Testing Centre Code: JH0100065
Testing Centre Name: M/S JAI JAGDAMDEY FUEL STATION
Centre Address: BARA PANDEYDIH, BAGHMARA, DHANBAD, JHARKHAND, 828307
Test Conducted By: SHASHI KUMAR MAHATHA

**TEST RESULT FOR DIESEL VEHICLE**

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	1023.0	2460.0	0.063	30.0
TEST 2	1023.0	2340.0	0.04	30.0
TEST 3	1023.0	4120.0	1.434	30.0
AVG	1023.0	2973.33334	0.51234	30.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100065 manually, Please visit RTO and correct norms

VEHICLE EMISSION CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 28/Jun/2021

DIESEL DRIVEN VEHICLES
Certified that the vehicle conforms to the standards
prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	0.51234

Registration No: JH01000650000114
Registration No: JH10AJ4311
Owner Name: SANTAY KUMAR
Owner Name: JAISWAL
Engine No: MAT448117D3C06570
Engine No: B591803231C63316769
Type of Vehicle: Goods Carrier
Make: TATA MOTORS LTD
Model: LPK2518
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 16/Apr/2013
Current Status: BHARAT STAGE III/IV
Fuel: DIESEL
Date of Testing: 29/Jun/2020
Test Equipment: Naman Electronics
Manufacturer Name: NAMTECH SM 54
Manufacturer Model: NAMTECH SM 54
Test Equipment Serial: 2019/NAM/09-714



Test Date: 09/05/21
Test Charge: Rs.300.0
Test Charge: (three hundred rupees only)
Auto Emission Testing Centre Code: JH0100065
Testing Centre Name: M/S JAI JAGDAMDEY FUEL STATION
Centre Address: BARA PANDEYDIH, BAGHMARA, DHANBAD, JHARKHAND, 828307
Test Conducted By: SHASHI KUMAR MAHATHA

TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	1023.0	2460.0	0.063	30.0
TEST 2	1023.0	2340.0	0.04	30.0
TEST 3	1023.0	4120.0	1.434	30.0
AVG	1023.0	2973.33334	0.51234	30.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100065 manually, Please visit RTO and correct norms

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 04/Sep/2021

Certificate SI. No.: JH01001960002219
Registration No.: JH10AN7092
Owner Name: MANISH KUMAR AGARWAL
Chassis No.: MAT44B117E2B*****
Engine No.: BS91803241B633*****
Class of Vehicle: Goods Carrier
Make: TATA MOTORS LTD
Model: LPT2518TC
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 28/Mar/2014
Emission Norms: BHARAT STAGE III
Fuel: DIESEL
Date of Testing: 05/Mar/2021
PUC Equipment Manufacturer Name: AVL India Pvt Ltd
PUC Equipment Manufacturer Model: AVL 437C
Name: Name
PUC Equipment Serial No.: 4801

DIESEL DRIVEN VEHICLES
Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	2.45	0.77667



Time of Testing: 17:57:54
Fee Charged: Rs.300.0
Fee Charged: (three hundred rupees only)
In case of any complain Please write to Transport Commissioner Jharkhand

Auto Emission Testing Centre Code: JH0100196
Testing Centre Name: RUDRA ENTERPRISES
Centre Address: HIRAK ROAD JAMUATAND, DUMRA BAGHMARA DHANBAD, 828306
Test Conducted By: MADHUKAR RAM GUPTA



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	705.0	3035.0	0.74	88.0
TEST 2	710.0	3050.0	0.77	88.0
TEST 3	705.0	2985.0	0.82	88.0
AVG	706.66667	3023.33334	0.77667	88.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100196 manually, Please visit RTO and correct norms

EMISSION UNDER CONTROL CERTIFICATE
 Authorised By:
 Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 25/Mar/2022

Certificate SL No.: JH01000650000794
 Registration No.: **JH10AH9338**
 Owner Name: ANIL KUMAR
 Chassis No.: MAT448062D3A*****
 Engine No.: B591803231A633*****
 Class of Vehicle: Goods Carrier
 Make: TATA MOTORS LTD
 Model: LPK2518
 Vehicle Category: HEAVY GOODS VEHICLE
 Date of Registration: 28/Feb/2013
 Emission Norms: BHARAT STAGE III/IV
 Fuel: DIESEL
 Date of Testing: 26/Mar/2021
 PUC Equipment Manufacturer Name: Naman Electronics
 PUC Equipment Manufacturer Model: NAMTECH SM 54
 PUC Equipment Serial No.: 2019/NAM/09-714

DIESEL DRIVEN VEHICLES
 Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

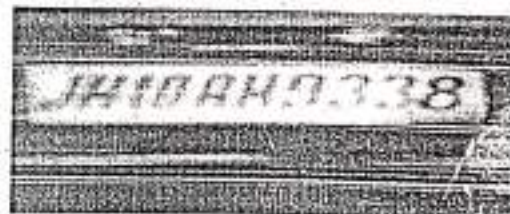
FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	1.12667

Date of Testing: 10:42:27
 Fee Charged: Rs.300.0
 Fee Charged:

(three hundred rupees only)

In case of any complaint Please write to Transport Commissioner Jharkhand

Auto Emission Testing Centre Code: JH0100065
 Testing Centre Name: M/S JAI JAGDAMDEY FUEL STATION
 Centre Address: BARA PANDEYDIH, BAGHMARA, DHANBAD, JHARKHAND, 828307
 Test Conducted By: SHASHI KUMAR MAHATHA



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	700.0	2240.0	1.05	0.0
TEST 2	700.0	2300.0	1.13	0.0
TEST 3	700.0	2200.0	1.2	0.0
AVG	700.0	2246.66667	1.12667	0.0

This is a computer generated certificate and does not require signature
 Fuel Norms entered by PUC center JH0100065 correctly. Please visit RTO and correct norms

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 27/Dec/2021

Certificate St. No.: JH01000720000138
Registration No.: JH10AL0358
Owner Name: DHANANJAY MAHTO
Chassis No.: MAT448062D2H09053
Engine No.: B591803231H63340744
Class of Vehicle: Goods Carrier
Make: TATA MOTORS LTD
Model: LPK2518
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 27/Sep/2013
Emission Norms: BHARAT STAGE III/IV
Fuel: DIESEL
Date of Testing: 28/Dec/2020
PUC Equipment: 135YS
Manufacturer Name: ECM1601
PUC Equipment: Name
Manufacturer Model: ECM1601
PUC Equipment Serial No.: C0481



DIESEL DRIVEN VEHICLES

Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	0.098

Time of Testing: 15:31:28
Fee Charged: Rs.300.0
Fee Charged: (three hundred rupees only)

In case of any complain Please write to Transport Commissioner Jharkhand

Auto Emission Testing Centre Code: JH0100072
Testing Centre Name: DUMRA PETROL SERVICE STATION
Centre Address: DUMRA, BAGHMARA, POST-NAWAGARH, DHANBAD, 828306
Test Conducted By: SUBHASH KUMAR AGARWAL



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	603.0	1859.0	0.098	27.0
TEST 2	713.0	2048.0	0.098	27.0
TEST 3	723.0	2027.0	0.098	27.0
AVG	679.66667	1978.0	0.098	27.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100072 manually, Please visit RTO and correct norms

Dhananjay Mahto

EMMISSION UNDER CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 14/Jul/2021



DIESEL DRIVEN VEHICLES

Certified that the vehicle conforms to the standards prescribed under rule 115(2) of CMV Rules 1989

Certificate No.: JH01001960001932
Registration No.: JH10AG9148
Owner Name: BHIM LAL RAWANI
Chassis No.: MAT448085C3N32431
Engine No.: B591803221L63302378
Class of Vehicle: Goods Carrier
Make: TATA MOTORS LTD
Model: LPK2518
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 10/Dec/2012
Emission Norms: BHARAT STAGE III
Fuel: DIESEL
Date of Testing: 15/Jan/2021
PUC Equipment: AVL India Pvt Ltd
Manufacturer Name: AVL India Pvt Ltd
PUC Equipment: AVL 437C
Manufacturer Model Name: AVL 437C
PUC Equipment Serial No.: 4801

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	2.45	1.64334



Time of Testing: 11:20:43
Fee Charged: Rs.300.0
Fee Charged: (three hundred rupees only)

Auto Emission Testing Centre Code: JH0100196
Testing Centre Name: RUDRA ENTERPRISES
Centre Address: HIRAK ROAD JAMUATAND, DUMRA BAGHMARA DHANBAD, 828306
Test Conducted By: MADHUKAR RAM GUPTA

In case of any complain Please write to Transport Commissioner Jharkhand

TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	680.0	2960.0	1.62	75.0
TEST 2	690.0	3000.0	1.66	75.0
TEST 3	690.0	2990.0	1.65	75.0
AVG	686.66667	2983.33334	1.64334	75.0

This is a computer generated certificate and does not require signature
Fuel Norms entered by PUC center JH0100196 manually. Please visit RTO and correct norms

POLLUTION UNDER CONTROL CERTIFICATE

Authorised By:
Transport Department, Government of Jharkhand



TEST RESULT : PASS
VALID TILL: 28/Sep/2021

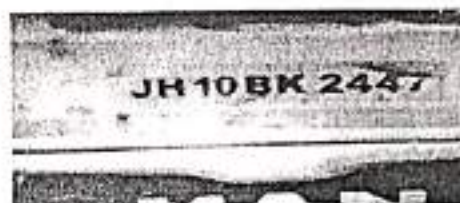
DIESEL DRIVEN VEHICLES
Certified that the vehicle conforms to the standards
prescribed under rule 115(2) of CMV Rules 1989

FUEL	Light Absorption Coefficient (Permissible Limit)	Measured Value
DIESEL	1.62	0.59

Certificate No.: JH01002580000053
Registration No.: JH10BK2447
Owner Name: SANJAY UDYOG PVT LTD
Chassis No.: MBKMCSAE23N020212
Engine No.: 6DJA27909
Class of Vehicle: Goods Carrier
Make: MAN TRUCKS INDIA PVT.
LTD.
Model: AAKN0054FD1_LF20_16_TYM
Vehicle Category: HEAVY GOODS VEHICLE
Date of Registration: 05/Feb/2018
Emission Norms: BHARAT STAGE IV
Fuel: DIESEL
Date of Testing: 29/Sep/2020
PUC Equipment
Manufacturer Name: Netel (India) Ltd
PUC Equipment
Manufacturer Model: NPM-SM-111B
Name
PUC Equipment: 2052
Serial No.

Time of Testing: 11:44:24
Fee Charged: Rs.300.0
Fee Charged: (three hundred rupees only)

Auto Emission Testing Centre Code: JH0100258
Testing Centre Name: M/S SRI RAM
AUTO POLLUTION CENTRE
Centre Address: BHIKHRAJPUR
KARMATAND, BALIAPUR, 826004
Test Conducted By: SURESH
KUMBHAKAR



TEST RESULT FOR DIESEL VEHICLE

	IDLE RPM	MAX RPM	K VALUE	OIL TEMP
TEST 1	85.0	5872.0	0.6	0.0
TEST 2	891.0	4660.0	0.58	0.0
TEST 3	952.0	2570.0	0.59	0.0
AVG	642.66667	4367.33334	0.59	0.0

This is a computer generated certificate and does not require signature

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

Ref: GM/B-II/18-19/ ८३२

Date: 24.10.2018

To,
The Mukhiya
Dumra (North) Gram Panchayat

Sub: Regarding submission of EC letter of Cluster-II groups of mines, BCCL.
Ref-EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013

Dear Sir,
Environmental clearance of Cluster-II groups of mines, BCCL has granted by ministry of Environment, Forest and Climate Change vide EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013. As per general condition no.xiv of EC letter, Please find enclosed herewith the above referred letter. This is for your kind information and record.

Encl: As above

Yours Sincerely

[Signature]
General Manager
Block-II Area

Copy to:
1. Dy. GM (Env), Koyla Bhawan.

Received
Gurpreet Arora
मुखिया २५-१०-१८
ग्राम पंचायत डुमरा उत्तर
ब्लॉक-II- नावागारा (धनबाद)

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

Ref: GM/B-II/18-19/ ८३२

Date: 24.10.2018

To,
The Mukhiya
Dumra (South) Gram Panchayat

Sub: Regarding submission of EC letter of Cluster-II groups of mines, BCCL.
Ref-EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013

Dear Sir,
Environmental clearance of Cluster-II groups of mines, BCCL has granted by ministry of Environment, Forest and Climate Change vide EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013. As per general condition no.xiv of EC letter, Please find enclosed herewith the above referred letter. This is for your kind information and record.

Encl: As above

Yours Sincerely

[Signature]
General Manager
Block-II Area

Copy to:
1. Dy. GM (Env), Koyla Bhawan.

Received
Namrata Singh
मुखिया २५-१०-१८
ग्राम पंचायत डुमरा दक्षिण
ब्लॉक-II- नावागारा (धनबाद)



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

Ref: GM/B-II/18-19/ १३५

Date: 24.10.2018

To,
The Mukhiya
Barera Gram Panchayat

Sub: Regarding submission of EC letter of Cluster-II groups of mines, BCCL.

Ref-EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013

Dear Sir,

Environmental clearance of Cluster -II groups of mines, BCCL has granted by ministry of Environment, Forest and Climate Change vide EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013. As per general condition no.xiv of EC letter, Please find enclosed herewith the above referred letter. This is for your kind information and record.

Encl: As above

Yours Sincerely

General Manager
Block-II Area

Copy to:
1. Dy. GM (Env), Koyla Bhawan.

Received
मरीज देवी
25/10/2018
मुखिया
ग्राम पंचायत बरेरा



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

Ref: GM/B-II/18-19/ १३५

Date: 24.10.2018

To,
The Mukhiya
Munsih Gram Panchayat

Sub: Regarding submission of EC letter of Cluster-II groups of mines, BCCL.

Ref-EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013

Dear Sir,

Environmental clearance of Cluster -II groups of mines, BCCL has granted by ministry of Environment, Forest and Climate Change vide EC letter no. J-11015/35/2011-IA.II(M) dt 06.02.2013. As per general condition no.xiv of EC letter, Please find enclosed herewith the above referred letter. This is for your kind information and record.

Encl: As above

Yours Sincerely

General Manager
Block-II Area

Copy to:
1. Dy. GM (Env), Koyla Bhawan.

Received
अमिता देवी
25/10/2018
(मुखिया) ग्राम पंचायत मुन्सिह
मुखिया
ग्राम पंचायत मुन्सिह



Gabion Plantation



Oil & Grease Trap



Stone embankment along Jamunia river

पत्रात मुद्रावाचन
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ए प्रतिवेदन एव
एव महाप्रकाश
तथा मे कार्यालय
रा परिप्रेक्ष्या से
मकारिता होने के

सुनवाई कार्यक्रम

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म विवा मया हे।
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मिकादी

CPR/T-104 Chief Pass (for Complaints regarding Corruptions)
Railway Uplifts Mobile Helpline No. 0501-155119 (for Complaints regarding Corruptions)
SERVING CUSTOMERS WITH A SMILE

Bharat Coking Coal Limited
(A Subsidiary of Coal India Limited)

This is to bring into notice of all concerned that the following 09 (Nine) Clusters of BCCL consisting of 63 Mines and 02 washeries are granted Environmental Clearances by Ministry of Environmental and forests.

Sl. No.	Name of the Cluster	Sanction order number and date
1	Cluster-I (Damodar Group of 3 Mines - Damodar (Albion Section) OCP, Damoda UGP and Damoda BJ Section OCP) Group of Mines (of 0.9 MTPA normative and 1.17 MTPA (peak) in a combined ML area of 575 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Block Chandrapur, Dist. Dhanbad, Jharkhand.	J-11015/93/2009-1A II (M) dated 6th Feb. 2013
2	Cluster-II (5 mines of a combined prod. capacity 15.55 MTPA with a peak production of 20.215 MTPA) in a combined ML area of 2025.71 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand.	J-11015/35/2011-1A II (M) dated 6th Feb. 2013
3	Cluster-III (7 mines of a peak production of 3.6 MTPA in a combined ML area of 1420.61 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand (EC based on TOR granted on 04.11.2010)	J-11015/213/2010-1A II (M) dated 6th Feb. 2013
4	Cluster-IV (6 mines with production capacity 2.851 MTPA (Normative) 3.706 MTPA (Peak) in a combined ML area of 1123.79 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand excluding Gasitand Colliery UG	J-11015/212/2010-1A II (M) dated 6th Feb. 2013
5	Cluster-V (7 mines of a 4.854 (Normative) and 6.311 (Peak) production of MTPA in a combined ML area of 1957.08 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand (EC based on TOR granted on 16.03.2011)	J-11015/01/2011-1A II (M) dated 11th Feb. 2013
6	Cluster-VII (combined capacity 6.227 MTPA with a peak prodn. of 8.16 MTPA in a combined ML area of 2127.7 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand (EC based on TOR granted on 09.12.2010) (excluding Kustore UG and East Bhuggatdih)	J-11015/238/2010-1A II (M) dated 6th Feb. 2013
7	Cluster-X (6 mines of 1.762 MTPA of normative and peak production of 2.289 MTPA in a combined ML area of 2057.05 ha) and Sudamdin Coal Washery (Within the lease hold of Sudamdin Shah Mine) of 1.6 MTPA of normative and 2.08 MTPA peak production for a area of 18 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand (EC based on TOR granted on 09.02.2011)	J-11015/380/2010-1A II (M) dated 6th Feb. 2013
8	Cluster-XVI - Coaimines (Dahibari-Basantimata OCP, Basantimata under Ground Mine, New Laikdih OCP (including Dahibari Coal Washery), Laikdih Deep UG, Chanch UG) (normative 1.51 MTPA and 1.553 MTPA peak) in a combined ML area of 1964.21 ha) and Dahibari washery of 1.6 MTPA in the area of 12 ha of M/s Bharat Coking Coal Ltd., in Dist. Dhanbad, Jharkhand (EC based on TOR granted on 26.05.2010)	J-11015/185/2010-1A II (M) dated 6th Feb. 2013
9	Cluster-VIII Group of 10 Mines (combined capacity 4.31 MTPA with a peak prodn. of 5.603 MTPA) in a combined ML area of 5.603 (1200.41 ha-1649 ha=1183.92 ha) of M/s Bharat Coking Coal Ltd., located in Jharia Coalfields, Dist. Dhanbad, Jharkhand.	J-11015/298/2010-1A II (M) dated 15th Feb. 2013

The copy of the clearance letter is available with the Jharkhand State Pollution Control Board and may also be seen at the website of the Ministry of Environmental and forests at <http://envfor.nic.in> and on the official website of BCCL at <http://www.bccl.gov.in>

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Newspaper advertisement