भारत कोकिंग कोल लिमिटेड
'एक मिनी रत्न कंपनी'
(कोल इंडिया का एक अंग)
महाप्रबंधक का कार्यालय
लोदना क्षेत्र ,पो.-भागा
धनबाद -828301,(झारखंड)
वेबसाइट :www.bccl.gov.in, mail.gov.in
ईमेल :cgmlodna@bccl.gov.in,
gmlodna.bccl@coalindia.in
सी.आई.एन.:U10101JH1972GO1000918

बीसीसीएल
BCCL

Bharat Coking Coal Limited
A Mini Ratan Company
(A Subsidiary of Coal India Limited)
Office of the General Manager
Lodna Area , PO-Bhaga
Dhanbad-828301 (Jharkhand).
Website: www.bccl.gov.in, mail.gov.in
Email: cgmlodna@bccl.gov.in,
gmlodna.bccl@coalindia.in
CIN:U10101JH1972GO1000918

Ref. No: - BCCL/LA/GM/26-27/ 75

Through- Email Mode
Dated:- 29/5/2026

To,
The Director,
Ministry of Environment, Forest & Climate Change, Govt. Of India.
2nd Floor, Headquarter- Jharkhand State Housing Board,
Harmu Chowk, Ranchi, Jharkhand – 834002

Sub: -Six monthly compliance report on implementation of Environmental Measures for the period from 1st October 2025 to 31st March 2026 in respect of Cluster – IX Group of Mines, Lodna Area of BCCL.

Ref. No. 1: EC Order No.-J-11015/307/2010-IA.II (M), dated – 21st May, 2013.
Ref. No. 2: EC Order No. -J-11015/307/2010-IA.II (M), dated – 1st March, 2018.

Dear Sir,

Please find enclosed herewith the Six Monthly Compliance report on implementation of Environmental Measures for the period from 1st October 2025 to 31st March 2026 in respect of Cluster - IX Group of Mines, Lodna Area of BCCL.

Enclosure: as above.

Yours faithfully,

29/5/26
General Manager
Lodna Area

Cc to (Through E-mail):-

1. Scientist & In-charge, Zonal Office, Central Pollution Control Board, 5th Floor 502, House & Conclave 1582, Rajdanga main Road, Kolkata-700107
2. Member Secretary, Jharkhand State Pollution Control Board, TA Division Building, H.E.C, Dhurwa, Ranchi-834004
3. Regional Office , Jharkhand State Pollution Control Board, Sardar Patel nagar, Dhanbad
4. HoD (Env) BCCL, Koyla Bhawan, Dhanbad.
5. File

ENVIRONMENTAL CLEARANCE COMPLIANCE OF CLUSTER-IX
(GRANTED VIDE – J-11015/307/2010-IA.II (M), dated – 21st May, 2013 and Amendment on dated- 1st March 2018)
(From 1st October 2025 to 31st March 2026)

Sl. No.	A.) Specific conditions by MOEF	Compliance
i.	The Maximum production shall not exceed beyond that for which environmental clearance has been granted for the mine of cluster IX.	**Being Complied.** The production from the cluster is within the limit for which environment clearance has been granted. Both Mines of Cluster IX namely Amalgamated Joyrampur Colliery and NT-ST (Expansion) OCP is currently in operation mode. Coal Production & Overburden Production since 2018 along with previous six months is enclosed in **Annexure I.**
ii.	Action should be taken to segregate and isolate the fire areas eg. Trench cutting for isolation of fire. Area-wise Action Taken report for extinguishing the fire should be provided.	**Being Complied.** Action has been taken for extinguishing the fire are as follows: 1. In NT-ST (Expansion) OCP, Fiery Hotspot are being excavated as per the Master Plan Implementation. The work was awarded to deal the fire by excavation with ref no. BCCL/GM/SECY/LODNA/HIRING-HEMMOS/2015/498 dated 30/06/2015 and BCCL/GM/SECY/LODNA/HIRINGHEMM-OS/2019/532 dated 28/03/2019. 2. In Amalgamated Joyrampur Colliery Fiery Hotspot are being dealt by excavation method as per the Govt. approved Master Plan (Total Excavation of Fire). 3. To prevent the spread of fire, water pool has been created. 4. Cracks and potholes being blanketed by sand and soil to cut oxygen supply to minimize the spontaneous heating. Action taken report is enclosed herewith along with approved Master Plan showing Control Measures for dealing with Fire enclosed in **Annexure II.**
iii.	'Mission Mode Program' for extinguishing fire is required wherein scientists and other experts be involved. Any international agency may also be contacted for their expertise in extinguishing the fire in such big area.	**Being Complied.** BCCL has engaged National Remote Sensing centre (NRSC), IRSO for Delineation of Surface Coal Fire and associated Land Subsidence in Jharia Coalfield using satellite based remote-sensing techniques BCCL has also engaged IIT-ISM for Scientific Assessment of Old & Dangerous Workings of BCCL mines that will assess Danger of Fire and Susbsidence.

		Thus Scientist and other experts have been involved under 'Mission Mode Program' for extinguishing fire. For engagement of international agency, Global expression of interest (EOI) was floated vide Ref no. BCCL/GM(CMC)/GLOBAL/EOI/FIRE/2014/870 dated 18.01.2014 by General Manager (Contract Management Cell) with the following description of work Dealing with coal mine fire in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand , India. At Location of Leasehold of BCCL in Jharia coalfield Dhanbad, Jharkhand, India. Two firms participated in the said EOI Namely DMT GmbH & Co. KG Essen/Germany and Met-Chem Canada Inc. Both the Bidders were disqualified as they could not fulfil the requirements laid down in the EOI and failed to submit the required documents for evaluation by technical committee. Thus, BCCL by taking into consideration the findings, suggestion of reputed Mining Institutes like ISM, Dhanbad and CIMFR, Dhanbad adopted the method of fire excavation for earliest fire dousing as mentioned in approved Master Plan. Latest communication has been made to IIT(ISM), Dhanbad, BIT Sindri & CIMFR, Dhanbad for providing their expertise/recommendation for control of fire and their reclamation. Copy of Communications and Copy of EOI floated earlier has been enclosed in **Annexure III**.
iv.	The recommendation of Indira Gandhi Centre of Atomic Research, Kalpakam should be followed dealing with fire in coal mine in Jharia Coalfield.	**Complied.** An E-mail was sent and requested for providing recommendation in this regard. IGCAR replied that there is no any recommendation from their end. Copy of Communications enclosed in **Annexure IV.**
v.	Transportation Plan should be submitted to the MOEF.	**Complied.** Transportation Plan prepared on proper scale. Transportation is being done by covering vehicle with tarpaulin cover. Transportation plan enclosed in **Annexure V.**
vi.	The finalized Mine Closure Plan of Cluster – IX should be submitted to MOEF. The void should be in 30 ha. Area with 30 mt. depth.	**Will be Complied.** Mine closure plan as per the guideline of Ministry of coal prepared by CMPDIL is under implementation and progressive mine closure plan is being followed. Presently no mine in Cluster IX is under Final Mine Closure stage. As on date final voids are not available and Mine is in progressive stage

		Progressive Mine Closure plan has been enclosed for Amal. NTSTJG OCP and Amal. Joyrampur Colliery. Revised Progressive Mine Closure Approved for Cluster IX is also enclosed As **Annexure VI.**
vii.	The road transportation of coal during phase – 1 should be by mechanically covered trucks. The road used for coal transportation should be developed with avenue plantation on both sides.	**Being Complied.** Request has been submitted to some of the vendors for making available details of mechanically covered trucks. However, no OEMs are present for mechanically covered coal transport. Undertaking in this regard is also attached. Thus, present Transportation is being done by covering vehicle with tarpaulin cover. Avenue plantation is being done along the transportation route. 1200 nos. of Bamboo gabion avenue plantation have been done by DFO, Dhanbad in nearby colonies Copy of the request submitted to vendors for making available the details of mechanically covered trucks is enclosed as **Annexure VII**.
viii.	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.	**Being Complied.** It is under active compliance. Training and skill development programs are being conducted by VTCs and HRD of BCCL on regular basis. There are 02 Handloom Training Centres in Lodna area at Alakdiha and Mukunda, Dhanbad. Skill Development is also being conducted under CSR project - Skill Development Program through Central tool Room - Skill Development program through CIPET, Ranchi (Plastic Engineering) - Skill development program through National Skill Training Institute Hyderabad - Teacher Training Programme for skill upgradation of teachers - Skill development project through Multi Skill Development Institute (MSDI) - Skill development training on bamboo crafts through IIT(ISM). Photographs of training centres enclosed in **Annexure VIII.**
ix.	Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet form.	**Being Complied.** The Details of transportation, CSR, R&R and implementation of environmental action plan in Booklet form that is attached as **Annexure VIII**.

x.	A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.	**Complied.** More than 80% of coal is transported through railway which is environmentally better option than the road transportation. The study has been completed by the CMPDIL. The project proponent has submitted report of study to analyze the extent of reduction in pollution load every year by reducing road transport. Pollution load study report enclosed as **Annexure IX.**
xi.	The expertise available internationally should be utilized for control of fire in Jharia coalfields and for their reclamation and to further minimize time for fire and subsidence control.	**Being Complied.** Global expression of interest (EOI) was floated vide Ref no. BCCL/GM(CMC)/GLOBAL/EOI/FIRE/2014/870 dated 18.01.2014 by General Manager (Contract Management Cell) with the following description of work Dealing with coal mine fire in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand, India. At Location of Leasehold of BCCL in Jharia coalfield Dhanbad, Jharkhand, India. Two firms participated in the said EOI Namely DMT GmbH & Co. KG Essen/Germany and Met-Chem Canada Inc. Both the Bidders were disqualified as they could not fulfill the requirements laid down in the EOI and failed to submit the required documents for evaluation by technical committee. Thus, BCCL by taking into consideration the findings, suggestion of reputed Mining Institutes like ISM, Dhanbad and CIMFR, Dhanbad adopted the method of fire excavation for earliest fire dousing as mentioned in approved Master Plan. BCCL has engaged National Remote Sensing centre (NRSC), IRSO for Delineation of Surface Coal Fire and associated Land Subsidence in Jharia Coalfield using satellite based remote-sensing techniques BCCL has also engaged IIT-ISM for Scientific Assessment of Old & Dangerous Workings of BCCL mines that will assess Danger of Fire and Susbsidence Copy of Communications have been enclosed as **Annexure III**.
xii.	The abandoned pits and voids should be backfilled with OB and reclaimed with plantation and or may be used for pisciculture.	**Will be Complied.** At present there is no open abandoned pit. Abandoned voids will be utilized for Pisciculture, if any in Post Mining Phase Mining plan enclosed for Amal. NTSTJG OCP and Amal. Joyrampur Colliery in **Annexure VI.**
xiii.	BCCL may consider setting up a separate management structure for implementing environment policy and socio-economic issues and the capacity building required in this regard.	**Complied.** Separate multidisciplinary environmental Management cell at Area Level has already been established. A full-fledged Environment Department, headed by a HOD (Environment) along with a suitable, qualified

		multidisciplinary team of executives has been established. The activities are monitored on regular basis at Area and at Headquarters levels. GM (Environment) at Headquarters level, Coordinates with all the Areas and reports to the Director (Technical) and in turn, he reports to the CMD of the company. The team is multidisciplinary and very much motivated under the guidance of the company's Director (Technical) and CMD. Further capacity building at both corporate and operating levels is being done. Office Order of the formation of Separate multidisciplinary environmental Management cell at Area Level has already been enclosed as **Annexure X.**
xiv.	The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board.	**Complied** The location of manual monitoring stations in Jharia Coal Field has been identified with the consultant advisory of CMPDIL and also finalized with the permission of Jharkhand State Pollution Control Board. The location of monitoring stations is: (i) Jeenagora (A13) (ii) Kusmatand Village (A12) (iii) Bhowrah North (A14) (iv) Hurriladih UGP (A28) 2 Online PM10 Analyzers have been installed at Railway Siding and Regional Store. 2 CAAAQMS (One Core and One Buffer) have been installed at Lodna GM Office (Core) and EJ Area Guest House (Buffer) and are actively sharing data with CPCB servers. Copy of approval letter enclosed as **Annexure XI.** Photographs of Air Quality monitoring Stations Enclosed in **Annexure XXXVII.**
xv.	The 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 get carried out for the entire Jharia Coalfields.	**Complied.** The said study of source apportionment has been conducted by NEERI, Nagpur. Final report is enclosed as **Annexure XII.**
xvi.	Mineralogical composition study should be undertaken on the composition of the suspended particulate matter (PM10 and PM2.5) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of air pollution,	**Complied.** The said study of source apportionment has been conducted by NEERI, Nagpur. Final report is enclosed as **Annexure XII.**

	based on which appropriate mitigative measures could be taken.	
xvii.	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.	**Complied.** The National Remote Sensing Agency (NRSA) is undertaking periodic monitoring of the Jharia Coalfield region using satellite-based remote sensing techniques. A recent project report titled "Delineation of Surface Coal Fire and Associated Land Subsidence in Jharia Coalfield (2022–2024), Jharkhand" was submitted in May 2025. According to the findings of this report: • No surface coal fire area (0.000 sq. km) has been detected in the Bhagdigi, Bararee, Jealgora, Jeenagora, Lodna, and Joyrampur collieries. • In North Tisra, the fire-affected area has reduced from 0.097 sq. km (2022) to 0.041 sq. km, indicating successful containment or natural extinction. • In South Tisra, the coal fire area has decreased from 0.210 sq. km (2022) to 0.157 sq. km, reflecting a reduction in the extent of active fire zones Report Enclosed as **Annexure-XIII.**
xviii.	Measures to prevent ingress of air (Ventilation) in such areas, to prevent restart fresh / spread fires in other areas including in mines of cluster IX shall be undertaken.	**Being Complied.** Action is being taken as per Jharia Master Plan Approved by GOI and State Govt. of Jharkhand. Excavation/ Open Cast mining is being done in the Fire/subsidence affected mines to dig out combustible materials to save the coal from burning and to prevent further spread of the fire. Once the fiery coal is dugout/ excavated there will be no chance of further restarting/ spreading of fresh fire into other areas. Cracks and potholes being blanketed by sand and soil to cut oxygen supply to minimize the spontaneous heating. As per NRSC report the fire area has reduced over time. The Fire has reduced from 0.307 Sq km (2022) to 0.198 Sq km (2024) A letter to CISF, requesting for help at the time of filling of cracks and potholes is enclosed herewith along with photograph in **Annexure XIV.** Photographs of water pools to prevent spread of fire is being enclosed as **Annexure XIV.**

		Copy of NRSC report Page showing reduction in Fire has been Enclosed in **Annexure XIII.**
xix.	Underground mining should be taken up after completion of reclamation of Opencast mine area after 15 Years.	**Will be complied.** Underground Mining will be done after extraction of upper seams and beneath Backfilled and reclaimed area.
xx.	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.	**Being Complied.** Action is being taken to control mine fires including old OB dump & areas as specified in Jharia Master Plan by Total excavation of Fire. Soil has been spread to eliminate the spontaneous combustion. As per NRSC report the fire area has reduced over time. The Fire has reduced from 0.307 Sq km (2022) to 0.198 Sq km (2024). Photographs and Copy of NRSC report Page showing reduction in Fire has been enclosed as **Annexure XIV**.
xxi.	The rejects of washeries in Cluster – IX should be sent to FBC based plant.	**Complied.** Coal washery does not exist in this cluster at present.
xxii.	There shall be no external OB dumps. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.	**Being Complied.** Action is being taken as specified in EMP. No Dumping has been done in noncoal bearing area. Dumping has been done after excavation of Coal in de-coaled area. Backfilling of OB is going on with mining. Concurrent Grass seeds are being broadcasted on OB dumps for enhancing greenery and mitigating pollution. At the end of Mining there shall be no void and area will be re-vegetated and reclaimed Photographs of OB Dump where grass seeding have been done are enclosed in **Annexure XXXVIII.**
xxiii.	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 – IX shall be drawn up and implemented.	**Being Complied.** Mining operation is being done as per approved Calendar Plan. Calendar Plan has been prepared. Mine closure plan as per the guidelines of Ministry of Coal has been prepared by Central Mine Planning and Design Institute (CMPDI). Progressive mine closure plan is being implemented. Activities under mine closure plan are: (i) Subsidence Management (ii) Reclamation of abandoned Quarry (iii) OB dump Reclamation (iv) Plantation (v) Entrepreneurship Development (vi) Miscellaneous activities Details of production are enclosed in **Annexure I.**

<table>
<tr><td>xxiv.</td><td>The void shall be converted into a water reservoir of a maximum depth of 15-20 m and shall be gently sloped and the upper benches of the reservoir shall be stabilized with plantation and the periphery of the reservoir fenced. The abandoned pits and voids should be backfilled with OB and biologically reclaimed with plantation and or may be used for pisciculture</td><td>Will be complied.
This is Post Mine Closure Condition. Presently, the mine is operative.
At present no abandoned Pit and voids are present for Backfilling.
A part of the void will be converted into the water body as specified in EMP.
At present there is no open abandoned pit. Abandoned Voids will be utilized for Pisciculture, if any in Post Mining Phase</td></tr>
<tr><td>xxv.</td><td>Mining shall be carried out as per statuette from the streams / Nalas flowing within the lease and maintaining a safe distance from the Nalas flowing along the lease boundary. A safety barrier of a minimum 60 m width shall be maintained along 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.</td><td>Being Complied.
Mining is being carried out as per Statute from the streams/Nalas flowing within the lease and maintaining a safe distance (>60 m) from the nalas flowing along the lease boundary.

Photographs of Embankment at Chatkari Jore enclosed as Annexure XXXIX.</td></tr>
<tr><td>xxvi.</td><td>Active OB dumps near water bodies and rivers should be re-handled for backfilling abandoned mines voids. However, those which have been biologically reclaimed need not be disturbed.</td><td>Being Complied.
No active dumps near water bodies exist.</td></tr>
<tr><td>xxvii.</td><td>Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 937.84 ha. Area would be reclaimed. The total additional area under plantation would be 367.95 ha. (189.95) ha. abandoned quarry area, 178 ha. Active quarry area, 104.34 OB dump outside quarry area, 36.49 ha. service building / Mine infrastructure area / coal dump etc., 165.88 ha. Green belt around OCP, 263.22 ha. Barren area), by panting 2344700 plants at a total cost Rs. 10830.45 lakhs.</td><td>Being Complied.
Grassing is being done every year during the monsoon over the OB dumps.
1200 Nos of bamboo gabion plantation has been done in nearby area of colonies.

Photographs of Plantation and Grassing done is enclosed in Annexure XXXVIII.
Year wise plantation is being done as per following details:
<table>
<tr><th>Year</th><th>Cluster/Mine/Area</th><th>Area of greenbelt (Ha.)</th></tr>
<tr><td>2014-15</td><td>Lodna</td><td>05</td></tr>
<tr><td>2015-16</td><td>Lodna</td><td>07</td></tr>
<tr><td>2016-17</td><td>Lodna</td><td>07</td></tr>
<tr><td>2017-18</td><td>Lodna</td><td>07</td></tr>
<tr><td>2018-19</td><td>Lodna</td><td>3.8</td></tr>
<tr><td>2019-20</td><td>Lodna</td><td>0.3</td></tr>
<tr><td>2020-21</td><td>Lodna</td><td>16</td></tr>
<tr><td>2022-23</td><td>Lodna</td><td>10</td></tr>
<tr><td>2023-24</td><td>Lodna</td><td>05</td></tr>
</table></td></tr>
</table>

		2024-25	Lodna	0
xxviii.	The road should be provided with avenue plantation on both side as trees act as sink of carbon and other pollutant.	**Being Complied.** 1200 nos. of bamboo gabion avenue plantation has been done by DFO, Dhanbad along roadside. 400 nos. of plants from Indira Chowk to Patherdih, 25 nos. of plants in bararee More, 25 nos. of plants in chatkari jore, 25 nos. of plants in Magazine etc. Sneh Smriti Upvan has been established in which fruit bearing plants have been planted Photographs enclosed in **Annexure VIII.**		
xxix.	Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action plan prepared for Dhanbad as a critically polluted area and relevant for Cluster IX shall be implemented.	**Being Complied.** Specific mitigative measures have been taken for the Jharia Coalfields in the Environmental Action plan prepared for Dhanbad: 1. Covered transportation of coal. 2. Water sprinkling is being done by mobile water sprinklers and fog cannon along prominent dust generating roads. 3. Plantation. 4. Apprx. 1KM of Toe wall constructed along OB dump 5. Avenue Plantation along the road 6. Water sprinkling through Truck Mounted Fog Cannon. 7. Construction of Pucca Roads from South Tisra workshop to North tisra Checkpost. 8. Grass seeding on dormant OB Dumps. 9. Wetting of coal before loading at railway siding. 10. 2 Nos. of PM10 Analyser Instrument has been installed in core zone. 11. Trolley mounted Fog canons installed at GOL Siding No. 9 12. Green net installed at railway siding. 13. COAAQMS installed in core zone. 14. Electric loaders deployed at sidings. Photographs Enclosed in **Annexure VIII, Annexure XXXVII, Annexure XXXVIII and Annexure XL.**		
xxx.	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 very 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 the entire Jharia Coalfields. Mineralogical	**Complied.** The locations of monitoring stations have been finalized with the Jharkhand State Pollution Control Board. The location of monitoring stations are: (i) Jeenagora (A13) (ii) Kusmatand Village (A12) (iii) Bhowrah North (A14) (iv) Hurriladih UGP (A28) 2 Online PM10 Analyzer operational and 2 CAAQMS (One Core and One Buffer) under installation		

	composition study should be undertaken on the composition for suspended particulate matter (PM 10 and PM 2.5) in Jharia coalfields and also qualified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.	The said study of source apportionment has been conducted by NEERI, Nagpur Final report enclosed in **Annexure XIII.**
xxxi.	No ground water 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.	**Being Complied.** No ground water is being used for mining activities. Only Mine water is being used for the industrial purpose. Mine water is being reused for industrial purposes by supplying them through water channel in different mines of Cluster IX Latest CHR report enclosed as **Annexure XLI.**
xxxii.	Regular monitoring of groundwater level and quality of the study area shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including Arsenic and Fluoride during the month of May. Data thus collected shall be submitted to the Ministry of Environment & Forest and to the Central Pollution Control Board / SPCB quarterly within one month of monitoring. Rainwater harvesting measures shall be undertaken in case monitoring of water table indicates a declining trend.	**Being Complied.** CMPDI RI-II is regularly Conducting study of groundwater level and quality of areas within Cluster IX. As per report ground water has not been declined. To Monitor Ground water level DWLR has been fitted with both Piezometric Well within Cluster IX. Ground water quality monitoring data has been sent to State Pollution Control Board/Central Pollution Control Board Following Documents has been enclosed herewith: 1. Latest CHR **(Annexure XLI)** **2.** Latest Groundwater monitoring data **(Annexure XV)** **3.** Six Monthly compliance report mail to JSPCB/CPCB/MoEFCC **(Annexure XVI)** **4.** Photograph of piezometer **(Annexure XLI)** 5. Details of water sampling locations **(Annexure XI)**
xxxiii.	Mine discharge water shall be treated to meet standards prescribed standards before discharge into natural water coursed / 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.	**Being Complied.** Mine discharge water is being allowed to settle down in the mine sumps before filtration through Pressure Filter. The monitoring of water quality parameters is regularly carried out by CMPDIL. The report of mine water discharge is uploaded on BCCL official website which is also given in the six-monthly EC compliance report. Mine water quality data has-been enclosed as **Annexure XVII.**
xxxiv.	ETP shall also be provided for workshop, and CHP, if any. Effluents	**Being Complied.**

	shall be treated to confirm to prescribe standards in case discharge into the natural water course.	Conventional Oil and grease trap with recycling arrangement has been installed at Joyrampur workshop. No functional departmental workshop is operational as of November 2025 Photographs of existing Oil & Grease trap has been enclosed in **Annexure XLII.**
xxxv.	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.	**Being Complied.** No UG working, only OC operation in the mine. However, some cracks are developed naturally which are filled by incombustible materials regularly and Some buildings and structures are being dismantled also for the purpose of shifting of fires and subsidence affected people to a safe place. A copy of letter related to subsidence and subsidence record is attached as **Annexure XVIII**.
xxxvi.	Sufficient coal pillars shall be left un-extracted around the air shaft (within the subsidence influence area) to protect from any damage from subsidence, if any.	**Complied.** No UG working, only OC operation in the mine.
xxxvii.	High root density tree species shall be selected and planted over areas likely to be affected by subsidence.	**Being Complied.** No UG working, only OC operation in the mine. Planation is regularly done in leasehold area of Cluster IX. High root density plants are regularly planted as per the roadmap prepared by Forest Research Institute, Dehradun. Copy is enclosed as **Annexure XIX**.
xxxviii.	Depression due to subsidence resulting in water accumulating within the low-lying areas shall be filled up or drained out by cutting drains.	**Being Complied.** Time to time depression has been filled by the locally available material and overburden.
xxxix.	Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.	**Complied.** No UG working, only OC operation in the mine.
xl.	No depillaring operation shall be carried out below the township / colony.	**Being Complied.** At present no depillaring operation is going on under below the township/ colony. Undertaking enclosed as **Annexure XX.**
xli.	The transportation plan for conveyor-cum-rail for Cluster-IX should be dovetailed with Jharia Action plan. Road transportation of coal during Phase – 1 should be by mechanically covered trucks, which should be introduced at the earliest. The plan for conveyor-cum-rail for Cluster – IX	**Being Complied.** Action has been taken for formulating adequate transportation plan for conveyor-cum-rail system of dispatch. CMPDIL has been requested to prepare the plan. However, CMPDIL had submitted that such transportation plan can be completed only after implementation of Master Plan and dousing of the fire.

	should be dovetailed with Jharia Action Pan. The road transportation of coal during Phase – 1 should be done by mechanically covered trucks.	Request has been submitted to some of the vendors for making available details of mechanically covered trucks. Transportation is being done by covering vehicle with tarpaulin cover and it is made mandatory in Transportation contracts The copy of the reply submitted by CMPDI is attached as **Annexure XXI.** Request has been submitted to some of the vendors for making available details of mechanically covered trucks. Copy of the same is attached as **Annexure VII.** Transportation is being done by covering vehicle with tarpaulin cover and it is made mandatory in Transportation contracts. Photographs enclosed in **Annexure VIII** and **Annexure XL.**
xlii.	A study should be initiated to analyze extent of reduction in pollution load every year by reducing road transport.	**Complied.** More than 80%of coal is transported through railway which is environmentally better option than the road transportation. The study has been completed by the CMPDIL. The Project Proponent has submitted the report of study to analyze the extent of reduction in pollution load every year by reducing road transport. Copy of report of Pollution load study Enclosed as **Annexure IX.** Details of Rail vs Road Transport enclosed in **Annexure VIII.**
xliii.	R&R of 12246 Nos. of PAF's involved. They should be rehabilitated at cost of Rs. 126092.027 Lakhs as per the approved Jharia Action Plan.	**Being Complied.** Implementation is being done as per the Master Plan. As per the approved Master Plan prepared for dealing with fire subsidence and rehabilitation in the leasehold of BCCL for Jharia Coal Field, the master plan has identified 595 unstable sites in the entire Jharia Coal Field. Out of these, 98 sites covering an area of 224.56 Ha consisting of 12246 no. of houses/families fall in Cluster-IX mines. The cost for rehabilitation for the families is estimated to be Rs. 126092.03 lakhs. In the NT-ST-Jeenagora mining block, 1716 houses have to be rehabilitated. The cost for rehabilitation is estimated to be Rs. 6989.88 lakhs with an affected area of 22.74 ha. The responsibility of shifting Fire affected families/encroachers is with Jharia Rehabilitation and Devlopment Authourity (JRDA) formulated under the Chairmanship of DC, Dhanbad. 547 Nos. of Quarters have been allotted for shifting of PAFs by JRDA at Belgaria Township. The shifted PAFs belongs to the fire

		affected areas of DB road and Bengal Jharia section of NT-ST OCP, 271 Nos. of Fire affected Families/Encroachers have been shifted to Belgaria & Karmatand Township. Revised and Approved JMP Plan has been enclosed as **Annexure XLV.**
xliv.	A detailed CSR Action plan shall be prepared for Cluster IX group of mines. Specific activities shall be identified for CSR the budget of RS. 142.55 Lakhs per year @ Rs. 5/T of coal as recurring expenditure. The 391.28 ha. of area within Cluster IX 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 1942.12 ha. of area at the post-mining stage, the waste land / barren land within Cluster IX ML. shall be rehabilitated / reclaimed as forest / agricultural land under CSR Plan in consultation with local communities. Third party evaluation shall be got carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the company and to the local youth, who are motivated to carry out the work in future.	**Being Complied.** TISS has conducted the survey for effective and need based CSR activities implementation. Also Mid- term Evaluation of Project *Swablamban* - Reeling and Spinning Training Project under CSR has been conducted by TISS, Mumbai. Under the CSR activities in the purview of NTST-Jeenagora OC, the handloom making projects (Jharkraft) at Mukunda at an expenditure of about Rs.10.38 lakhs during the year 2015-17 and at Alakdiha at an expenditure of about Rs.10.72 lakhs during the year 2016-18 have been established Following supporting documents has been enclosed: 1. A detailed CSR Booklet **(Annexure VIII)** 2. Approved CSR activities for Year 2025-26 within Lodna Area **(Annexure XLIII)** 3. Copy of study conducted by TISS is attached as **Annexure XXII.**
xlv.	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1:5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3years (for any one particular season which is consistent in the time series), and the	**Being Complied.** The Project Proponent has submitted Land Use Map of Cluster IX which has been prepared by CMPDIL using remote sensing data for monitoring of land use pattern and for post mining land use Land use pattern study conducted by CMPDI enclosed herewith as **Annexure XXIII.**

	report submitted to MOEF and its Regional office at Bhubaneswar.	
xlvi.	A final Mines Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forest 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 during mine reclamation and at the post mining stage for habitat restoration.	**Being Complied.** Progressive Mine closure plan as per approved MCP is under implementation. Final closure plan will be submitted at appropriate time. Ecological Restoration a mix of native species are being used in mine reclamation. Native species of flora and fauna can be seen on this site. Approval of Mine Closure Plan is attached as **Annexure VI.**
xlvii.	A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company for implementing environment policy and socio-economic issues and the capacity building required in this regard.	**Complied.** Separate multidisciplinary environmental management cell at Area Level has already been established. Environmental Engineer provided at Mine and Area level. A full-fledged Environment Department, headed by a HOD (Environment) along with a suitable qualified multidisciplinary team of Executives has been established. The activities are monitored on regular basis at Area and at Headquarters levels. GM (Environment) at Headquarters level, Coordinates with all the Areas and reports to the Director (Technical) and in turn, he reports to the CMD of the company. The team is multidisciplinary and very much motivated under the guidance of the company's Director (Technical) and CMD. Further capacity building at both corporate and operating levels is being done Copy of Office Order of Separate multidisciplinary environmental management cell at Area Level for Lodna area been enclosed as **Annexure X.**
xlviii.	Implementation of final mine closure plan for Cluster IX, subject to obtaining prior approval of the DGMS in regard to mine safety issues.	**Will be Complied.** Final Mine Closure Plan, will be prepared at appropriate time. Mine closure plan as per the guidelines of Ministry of Coal has been prepared by Central Mine Planning and Design Institute (CMPDIL) and progressive mine closure plan is being implemented. Approval of Mine Closure Plan is attached as **Annexure VI.**
xlix.	**Corporate Environment Responsibility**: - The company shall have a well laid down Environment Policy approved by the Board of Directors.	**Complied.** A well-defined Corporate Environment Policy has been constituted at BCCL: https://www.bcclweb.in/environment/CEP_2025.pdf and at CIL level: https://d3u7ubx0okog7j.cloudfront.net/documents/CEP-2023_fzZZl1q.pdf

		to promote sustainable development by protecting the environment through integrated project planning & design, prevention/mitigation of pollution, conservation of natural resources, restoration of ecology & biodiversity, recycling/ proper disposal of wastes, addressing climate change and inclusive growth.
	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.	**Complied.** A well-defined Corporate Environment Policy has already been laid down and approved by the Board of Directors.
	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.	**Complied.** A hierarchical system of the company to deal with environmental issue from corporate level to mine level already exists
	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.	**Complied.** Board reviews all the environment compliance matters that creates a system of reporting infringements/ deviation/ violation of the environmental/forest/wildlife norms/conditions and/or shareholders /stake holders on quarterly basis Following documents have been enclosed: 1. Flow chart of hierarchical system of the company to deal with environmental issue from corporate level are enclosed as **Annexure XXIV.** 2. CEP 2025 enclosed as **Annexure XXXVI.** 3. A letter with reference no.23/3/2015-ASO/BA, Government of India, Ministry of Coal, dated 26/04/2017 enclosed as **Annexure XXV.**

Sl. No.	B) General Conditions	Compliance
i.	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	**Complied.** No change in mining technology and scope of working has been undertaken.
ii.	No change in the calendar plan of production for quantum of mineral coal shall be made.	**Being Complied.** The approved peak production of coal for Cluster IX is 8.512 MTPA. The production of coal for the cluster is well within the limit Coal Production & Overburden Production since 2018 along with previous six months is enclosed in **Annexure I.**
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 ND_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.	**Being Complied.** The optimum location of monitoring stations in Jharia Coal Field has been identified with the consultant advisory of CMPDIL and finalized with the approval of Jharkhand State Pollution Control Board. The location of monitoring stations are: (i) Jeenagora (A13) (ii) Kusmatand Village (A12) (iii) Bhowrah North (A14) (iv) Hurriladih UGP (A28) The work of monitoring of ambient environment (Air quality monitoring and water quality monitoring including monitoring of Heavy metals) had been started by Central Institute of Mining & Fuel Research (CIMFR), Dhanbad which is having CSIR Laboratory recognized under the EP Rules. Currently CMPDIL is carrying out the work of monitoring. Specific mitigative measures have been taken for the Jharia Coalfields in the Environmental Action plan prepared for Dhanbad: 1. Covered transportation of coal. 2. Water sprinkling is being done by mobile water sprinklers and fog cannon along prominent dust generating roads. 3. Plantation. 4. Apprx. 1KM of Toe wall constructed along OB dump 5. Avenue Plantation along the road 6. Water sprinkling through Truck Mounted Fog Cannon. 7. Construction of Pucca Roads from South Tisra workshop to North tisra Checkpost. 8. Grass seeding on dormant OB Dumps. 9. Wetting of coal before loading at railway siding. 10. 2 Nos. of PM10 Analyser Instrument has been installed in core zone.

		11. Trolley mounted Fog canons installed at GOL Siding No. 9 12. Green net installed at railway siding. 13. COAAQMS installed in core zone. 14. Electric loaders deployed at sidings. Air quality Monitoring report is attached in **Annexure XXVI** Water quality monitoring report is attached in **Annexure XVII** Report for Monitoring of Heavy metals have been enclosed as **Annexure XXXIV.**
iv.	Data on ambient air quality (PM 10, PM 2.5, SO_2 and NO_X) and heavy metals such as HG, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.	**Being Complied.** Data is regularly submitted to ministry along with compliance report. Air quality Monitoring report, Water quality monitoring report and report of Monitoring of Heavy metals are being submitted with six monthly compliance report Documented enclosed herewith: 1. Monitoring location approved by JSPCB enclosed as **Annexure XI.** 2. Air quality Monitoring report is attached have been enclosed as **Annexure XXVI.** 3. Water quality monitoring report have been enclosed as **Annexure XVII.** 4. Monitoring of Heavy metals report have been enclosed as **Annexure XXXIV.**
v.	Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs / muffs.	**Being complied.** Personnel operating HEMMs, drilling machine and other machines comply with safety regulation and are equipped with Personal Protective Equipment. The noise and vibration during blasting operations are controlled by using Electronic Detonators. At present no U/G mine is in operation which is a high noise area. In the O/C mine, all equipment and machines are regularly maintained and the noise level is within prescribed limits Noise monitoring data has been enclosed as herewith as **Annexure XXVII.**
vi.	Industrial wastewater (workshop and wastewater from the Mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.	**Being Complied.** Industrial wastewater (workshop and wastewater from the Mine) is not discharged to any water body. Effluents discharge standards are regularly monitored by CMPDIL for cluster IX group of mines. Mine water is being treated using filter Plants (Pressure, Sand filters etc.) for its further use in industrial purpose and supply to the community. O&G trap present at MDO workshop.

<table>
<tr><td></td><td></td><td>Mine water monitoring report has been enclosed as Annexure XVII.

Photograph of O&G trap at MDO workshop enclosed as Annexure XLII.</td></tr>
<tr><td>vii.</td><td>Vehicular emission shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.</td><td>Being Complied.
PUC is being maintained for transport vehicles.

PUC Certificate some vehicle involved in transportation is enclosed as Annexure XXVIII.</td></tr>
<tr><td>viii.</td><td>Monitoring of environment 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.</td><td>Being Complied.
Ambient environmental monitoring is being done by CMPDIL.

Mine water monitoring report has been enclosed as Annexure XVII.
Noise monitoring data has been enclosed as herewith as Annexure XXVII.
Air quality Monitoring report is attached have been enclosed as Annexure XXVI.
Monitoring of Heavy metals report have been enclosed as Annexure XXXIV.</td></tr>
<tr><td>ix.</td><td>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.</td><td>Being Complied.
Dust is suppressed at source by water sprinkling. Dust masks are provided to persons working in dusty areas. The Project Proponent has submitted the details of dust masks provided to Personnel workers which are as follows::
<table>
<tr><th>FY</th><th>Dust Mask</th></tr>
<tr><td>2015-16</td><td>1000</td></tr>
<tr><td>2016-17</td><td>940</td></tr>
<tr><td>2017-18</td><td>1000</td></tr>
<tr><td>2018-19</td><td>1000</td></tr>
<tr><td>2019-20</td><td>350</td></tr>
<tr><td>2020-21</td><td>1500</td></tr>
<tr><td>2021-22</td><td>140</td></tr>
<tr><td>2022-23</td><td>540</td></tr>
<tr><td>2023-24</td><td>112</td></tr>
<tr><td>2024-25</td><td>123</td></tr>
<tr><td>2025-26</td><td>640</td></tr>
</table>
Details of Safety Equipment distributed since FY 2019-20 till March 25 is enclosed in Annexure XXXV.

Vocational training Centres under separate Human Resource Development Dept. is conducting regular training programme on these issues. Details of training programme are as:
<table>
<tr><th>Year</th><th>Total</th></tr>
<tr><td>2013-14</td><td>1348</td></tr>
</table></td></tr>
</table>

		<table><tr><td>**2014-15**</td><td>**1353**</td></tr><tr><td>**2015-16**</td><td>**2715**</td></tr><tr><td>**2016-17**</td><td>**1004**</td></tr><tr><td>**2017-18**</td><td>**2145**</td></tr><tr><td>**2018-19**</td><td>**1013**</td></tr><tr><td>**2019-20**</td><td>**794**</td></tr><tr><td>**2020-21**</td><td>**664**</td></tr><tr><td>**2021-22**</td><td>**566**</td></tr><tr><td>**2022-23**</td><td>**650**</td></tr><tr><td>**2023-24**</td><td>**398**</td></tr><tr><td>**2024-25**</td><td>**422**</td></tr><tr><td>**2025-26**</td><td>**614**</td></tr></table> Safety talks are regularly conducted before start and end of shifts. Photographs and record of such safety talks enclosed in **Annexure XLVI.**
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 measure, 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.	**Being Complied.** Initial Medical Examination (IME) of contracted personnel and periodical Medical Examination (PME) of all the personnel are carried out as per the Statutes and Director General of Mines Safety (DGMS) guidelines. Details of IME/PME done since 2018 till March 26 is enclosed in **Annexure XXXV** Details of PME/IME: <table><tr><td>**Year**</td><td>**IME**</td><td>**PME**</td></tr><tr><td>**2014**</td><td>**09**</td><td>**1710**</td></tr><tr><td>**2015**</td><td>**333**</td><td>**1564**</td></tr><tr><td>**2016**</td><td>**257**</td><td>**1335**</td></tr><tr><td>**2017**</td><td>**245**</td><td>**1134**</td></tr><tr><td>**2018**</td><td>**Nil**</td><td>**1400**</td></tr><tr><td>**2019**</td><td>**380**</td><td>**1058**</td></tr><tr><td>**2020**</td><td>**133**</td><td>**495**</td></tr><tr><td>**2021**</td><td>**Nil**</td><td>**1100**</td></tr><tr><td>**2022**</td><td>**Nil**</td><td>**1027**</td></tr><tr><td>**2023**</td><td>**Nil**</td><td>**558**</td></tr><tr><td>**2024**</td><td>**34**</td><td>**882**</td></tr><tr><td>**2025**</td><td>**110**</td><td>**526**</td></tr></table>
xi.	A separate environment 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.	**Complied.** Separate multidisciplinary environmental management cell at Area Level has already been established. Environmental Engineer provided at mine and Area level. The activities are monitored on regular basis at Area and at Head Quarters levels. GM (Environment) at Head Quarter Level Co-ordinates with all the Areas and reports to the Director (Technical) and in turn he reports to the CMD of the company. The team is multidisciplinary and very much

<table>
<tr><td></td><td></td><td>motivated under the guidance of company's Director (Technical) and CMD. Further capacity building at both corporate and operating level is being done.

Copy of Office Order regarding formulation of area level environment management cell is enclosed as Annexure X.</td></tr>
<tr><td>xii.</td><td>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.</td><td>Being Complied.
The funds are available at Area and HQ level for implementation of activities in the capital & revenue budget.
Separate account for environment protection measures. The details are as follows:
<table>
<tr><td>Accounting ledger</td><td>Items</td></tr>
<tr><td>41100018</td><td>Environmental Expenses- Tree Plantation</td></tr>
<tr><td>41100019</td><td>Environmental Expenses- Other Environmental</td></tr>
<tr><td>41100020</td><td>Environmental Expenses- Statutory payment to SPCB</td></tr>
<tr><td>41100021</td><td>Envt Expenses-Handling/disposal/Hazardous/Bio-MediWastes</td></tr>
<tr><td>41100022</td><td>Environmental Expenses- Air,water, Noise monitoring</td></tr>
<tr><td>41100023</td><td>Envt Expenses-Expenditure on OB dumps reclamation</td></tr>
<tr><td>41100024</td><td>Environmental Expenses- fees for Consent to Operate</td></tr>
<tr><td>41100025</td><td>Environmental Expenses- ISO related Activities</td></tr>
</table>
Details of the funds are available at Area and HQ level for implementation of activities in the capital & revenue budget are enclosed in Annexure XXIX.</td></tr>
<tr><td>xiii.</td><td>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.</td><td>Complied.
It has been complied and published timely.

Copy of newspaper advertisement enclosed as Annexure XXX.</td></tr>
<tr><td>xiv.</td><td>A copy of the environmental clearance letter shall be marked to concern</td><td>Complied.</td></tr>
</table>

	Panchayat/ ZilaParished, 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.	Environmental Clearance letter received by Panchayat/ Zila Parishad. Copy of Environmental Clearance letter received by Panchayat/ Zila Parishad is enclosed as **Annexure XXXI.**
xv.	A copy of the environmental clearance letter shall 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.** Photograph of display of CO Baliyapur Office enclosed as **Annexure XLIV.**
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 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.	**Being Complied.** The EC, its compliance along with monitoring data is being uploaded regularly on BCCL official website. http://www.bcclweb.in/?page_id=20425 The photo of the display of critical environmental parameters at the entrance of mine office enclosed as **Annexure XXXII.**
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 Offices of CPCB and the SPCB.	**Being Complied.** Six monthly reports of cluster –IX is regularly submitted to (twice in a year) the Regional Office of MoEFCC, Ranchi along with required data and information in soft copy. The same has been uploaded on Parivesh Portal.
xviii.	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the Office(s) of the Regional Office by furnishing the requisite data / information / monitoring reports.	**Being Complied.** Project will extend its all-possible support and cooperation to the Regional Office in any kind of monitoring/visit/data collection etc
xix.	The Environment Statement for each financial year ending 31 March in for-V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (protection) Rules, 1996, as amended subsequently,	**Complied.** Complied regularly on time. Environment Statement enclosed as **Annexure XXXIII.**

	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.	

Sl. No.	C.) Other Conditions by MOEF :	Compliance
i.	The Ministry or any other Competent Authority may stipulate any further condition(s) for environmental protection.	**Complied.** Following additional measure as informed by MoEF and JSPCB from time to time
ii.	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.	Agreed.
iii.	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act 1991 along with their amendments and Rules. the proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.	**Complied.** The storage of materials does not attract PLA, 1991.
iv.	The Environmental clearance is subject to the outcome of the Writ Petition filed by M/s Bharat Coking Coal Limited (BCCL) in response to the closure orders issued by the Jharkhand State Pollution Control Board which is pending in the Jharkhand High Court.	**Complied.** Writ Petition has been disposed of.

27-5-26

Project Officer
Amal. Joyrampur Colliery, BCCL

PROJECT OFFICER
AMAL. JOYRAMPUR COLLIERY
LODNA AREA (X). B.C.C.L

27/5/26

Addl. General Manager
Lodna Area, BCCL

27.5.26

General Manager
Lodna Area, BCCL

27/5/26

Project Officer
NT-ST (Exp.) OCP, BCCL

परियोजना पदाधिकारी
Agent/Project Officer
एकी0 नार्थ–साउथ तिसरा कुजमा ओसीपी
Amal. NT-ST- Kujama OCP
लोदना क्षेत्र–X
Lodna Area-X

27/05/26

Area Mgr. (Env.)
Lodna Area, BCCL

27/05/26

Asst. Mgr (Env)
Lodna Area, BCCL

Coal produced between Oct '25 to Mar '26 (Cluster IX, Lodna Area, BCCL) - Tonnes							
Mines	**Oct-25**	**Nov-25**	**Dec-25**	**Jan-26**	**Feb-26**	**Mar-26**	**Total**
Amal NTSTJG OCP	765151.83	701300	729950	479520	556935	659080	3891936.83
Amal Joyrampur Colliery	31650	32040	70980	69870	163710	231990	600240
Total	796801.83	733340	800930	549390	720645	891070	4492176.83

Overburden produced between Oct '25 to Mar '26 (Cluster IX, Lodna Area, BCCL) - M3							
Mines	**Oct-25**	**Nov-25**	**Dec-25**	**Jan-26**	**Feb-26**	**Mar-26**	**Total**
Amal NTSTJG OCP	1851232.31	2228507.3	2307150.08	2577185.44	2463047.92	1889187.05	13316310.1
Amal Joyrampur Colliery	1314451.18	1568473.04	1756181.11	1479052.47	1519767.84	623016.25	8260941.89
Total	3165683.49	3796980.34	4063331.19	4056237.91	3982815.76	2512203.3	21577251.99

Yearwise Production (2018-2026)				
	Total Coal (Tonnes)		**OBR (M3)**	
FY	**NT-ST (Expansion) OCP**	**AJC**	**NT-ST (Expansion) OCP**	**AJC**
2018-19	2484642	Nil	10362176	Nil
2019-20	2534760	Nil	11027419	Nil
2020-21	2264372	Nil	11953215	Nil
2021-22	3813224	Nil	10969702	Nil
2022-23	6048770	Nil	10961364	Nil
2023-24	6139275.64	706025	24773863.36	24271431.09
2024-25	5343635	807510	31902974.46	23419284.33
2025-26	7084721.83	808836.1	31331136.25	16638143.55

Details of Top soil generated, Backfilling area and Reclaimed			
FY	**Top Soil generated (cum)**	**Backfilling area (Ha)**	**Reclaimed Area (Ha.)**
2013-14	414332	3.6	Nil
2014-15	420456	4.38	5
2015-16	479584	5	7
2016-17	66049	1.6	7
2017-18	492342	4.75	7
2018-19	187598	-	3.8
2019-20	12552	-	0.3
2020-21	5000	-	16
2021-22	8400	-	-
2022-23	Nil	6	10
2023-24	Nil		
2024-25	Nil		
2025-26	Nil		

Annexure I

झारखण्ड सरकार
खान एवं भूतत्व विभाग
जिला खनन कार्यालय, धनबाद।
(Email- dmo-dhanbad@jharkhandmail.gov.in)

पत्रांकः–1868 /एम0, धनबाद, दिनांकः–10 / 12 /2025

प्रेषकः– जिला खनन पदाधिकारी,
धनबाद।

सेवा में,

महाप्रबंधक,
लोदना क्षेत्र,
मेसर्स बी0सी0सी0एल0, जिला– धनबाद।

विषयः– Submission of Coal Production details of dirrerent mines of Cluster IX, Lodna Area as per record available at collieries for FY 2018-19 to 2024-25.

प्रसंगः– आपका पत्रांक BCCL/LA/GM/2025-26/740, Dated 14.11.2025.

महाशय,

उपर्युक्त विषयक प्रासंगिक पत्र के आलोक में लोदना क्षेत्र अन्तर्गत NT-ST Expn. OCP & Amalgamated Joyrampur Colliery से वित्तीय वर्ष 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 & 2024-25 में कोयला खनिज का उत्पादन निम्नवत हैः–

SL#	Name of Colliery	JIMMS ID	Financial Year	Production	Unit
1	NT-ST Expn. OCP	0204017163	2018-19	2484642	MT
2			2019-20	2534760	MT
3			2020-21	2264372	MT
4			2021-22	3813224	MT
5			2022-23	6048770	MT
6			2023-24	6139275	MT
7			2024-25	5343635	MT
Total				**28628678**	MT

SL#	Name of Colliery	JIMMS ID	Financial Year	Production	Unit
1	Amalgamated Joyrampur Colliery	0204017164	2018-19	0	MT
2			2019-20	0	MT
3			2020-21	0	MT
4			2021-22	0	MT
5			2022-23	0	MT
6			2023-24	706025	MT
7			2024-25	807510	MT
Total				**1513535**	MT

नोटः– The production is being done through Underground and Opencast mechanism.

विश्वामित्राजन,

जिला खनन पदाधिकारी,
धनबाद।

Area-wise Action Taken Report

AREA-WISE ACTION TAKEN REPORT FOR EXTINGUISHING THE FIRE IN CLUSTER IX (In compliance of EC Specific Condition no. ii)

Name of Area/site	Name of Mine	Action Taken
Patch-B	NT-ST(Exp.) OCP	Fiery Hotspot are being dealt by only proven excavation method. The work was awarded for extraction of coal with vide ref no. BCCL/GM/SECY/LODNA/HIRING-HEMM-OS/2015/498 dated 30/06/2015 and BCCL/GM/SECY/LODNA/HIRING-HEMM-OS/2019/532 dated 28/03/2019. After Excavation of Fiery Coal, firefighting of coal is being done by directing water through hose pipe before stacking coal in coal dumps. Water is sprayed over stacked coals at coal dump in order to extinguish any left off coal fire.
Patch-F	NT-ST(Exp.) OCP	
Lodna, Near Raksha Kali Mandir	Amal. Joyrampur Colliery	Sand and Loose Materials are used to fill the cracks through which smoke is observed in order to minimize the spontaneous heating
Joyrampur Near Bagdigi Bridge	Amal. Joyrampur Colliery	
Gokul Park	NT-ST(Exp.) OCP	Soil has been spreaded on the slope of the Gokul Park to minimize the spontaneous heating and also some water pool has been created in Gokul Park to minimize the fire.

General Manager Lodna Area	AGM Lodna Area	AM (Env.) Lodna Area	Project Officer Amal. Joyrampur Colliery	Project Officer NT-ST(Exp.) OCP
	11/3/22	11/3/22	11/03/2022	11/3/22

Scanned with CamScanner

Annexure II

BHARAT COKING COAL LIMITED
(A Subsidiary of Coal India Limited)
Office of the Project Officer
Amalgamated Joyrampur Colliery
Lodna Area- X

Ref.No. BAR/AJC/SO/2021/ 419

Date:- 20/12/21

सेवा में,

सहायक समादेष्टा,
सी .आई एस .एफ,
जियलगोरा कैम्प

विषय :-अवैध खनन की भराई में सहयोग करने हेतु सूचना

महाशय,

दिनांक 22.12.2021 दिन बुधवार को सुबह 10 बजे बराटी कोलियरी में X सीम लक्ष्मी इंक्लाइन के पास प्रबंधन द्वारा अवैध खनन की भराई कराई जाएगी। अवैध खनन की भराई शांतिपूर्ण तरीके से हो इसके लिए हमें आपके सहयोग की आवश्यकता है।

अतः आपसे अनुरोध है की उक्त वर्णित स्थान पर अपनी मौजूदगी सुनिश्चित करके भराई का कार्य को शांतिपूर्ण ढंग से करने में सहयोग प्रदान करें।

परियोजना पदाधिकारी
एकीकृत जयरामपुर कोलियरी

प्रतिलिपि:-

१. क्षेत्रीय प्रबंधक (सुरक्षा), लोदना क्षेत्र
२. सुरक्षा पदाधिकारी, अमल- जयरामपुर कोलियरी
३. प्रबन्धक, अमल- जयरामपुर कोलियरी
४ कार्यालय प्रति

Annexure II

देवघर से प्रकाशित

जोहार झारखण्ड

RNI.NO. JH-03/000-3257

■ वर्ष-1 ■ पृष्ठ-6 ■ अंक- 15 ■ मूल्य-03 रुपया ■ joharjharkhand48@gmail.com

बीसीसीएल प्रबंधक द्वारा अवैध कोयला माईन्स की भराई

जोहार झारखण्ड/संवाददाता।

जोड़ापोखर। कोयला चोरी को रोकने को लेकर लगातार बीसीसीएल प्रबंधक द्वारा अवैध कोयला माईन्स की भराई की जा रही है। इसी के तहत आज बीसीसीएल क्षेत्र संख्या 10 अंतर्गत बरारी कोलियरी में कई जगह चल रहे कोयला के अवैध माईन्स के मुहानों को आज परियोजना पदाधिकारी ए के पांडेय के नेतृत्व में डोजरिंग कर भराई की गई। डोजरिंग के दौरान सीआईएसएफ तथा जोड़ापोखर पुलिस मुस्तैद दिखी। परियोजना पदाधिकारी ए के पांडेय ने बताया कि कोयला चोरी रोकने को लेकर लगातार छापेमारी कर अवैध कोयला के माइन्स की भराई की जा रही है। बरारी कोलियरी क्षेत्र के भूलन बरारी, भूलन 6 न., पंख घर, बाजार धौड़ा आदि जगहों पर अवैध कोयले की माईन्स की डोजरिंग के द्वारा भराई कराई गई है। उन्होंने कहा की क्षेत्र में अवैध कोयला के जरिये राजस्व का भारी नुकसान हो रहा है, हर हाल पर इसमें अंकुश लगाया जाएगा। मौके पर बीसीसीएल के प्रबंधक राम पूजन राम, सेफ्टी प्रबंधक केके महतो, सुखदेव मंडल आदि मौजूद थे।



घोवाटोड़ के रहने वाले
करण कुमार की अब जो
ली में जॉब करते हैं, उनकी
र स्टेशन पर पड़े चिंतित
मण सिंह पर पड़ी तो उन्होंने
लालमणि वृद्ध सेवा आश्रम
खाना पूर्ति के बाद उन्हें आश्रम में
रहने के लिए स्थान उपलब्ध
कराई. आश्रम के अध्यक्ष नौशाद
गद्दी ने कहा की विगत 2006 से
वे वृद्ध जनों के सेवा में तत्पर है
लक्ष्मण सिंह को व्यवस्थित करने
में आश्रम अध्यक्ष नौशाद गद्दी
सदस्य ओमकार मिश्रा, अभिकरण
कुमार समेत ओल्ड एज होम के
सेवाकर्ता उपस्थित थे.

है हैं मनमानी पैसे

से वाहनों

सबब

नहीं दिलाया निजात



सूली बाइक फंसने पर 100
ए वहीं कार व मालवाहक
सने पर 500 रुपए तक की
सूली की बातें सामने आयी है.
हीं ऑटो वालों से भी 200
ए तक वसूला जा रहा है.
लिस की तैनाती के बाद भी वे
ामोश रहते हैं.

बरारी कोलियरी क्षेत्र के कई स्थानो के अवैध उत्खनन मुहानों की जयरामपुर पीओ ने की भराई



नई पत्रवार्ता प्रतिनिधि

झरिया : लोदना क्षेत्र के बरारी कोलियरी के कई जगहों पर चल रहे कोयला के अवैध माइंस के मुहानों को बुधवार को एकीकृत जयरामपुर के परियोजना पदाधिकारी एके पांडेय ने डोजरिंग कराने पहुंचे, जिसके बाद कोयला तस्करों में हड़कम मच गया.डोजरिंग के दौरान सीआईएसएफ तथा जोड़ापोखर पुलिस मौजूद थी. परियोजना पदाधिकारी एके पांडेय ने बताया कि महाप्रबंधक के आदेश पर बरारी कोलियरी क्षेत्र के भूलन बरारी, कब्रिस्तान,भूलन बरारी 6 नंबर , पंखा घर, बाजार धौड़ा आदि जगहों पर अवैध कोयले की माइंस की डोजरिंग के द्वारा भराई कराई गई है. उन्होंने कहा की क्षेत्र में अवैध कोयला के उत्खनन से राजस्व का भारी नुकसान हो रहा है. हर हाल पर इस पर अंकुश लगाया जाएगा. मौके पर बीसीसीएल के प्रबंधक एसके सील, सुखदेव मंडल, राजेश महतो, अजित मांझी आदि मौजूद थे.

Global Expression of Interest (EoI)

For

Dealing with coal mine fires in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand, India. Detailed scope of work as given in the document.

LAST DATE OF SUBMISSION : 28.04.2014

1. BHARAT COKING COAL LIMITED: A PROFILE

Bharat Coking Coal Limited incorporated in January, 1972 is a fully owned subsidiary of Coal India Limited a 'Maharatna' Public Sector Undertaking under the Ministry of Coal, Government of India. Being the sole repository of prime coking coal in the country, BCCL, at present operates 66 coal mines spread over in Jharia Coalfield and part of Raniganj Coalfield apart from 6 coking coal washeries & 2 non-coking coal washeries. The mines are grouped under 12 areas for administrative convenience. BCCL has some unique inherent and perennial characteristics which are adversely affect the normal operation of the Company. Difficult geo-mining conditions involving large number of overlaying coal seams, preponderance of old workings, high degree of gassiness, coal fires affecting working seams, water logged upper seams above current places of working, etc, restricts coal production and productivity. Besides, high density of population in the coal bearing areas limits the equipment size of opencast operations apart from being an impediment to acquisition of land for uninterrupted operations. In the year 2012-13, the company achieved a coal production of 31.21 million tone and offtake of 32.99 million tone thereby registering the highest ever the Turnover and Profitability (PAT) of Rs 10176.62 Cr. and Rs 1709.06 respectively. A brief description of the organizational structure and the detailed activities of Bharat Coking Coal Limited can be viewed in the website http://www.bccl.gov.in.

The mission is to produce planned quantity of coal efficiently and economically in an Eco-friendly manner with due regard to Safety, Conservation & Quality. The company strives to meet the growing demand of thermal as well as metallurgical coal in the country in a environmentally and socially sustainable manner.

SC-10

2.2. Bidder's Credential Requirement:

i) The bidder(s) must have successfully dealt with mine fire in at least two coal mines, one open cast and one underground mine. The annual capacity of opencast and underground mines should be at least 2 Mt and 0.5 Mt respectively during last seven years of last financial year. The documentary proof of successful dealing with fire shall be submitted along with the bid.

ii) The bidders in their name must have achieved a minimum average annual financial turnover of INR One Hundred Million or equivalent USD during last 3 years ending 31st March of previous financial year. The documentary evidence to this effect would be copies of audited Balance Sheet and Profit & Loss A/c duly countersigned by the authorized representative of bidding company and a declaration to the above affect duly signed by the authorized representative of bidding company & counter signed by a Chartered Accountant or equivalent.

iii) The bidder must possess "key personnel" (minimum number) of the following categories with requisite qualification and experience :-

Sl. No	Skill of key personnel	Requisite Qualification	Minimum Experience	Minimum Nos. for eligibility
1.	Technical Expert (Mining/ Fire dealing/ Mine Rescue)	B.E /B.Tech (Mining) or equivalent	10 years	10
2.	Technical Expert (Geology/Remote Sensing)	M. Sc (Geology) or equivalent	10 years	2
4.	Technical expert (Environment)	B. Tech/BE/M.Sc.(Envr) or equivalent	10 years	1
4.	Technical Expert (Infrastructure)	B.E /B.Tech (Mechanical / Electrical / Civil) or equivalent	10 years	3
5.	IT Expert	B.E /B.Tech/ M.Sc (Computer) or equivalent	10 years	1
6.	Financial Expert	MBA(Finance)/Chartered Accountant/ICWA or equivalent	10 years	1

Note :- The bidder shall designate one of the team members as the team leader.

The documentary evidence to this effect would be self-attested CVs including necessary competency certificate for work in Indian mines duly countersigned by the authorized representative of bidding company.

iv) Copy of PAN (Permanent Account Number) with Income Tax Authority in India for bidder(s) from India.

v) Copy of PAN Based Service Tax Registration Number in India for bidder (s) from India.

3.0 Availability of details for EOI :

Details for EOI including Terms and Conditions of EOI can be collected from the following place during the period as stated below:

Date: From **27.01.2014** to **26.02.2014.**

Time: **10.00 AM** to **1.00 PM** (on all working days)

Office of the GM (CMC)
Contract Management Cell, BCCL
Level-V, Koyla Bhawan,
Dhanbad - 826005

Details for EOI including Terms and Conditions of EOI can also be downloaded directly from the BCCL web-site http://www.bccl.gov.in and NIC Portal, website http://www.tenders.gov.in during the period as mentioned above.

4.0 Pre - EOI submission meeting :

Pre - EOI submission meeting will be held on **14.02.2014 at 11:00AM** in the office of GM (CMC), BCCL, Level-V, Koyla Bhawan, Dhanbad for clarifications and discussion.

5.0 GENERAL INSTRUCTIONS FOR SUBMISSION OF EOI :

Expression of Interest (EOI) shall be submitted by the Consultants / agencies / firms / organizations in a sealed envelope superscribed with **"EOI for Dealing with coal mine fires in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand, India. Detailed scope of work as given in the document."** giving EOI reference no. with date and full postal address & telephone nos. on the envelope.

6.0 RECEIPT OF EOI

EOI will be received in sealed envelopes up to **28.04.2014** at the following address only:

Office of the GM (CMC)
Contract Management Cell, BCCL
Level-V, Koyla Bhawan,
Dhanbad - 826005

The offers may be submitted through post also. BCCL takes no responsibility for delay, loss or non receipt of the offers send by post. Fax offers or offers sent through e-mail shall not be accepted.

SC-ID

7.0 OPENING OF THE EOI :

EOI will be opened **on 29.04.2014 at 04.00 PM** in the office of the GM (CMC), BCCL, Level-V, Koyla Bhawan, Dhanbad-826005.

8.0 Bidders are requested to go through the details of EOI document & enclose all the required documents along with the proposal. Each page of the proposal shall be signed with seal.

9.0 Prospective parties may note that mere submission of EOI and / or submission of additional information do not automatically entitle them to claim for pre-qualification. BCCL reserves the right to seek for any other information during the process of evaluation, if required.

10.0 BCCL reserves the right to reject any / all the applications to EOI without assigning any reason(s) whatsoever thereof.

Sd/-
General Manager
(Contract Management Cell)

Distribution :

1. PRO – With a request to publish the abridged EOI as enclosed in local as well as National dailies as per norms of the Company and also arrange to send the paper cutting of publication to the Contract Management Cell.
2. D(T)OP / D(T)P&P / D(F) / D(P) / CVO.
3. GM(Co-ordn) / GM(S&M) / GM(F)I/C / GM(M&M) / GM(E&M) / GM(Excv) / GM(P&P) / GM(IE) / GM(System) / Dy. GM (Envt.), BCCL
4. Sr.ES to CMD - for kind information of CMD.
5. HOD (Admn) with a request to display this EOI in Koyla Bhawan Notice Boards.
6. All CGMs/GMs of the Areas including Washery Zones for wide circulation through display in the Notice Boards.
7. Inspector, CISF- with a request to deploy security personnel at the office of GM (CMC), Level-V, Koyla Bhawan on 28.04.2014 from 9:30A.M to 4:00P.M and on 29.04.2014 from 3:30 PM till completion of the meeting.
8. Desk In-Charge, BCCL, M M Division, 4th floor, 6, Lyons Range, Kolkata.
9. CGM / GM (Contract Management Cell), WCL/SECL/NCL/MCL/ECL/CCL & CIL
10. Sri R.K. Choubey, Sr.DEO / Sri B N Banerjee, DEO, CMC Deptt. - to upload this EOI in BCCL Website and forward soft copy of NIC format to GM (System) for uploading the same at NIC portal website (soft copy of the same is enclosed for needful).

Sd/-
General Manager
(Contract Management Cell)

Fire Dealing Photographs






GPS Map Camera
Tisra, Jharkhand, India
Pccm+grx, Tisra, Jharkhand 828131, India
Lat 23.723113° Long 86.436154°
Saturday, 15/11/2025 12:28 PM GMT +05:30
Google


GPS Map Camera
Tisra, Jharkhand, India
Pc9h+h75, Tisra, Jharkhand 828131, India
Lat 23.719132° Long 86.428487°
Saturday, 29/11/2025 10:45 AM GMT +05:30
Google


Tisra, Jharkhand, India
Pc9h+h76, Tisra, Jharkhand 828131, India
Lat 23.719004° Long 86.428646°
Saturday, 29/11/2025 10:45 AM GMT +05:30
Google



Global Expression of Interest (EoI)

For

Dealing with coal mine fires in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand, India. Detailed scope of work as given in the document.

LAST DATE OF SUBMISSION : 28.04.2014

1. BHARAT COKING COAL LIMITED: A PROFILE

Bharat Coking Coal Limited incorporated in January, 1972 is a fully owned subsidiary of Coal India Limited a 'Maharatna' Public Sector Undertaking under the Ministry of Coal, Government of India. Being the sole repository of prime coking coal in the country, BCCL, at present operates 66 coal mines spread over in Jharia Coalfield and part of Raniganj Coalfield apart from 6 coking coal washeries & 2 non-coking coal washeries. The mines are grouped under 12 areas for administrative convenience. BCCL has some unique inherent and perennial characteristics which are adversely affect the normal operation of the Company. Difficult geo-mining conditions involving large number of overlaying coal seams, preponderance of old workings, high degree of gassiness, coal fires affecting working seams, water logged upper seams above current places of working, etc, restricts coal production and productivity. Besides, high density of population in the coal bearing areas limits the equipment size of opencast operations apart from being an impediment to acquisition of land for uninterrupted operations. In the year 2012-13, the company achieved a coal production of 31.21 million tone and offtake of 32.99 million tone thereby registering the highest ever the Turnover and Profitability (PAT) of Rs 10176.62 Cr. and Rs 1709.06 respectively. A brief description of the organizational structure and the detailed activities of Bharat Coking Coal Limited can be viewed in the website http://www.bccl.gov.in.

The mission is to produce planned quantity of coal efficiently and economically in an Eco-friendly manner with due regard to Safety, Conservation & Quality. The company strives to meet the growing demand of thermal as well as metallurgical coal in the country in a environmentally and socially sustainable manner.

SC-10

2.2. Bidder's Credential Requirement:

i) The bidder(s) must have successfully dealt with mine fire in at least two coal mines, one open cast and one underground mine. The annual capacity of opencast and underground mines should be at least 2 Mt and 0.5 Mt respectively during last seven years of last financial year. The documentary proof of successful dealing with fire shall be submitted along with the bid.

ii) The bidders in their name must have achieved a minimum average annual financial turnover of INR One Hundred Million or equivalent USD during last 3 years ending 31st March of previous financial year. The documentary evidence to this effect would be copies of audited Balance Sheet and Profit & Loss A/c duly countersigned by the authorized representative of bidding company and a declaration to the above affect duly signed by the authorized representative of bidding company & counter signed by a Chartered Accountant or equivalent.

iii) The bidder must possess "key personnel" (minimum number) of the following categories with requisite qualification and experience :-

Sl. No	Skill of key personnel	Requisite Qualification	Minimum Experience	Minimum Nos. for eligibility
1.	Technical Expert (Mining/ Fire dealing/ Mine Rescue)	B.E /B.Tech (Mining) or equivalent	10 years	10
2.	Technical Expert (Geology/Remote Sensing)	M. Sc (Geology) or equivalent	10 years	2
4.	Technical expert (Environment)	B. Tech/BE/M.Sc (Envr) or equivalent	10 years	1
4.	Technical Expert (Infrastructure)	B.E /B.Tech (Mechanical / Electrical / Civil) or equivalent	10 years	3
5.	IT Expert	B.E /B.Tech/ M.Sc (Computer) or equivalent	10 years	1
6.	Financial Expert	MBA(Finance)/Chartered Accountant/ICWA or equivalent	10 years	1

Note :- The bidder shall designate one of the team members as the team leader.

The documentary evidence to this effect would be self-attested CVs including necessary competency certificate for work in Indian mines duly countersigned by the authorized representative of bidding company.

iv) Copy of PAN (Permanent Account Number) with Income Tax Authority in India for bidder(s) from India.

v) Copy of PAN Based Service Tax Registration Number in India for bidder (s) from India.

3.0 Availability of details for EOI :

Details for EOI including Terms and Conditions of EOI can be collected from the following place during the period as stated below:

Date: From **27.01.2014** to **26.02.2014.**

Time: **10.00 AM** to **1.00 PM** (on all working days)

Office of the GM (CMC)
Contract Management Cell, BCCL
Level-V, Koyla Bhawan,
Dhanbad - 826005

Details for EOI including Terms and Conditions of EOI can also be downloaded directly from the BCCL web-site http://www.bccl.gov.in and NIC Portal, website http://www.tenders.gov.in during the period as mentioned above.

4.0 Pre - EOI submission meeting :

Pre - EOI submission meeting will be held on **14.02.2014 at 11:00AM** in the office of GM (CMC), BCCL, Level-V, Koyla Bhawan, Dhanbad for clarifications and discussion.

5.0 GENERAL INSTRUCTIONS FOR SUBMISSION OF EOI :

Expression of Interest (EOI) shall be submitted by the Consultants / agencies / firms / organizations in a sealed envelope superscribed with **"EOI for Dealing with coal mine fires in lease hold of BCCL in Jharia Coalfield, Dhanbad, Jharkhand, India. Detailed scope of work as given in the document."** giving EOI reference no. with date and full postal address & telephone nos. on the envelope.

6.0 RECEIPT OF EOI

EOI will be received in sealed envelopes up to **28.04.2014** at the following address only:

Office of the GM (CMC)
Contract Management Cell, BCCL
Level-V, Koyla Bhawan,
Dhanbad - 826005

The offers may be submitted through post also. BCCL takes no responsibility for delay, loss or non receipt of the offers send by post. Fax offers or offers sent through e-mail shall not be accepted.

SC-ID

7.0 OPENING OF THE EOI :

EOI will be opened **on 29.04.2014 at 04.00 PM** in the office of the GM (CMC), BCCL, Level-V, Koyla Bhawan, Dhanbad-826005.

Bidders are requested to go through the details of EOI document & enclose all the required documents along with the proposal. Each page of the proposal shall be signed with seal.

9.0 Prospective parties may note that mere submission of EOI and / or submission of additional information do not automatically entitle them to claim for pre-qualification. BCCL reserves the right to seek for any other information during the process of evaluation, if required.

10.0 BCCL reserves the right to reject any / all the applications to EOI without assigning any reason(s) whatsoever thereof.

Sd/-
General Manager
(Contract Management Cell)

Distribution :

1. PRO – With a request to publish the abridged EOI as enclosed in local as well as National dailies as per norms of the Company and also arrange to send the paper cutting of publication to the Contract Management Cell.
2. D(T)OP / D(T)P&P / D(F) / D(P) / CVO.
3. GM(Co-ordn) / GM(S&M) / GM(F)I/C / GM(M&M) / GM(E&M) / GM(Excv) / GM(P&P) / GM(IE) / GM(System) / Dy. GM (Envt.), BCCL
4. Sr.ES to CMD - for kind information of CMD.
5. HOD (Admn) with a request to display this EOI in Koyla Bhawan Notice Boards.
6. All CGMs/GMs of the Areas including Washery Zones for wide circulation through display in the Notice Boards.
7. Inspector, CISF- with a request to deploy security personnel at the office of GM (CMC), Level-V, Koyla Bhawan on 28.04.2014 from 9:30A.M to 4:00P.M and on 29.04.2014 from 3:30 PM till completion of the meeting.
8. Desk In-Charge, BCCL, M M Division, 4th floor, 6, Lyons Range, Kolkata.
9. CGM / GM (Contract Management Cell), WCL/SECL/NCL/MCL/ECL/CCL & CIL
10. Sri R.K. Choubey, Sr.DEO / Sri B N Banerjee, DEO, CMC Deptt. - to upload this EOI in BCCL Website and forward soft copy of NIC format to GM (System) for uploading the same at NIC portal website (soft copy of the same is enclosed for needful).

Sd/-
General Manager
(Contract Management Cell)

Communication with IIT (ISM) and CIMFR, Dhanbad for providing expertise for control of fire.

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-X

Ref No.: BCCL/LA/GM/2022/ 16 Date: 6/5/2022

To
The Director
CIMFR,Dhanbad
Dhanbad,Jharkhand
PIN-826015

Subject: Request for providing your expertise for control of fire and their reclamation in Cluster- IX of BCCL.

Respected sir,
As per inspection done by Integrated Regional Office Ranchi MoEF&CC on dated 23.02.2022 and 24.02.2022 (inspection report enclosed) of cluster IX group of mines of BCCL and specific condition no -xi of Environmental clearance no.-NO.J-11015/307/2010-IA.II (M) (Copy attached), your expertise/ recommendation is needed for control of fire and their reclamation in cluster-IX group of mines of BCCL as cluster-IX groups of mines are fire affected.

You are therefore requested to provide your expertise/recommendations for control of fire and their reclamation in cluster-IX group of mines of BCCL.

I shall be highly obliged to you for this act of kindness.

Thanking you!

Faithfully your's
6/5/22
General Manager
Lodna Area,BCCL

Encl: As above.

Cc to:
1. HoD(Env.),BCCL
2. File.

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-X

Ref No. : BCCL/LA/GM/2022/17 Date: 6/5/2022

To
The Director
IIT(ISM), Dhanbad
Dhanbad,Jharkhand
PIN-826004

Subject: Request for providing your expertise for control of fire and their reclamation in Cluster- IX of BCCL.

Respected sir,

As per inspection done by Integrated Regional Office Ranchi MoEF&CC on dated 23.02.2022 and 24.02.2022 (inspection report enclosed) of cluster IX group of mines of BCCL and specific condition no -xi of Environmental clearance no.-NO.J-11015/307/2010-IA.II (M) (Copy attached) , your expertise/ recommendation is needed for control of fire and their reclamation in cluster-IX group of mines of BCCL as cluster-IX groups of mines are fire affected.

You are therefore requested to provide your expertise/recommendations for control of fire and their reclamation in cluster-IX group of mines of BCCL.

I shall be highly obliged to you for this act of kindness.

Thanking you!

Faithfully your's

6/5/22

General Manager
Lodna Area,BCCL

Encl: As above.

Cc to:

1. HoD(Env.),BCCL
2. File.

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-X

Ref No.: BCCL/LA/GM/2022/755 Date: 13/10/2022

To
The Director
CIMFR,Dhanbad
Dhanbad,Jharkhand
PIN-826015

Subject: Request for providing Performa Invoice (PI)/Quotation for providing your expertise for control of fire and their reclamation in Cluster- IX of BCCL.

Respected sir,

As per inspection done by Integrated Regional Office Ranchi MoEF&CC on dated 23.02.2022 and 24.02.2022 (inspection report enclosed) of cluster IX group of mines of BCCL and specific condition no -xi of Environmental clearance no.-NOJ-11015/307/2010-IA.II (M) (Copy attached), your expertise/ recommendation is needed for control of fire and their reclamation in cluster-IX group of mines of BCCL as cluster-IX groups of mines are fire affected.

You are therefore requested to provide Performa Invoice(PI)/Quotation for providing your expertise/recommendations for control of fire and their reclamation in cluster-IX group of mines of BCCL.

I shall be highly obliged to you for this act of kindness.

Thanking you!

Faithfully your's
13/10/22
General Manager
Lodna Area,BCCL

Encl: As above.

Cc to:

1. HoD(Env.),BCCL.
2. File.

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-X

Ref No. : BCCL/LA/GM/2022/757 Date: 13/10/2022

To
The Director
BIT Sindri, Dhanbad
Dhanbad,Jharkhand
PIN-828123

Subject: Request for providing Performa Invoice (PI)/Quotation for providing your expertise for control of fire and their reclamation in Cluster- IX of BCCL

Respected sir,

As per inspection done by Integrated Regional Office Ranchi MoEF&CC on dated 23.02.2022 and 24.02.2022 (inspection report enclosed) of cluster IX group of mines of BCCL and specific condition no -xi of Environmental clearance no.-NO.J-11015/307/2010-IA.II (M) (Copy attached), your expertise/ recommendation is needed for control of fire and their reclamation in cluster-IX group of mines of BCCL as cluster-IX groups of mines are fire affected.

You are therefore requested to provide Performa Invoice(PI)/Quotation for providing your expertise/recommendations for control of fire and their reclamation in cluster-IX group of mines of BCCL.

We shall be highly obliged to you for this act of kindness.

Thanking you!!

Faithfully your's

13/10/22
General Manager
Lodna Area,BCCL

Encl: As above.

Cc to:

1. HoD(Env.),BCCL
2. File.

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-II

Ref No. : BCCL/LA/GM/2022/756 Date: 13/10/2022

To
The Director
IIT(ISM), Dhanbad
Dhanbad,Jharkhand
PIN-826004

Subject: Request for providing Performa Invoice (PI)/Quotation for providing your expertise for control of fire and their reclamation in Cluster- IX of BCCL.

Respected sir,

As per inspection done by Integrated Regional Office Ranchi MoEF&CC on dated 23.02.2022 and 24.02.2022 (inspection report enclosed) of cluster IX group of mines of BCCL and specific condition no -xi of Environmental clearance no.-NOJ-11015/307/2010-IA.II (M) (Copy attached), your expertise/ recommendation is needed for control of fire and their reclamation in cluster-IX group of mines of BCCL as cluster-IX groups of mines are fire affected.

You are therefore requested to provide Performa Invoice(PI)/Quotation for providing your expertise/recommendations for control of fire and their reclamation in cluster-IX group of mines of BCCL.

We shall be highly obliged to you for this act of kindness.

Thanking you!

Faithfully your's

13/10/22
General Manager
Lodna Area,BCCL

Encl: As above.

Cc to:

1. HoD(Env.),BCCL
2. File.

Annexure IV

Gmail Environment Lodna Area <envlodna@gmail.com>

Fw: Recommendation of Indira Gandhi Centre of atomic Research, Kalpakkam for dealing the fire in coal mine in Jharia coalfield.

O.T.G.Nair <diradmn@igcar.gov.in> 24 February 2020 at 13:47
To: envlodna@gmail.com
Cc: "Venkatraman B.[Dir SQFRMG]" <bvenkat@igcar.gov.in>, borah@igcar.gov.in

Sir,

It appears that the reference to IGCAR in the MoEF letter dated 21-5-2013 is erroneous. You may like to check-up with MoEF. .

Regards,

Director (P&A)

From: Environment Lodna Area
Sent: Saturday, February 15, 2020 12:35 AM
To: O.T.G.Nair ; borah@igcar.gov.in
Subject: Re: Fw: Recommendation of Indira Gandhi Centre of atomic Research, Kalpakkam for dealing the fire in coal mine in Jharia coalfield.

Dear Sir,

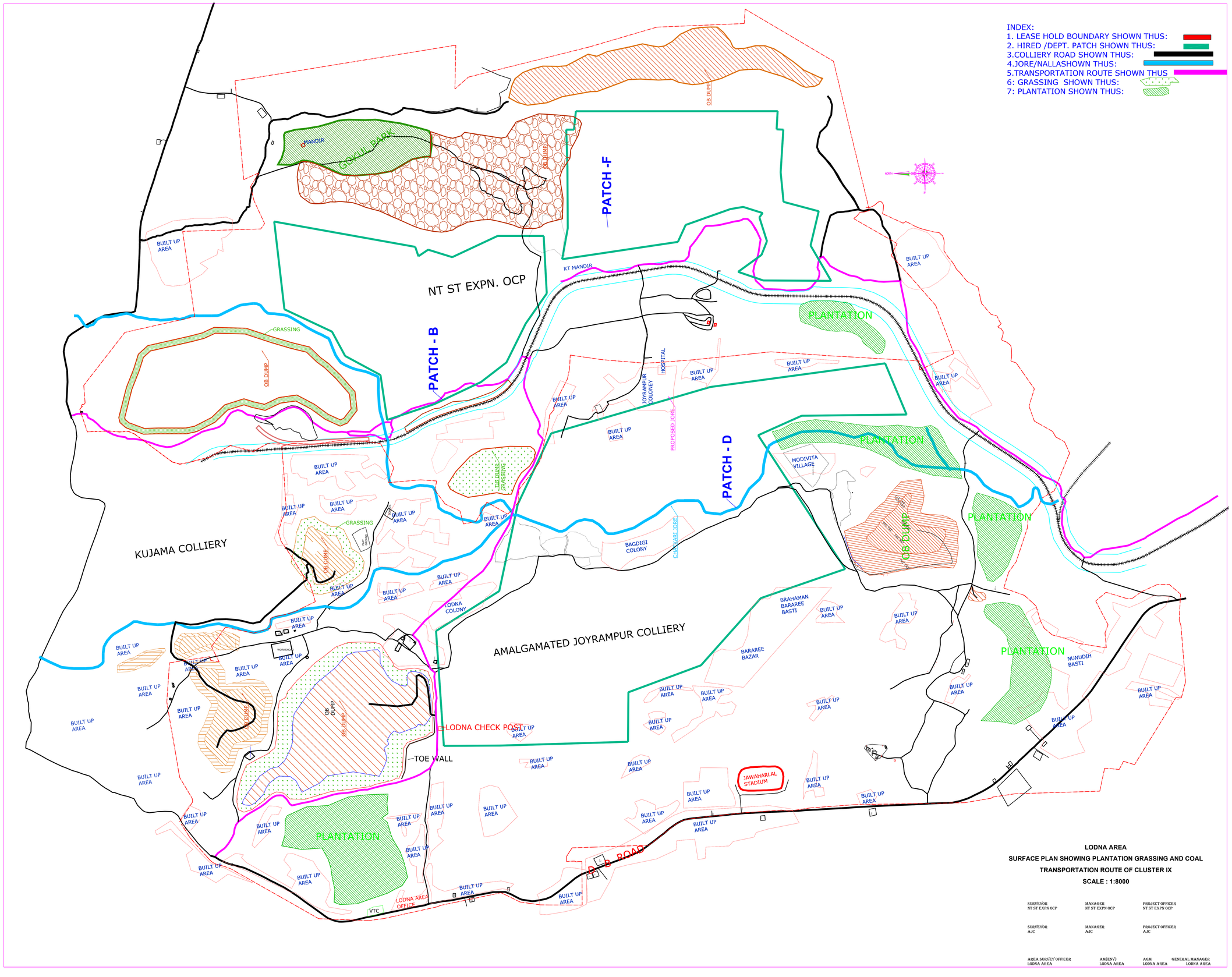
As per **EC no: J-11015/307/2010-IA-II (M) dated: 21st May 2013, Specific condition no. iv** (copy attached) of Cluster IX, it is mentioned that the recommendation of Indira Gandhi Centre for Atomic Research, Kalpakkam should be followed. Cluster IX of mines situated in Lodna Area of Jharial Coal field is highly affected by fire.

We request you provide us the recommendation made by your institution for dealing the fire in the following address.
Enclosure: EC (Cluster IX)

warm regards
General manager

On Thu, 9 Jan 2020 at 22:32, O.T.G.Nair <diradmn@igcar.gov.in> wrote:

> Dear Dr. Borah,
>
> The previous papers were sent to you for a response to the firm. Please look into this.
>
> Regards,
>
> OTG Nair
>
> From: Environment Lodna Area
> Sent: Saturday, January 11, 2020 12:59 AM
> To: O.T.G.Nair
> Subject: Re: Fw: Recommendation of Indira Gandhi Centre of atomic Research, Kalpakkam for dealing the fire in coal mine in Jharia coalfield.
>
> Dear Sir,
> Please give your recommendation. We need to comply this condition as per EC given by MoEF&CC and we have to submit the report to MoEF&CC.
> So You are kindly requested to do the needful at the earliest.
>
> warm regards
> General manager


INDEX:
1. LEASE HOLD BOUNDARY SHOWN THUS:
2. HIRED /DEPT. PATCH SHOWN THUS:
3.COLLIERY ROAD SHOWN THUS:
4.JORE/NALLASHOWN THUS:
5.TRANSPORTATION ROUTE SHOWN THUS
6: GRASSING SHOWN THUS:
7: PLANTATION SHOWN THUS:
PATCH -F
PATCH - B
PATCH - D
NT ST EXPN. OCP
KUJAMA COLLIERY
AMALGAMATED JOYRAMPUR COLLIERY
GOVT. LAND
MANDIR
KT MANDIR
OB DUMP
BUILT UP AREA
GRASSING
PLANTATION
HOSPITAL
JOYRAMPUR COLONEY
PROPOSED JORE
MODIVITA VILLAGE
BAGDIGI COLONY
CHAKARI JORE
LODNA COLONY
BRAHAMAN BARAREE BASTI
BARAREE BAZAR
NUNUDIH BASTI
LODNA CHECK POST
TOE WALL
JAWAHARLAL STADIUM
B ROAD
LODNA AREA OFFICE
VTC
WORKSHOP
LODNA AREA
SURFACE PLAN SHOWING PLANTATION GRASSING AND COAL
TRANSPORTATION ROUTE OF CLUSTER IX
SCALE : 1:8000
SURVEYOR NT ST EXPN OCP
MANAGER NT ST EXPN OCP
PROJECT OFFICER NT ST EXPN OCP
SURVEYOR AJC
MANAGER AJC
PROJECT OFFICER AJC
AREA SURVEY OFFICER LODNA AREA
AM(ENV) LODNA AREA
AGM LODNA AREA
GENERAL MANAGER LODNA AREA


GPS Map Camera
Tisra, Jharkhand, India
PC8W+54Q, Tisra, Jharkhand 828115, India
Lat 23.715470, ° Long 86.445357°
20/01/26 02:24 PM GMT +05:30
Google


GPS Map Camera
Tisra, Jharkhand, India
PC8W+54Q, Tisra, Jharkhand 828115, India
Lat 23.715470, ° Long 86.445357°
20/01/26 02:11 PM GMT +05:30
Google


GPS Map Camera
Tisra, Jharkhand, India
PC8W+54Q, Tisra, Jharkhand 828115, India
Lat 23.715469, ° Long 86.445353°
20/01/26 02:09 PM GMT +05:30
Google

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.

BHARAT COKING COAL LIMITED

MINING PLAN

AND

MINE CLOSURE PLAN

FOR

AMALGAMATED JOYRAMPUR COLLIERY (OC)

(LODNA AREA)

November – 2017

CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD.
REGIONAL INSTITUTE NO.-II
DHANBAD

GENERAL INFORMATION

1. Name of the Coal Block area (Acre/Hectare/Sq. Km.)
   Amalgamated Joyrampur Colliery(OC) (Part of Mukunda), 1186.97 Ha as per the plan supplied by the colliery authority.

2. Name of the Coalfield and its location i.e. District and State
   Jharia Coalfield, Dhanbad distt. , Jharkhand

3. Name & Address of the Applicant : Kalyanji Prasad
   General Manager,
   Lodna Area, Bharat Coking Coal Limited,
   Dhanbad.

4 Indication, if it is a Revised Mining Plan and if so, the Revision no. i.e. First Revision, Second Revision etc.

   Not Applicable

5. Targetted capacity: 2.512 MTY + 30%

6. Date of preparation of Mining Plan- November.2017

7. Indication, if the Mining Plan is re-submitted after incorporation the suggestions of Standing Committee

   Not Applicable

C. SUMMARISED DATA	
1. General	
a) Name and Addresses of the applicant company	BCCL(A Central Public Sector Undertaking) owned by Govt. of India
b) Name and address of the Block allottee	Not Applicable
c) Relationship between the applicant allottee company	Not Applicable
d) Status of the applicant company: Central / Public Sector Undertaking / state Government Undertaking / IV Company / Pvt. Company / Public Co. / Others (Specify).	Central PSU
e) Name of the coal block together with name of coalfield & state where located	Part of Mukunda Block, JCF, JHARKHAND
f) Date of allotment	By Nationalisation
g) End use of coal as per approval by the competent authority	Power Houses & Steel Plant
h) ROM quantity proposed to be produced as per mining plan	0.40 Mill.Te in 1st year, 0.70 Mill.Te. in 2nd year, 1.00 Mill.Te per annum in 3 rd year, 1.40 in 4th year, 1.90 Mill. Te. In 5th year, 2.512 Mill.Te. from 6 th year to 22nd year, 1.80 Mill.Te in 23rd year, 1.30 Mill. Te. In 24 th year, 0.825 Mill. Te in 25th year.
i) Norms adopted for calculating ROM quantity requirement is case is differs from the quantity indicated in the allotment order.	Not Applicable
j) Beneficiation required – Yes/No	No
k) Requirement of beneficiated coal & expected availability thereof.	Not Applicable
l) Period for which mining lease is to be renewed	NA
m) Date of Expiry of earlier mining lease, if any	30.04.2002
n) RQP who has prepared the mining plan*	

*Based on authenticated data, information and plans furnished by Amalgamated Joyrampur Colliery (OC), Lodna Area, BCCL, this mining plan is prepared at CMPDI, RI-II.

D. Information regarding earlier approved Mining Plans, if any	
a) Approval letter no and date	**NOT APPLICABLE**
b) Lease Area	
c) Date of grant of lease	
d) Date of Expiry of lease	
e) Targeted Production	
f) Proposed year of start of production	
g) Propose year of achieving the targeted production level	
h) Envisaged life of the mine (in years)	
i) Date of actual commencement of mining operations, if operations already started	
j) Likely date of Mining Operations, if operations not yet started & reasons for non-commencement of operations	
k) Planned production and actual levels achieved in last 3 years.	
l) Coal – U/G	
O/Cast	
OB	
m) Reasons for difference between the planned and actual production levels.	
n) Reason for revision of the Mining Plan	
o) Details of changes in the new mining plan compared to earlier approval	
(i) Lease Area	
(ii) Block boundary	
(iii) Production level	
(iv) Reserves	
E. Location	
a) Location of the Block Taluka / Village / Khasra / Plot / Block Range/ Etc.	Lodna, Padhyadih, Madhuban, Bhulan Bararee, Brahman Bararee, Radhachowk, Bhati, Jealgora, Bagdigi, Joyrampur and Nunudih mouza
b) Name of the Coalfield / Coal belt	JHARIA Coalfield
c) Particulars of adjacent blocks North – South, East, West	.
d) Area of the allotted block (hectares) i. Geological block area ii. Mining block area	Part of Mukunda Block, Total leasehold area -1186.97 Ha.

e) Reference no. of plan of block boundary issued by CMPDI/SCCL / NLCL (a copy of the plan also to be annexed)	Not Applicable
f) Whether the lease boundary / required boundary is same as demarcated by CMPDI/SCCL / NLCL for delineating block / sub-block.	Not Applicable
g) Existing Mining Lease Area in case of existing mines, (hectares)	1186.97 Ha
h) Applied / Required Lease Area as per the mining plan under consideration (hectares)	1186.97Ha
i) Whether the applied lease area falls within the allotted block	Yes
j) Area (hectares) of lease which falls outside the block/ sub-block delineated by CMPDI/SCCL/NLC.	Not Applicable
k) Details of outside area: - Whether forms part of any other coal block - Whether it contains any coal/ lignite reserves - Purpose for which it is required, e.g. roads/ OB dumps/service buildings/ colony safety zone / others (specify)	Not Applicable
l) Whether some part(s) of the allotted block has not been applied for mining lease. - Total area in Ha. Of such part(s) - Total reserves in such part(s) - Brief reasoning for leaving such part(s)	Not Applicable
m) Type of land involved in Hectares - Forest land - Non Forest land o Tenancy land o Govt. land o BCCL Land o Others	 Nil 49.91 Ha 23.61 Ha 1002.94 Ha 110.51 Ha
n) Proximity of public road / railway line/ major water body if any and approximate distance.	The Amalgamated Joyrampur Colliery is located in the South-eastern part of the Jharia coalfield. It is situated at a distance of 11 Km from Dhanbad Railway station and situated in the eastern side of Jharia Patherdih – Sindri main road.
o) Topo sheet no. with latitude and longitude	The project area lies between Latitude 23º44'03" to 23º40'57" (N) and Longitude 86º24'43" to 86º26'46" (E). The area falls in Survey of India Topo sheet

	No. 77, 78, 79, 85, 86 & 87 (all partly) of Jharia coalfield (RF 1:4000).
F. GEOLOGY AND EXPLORATION	
a) Name of the Geological Block and area in hectares	Amalgamated Joyrampur Coliery (OC), Part of Mukunda Block. Area of the Leasehold Boundary of the mine : 1186.97 hectares
b) Name of the Geological Report (GR) with year of preparation	Geological Report on Exploration for Coal in Mukunda Open Cast Block, Jharia Coalfield, Dhanbad (July, 1981, prepared by CMPDI)
c) Name of the agency which conducted exploration and prepared GR	CMPDI, MECL & GSI
d) Period of conducting exploration	Till mid of June, 1981
e) Details of drilling (by all agencies)	Table Enclosed **(Table-3.1)**
f) No. of boreholes drilled within the leasehold boundary	68
g) Overall borehole density within the block (no./sq.km)	6 BHs/Km^2
h) Area covered by ' detailed' exploration within the leasehold boundary (hectares) i) Area covered by ' detailed' exploration outside the block(hectares) - No. of boreholes drilled outside the block - Borehole density for outside area (no./sq.km)	1186.97 hectares 1013.03 hectares 63 6 BHs/Km^2
j) Whether entire lease area has been covered by 'detailed' exploration.	Yes
k) Whether any further exploration is required or suggested and timeframe in which it is to be completed	No
l) Number of coal/lignite seams/horizons - Thickness range of coal seams - Mean Thickness of total coal horizon - Standard Deviation of thickness - Minimum & maximum depth of coal seams	Table Enclosed **(Table-4.2)**
m) Gross Calorific Value (GCV in K Cal/kg) and useful Heat Value (UHV in K. Cal/Kg). of cal as per GR : Range Mean	All coal seams are coking

n) Quality(Grade) of coal as per GR: Range Mean	Given in seam wise description
o) Total geological reserves in the block	Net Geological Reserves considered is 121.09 M.Te within the leasehold boundary
p) Depletion of reserves(in case of running mine)	NA
q) Additional reserves established (if any for running mine) r) Geological reserves considered for mining: by opencast by underground	NA Net Geological Reserves considered for Opencast Mining is 57.81 M.Te within delineated quarry..
s) Corresponding Extractable reserves: by opencast by Underground	Extractable/Mineable Reserves considered for Opencast Mining is 52.029 M.Te . within delineated quarry.
t) Percentage of recovery w.r.t. geological reserves by opencast by Underground *Seam wise details of items (f) to (t) to be included in the relevant chapter.	Mineable/Extractable Reserve is 90% of Net Geological Reserves of the Seams considered within delineated quarry.

G. Mining	
a) Existing and proposed method of mining (opencast for OB & coal separately with dragline/ shovel / surface miners / manual / etc.) (underground by long wall/ bord & pillar / continuous miners/ LHD/ SDL/manual/etc..)	Opencast with Shovel - dumper
b) The peak capacity as well in addition to targeted capacity in mtpa when the mine is fully developed and the year which proposed to be achieved by underground: by opencast : Total:	0.40 Mill.Te in 1st year, 0.70 Mill.Te. in 2nd year, 1.00 Mill.Te per annum in 3 rd year, 1.40 in 4th year, 1.90 Mill. Te. In 5th year, 2.512 Mill.Te. from 6 th year to 22nd year, 1.80 Mill.Te in 23rd year, 1.30 Mill. Te. In 24 th year, 0.825 Mill. Te in 25th year.
c) Life of the mine underground workings: opencast workings: Total:	- 25 Years 25 Years

d) Indicate quantum of production and expected grade as in table below:

Year	UG production Mt	Opencast			ROM coal (Mt)	Saleable coal (Mt)	Washery rejects (Mt)
		Production Mt	OB (Mcum)	Stripping ratio (cum/t)			
Year wise till targeted production is reached	-	The detailed calendar programme given in Chapter V					
Total for full lease period	-						

e) Whether the proposed external OB dump site is coal/ lignite bearing: - If so, whether coal/lignite below waste disposal area is extricable.	NA
f) Whether negative proving for coal / lignite in the proposed site for OB dump / infrastructure has been done.	NA
g) Proposed configuration of HEMM for OC (Coal & OB) & Major Equipment for UG.	Shovel-dumper
h) Mode of entry for underground mines	-
i) Operations that are proposed to be outsourced	Excavation and transportation of OB and coal including drilling operation.
j) Propose coal evacuation facilities Face to surface Surface to railway siding.	 By Dumpers/Tippers By tippers

H. END USE OF COAL	NOT APPLICABLE
a) Capacity of the approved end use plants	
b) Coal/ lignite requirement for end use plant with grade / quality	
c) % age of end use requirement to be met from this mine	
d) If washing / beneficiation of the coal / lignite is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the beneficiation and recovery rate with consumption of water etc.	
e) Proposed Use of Rejects/Middlings	

I. ENVIRONMENTAL MANAGEMENT	
a) Existing land use pattern	Given in Chapter-IX
b) Land area indicating the area likely to be degraded due to mining, dumping, roads, workshop, washery, township etc.	Nil
c) Surface features over the block area	Villages, Infrastructure, etc.
d) No. of villages/ houses to be shifted	Rehabilitation is required for total 9439 houses*
e) Population to be affected by	
f) Year wise proposal for reclamation of land affected by mining activities	Given in Chapter X
g) Monitoring schedules for different environmental components after the commencement of mining and other related activities.	Air and Water quality monitored on regular basis by CMPDI,RI-2

J. PROGRESSIVE AND FINAL MINE CLOSURE PLAN (Details given in Mine Closure Chapter)	
a) Estimated total expenditure for mine closure activities (Rs. in lakhs)	26996.897
b) Major closure activities with proposed expenditure (Rs. in lakhs)	
i. Dismantling of Structures	925.4888
ii. Permanent Sealing of mine entries (incline mouth and air shaft)	420.3945
iii. Subsidence Management	19.2003
iv. LANDSCAPING	115.349
v. Plantation	244.0154
vi. Monitoring/Testing of parameters for three years	164.9246
vii. Entrepreneurship Development (Vocational/skill development training for sustainable income of affected people	100.0635
viii. Miscellaneous and other mitigative measures	590.8691
ix. Manpower Cost for Supervision	262.46

*R&R required for external OB dump is not included as it is yet to be estimated.

K. OTHERS	
a) Base date of mining plan	Novenber,2017
b) Calendar year from which the production will start	2017-18
c) Results of any investigation carried out for scientific mining conservation of minerals and protection of environment, future proposals.	NA
d) Signature of RQP Date Place	

MINING PLAN AND MINE CLOSURE PLAN

FOR

AMALGAMATED JOYRAMPUR COLLIERY(OC)

LIST OF CONTENTS

CHAPTER	PARTICULARS	PAGE NO.
	List of Contents	i
	List of Annexures	ii
	List of Plates	iii
	List of Abbreviations	iv
	General Information	GI-1
	Summarized Data	SD-1 to SD-8
I	Introduction	1 - 6
II	Details of Earlier Approval of Mining Plan	1
III	Locations, Topography & Communication	1 - 5
IV	Exploration Geology Seam Sequence Coal Quality & Reserves	1 - 35
V	Mining	1 - 16
VI	Manpower, Safety and Supervision	1 - 21
VII	Coal handling, washing & mode of dispatch	1
VIII	Infrastructure Facilities Proposed and Their Location	1 - 8
IX	Land requirement	1 - 2
X	Environment management	1 - 22
XI	Environmental Monitoring Report	1 - 13
XII	Progressive and Final Mine Closure Plan	1 – 21
	ANNEXURE	A-1 – A-2 & 1-6
	PLANS	

MINING PLAN AND MINE CLOSURE PLAN
FOR
AMALGAMATED JOYRAMPUR COLLIERY(OC)

LIST OF ANNEXURE

Sl. No.	Particulars	Annexure No.	Page No.
1	Copy of noting sheet from GM(P&P), BCCL & GM, Lodna Area, BCCL for preparation of Mining Plan	IA & IB	A.1 & A.2
2	Minutes of meeting	IC	1-6

MINING PLAN AND MINE CLOSURE PLAN

FOR

AMALGAMATED JOYRAMPUR COLLIERY(OC)

LIST OF PLATES

SL No.	Plate no.	Subject
1	G-I	Location plan
2	G-II	Geological Plan
3	G-III(A-G)	Short Logs
4	G-IV(A-C)	Geological Cross Section along A-A' BB'& CC'
Floor Contour Plan of Seams		
5	G-V-A	XV-A
6	G-V-B	XV
7	G-V-C	XIV-A
8	G-V-D	XIV
9	G-V-E	XIII-B
10	G-V-F	XIII-A
11	G-V-G	XIII
12	G-V-H	XI/XII & XI/XII/XIII (Combined)
13	G-V-I	IX/X
Seam Folio Plan of Seams		
14	G-VI-A	XV-A
15	G-VI-B	XV
16	G-VI-C	XIV-A
17	G-VI-D	XIV
18	G-VI-E	XIII-B
19	G-VI-F	XIII-A
20	G-VI-G	XIII
21	G-VI-H	XI/XII & XI/XII/XIII (Combined)
22	G-VI-I	IX/X
23	MIN-I	Surface Plan
24	MIN-II	Plan Showing Initial Stage Mining Operation
25	MIN-III	Plan Showing Intermediate Stage Mining Operation
26	MIN-IV	Final Stage Dump Plan
27	MIN-V	Surface Plan showing the location of proposed external OB dump
28	ENV-I	Plan showing Proposed Plantation Sites

List of Abbreviations used in the Report

BCCL - Bharat Coking Coal Limited
RF - Representative Factor
MECL - Mineral Exploration Corporation Limited
UVM - Unit Volatile Matter
UHV - Useful Heat Value
GCV - Gross Calorific Value
BH - Bore Hole
B&P - Bord and Pillar
SDL - Side Discharge Loader
DB - District Board
SOP - Standing on Pillar
OC - Open Cast
OB - Over Burden
HEMM - Heavy Earth Moving Machinery
CMR - Coal Mines Regulations
DGMS - Directorate General of Mines Safety
UG - Underground/Ungraded
GPM - Gallon Per Minute
HT/LT - High/Low Tension
HP - Horse Power
DVC - Damodar Valley Corporation
BOD - Biological Oxygen Demand
MCP - Mine Closure Plan
WM - Weathered Mantle

CHAPTER - I

INTRODUCTION

1.0 INTRODUCTION

Bharat Coking Coal Limited, a subsidiary of Coal India Limited, is a Central Public Sector undertaking, owned by the Govt. of India, engaged for extraction of Coal in Jharkhand and West Bengal. Lodna Area of BCCL is located in the South-eastern part of the Jharia coalfield. It is situated at a distance of 11 Km from Dhanbad Railway station and situated in the eastern side of Jharia Patherdih – Sindri main road. Prior to nationalization all the mines were being operated by large nos. of private colliery owners. Amalgamated Joyrampur Colliery is under the administrative control of Lodna area of BCCL.

Amalgamated Joyrampur Colliery is formed by Amalgamation of 05(five) Underground Mines (i.e. Lodna Colliery, Bagdigi Colliery, Bararee Colliery, Jealgora Colliery & Joyrampur Colliery) vide letter no. R-2/0100190/ P-12-15/1517-27 dated 28.8.2015 issued by Director of Mines safety, Region-2,DGMS, Dhanbad . Brief history of each individual mines are given below. All the Underground Mines were earlier worked by different small Mine owners and seams were developed , depillared in patches and at present all the upper seams upto XI/XII seam are under fire. It is proposed to extract the fire affected seams by Opencast method upto IX/X seam to make the underlying seams workable.

The demarcated boundary of Amalgamated Joyrampur Colliery covers a leasehold area of 1186.97 Ha. and it involves part of Mukunda Geological Blocks. Seams from I to XVI Seam exist within the mine and all the upper seams upto XI/XII seam are under fire within boundary of Amalgamated Joyrampur Colliery .

At present all the underground units of Amalgamated Joyrampur Colliery are closed. Now it has been decided by BCCL management to extract the fiery

seams by Opencast method upto IX/X seam to unlock the underlying seams that have been rendered unworkable due to existence of fire in overlying seams.

At present opencast mining operation is going on by deployment of hired HEMM(Patch-D) in the leasehold of Amalgamated Joyrampur Colliery.

BRIEF HISTORY OF MINES :

Lodna Colliery :

This mine is a Large U/G mine situated in the eastern side of the Jharia Patherdih main line. This Mine was opened in the Year 1920 by Turner Morrison Company. At the beginning Bagdigi colliery and Lodna colliery were operated as one mine. Later on Bagdigi Colliery was separated from Lodna Colliery. Prior nationalization a few no of small mines like North Burakar Company , N.S. Lodna, Standard Baniyahir, New Suratand , Lelori Pathra, Kalithan Suratand ,Suratand etc in the periphery of Lodna colliery were also amalgamated to Lodna Colliery.

Total lease hold area of Lodna U/G Mine was 391.64 Ha. In the past there was a washery, Coke plant situated at this Mine and this mine was one of the premier mine of BCCL till a long period after nationalization. In Lodna colliery there are total 17 seams available starting from XVA to IIB/I seam with a minimum thickness of 1.48 m (IIT seam) to maximum thickness of 18.11 m (III seam).

Presently there is no coal production from the mine and only pumping is going on.

Bagdigi Colliery:

With a lease hold area of 61 Ha this mine is presently closed due to fire in the shaft. Production of coal stopped from 22.09.2011 due to water logging and later on shafts were filled up due to fire. This mine was part of Lodna colliery started by Turner Morrison Company in 1920. In the year 1935 there was a water gas explosion in the mine. The Mine got inundated in the year 2001 ,due to which the Mine remained closed for a long time and re-started after

dewatering. In the Year 2013 due to increase in temperature of the in-set stoppings of both 9 & 12 Pit and jumping up of fire from the sealed off areas to the pits both the Pits (9 &12 Pit) were filled up and all the Mining activities in the Mine are stopped. At the time of stoppage of work at Bagdigi colliery development was going on in VII seam.

Presently the entries in the Mine is filled up completely.

Joyrampur Colliery:

Joyrampur colliery with a lease hold area of 98.04 Ha was working but due to water problem production is stopped and only pumping is being done at the present moment. Before nationalization the mine was worked by small mine owners and developed in four sections from north to south namely , East Lodna section, Khas Joyrampur section, Lower Joyrampur section and Pure Joyrampur section.

Presently there is no coal production from underground unit and only pumping is going on. At present opencast mining operation is going on by deployment of hired HEMM(Patch-D) in the leasehold of Amalgamated Joyrampur Colliery.

Bararee Colliery:

This Mine was started by East India Company in the year 1905. Total lease hold area of the mine 475 Ha. Previously it was part of Bhowra area and in the year 1997 this mine was annexed/merged to Lodna Area. Bhulan Bararee thrust zone lies here ,where all the seams abruptly changes its dip from 1in 10 to 1in1.

Presently there is no coal production from underground unit and only pumping is going on.

Jealgora Colliery:

This Mine was started by East India Company in the year 1905. Total lease hold area of the mine 138 Ha. Previously it was part of Bhowra area and in the

year 1997 this mine was annexed/merged to Lodna Area. Production stopped from this mine 2007 due to water logging.

Presently there is no coal production from underground unit and only pumping is going on.

The coal production from 2012-13 to 2016-17 for erstwhile different mines within the leasehold of Amalgamated Joyrampur Colliery is given below:

Sl No.	Name of colliery	Production stopped since	Coal Production in Te.				
			2012-13	2013-14	2014-15	2015-16	2016-17
1	Joyrampur Colliery	25.09.14	67506	22098	3813	0	0
2	Bagdigi Colliery	23.09.11	0	0	0	0	0
3	Lodna Colliery	27.07.13	83434	20460	0	0	0
4	Bararee Colliery	14.02.17	95482	66500	55917	60450	56363
5	Jealgora Colliery	2007	0	0	0	0	0
6	Amalgamated Joyrampur Colliery						67676

1.1 MINING PLAN

The Draft Mining Plan was prepared as per the reference received from BCCL (Vide noting No. 1779 dated 25/10/2017, copy enclosed as Annexure-IA & letter no. BCCL/GM(LA) : Secy :2017/284 dated 14.10.2017 issued by GM, Lodna Area, copy enclosed as Annexure-IB) and circulated to BCCL. Comments regarding Draft Mining Plan has been received from GM(P&P), BCCL(HQ) vide letter no BCCL/GM(P&P)/F-76/456 dated 18.11.2017 and Lodna Area, BCCL vide letter no. BCCL/LA/2017/844 dated 18.11.2017 After compliance of the above comments this report has been finalized and submitted .

Scope of the Mining Plan :

1. Exploitation of the seams by opencast method of mining is considered.

2. Seams from IX/X seam and all above occurring seams (upto XVA seam) within the proposed quarry limit has been considered for exploitation.

3. The Surface limit of west side of proposed quarry has been finalized keeping 60 m distance from proposed diverted route of Chatkari Jore.

Limitation of the Mining Plan

1. Seams below IX/X seam have not been considered for exploitation.
2. Most of the seam has been affected by fire. The extents of fire are tentative and demarcated by colliery authority. The coal resource within the fire area is assumed as "zero" and the coal resource beyond the fire limit as demarcated on the individual seam working plan are tentative and the same may not be available also as impact of fire on individual seams in not known.
3. Grade of coal within the fire affected area cannot be assessed or confirmed, however the grade of coal within the fire area will be given as per available data in Geological Report of Mukunda OCP (1981), which may be deteriorated later due to burning effect of fire and cannot be confirmed.
4. This Mining Plan has been prepared based on the data / plans and other information submitted by Project / BCCL.

This Mining Plan has been prepared based on Feasibility Report prepared earlier by BCCL for obtaining environmental clearance and the data furnished by BCCL/Area/Collieries at current scenario

1.2 SURFACE REORGANIZATION

1.2.1 LAND ACQUISITION:

The Status of land within the Amalgamated Joyrampur Colliery leasehold is given in table below:

Sl. No.	Particulars	Total (Ha)
1	BCCL land	1002.94
2	Forest land	Nil
3	Govt. land	23.61
4	Tenancy land	49.91
5	Others	110.51
	Total	1186.97

The land other than BCCL holding has to be transferred to BCCL / to be acquired by BCCL.

Apart from the above, land for external OB dump of around 424.93 M.Cum. will be required in non-coal bearing area or in the de-coaled area of adjacent mine. The mine management has identified area for external dump that is shown in Plate no.-MIN-V.

1.2.2 REHABILITATION / SHIFTING OF HOUSES

The location of the proposed quarry is highly crowded with population and built up areas. Therefore, huge numbers of BCCL, private and encroacher houses need to be shifted for the operation of the mining plan. As per the data furnished by Colliery authority that all rehabilitation required for excavation is covered under Jharia master Plan.

1.2.3. SURFACE CONSTRAINTS

The Chutkari jore is flowing from north to south through the middle of proposed quarry. This jore needs to be diverted for the operation of the quarry. The diversion of the Chatkari jore will be done through the dipside of the quarry considering topography and existing drainage pattern of the area. Feasibility of diversion of the Chatkari jore along the proposed route needs to be examined in detail. Surface limit of proposed quarry has been fixed keeping minimum 60 m distance from the proposed diverted route of Chatkari Jore. Other mine infrastructures situated over the proposed quarry area required to be shifted in other suitable places.

CHAPTER-II

DETAILS OF EARLIER APPROVAL OF MINING PLAN

2.0 No approved mining plan exists for the mines.

CHAPRER - III

PROJECT SITE INFORMATION

3.0 INTRODUCTION

The area under consideration falls within the Mukunda exploration block in the eastern part of Jharia coalfield, District: Dhanbad, Jharkhand. The Report is based on the data available in the “Geological Report on exploration for coal in Mukunda Open Cast Block” Jharia coalfield, Dhanbad (July, 1981, prepared by CMPDI, RI-2, Dhanbad).

3.1 GENERAL

The Jharia coalfield is located in the Dhanbad and Bokaro districts of Jharkhand. After nationalization and formation of Bharat Coking Coal Ltd. (BCCL), a feasibility report for reconstruction and development of the collieries (FR ’78) of this coalfield was prepared in collaboration with the Polish consultants, wherein amalgamation of the erstwhile collieries including virgin area was envisaged. In this FR, 9 large opencast blocks and 21 large underground blocks were envisaged. However, this could not be implemented in full due to various constraints.

The present report is confined to the assessment of the part area (northern part) of original block of Mukunda OCP (GR, 1981), it includes part area of Lodna Colliery, Bagidigi, Colliery, Joryampur Colliery, Jealgora Colliery and Bararee Colliery which are constitute the Amalgamated Joyrampur Colliery.

3.2 LOCATION

The area under consideration is located in western halves of Mukunda exploration block of Jharia coalfield and constitutes of leasehold boundary of Amalgamated Joyrampur Colliery of Lodna Area, BCCL. The project area lies between Latitude 23º44'03" to 23º40'57" (N) and Longitude 86º24'43" to 86º26'46" (E). The area falls in Survey of India Topo sheet No. 77, 78, 79, 85, 86 & 87 (all partly) of Jharia coalfield (RF 1:4000).

3.3 AREA

The leasehold boundary of Amalgamated Joyrampur is 1186.97 Ha The surface area of the proposed quarry under consideration has a total surface area of about 749 Ha.

3.4 ACCESSIBILITY

The proposed project area is about 5 Km west of Jharia town and can be approached easily by Dhanbad-Jharia-Sindri road. The location of the project site is shown in Plate-G-I.

3.5 CLIMATE AND RAINFALL DATA

The area under consideration falls in the sub-humid region of the state of Jharkhand. The maximum temperature rises as high as 48°C during summer (April to middle of June) and falls down to minimum of 6°C during winter (December to January). The area receives fair to moderate rainfall, the average annual precipitation being 140 cm, most of which is received between June to September.

3.6 TOPOGRAPHY AND DRAINAGE

The area has a general undulating topography with a gentle southward slope. The mining activity which is going on in the area over 100 of years severely obliterated the general topography. Several small quarries, subsided goaf, OB dump, fire etc. have been shattered the original topography of the area. The highest elevation (199.17 m) has been observed near borehole no. NGK-17 in the north-eastern part, whereas, the lowest ground elevation (161.44 m) has been observed in the southern corner of the block around borehole No GL-5.

The drainage of the block is mainly controlled by southerly flowing Chatkari Jore which is a tributary of Damodar River. The another small nala, Tisra Jore is flowing from north to south and meet with the Chatkari Jore near bore hole GL-9.

3.7 PROPOSED QUARRY BOUNDARY

The quarry limits of the Amalgamated Joyrampur Colliery on the surface is delineated within the leasehold boundary as under:

North : Minimum of about 25 m from the leasehold boundary.
South : Limit of Metamorphics/Minimum of about 25 m from the leasehold boundary.
East : Leasehold boundary of Amalgamated Joyrampur Colliery.
West : Minimum Distance of about 60 m from the proposed diverted route of Chatkari jore.

3.8 STATUS OF EXPLORATION

A total of 35 boreholes have been drilled involving a total meterage of 10325.65 meters within the proposed quarry area.

Table- 3.1A

Status of Exploration

Serial No	Series	Drilling Agency	No. of BH	Meterage drilled
1	GL	CMPDI	8	2504.03
2	JBJ	GSI	1	470.15
3	LJ	GSI	1	412.95
4	MJ	MECL	9	3423.85
5	MSR	CMPDI	8	728.96
6	NGK	CMPDI	1	511.65
7	ST	CMPDI	7	2274.06
Total			35	10325.65

The density of boreholes comes to 5 BHs/Km^2 within the proposed delineated quarry limit.

A total of 68 boreholes have been drilled involving a total meterage of 19709.65 meters within whole leasehold area of Amalgamated Joyrampur Colliery.

Table- 3.1B

Status of Exploration

Serial No	Series	Drilling Agency	No. of BH	Meterage drilled
1	GL	CMPDI	10	3314.43
2	JBJ	GSI	3	1558.65
3	LJ	GSI	4	1838.79
4	MJ	MECL	14	5473.05
5	MSR		11	858.11
6	NGK	CMPDI	14	3128.88
7	ST	CMPDI	12	3537.74
Total			68	19709.65

The density of boreholes comes to 6 BHs/Km^2 within the whole leasehold area of Amalgamated Joyrampur Colliery Boundary.

3.9 SCOPE AND LIMITATIONS

1. The scope of the present assessment is to assess the potentiality of seams (seam XV-A seam to seam IX/X seam) occurring within the project area for their extraction by opencast mining method.

2. Only the standard geological nomenclature of seams has been used in this report.

3. The report is based on the data available in the “Geological report on Exploration for coal in Mukunda Open Cast Block” Jharia coalfield, Dhanbad (July, 1981, prepared by CMPDI, RI-2, Dhanbad). In addition to that, there are some infilling bore holes (MSR Series) which were drilled after preparation of the above GR, have been incorporated in the present report.

4. The updated mine plan / data generated and supplied by colliery authorities have also been considered for preparing this report. The

surface plan of this report is mainly based on colliery plan and topo sheet of Survey of India.

5. The coordinates of the boreholes have been converted into the Jharia grid as supplied by the colliery authority.

6. An element of approximation exists in location and extent of mine workings when matched with borehole location plan. Surface features like quarries, Incline, roads etc. shown on the plan supplied by colliery do not well match with Survey of India Topo sheet available on 1:4000 RF.

7. Areas having thickness less than 0.5 m have not been considered for geological reserve estimation.

8. In some bore holes (GL & MSR series) only band-by-band quality data are available, hence weighted average have been calculated for those data.

9. In seam descriptions, the special test data (CI, CT, SI etc.) and ultimate analysis data are taken form “Geological report on Exploration for coal in Mukunda Open Cast Block” Jharia coalfield, Dhanbad (July, 1981, prepared by CMPDI, RI-2, Dhanbad).

10. Most of the seam has been affected by fire. The extents of fire as demarcated colliery authority are tentative. The coal resource within the fire area is assumed as “zero” and the coal resource beyond the fire limit as demarcated on the individual seam working plan are quiet uncertain and the same may not be available (since impact of fire in these areas on the individual seams cannot be confirmed due to very old workings which are unapproachable) .

11. Grade of coal within the fire affected area cannot be assessed or confirmed, however the grade of coal within the fire area will be given as per available data in Geological Report of Mukunda OCP (1981), which may be deteriorated later due to burning effect of fire and cannot be confirmed.

CHAPTER – IV

GEOLOGY & DEPOSIT APPRAISAL

4.0 GEOLOGY

4.1. REGIONAL GEOLOGY OF JHARIA COALFIELD

The Jharia coalfield (453 Km^2) is sickle shaped on plan and occurs in the form of syncline with its axis trending broadly in E-W direction and plunging towards west. The southern flank of this coalfield is truncated by boundary fault having maximum throw about 2.5 Km at Mohuda Basin. The non-coal bearing Talchir formation is mainly exposed along the northern and western portion of the coalfield. The Barakar formation covering an area of 218 Km^2 which is exposed in the northern, eastern and south-eastern part of the coalfield area contains over 40 coal horizons including local and persistent seams, some of which are exclusively store house of metallurgical coal in India. The Barakar formation is successively overlain by Barren Measure formation which is devoid of work able coal seams. This is mainly exposed in the central part of the coalfield. The Barren Measure is overlain by the coal bearing Raniganj formation (54 Km^2). These are exposed within a sub elliptical basin the south-western part of the coalfield.

4.2. STRATIGRAPHY

The Regional stratigraphic succession of Jharia coalfield is given in table no. 4.1

Archeans: The Archeans, consisting of gneisses and mica schists are exposed all along the periphery of Jharia Coalfield. A tongue or protrusion of metamorphic, thrusting into the Gondwanas, is observed near Patherdih in the south-eastern part of the coalfield. Besides, a small inlier of metamorphic has been noticed near Khenudih in the north-western part of the coal field. Metamorphic high has been interpreted in the south-eastern part of the

coalfield in Sitanala area, resulting the omission of older seams. The metamorphics are profusely intruded by quartz veins.

Talchir: In an Archean basement, the lower Gondwana sediments are deposited with a pronounced unconformity. The lowermost Gondwana sediments of Talchir formation are represented by variegated shale and greenish sandstones which at times show laths of unaltered feldspars. They are exposed all along the northern fringe of the coal field. They are, however not exposed along the southern fringe due to boundary fault. Near Lutipahar in the north-western part of the coal field, Talchir formation is comparatively well developed in a large area and boulder bed shows exposures of spheroidal weathering.

Barakar: In the eastern, northern and north-eastern parts of the block, the Barakar are extensively developed. All along the southern boundary they are extending under the thick over of Barren Measures. The Barakar formation comprises pebbly sandstones, conglomerate, grit, coarse to fine grained sandstones, shales, carbonaceous shales and coal seams. Verma *et. al*. (1989) have observed a gradual decrease in thickness of Barakar from east to west. A maximum thickness more than 1250 m has been observed in the south-eastern part of the coalfield in Tasra region, while minimum thickness of around 600m is noticed in Damuda area. Barakar is the most important geological formation as it contains more than 40 coal horizons having thickness more than 50 cm.In general seam X (Ten) and younger seams are better quality coal (prime coking) than older seams which changes with depth to non-coking coal.

Barren Measure: The Barren Measure formation lying conformably over the Barakar formation consists of massive multistoried sandstone alternating with carbonaceous shale, grey shale and sandstone/ shale intercalations with occasionally very thin impersistent, non-workable coal horizons in the lower part of the formation. The Barren Measures shows a widespread development extend ending from the central part of the coalfield up to the southern margin.

The maximum thickness of the Barren Measure has been estimated to be around 625m in the central part of the basin. It gradually decrease westward and eastward and reduces to a minimum of 375m in the south-eastern part.

Raniganj: Raniganj formation is deposited in sub elliptical basin that is called Mohuda basin the south-western part of the coalfield. The formation represented by sandstone, shale, carbonaceous shale and coal seams. There are 24 coal seam have been reported from this formation. These seam comprise high volatile, high moisture, medium coking coal. The maximum thickness around 725m of Raniganj formation has been observed.

Igneous Intrusive: Mica peridotite and dolerite are the two most common Post Gondwana intrusives. The mica peridotite occur as dyke and sill throughout the entire coal field and has caused widespread devolatisation of the coal seams. The dolerite dyke is mostly confined in the western part of the coal field and has limited effect on coal seams. A number of dykes and their offshoots have been established in the coalfield, but the most surprising phenomenon of a 250m zone characterized by pyrolitization and devolatisation has been observed in the north-western part of the coalfield at Daumda Block where presence of any igneous intrusives has not been noticed. The mica periodotite sills have devolatised the extensive reserve of good quality coal in the coalfield and have limited or practically no effect on inferior quality coal.

As mentioned earlier most of the area is covered by sandy soil and alluvium. The thickness of soil varies from 1.0 m to 9.0 meter.

Table-4.1

Geological Succession of Jharia coalfield

Stratigraphic Division	Age	Formation	Lithological characters
Lower Gondwana	Recent	Alluvium/Soil/Sand	
	Cretaceous to Jurassic	Mica Peridotite/Dolerite Dyke	
	---------- Unconformity ----------		
	Upper Permian	Raniganj Formation	Mainly fine to medium grained grey current bedded sandstone with shale and coal seam
	Middle Permian	Barren Measures	Black carbonaceous micaceous shale with clay, ironstone and sandstone.
	Lower Permian	Barakar Formation	Coarse grained to conglomeratic white sandstone with shale and coal seams
	Lower Permian	Talchir Formation	Coarse grained sandstone, white or slightly variegated at Top, green shale with undecomposed feldspar, boulder bed etc.
	---------- Unconformity ----------		
	Archeans		Granites, gneisses and schists.

4.3. GEOLOGY OF AMALGAMATED JOYRAMPUR COLLIERY

The area under consideration is located in the eastern flank of the Jharia coalfield, and it is primarily covered by the Barakar formation which is overlain by thin layers of sandy soil and clay. The thickness of soil is ranges between 1.5 m. (GL-6) to 14.2 m. (MJ-11). Talchir formation also outcropping on the south-eastern boundary of the project area. The southern limit of the coal bearing formation is delineated by a major fault (F7-F7) having a maximum throw of 90 m. toward north direction. The up thrown side of this fault is occupied by metamorphic rock of Archean age. The rocks of Barakar formation consist of pebbly sandstone, grits, fine to coarse grained sandstone, intercalation of sandstone and shale, sandy shale, grey shale, carbonaceous shale, fire clays and number of coal seams. Coal seams XVI to IX/X occur

within the project area and under the purview of this Geological Report (Plate No. G-III). The maximum thickness of Barakar formation as encountered in the borehole no. LJ-2 has been found to be 600 m.

Good rock exposures are rather few excepts in old quarries and it has not been possible to precisely delineate the incrop position of the seams because of the extensive goaf, fire and subsided ground which have severely affected the original topography. The incrop position of the coal seams have been extrapolated on the basis of geological data viz. geological cross section, floor contour and quarry/incline positions and are interpretative. Geology and correlation of the seams have been established mainly on the basis of sub-surface data obtained from borehole and mine workings.

Igneous Intrusion:

The following dykes are reported to occur in the colliery workings within the project area.

1. A 10 m. thick dyke (dyke-1) running approximately north-south all along the west central portion of the project area.

2. A NW-SE trending 5 m. thick dyke (dyke-2) located in the SW quadrant of the project area. This dyke appears to meet the above mentioned 10m thick dyke east of borehole JBJ-3.

The position of the dykes is shown in plate no: G-III as well as in geological cross sections. These positions have been projected from the locations shown in some of the working plans of the seams. In addition to the dykes mentioned above, a number of coal seams are partly or wholly pyrolitised converting them to jhama at palces in the area indicating the presence of several sills of mica peridotites.

4.4 SEQUENCE OF COAL SEAMS (within the proposed quarry Limit)

Table-4.2

Seam/Parting	True Seam Thickness (m)		Average Seam/Parting Thickness (meter)	No. of BH intersection	Depth Range (approx.) (m)
	Minimum	Maximum			
XVI	2.16 (GL-10)	3.25 (MJ-6, 12)	2.95		
P	64.73 (GL-10)	75.81 (NGK-31)	72		
XV-A	**0.6 (MJ-1)**	**1.60 (NGK-33)**	**1.15**	**6**	Incrop to 65
P	28.31(GL-2)	38.85 (MJ-2)	34		
XV	**7.50 (NGK-33)**	**11.25 (JBJ-1)**	**7.95**	**9**	Incrop to 110
P	2.08 (JBJ-1)	6.70 (GL-2)	4		
XIV-A	**1.42 (MJ-2)**	**3.75 (GL-2)**	**2.00**	**9**	Incrop to 115
P	14.50 (JBJ-1)	25.40 (GL-3)	20		
XIV	**4.14 (LJ-3)**	**9.68 (MJ-11)**	**8.20**	**10**	Incrop to 140
P	15.91 (GL-2)	22.96 (NGK-33)	18		
XIII-B	**0.67 (GL-2)**	**4.30 (MJ-4)**	**2.70**	**12**	Incrop to 160
P	1.39(MJ-2)	28.3 (MJ-4)	10		
XIII-A	**1.2 (MJ-9)**	**4.6 (MJ-1)**	**3.80**	**13**	Incrop to 170
P (XIII-A to XIII)	4.75 (GL-5)	11.6 (MJ-11)	11		
P (XIII-A to XI/XII/XIII)	5.75(MJ-9)	26.56 (NGK-33)	24		
XIII	**2.3 (GL-4)**	**6.10 (MJ-4)**	**4.00**	**12**	Incrop to 180
XI/XII/XIII	**11.75 (MJ-10)**	**19.80 (MJ-8)**	**14.00**	**9**	Incrop to 200
P (XIII to XI/XII)	3.85 (MJ-4)	34.00 (GL-2)	24		
XI/XII	**6.02 (MJ-1)**	**10.0 (MJ-4)**	**7.90**	**19**	Incrop to 205
P	10.32 (GL-1)	39.17 (MJ-4)	23		
X-A	**0.25 (LJ-3)**	**5.65 (MJ-8)**	**2.25**	**29**	Incrop to 220
P (X-A to IX/X)	13.95 (GL-2)	63.10 (LJ-3)	41		
IX/X	**3.48 (JBJ-1)**	**15.88 (GL-7)**	**9.2**	**31**	50-270

4.5 NOMENCLATURE OF COAL SEAMS VIS-À-VIS COLLIERY NOMENCLATURE

Table – 4.3

Standard Nomenclature (Geological)	Colliery Nomenclature (Amalgamated Joyrampur Colliery)
XVI	XVI
XV-A	XV-A
XV	XV
XIV-A	XIV-A
XIV	XIV
XIII-B	XIII-B
XIII-A	XIII-A
XIII	XIII
XI/XII	XI/XII
X-A	X-A
IX/X	IX/X

4.6 GEOLOGICAL STRUCTURE OF THE BLOCK

4.6.1 STRIKE & DIP

The geological structure of the area is relatively simple. The general strike of the strata is normally NNW-SSE swinging to N-S covering the major part of the area and finally E-W in the southern extremity of the area. The beds dip 4° to 12° due WSW, west and north respectively. In the small strip (in the southern part) where the strike of the formation swings to NNE-SSW and E-W, the gradient of the seam is steeper (40°) because of the proximity of the area to the major fault (throw 90 m towards north). The relevant details of strike and dip can be seen from the geological cross section and floor contour plans.

4.6.2. FAULTS

Based on boreholes/colliery data 7 nos. of faults have been interpreted within the colliery leased hold area. Throw of these faults varies from 10 m to 90 m. The details of fault are given in Table No–4.4.

Description of faults

Table- 4.4

Sl. No.	Fault No.	Extent & Location	Trend/Dip	Max Throw / Direction	Nature & Evidence
1.	**F1-F1**	Strike fault located at the western limit of the block .It originates near the boundary at about 440 m NE of LJ-1 and continuous in the SE direction	NW-SE	15 m./NE	Encountered in the colliery workings of XV, XIV-A and XIV seams
2.	**F2-F2**	Located in the NW corner of the block. It originates at a point about 400 m SW of NGK-12 and dies out at about 190 m south of NGK-3.	NW-SE/ 60^0	10m./SW	Encountered in the colliery workings of XA, IX/X, VIII-A and VIII seams
3.	**F3–F3**	Located in the NW corner of the block It originates at about 90 m NW of NGK-3 and at a point 400 m SE of NGK – 11. It runs in the SE direction and dies out about 50 m south of NGK-3.	NW-SE/ 60^0	10 m./NE	• Encountered in the colliery workings of X-A, IX/X, VIII-A and V/VI/VII/VIII seams. • Roof of V/VI/VII/VIII seam is faulted in NGK-3
4.	**F4–F4**	Located in the central part of the project area. It originates from midway between NGK-5 and GL-7 and continuous south-easterly upto the eastern limit of the block.	NW-SE/ 60^0	15 m./NE	• Encountered in the colliery workings of IX/X, VIII-A, VIII, VII, V/VI/VII, V/VI, IV Bot, III and I seams. • Shifting of the coal seam outcrops across the fault.
5.	**F5–F5**	Located in the central part of the project area. It originates from midway between NGK-5 and GL-7 and runs parallel to F4-F4. It dies out near NGK-6.	NW-SE/ 60^0	10 m./NE	Encountered in the colliery workings of IX/X, VIII-A, VIII and V/VI/VII seams
6.	**F6–F6**	Located in the south-eastern part of the project area. It originates at about 320 m. south west of NGK-1 and continuous towards SSW. It passes east of boreholes ST-7 , ST-12 and dies out at a point about 120 m west of ST-13	NNE-SSW swinging to NE-SW/60^0	10 m./WNW or NW	• Encountered in the colliery workings of IX/X, VIII-A, VIII, VII and V/VI seams. • Reduction of parting between V/VI and VII seams in ST-7. • Reduction of parting between IX/X and VIII-A and slicken-sided cores at 45 m. depth in ST-12.
7.	**F7–F7**	This faults form the southern boundary of the Mukunda OC block. It passes south of MJ-5, MJ-14 and MJ-8 and gradually dies out about 390 m. south of ST-19.	ESE-WNW to ENE-WSW (curvilinear)/ 60^0	90 m./N	• Reduction of parting between X-A and IX/X seams in MJ-5. • Floor faulted of I/II Bot seam in MJ-8. • High core dip at 440 m. depth in MJ-8.

4.7. METHODOLOGY FOR ASSESSMENT OF COAL SEAMS

4.7.1. THICKNESS & SPATIAL VARIATION OF SEAMS

The description and the assessment of the quality of coal seam are primarily based on the seam folio plans which depict the iso-chores, iso-ash, iso-UVM and iso-UHV lines besides the outer extent of the underground and opencast developments.

4.7.2. ISO- CHORES

Only the vertical thickness (In-band) of the coal seams, as encountered in the boreholes, has been considered for drawing iso-chores. Since 50 cm thickness has been considered as the minimum limit for reserve estimation, the iso-chores of 50 cm have been drawn followed by iso-chores of 0.9, 1.2, 2, 4, 6, 8, 10, 12, and 15 m.

4.7.3. ISO-ASH

The ash content forms the basis for grading of coking coals as per notification by Gov. of India, Ministry of Energy, Dept. of Coal, dated 13.02.1981. Coal having ash > 50% (in case of coking coal) have not been assessed.

4.7.4. FLOOR CONTOUR PLANS

Floor contour plans of all persistent coal seams have been drawn. Spot levels of various seam workings have been considered during preparation floor contour plans. However in some cases, like seam IX/X and seam XI/XII, there are a little variation exists between the floor value and the spot level data of the respective seams. In this circumstance, we have confirmed the floor value with the FRL values of the respective seams available in various pit sections of different collieries. It may be noted that the spot levels are not necessarily on the floor of the respective seams as most of the seams are thick and two sections UG development are present (e.g. seam IX/X and XI/XII). Necessary corrections have been made while using the data.

4.7.5. BASIS FOR THICKNESS AND QUALITY DETERMINATION

Analytical results of coal cores supplied by the C.F.R.I and private analytical agencies have been utilized to assess the thickness and quality of the coal seams.

While determining the quality of the seams following norms have been followed.

i. Coal Sections containing ash upto 35.0%.
ii. Shaly coal Section containing ash form 35.01% to 50.0%.
iii. Dirt bands Sections with ash from 50.01% to 75%.

To arrive at the in-band thickness of the coal seams as per opencast norms, all dirt bands (combustible) up to 1.00 m thickness occurring within the seam have been included. Dirt bands having thickness more than 1.00 m occurring within the seam have been excluded.

If the non-combustible bands that are developed within the seam persistently in a considerable area, the seam have been considered as split and line of split or merger has been drawn in relevant floor contour and seam folio plans.

The analytical data / overall analysis of various coal cores for including bands (In-band) as well as excluding bands (Ex-bands) were provided by the analytical laboratories. The in-band ash of the seams, wherever not available, have been calculated on weighted average basis and in case where weight is not given it has been calculated on length average basis.

The volatile matter on unit coal basis (UVM) has been calculated by the following empirical formula –

$$UVM\% = 100-(100xFC)/100-(1.1A+M) \quad \text{(i)}$$

Where:

FC = Fixed carbon

A = Ash%

M = Moisture %

Carbonate correction, wherever required have been carried out.

Seam wise average quality parameters are given in Table No.-4.5.

4.8. SEAM-WISE DESCRIPTION

Seam XV-A

This seam occurs below XVI seam with a parting varies from 64.73 m (GL-10) to 75.81m (NGK-31).The full coal thickness has been intersected into 15 boreholes within the project limit. The In-band thickness of seam varies from 0.60 m (MJ-1) to 1.60 m (NGK-33). The seam has been considered as prime coking coal within the project area. In general, the ash content shows an increasing trend from south to north. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
19.0-28.30	31.9.-34.5	W-I – W-IV	25* 17-24	G2-G3* F-G1	6.5*	0.26-0.84
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Roof & Floor

Roof and floor both generally composed of carbonaceous shale.

Exploitation

The seam is extensively quarried, goved and it is almost exhausted within the project area, as well it is fallen within the active fire zone hence resource has not been assessed.

Seam XV

Seam XV occurs below XV-A seam with a parting varies from 28.31m (GL-2) to 38.85 m. (MJ-2). The full coal thickness have been intersected in 4 boreholes. The In-band thickness of the seam varies from 5.50m (NGK-33) to

8.22m (MJ-10). In one borehole the seam is partly jhama and in 5 boreholes only part thickness has been encountered due to underground working.

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
9.90-14.90	30.0-32.8	S-I	24-26* 18-30	G2-G4* E-G3	6.5-7.0*	1.14-1.60
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Roof & Floor

The roof is generally of carbonaceous shale while the floor is generally made up with shale and sandstone.

Exploitation

The seam is extensively quarried, goved and it is almost exhausted within the project area, as well as it is fallen within the active fire zone hence resource has not been assessed.

Seam XIV-A

This is underlying below the seam XV with a parting of 2.08m (JBJ-1) to 6.70m (GL-2) and has been intersected fully in 7 boreholes within the proposed project limit. In-band thickness of the seam varies from 1.42 m (MJ-2) to 3.75 m. (GL-2). In 2 boreholes only part thickness has been encountered due to underground working.

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
10.20-19.20	28.6-35.1	S-I – W-I	24* 19-22	G2-G3* E-F	6.5*	0.41-1.80
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Roof & Floor

The roof is generally of sandstones and floor is generally made up with carbonaceous shale.

Exploitation

The seam is extensively quarried, goved and it is almost exhausted within the project area, as well as it is fallen within the active fire zone hence resource has not been assessed.

Seam XIV

This seam is separated from the overlying seam XIV-A by a parting of thickness varying from 14.50 (JBJ-1) to 25.40 (GL-3) and it has been intersected fully in 7 boreholes within the proposed project limit. In-band thickness of the seam varies from 7.24 m (NGK-33) to 9.68m (MJ-11). In 3 boreholes, only part thickness has been encountered due to underground working.

The seam has been considered as prime coking coal within the project area. The ash content, in general, increases from east to west. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
14.00-20.10	27.7-32.9	S-I – W-I	23-26* 18-28	G1-G4* F-G5	7.0-7.5*	0.34-2.70
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
0.55	–	0.55

Roof & Floor

The roof is generally of sandstones and floor is generally made up of grey shale and carbonaceous shale.

Exploitation

The seam has been extensively worked and goaved in the project area. Except for a small virgin area in the north western part of the area, the other small areas, which are virgin, are restricted to the barriers between the leaseholds of erstwhile collieries. The seam is extensively on fire in the north-western, west-central and in small patches in the southern fringes of the project area.

Seam XIII-B

XIII-B seam occurs 15.91 m. (GL-2) to 22.96 m. (NGK-33) below the overlying XIV seam and has been intersected fully in 10 boreholes within the project limit. The In-band thickness varies from 0.67 m. (GL-2) to 4.30 m. (MJ-4). In one borehole the seam is partly jhama and in 2 boreholes only part thickness has been encountered due to underground working.

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
21.8-38.0	28.8-32.0	W-II – UG	17-23* 18-21	G2-G3* F-G1	6.5-7.5*	0.08-1.50
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
1.79	0.03	1.82

Jhama: 0.06 Mt.

Roof & Floor

The roof generally made up with fine to medium grained sandstone& floor is made of shale.

Exploitation

The seam has been extensively worked and goaved in the project area, except for the north western part of that area. The other small areas, which are virgin, are restricted to the barriers between the leaseholds of erstwhile collieries. The seam is extensively on fire in the north-western and in small patches in the south-eastern portion of the project area.

Seam XIII-A

This seam is underlying below the seam XIII-B with a parting between 1.39 m. (MJ-2) to 28.3 m. (MJ-4) and has been intersected fully in 8 boreholes within the proposed project limit. In one borehole the seam is completely jhama and

in 4 boreholes part jhama thickness has been encountered. In one borehole the seam is faulted (MJ-3). In-band thickness of the seam varies from 1.20 m (MJ-9) to 4.30 m (NGK-33).

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
17.90-31.00	29.1-32.3	S-II – W-IV	24-25* 18-29	G2-G4* F-G2	7-8*	0.47-0.98
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
1.02	1.72	2.74

Jhama: 6.36 Mt.

Roof & Floor

The roof is generally of sandstone while the floor is generally carbonaceous shale.

Exploitation

The seam has been extensively worked and goaved in the project area, except dip side of that area. The other small virgin patches are available at the barriers between the leaseholds of erstwhile collieries. The seam is extensively on fire in the north-western and west-central portion as well as in small patches in the south-eastern portion of the project area.

Seam XIII

XIII seam occurs 4.75 m. (GL-5) to 11.60 m. (MJ-11) below the overlying XIII-A seam and the full coal thickness of the seam has been intersected in 11 boreholes within the project limit. The In-band thickness varies from 2.30 m. (GL-4) to 4.45 m. (MJ-4). In one borehole the seam is partly jhama. The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
13.10-24.2	27.30-29.80	S-I – W-IV	21* 15-26	G5* E-G3	-	0.01-1.50
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
5.30	0.03	5.33

Jhama: 0.07 Mt.

Roof & Floor

The roof is generally of carbonaceous shale while the floor isfine grained sandstone and dark shale.

Exploitation

The seam has been extensively worked and goaved in the project area, except dip side of that area. As far as the composite seam is concerned, the seam has been extensively developed in 1 section and goaved at places. The seam is virgin in small areas in the SW and NW sides of the block. The seam is extensively on fire in the north-western and west-central portion as well as in two small patches in the south-eastern portion of the project area.

Seam XI/XII/XIII

The seam has been occurring in south-central side within the project limit. It is underlying below the seam XIII-A with a parting between 5.75 m. (MJ-9) to 26.56 m. (NGK-33) and the full coal thickness has been intersected in 6 boreholes within the proposed project limit. In 2 boreholes only part thickness has been encountered due to underground working.

In-band thickness of the seam varies from 11.75 m (MJ-10) to 14.00 m (MJ-13).

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
20.60-27.00	26.9-30.5	W-I – W-III	22-26* 12-32	G-G3*	5.5-7.5*	0.29-1.59
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
4.81	–	4.81

Roof & Floor

The roof is generally of sandstone while the floor is generally carbonaceous shale.

Exploitation

The seam has been extensively worked and goaved in one or 2 section and very small patches are remaining as virgin within the project area.

Seam XI/XII

This seam is underlying below the seam XIII with a parting between 3.85 (MJ-4) to 34.00 m. (GL-2) and the full coal thickness has been intersected in 14 boreholes within the proposed project limit. In 4 boreholes only part thickness has been encountered due to underground working.

In-band thickness of the seam varies from 6.02 m (MJ-1) to 10.00 m (MJ-4).

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	CO_2%
17.00-30.00	27.2-30.2	S-II – W-IV	13-19* 15-25	F-G3* E-G7	0.19-1.20
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.					

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
4.58	–	4.58

Roof & Floor

The roof is generally of sandstone while the floor is generally carbonaceous shale.

Exploitation

The seam has been extensively worked in one or two sections and is goaved in the eastern half. Several sand stowed developed zones also occur within the area. The seam is extensively on fire in the north-western and central portion of the project area.

Seam X-A

This seam is underlying below the seam XI/XII with a parting between 10.32(GL-1) to 39.17 m. (MJ-4) and the full coal thickness has been intersected in 20 boreholes within the proposed project limit. In 5 boreholes only part jhama thickness has been encountered and in one borehole full jhama with MP has been encountered. In one borehole (GL-1) the seam is occurs as carbonaceous shale.

In-band thickness of the seam varies from 0.25 m (LJ-3) to 3.12 m (MJ-9). The seam is very thin and most of the area it is non workable.

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.	CO_2%
22.0-47.32	25.7-31.7	S-II - UG	19- 23* 17-22	G-G5* F	5.5*	0.51-0.62
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.						

Net Geological Resource (Mt.)

Seam XA is very thin (average thickness below 1 meter), impersistable hence its resource can not to be considered for mine planning purpose.

Roof & Floor

The roof is generally of sandstone while the floor is generally carbonaceous shale.

Seam IX/X

This seam is either underlying below the seam X-A with a parting between 13.95 (GL-2) to 63.10 m. (LJ-3) and the full coal thickness has been intersected in 23 boreholes within the proposed project limit. In 7 boreholes only part thickness has been encountered due to underground working.

In-band thickness of the seam varies from 4.51 m (ST-15) to 9.84 m (GL-9).

The seam has been considered as prime coking coal within the project area. Detailed quality parameters and net geological resource is given below in table.

Quality Parameters

Proximate Analysis (On air-dried basis)

Ash%	UVM%	Grade	C.I.	G.K.L.T	S.I.
25.00-45.50	23.80-29.30	W-III - UG	15-25* 13-28	E - G6* E - G5	2-7*
* Result of coking properties based on float fraction at 1.50 Sp. Gr. cut (3mm size). Without asterics (*) are on raw coal only.					

Ultimate Analysis (Unit Coal basis)

CO_2%	C %	H%	P%	S%
0.15-1.60	88.70-90.32	4.68-4.85	0.112-0.117	0.51-0.60

Net Geological Resource (Mt.)

Coal	Coal in C+JH Zone	Total
31.49	–	31.49

Roof & Floor

The roof is generally of sandstone while the floor is generally carbonaceous shale.

Exploitation

The seam has been extensively worked and goaved in the project area, except western and south-western portions where it is virgin. In most of the area the seam has been worked in two sections but at places it has it has also been developed in three sections. It has been extensively goaved in the eastern part of the area and in patches only elsewhere. There are some stooks areas which have been filled with sand. In the incrop region small old quarries are found. The seam is extensively on fire in several patches towards the eastern portion and also in a small patch in the north central portion of the area. (Ref: GR, Mukunda OC Block, July, 1981).

4.9 INSITU COAL QUALITY

The quality of coal seams in this Revised Geological Report is based on “Geological Report, Mukunda Open Cast ” Jharia coalfield, Dhanbad (July, 1981, prepared by CMPDI, RI-2, Dhanbad).The non-combustible bands like sandy shale, sand stone, siderite,grey shale (Ash > 75 %) etc. irrespective of their thickness and carb shale(Ash > 50 %) of 1 meter and above in thickness occurring within the seam, have been excluded from the total thickness of the seam for computing the effective thickness (**I**100) of coal seams for the purpose of quality consideration. Rest of the dirt bands has been included as a part of the coal seams.

Faulted, partly faulted, worked seam/part worked seam thickness encountered in the boreholes have not been considered for the purpose of quality assessment.

4.10.1 RESOURCE ESTIMATION CRITERIA

A. The seam wise status of developed, depillared and goaved areas in addition to virgin patches has been identified on the basis of seam working plan. These have been clearly marked on the seam folio plans and floor contour plans of all the seams proposed for quarrying in the area.

B. **Goaf & Quarries**: These areas have been considered as devoid of coal, however in case of goaf the devoid zone is considered according to the height of the goaf.

C. **Developed Areas:** In developed areas, where reserves are standing on pillars, seam wise dimension of extraction (height & width) have been decided on the basis of seam working plan made available by area/collieries authorities and after detailed discussion with them. And only after that percentage of extraction factor for each seam has been arrived which ranges from 30 % to 50 %. For standing on pillars an average of 30% and for stooks 90% extraction of coal has been considered and accordingly Net Geological Resource has been calculated.

D. **Thickness:** Only the In-band (I100) thickness of the seam has been considered for reserve estimation. Areas having thickness less than 0.5 m have not been considered for reserve estimation.

E. **Jhama Zone:** The jhama and coal+ jhama zone have been drawn on the basis of following assumption :

- In case full jhama being encountered in one borehole and full coal in adjoining boreholes, the total distance between two boreholes, has been divided into three equal parts to represent full jhama zone, coal+jhama zone and full coal zone

- In case of part of jhama and part of coal being encountered in one bore hole and full coal in the adjoining borehole, the total distance

between two boreholes have been divvied into two equal parts to represent coal + jhama zone and full coal zone.

The demarcated zones are indicative of possible occurrence of coal and jhama zone. However, in view of erratic behavior of the burning pattern, these zones are interpretative.

- Keeping in view, the erratic behavior of pyrolitsation, thickness, ash, UVM etc. quality lines have not been drawn within coal + jhama zone. As stated earlier , seam XIII, XIII-A, XIII-B, XIV and XV has undergone pyrolitisation in part area, the resource of coal in coal + jhama zone have been assessed separately on the basis of total thickness of coal encountered in the boreholes within the pyrolitised zone.

- The resources of jhama in pyrolilitisation zone have been assessed separately by considering the specific gravity of jhama is 1.7 and effective thickness of jhama in these zones excludes the thickness of the MP bands.

- Not developed areas have been demarcated and these areas have been excluded from resource estimation.

F. Resource under fire affected area:

- It is very difficult to know the extent underground fire and its quantitative and qualitative affect upon the seam under consideration. However, quantitative assessment of coal has been derived based on data as provided by the colliery authority regarding the extent of fire and percentage of coal damage due to fire.
- Most of the seams have been affected by fire. The extents of fire are purely tentative and demarcated by the colliery authority. The coal resources within the fire area are tentative and the same may not be available also as impact of fire on individual seams in not known.

- Since the effect of fire upon each seam are not uniform, hence we considered the data of seam wise percentage of damage coal due to fire as provided by colliery authority .

- Grade of coal within the fire affected area cannot be assessed or confirmed, however the grade of coal within the fire area has been considered as per available data in Geological Report of Mukunda OCP (1981), which may be deteriorated later due to burning effect of fire and cannot be confirmed.

- Quantity of coal in seams XV-A, XV, XIV-A within the proposed quarry limit have not been assessed in line of deliberations made with the colliery authority in view extensive mining activity as well as severe burning effect of coal.

G. Seam extent (floor limit) of different seams within the periphery of proposed quarry limit has been decided on the basis of slope study during the preparation of Mukunda PR.

Coal resource estimation of individual seam within the proposed quarry limit has been assessed by taking the area of each seam extent marked in individual floor contour plan/seam folio plan and considering all the assumptions as discussed above.

4.10.2 METHODOLOGY OF RESERVES CALCULATION

The reserve has been estimated through “MINEX” software.

1. The resource has been calculated using “Detailed Resource Reporting” menu of **MINEX 6.5.1** software along with separate template for each individual seam.

2. A deduction of 10% from the ‘gross resources’ of coal has been made to account for unidentified geological uncertainties like structural

disturbances, washout zones etc. to arrive at the 'net geological resources'.

3. The seam wise status of developed, depillared, stook, fire areas in addition to virgin patches has been identified on the basis of seam working plan supplied by the concerned area/colliery officials. These have been clearly marked on the seam folio plans and floor contour plans of all the seams.

4. **Heave Zone**: The areas falling within the heave zone of a fault has been excluded for the purpose of resource estimation.

5. Coal resource estimation of individual seam within the proposed quarry limit of Amalgamated Joyrampur Colliery has been assessed by taking the area of each seam extent marked in individual floor contour plan/seam folio plan.

4.11 EXPLORATORY WASHABILITY TESTS

Exploratory washability test result of coal cores of BH No. GL-10 given in Annexure-I (A).

4.12 BAND IN COAL SEAM

All the seams contain several number of bands. The thickness of the band varies from 2 centimeters to 2 meter. The bands generally composed of carbonaceous shale, dark shale, fine grained sandstone, MP etc.

4.13 CONCLUSION

The integrated geological assessment of the surface and subsurface data available from the earlier geological reports have clearly established 51.32 million tonnes of coal out of which 49.54 million tonnes is available in full coal zone and 1.78 million tonnes coal available within coal+jhama zone. Out of 51.32 million tonnes of total proved resource of coking coal, about 31.49 million tonnes (61.0 %) coal available in seam IX/X only. Beside coal, 6.49 million tonnes jhama also vailable within the proposed project limit.

Net Geological Resource of Coal & Jhama

(Within the Proposed Quarry Limit)

Table No: 4.5

Seam wise/grade wise proved resource of coking coal (Million Tonnes)

Proved								
Coking (Full Coal Zone)								
Seam	**S-I**	**S-II**	**W-I**	**W-II**	**W-III**	**W-IV**	**UG**	**Sub Total**
XV-A	Almost Exhausted (Extensively quarried, goved, dipillered and fallen within active fire zone. Resource cannot be assessed)							
XV	Almost Exhausted (Extensively quarried, goved, dipillered and fallen within active fire zone. Resource cannot be assessed)							
XIV-A	Almost Exhausted (Extensively quarried, goved, dipillered and fallen within active fire zone. Resource cannot be assessed)							
XIV	0.02	0.41	0.12					**0.55**
XIII-B				0.21	0.37	1.20	0.01	**1.79**
XIII-A			0.10	0.18	0.31	0.43		**1.02**
XIII	0.02	1.42	2.82	0.80	0.24			**5.30**
XI/XII/XIII			0.08	3.30	1.43			**4.81**
XI/XII		0.1	0.95	2.63	0.52	0.38		**4.58**
IX/X					2.69	26.40	2.40	**31.49**
Total	0.04	1.93	4.07	7.12	5.56	28.41	2.41	**49.54**

Table No: 4.6

Seam wise/grade wise proved resource of coking coal (Million Tonnes)

Proved							
Coking (Coal in Coal+Jhama Zone)							
Seam	**S-II**	**W-I**	**W-II**	**W-III**	**W-IV**	**UG**	**Sub Total**
XIII-B					0.02	0.01	**0.03**
XIII-A	0.04	0.04	1.26	0.36	0.02		**1.72**
XIII	0.02	0.01					**0.03**
Total	0.06	0.05	1.26	0.36	0.04	0.01	**1.78**

Table No: 4.7

Seam wise/ proved resource of Jhama (Million Tonnes)

Jhama Resource (Mt.)	
Proved	
Seam	
XIII-B	0.06
XIII-A	6.36
XIII	0.07
Total	**6.49**

Table No: 4.8

Coal Resource Summary Table (Million Tonnes) Within Proposed Quarry Limit

Coal Resource Summary (Mt.)					
Seam	Coal	Coal in C+Jh Zone	Sub Total	Jhama	Total
XIV	0.55		0.55		0.55
XIII-B	1.79	0.03	1.82	0.06	1.88
XIII-A	1.02	1.72	2.74	6.36	9.1
XIII	5.3	0.03	5.33	0.07	5.4
XI/XII/XIII	4.81		4.81		4.81
XI/XII	4.58		4.58		4.58
IX/X	31.49		31.49		31.49
Total	**49.54**	**1.78**	**51.32**	**6.49**	**57.81**

Table No: 4.9

Coal Resource Summary Table (Million Tonnes) Within Leasehold Boundary

Coal Resource Summary (Mt.)					
Seam	Coal	Coal in C+Jh Zone	Sub Total	Jhama	Total
XIV	2.03		2.03		2.03
XIII-B	3.03	0.61	3.64		3.64
XIII-A	1.37	2.91	4.28	12.38	16.66
XIII	2.03	1.60	3.63	2.40	6.03
XI/XII/XIII	9.12	3.27	12.39		12.39
XI/XII	8.25		8.25		8.25
IX/X	72.09		72.09		72.09
Total	97.92	8.39	106.31	14.78	121.09

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
IX	31.8	41.6	20.9	50.6	36.6	7.8	
1					Clean	Middlings	Rejects
1.0	Proximate analysis (Air dried basis)						
1.1	Moisture %				1.0	0.8	
1.2	Ash %				20.9	36.6	58.9
1.3	V.M. %				20.6	18.2	
2.0	Calorific value (K.Cal/kg)						
2.1	Gross					5150	
2.2	Net					4960	
3.0	Phosphorus				0.049		
4.0	Coking properties						
4.1	Caking Index				21		
4.2	Coke Type (GKLT)				G1		
4.3	Swelling Index				5		
5.0	Ultimate Analysis (Unit Coal Basis)						
5.1	Carbon				89.63	89.52	
5.2	Hydrogen				4.87	4.89	
5.3	Nitrogen				2.04	1.81	
5.4	Sulphur				0.73	0.69	
5.5	Oxygen (By difference)				2.73	3.09	
6.0	H.G.I.					49	
7.0	Ash fusion temperature range in ^{0}C (In Mild reducing temperature)						
7.1	Initial Deformation					1210	
7.2	Hemispherical Point					1370	
7.3	Flow Point					1400(over)	
8.0	Carbonate CO_2 %				0.47	0.88	
9.0	Ash Analysis						
9.1	SiO_2					57.39	
9.2	Al_2O_3					23.48	
9.3	Fe_2O_3					7.95	
9.4	TiO_2					1.43	
9.5	P_2O_5					1.52	
9.6	CaO					3.51	
9.7	MgO					2.10	
9.8	SO_4 (Sulphate)					1.03	
9.9	Alkalies (By difference)					1.79	
10	Ash Viscosity						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XI/XII	21.4	75.1	15.8	16.4	33.3	8.5	
1					**Clean**	**Middlings**	**Rejects**
1.0	**Proximate analysis (Air dried basis)**						
1.1	Moisture %				1.1	1.0	
1.2	Ash %				15.8	33.3	47.5
1.3	V.M. %				24.0	21.0	
2.0	**Calorific value (K.Cal/kg)**						
2.1	Gross					5370	
2.2	Net					5170	
3.0	**Phosphorus**				0.061		
4.0	**Coking properties**						
4.1	Caking Index				23		
4.2	Coke Type (GKLT)				G		
4.3	Swelling Index				$5^{1/2}$		
5.0	**Ultimate Analysis (Unit Coal Basis)**						
5.1	Carbon				88.96	88.51	
5.2	Hydrogen				5.03	5.08	
5.3	Nitrogen				1.71	1.59	
5.4	Sulphur				0.69	0.74	
5.5	Oxygen (By difference)				3.61	4.08	
6.0	**H.G.I.**					59	
7.0	**Ash fusion temperature range in ^{0}C (In Mild reducing temperature)**						
7.1	Initial Deformation					1180	
7.2	Hemispherical Point					1350	
7.3	Flow Point					1400(over)	
8.0	**Carbonate CO_2 %**				0.51	1.03	
9.0	**Ash Analysis**						
9.1	SiO_2					60.31	
9.2	Al_2O_3					23.73	
9.3	Fe_2O_3					8.43	
9.4	TiO_2					1.41	
9.5	P_2O_5					0.81	
9.6	CaO					2.31	
9.7	MgO					1.04	
9.8	SO_4 (Sulphate)					0.89	
9.9	Alkalies (By difference)					1.07	
10	**Ash Viscosity**						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XIII-B	27.4	66.1	15.6	11.2	37.8	22.7	
1					**Clean**	**Middlings**	**Rejects**
1.0	**Proximate analysis (Air dried basis)**						
1.1	Moisture %				1.0	1.1	
1.2	Ash %				15.6	37.8	58.2
1.3	V.M. %				25.0	21.0	
2.0	**Calorific value (K.Cal/kg)**						
2.1	Gross					4910	
2.2	Net					4710	
3.0	**Phosphorus**				0.055		
4.0	**Coking properties**						
4.1	Caking Index				20		
4.2	Coke Type (GKLT)				G/ G1		
4.3	Swelling Index				6 $^{1/2}$		
5.0	**Ultimate Analysis (Unit Coal Basis)**						
5.1	Carbon				88.54	88.34	
5.2	Hydrogen				5.12	5.16	
5.3	Nitrogen				1.83	1.71	
5.4	Sulphur				0.69	0.73	
5.5	Oxygen (By difference)				3.82	4.06	
6.0	**H.G.I.**					49	
7.0	**Ash fusion temperature range in ^{0}C (In Mild reducing temperature)**						
7.1	Initial Deformation					1190	
7.2	Hemispherical Point					1390	
7.3	Flow Point					1400(over)	
8.0	**Carbonate CO_2 %**				0.31	0.78	
9.0	**Ash Analysis**						
9.1	SiO_2					58.15	
9.2	Al_2O_3					22.16	
9.3	Fe_2O_3					9.01	
9.4	TiO_2					1.93	
9.5	P_2O_5					1.25	
9.6	CaO					2.68	
9.7	MgO					1.71	
9.8	SO_4 (Sulphate)					1.03	
9.9	Alkalies (By difference)					2.10	
10	**Ash Viscosity**						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XIV	22.2	72.0	16.1	24.7	36.1	3.3	
1					Clean	Middlings	Rejects
1.0	Proximate analysis (Air dried basis)						
1.1	Moisture %				1.2	0.9	
1.2	Ash %				16.1	36.1	51.8
1.3	V.M. %				24.9	21.1	
2.0	Calorific value (K.Cal/kg)						
2.1	Gross					5170	
2.2	Net					4960	
3.0	Phosphorus				0.029		
4.0	Coking properties						
4.1	Caking Index				24		
4.2	Coke Type (GKLT)				G/ G1		
4.3	Swelling Index				6 1/2		
5.0	Ultimate Analysis (Unit Coal Basis)						
5.1	Carbon				88.36	88.15	
5.2	Hydrogen				5.11	5.15	
5.3	Nitrogen				1.97	2.01	
5.4	Sulphur				0.71	0.81	
5.5	Oxygen (By difference)				3.85	3.88	
6.0	H.G.I.					49	
7.0	Ash fusion temperature range in ^{0}C (In Mild reducing temperature)						
7.1	Initial Deformation					1160	
7.2	Hemispherical Point					1380	
7.3	Flow Point					1400(over)	
8.0	Carbonate CO_2 %				0.37	1.02	
9.0	Ash Analysis						
9.1	SiO_2					56.19	
9.2	Al_2O_3					25.11	
9.3	Fe_2O_3					11.21	
9.4	TiO_2					1.75	
9.5	P_2O_5					0.97	
9.6	CaO					2.01	
9.7	MgO					0.98	
9.8	SO_4 (Sulphate)					0.71	
9.9	Alkalies (By difference)					1.07	
10	Ash Viscosity						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XIV-A	13.4	95.4	12.2	3.8	26.4	0.8	
1					**Clean**	**Middlings**	**Rejects**
1.0	**Proximate analysis (Air dried basis)**						
1.1	Moisture %				1.5	1.3	
1.2	Ash %				12.2	26.4	72.3
1.3	V.M. %				27.0	22.7	
2.0	**Calorific value (K.Cal/kg)**						
2.1	Gross					6090	
2.2	Net					5880	
3.0	**Phosphorus**				0.051		
4.0	**Coking properties**						
4.1	Caking Index				22		
4.2	Coke Type (GKLT)				G1/ G2		
4.3	Swelling Index				$5^{1/2}$		
5.0	**Ultimate Analysis (Unit Coal Basis)**						
5.1	Carbon				87.06	88.08	
5.2	Hydrogen				5.17	5.10	
5.3	Nitrogen				2.02	1.97	
5.4	Sulphur				0.71	0.75	
5.5	Oxygen (By difference)				4.24	4.10	
6.0	**H.G.I.**					64	
7.0	**Ash fusion temperature range in ^{0}C (In Mild reducing temperature)**						
7.1	Initial Deformation					1190	
7.2	Hemispherical Point					1390	
7.3	Flow Point					1400(over)	
8.0	**Carbonate CO_2 %**				0.27	0.81	
9.0	**Ash Analysis**						
9.1	SiO_2					51.45	
9.2	Al_2O_3					27.37	
9.3	Fe_2O_3					10.51	
9.4	TiO_2					1.71	
9.5	P_2O_5					0.98	
9.6	CaO					2.31	
9.7	MgO					1.91	
9.8	SO_4 (Sulphate)					0.91	
9.9	Alkalies (By difference)					2.85	
10	**Ash Viscosity**						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XV-A	25.1	68.6	16.7	20.7	34.7	10.7	
1					**Clean**	**Middlings**	**Rejects**
1.0	**Proximate analysis (Air dried basis)**						
1.1	Moisture %				1.3	1.4	
1.2	Ash %				16.7	34.7	60.0
1.3	V.M. %				26.0	20.9	
2.0	**Calorific value (K.Cal/kg)**						
2.1	Gross					5260	
2.2	Net					5260	
3.0	**Phosphorus**				0.037		
4.0	**Coking properties**						
4.1	Caking Index				20		
4.2	Coke Type (GKLT)				G/ G1		
4.3	Swelling Index				6		
5.0	**Ultimate Analysis (Unit Coal Basis)**						
5.1	Carbon				87.85	87.82	
5.2	Hydrogen				5.19	5.06	
5.3	Nitrogen				1.99	2.01	
5.4	Sulphur				0.69	0.75	
5.5	Oxygen (By difference)				4.28	4.36	
6.0	**H.G.I.**					55	
7.0	**Ash fusion temperature range in ^{0}C (In Mild reducing temperature)**						
7.1	Initial Deformation					1170	
7.2	Hemispherical Point					1350	
7.3	Flow Point					1400(over)	
8.0	**Carbonate CO_2 %**				0.39	0.51	
9.0	**Ash Analysis**						
9.1	SiO_2					60.15	
9.2	Al_2O_3					22.11	
9.3	Fe_2O_3					9.15	
9.4	TiO_2					1.39	
9.5	P_2O_5					1.11	
9.6	CaO					2.43	
9.7	MgO					1.13	
9.8	SO_4 (Sulphate)					0.78	
9.9	Alkalies (By difference)					1.75	
10	**Ash Viscosity**						

ANNEXURE-I (A)

Exploratory Washability Test Result

Borehole No.GL-10

(Sample crushed to 13 mm size)

Seam No.	Ash % of the raw coal	Cleans at 1.50		Middlings at 1.50 to 1.80		Rejects at 1.80	
		Wt %	Ash%	Wt %	Ash %	Wt %	Ash %
XVI	26.4	60.9	16.2	26.0	33.5	13.1	
1					**Clean**	**Middlings**	**Rejects**
1.0	**Proximate analysis (Air dried basis)**						
1.1	Moisture %				1.7	1.0	
1.2	Ash %				16.2	33.5	59.5
1.3	V.M. %				29.4	23.3	
2.0	**Calorific value (K.Cal/kg)**						
2.1	Gross					5380	
2.2	Net					5180	
3.0	**Phosphorus**				0.041		
4.0	**Coking properties**						
4.1	Caking Index				20		
4.2	Coke Type (GKLT)				G1/ G2		
4.3	Swelling Index				6		
5.0	**Ultimate Analysis (Unit Coal Basis)**						
5.1	Carbon				86.92	86.94	
5.2	Hydrogen				5.39	5.27	
5.3	Nitrogen				2.01	1.98	
5.4	Sulphur				0.71	0.75	
5.5	Oxygen (By difference)				4.97	5.06	
6.0	**H.G.I.**					59	
7.0	**Ash fusion temperature range in ^{0}C (In Mild reducing temperature)**						
7.1	Initial Deformation					1180	
7.2	Hemispherical Point					1380	
7.3	Flow Point					1400(over)	
8.0	**Carbonate CO_2 %**				0.61	1.03	
9.0	**Ash Analysis**						
9.1	SiO_2					56.10	
9.2	Al_2O_3					24.58	
9.3	Fe_2O_3					10.31	
9.4	TiO_2					1.71	
9.5	P_2O_5					0.81	
9.6	CaO					2.64	
9.7	MgO					1.32	
9.8	SO_4 (Sulphate)					0.75	
9.9	Alkalies (By difference)					1.78	
10	**Ash Viscosity**						

CHAPTER - V

MINING

5.0 PRESENT STATUS

Amalgamated Joyrampur Colliery is under the administrative control of Lodna area of BCCL. Amalgamated Joyrampur Colliery is formed by Amalgamation of 05(five) Underground Mines (i.e. Lodna Colliery, Bagdigi Colliery, Bararee Colliery, Jealgora Colliery & Joyrampur Colliery) vide letter no. R-2/0100190/P-12-15/1517-27 dated 28.8.2015 issued by Director of Mines safety, Region-2, DGMS, Dhanbad. The demarcated boundary of Amalgamated Joyrampur Colliery covers a leasehold area of 1186.97 Ha. as per data/plan supplied by colliery authority and it involves part of Mukunda Geological Block. All the Underground Mines were earlier worked by different small Mine owners and developed , depillared in patches. Seams from I to XVI Seam exist within the mine and all the upper seams upto XI/XII seam are under fire within boundary of Amalgamated Joyrampur Colliery At present all the underground units of Amalgamated Joyrampur Colliery are closed. It is proposed to extract the fire affected seams by Opencast method upto IX/X seam to make the underlying seams workable.

At present opencast mining operation is going on by deployment of hired HEMM(Patch-D) in the leasehold of Amalgamated Joyrampur Colliery.

Opencast:

As stated earlier it has been decided by BCCL management to discontinue underground mining operation within Amalgamated Joyrampur Colliery. In this mining plan, it is proposed to extract the IX/X & all above occurring seam within proposed quarry (upto XVA seam) through opencast operation .The details of the quarry are given in relevant Para . Opencast operation is proposed to be worked by Shovel-Dumper system of mining.

Nomenclature:

Nomenclature of coal seams Vis-À-Vis Colliery Nomenclature

Standard Nomenclature (Geological)	Colliery Nomenclature (Amalgamated Joyrampur Colliery)
XVI	XVI
XV-A	XV-A
XV	XV
XIV-A	XIV-A
XIV	XIV
XIII-B	XIII-B
XIII-A	XIII-A
XIII	XIII
XI/XII	XI/XII
X-A	X-A
IX/X	IX/X

Present Status of Seams:

Status of the seams of different erstwhile individual mines are given below.

Seamwise status of Working

1. **Lodna Colliery:**

Seam	Status
XIV	Exhausted and on Fire
XIII B	Exhausted and on Fire
XIIIA	Exhausted and on Fire
XIII	Exhausted and on Fire
XI/XII	50% area depillared with caving/stowing, 50% area standing on pillars. Dip side area is waterlogged.
IX/X	Partly depillared Partly Standing on Pillar.
VIIIA	In 70 % area the seam has been thinned out and in 30% area the seam is developed and standing on Pillar.
VIII	In 60 % area the seam is developed and in 40% area the seam is virgin. Dipside developed working is waterlogged.
VII	In 40 % area the seam is developed and in 60% area the seam is virgin.
V/VI	In 10 % area the seam is developed and in 90% area the seam is virgin. The developed workings are fully waterlogged.
All seams below V/VI seam are virgin.	

BAGDIGI COLLIERY

Seams	Status
XV	Exhausted and under fire.
XIVA	Exhausted and under fire.
XIV	Exhausted and under fire.
XIIIB	Exhausted and under fire.
XIII A	Exhausted and under fire.
XIII	Exhausted and under fire.
XI/XII	Exhausted and under fire.
X(A)	Not worked due to thinness
IX/X	Exhausted.
VIIIA	Not worked due to thinness
VIII	50% area developed and 50% area virgin. seam.
VII(T)	50% area developed and 50% area virgin. .
All seams below VIIT are virgin.	

JOYRAMPUR COLLIERY

Seam	Status of Working
XIII B	Exhausted & under Fire.
XIII A	Exhausted & under Fire.
XIII	Exhausted & under Fire.
XI/XII	Mostly depillared with caving and partly standing on pillars. The seam is on fire.
IX/X	Mostly depillared (90%) with caving and partly standing on pillars. The seam is on fire.
VIIIA	Mostly depillared (90%) with caving and partly standing on pillars.
VIII	50% depillared with caving/stowing and 50% area developed and standing on pillars.
VII	65% depillared with caving/stowing and 35% area developed and standing on pillars. At present seam is being depillared with stowing (Manual)
V/VI	Fully developed and standing on pillars. The dipside area waterlogged (30 MG).
IV T	35% area developed and 65 % area virgin. .
All the seams below IVT seam are Virgin	

BARAREE COLLIERY

Sl. No.	Seam	Status
1	XV	Fully developed on B&P method Partly caved and rest SOP., Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
2	XIV A	Fully developed on B&P method Partly caved and rest SOP., Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
3	XIV	Fully developed on B&P method Partly caved and rest SOP., Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
4	XIIIB	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP., Under fire and dipside water logged. Outcrop zone quarried. Unapproachable.
5	XIIIA	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP., Under fire and dipside water logged. Unapproachable.
6	XIII	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP., Under fire and dipside water logged. Unapproachable.
7	XI/XII	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP., Under fire and dipside water logged. Unapproachable.
8	X(Top)	Under development by B&P Method.
9	X (Bottom)	Under development by B&P Method Drowned below 14^{th} level .standing on pillar.
10	IX	Almost Drowned . standing on pillar
11	VIII	Almost Drowned standing on pillar
12	VII(T)	Almost Drowned standing on pillar
13	VII(B)	Developed in small portion and drowned at present.
14	V/VI & below	Virgin

JEALGORA COLLIERY

Sl. No.	Seam	Status
1	XV	Fully developed on B&P method Partly caved and rest SOP.,Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
2	XIV A	Fully developed on B&P method Partly caved and rest SOP.,Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
3	XIV	Fully developed on B&P method Partly caved and rest SOP.,Under fire and dipside water logged. Being excavated in the outcrop zone. Unapproachable.
4	XIIIB	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP.,Under fire and dipside water logged. Outcrop zone quarried. Unapproachable.
5	XIIIA	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP.,Under fire and dipside water logged. Unapproachable.
6	XIII	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP.,Under fire and dipside water logged. Unapproachable.
7	XI/XII	Fully developed on B&P method Partly caved, partly split and stowed and rest SOP.,Under fire and dipside water logged. Unapproachable.
8	IX/X and below	Virgin

5.1 CHOICE OF MINING METHOD

Considering the dip of beds which varies from 4^0 to 12^0 and mining of multiple seam separated by multi partings, the shovel dumper combination is proposed for mining. The opencast is proposed to be operated with Shovel-Dumper System of mining.

5.1.1 JUSTIFICATION FOR OPTIMIZATION OF TARGETED CAPACITY

As per the current mining parameters of the mine, the normative production of the mine is 2.512 MTPA. The peak production from the mine will be 30% higher than the normal production (2.512 MTPA + 30%) which can be achieved by better utilization of resources and favorable geo-mining conditions.

5.1.2 ASSUMPTIONS MADE, IF ANY

It is assumed opencast method with Shovel-Dumper System of mining will be used in the mine. It is also assumed that required excavation & transport capacity will be available for opencast mining operation.

5.2 RESERVES

5.2.1 GEOLOGICAL AND MINEABLE RESERVES

The net geological reserves within leasehold boundary as well as within delineated quarry, blocked reserves within barrier & batter, mineable reserve within the delineated quarry & parting wise OB within the delineated quarry area given in the following tables:

SEAMS	Net Geological Reserve (mt.)			Mineable Reserve (mt.) within delineated quarry
	Within leasehold boundary	Blocked Reserves in Barriar & Batter	Within delineated Quarry	
XIV	2.03	1.48	0.55	0.495
XIII-B	3.64	1.76	1.88	1.692
XII-A	16.66	7.56	9.10	8.190
XIII	6.03	0.63	5.40	4.860
XI/XII/XIII	12.39	7.58	4.81	4.329
XI/XII	8.25	3.67	4.58	4.122
IX/X	72.09	40.60	31.49	28.341
Total	121.09	63.28	57.81	52.029

- XIVA, XV and XVA seams are exhausted/burnt within the delineated quarry area

PARTING WISE OB TO BE REMOVED

Partings	Volume in M.Cum
Top OB	300.98
Parting Between XIV & XIIIB	45.69
Parting Between XIIIB & XIIIA	37.43
Parting Between XIIIA & XIII	37.02
Parting Between XIII & XI/XII &XI/XII/XIII	70.78
Parting Between XI/XII & XI/XII/XIII & IX/X	377.78
Total	869.68

5.4 GEO-MINING PARAMETERS

5.4.1 SEAMS TO BE WORKED

In this mining plan, it is proposed to extract the IX/X & all above occurring seams (upto XVA seam) in the proposed quarry limit through opencast operation.

Thus, IX/X to XVA seam are to be worked by opencast method of mining.

The seams below IX/X seam will be considered while preparing the expansion Project Report of NT-ST including the area of Amalgamated Joyrampur Colliery with I seam as base seam.

5.5 MINING ELEMENTS

5.5.1 BRIEF DESCRIPTION OF OPENCAST OPERATIONS

At present all the underground units of Amalgamated Joyrampur Colliery is closed. It has been proposed in this mining plan to extract coal from IX/X to XVA seam through opencast operation. The base seam of the mine will be IX/X seam floor. The mine boundary of the quarry is given below.

Mine Boundaries Delineation

The quarry limits of the Amalgamated Joyrampur Colliery on the surface is delineated within the leasehold boundary as under:

North : Minimum of about 25 m from the leasehold boundary.

South : Limit of Metamorphics/Minimum of about 25 m from the leasehold boundary.

East : Leasehold boundary of Amalgamated Joyrampur Colliery

West : Minimum Distance of about 60 m from the proposed diverted route of Chatkari jore

Basic Dimensions of the Quarry

Basic dimensions of the quarry is tabulated below:

Sl. No.	Description	Unit	Value
1	Area of Excavation	Ha	749
2	Strike Length	km	4.330
3	Dip rise width	m	1.950
4	Min and Maximum depth	m	70-240
5	Base of quarry		Floor of IX/X seam

Opening of the Mine

Amalgamated Joyrampur Colliery is proposed to be developed through access trench and box cut which is further fully developed into benches along the strike length above IX/X seam floor. Surface Plan is shown in Plate no. MIN-I. It is suggested that the mines should work as per stage plan given herewith, so that equipment deployment of the proposed opencast can be facilitated better in the later stage. Plan showing initial stage mining operation is shown in Plate no. MIN-II. Plan showing intermediate stage mining operation is shown in Plate no. MIN-III.

OC Operations

It has been decided by BCCL management to mine out IX/X & all occurring seams within quarry limit (upto XVA seam) by opencast mining in the Amalgamated Joyrampur Colliery. The proposed Amalgamated Joyrampur Opencast has a life of about twenty five years considering the seams & area as stated above. The broad parameters of proposed Amalgamated Joyrampur Opencast Mine are given here:

Mineable/Extractable Coal	:	52.029 M.Tes
Overburden including Loose OB	:	869.68 M. Cum
Av. Stripping Ratio	:	16.72 M^3/Te

Base of the Quarry

Floor of IX/X seam is the base of the quarry .

Haul Road Layout

It is proposed to lay 20 m haul road at 1 in 16 gradient in the floor of the IX/X seam in proposed area to reach the maximum quarry depth, Haul road alignment is shown in Plate no. MIN-IV (Final Stage Dump Plan).

Excavation

All the seams considered for exploitation will be mined in separate single benche where ever possible.

Variation in thickness of OB will make it difficult to maintain uniform bench height in OB horizons. However, it is proposed to have a ceiling on OB bench height from safety reasons. The height of the bench generally shall not exceed the boom height of shovel. The height of the bench is proposed as 10 m.

Out of total 869.68 M.Cum of OB, 444.75 Mcum of OB will be dumped internally in the decoaled area of the quarry on quarry floor and the rest around 424.93 Mcum will have to be dumped externally. The lead for internal OB dumping will be from 1.00 Km to 4.00Km. Final Stage dump Plan is shown in Plate no. MIN-IV. The mine management has identified area for external dump that is shown in Plate no.-MIN-V.

For initial years OB will be dumped in external dump. After creation of void in the decoaled area at IX/X seam floor of Amalgamated Joyrampur Colliery , OB will be dumped internally from 3rd year onwards.

For convenience of operation it is proposed to keep a minimum working width of coal and OB bench as 10 to 20 m. The working benches of OB and coal will be kept at a slope angle of 70^{o} and 80^{0} respectively during operation.

The final pit slope of the quarry has been planned at 37^{o} for the final depth of the quarry (240 m)

Year wise dump schedule given below.

YEAR	INTERNAL DUMP (M.Cum.)	EXTERNAL DUMP (M.Cum.)	TOTAL (M.Cum.)	AREA FOR RECLAMATION (Ha)
1		15.00	15.00	
2		22.00	22.00	
3	3.00	27.00	30.00	
4	4.10	34.90	39.00	
5	8.10	35.90	44.00	
6	10.00	34.00	44.00	
7	15.00	29.00	44.00	
8	22.96	21.04	44.00	
9	25.42	17.08	42.50	
10	25.42	17.08	42.50	
11	25.42	17.08	42.50	
12	25.42	17.08	42.50	
13	25.42	17.08	42.50	
14	25.42	17.08	42.50	20.82
15	25.42	17.08	42.50	20.85
16	25.42	17.08	42.50	41.64
17	25.42	17.08	42.50	41.64
18	25.42	17.08	42.50	41.64
19	25.42	17.08	42.50	41.64
20	29.90	11.10	41.00	41.64
21	21.89	7.11	29.00	41.64
22	21.00		21.00	41.64
23	16.00		16.00	41.64
24	8.00		8.00	41.64
25	5.18		5.18	41.64
PC-1				41.64
TOTAL	444.75	424.93	869.68	499.71

OB Dump Benches

Bench height for OB dumps will be 30 m and slope of individual dump benches will be 37^0. Width of berm between two adjacent benches will be about 40 m. Dumping will be done by End-Tipping method.

Drilling and Blasting

O.B. will be excavated in benches after proper drilling & blasting. Drilling in OB benches will be done by 250mm/160mm drills. The blasted OB will be dozed, heaped and loaded on to dumpers for transportation to OB dumps.

Drilling in coal benches will be done by 100 mm/ 160mm drills and after proper drilling & blasting, the blasted coal will be loaded by Shovels on to dumpers for transportation up to the surface stock yard.

The standard practice involving the electric detonators for the initiation of detonating cord, detonating relays to achieve hole-to-hole delays, use of Heavy ANFO, slurry or emulsion explosives as the column charge will be used for blasting.

The pattern of drilling and blasting will be decided during actual operation of the quarry. However, specific consumption of explosives has been envisaged as 0.3 kg/cum for OB and 0.2 kg/cum for Coal.

Transportation

There exist two Railway Sidings named as no. 6 and no. 9 siding in Lodna Area. The ROM coal from the OC will be transported by the tipping trucks from the pithead stock up to the siding directly and spread them all along the wharf. Contractual pay loaders will be engaged to load the coal into the railway wagons.

5.5.3 LIFE OF MINE

The life of mine for opencast project is 25 years at projected level of production.

5.5.4 SEQUENCE OF MINING

The mining shall be carried out in descending order.

5.6 MACHINERY TO BE DEPLOYED

Shovel Dumper System of Excavation with Drilling & Blasting will be supported with suitable population of Dozers, Motor Grader, Water Sprinkler and other

Auxiliary / Support equipments for excavation in the hot ROM material conditions.

5.7 PRODUCTION SCHEDULING

OPENCAST

The normative target production of the mine will be 2.512 MTY. However the peak production capacity of 2.512 MTY + 30% which may be achieved occasionally by better utilization of resources & favorable geo mining condition.

The calendar programme of mining operation has been formulated based on the adopted sequence of mine development and optimum condition of mining operation for the entire life of opencast project.

The year wise production from the Amalgamated Joyrampur Colliery is given below:

Year	CoalProduction (M.Tes)	O.B.Removal (M.Cum)	Av. Stripping ratio (Cum/T)
1	0.40	15.00	37.50
2	0.70	22.00	31.43
3	1.00	30.00	30.00
4	1.40	39.00	27.86
5	1.90	44.00	23.16
6	2.512	44.00	17.52
7	2.512	44.00	17.52
8	2.512	44.00	17.52
9	2.512	42.50	16.92
10	2.512	42.50	16.92
11	2.512	42.50	16.92
12	2.512	42.50	16.92
13	2.512	42.50	16.92
14	2.512	42.50	16.92
15	2.512	42.50	16.92
16	2.512	42.50	16.92
17	2.512	42.50	16.92
18	2.512	42.50	16.92
19	2.512	42.50	16.92

Year	CoalProduction (M.Tes)	O.B.Removal (M.Cum)	Av. Stripping ratio (Cum/T)
20	2.512	41.00	16.32
21	2.512	29.00	11.54
22	2.512	21.00	8.36
23	1.80	16.00	8.89
24	1.30	8.00	6.15
25	0.825	5.18	6.28
TOTAL	52.029	869.68	16.72

5.8 FIRE DEALING MEASURES

The proposed excavation area is a part of large fire of Lodna Area. Practically all the fires of the Lodna Area west of the erstwhile Rly. line e.g. Bagdigi fire, Lodna fire and Bararee colliery fire have merged into a single mega fire. Even the fire has crossed east of erstwhile Rly. property at places and active fire is visible on the east side . Presently, the fire is under control by surface sealing, trenching etc. So, any excavation in any part of fire area will increase breathing and there is all likelihood of aggravation of fire. Therefore, for excavating the proposed area top most priority has been accorded to seal off air supply to the exposed faces. The techniques are as follows :

5.8.1. APPLICATION OF THERMOSEAL

To isolate the operation area, every exposed mouths of development gallery along box-cut need to be closed with non-combustible material (OB rock & mutti), compacted properly and sprayed with Thermoseal (a mica based sealant). The sealant will close all the pores of breathing and thus chances of aggravation of fire will be minimised. For spraying ‘Thermoseal’ a ‘Sealant Spraying Machine’ will be used.

The ‘Thermoseal’ will also be sprayed over the coal face exposed along the box-cut. These exposed coal face might have either burnt out or are already on fire or are succeptible to spontaneous combustion due to heating and long history of fire in the area. Spraying of Thermoseal over the exposed coal face will cut-off air supply and thus prevent further aggravation of fire. If the faces are very

hot, immediate cooling should be done by spraying 'Water-Chemical (DAP&Urea) mixture or Water-Pyrocool mixture and then 'Thermoseal' should be applied. At final pit limit the sealant should be sprayed after covering the exposed faces with mutti & compacting them properly.

5.8.2. APPLICATION OF WATER-CHEMICAL MIXTURE

Even if the above mentioned measures are taken, possibility of occurrence of blazing fire on the exposed excavation / coal faces cannot be ruled out. To cool down such blazing fire during excavation, it is proposed that a water-chemical mixture containing Urea & DAP (on 1:1 ratio) be sprayed at high-pressure through nozzles of the Fire Tenderers into the fire site. For the purpose 50 Kg each of Urea & DAP has to be mixed with water in a fire tenderer of 18 Kl for spraying. After quenching the fire immediate measure is required to be taken to seal off the area so that fire do not re-erupt there again.

Alternatively, a 0.50% mixture of Pyrocool with water may also be used for spraying thro' high-pressure nozzles. However, since the chemical (Pyrocool) is very costly, it should be used judiciously only in case of uncontrollable and emergency fire conditions.

5.8.3. MODIFICATION IN UNIT OPERATIONS FOR EXCAVATION OVER FIRE AREA

For excavation of the area, standard unit operations of opencast mining e.g. drilling, blasting, excavation, transportation and dumping will be followed. But due to presence of fire, the unit operation will be modified slightly which are as follows:

Cooling of faces: Over the benches under excavation, application of fire fighting chemicals / additives like Di-ammomnum Phosphate (DAP) with Urea, mixed with water has to be carried out for suppressing the fire, extracting the heat and reducing the flame rapidly followed by profuse water jetting by high pressure nozzles for safe deployment of man & machines.

Cooling of Blast-hole & Insertion of Fire Resistant & Thermal Insulation Casing in the Blast Hole

Over the benches under excavation, drilling of blast-hole will be followed by cooling of the hole by use water and / or water-chemical mixture to bring down the temperature below 70^{o}C (if temp is very high). Finally fire resistant and thermal insulator casing will be inserted inside the hole before charging the explosive into it.

Blasting of the Excavation Bench

The size of each blast will be small with fewer number of blast holes established on the basis of rate of increase in temperature within the blast-hole, so that temp inside the hole before blasting is kept under detonation limit.

Quenching of Blasted Bench with Flushing of Water

After blasting the bench, the excavation area will be quenched by profuse use of water. For this, pipe range has been proposed to be laid round the quarry and high pressure nozzles has been proposed to be connected at regular interval with T-joint so that water can be sprayed over hot/fire excavation benches. Adequate pumping capacity has been provided from a Water Reservoir proposed to be excavated for the purpose. Water into the reservoir will be filled from pumps located in different collieries. From this surface Water Reservoir, water will be pumped out at faces for quenching purpose.

Excavation of the blasted & quenched material shall be done by use of Electric Rope Shovels and loaded into Rear Dumpers.

Transportation & Dumping

OB will be transported to external or internal OB dumps for dumping. After dumping, the OB will be again sprayed with water to quench the fire, if any, completely, so that chances of re-appearance of fire at OB

dumps is eliminated. Adequate pumps have been provided for the purpose.

Coal, if recovered, will be transported to Surface Coal Stock Pit filled up with water where hot ROM coal will be quenched completely and then transported to the Washeries or the Railway sidings, as the case may be.

Sealing Off At Pit Limit

At the end of the mine life, end pit slope within the seam and every exposed mouths of development gallery along the length of the bench / box-cut should be closed with non-combustible material (OB rock &mutti), compacted properly and sprayed with Thermoseal (a mica based sealant). The exposed gallaries will be filled up first followed by sealing of exposed coal on the highwalls of the quarry.

5.8.4. FIELD TRIALS OF THE FIRE DEALING MEASURES

Before starting the operation of actual excavation within the fire area, field trials need to be conducted for all the fire-dealing-measures suggested in the foregoing para. Field-trials are necessary to standardize and indigenize the technique by the colliery. Field Trials should be conducted in consultation with CIMFR & DGMS.

CHAPTER - VI

MANPOWER, SAFETY AND SUPERVISON

6.0 MANPOWER

The total manpower strength of Amalgamated Joyrampur Colliery is 2040 as on 01.11.2017.

	Number
EXECUTIVE	15
NON EXECUTIVE	2025
TOTAL	2040

The manpower engaged in outsourcing is 181.

6.1 SAFETY

Safety of men and machine deployed in the mining area should be properly taken care of irrespective of whether the mining activities are performed by departmental or by outsourcing option.

All the regulations & schedules of Coal Mines Regulations 1957 relating to opencast mining and other circulars issued time to time have to be adhered to and implemented in order to maintain day to day safety precautions as per stature. The following precautions should be taken during opencast mining operations.

SURFACE FEATURES :

i) Before starting any quarrying operation all structures / dwellings if any located with 100 m distance from the proposed area shall be vacated and rendered uninhabitable and no blasting shall be done within 100 m of both sides of any High tension line and its trestle, passing through the proposed area, if any.

ii) The management shall indemnify any person who may be affected and owner of any surface structure in case of damage or loss to any life or property arising out of aforesaid mining operation.

iii) Hot overburden excavated during mining operation or any hot material or ash shall not be deposited on any outcrop of coal or in opencast workings or in any ground broken by extraction of coal.

iv) Water pool shall be constructed above entire fire affected area after filling it with mutti/inflammable material and shall be maintained effectively.

v) After completion of operations, excavated area shall be filled with incombustible material and restored to the original ground level within the period not exceeding three months voids formed due to excavation in the quarry shall be back-filled simultaneously with coal extraction.

vi) An embankment 3.0 m above the HFL and 3.0 m wide at top with sides sloping at an angle of 45 degree pitched with slope shall be built along the river and Jore at places where the R.L. of the ground containing the edges of the quarry 3.0 m less than the HFL at the River or Jore.

OPEN CAST WORKINGS :

i) The height of the benches shall not be more than the height of the boom of the machine used for digging, excavation or removal.

ii) The width of any bench shall not be less than :-

(a) three times of the widest Machine plying on the bench plus five meters, or

(b) if dumpers ply on the bench-three times of the width of the dumper or

(c) the height of the bench whichever is more.

iii) The quarry shall be completely worked by deployment of Machineries no manual working shall be permitted within 10.0 m of the working face.

iv) Adequate precautions shall be taken to ensure dressing of the side. Special care shall be taken, when any slip or other plane of weakness or other geological disturbance exists, so as to prevent danger to the work-persons.

v) No person shall be engaged to work or allowed to travel close to high sides / benches from which he is likely to fall more than 1.8 m vertically down, unless he is provided with and uses a safety belt or rope.

FENCING AROUND OPENCAST WORKINGS :

i) The top edge of the opencast working shall be kept fenced with wire rope strands or barbed wire, supported by posts of timber, iron or concrete (movable). The gap between the adjacent rope strand or wires shall not be more than 0.30 m and bottom most rope, strand or wire shall not be more than 0.25 m and the topmost rope, strand or wire shall not be less than 1.0 m from ground level.

ii) At the finishing stage, opencast working shall be fenced with a masonry wall using lime mortar not less than 0.40 m thick and not less than 1.2 m high, with a parapet top.

SPOIL BANKS :

(i) The slope of a spoil-bank face shall be determined by the natural angle of repose of the material being deposited, but shall in no case exceed 37½ degree from the horizontal. The spoil-bank face shall not be retained by artificial means at an angle in excess of its natural angle of repose.

(ii) Any spoil-bank exceeding 30.0 m in height shall be benched so that no bench exceeds 30.0 m in height and the general slope does not exceed vertical to 1.5 m horizontal.

(iii) The toe of a spoil-bank face shall not be permitted to approach a railway or other public works, public road or building or other permanent structure

not belonging to the Owner of the mine, closer than a distance equal to the vertical height of its face.

(iv) No person shall, or shall be permitted to approach the toe of an active spoil-bank where he may be endangered from material rolling down the face.

HAUL ROADS :

i) No road shall be of width less than three times the width of the largest vehicle plying on road plus 5.0 m.

ii) All corners and bends in roads shall be made in such a way that the operators of the vehicle shall have a clear view for a distance of not less than 3.0 times the breaking distance of largest vehicle playing at speed of 40.0 Km/Hour.

iii) Wherever it is not possible to ensure clear visibility of the operator for a distance as specified in Clause (b), there shall be provided two roads of width not less than 2 times the width of the largest vehicle plus 3.0 m with a strong road divider in between having adequate lighting and reflector along the divider.

iv) Where any road is existing above the level of surrounding area, it shall be provided with strong parapet walls / embankment of the following dimensions:

(i) Width at top-not less that 1.0 m.
(ii) Width at Bottom-not less than 2.5 m.
(iii) The height not less than the diameter of tyre of largest vehicle playing on road.
(iv) It may be noted that just dumping of mud or overburden shall not treated a strong parapet wall.

v) No road shall have a gradient steeper than 1 in 16.

vi) Ramps with 1 in 10 gradients shall not be more than 10.0 m at one stretch and in case of machine having largest turning radius, the length of the span at a stretch one the ramp shall be designed compatibly with a written permission from the Regional Inspector of Mines.

6.2 SAFETY ASPECTS FOR OF HEMM / EQUIPMENT

Special precaution should be taken while deploying workers in the mine. Before employing any labour to the mine proper vocational training should be imparted and recommendations of VIII Safety Conference should be strictly followed. Some of the major aspects are as follows:-

A) For persons:

i) No persons shall be deployed unless he is trained at VTC.
Records in Form-B Form-D shall be maintained.

ii) Records of Vocational training Certificate and driving license of operators shall be kept by competent authority and shall be made readily available for inspection by management.

iii) No person shall be employed unless person holds VTC. A record of it shall be maintained.

iv) Adequate supervision shall be maintained by qualified competent persons only.

B) For Machineries as recommended by DGMS Cir. (Tech.) 1 of 1999:

i) All the machineries to be deployed in mines should be checked before deployment by competent authority.

ii) A proper record of repair and maintenance along with inspection done by competent authority and defect pointed out shall be maintained and signed by authorized person.

iii) All the equipment shall be provided with audio-visual alarms, proper light for use at night and period.

iv) When natural light is not sufficient an audio-visual alarms for reversing on trucks shall be provided.

v) Machine manufacturers should be asked to give risk analysis details in respective machines deployed

vi) Suitable type of the fire extinguishers shall be provided in every machine.

C) General:

i) No person/vehicle shall be deployed at any place other than authorized place.

ii) All workers should obey lawful instruction of mine management.

iii) Risk Management Plan of tipper/pay loader shall be made and implemented.

iv) All drivers shall obey systematic traffics rules prepared by management.

v) Before deploying workers they must be trained and briefed about safety aspects in opencast mine. However during course of execution of the work, if any accident occurs whether major or minor, the matter shall have to be immediately informed to mine management, i.e. Colliery Manager/Agent/GM of Area so that Notices of accidents in a accordance of (Reg.9 of CMR 1957) and Section 23 of The Mines Act 1952 may be given and other necessary steps may be taken in accordance with the Mines Act 1952.

vii) Mine authority shall operate transport system in such a way so as to minimize pollution in the mine.

6.3 STABILITY OF BENCHES, QUARRY HIGHWALLS AND SPOIL DUMPS:

In opencast mines, slope failure takes place mainly due to:

i) Shearing effect on rocks

ii) Ground water pressure

Shearing effect occurs due to gravity loading, shock & seismic vibration. Shock & seismic vibration can be minimized by adopting control blasting techniques.

Gravity loading can be minimized by controlling the kinetic load of dumpers by preventing over speeding while running on the benches.

Since the seams are developed, problem of ground water pressure is not likely to be faced in developed part of the project. Adequate pumping provision has been made which will reduce the ground water pressure.

Bench parameters shall be adopted as mentioned in the report. However, during actual mining operation, the condition of benches & dumps should be closely observed at regular intervals and the dimension is to be modified as and when required. Working benches and spoil dumps shall be kept under constant vigil to mark any development of crack.

During quarry operations, it is necessary to adopt required mining parameters for the stability of benches, high walls and spoil dumps. It is also mandatory to examine systematically the fencing of mine workings, landslides and cracks between benches. It is required to maintain well-graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions.

6.4 MEASURES TO BE TAKEN FOR FIRE FIGHTING AND FIRE PREVENTION:

The excavation of fire area will be required during quarry operation. Therefore, method of work as discussed in fire dealing measures and other statutory provisions in this respect must be adhered to while working in the fire zone. However, the method may be improved / upgraded after suitable scientific field trials.

During implementation of the fire dealing measures and excavation & dumping of hot materials, monitoring of status of fire, its movement, temperature condition and efficiency of fire dealing measures, is to be done regularly. Even

on dump sites, such a monitoring is required so that quenching can be done in time to avoid dump fire.

In addition to statutory provisions, the measures for fire fighting and prevention of fires are as follows:

1) Organisation of special cell for systematic observations to examine and prevent fire.
2) Removal of spillage of coal on benches and cleaning of coal horizons to prevent cases of coal heating.
3) Storage of lubricants and cotton waste in enclosed fireproof containers in working places.
   Provision of fire extinguishers

6.5 PRECAUTIONS AGAINST DANGER OF INUNDATION FROM SURFACE WATER.

1) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.

2) Inspections for any accumulation of rainwater, obstruction in normal drainage and weakening in embankment.

3) Standing order for withdrawal of working persons in case of apprehended danger.

4) During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.

5) Nallah or water inlets may be diverted or isolated by embankments if so required.

6.6 PROTECTION OF EQUIPMENT DEPLOYED AT BOTTOM HORIZONS FROM FLOODING:

During the heavy monsoon period, the mining operation in the lower-most bench may have to be stopped. Therefore, it is proposed to drown the lower-most bench, which would work as a sump. The water will be pumped out and discharged into the nearby Kari jore.

For ensuring safety of the equipment while working out bottom horizons with no access to surface profile, the following measures should be taken:

1) Drivage of initial trenches if any and coal cutting on bottom benches should be done during the dry period of the year.

2) Ramps should be made for quick shifting of equipment from bottom horizons, liable to be flooded during monsoon period, to the top horizons.

6.7 PREVENTION OF ELECTRIC SHOCKS:

During mining operations, all the statutory provisions of the Indian Electricity Rules 1956, and Indian Standards for installation and maintenance of electrical equipment etc. should be observed.

1) For protection from electric shocks to persons, all electrical equipment with voltage up to 1000V should be provided with Earth Leakage Relay, which will automatically disconnect electrical circuits.

2) Closed mobile substations and switchgears should be mechanically interlocked which exclude the possibility of opening the door when oil switch and air circuit breakers are in operation.
3) All metal parts of electrical equipment should be properly earthed to avoid failure of insulation.
4) All H.T lines and cables located within the blasting zones should be disconnected during charging & blasting operations.

6.8 DUST SUPPRESSION & DILUTION OF EXHAUST FUMES :

The following measures should be adopted for dust suppression at all quarry working places, dumps, haul roads, CHP and near other auxiliary mining operations.

1) Spraying with water on all working faces & haul roads, by special spraying machines or water-sprinkler.
2) While drilling holes, it is necessary to use dust extraction devices.
3) Installation of local dust suppression and air conditioning devices in cabins of excavators and drilling rigs may be considered.
4) Leveling of spoil dump surface.
5) Separate dust suppression arrangement should be provided for CHP.

To prevent collection of harmful mixtures in the atmosphere, from the different sections of quarry workings, it is recommended:-

To spread out the sources of dust formation and omission of harmful gases throughout the working area of the quarry.

1) Drilling & blasting operations should be timed for periods of maximum wind activity during the day.
2) Dumpers may be provided with purifiers for exhaust gases.

6.9 MEASURES TO BE TAKEN WHILE DRILLING BLASTING:

PRECAUTIONS WHILE DRILLING :

1. The holes shall be drilled in the pattern proposed by the Manager on beginning of that day, in such a way that length of the face shall be more than three times the width of the face having three rows of holes, with spacing and burden as recommended for specific diameter of hole.

2. i) No drilling shall be commenced in an area where shots have been fired, until the shot fire has made a thorough examination at all

places, including remaining butts of old deep holes, for unexploded charges that the drill may strike.

(ii) The position of every deep hole to be drilled shall be distinctly marked by the blasting Overman so as to be readily seen by the drillers.

(iii) No drill or bore rod or pick shall be inserted in butts of old deep holes even if an examination under Clause (i) has failed to reveal presence of explosives.

3. (i) Drilling operations shall not be carried out simultaneously on two benches at places directly one above the other.

(ii) Drilling and charging of deep holes shall not be carried out in the same area at the same time.

PRECAUTIONS WHILE TRANSPORT OF EXPLOSIVES :

i) Where explosives are transported in bulk for deep hole blasting the precautions laid down under Regulation 164A (of C.M.R. Amendment Regulation 1971 vide Notification No. G.S.R. 568 dated 17/04/71) shall be strictly complied with.

(ii) All conditions specified by the Chief Inspector of Mines in the documents, if any granting permission to carry a larger quantity of explosives in a single case or canister or for the use at one time in one place of more than one such case or canister, in relaxation of Regulation 163 of the Coal Mines Regulations, 1957, shall be strictly complied with.

(iii) Not withstanding anything contained in the Coal Mines Regulations, 1957, the transportation of explosives, preparation of charges and the charging and stemming of holes shall be carried out under the personal supervision of a competent person who shall himself fire the shots in deep holes.

PRECAUTIONS WHILE CHARGING OF HOLES :

i) Where there is any doubt and particularly where there are cracks and crevices reported in the hole at the time of drilling the bottom 2.0 m length of the hole shall be filled with sand / water ampoule. In crushed / broken ground charging of the hole shall not be done.

ii) Explosives shall be delivered first to the hole farthest from the 'Priming Station' so as to avoid persons walking among piles of explosives.

iii) Not more than one hole shall be in the process of being charged at any one face at any one time.

iv) All charging, stemming and connecting up shall be done while standing on the solid, that is to say, on the side of holes remote from the quarry face.

v) The safe explosives charge for a limiting peak particle velocity shall not exceed the limits recommended at Para 7.2 of D.G.M.S. Circular No. 7 of 1997. The P.P.V. shall be measured once in every quarter and the records of the same shall be maintained in a bound paged book and a copy of the same shall be submitted to this Directorate.

vi) The cartridges of explosive shall be lowered carefully to avoid sticking in the hole so as not to cause air / space. After inserting cartridges the length of the remaining hole shall be measured to ascertain that the cartridges are in close contact and there is no air space.

PRECAUTIONS WHILE FIRING OF THESHOTS :

i) A safe code of blasting practice shall be framed by the manager and shall be circulated to all concerned for its strict compliance.

(ii) The Manager shall fix the blasting time and shall circulate it to all concerned and display it on the Notice Board.

(iii) Clear and distinct warning shall be given before commencing charging of hole as well as before firing the shots. Subsequent to blast, after 15.0 minutes all clear signal shall be given. Presently hooters shall be installed for this purpose.

(iv) Adequate number of guards shall be posted to prevent inadvertent entry of any persons in the danger zone during firing of the shots.

(v) Shots shall not be fired except during the hours of day light or until adequate artificial light is provided. All holes charged on any one day shall be fired on the same day. Sleeping of holes shall not be permitted till the time specific permission in this regard is obtained.

(vi) Shots if fired beyond day light hours should be muffled so that, flying fragments from blasting can not project beyond a distance of 10.0 m from the place of firing in this connection, attention is drawn to D.G.(Tech.) Circular No. 8 of 1976 for compliance.

(vii) As far as practicable the shot firing shall be carried out either between shifts or during the rest interval or at the end of work for the day.

(ix) Precautions with regards to taking shelter, etc., as laid down in Regulation 170 of the Coal Mines Regulations, 1957 (Third Amendment) Regulation 1974 (vide Notification No. G.S.R. 1092 dated 20/09/74) shall be complied with.

(x) Notwithstanding what is contained under Regulation 170 of the Coal Mines Regulations, 1957, no person other than blasting in-charge and his assistants, if any, shall be permitted to remain within a radius of 20.0m or within 60.0 m on the same bench where charging of holes with explosives is being carried out.

(xi) A proper record of every blast showing the patter of shot-holes and particulars of charge and observation regarding fly rock and ground vibration shall be maintained by the blasting in-charge (First class

Assistant Manager) and shall be countersigned by the Manager on every entry.

(xii) All works relate to drilling, charging and firing of deep holes shall be carried out under supervision of Blasting – Officer / blasting in-charge, who shall having First Class Mine Manager's Certificate of Competency. He shall be assisted by an Overman for all works.

PRECAUTIONS WHEN PROVISION UNDER REGULATION 170 (1A) & (1B) ARE ATTRACTED

(i) No deep hole blasting shall be done within a distance of 100.0 m from any public road, land acquired for railway, any structure not belonging to the owner and those inhabited by any person unless vacated and demolished.

(ii) For carrying out blasting in the quarry when the permanent structures or buildings are located beyond 100 m but within 300 m of the site of blasting, safe charge of explosive that will cause ground vibrations less than the stipulated norms, as suggested by Proj No. Cons/2012/12-13 dated January 2013 studied by the Indian School of Mines, shall be used.

(iii) Not more than three rows shall be fired in a round of blast. The blasting patch shall be such that the length of the face is more than three times the width of the face.

(iv) Face of the blasting patch shall not be oriented in the strike direction. The initiation of a round shall start from the village end.

(v) For day-to day blast, burden and spacing shall not be less than 2.5 m and 3.0 m respectively.

(vi) To reduce noise and air over-pressure levels, the surface detonating cord shall be covered with at least 15 cm thick sand.

(vii) Before conducting deep hole blasting in the OCP, persons employed in the belowground workings lying within 180 m of the point of blasting measured in any direction, in the same mine or in any adjoining mine,

shall be withdrawn and no work-person shall be readmitted into the said underground workings until the same have been inspected by a competent person duly authorized for the purpose and found safe and free from loose roof and sides, any noxious gases and signs of fire etc.

(viii) A system of obtaining written confirmation from the Manager or authorized person of Colliery in a register, the respect to withdrawal of persons from underground shall be recorded and shall be countersigned by Manager of the mine. A code of practice in this regard, duly signed by the Manager of the colliery shall be adopted and submitted to this Directorate.

(ix) Danger zone shall be kept marked in the field as well as on the plan maintained under Regulation 59(1)(a) of the Coal Mines Regulations, 1957.

(x) Competent persons i.e. explosive carrier trained in controlled blasting techniques and duly authorized by manager shall be permitted for charging & firing the shots.

(xi) Blasting shall be conducted in such a way that the underground galleries are completely filled up, failing which no heavy machinery should be brought over those galleries.

(xii) Further dozing/filling shall be done in these galleries before bringing heavy machineries over these galleries:

(a) Where there is any doubt and particularly where there are cracks and crevices the bottom 2 m length of the hole shall be filled with sand.

(b) No person including shot firer shall take shelter within 100 m of the site of blasting in the quarry unless such shelter shall be of approved design.

(xiii) The provisions of Regulation 170 of Coal Mines Regulations, 1957 shall be strictly complied with subject to the conditions as stipulated in the permission letter.

6.10 PRECAUTIONS WHILE EXTRACTING THE DEVELOPED PILLARS

(i) No heavy machinery or vehicle except drilling machinery shall be deployed when the thickness of overburden above the underground galleries as proved by advance bore hole or other suitable means is reduced to 6.0 meters unless the underground galleries are completely filled in after blasting.

(ii) Where the workings are accessible the same shall be surveyed and cleaned of all the coal dust and thickly stone dusted before commencement of extraction of pillar.

(iii) The spacing of the holes in overburden bench lying immediately above the coal seam shall be so adjusted that the holes do not lie immediately above the galleries as for as possible in under to ensure that the holes do not directly fire into the underground workings.

(iv) Blasting shall be done in such manner so that the underground galleries are completely filled up. Otherwise mutti / overburden shall be dozed to fill up the galleries completely.

(v) No person shall be allowed at any place in opencast workings where thickness of overburden and / or coal over any gallery has been reduced to 1.5 m or less.

(vi) Each coal pillar shall be exposed completely by removing the overburden overlying the pillar and the adjoining galleries on all side.

(vii) The quarrying operations shall be done from rise to the dip.

(viii) Entrances to the wide underground galleries in an opencast shall be kept effectively fenced off.

(ix) D.G.M.S.(Tech.) Circular No. 3 and Circular No. 4 of 1980 regarding precautions against the danger of coal dust explosion while extracting pillars by opencast method shall be complied with.

6.11 CONSERVATION

For conservation of precious coal resource during mining operation, following measures are suggested :

i) OB dump should be so planned so that no extractable coal is buried below OB dumps which may result in sterilisation of coal reserves.

ii) No OB dumping should be done within the coal bearing area.

iii) Adequate precaution should be taken to eliminate loss of coal while mining the developed coal seams.

iv) Coal in "Coal+Jhama Zone" should be identified and mined selectively and separably from Jhama.

vi) While working in zone affected by fire, measures as suggested in ‘Fire Dealing Measures’ should be adhered to religiously to maximise recovery of coal in fire zone.

vii) Practice of selective mining of dirt bands must be adhered to by sub-benching whenever bench > 1.0 m thickness is encountered.

viii) Extractable local seams (> 0.50 m thickness) whenever encountered must be exploited by sub-benching.

6.12 DISASTER MANAGEMENT PLAN

Mining is a hazardous industry. There is risk to life and property associated with various mining and allied activities of the project. The project report has been drawn in conformity with the prevailing statutory provisions as per Mines Act, 1952 & CMR 1957 applicable for safety in mines. A detailed study has been

carried out covering identification and assessment of risk, and recommendation of measures to prevent damage to life and property against such risks.

Safety Audit is an integrated component of Risk Assessment and Safety Management, which is required to be undertaken on regular basis by System Study and Safety Audit(SYSSA). Such System Study and Safety Audit (SYSSA) should be conducted at least once in every year, after every major accident or disaster or dangerous occurrence, before implementation of any new technology or use of any new system or machinery in the mine. Such Study may be subject wise as well as an integrated report of the mine incorporating all subjects such as mining, mechanical, , electrical, personal, occupational Health & Hygiene, and any other subject applicable to the mine and the system prevailing or to be used therein.

Risk Reduction Programme (RRP) is an ongoing process to achieve Zero Harm Status of Safety in any mine and should be incorporated in the Disaster Management Programme.

6.13 Recommendations of 11th conference on Safety in Mines held on 4th & 5th July, 2013 at New Delhi regarding Contractor work vis-à-vis safety

Para 2.0 :Contractor work vis-à-vis safety

2.1 Employer's responsibilities

2.1(a) Suitable clauses (in consistence with risk of the work allotted) shall be included in tender document (including NITs) stating how the risk arising to men and material from the mining operation/operations to be done by the contractors shall be managed.

2.1(b) Ensure that contractors are familiar with the relevant parts of the statutes, health and safety management system and are provided with copies of such documents prior to commencing work.

2.1(c) Ensure that contractor's arrangements for health and safety management are consistent with those for the mine owner. All the rules, regulations and bye-laws as applicable to the mine owner are also applicable to the contractor. Details of the contractor's workmen should be maintained in the owners Form-B register. Whereas as C, D & E registers for contractor men may be maintained independently by the owner and shall be kept in the mine office of the manager.

2.1(d) Ensure that contracts should preferably of longer period (3 years), so that there is adequate scope of management of safety by the contractor.

2.1(e) Ensure that contractors provide the machinery, operator and other staff with written safe work procedures for the work to be carried out, stating clearly the risk involved and how it is to be managed.

2.1(f) Monitor all activities of the contractors to ensure that contractors are complying with all the requirements of statute and the system related to safety. If found non-compliance of safety laws directing the contractors to take action to comply with the requirements and for non-compliance, the contractor may be suitably penalized. Clause to this affect may be a part of the agreement between the employer and the contractor.

2.1(g) Where a risk to health or safety of a person arises because of a noncompliance directing the contractor to cease work until the non- compliance is corrected.

2.2 Contractor's responsibilities:

2.2(a) Prepare written Safe Operating Procedure (SOP) for the work to be carried out, including an assessment of risk, wherever possible and safe methods to deal with it/them.

2.2(b) Provide copy of the SOP to the person designated by the mine owner who shall be supervising the contractor's work.

2.2(c) Keep an up to date SOP and provide a copy of changes to a person designated by the mine owner.

2.2(d) Ensure that all work is carried out in accordance with the Statue and SOP and for the purpose he may deploy adequate qualified and competent personnel for the purpose of carrying out the job in a safe manner.

2.2(e) For work of a specify scope/nature, develop and provide to the mine owner a site specific Code of Practice (COP).

2.2(f) Ensure that all sub-contractors hired by him comply with the same requirement as the contractor himself and shall be liable for ensuring the compliance all safety laws by the sub or sub-sub contractors.

2.2(g) All persons deployed by the contractor for working in mine must undergo vocational training, initial medical examination, PME. They should be issued cards stating the name of the contractor and the work and its validity period, indicating status of VT & IME.

2.2(h) Every person deployed by the contractor in a mine must wear safety gadgets to be provided by the contractor. If contractor is unable to provide, owner, agent and manager of the mine shall provide the same.

2.2(i) The contractor shall submit to DGMS returns indicating -Name of his firm, Registration number, Name and address of person heading the firm, Nature of work, type of deployment of work persons, Number of work persons deployed, how many work persons hold VT Certificate, how many work persons undergone IME and type of medical coverage given to the work persons. The return shall be submitted quarterly (by 10th of April, July, October and January) for contracts of more than one year. However, for contracts of less than one year, returns shall be submitted monthly.

2.3 Employees Responsibilities

2.3(a) An employee must, while at work, take reasonable care for the health and safety of people who are at the employee's place of work and who may be affected by the employee's act or omissions at work.

2.3 (b) An employee must, while at work, co-operate with his or her employer or other persons so far as is necessary to enable compliance with any requirement under the act or the regulations that is imposed in the interest of health, safety and welfare of the employee or any other person.

CHAPTER - VII

COAL HANDLING, WASHING &MODE OF DISPATCH

7.1 COAL DISPATCH ARRANGEMENT

Presently produced coal from Lodna area is dispatched to crockeries through local sale and to power plants through 6 no. and 9 no. siding. Further coal produced from Amalgamated Joyrampur Colliery will be dispatched by road and rail (through 6 and 9 no. siding) until the proposed siding at Patherdih-Rakhitpur railway comes up.

90 % coal will be dispatched to Patherdih coal washery through rail and proposed conveyor belts.

10 % coal will be provided to crockeries and consumers through roads.

CHAPTER - VIII

INFRASTRUCTURE FACILITIES PROPOSED AND THEIR LOCATION

8.0 GENERAL

Amalgamated Joyrampur Colliery is under the administrative control of Lodna area of BCCL. Amalgamated Joyrampur Colliery is formed with Amalgamation of 05(five) Underground Mines (i.e. Lodna Colliery, Bagdigi Colliery, Bararee Colliery, Jealgora Colliery & Joyrampur Colliery) vide letter no. R-2/0100190/ P-12-15/1517-27 dated 28.8.2015 issued by Director of Mines safety, Region-2, DGMS, Dhanbad.

8.1 PRESENT LINKAGE OF COAL

Coal produced from Amalgamated Joyrampur Colliery will be dispatched by road and rail (through 6 and 9 no. siding) until the proposed siding at Patherdih-Rakhitpur railway comes up.

90 % coal will be dispatched to patherdih coal washery through rail and proposed conveyor belts.

10 % coal will be provided to crockeries and consumers through roads.

8.2 PRESENT PUMPING ARRANGEMENT

List of installed pumps are given in table below.

Sl. No.	Pump Type	Detail	Location
1	Submersible Pump	Head - 210 Mtr, GPM-600, RPM-2900	1 Pit, Lodna Colliery
2	Submersible Pump	Head - 210 Mtr, GPM-600, RPM-2900	2 Pit, Lodna Colliery
3	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	5 Pit, Joyrampur Colliery
4	Submersible Pump	Head - 160 Mtr, GPM-600, RPM-2900	Seth Kothi, Joyrampur Colliery
5	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	7 Pit, Jealgora Colliery
6	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	7 Pit, Jealgora Colliery
7	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	7 Pit, Jealgora Colliery
8	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	2 Pit, Jealgora Colliery
9	Submersible Pump	Head - 180 Mtr, GPM-600, RPM-2900	2 Pit, Jealgora Colliery
10	Submersible Pump	Head - 200 Mtr, GPM-600, RPM-1450	2 Pit, Jealgora Colliery
11	Horizontal Pump	GPM - 600	2 Pit, Jealgora Colliery
12	Horizontal Pump	GPM - 600	2 Pit, Jealgora Colliery
13	Submersible Pump	GPM - 600	Huchunktand, Jeenagora Colliery
14	Submersible Pump	GPM - 600	KT, Jeenagora Colliery
15	Submersible Pump	GPM - 600	Bhatta Par, Jeenagora Colliery
16	Submersible Pump	GPM - 600	East Golakdih (Sai Shree), Jeenagora Colliery
17	Submersible Pump	GPM - 600	Near Jeenagora Weigh Bridge, Jeenagora Colliery
18	Horizontal Pump	PL - III, 5 Stage, 1000 GPM	F - Patch, Amalgamated NT-ST-JGR Colliery
19	Horizontal Pump	PL - III, 5 Stage, 1000 GPM	F - Patch, Amalgamated NT-ST-JGR Colliery
20	Horizontal Pump	GPM - 2000	F - Patch, Amalgamated NT-ST-JGR Colliery

21	Horizontal Pump	PL - II, 4 Stage, GPM - 1000*	NT coal face, Amalgamated NT-ST-JGR Colliery
22	Horizontal Pump	GPM - 1000	NT coal face, Amalgamated NT-ST-JGR Colliery

8.3 PRESENT POWER SUPPLY

The Amalgamated Joyrampur Colliery of Lodna area are receiving power at 11 kV from Jeolgora main D.G. sub-station of BCCL. The main D.G. sub-station of BCCL is receiving power at 33 kV from DVC and is stepped down to 11 kV for supplying power to different collieries of Lodna Area.

The colliery sub-station wise installed main transformers are as under;

Sl.no.	Capacity in MVA	Nos.	Voltage ratio in kV	Supplying power to
a. JEOLGORA MAIN D.G. SUB-STATION OF BCCL				
1	10	3	33/11	Joyrampur, Bagdigi, Bararee, lodna, Jeolgora, Bhowrah collieries and Patherdih coal washery
b. BARAREE X SEAM SUB-STATION				
1	7.5	1	11/3.3	Surface and underground load
2	0.5	1	3.3/.550	
c. BAGDIGI SUB-STATION				
1	1	1	11/3.3	Surface and underground load
2	1	1	11/0.55	
3	0.250	1	3.3/.44	
4	0.250	1	0.55/0.44	
d. LODNA P.H.SUB-STATION				
1	3.15	2	11/3.3	Surface and underground load
2	1.5	1	11/3.3	
3	1	2	11/3.3	
4	1	1	11/0.44	
e. JEOLGORA 2-PIT SUB-STATION				
1	1.5	1	11/0.55	Surface and underground load
2	1	1	11/0.55	
3	0.75	2	11/0.55	
4	0.50	1	11/0.44	
5	2	2	11/2.2	
6	0.60	1	11/2.2	
7	0.250	1	2.2/0.55	
8	0.30	1	2.2/0.55	
f. JOYRAMPUR 3 & 5-PIT SUB-STATION				
1	1	2	11/3.3	Surface and underground load
2	1	3	11/0.55	
3	0.5	3	11/0.44	

8.4 WORKSHOP & STORE

There is no departmental workshop. An E & M workshop is proposed to the day-to-day repair and maintenance of pumps, motors, CHP assemblies etc. is being done. The excavation workshop will be maintained by outsourcing agency.

Existing store will cater the future requirements.

8.5 MAGAZINE – LOCATION AND CAPACITY & AREA

There are three magazines in the premises of Bhulan Bararee Magazine. Old licence numbers are as under:-

E/EC/JH/22/854(E50524)
1144/EX- surrendered
E/EC/JH/22/393(E12946)

Add. General Manager, Lodna Area is the licence holder of both the magazines.

Licence for the 3rd Magazine has been applied but not been granted yet.

Only two(02) nos. of magazines are in operation. These are situated in one premise at Bhulan Bararee Magazine. Bhulan Bararee Magazine is being used as a central magazine since 08.10.2010. Two nos. explosive van (one departmental and one hired) are used for transportation of explosives.

Explosives and accessories are distributed by an explosive van under the control of Explosive Issue Clerk to all the UG collieries and OCP of Lodna Area. Quarterly return (online) is submitted on regular basis.

8.6 INFRASTRUCTURE FACILITIES AVAILABLE

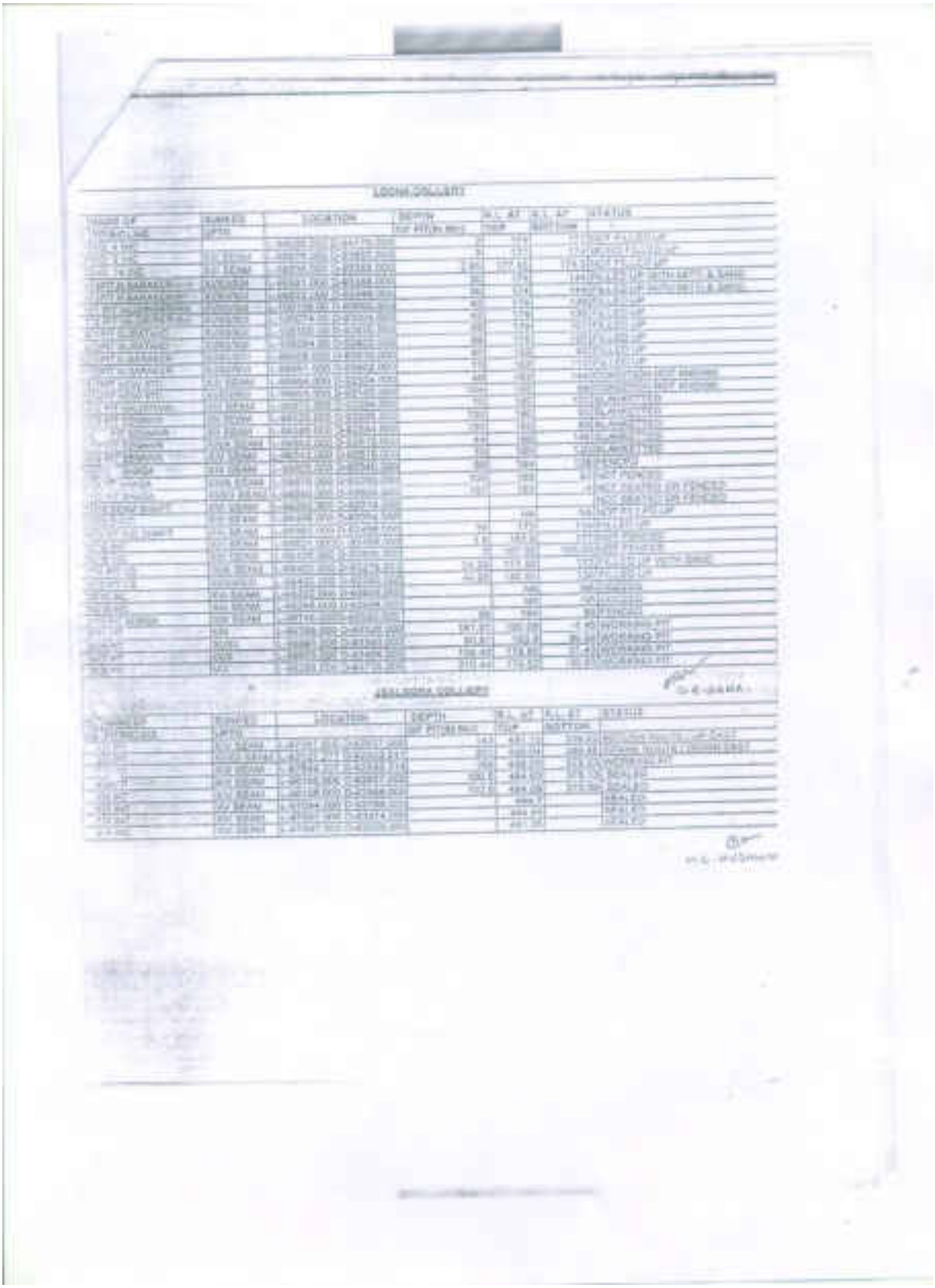
The detail infrastructures are as under:

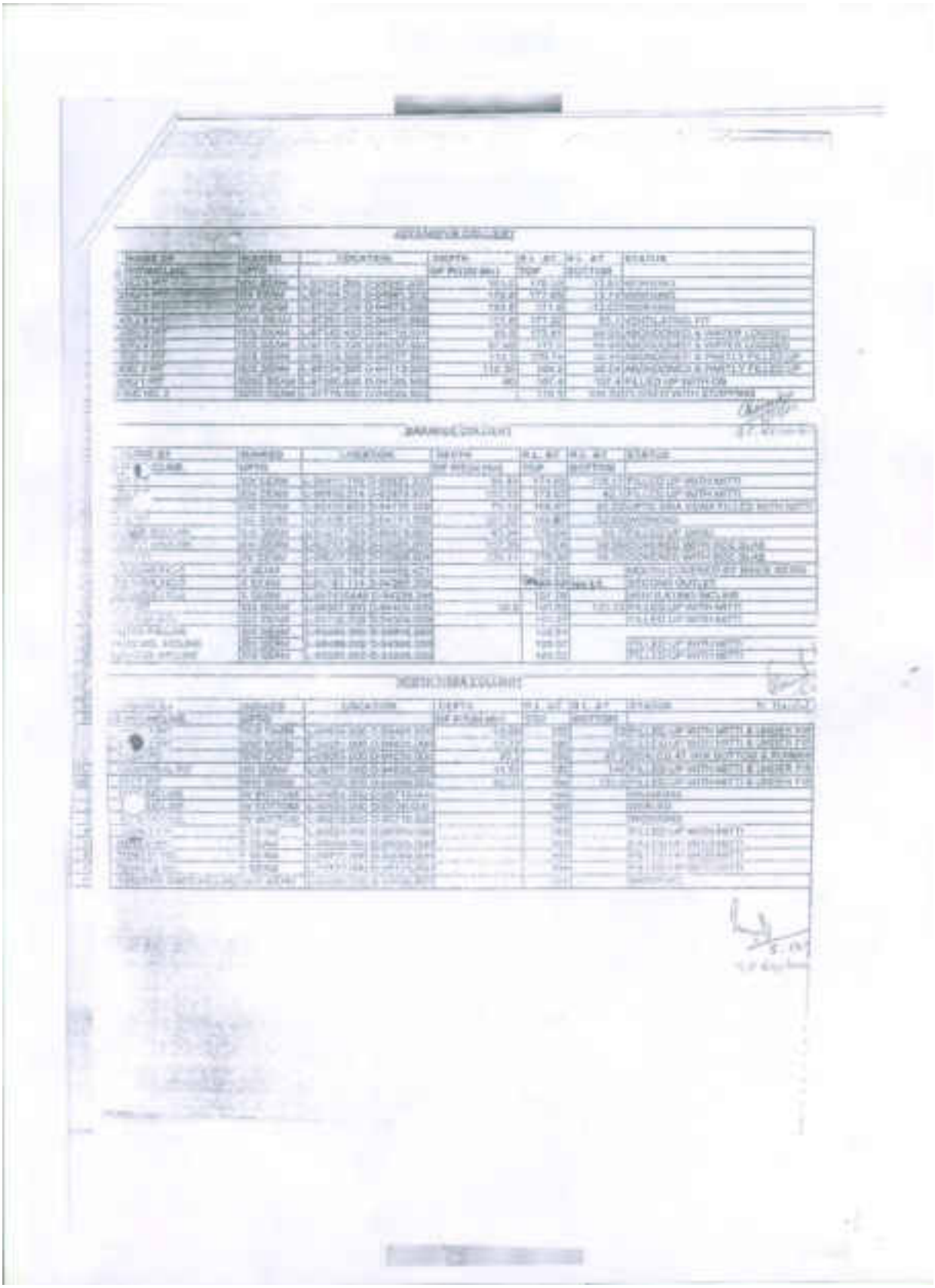
Sl.	Name of establishment	Nos.	Remarks
1	Alakdiha Out post	01	
2	Post Office	01	
3	Bank Of India	01	
4	CISF Camp	01	
5	Joyrampur Colliery Dispensary	01	
6	School	05	
7	Temple	06	
8	Community Hall	01	
9	Anganwadi Kendra	02	
10	Lodna Area Office	01	
11	Joyrampur Colliery Office including workshop, substation, Area Auto garage		
12	Pit Head gear structures with winding engines	05	Joyrampur-02 Bagdigi-02 Lodna-01
13	BCCL quarters	1291	
14	Unauthorised	1077	
15	Bagdigi Colliery Office with workshop, sub-station		

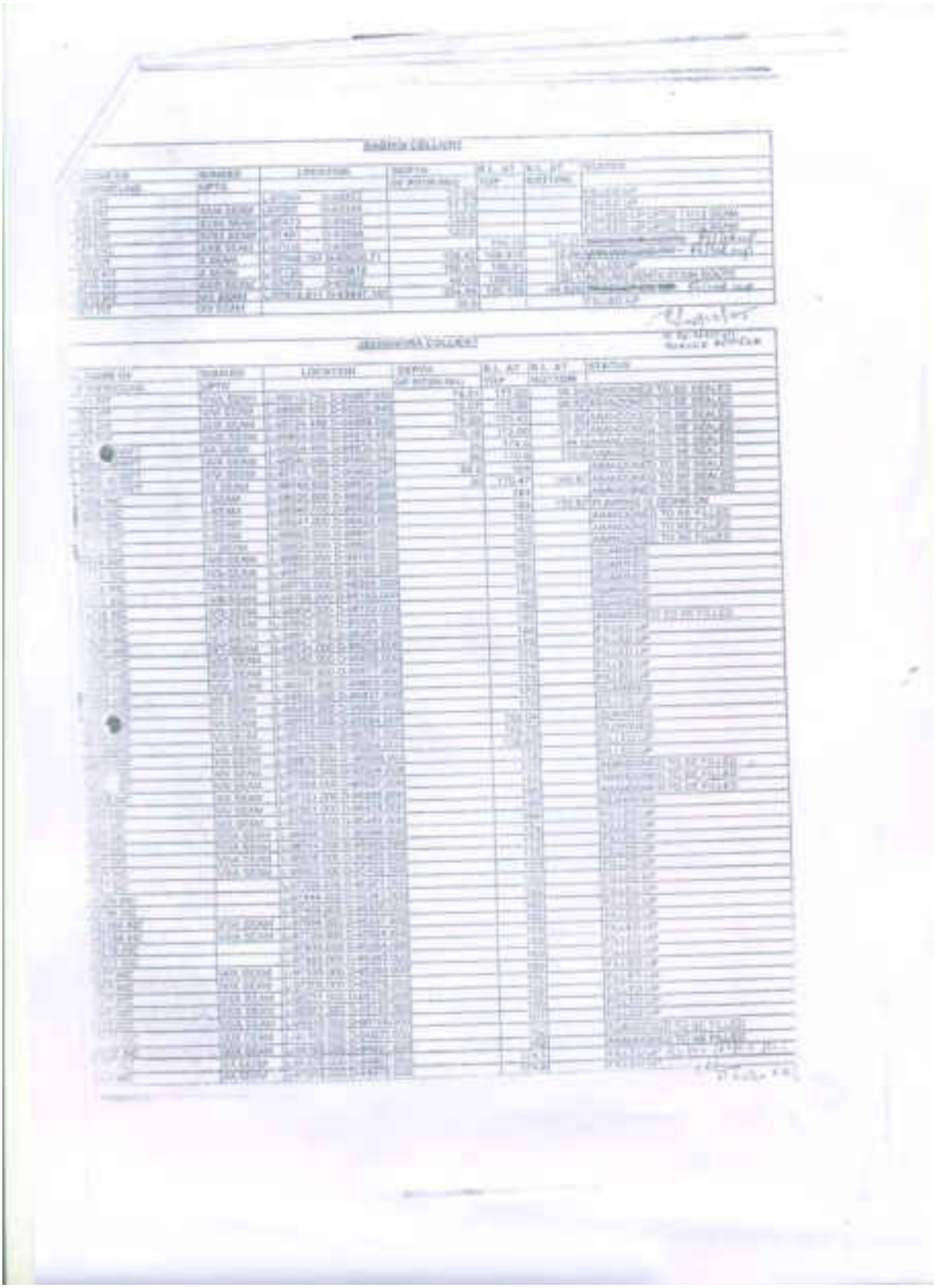
The infrastructures situated within proposed quarry limit required to be shifted in other suitable places.

Pit/Incline in the Leasehold Area:

Present status of Pit/Incline exist within the mines of Lodna Area is given in following pages:







CHAPTER - IX

LAND REQUIREMENT

9.0 LAND ACQUISITION:

The Status of land within the Amalgamated Joyrampur Colliery leasehold is given in table below:

Sl. No.	Particulars	Total (Ha)
1	BCCL land	1002.94
2	Forest land	Nil
3	Govt. land	23.61
4	Tenancy land	49.91
5	Others	110.51
	Total	1186.97

9.1 LAND USE

Type of Present land use (Ha)

Sl No.	Type of Land Use		Area (Ha)
1	Running Quarry	Backfilled	0
		Not Backfilled	0
2	Abandoned Quarries	Backfilled	19.53
		Not Backfilled	41.29
3	O.B Dump*		61.82
4	Service building/ Mine Infrastructure		12.81
5	Coal Dump		2.81
6	Rail and Road		55.83
7	Homestead Land		125.12
			74.74
8	Agricultural Land		0
9	Forest Land		0
10	Plantation		34.67
11	Water Body		15.76
12	Barren Land		742.59
TOTAL			**1186.97**

*In proposed stage, apart from the above, land for external OB dump of around 424.93 M.Cum. will be required in non-coal bearing area or in the de-coaled area of adjacent mine. Therefore, in proposed stage, the mine management has identified about 900 Ha land for external dump in non coal bearing area that is shown in Plate no.-MIN-V.

CHAPTER - X

ENVIRONMENT MANAGEMENT

10.0 ENVIRONMENTAL IMPACT ASSESSMENT

10.1 INTRODUCTION

The impacts (both beneficial and adverse) of mining and its allied activities of the project have been assessed and presented in respect of biophysical & socio-economic environment.

Environmental Impact assessment has been carried out by studying the likely impacts on existing ambient air, water and noise conditions etc. of the area due to mining activities at the site under consideration. For this, the latest data generated from the mine / adjacent existing mine has been taken into consideration as this will give a practical status of the impact of existing mining activities in the area.

10.2 AIR POLLUTION IMPACT ASSESSMENT

The impact assessment has been carried out dealing with the following points:

(a) Phase-wise inventory of air pollution emission sources

(b) Impact assessment

a. Phase-wise inventory of air pollution emission sources

The pollution sources are obvious and to assess the impact, the project life is divided into following time frames:

Operational phase

Post-operational stage

The activities associated with these time frames and having impact on the ambient air quality along with the pollutants are enumerated in the following sections:

Operational phase

During this phase, activities necessary for mining of coal, its handling and transport are taken up. Such activities having impact on ambient air quality are detailed below:

(i)	Drilling & Blasting	:	Dust confined to OC Workings only
(ii)	Handling of coal	:	Noise, Dust and noxious gases
(iii)	Movement of vehicles	:	Noise, Dust and noxious fumes

Post-operational stage

During this stage of the project, the activities related to the closure of mine are to be carried out. Preparation of mine closure plan shall be carried out during the period four to five years before the closure of the mine. Some of the activities for the closure are:

- Modifications in physical and biological reclamation of subsided area, if any
- Salvaging and shifting operation of UG Machineries and other equipment
- Clearing of coal and other materials, restoration of infrastructure area & colony area to the extent possible and necessary if not useful for other projects
- Management of hydrology and hydrogeology.
- Redeployment of workforce, etc.
- Arrangement & implementation of post-operation monitoring mainly keeping watch, vigil, etc.

The activities having impact on the ambient air quality are enumerated below:

(i)	Movement of dozers for physical reclamation of subsided area	:	Noise, Dust and obnoxious fumes
(ii)	Movement of vehicles for shifting and salvaging operation of UG Machineries and other equipment	:	Noise, Dust and obnoxious fumes
(iii)	Movement of vehicles for clearing of coal and other materials	:	Noise, Dust and obnoxious gases

b. Impact assessment

The mining and its related activities create ambient air pollution. The impact of mining on ambient air quality is highlighted in the following paragraphs:

The ambient air quality is influenced due to the presence of RPM, SPM, SO_2, NOx, etc., which are generated due to various activities like drilling, blasting and coal & material handling related to the project. Further, the ambient air quality is affected to a varying degree due to the mining activities of other nearby opencast and underground coalmines of the same coalfield. The concentration of pollutants may vary depending upon the various micro-meteorological parameters and the seasons of a year.

In order to assess the ambient air quality in the area surrounding the site where mining activities are continuing since beginning of the 20th century vis a vis the present scenario monitoring has been carried out at nearby villages based on the wind pattern and topography. The results of the monitoring completed by CMPDI RI-II, Dhanbad in 2016 (Refer Chapter XI) shows that, in spite of mining activities continuing in the area the Environmental quality w.r.t. ambient air has not been affected to any significant extent as the recorded data are all within the permissible limits.

The present assessment as validated through monitoring data as explained above, also proves that, mining activities in the area have not affected the ambient air to any significant extent which has become possible because of various Pollution Control Measures which are continuously being taken and augmented whenever necessary.

Moreover, fortnightly monitoring of ambient air quality at all the operating mines helps in identifying any source generating the pollution for which appropriate control measures are then planned for implementation, which can be validated in the subsequent monitoring.

The above paragraphs clearly bring out the fact that, impact of mining activities on ambient air is insignificant and the mine under consideration will be no exception.

10.3 IMPACT ASSESSMENT ON WATER

I. Identification of the sources of water pollution

Likely sources of water pollution from this project along with the type of pollutants are as follows:

(i) Sanitary (domestic) wastewater : Suspended solids and BOD.

(ii) Water pumped out from mine : Suspended solids of coal, clay and oil.

(iii) Surface run-off passing through coal stockpiles : Suspended solids.

(iv) Storm water from leasehold area and built-up area : Suspended solids.

II. Impact Assessment

Mining and its related activities may create water quality problems. The impact of mining at the project on both surface and ground water sources are given subsequently.

(a) Surface water sources

Deterioration of water quality and pollution of water bodies due to discharge of mine effluent, if not treated. Change in relief pattern due to mining may cause flooding, siltation, choking and pollution. Mitigation measures would involve provision of the following depending on the site condition and actual requirement statutory or otherwise.

(i) Garland drains on periphery of mine entries for managing flood,
(ii) Sedimentation ponds for reducing the pollution of surface water bodies.

As per the quarterly water quality monitoring data generated by CMPDI RI-II for Cluster Group of Mines in which Amalgamted Joyrampur falls, the physico-chemical characteristics of surface water samples have been found to be

within the permissible limit. The details are given in Chapter XI of the Mining Plan.

However, due care will be taken to treat the mine water discharge by sedimentation if need arise for the mine under consideration.

III. Impact on noise level

In order to assess the existing ambient noise level in the surrounding of the mine site corresponding to existing scenario, ambient noise level data has been generated at different villages and it is seen that existing quality of ambient noise is quite satisfactory.

In case of UG mines the basic coal winning operations are restricted below ground, as such the effect on ambient noise at surface is negligible.

ACCEPTABLE INDUSTRIAL NOISE LEVEL

As per Env. (Protection) Amendment Rules, 2000 the ambient air quality standards in respect of noise in industrial, commercial, residential and silence zones area as follows:

Table No.10.1 Noise Level Limit Category-wise

Sl. No.	Category of area	Limits [dB (A)]	
		Day time (6.00 AM to 10.00 PM)	Night time (10.00 PM to 6.00 AM)
1.	Industrial	75	70
2.	Commercial	65	55
3.	Residential	55	45
4.	Silence zone	50	40

Assessment of the degree of noise, to which a workplace noise is harmful, is done by comparing the values measured at workplace to the permissible TLV adopted by statutory bodies like DGMS.

The Director General of Mines Safety vide their circular no. DG (Tech.)/18 of 1975 has prescribed the TLV for noise level as 90 dB (A), for the workers engaged in mining occupation likely to be exposed to in an 8 hour shift period

with unprotected ear. Whereas, the following table shows the maximum permissible noise exposure levels, as per American Standards, for the industrial workers.

Table No.10.2 Noise Level Limit as per Exposure Time

Exposure time (Hrs./day)	Noise level [dB (A)]
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	108
0.25 or less	115
Exposure to Pulse or Impact Noise Should Not Exceed 140 Db (A)	

Now to assess the likely contribution from mining activities, the ambient noise level of an operating mine of the same area has been taken into consideration. It is observed that noise level recorded in mine activity area is well within the permissible limit.

The present assessment as validated through monitoring data as explained above, also proves that, mining activities in the area have not affected the ambient noise to any significant extent which has become possible because of various Pollution Control Measures are continuously being taken and augmented whenever necessary.

Moreover, fortnightly monitoring of ambient noise quality at all the operating mines helps in identifying any source generating the pollution for which appropriate control measures are then planned for implementation which can be validated in the subsequent monitoring.

The above paragraphs, clearly bring out the fact that, impact of mining activities on ambient noise is insignificant and the mine under consideration will be no exception.

IV. Socio- economic Impact

The socio –economic impacts of the project is given below.

A) Population Growth and Migration

Mining activities in this coalfield is continuing since beginning of 20th century. The development of the area is totally indebted to coal mining as well as the entire economy of the area is sustaining due to coal mines. In addition to creating adequate direct employment in the coalmine large opportunities of indirect employment have also been created. Numbers of people from out side the state have migrated in this region, which has resulted in through mixing of different culture and customs as per the tradition of our country "Unity in diversity".

B) Resettlement & Rehabilitation.

Due to acquisition of tenancy land for mining activity number of landowners would be affected. All the land losers have been suitably compensated as per Company's norms.

5 collieries of Lodna area, BCCL namely Joyrampur Colliery, Bagdigi Colliery, Lodna Colliery, Bararee Colliery and Bagdigi Colliery have been amalgamated into a single mine namely Amalgamated Joyrampur Colliery.

There are eighty sites in leasehold of Amalgamated Joyrampur Colliery which are proposed to be rehabilitated as per Master Plan of JCF (March'08). The Sites are as follows:

Table No.10.3 Rehabilitation proposed under Amalgamated Joyrampur Colliery

Colliery	Village/Site	BCCL	Pvt.	Enchr	Other	Total
	PHASE-I					
Bagdigi	Bagdigi Basti /O1	0	715	0	0	715
Bagdigi	Bagdigi Colony / O2	105	0	57	0	162
Bagdigi	Bagdigi Colony / O2	0	0	43	0	43
	Sub total	**105**	**715**	**100**	**0**	**920**
Bararee	Along Jore Side Colony/11	35	30	0	0	65
Bararee	Along Jore Side Colony/11	0	0	13	0	13

Colliery	Village/Site	BCCL	Pvt.	Enchr	Other	Total
Bararee	Bazaar Dhowrah/12	0	0	14	0	14
Bararee	Brahman Basti / O2	0	21	0	0	21
Bararee	Chhata Dhowra & Durga Mandir /O5	52	0	0	0	52
Bararee	Chiraiyatand Colony /O1	130	0	0	0	130
	Colony near 1 pit /O4	65	0	43	0	108
Bararee	Colony near Bararee School / Bagan Dhowra /O3	41	0	29	0	70
Bararee	Digwadih New Colony / O8	129	0	0	0	129
Bararee	Dom Dhowra /O6	55	0	0	0	55
Bararee	East side of DB Road /O9	0	136	0	0	136
Bararee	Mudivita Village/10	0	82	0	3	85
Bararee	Mudivita Village/10	0	6	0	0	6
Bararee	Naya Dhowra Colony/ O7	46	7	0	0	53
	Sub total	**553**	**282**	**99**	**3**	**937**
Jealgora	1&2 Pit Area/11	152	0	36	0	188
Jealgora	Bagdigi Basti / 12	6	180	0	20	206
Jealgora	Bucharkhana Area O1	54	43	29	0	126
Jealgora	Buriband /14	62	0	0	0	62
Jealgora	Check Post area /O6	44	0	0	0	44
Jealgora	North Jealgora 3&4 Pit/ O2	152	0	0	0	152
Jealgora	Stadium Area colony/O8	18	0	0	0	18
Jealgora	Sweeper Dhowra /O9	70	0	50	0	120
	Sub total	**558**	**223**	**115**	**20**	**916**
Joyrampur	6 pit Dhowra & Atta Chaki /O1	23	0	0	0	23
Joyrampur(S)	6 pit Dhowra & Atta Chaki /O1	0	0	96	0	96
Joyrampur	Around Area Office/WS & No. 2 Basti/O3	137	0	0	0	137
Joyrampur	Beer Company Locality/O5	87	0	0	2	89
Joyrampur	Durga Mandir Area /O4	105	0	0	2	107
Joyrampur	Hazaribagh Colony near Hosptal /O2	73	0	0	0	73
Joyrampur(S)	Hazaribagh Colony near Hosptal /O2	0	0	47	0	47
	Sub total	**425**	**0**	**143**	**4**	**572**
Lodna	2 pit Bhaga Colony/ 28	44	36	0	0	80
Lodna	16 no incline Jore side Colony / 22	16	17	0	0	33
Lodna	2 No. Incline Colony / 23	13	0	0	0	13
Lodna(S)	2 No. Incline Colony / 23	0	0	310	0	310
Lodna	3 pit basti /O9	0	71	0	0	71
Lodna(S)	3 pit basti /O9	0	0	6	0	6
Lodna	4 pit Colony / 24	213	0	0	0	213
Lodna	5 No. Colony/ (C-17)	112	0	0	0	112
Lodna	8 pit area colony / 19	59	0	0	0	59
Lodna(S)	8 pit area colony / 19	0	0	74	0	74

Colliery	Village/Site	BCCL	Pvt.	Enchr	Other	Total
Lodna	Balugada Colony / 26	41	0	0	0	41
Lodna(S)	Balugada Colony / 26	0	0	3	0	3
Lodna	Chalchalia Labour Colony /25	59	0	0	0	59
Lodna	Chalchalia Labour Colony/ (C-13)	60	0	71	4	135
Lodna	Firkuband Colony / 30	23	37	0	0	60
Lodna	Hanumangari Basti/14	0	71	0	0	71
Lodna	Indira Chowk Road side Basti /O7	0	7	0	0	7
Lodna(S)	Indira Chowk Road side Basti /O7	0	19	0	0	19
Lodna	Jealgora Barrier Colony / 18	100	0	0	0	100
Lodna	Jeenagora Branch site / 20	12	0	0	0	12
Lodna(S)	Jeenagora Branch site / 20	0	0	30	0	30
Lodna	Jharia Club & road side Basti /O8	50	93	0	0	143
Lodna	Joyrampur / Badigi Barrier / 21	23	0	0	0	23
Lodna	Kalidham Colony / 27	18	0	0	0	18
Lodna	Kujama Village /O2	0	64	0	0	64
Lodna(S)	Kujama Village /O2	0	51	21	0	72
Lodna	Lodna Village /O1	537	314	1626	16	2493
Lodna(S)	Lodna Village /O1	0	24	26	0	50
Lodna	Nadiapar Kujama Basti /O4	33	91	0	0	124
Lodna	New Bhaga Bast / 11	233	0	0	0	233
Lodna	New Colony Baniahir /13	205	0	0	0	205
Lodna	Niluri Patra Bastee /O5	23	86	0	0	109
Lodna	Office Compelx Area / 31	129	57	0	10	196
Lodna(S)	Office Compelx Area / 31	0	0	21	0	21
Lodna	Suratand Basti /O6	0	79	0	0	79
Lodna(S)	Suratand Basti /O6	0	49	80	0	129
Lodna	Tar Plant Area / 12	12	0	0	0	12
Lodna(S)	Tar Plant Area / 12	0	10	9	0	19
	Sub total	**2015**	**1176**	**2277**	**30**	**5498**
	Total(Phase-I)	**3656**	**2396**	**2734**	**57**	**8843**
	PHASE-II					
Lodna	5 No. Colony/29	94	57	0	0	151
Lodna	GM Bunglow & Road Side Bastee/15	58	0	0	0	58
Lodna	Phus Bungla Road side Bastee/10	15	120	0	0	135
Lodna	Phus Bungla Road side colony/16	0	58	0	0	58
Lodna	Puranadih Village/O3	0	143	0	0	143
Lodna	Shalimar Colony/17	47	0	0	0	47
Lodna	5 No. Colony/29	94	57	0	0	151
Lodna	GM Bunglow & Road Side Bastee/15	58	0	0	0	58

Colliery	Village/Site	BCCL	Pvt.	Enchr	Other	Total
Lodna	Phus Bungla Road side Bastee/10	15	120	0	0	135
Lodna	Phus Bungla Road side colony/16	0	58	0	0	58
	Sub total	**214**	**378**	**0**	**0**	**592**
	Total(Phase-II)	**214**	**378**	**0**	**0**	**592**
	Total(Phase I+II)	**3870**	**2396**	**2734**	**57**	**9435**

C) **Transport and Communication**

The present network of metalled approach road to the place of work and other places of public interests like shopping, education, medical services etc. is going to improve with continuation of mining operation.

D) **Health**

The facilities created in the area are extended for neighboring population also.

E) **Literacy**

With continuation of mining activities in the area, educational facilities developed in the area will continue to improve the literacy of the rural areas also.

F) **Economic Impacts**

With the continuation of mining activities the occupational structure of the area is going to improve further and many people are likely to be involved in the job of mining and allied activities. Hence, income level of these people is likely to improve to significant level.

Employment opportunities both direct & indirect in this project are likely to cause migration from outside. Amenities like medical educational, recreational etc. are available to local people and their quality of life has definitely improved.

V. Land Use Pattern during Mining

Land in case of coal mining activity, gets degraded by way of actual excavation for coal winning operation and dumping of waste material on the surface especially in the open cast mining.

Year wise backfilling programme and area of reclamation is given below:

YEAR	BACKFILLING QUANTITY (M.Cum.)	AREA FOR RECLAMATION (Ha)
1		
2		
3	3.00	
4	4.10	
5	8.10	
6	10.00	
7	15.00	
8	22.96	
9	25.42	
10	25.42	
11	25.42	
12	25.42	
13	25.42	
14	25.42	20.82
15	25.42	20.85
16	25.42	41.64
17	25.42	41.64
18	25.42	41.64
19	25.42	41.64
20	29.90	41.64
21	21.89	41.64
22	21.00	41.64
23	16.00	41.64
24	8.00	41.64
25	5.18	41.64
PC-1		41.64
TOTAL	444.75	499.71

VI. Rehabilitation & Resettlement:

The land losers have been suitably rehabilitated as per company norms. In addition, various socio-economic developmental activities have already been taken up after survey of the felt needs of the community around the project throughout the revenue life of the mine and the same will be continued during balance life of the project.

VII. Impact on flora & fauna:

There is no endangered and endemic species in core and buffer zone. By developing plantation of native species efforts are being made to improve the green cover in and around the immediate vicinity of the mine area. BCCL in association with local people will make all efforts to conserve the flora & fauna in the immediate surroundings of the mine area.

10.4 ENVIRONMENTAL MANAGEMENT PLAN

I. Environmental Pollution Control Measures:

i) Air, Noise Pollution Control Measures:

a) To reduce air pollution due to dust produced during various mining and allied activities, adequate water spraying would be done at strategic points so that dust do not get air-borne. Suitable chemical re-agents to coagulate the dust particles would also be tried while water spraying.

b) Proper blasting techniques by designing a suitable blasting pattern after actual field observation would be followed to minimize adverse effects of ground vibration and noise if required.

c) Black topping of roads.

d) Biological reclamation of subsided areas, development of green belt around infrastructure, colony, along roads and in vacant land against villages would be undertaken for arresting dust and noise propagation.

e) Fixed sprinklers will be provided along haul road in lease area outside the quarry.

f) Proper maintenance of all Machines etc. will be undertaken so as to reduce harmful exhaust and noise.

g) Regular cleaning of transportation roads will be carried out.

h) Coal are being transported using covered trucks. No overloading of trucks are being allowed.

i) Personal protective gears are given to workmen exposed to dusty and noise work environment.

Plantation/green carpeting/ green belt as a mitigative measures against environmental pollution:

Plantation/green carpeting is an important tool to combat air pollution, noise pollution and soil erosion. In addition to these it gives an aesthetic look to the area.
For plantation purpose following areas can be considered:

Area where ornamental trees viz. gulmohar, Eucalyptus and fruit trees like Mango, Guava, Jamun and medicinal plant like Neem etc. can be provided like colony area, schools, dispensary, community buildings, playground etc. Grass carpeting can be provided in dip side batter,

Areas where different rows of trees including tall and fast growing varieties along with ornamental shady trees shall be planted e.g. around colony, along roads, haul roads, and around industrial buildings, etc.

Plantation of these trees will also take off some pressure on the nearby forests as far as firewood is concerned.

Plantation Programme / Green Belt:

As being practiced presently, the plantation/green carpeting would be taken up with the help of State Forest Deptt. With three years maintenance contract after plantation of saplings. Thereafter, this process would continue concurrently with the mining activities.

Width of green belt:

a) Along the roads 1000 saplings per road km; two rows on both sides of the road; width – 3 m.

b) Around colony & infrastructure – 2500 saplings per ha; width – 5 m; 3 rows of plantation all around.

c) Vacant land – 2500 saplings per ha.

Density of plantation will be as mentioned earlier.

Plantation activity will be carried out throughout the life of the mine around the quarry and in safety zone. In post closure period plantation will be carried over OB dumps to biologically reclaim it. Phase wise Plantation activities to be carried out are as mentioned under:

Proposed Plantation Amalgamated Joyrampur Colliery (OC)												
	Year	Pandeybera		Jealgora		OB Dump		Batter & Safety Zone		Total Plantation	Total Area Under Additional Plantation (Ha)	Total Plantation cost @ Rs.55101/Ha (in Rs.Lakhs)
		Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings			
During active mining	1							1.5	3750	3750	1.5	0.83
	2							1.5	3750	3750	1.5	0.83
	3							1.5	3750	3750	1.5	0.83
	4	7.778	19445							19445	7.778	4.29
	5	7.778	19445							19445	7.778	4.29
	6	7.788	19470							19470	7.788	4.29
	7	7.788	19470							19470	7.788	4.29
	8	7.788	19470							19470	7.788	4.29
	9	7.798	19495							19495	7.798	4.30
	10			9.3775	23444					23444	9.3775	5.17
	11			9.3775	23444					23444	9.3775	5.17
	12			9.3775	23444					23444	9.3775	5.17
	13			9.3775	23444					23444	9.3775	5.17
	14					20.82	52050			52050	20.82	11.47
	15					20.85	52125			52125	20.85	11.49
	16					41.64	104100			104100	41.64	22.94
	17					41.64	104100			104100	41.64	22.94
	18					41.64	104100			104100	41.64	22.94
	19					41.64	104100			104100	41.64	22.94
	20					41.64	104100			104100	41.64	22.94

	Year	Pandeybera		Jealgora		OB Dump		Batter & Safety Zone		Total Plantation	Total Area Under Additional Plantation (Ha)	Total Plantation cost @ Rs.55101/Ha (in Rs.Lakhs)
		Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings	Area (ha)	Trees/ saplings			
	21					41.64	104100			104100	41.64	22.94
	22					41.64	104100			104100	41.64	22.94
	23					41.64	104100			104100	41.64	22.94
	24					41.64	104100			104100	41.64	22.94
	25					41.64	104100			104100	41.64	22.94
Post mining	26					41.64	104100	45.49	113729	217829	87.13	48.01
	27							45.49	113729	113729	45.49	25.07
	28							45.49	113729	113729	45.49	25.07
	29							46.99	117479	117479	46.99	25.89
	Total	**46.72**	**116795**	**37.51**	**93775**	**499.71**	**1249275**	**187.97**	**469915**	**1929760**	**771.91**	**425.33**

Plantation Site Details

Plantation Site No.	Location	Area (Ha.)
1	Pandeybera	46.72
2	Jealgora	37.51
3	OB Dump	499.71
4	Batter & Safety Zone	187.97
	Total	771.91

ii) Water Pollution Control Measures:

a) Domestic Effluent:

Residential quarters are provided with conventional soak pit system.

b) Mine Discharge:

Water collected in the workings will be first allowed to settle in sumps. Sufficiently large sumps has been provided to eliminate the discharge of undissolved suspended solids to the surface along with mine water. The quality of mine pumped out water as being monitored in all the operating mines also establishes the fact that, the untreated mine pumped out water does not contain any significant pollution load.

c) The final treated discharge then be utilized for various purposes e.g. water spraying, watering of plants, etc. Balance quantity if any, will be supplied for irrigation, if required otherwise discharged in natural watercourses. Moreover, analysis of water pumped out from existing mines around the mine under consideration shows that even untreated water meets the acceptable limits; as such quality of water pumped out from the mine is not likely to have any significant pollution load even in untreated condition. However, it is proposed to carry out the monitoring of quality of mine discharge and if any undesirable element is found in the sample it will be treated properly before it is re-used.

iii) Remedial measures to control ground water depletion

The following methodology and remedial measures will be taken to minimize the mine-induced impact on ground water levels and also adverse effects in the area.

a) 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 & surface water ponds. Utilization of mine water for local irrigation use may also enhance the ground water recharge potential through artificial recharge in the area.

b) Runoff conservation structures like check dams, nala bunds may be constructed over the stream / nala bed which would help in recharging

of the groundwater levels as the increased contact period of stored rainwater with the underlying formation will lead to more percolation of the water to underlying strata. They should be constructed across small streams with gentle slope and there is no submergence beyond stream course. The site selection should be based on having sufficient thickness of permeable bed / weathered formation to facilitate recharge within short span of time.

c) Roof-top rainwater harvesting (RWH) may be taken up by the mine authority in the project area using the administrative/ residential buildings.

d) After cessation of mining operation, 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 be considered as a temporary phenomenon. The abandoned mine workings (UG) behave as water pool and improve the groundwater resources availability in the coalfield area.

e) Increase in vegetative cover by plantation in the mine area as suggested in the proposed mining plan under land amelioration measures, this in turn will contain the surface run-off and increase the groundwater recharge in the mining area.

f) Creation of awareness among workers and local peoples about Rain water harvesting and artificial recharge will be given priority by the mine management. This aspect is usually covered during the Environmental Week celebrated every year (5 to 12 June).

g) Monitoring of water quality of mine water discharge, local River/nala and domestic water source (dug well/hand pump wells) will be continued under routine monitoring (Quarterly).

h) The water shortage in the villages, if any, in the influence area can be supplemented by supply of water from outside source or from the mine water after treatment

Regular well water monitoring in nearby villages will be carried out quarterly as per MOEF’s guidelines.

iv) Rehabilitation:

There is no village in the core zone. Hence no house oustees is involved in this project. However, land losers have been suitably compensated as per Company's norms.

v) Occupational Health:

The coal mining activity is carried out as per statute. Initial & periodical medical examination of the workmen is done as per statute. At area level there is a full-fledged hospital.

II. Disaster Management Plan

Mining is a hazardous industry. There is risk to life and property associated with various mining and allied activities of the project. The project report has been drawn in conformity with the prevailing statutory provisions as per Mines Act, 1952 & CMR 1957 applicable for safety in mines. A detailed study has been carried out covering identification and assessment of risk, and recommendation of measures to prevent damage to life and property against such risks. They are discussed subsequently.

i) Innundation

Provisions stipulated in the statute should be strictly complied with.

ii) Ventilation

Adequate ventilation, as stipulated in the statute, shall be provided at the mine.

iii) Precaution Against Fire

(1) Wild or herbaceous plants shall be removed from the mine.

(2) No person shall deposit heated material or ashes on surface near any opencast working. Also no person shall light a fire or permit a fire to be lighted in any UG working except by the permission in writing of the Manager and only for a special purpose specified therein.

(3) Panels should be sealed off immediately after extraction.

iv) DUST SUPPERSSION

Suppression of mine dust may be done by water spraying as per Statute. Fixed sprinklers at continuous intervals should be provided on roads outside the quarry in leasehold area on which coal hauling operations are undertaken. Total length of such road is 3.87 km and considering a throw of approx. 20 m for each fixed sprinkler, 97 sprinklers should be installed at 40 m interval each on one side of the road.

v) MISCELLANEOUS PRECAUTIONS

i. Machinery to be deployed in the project shall be equipped with suitable inbuilt safety devices like audio-visual alarm, fire extinguishers etc.
ii. Emergency Response Plan shall be prepared by Manager as per statute.
iii. Monsoon preparation shall be done in project in advance every year.
iv. All provisions regarding storage, transport & use of explosive as per statute shall be strictly followed.
v. All the regulations & schedules of Coal Mines Regulations 1957 relating to underground mining have to be adhered to and implemented in order to maintain day to day safety precautions as per statute.

III. MONITORING & MANAGEMENT ORGANISATION

Close monitoring of the environment and implementation of various protective measures discussed in the report forms an important part of EMP. In the earlier paragraphs the causes of various pollutions along with the preventive and mitigative measures have been discussed. In this paragraph, monitoring organization is being discussed.

Monitoring Organization

To have a close watch on the environmental condition and implementation of the various measures suggested, a multi-disciplinary approach is essential.

a) BCCL (HQ) acts as an apex body, which monitors the activities relating to environment at project level through the General Manager.

b) General Manager of the area co-ordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the Project. Nodal Officer (Environment) of the area monitors all aspects of environment on behalf of the General Manager. He also takes suitable steps for generation of environmental data for its analysis and interpretations. Plantation is being done on a large area. At present it is implemented through State Forest Deptt. The horticulturist along with the Supervisor shall only monitor and guide the agency for selection of site, treatment of soil and selection of species.

c) Project Officer is primarily responsible for reclamation of the mined out area. He shall also be responsible for biological reclamation with the assistance of GM's office.

ORGANISATION CHART

Sl. No.	Measures/Actions		Agency
1.	Environmental Control	1	General Manager, Lodna Area
		2	Nodal Officer, (Environment), Lodna Area
		3	Project Officer, Amalgamated Joyrampur Colliery
		4	Area Manager (Civil), Lodna Area
		5	Environmental Cell (BCCL H.Q.)
2.	Environmental Monitoring	1	General Manager, Lodna Area
		2	Staff Officer (Civil), Lodna Area
		3	Nodal Officer, (Environment), Lodna Area
		4	Project Officer, Amalgamated Joyrampur Colliery
		5	Environment Cell of BCCL Headquarters
		6	Environmental Laboratory of CMPDI RI-II, Dhanbad.
3.	Reclamation	1	Project Officer, Amalgamated Joyrampur Colliery
		2	Nodal Officer (Environment), Lodna Area

CHAPTER - XI

ENVIRONMENTAL MONITORING REPORT

11.1 AIR AND WATER QUALITY

The mine falls in Cluster IX for the purpose of Environmental Monitoring Data Generation. The quarterly monitoring of water quality under Quarterly Environmental Monitoring report for Cluster-IX is being conducted by CMPDI RI-II, Dhanbad by collecting water samples from ground water, surface water and mine water discharge / workshop discharge (if any) for the proposed project. The various purposes of the water environment monitoring are as follows:

- To assess the water quality characteristics for critical parameters;
- To evaluate the impacts on agricultural productivity, habitat conditions, creational resources and aesthetics in the vicinity ; and
- To facilitate predication of impact on water quality by project activities

The results as per CMPDI RI –II, Dhanbad Report are given subsequently.

To assess the quality of lotic system (surface water), water samples were collected from the following locations (Refer to CMPDI RI-II Report):

TABLE – 11.1
Sampling locations for water quality monitoring in Cluster-IX

S. No	Components	Locations (Station Code)	Frequency	Number of Parameters Covered
1	Mine Water:	Jeenagora (MW9)	Each Fortnight	Four (pH, TDS, TSS, O&G)
2	Mine Water	Jeenagora (MW9)	Half Yearly	Twenty Seven parameters
4	Surface Water	i) Surface Water quality at **U/S of Kashi Jore (SW19).** ii) Surface quality at **D/S of Kashi Jore (SW20).**	Quarterly	Seventeen Parameters
5	Drinking Water	Lodna (GW9)	Quarterly	Twenty Five parameters

Table 11.2: Physico-chemical characteristics of surface water in Cluster-IX Mining Area

(A) Period: Quarter Ending September 2016

1. Upstream in Kashi Jore SW-19
2. Downstream in Kashi Jore SW-20

Sl. No	Parameter	Sampling Stations		Detection Limit
		SW-19	SW-20	
1	Arsenic (as As), mg/l, Max	<0.002	<0.002	0.002
2	BOD (3 days 27°C), mg/l, Max	2.4	2.6	2.00
3	Colour (Hazen Unit)	colourless	colourless	Qualitative
4	Chlorides (as Cl), mg/l, Max	254	44	2.00
5	Copper (as Cu), mg/l, Max	<0.03	<0.03	0.03
6	Disolved Oxygen, min.	4.9	4.5	0.10
7	Fluoride (as F) mg/l, Max	0.56	0.74	0.02
8	Hexavalent Chromium, mg/l, Max	<0.01	0.01	0.01
9	Iron (as Fe), mg/l, Max	<0.06	<0.06	0.06
10	Lead (as Pb), mg/l, Max	<0.005	<0.005	0.005
11	Nitrate (as NO_3), mg/l, Max	41.2	13.4	0.50
12	pH value	8.42	8.55	2.5
13	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.002	<0.002	0.002
14	Selenium (as Se), mg/l, Max	<0.002	<0.002	0.002
15	Sulphate (as SO_4) mg/l, Max	135	232	2.00
16	Total Dissolved Solids, mg/l, Max	780	600	25.00
17	Zinc (as Zn), mg/l, Max	<0.01	< 0.01	0.01

The pH value is slightly alkaline in nature and found well within the prescribed limit. All the parameters were found within the prescribed limits of the applicable standards. The concentrations of the analysed heavy metals in the surface water resource are also found within the prescribed limits.

The physico-chemical characteristics of ground water samples collected from Jeenagora in Cluster IX have been presented in Table-11.3.

Name of the Company: Bharat Coking Coal Limited	Year : 2016-17
Name of the Cluster : Cluster - IX	Period: Q. E. Sept, 2016.

Area :`LODNA	**Jeenagora Stations:** Ground Water from Lodna GW-9	**Project: Jeenagora**	**Date of Sampling:** 06/09/2016

Table-11.3 : Physico-chemical characteristics of ground water samples

Sl. No	Parameter	Sampling Stations	Detection Limit	IS:10500 Drinking Water Standards	Standard / Test Method
		GW-9			
1	Boron (as B), mg/l, Max	<0.20	0.20	0.5	APHA, 22nd Edition ,Carmine
2	Colour,in Hazen Units	4	1	5	APHA, 22nd Edition ,Pt.-Co. Method
3	Calcium (as Ca), mg/l, Max	185.6	1.60	75	IS-3025/40:1991, EDTA
4	Chloride (as Cl), mg/l, Max	110	2.00	250	IS-3025/32:1988, R-2007, Argentometric
5	Copper (as Cu), mg/l, Max	<0.03	0.03	0.05	IS 3025/42 : 1992 R : 2009, AAS-Flame
6	Fluoride (as F) mg/l, Max	0.63	0.02	1.0	APHA, 22nd Edition , SPADNS
7	Free Residual Chlorine, mg/l, Min	0.09	0.02	0.2	APHA, 22nd Edition, DPD
8	Iron (as Fe), mg/l, Max	<0.06	0.06	0.3	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
9	Lead (as Pb), mg/l, Max	<0.005	0.005	0.01	APHA, 22nd Edition, AAS-GTA
10	Manganese (as Mn), mg/l, Max	0.65	0.02	0.1	IS-3025/59:2006, AAS-Flame
11	Nitrate (as NO_3), mg/l, Max	4.43	0.5	45	APHA, 22nd Edition, UV-Spectrphotometric
12	Odour	Agreeable	Qualitative	Agreeable	IS 3025 /05:1983, R-2012, Qualitative
13	pH value	8.24	2.5	6.5 to 8.5	IS-3025/11:1983, R-1996, Electrometric
14	Phenolic compounds (as C_6H_5OH), mg/l, Max	<0.001	0.001	0.001	APHA, 22nd Edition,4-Amino Autipyrine
15	Selenium (as Se), mg/l, Max	<0.002	0.002	0.01	APHA, 22nd Edition, AAS-GTA
16	Sulphate (as SO_4) mg/l, Max	11	2.00	200	APHA, 22nd Edition. Turbidity
17	Taste	Acceptable	Qualitative	Acceptable	APHA, 22nd Edition. Taste
18	Total Alkalinity (c_aco_3),, mg/l, Max	252	4.00	200	IS-3025/23:1986, Titration
19	Total Arsenic (as As), mg/l, Max	<0.002	0.002	0.01	IS 3025/ 37:1988 R : 2003, AAS-VGA
20	Total Chromium (as Cr), mg/l, Max	<0.04	0.04	0.05	IS-3025/52:2003, AAS-Flame
21	Total Dissolved Solids, mg/l, Max	890	25.00	500	IS 3025 /16:1984 R : 2006, Gravimetric
22	Total Hardness (c_aco_3), mg/l, Max	688	4.00	200	IS-3025/21:1983, R-2002, EDTA
23	Turbidity, NTU, Max	9	1.0	1	IS-3025/10:1984 R-1996, Nephelometric
24	Zinc (as Zn), mg/l, Max	0.84	0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame
25	Nickel (as Ni), mg/l Max	<0.20	0.01	5.0	IS 3025/ 49 : 1994, R : 2009, AAS-Flame

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

The physico-chemical characteristics of Mine water samples collected from Cluster IX have been presented in Table-11.4.

Table 11.4: Physico-chemical characteristics of effluent (mine water) in Cluster-IX Mining Area

Location: Jeenagora MW-9

Date of sampling: 23/06/2017 (Quarter Ending June 2017)

Sl.No.	Parameter	Sampling Stations	Detection Limit	MOEF -SCH-VI STANDARDS Class 'A'
		MW-9		
1	Ammonical Nitrogen, mg/l, Max	0.05	0.02	50.0
2	Arsenic (as As), mg/l, *Max*	<0.002	0.002	0.2
3	B.O.D (3 days 27°C), mg/l, Max	<2.00	2.00	30.0
4	COD, mg/l, Max	20	4.00	250.0
5	Colour	colourless	Qualitative	Qualitative
6	Copper (as Cu), mg/l, *Max*	<0.03	0.03	3.0
7	Dissolved Phosphate, mg/l, Max	<0.30	0.30	5.0
8	Fluoride (as F) mg/l, *Max*	0.76	0.02	2.0
9	Free Ammonia, mg/l, Max	<0.01	0.01	5.0
10	Hexavalent Chromium, mg/l, Max	<0.01	0.01	0.1
11	Iron (as Fe), mg/l, *Max*	<0.06	0.06	3.0
12	Lead (as Pb), mg/l, *Max*	<0.005	0.005	0.1
13	Manganese(as Mn), mg/l, Max	<0.02	0.02	2.0
14	Nickel (as Ni), mg/l, *Max*	<0.10	0.10	3.0
15	Nitrate Nitrogen, mg/l, *Max*	3.79	0.50	10.0
16	Oil & Grease, mg/l, Max	<2.00	2.00	10.0
17	Odour	Agreeable	Agreeable	Qualitative
18	pH value	8.33	2.5	5.5 to 9.0
19	Phenolic compounds (as C_6H_5OH),mg/l, *Max*	<0.002	0.002	1.0
20	Selenium (as Se), mg/l, *Max*	<0.002	0.002	0.05
21	Sulphide (as SO_3), mg/l, Max	<0.005	0.005	2.0
22	Temperature (°C)	21.7	Shall not exceed 5^0 C above the receiving temp.	
23	Total Chromium (as Cr), mg/l, *Max*	<0.04	0.04	2.0
24	Total Kjeldahl Nitrogen, mg/l, Max	4.2	1.00	100.0
25	Total Residual Chlorine, mg/l, Max	<0.02	0.02	1.0
26	Total Suspended Solids, mg/l, Max	26	10.00	100.0
27	Zinc (as Zn), mg/l, *Max*	0.02	0.01	5.0

Note: Desirable / * Permissible limit in the absence of alternate source.

TABLE –11.5
GENERAL STANDARDS FOR DISCHARGE OF EFFLUENTS

[The Gazette of India – Extraordinary {Part II- Sec. 3(i)} Ministry of Environment and Forests Notification New Delhi, 19th May, 1993]

SI. No.	Parameters	Standards			
		Inland Surface Water	Public Sewers	Land for irrigation	Marine coastal areas
		(a)	(b)	(c)	(d)
1	Colour and odour	Note-1	Note-1	Note-1	Note-1
2	Suspended Solids, mg/l max.	100	600	200	Note-2
3	Particle size of Suspended Solids.	Note-3	-	-	Note-4
4	Dissolved solids (inorganic) mg/l max.	2100	-	2100	-
5	pH value	5.5-9.0	5.5-9.0	5.5-9.0	5.5-9.0
6	Temperature, ^{O}C	Note-5	-	-	Note-5
7	Oil & grease, mg/l max.	10	20	10	20
8	Total residual chlorine, mg/l max.	1.0	-	-	1.0
9	Ammonical Nitrogen (as N), mg/l. max.	50	50	-	50
10	Total Kjeldahl nitrogen (as NH_3), mg/l max.	100	-	-	100
11	Free ammonia (as N), mg/l max.	5	-	-	5
12	Biochemical Oxygen Demand (3 days at $27^{o}C$), max.	30	350	100	100
13	Chemical Oxygen Demand, mg/l max.	250	-	-	250
14	Arsenic (as As), mg/l max.	0.2	0.2	0.2	0.2
15	Mercury (as Hg), mg/l max.	0.01	0.01	-	0.01
16	Lead (as Pb), mg/l max.	0.1	1.0	-	2.0
17	Cadmium (as Cd), mg/l max.	2.0	1.0	-	2.0
18	Hexavalent Chromium (as Cr^{+6}), mg/l. max.	0.1	2.0	-	1.0
19	Total Chromium (as Cr), mg/l max.	2.0	2.0	-	2.0
20	Copper (as Cu), mg/l max.	3.0	3.0	-	3.0
21	Zinc (as Zn), mg/l max.	5.0	15	-	15
22	Selenium (as Se), mg/l max.	0.05	0.05	-	0.05
23	Nickel (as Ni), mg/l max.	3.0	3.0	-	5.0
24	Boron (as B), mg/l max.	2.0	2.0	2.0	2.0
25	Percent Sodium, max.	-	-	60	-
26	Residual sodium carbonate, mg/l max.	-	-	5.0	-
27	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.2
28	Chloride (as Cl) mg/l max.	1000	1000	600	-
29	Fluoride (as F) mg/l max.	2.0	15	-	15
30	Dissolved Phosphate (as P), mg/l max.	5.0	-	-	-
31	Sulphate (SO_4) mg/l max.	1000	1000	1000	-

SI. No.	Parameters	Standards			
		Inland Surface Water	Public Sewers	Land for irrigation	Marine coastal areas
		(a)	(b)	(c)	(d)
32	Sulphide (as S), mg/l max.	2.0	-	-	5.0
33	Phenolic Compound (C_6 H_5 OH), mg/l max.	1.0	5.0	-	5.0
34	Radioactive materials: (a) Alpha emitters, µc/ml max. (b) Beta emitters, µc/ml max.	 10^{-7} 10^{-6}	 10^{-7} 10^{-7}	 10^{-7} 10^{-6}	 10^{-7} 10^{-7}
35	Bio-assay test	Note-6	Note-6	Note-6	Note-6
36	Manganese (as Mn) mg/l max.	2.0	2.0	-	2.0
37	Iron (as Fe) mg/l max.	2	3	-	3
38	Vanadium (as V), mg/l max.	0.2	0.2	-	0.2
39	Nitrate Nitrogen, mg/l max.	10	-	-	20
40	Pesticides, µg/l max.				
	(i) Benzene Hexachloride				
	(ii) Carbaryl	10	-	10	10
	(iii) DDT	10	-	10	10
	(iv) Endosulfan	10	-	450	450
	(v) Dimethoate	10	-	10	10
	(vi) Fenitrothion	10	-	10	10
	(vii) Malathion	10	-	10	10
	(viii) Phorate	10	-	10	10
	(ix) Methyl Parathion	10	-	10	10
	(x) Phenthoate	10	-	10	10
	(xi) Pyrethrums	10	-	10	10
	(xii) Copper oxychloride	9600	-	9600	9600
	(xiii) Copper sulphate	50	-	50	50
	(xiv) Ziram	1000	-	1000	1000
	(xv) Sulphur	30	-	30	30
	(III) Paraquat	2300	-	2300	2300
	(IIIi) Propanil	7300	-	7300	7300
	(IIIii) Nitrofen	780	-	780	780

Note-1: All efforts should be made to remove colour and unpleasant odour as far as practicable.

Note-2: (a) For process water – 100,
(b) For cooling water effluent, 10% above total suspended matter in influent.

Note-3: Shall pass 850 micron IS sieve.

Note-4: (a) Floatable solids-max. 3 mm.
(b) Settleable solids-max. 850microns.

Note-5: Shall not exceed 5^0C above the receiving water temperature.

Note-6: 90% survivals of fish after 96 hours in 100% effluent.

From the results shown above, it may be safely concluded that the physico-chemical characteristics of the discharge water samples collected from the four locations for one season had variations with respect to almost all the parameters but were well within the limits of General Standards for Discharge of Effluents. As regards heavy metals, like Iron were also within prescribed limits.

Air Quality monitoring

The monitoring of air quality under Quarterly Environment Monitoring Programme for Cluster IX is being conducted CMPDI RI-II, Dhanbad and test results of air samples are furnished subsequently.

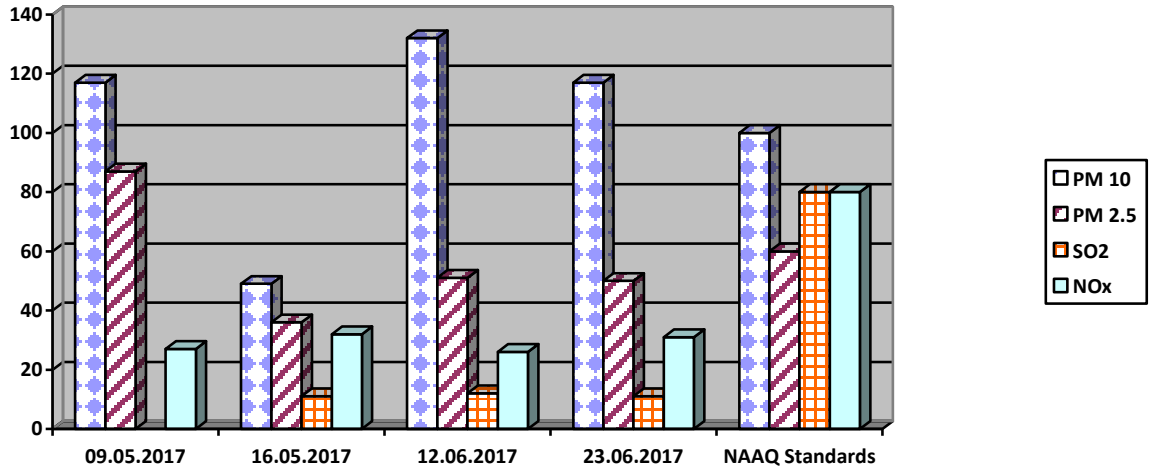
Table 11.6: Location of Air Sampling Stations

S. No	Components	Locations (Station Code)	Frequency	Number of Parameters Covered
1	Air Quality	**(Core Zone)** Jeenagora (A13)	Each Fortnight	Four (PM10, PM2.5, SO_x, NO_x)
		(Buffer Zone) Bhowrah North (A14) Hurriladih UGP (A28) & Kusmatand Village (A12)	Each Fortnight	Four (PM10, PM2.5, SO_x, NO_x)
2	Noise Levels	Jeenagora (N13) Bhowrah North (N14) Hurriladih UGP (N28) & Kusmatand Village (N12)	Each Fortnight	-NA-

Table 11.6A: Ambient Air Quality in Cluster-IX Mine Area for Core and Buffer zone

(A) **Station Code/Name: A13 – Jeenagora, Category: Industrial, Zone: Core Zone**

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_x
1	09.05.2017	117	87	<10	27
2	16.05.2017	49	36	11	32
3	12.06.2017	132	51	12	26
4	23.06.2017	117	50	11	31
	NAAQ Standards	100	60	80	80

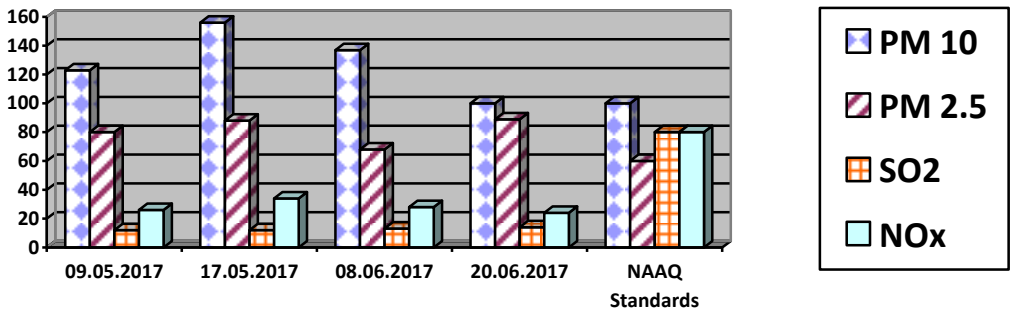


Trace Metal analysis report of Ambient Air Quality

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Led (Pb)
Concentration(μg/m³)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

(B). Station Code/Name: A14 Bhowrah North, Category: Industrial. , Zone: Buffer Zone

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_x
1	09.05.2017	123	80	12	26
2	17.05.2017	156	88	12	34
3	08.06.2017	137	68	13	28
4	20.06.2017	100	89	14	24
	NAAQ Standards	100	60	80	80



Trace Metal analysis report of Ambient Air Quality

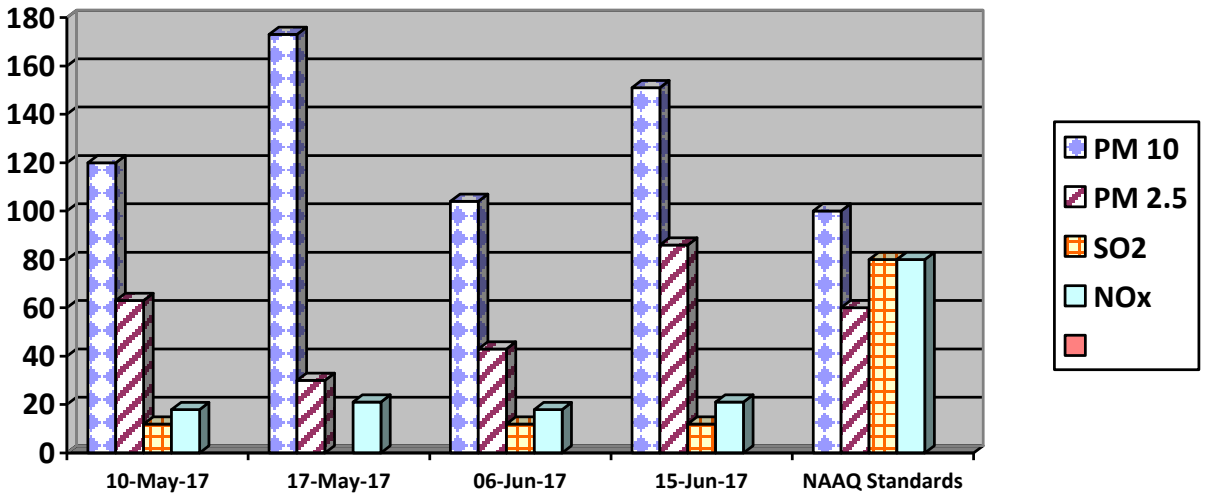
Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Led (Pb)
Concentration(μg/m³)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

(C).Station Code/Name: A28 Hurriladih UGP Category: Industrial.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_x
1	10- May - 17	120	63	12	18
2	17- May - 17	173	30	<10	21
3	06- June - 17	104	43	12	18
4	15- June - 17	151	86	12	21
	NAAQ Standards	100	60	80	80

Trace Metal analysis report of Ambient Air Qualit

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005



Trace Metal analysis report of Ambient Air Qualit

Parameters	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Mercury (Hg)	Nickel (Ni)	Led (Pb)
Concentration($\mu g/m^3$)	<0.005	<0.001	<0.01	<0.001	<0.1	<0.005

(D).Station Code/Name: A12 Kusmatand Village Category: Buffer.

Sl. No.	Dates of sampling	PM 10	PM 2.5	SO_2	NO_x
1	16- May - 17	192	50	11	30
2	05- June - 17	174	52	<10	21
3	28- June - 17	58	22	13	19
	NAAQ Standards	100	60	80	80

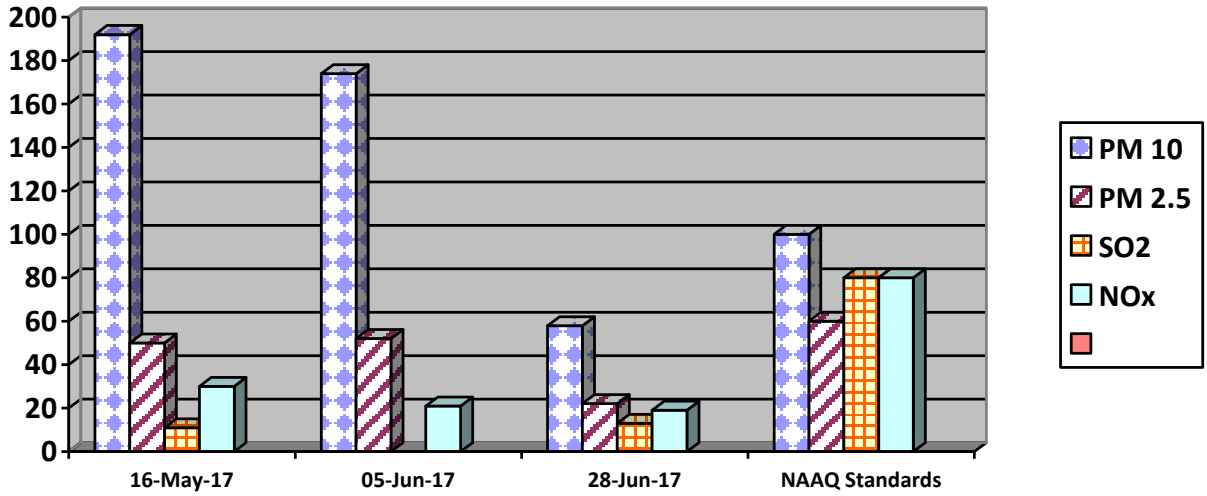


Table 11.6B: National Ambient Air Quality Standards
(As per MoEF Notification on* 16th November, 2009*)

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial, Residential, rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulpher Dioxide (SO_2), µg/m^3	Annual* 24 hours**	50 80	20 80	- Improved West and Gaeke - Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m^3	Annual* 24 hours**	40 80	30 80	-Modified Jacob & Hochheiser (Na-Arsenite) -Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM_{10} µg/m^3	Annual* 24 hours**	60 100	60 100	-Gravimetric -TOEM - Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM_2 µg/m^3	Annual* 24 hours**	40 60	40 60	-Gravimetric -TOEM - Beta attenuation
5	Ozone (O_3) µg/m^3	8 hours* 1 hour**	100 180	100 180	-UV photometric -Chemiluminescence -Chemical Method
6	Lead (Pb)	Annual*	0.50	0.50	-AAS/ICP method

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial, Residential, rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
	µg/m^3	24 hours**	1.0	1.0	after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide(CO) mg/m^3	8 hours* 1 hour**	02 04	02 04	-Non Dispersive Infra Red (NDIR)Spectroscopy)
8	Ammonia(NH_3) µg/m^3	Annual* 24 hours**	100 400	100 400	- Chemiluminescence - Indophenol blue method
9	Benzene(C_6H_6) µg/m^3	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(o) Pyrine (BaP)-Particulate phase only, ng/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11	Arsenic(As), ng/m^3	Annual*	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel(Ni), ng/m^3	Annual*	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

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

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note – Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limit specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

NOISE LEVEL DATA

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

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

Name of the Stations & Code :

1. **Dobari UGP (N11)**
2. **Jeenagora (N13)**
3. **Hurriladih UGP (N28)**
4. **Kusmatand Village (N12)**

(a) First Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Jeenagora (N13)**	**Industrial area**	09.05.17	59.1	*75*
2	**Bhowrah North (N14)**	**Industrial area**	09.05.17	59.8	*75*
3	**Hurriladih UGP (N28)**	**Industrial area**	10.05.17	63.1	*75*

(b) Second Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	**Jeenagora (N13)**	**Industrial area**	16.05.17	60.8	*75*
2	**Bhowrah North (N14)**	**Industrial area**	17.05.17	61.3	*75*
3	**Hurriladih UGP (N28)**	**Industrial area**	17.05.17	61.2	*75*
4	**Kusmatand Village (N12)**	**Residential Area**	16.05.17	53.8	*55*

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

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

Name of the Stations & Code :

1. **Dobari UGP (N11)**
2. **Jeenagora (N13)**
3. **Hurriladih UGP (N28)**
4. **Kusmatand Village (N12)**

(a) First Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	Jeenagora (N13)	Industrial area	12.06.17	60.1	*75*
2	Bhowrah North (N14)	Industrial area	08.06.17	58.2	*75*
3	Hurriladih UGP (N28)	Industrial area	06.06.17	62.2	*75*
4	Kusmatand Village (N12)	Residential Area	05.06.17	50.7	*55*

(b) Second Fortnight

Sl. No.	Station Name/Code	Category of area	Date	Noise level dB(A)LEQ	**Permissible Limit of Noise level in dB(A)*
1	Jeenagora (N13)	Industrial area	23.06.17	62.3	*75*
2	Bhowrah North (N14)	Industrial area	20.06.17	59.5	*75*
3	Hurriladih UGP (N28)	Industrial area	15.06.17	60.7	*75*
4	Kusmatand Village (N12)	Residential Area	28.06.17	51.6	*55*

CHAPTER - XII

PROGRESSIVE AND FINAL MINE CLOSURE PLAN

12.0 MINE CLOSURE PLANNING

12.1 OBJECTIVES OF CLOSURE PLANNING

Mine closure planning has to be carried out at the starting of the mine and needs periodic reviewing and revision during its life cycle to cope with the geo-technical constraints, safety and economic risks, social and environmental challenges. Various other objectives are as follows:

- To allow a productive and sustainable after-use of the site which is acceptable to the mine owner and the regulatory authority;
- To protect public health and safety;
- To alleviate or eliminate environmental damage and thereby encourage environmental sustainability;
- To minimize adverse socio-economic impacts.

12.2 DIFFERENT ASPECTS OF MINE CLOSURE PLANNING

The mine closure planning broadly involves the following aspects:

(a) Technical aspects:

The following technical aspects would be reviewed in the final mine closure planning.

- **Safety hazards including management of fire and subsidence**:
  In the mine closure plan, action will be taken to cover all the safety aspects including management of fire & subsidence and mine inundation.

- **Management of Pit Slopes:**
  During operation of the mine, overall slope will be maintained at an angle not exceeding 22^0-28^0. Vegetation cover will also be provided along the slopes to arrest any failure.

As regards stability of back-filled dumps, the final level of reclaimed backfill will be matched with the levels of surrounding areas leaving a final residual void which will serve as a lagoon which may be utilised as water reservoir for the locality.

During operation, the external and internal OB dump will be developed with 40m berm width and maximum height of 90m in case of external OB dump and the overall dump slope shall not exceed 22 to 28 degrees. The waste dumps will be provided with toe wall and garland drains. The dump will be technically reclaimed and vegetation will be grown after spreading the top soil. The above measures will prevent slope failure and improve the aesthetic value.

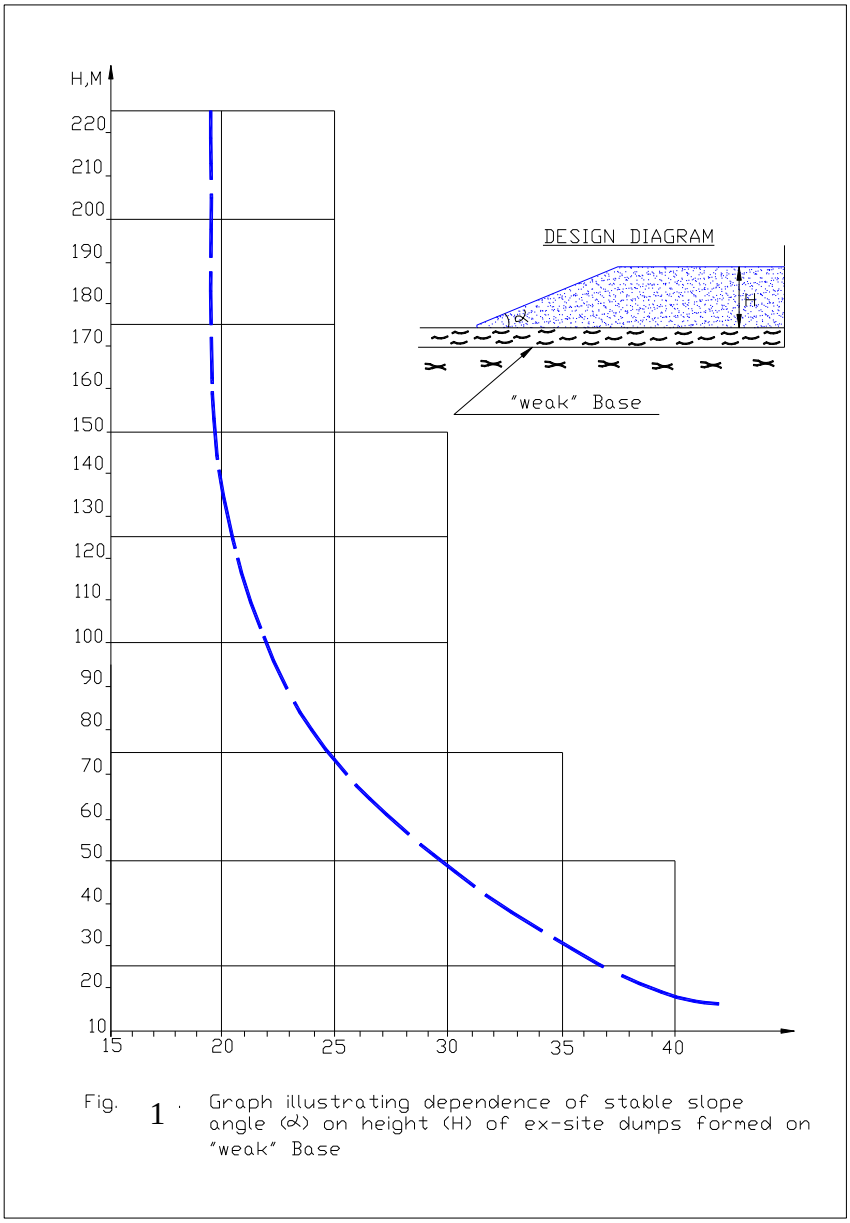


Fig. 1 . Graph illustrating dependence of stable slope angle (α) on height (H) of ex-site dumps formed on "weak" Base

The final level of reclaimed backfill will be matched with the levels of surrounding areas leaving a final residual void which will also serve as a lagoon which may be utilised as water reservoir for the locality. Most of the back filled area shall be afforested by selecting proper plant species in consultation with State Forest Department. A part of the back filled area would also be developed for agricultural purpose with the help of the concerned State Authority.

- **Management of hydrology and hydro-geology**:

  In the mine closure plan, the surface flow pattern of precipitation and mine water would be clearly developed and water channel suitably laid down so that it does not disturb the general hydrology of the area.

  Mining operation may reduce the water table of the area. To recharge the water table, it is proposed that the mine water during operation will be discharged into surface water settling tank over flow of settled water from the tank will be used for water sprinkling, plantation, domestic purpose, etc. Therefore, the excess over flow water will be discharged into the nearby river. After closure of the mine vegetation will be grown on the entire vacant area.

- **Details of decommissioning of the infrastructures:**

  The decommissioning of the various infrastructures developed for the mine like office complex, roads, pipelines and transmission line etc. shall be planned in details so that the land occupied by these infrastructures are released. However, before such decommissioning, the possibility of re-use of these infrastructures for the neighbouring mines shall be explored.

- **Closure of entry to the open-cast mine:**

  At the end of the mine life, end pit slope within the seam and every exposed mouths of development gallery along the length of the bench / box-cut should be closed with non-combustible material (OB rock & mutti), compacted properly and sprayed with Thermoseal (a mica based sealant).

(b) <u>Environmental aspects</u>

This would include the following:

- **Management of final voids**:

  In the mine closure plan, voids due to mining are to be dealt and the final land use plan will include filling of the voids for land reclamation where possible and for hydro reclamation where feasible.

- **Reclamation of forests/vegetation:**
  It is to be ensured that in the final land use plan, all vacant land acquired for the project is afforested.

- **Channelisation of available water:**
  If the mine is having sufficient water and if on closure, the mine water flows into the surface water courses, channelising this water for surrounding community for their irrigational/domestic uses may be taken up. This can be planned by providing structures involving one time costing.

- **Management of Recharge Areas**:
  The pre-mining and post mining scenario on the hydrogeological recharge system would be included in the closure plan.

- **Acceptable Surface and Ground Water Flows**:
  In the final closure plan of the mine, wherever the mine water is likely to flow out to surface and meet the surface water sources; the quality of water from such mines would be assessed and flow pattern designed in the final plan.

(c) Social aspects

The social aspects of land use planning relating to mine closure would include the following:

- **Re-deployment of Workforce:**
  The company employees will be gainfully engaged in the neighboring projects after cessation of mining activities.

- **Management of Community Facilities:**
  In view of the short life of the project no new community facility will be created. However, the existing facilities of adjoining areas will be strengthened.

(d) Financial aspects:

There are two types of Closure, namely, Progressive Mine Closure (Concurrent) and Final Mine Closure. The cost of Progressive Closure activities is realized by the established norms and calculation made in that regard is explained below in Para 12.8, Chapter XII.

The Final Mine closure cost has to deal with the following:

Cost of closure activities.

- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring.
- Creation of a corpus fund for the final mine closure.

12.3 MINE CLOSURE OBLIGATIONS

There is need to define the liabilities, responsibilities and authorities of the mine management, other regulatory bodies, Central and State Governments after mine closure. Some obligations relating to the Mine Management Companies are as follows:

(a) **Health & Safety :** Regulation Nos. 6, 61, 106, 112 of Coal Mines Regulations, 1957 and its related DGMS Circulars;

(b) **Environment :** Water (Prevention & Control of Pollution) Act, 1974; Air (Prevention & Control of Pollution) Act, 1981; Environmental (Protection) Act, 1986 and Environmental Protection (Amendment) Rule, 2000; DGMS Directives on Noise & Ground Vibration;

(c) **Forest :** Forest (Conservation) Act, 1980.

(d) **Rehabilitation :** CIL's policy, however, applicable for land oustees only.

(e) **Decommissioning/asset disposal, etc.**

12.4 IMPACT ASSESSMENT REMEDIAL MEASURES

Environmental Impact on Landscape, Water Source, air and noise pollution during mine life has been discussed earlier. It is imperative that the environmental monitoring may be continued for 3 years after closure of OC in order to assess corrective measures to be implemented to sustain pre-mining ecosystem and environment in the core and buffer zone (to the extent possible).

12.5 STAKEHOLDERS INVOLVEMENT

Various stakeholders effected due to mine closure need to be identified and they may be as follows :

The Company	:	Employees, Management & Stakeholders
The Community	:	Local business and service providers, landholders, neighbours and nearby residents, local Government and NGOs and Community Groups.
The State	:	The State Government. The Central Government and concerned Government Agencies.

There is need of regular consultations between the stakeholders to evolve the needs of the stakeholders and their involvement in the process.

12.6 CLOSURE ACTION PLAN

Closure planning is a whole-of-life exercise that begins at the start of a mine and continues till post-closure. The dynamic nature of closure planning requires regular and critical review to reflect changing circumstances as a result of any operational change, new regulation, and new technology and remain flexible enough to cope with unexpected events.

The following steps have to be undertaken in relation to Mine Closure Planning:

- Prior to the surface demolition/restoration a surface audit should be undertaken on all surface structures, spoil heaps, lagoons, etc. to assess whether there are any hazardous materials that could cause problems; viz. explosives, chemicals, etc. A list of surface assets should be prepared and made available to potential purchasers, prospective purchasers could be invited and asked to submit sealed bids, this could ensure that the sale of assets give better financial gain.
- In order to identify potential impact, necessary hydro-geological studies into post-mining ground water recharge have to be done.
- Work force on roll of BCCL may be re-deployed for gainful utilization in the same or other mines of BCCL.
- As a detailed component of the Closure Plan, a Decommissioning Plan is to be developed towards the final stages preferably 5 years prior to tentative closure of the mine. Once established, it may be updated annually.

12.7 PROTECTIVE MEASURES TO BE TAKEN

Protective measures must include the following :

- The protection of mine Entries , building and other structure on the project site against access by unauthorized persons;
- The maintenance of all mechanical, hydraulic and waste management system;
- The continuation of all monitoring programmes;
- The control of all contaminated effluents;
- The securing of all petroleum products, chemicals and waste;
- The rendering of all tailings, dams and piles of earth, rock and waste resulting from work done on the project site in a stable and safe condition.

12.8 CLOSURE COSTS

As per MOC guidelines, a corpus escrow account @ Rs 1.0 lakhs (August, 2009 Price Level) per Ha (for UG) and @ Rs 6.0 lakhs (for OC) of the project area shall be opened with the coal controller organization to meet the expenses of final mine closure. The current Guidelines read as:

"It has been estimated that typically closure cost for an opencast mine will come around Rs. 6.00 lakh per Hectare of the project area and it would be Rs. 1.00 lakh per Hectare for underground mine project area at current price levels (August, 2009) and these rates will stand modified based on Wholesale Price Index as notified by Government of India from time to time".

It is difficult to conclusively predict the mining parameters on a long term basis owing to rapidly changing mining technology, developments in the field of clean coal technologies and R&D activities in development of alternative energy sources.

As per the latest Guidelines issued by the MoC, GoI (dt. 07.01.2013) the *"annual closure cost is to be computed considering the total project area at the above mentioned rates and dividing the same by the entire life of the mine in years for new projects and balance life of mine in years for operating/existing mines."*

As stated earlier that the 5 collieries of Lodna area, BCCL namely Joyrampur Colliery, Jealgora Colliery, Lodna Colliery, Bararee Colliery and Bagdigi Colliery have been amalgamated into a single mine namely Amalgamated Joyrampur Colliery vide letter no R-2/0100190/P-12-15/1517-27 dated 28.8.2015 issued by DGMS. Before amalgamation all the above 5 collieries of Lodna area were operating as single individual mine. Before amalgamation mine closure plan for 3 mines namely Joyrampur UG, Bararee UG and Lodna UG were prepared and approved by BCCL Board. As per the approved Mine Closure Plan the deposited amount till 31.3.2017 alongwith escrow account no. for above 3 mines are given in table below.

Name of mines	Escrow account no. & bank name	Amount deposited till 31.3.2017 (Rs. in Lakhs)
Joyrampur UG Mine	00150100009049 at bank of Baroda, Dhanbad Branch	40.15
Bararee UG Mine	00150100008940 at bank of Baroda. Dhanbad Branch	242.52
Lodna Colliery	00150100008942 at bank of Baroda, Dhanbad Branch	117.75
Total		400.42

The earlier mine closure plans were prepared considering Joyrampur UG, Bararee UG and Lodna UG as underground individual mine. However now 5 collieries of Lodna area, BCCL namely Joyrampur Colliery, Bagdigi Colliery, Lodna Colliery, Bararee Colliery and Jealgora Colliery have been amalgamated into a single mine namely Amalgamated Joyrampur Colliery.

At present all the underground units of Amalgamated Joyrampur Colliery are closed. In the present scenario, it has been decided by BCCL management to extract the fire affected seams in all the five mines by Opencast method upto IX/X seam.

In view of the above, a Mining Plan with revised Mine Closure Plan for Amalgamated Joyrampur Colliery is being prepared incorporating all the major current and proposed changes in the mining activities.

As per the data/plan furnished by mine officials, the total leasehold area of Amalgamated Joyrampur Colliery is 1186.97 Ha. Out of 1186.97 Ha area 1086.89 Ha area has been considered for computation of Mine closure cost. The 1086.89 Ha area comprises of 792.25 Ha of opencast and remaining 294.64 Ha project of underground. In addition to the above, 900 Ha has been considered for external dump. Thus the total project area for computation of mine closure cost comes to about 1986.89 Ha. Out of 1986.89 Ha, mine closure cost for 1692.25 Ha area has been considered as per Opencast norms and mine closure cost for the remaining 294.64 Ha area has been considered as per Underground norms.

Based on the above consideration, the mine closure cost for Amalgamated Joyrampur Colliery has been calculated.

The money deposited in the Escrow Account has to deal with the following:

- Cost of closure activities.
- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring.
- Creation of a corpus fund for the final mine closure

It is difficult to conclusively predict the mining parameters on a long term basis owing to rapidly changing mining technology, developments in the field of clean coal technologies and R&D activities in development of alternative energy sources.

As per the latest Guidelines issued by the MoC, GoI(dt. 07.01.2013) the *"annual closure cost is to be computed considering the total project area at the above mentioned rates and dividing the same by the entire life of the mine in years for new projects and balance life of mine in years for operating/existing mines."*

Jharia Coalfield is characterized by occurrence of a number of working coal horizons, giving a leverage of extended working life of the mines. Some more seams can come in the lap of workable horizons due to improvement in mining technology in times to come. The underground mines in leasehold of JCF are generally small capacity mines, giving a false impression of very long lives due to small level of current production level. There may be a strategy in future to amalgamate the mines for higher production level to attain the economics of scale. In such a situation, the life of the mine arrived at with current level of production for the balance reserve may not be workable in the long run.

In this mining plan, it is proposed to extract the IX/X & all above occurring seams in the proposed quarry limit through opencast operation using Shovel-Dumper system of mining. Amalgamated Joyrampur Colliery has mineable/extractable reserve of 52.029 MTs with avg. stripping ratio of 16.72 M^3/Te.

As discussed in Chapter-V, the life of the Amalgamated Joyrampur Colliery(OC) is estimated to be about 25 years, under given circumstances.

As per Mine Closure guidelines, the total expenditure to be incurred at the notified rate of the year (August 2009) has been calculated in following manner:

	UG Section	OC Section	Remarks
Area in Ha.	294.64	1692.25	Area X Notified Rate
Notified Rate (Rs. Lakhs/Ha)	1	6	
Total Amount (in base year) (Rs. Lakhs)	294.64	10153.5	

As per the guidelines *"these rates will stand modified based on Whole Price Index as notified by Government of India from time to time".*

Thus, an escalation factor has been calculated based on WPI of July. 2017 (177.79) ** vis-à-vis WPI of August '09(129.6) which comes out to be 1.37189737654321.

	UG Section	OC Section	Remarks
Total Amount (in base year) (Rs. Lakhs)	294.64	10153.5	Total Amount (in base year) X Escalation Factor
Escalation Factor	1.37189737654321	1.37189737654321	
Escalated Amount(Rs. Lakhs)	404.216	13929.56	

** As per the directives from Office of the Economic adviser, WPI series has been revised. In the revised series, base year has been changed to 2011-12 from 2004 -05. To account for the aforesaid change WPI Linking Factor has been taken as 1.561.

As stated earlier before amalgamation mine closure plan for 3 mines namely Joyrampur UG, Bararee UG and Lodna UG were prepared and approved by BCCL Board. As per the approved Mine Closure Plan the total deposited amount in all three Escrow Accounts till 31.3.2017 was Rs. 400.42 Lakhs. Thus after amalgamation either these three escrow accounts will be merged into a single escrow account in the name of Amalgamated Joyrampur Colliery or a new escrow account have to be opened in the name of Amalgamated Joyrampur Colliery. The amount already accrued in all 3 accounts shall be adjusted against the new closure cost calculated.

To account for the deposited amount, the total amount is deducted from the escalated amount to arrive at the balance escalated amount.

	UG Section	OC Section	Remarks
Escalated Amount (Rs. Lakhs)	404.216	13929.56	
Amount already deposited in escrow account(Rs. Lakhs)	400.42	0	
Balance Escalated Amount(Rs. Lakhs)	3.796	13929.56	

To arrive at the annual cost to be deposited in each year in an escrow account, the escalated amount shall be divided by the life of the section.

	Amount (in Rs. lakhs)		Remarks
	UG Section	OC Section	
Balance Amount	3.796	13929.56	Balance Amount / Life
Life	01	25	
Amount per year	3.796	557.182	

Since, Amalgamated Joyrampur Colliery is an opencast mine, balance amount for the underground section will be deposited in the 1st year along with the 1st instalment of OC section, detailed subsequently.

As per the guidelines, the arrived annual cost has to be escalated by 5% every year for the remaining life of the mine. The amount to be deposited every year after 5% escalation is given below:

Table No. 12.1 Break-Up cost of Mine Closure of Amalgamated Joyrampur Colliery

(Rs. Lakhs)

Year	UG Section	OC Section	Total
1	3.796	557.182	560.978
2		585.041	585.041
3		614.293	614.293
4		645.008	645.008
5		677.258	677.258
6		711.121	711.121
7		746.677	746.677
8		784.011	784.011
9		823.212	823.212
10		864.372	864.372
11		907.591	907.591
12		952.970	952.970
13		1000.619	1000.619
14		1050.650	1050.650
15		1103.182	1103.182
16		1158.341	1158.341
17		1216.258	1216.258
18		1277.071	1277.071
19		1340.925	1340.925
20		1407.971	1407.971
21		1478.370	1478.370
22		1552.288	1552.288
23		1629.903	1629.903
24		1711.398	1711.398
25		1796.968	1796.968
	3.796	26592.681	26596.477

The amount calculated above shall be deposited every year by BCCL in the Escrow Account in the name of Amalgamated Joyrampur Colliery.

Thus, total amount that shall be further deposited for final mine closure activities of Amalgamated Joyrampur Colliery in case of underground workings stands out to be Rs. 3.796 lakhs and in case of opencast workings during the considered period of 25 years stands out to be Rs. 26592.681 lakhs as per the present status of the mine.

The amount already deposited in the escrow account will also be available for mine closure activities and should be included to arrive at the total funds available for Mine Closure Activities.

	Amount (in Rs. lakhs)		
	UG Section	OC Section	Total
Amount Already Deposited in Escrow Account	400.42	0	400.42
Amount to be Deposited in the Escrow Account in the Future	3.796	26592.681	26596.477
Total Amount available for Mine Closure Activities	404.216	26592.681	26996.897

Based on the existing mine closure planning norms, the above calculated cost at Final WPI of July 2017 on mine closure may be tentatively grouped under different heads as given in Table No. 6.2 A and 6.2 B for underground and opencast respectively, as per guidelines of CMPDI(HQ).

Table 12.2 (A) Break up costs of Mine Closure Activities for Amalgamated Joyrampur Colliery (Underground)

Sl. No.	Activity	Mine Closure Cost (Rs. in Lakhs)
A	**Dismantling of Structures**	
	Service Buildings	14.1476
	Residential Buildings	42.7661
	Industrial Structures like CHP, Workshop, field sub-station, cap lamp room, haulage, fan installation etc.	25.5869
B	**Permanent Sealing of mine entries(incline mouth and air shaft)**	
	Sealing of incline mouths and air shafts	21.5043
C	***Subsidence Management**	19.2003

Sl. No.	Activity	Mine Closure Cost (Rs. in Lakhs)
D	**LANDSCAPING**	
	Landscaping of the cleared land for improving its esthetic	35.571
E	***Plantation**	
	Plantation over the cleared area obtained after dismantling and on other barren spaces	52.5481
F	**Monitoring/Testing of parameters for three years**	
	Air Quality	27.608
	Water Quality	25.6273
G	***Enterpreneuship Development(Vocational/skill development training for sustainable income of affected people**	30.9225
H	***Miscellaneous and other mitigative measures**	59.0155
I	**Manpower Cost for Supervision**	49.7186
	TOTAL	**404.216**

Note: * : To be covered under Progressive Mine Closure activities also

Table 12.2 (B) Break up costs of Mine Closure Activities for Amalgamated Joyrampur Colliery (Opencast)

Sl. No.	Activity	Mine Closure Cost (Rs. in Lakhs)
A	**Dismantling of Structures**	
	Service Buildings	53.185362
	Residential Buildings	710.0245827
	Industrial Structures like CHP, Workshop, field sub-station, etc.	79.778043
B	**Permanent Fencing of Mine Void and other dangerous area**	
	Random Ruble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	398.890215
C	**Grading of Highwall slopes**	
	Levelling and grading of highwall slopes	470.6904537
D	***OB Dump Reclamation**	
	Handling/Dozing of external OB Dump into mine void	23577.07097
	Bio-Reclamation including soil spreading, plantation and maintenance	106.370724

Sl. No.	Activity	Mine Closure Cost (Rs. in Lakhs)
E	**LANDSCAPING**	
	Landscaping of the cleared land for improving its esthetic	79.778043
F	***Plantation**	
	Plantation over area obtained after dismantling	132.963405
	Plantation around fencing	53.185362
	Plantation over the cleared external OB Dump	5.3185362
G	**Monitoring/Testing of parameters for three years**	
	Air Quality	58.5038982
	Water Quality	53.185362
H	***Enterpreneuship Development(Vocational/skill development training for sustainable income of affected people**	69.1409706
I	***Miscellaneous and other mitigative measures**	531.85362
J	**Manpower Cost for Supervision**	212.741448
	TOTAL	**26592.681**

Note: * : To be covered under Progressive Mine Closure activities also

Thus, total amount that shall be available for final mine closure activities of Amalgamated Joyrampur Colliery has been estimated as Rs. 26996.897 lakhs, out of which Rs. 26592.681 lakhs is for opencast based on OC norms at WPI of July 2017 and Rs. 404.216 lakhs is for underground based on UG norms at WPI of July 2017.

Mining is to be carried out in a phased manner initiating afforestation/reclamation work in the mined out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 80% of the total deposited amount including interest accrued in the ESCROW account may be released after every five years in line with the periodic examination of the Closure Plan as per Clause 3.1 of the Annexure of the Guidelines. The amount released should be equal to expenditure incurred on the Progressive mine closure in past five years or 80% whichever is less. The balance amount shall be released to mine owner/leaseholder at the end of the final Mine Closure on compliance of all provisions of Closure Plan. This

compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organisations, court etc. and certified by the Coal Controller.

However, the additional amount beyond the escrow account, if any, estimated later on, will be provided by the mine operator after estimating the final mine closure cost five years prior to mine closure (as per the mine closure guideline.

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN AMALGAMATED JOYRAMPUR COLLIERY (UG & OC)
(LIFE OF THE MINE : 25 YEARS)

S.N	Activity	Time Frame	Year							
			1st Phase	2nd Phase	3rd Phase	4th Phase	Final	Post Closure Phase		
			1-5	6-10	11-15	16-20	21-25	PC1	PC2	PC3
A	**Dismantling of Structures**									
	Service Buildings	2 years								
	Residential Buildings	2 & ½ years								
	Industrial structures like CHP, Workshop, field sub-station, etc.	2 & ½ years								
	Dismantling of Service Bulding, Residential Building and Industrial Services for Underground section	10 years								
B	**Permanent Fencing of mine void and other dangerous area and underground mine opening**									
	Random rubble masonry of height 1.2 metre including leveling up in cement concrete 1:6:12 in mud mortar	2 years								
	Sealing of incline mouths and air shafts of underground section	10 years								
C	**Subsidence Management and Grading of highwall slopes**									

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN AMALGAMATED JOYRAMPUR COLLIERY (UG & OC) (LIFE OF THE MINE : 25 YEARS)										
S.N	**Activity**	**Time Frame**	**Year**							
			1st Phase	**2nd Phase**	**3rd Phase**	**4th Phase**	**Final**	**Post Closure Phase**		
			1-5	**6-10**	**11-15**	**16-20**	**21-25**	**PC1**	**PC2**	**PC3**
	Subsidence Management	Throughout the life of the mine, if required including 3 years after cessation of mining operation								
	Levelling and grading of highwall slopes	2 years								
D	**OB Dump Reclamation**									
	*Handling/Dozing of OB Dump and backfilling	Throughout the life of the mine including 3 years after cessation of mining operation								
	*Technical and Bio-reclamation including plantation and post care	Throughout the life of the mine including 3 years after cessation of mining operation								
E	**Landscaping**									
	*Landscaping of the open space in the leasehold area for improving its esthetics and eco value	Throughout the life of the mine including 3 years after cessation of mining operation								
F	**Plantation**									
	Plantation over cleared area obtained after dismantling	2 years								

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN AMALGAMATED JOYRAMPUR COLLIERY (UG & OC)
(LIFE OF THE MINE : 25 YEARS)

S.N	Activity	Time Frame	Year							
			1st Phase	2nd Phase	3rd Phase	4th Phase	Final	Post Closure Phase		
			1-5	6-10	11-15	16-20	21-25	PC1	PC2	PC3
	*Plantation around the quarry area and in safety zone	Throughout the life of the mine including 3 years after cessation of mining operation								
	*Plantation over the external OB Dump	Throughout the life of the mine								
G	**Post Closure Env Monitoring / testing of parameters for three years**									
	Air Quality	3 years								
	Water Quality	3 years								
H	***Entrepreneurship Development (Vocational/skill development training for sustainable income of affected people**	Throughout the life of the mine								
I	***Miscellaneous and other mitigative measures**	Throughout the life of the mine including 3 years after cessation of mining operation								
J	***Post Closure Manpower cost for supervision**	3 years								

NOTE: *: To be covered under Progressive Mine Closure activities also**.**

ANNEXURE- IA

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

टिप्पणी पत्र

विभाग: योजना एवं परियोजना पत्रांक 87

अधिकारी का नाम: आर के साहा, वरीय प्रबंधक(खनन) दिनांक 23/10

विषय: **Requirement of Mining Plan and FSR in respect of Amalgamated Joyrampur Colliery of Lodna Area.**

Enclosed herewith a letter from GM(Lodna Area) regarding the above cited subject vide no. BCCL:GM(LA):Secy:2017:284 dated 14/10/17 seeking Mining opening permission from CCO for which consent to operate was submitted to JSPCB with present EC of Cluster IX. However, as pointed out that a modification in the EC is required since the Area is marked to be worked by underground method which is not possible now. As such Mining Plan and Feasibility Report of Amalgamated Joyrampur Colliery is required to be submitted afresh for seeking Mining Opening permission from CCO and consent to operate from JSPCB.

The Competent Authority is requested to accord approval to get this job done from CMPDI as required in the enclosed letter from GM, Lodna Area.

Sr. Manager(Mining)P&P

GM(P&P) 23/X/17

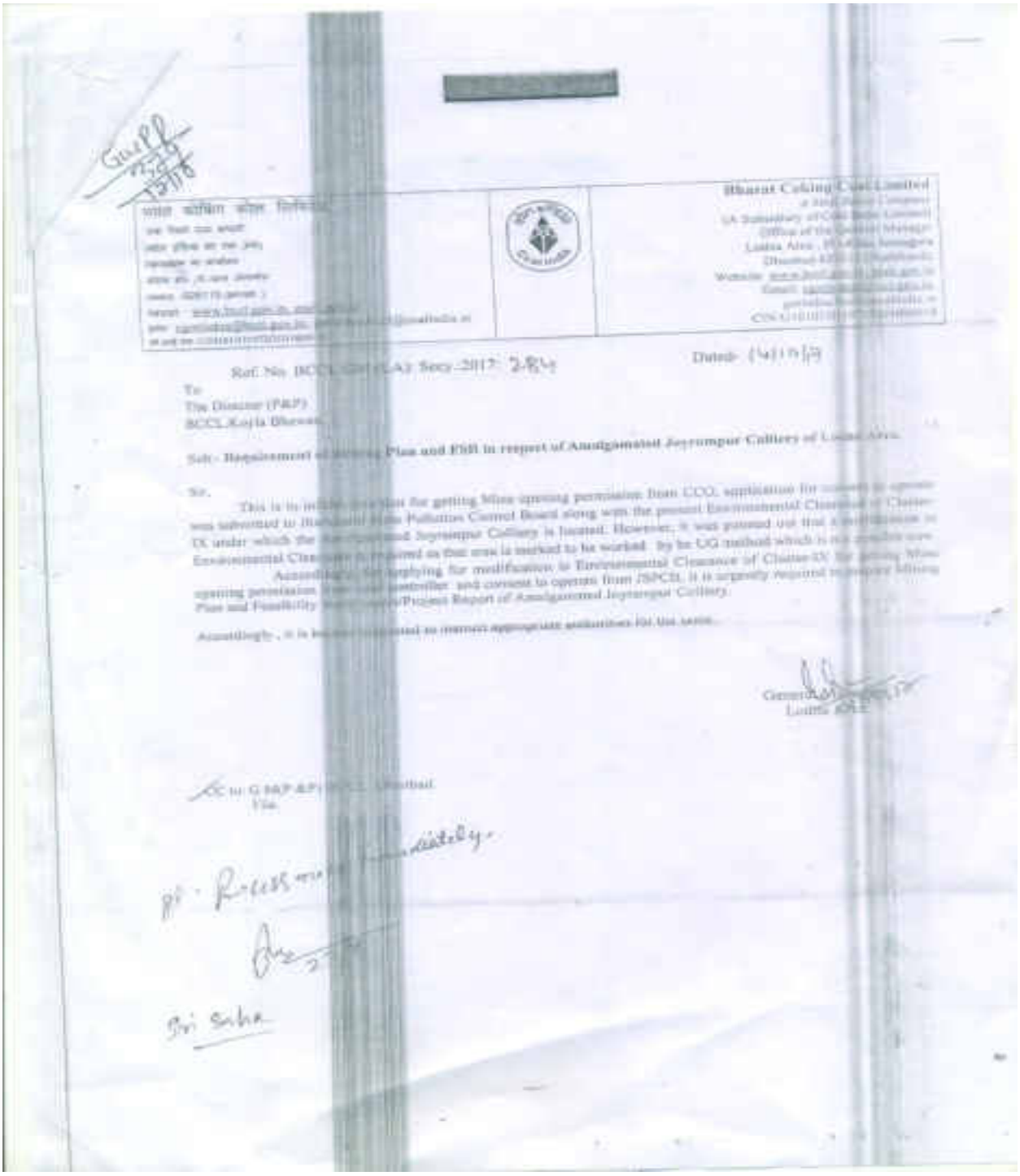
D(T)P&P 25/10/17

May be approved as Mining Plan and Feasibility Report to CMPDI 24/10

D(T)(P&P) 25/10/17

RD RJ II

ANNEXURE- IB



Bharat Coking Coal Limited

Ref. No: BCCL/Gen(LA)/ Secy.-2017/ 284 Dated- 14/10/17

To
The Director (P&P)
BCCL,Koyla Bhawan,

Sub:- Requirement of Mining Plan and FSR in respect of Amalgamated Joyrampur Colliery of Lodna Area.

Sir,

This is to inform you that for getting Mine opening permission from CCO, application for consent to operate was submitted to Jharkhand State Pollution Control Board along with the present Environmental Clearance of Cluster-IX under which the Amalgamated Joyrampur Colliery is located. However, it was pointed out that in the present Environmental Clearance it is allowed as that area is marked to be worked by by UG method which is not possible now.

Accordingly, for applying for modification in Environmental Clearance of Cluster-IX for getting Mine opening permission from Chief Controller and consent to operate from JSPCB, it is urgently required to prepare Mining Plan and Feasibility Report/Project Report of Amalgamated Joyrampur Colliery.

Accordingly , it is requested to instruct appropriate authorities for the same.

General Manager
Lodna Area

CC to G.M(P&P) BCCL, Dhanbad
Vide

Immediately.

Sri Sinha

CHAPTER – I
INTRODUCTION

1.0 Introduction

NT-ST-Jeenagora group of mines consist of three existing mines of Lodna Area of BCCL, namely, NTST OCP (256.15 Ha), Jeenagora OC (276.05 Ha) and North Tisra UG (246.24 Ha). These mines came into operation before nationalisation. In addition, the group also includes a very small part of Joyrampur UG. At present these mines are operating in NTST-Jeenagora Group of Mines.

The above Group of Mines are covered in Cluster IX for EMP. As per the approved Terms of Reference (TOR) in the proposed scenario (from April 2012 tentatively) for preparation of the Environment Management Plan of Cluster IX of BCCL, NT/ST (Exp) OCP is proposed to be worked by carving 755.15 Ha of land from the property of above four existing mines and additional 675.98 Ha land from outside coal bearing area for OB dumping and infrastructure. Hence the area of proposed NTST Expansion OCP is 1431.00 Ha which comprises 755.15 Ha land for mining and 675.85 Ha land from non-coal bearing area for OB dumping.

Within the proposed quarry area, there are three sanctioned opencast Mines viz. North Tisra OCP, South Tisra OCP and Sulunga- Jeenagora OCP (within Jeena Gora Colliery Boundary). All these projects are operating mines and are in the category of “Completed Projects of BCCL”. In addition to these OCP’s , there is one Underground production units in North Tisra Colliery boundary, namely 6 Incline .The underground production units along the three above mentioned opencast mine will be closed before merging into the proposed opencast project.

The present production from the different operational units is given in Table 1.1.

Table 1.1 Present Production Units – NT-ST-Jeenagora Group of mines

Sl. No.	Working Unit	Method of work with seam	Production ('12-'13) (MTY)	Remarks
1	NT/ST OCP	OCP (IV to I seam)	0.872	Shovel Dumper Combination by Deep Hole Blasting Method
2	Jeenagora OCP	OCP (IV Top to III seam)	1.057	Shovel Dumper Combination by Deep Hole Blasting Method
3	North Tisra UG	UG (IV BOTTOM)	0.095*	Bord & Pillar method with SDLs.

***** Likely to be closed soon due to OCP operation

This mine closure plan has been prepared on the basis of Project Report on NTST Expansion OCP & approved TOR/Form–I(Proposed Scenario) and data furnished by the officials of Lodna Area/ BCCL.

1.1 Name of mine owner / company

Project: North Tisra/ South Tisra (Expn.) OCP
Area: Lodna Area
Company: BCCL
Mine Owner: Director (Technical) (Operation), BCCL (Nominated)

1.2 Address for Communication with PIN and Phone nos.

PO : Khas Jeenagora
District : Dhanbad
State : Jharkhand
PIN : 828 115
Mob(Agent) : +91-9470596903

1.3 Location of mine:

Latitude :	$23^0$41'50'' to $23^0$43'48'' North
Longitude :	$86^0$26'14'' to $86^0$27'33'' East
Area :	Lodna Area
Coalfield :	Jharia Coalfield

1.4 Capacity of the mine

Mine started:	Proposed
Date of start of production:	Proposed
The capacity of the mines	6.0 MTY (PEAK – 7.8MTY)

1.5 Method of Mining including equipments deployment of in the area

There are three active units working in the lease hold area of NT/ST (Expn.) OCP as depicted in the Table 1.1. The NT/ST OCP is being worked in IVT, IVB, III, IIT, II B & I by opencast method using shovel & dumper combination, departmentally. Total O.B. of the running quarry is being dumped in decoaled area of the existing quarry on the floor of I seam. Deep hole blasting is being adopted for the quarrying. Blasted coal and overburden is further loaded by shovels on to the dumpers deployed for it. In Jeengora OCP, mechanised open cast mine is being worked in geologically IV Top, IV Bottom, & III seams. On an average IV Top seam & IV Bottom seams are 4.8m & 6.1m thick respectively while III seam is about 12m thick. IV Bottom has been developed in one section and SOP.

At North Tisra UG IV Bottom seam is being worked which has been extensively developed on B&P method of mining through 6 incline. The gradient of seams is suitable for the deployment of SDLs, wherever thickness permits. The average gradient of seam is around 1 in 5. It is, therefore will follow the B&P method of mining with SDL loading onto tubs. Apart from these three units, there is some part of Joyrampur UG mine considered in the proposed NTST Expansion OCP where VIII and IV Top seams are being worked at present. The seam IV (T) is being developed by Bord & Pillar with

SDL while the VIII seam is being depillared with stowing which will be replaced by V/VI Seam.

Seam IX/X, VIIIA, VIII, V/VI/VII, VII, V/VI, IVT, IVB, III, IIT, IIB & I have been considered for exploitation within the leasehold of the proposed NT/ST (Exp) OCP. The base of the quarry will be floor of I seam.

1.6 Coal Processing/ Beneficiation Operation

At present coal production from North Tisra UG is mostly linked by rail to steel sector and power plant through JGB No. 9 siding which is 2-3 km from the mine. Coal from pit head stock to siding is transported by road contractually. A part of its production is linked to various private cokeries through road. Coal from NT/ST OC is being dispatched through JGB No. 9 and 6 sidings for different thermal power stations. Road linkage for public sale is being carried through E-Auction. The production from Jeenagora OC is being sent to power house by rail. Some coal is being transported through road sale.

In proposed NT/ST (Expn.) OCP, the non-coking coal from the project will be linked to thermal power station. NLW coal will also be linked to TPS till it is unacceptable to SAIL/Washery. Coking coal (S-II to W-IV) will be linked to SAIL/Washeries. Jhama will be linked to cement companies, refractories etc.
No beneficiation is envisaged for the current output of the group of mines.

1.7 Total Lease/Project Area involved:-

Existing	:	755.15Ha
Proposed	:	1431.00Ha(including existing)
Total	**:**	**1431.00Ha**

1.8 Type of Lease /Project Area (Ha):-

Table 1.2 Type of Lease Area

Sl. No.	Particulars	Mining Area(Ha)	Outside mining area (Ha)	Total * (Ha)
1	BCCL land	568	65	633
2	Forest land	Nil	17	17
3	Govt. land	22	65	87
4	Tenancy land	60	616	676
5	Others (Rly. Land)	18.0	Nil	18.0
	Total	668.0	763.0	1431.0

*Includes 675.98 Ha of land outside of Cluster IX, proposed to be used for external dumping.

1.9 Communication and Physiography

The proposed NT/ST (Exp) OCP is well connected by rail and road. It is about 15Km south of Dhanbad town. The Jharia – Baliapur District Board road passes parallel to northern boundary and Patherdih-Pradhankhanta Rly. Line passes adjacent to southern boundary of the project.

The area has an undulating topography with a gentle slope towards west. The mining activity which is going on in the area since long time has severely obliterated the general topography. The maximum ground elevation of 202m has been observed in the north-eastern part while the minimum elevation is 163m in south-western part at BH No. ST-2. The drainage of the area is controlled by southerly flowing Tisra jore on the west side of the property.

1.10 Type of Present and Proposed Land Use of mining area (Ha)

Table 1.3 Land Use of Mining Area(Based on Mine data)

Sl. No.	TYPE OF LAND USE		Present mining land use (in Ha)	Post mining land use (in Ha)
1	Running quarry	Backfilled	47.11	0.00
		Not back filled	63.77	0.00
2	Abandoned quarry	Back filled	115.40	0.00
		Not back filled	35.85	0.00
3	External OB dump		45.93	0.00
4	Service Building/ Mine Infrastructure		36.61	25.00
5	Coal dump		5.42	5.00
6	Road & Rail		27.04	18.00
7	CHP/Siding			45.00
8	Homestead land		680.21	0.00
9	Agriculture land		6.00	0.00
10	Forest land		17.00	17.00
11	Plantation		20.80	886.93
12	Water body		9.62	164.46
13	Barren Land		320.24	269.61
	TOTAL		**1431.00**	**1431.00**

1.11 Statutory Approvals

Table 1.4 Statutory Approval Status

Sl. No	Particulars	Status
A	Mine plan / F.R / P.R	Formulated
B	Forestry clearance	Under process
C	Env clearance	Under process
D	Consent to operate	Existing Mines
E	Any other approval from Central / State regulatory authorities for operating mine with special reference to mine closure.	Mine closure plan to be approved by BCCL Board of Directors.

1.12 Reasons for Closure

The proposed NTST Expansion OCP has been planned after merging the properties of existing NTST –Jeenagora group of mines for a nominal capacity of 6.0MTY having an extractable reserves of 145.08MT. With this rate of production, the life of the project will be 30 years. This includes 2 years of pre-construction period, 2 years of construction periods and 26 years of production periods. There may be a scope of expansion of the mine further dip-side after reaching the proposed boundary as per the PR. In such situation, it is proposed that a new Mine Closure Plan should be prepared in the changed scenario.

A Report titled "***Draft scheme for dealing with fire by excavation method below Dhanbad-Patherdih Railway Line at Lodna Area (XI/XII Seam Base)***" was prepared and the Report is likely to be implemented in future to deal with the seams on fire. If the proposal is implemented, it is proposed that a Revised Mine Closure Plan should be prepared, taking into account the new emerging scenario.

Any mines in this group may be closed in future on account of exhaustion of economically recoverable coal reserves in the lease hold area before the start of the expansion project. It may also be closed on account of other unforeseen reasons i.e. Force Majeure or directives from statutory organizations or court etc. for which information and notices shall be served to concerned Government authorities and departments. Under such conditions, a revised Mine Closure Plan should be prepared. As per guidelines of Ministry of Coal, Govt. of India, mine closure plan has to be submitted along with the mine plan for getting competent approval within one or two years of date of approval of mine plan.

1.12.1 Need of Mine Closure Planning

Mining is a hazardous operation as it offsets the equilibrium of natural depositional environment viz. it alters or tries to alter the in-situ field stress, ground water, surface drainage system as well as the socio-economic

condition. Although mining activities are usually short term phenomena, they are liable to leave long lasting impacts on landscape, ecology and on the mind set of local inhabitants. Thus, it is imperative that any mining venture should have adequate closure plan addressing issues like reclamation, environmental protection and rehabilitation of disturbed area which should be acceptable to local community as well as the regulatory authority. Community acceptable implementation of mine closure plan bound to incur some extra cost. Neglecting this aspect will lead to future problems of attending compensation or may creep up expensive socio-economic problems.

Mine closure encompasses the restoration process designed to restore physical, chemical and biological quality disturbed by the mining activities. Mine closure is not just something that happens at the end of a mine's life, rather mine closure is an ongoing series of decisions and activities beginning in the pre-mining stage of mine and ending with a creation of self sustainable site that can be returned to the community.

Thus, a mine closure plan needs to define the liabilities, responsibilities and authorities of the different agencies like the mine management, other regulatory bodies, Central and State Governments after mine closure.

Various objectives of the advance mine closure planning are as given below.

a. To allow productive and sustainable after-use of the site, which is acceptable to the mine owner and the regulatory authority
b. To protect public health and safety
c. To eliminate environmental damage and thereby encourage environmental sustainability
d. To minimize adverse socio-economic impacts of mining activities
e. To protect the flora and fauna of the area affected by the mining
f. Effective use of the assets created during the course of mining

Primarily, the mine closure activities are planned in two stages. The initial plan identifies the activities required to be executed in line with the mining activities in progress, after the inception of the project, i.e., progressive mine closure activities. These activities may undergo subtle changes depending upon the actual site condition during implementation. Finally, a detailed closure plan is to be prepared 4-5 years before the actual closure time of the mine depending upon the existing parameters at that point of time, i.e., final mine closure activities.

1.12.2 Mine closure planning strategy in respect of NT-ST-Jeenagora Group of mines based on existing set of parameters

As the balance life of the mine is 30 years from now for the seams proposed to be worked , following activities are envisaged towards mine closure programme in respect of NT-ST-Jeenagora Group of mines.

a. Progressive mine closure activities will continue as envisaged in the project report and as enumerated in the various approvals, permits, consents etc. The progressive Closure activities are funded by levying a charge of ₹ 5.50/Te of coal for opencast mines.

   The recent guidelines issued in this regard by MoC, GoI will also be followed.

b. Although, it is very difficult to foresee the likely impacts due to closure of the mining activities in the leasehold area of the project, but in the present report, the same has been estimated and some mitigating measures have been suggested accordingly. These suggested measures along with certain other measures, as deemed fit, at the time of closure of mining activity in the seams being worked at present shall be taken up.

c. The final closure plan carrying the finer details would be prepared at the time of preparing the mine plan for last mineable patch of coal seam in the leasehold area of the group.

1.13 Approval of Company Board of Directors or any other competent authority

The closure plan will be placed to Board of Directors of BCCL for approval.

CHAPTER – II

MINE DESCRIPTION

2.1 Geology of the group

Geology of the block has been established by surface and sub surface data. The leasehold area of the NT-ST-Jeenagora Group of mines is entirely covered by Barakar formation. The coal bearing rocks of Barakar formation of Permian age occur in the NT-ST-Jeenagora Group of mines is located on the eastern edge of Jharia Coalfield, where rocks of Talchir, Barakar & Barren Measures are exposed in patches. However NT-ST-Jeenagora Group of mines is generally covered by soil which is underlain by the coal bearing rocks of the Barakar Measures.

A total of 44 boreholes have been drilled in time phases in the entire project. In addition, data of adjoining 10 boreholes have also been considered for the evaluation of geological features. The borehole density in the area is approximate 8/Sq. Km.

2.1.1 Geological Structure of the area

Dip & Strike

The general strike of the formation is North-South. In the small strip, strike of the formation swings to NNE-SSW, in the southern/south-western corner of the assessment area. The amount of dip varies from 8^0 to 11^0 westerly. The dip is however, steep towards southern part, adjacent to Fault F6-F6, because of the proximity of the area to the major fault.

Faults

A total of 7 faults having throw ranging from 2m to 20m have been deciphered in the area.

Pyrolitisation

The area is free from pyrolitisation, however seam II (Bottom) and I seam have been affected due to pyrolitisation in small part of the area, and the seam is partially/fully burnt in small part of the area.

2.1.2 General Description of coal seams

In NT-ST-Jeenagora Group of Mines, detailed drilling has proved existence of number of workable coal seams of over 0.50m thickness from XI/X to I seam.

2.1.3 Seam sequence

The generalised sequence of coal seams and the intervening partings in proposed NT/ST (Exp) OCP are given in Table 2.1.

Table 2.1 Generalised Seam Sequence and Parting

Seam/Parting	Thickness (m)	
	Minimum	Maximum
IX/X	8.17	12.06
P	14	38
VIIIA	1.00	5.47
P	4	30
VIII	1.45	3.93
P	2	3
V/VI/VII	15.10	17.74
P (VIII to VII)	3	22
VII	5.02	9.57
P	2	20
V/VI	4.32	8.44
P	20	33
IV TOP	1.52	6.95
P	13	19
L-5	0.76	2.60
P (L-5 to IVB)	2	6
P(IVT-IVB)	12	29
IVB	1.98	7.02
P	18	33
III	8.60	19.81
P	1	16
II TOP	0.90	5.75
P	1	13
II BOT	1.22	7.46
P (III to II Comb)	3	6
II (Comb)	5.80	7.6
P (IIB to I)	2	18
P (II Comb to I)	4	13
I	1.82	8.28

2.1.4 Reserves, Types and Quality

Balance mineable reserves have been given in the Table 2.2.

Table-2.2 Seam wise Grade & Reserve(as per PR)

Seam	Grade	Bal. Min. Res. (MT)
IX/X	W-IV	1.08
VIIIA	W-IV	2.27
VIII	W-III	2.69
V/VI/VII	W-IV	3.16
VII	W-IV	4.99
V/VI	W-IV	9.19
IVT	F	9.42
L-5	D	1.21
IVB	F	11.52
III	E	52.42
II Comb	E	5.32
IIT	D	7.42
IIB	E	12.37
I/I & IIB	W-IV	22.02
		145.08

Note: The reserve data estimated is based on the actual situation prevailing in the area. This reserve includes jhama also.

2.2 Mining Details

2.2.1 Boundary Details of NT-ST-Jeenagora Group of mines

North: - Colliery boundary between N. Tisra & Goluckdih/Kujama Collieries.

South:- Incrop of I seam in Bhulan Bararee thrust zone

East:- Intcrop of I seam and Metamorphics.

West:- 200m margin from incrop of XI/XII seam

2.2.2 Present Working Seams

North Tisra/South Tisra Opencast Mine: This opencast mine is operating within the sanctioned area and exploiting IV to I seams. Present production level is 0.872MTY.

Jeenagora Opencast (Patch): Production from III, IVB & IVT seams are being done in the name of Jeenagora (Patch) OC. OB Dumping in being done internally over the coal bearing area. Present production level is 1.057MTY.

Thus, total production from l these two opencast mines is 1.929MTY.

North Tisra UG: Total production from the underground unit from within the proposed quarry area is 0.095MTY. The winning of coal is being carried out from IVB seam.

2.3 Mining Methods

The proposed NTST Expansion OCP opencast is an expansion of the existing opencast mines. In the existing opencast mines, though infrastructure has been created but they are suitable for small level of production. The proposed opencast is a large mine with higher level of mechanisation. Therefore, all necessary infrastrcture need to be created for the larger project.

In the first two years of implementation of the proposed project (1st & 2nd) land will be acquired and shifting / rehabilitation of houses will be done to make the site available for working. During 3rd & 4th year of the project necessary infrastructure will be created like Workshop / Store, Power Supply arrangement, Feeder Breaker, Railway Siding etc. During these four years of construction (1st to 4th) of the expansion project, existing opencast mines will continue to produce coal & excavate OB. In fact the operation of the existing mines will be tailored to prepare the mine for larger level of mechanisation for the proposed 6.0 mty Opencast.

OB excavation and coal production from the proposed opencast will start by 5th year of operation and target will be achieved by 6th year. By this year all major construction activities will be completed for sustaining the production level for the entire project life.

2.3.1 The status of working and fire in different seams:

The status of exploitation of various coal seams and the area under fire considered in this report is based on the mine working plan supplied by the colliery authorities. The status of working and the fire limit of different seams are given below:

IX/X Seam: This seam has been extensively worked by UG method. The seam has been goaved in major part of the area and is under fire. This seam has also been quarried out in outcrop region.

VIIIA Seam: This seam has been quarried out in patches along the incrop region and extensively worked by underground method in major part of the area. The seam has been goaved also in major part, particularly in northern side of the area. The seam is under fire in northern part.

VIII Seam: The seam has been extensively worked by UG method. It has been quarried out along the incrop region. The seam has been goaved also in major part. The seam is under fire in northern half of the area.

V/VI/VII Seam: This combined seam is restricted to northern part of the area. The seam have been developed in two sections and quarried also towards incrop side. The seam is goaved at places. Seam is on fire in the northern part of the area.

VII Seam: This seam is quarried out in major part of incrop region. The seam has been worked through inclines in major part. It is developed in one section in major part and two sections working in small area in Jeenagora colliery only. The seam has been goaved also in patches. The part area of the seam is on fire also.

V/VI Seam: This seam is also extensively developed in the entire area and quarried out in incrop region. The seam has been goaved also in central part of the area. The seam has been developed in one section by underground method. The seam is under fire also in part area.

IV Top Seam: The seam is quarried in incrop region only and the seam is virgin in major part of the area. It has developed also through underground working in Jeenagora Colliery only.

IV Bot. Seam: The seam has been worked by underground method and it is quarried also. In small part, the seam is goaved and depillared.

III Seam: The seam has been quarried out in incrop region and it is extensively developed also. Two section of workings have been done in major part of the area.

II Top Seam: This seam has been mainly worked by opencast method. Underground development is restricted to South Tisra colliery only.

II Bot Seam: This seam is developed by UG method in major part of the area and quarried also in incrop region. The seam is virgin in dip side.

I Seam: This seam is developed only by underground method. In the northern side, the seam is goaved in incrop side. The seam is quarried also in small part.

2.3.1 OB dumps and their status

Table 2.3 OB Dump Status

	External OB Dump	Internal OB Dump
Nos.	Nil	4 (D1, D2, D3,D4)
Area (Ha)	Nil	(D1=31.9, D2=65.4, D3=7.15,D4=11) Total=115.45
Volume (capacity)	Nil	35 million Cum
Height (m)	----	D1=50, D2=70, D3=40,D4=50
Status	----	Active- D1, D2, D4 Dormant-D3

2.3.2 Depth of Workings & Mine Entries

At present all working seams occur at depth of 102 m in the quarry. All the underground mine entries except for the Incline of NT UG in the leasehold area are sealed or dozed off.

The details of existing outlets of North Tisra UG are as follows :

Name of the Outlet	Sunk in	X-sec. (mXm)	Purpose	winder/ Fan
1/6 Incline	IV Bot.	3.5X2	Intake, production	Haulage – 115 KW
3/6 Incline	IV Bot.	3.0X2	Intake, travelling	
Fan drift Adjacent to 3/6 Inc.	IV Bot.	4.25X2	Return	Fan- PV-160

2.3.3 Major Equipments

Table 2.4A List of major opencast equipment at NT ST OC

SL. No.	Existing Equipment	Annual Productivity/ Eqpt (MM^3)	No. Of Equip ment	Total annual Capacity (MM^3)
A	EXCAVATION CAPACITY			
1	5.0 m^3 Elect Rope Shovel with RD – 35 T	0.86	07	6.02
2	2.7 m^3 Elect. Hyd Shovel with RD – 35 T	0.65	02	1.3
3	1.3 m^3 Diesel Backhoe with RD – 35 T	0.40	01	0.40
4	1.2 m^3 Diesel Backhoe with RD – 35 T	0.30	01	0.30
5	Dragline 6/45	1.00		1.00
B	TRANSPORTATION CAPACITY (Avg. Lead - 1.00KM)			
1	Rear Dumper 35 Te with 5 m^3 Electric Rope Shovel		28	
2	Rear Dumper 35 Te with 2.7 m^3 Electric Hyd Shovel		06	
3	Rear Dumper 35 Te with 1.3 m^3 Diesel Backhoe		03	
4	Rear Dumper 35 Te with 1.2 m^3 Diesel Backhoe		03	
C	MINE CAPACITY (MM^3/Year)			

Table 2.4B List of major opencast equipment at Jeenagora OC

Sl No	Existing equipment	Bucket capacity (m^3)	No of equipment	Annual capacity Mm^3.
1	EKG - 399	5	1	0.86
2	EKG - 266	4.6	1	0.79
3	EKG - 519	5	1	0.86
4	H-55 (HYD)	3.3	1	0.68
5	TATA Hitachi (HYD)	2.8	1	0.54
	TOTAL	**--**	**5**	**3.73**
DUMPER				
1	35 Te Rear Dumper	--	21	(0.18 x 21)= 3.78
2	Water tanker	--	1	--
	TOTAL		**22**	**3.78**
DRILL				
1	IDM – 30 (160 mm)	--	1	N/A
2	IDM – 70 (250 mm)	--	1	N/A
3	R (Colla) (150 mm)	--	1	N/A
4	ICM – 260 (100 mm)	--	1	N/A
	TOTAL	--	4	N/A
DOZER				
1	155 D	320 HP	3	--
Crain	9 (T)	--	1	--
Motor Grader	Middle Blade	135 HP	1	--

Table 2.4C List of major UG equipment at North Tisra UG

Sl No	Existing equipment	No of equipment
I	**SURFACE**	
1	Haulage 150 HP	1No
2	Ventilation Fan PV -160	1No
II	UNDERGROUND	
1	SDL	3 nos.
2	Endless Haulage 50 H P	1 no.
3	Direct Haulage 75 H P	2 nos.
4	Main Pump 150 H P	2 nos.
5	Pump 70 H P	2 nos.
6	Air Compressor 60 H P	3 nos.
7	T S U (315 KVA)	4 nos.
8	Main Pump 1000 GPM	1 no.

Table 2.4D List of major opencast equipment proposed at NT-ST-Jeenagora Group of Mines(NTST EXPN. OCP)

Sl.No.	Particulars	Peak Population
A.	**HEMM for OB**	
1	10 m^3 Electric Rope Shovel	8
2	5 m^3 Electric Rope Shovel	2
3	250 mm (Elec.) Drill	8
4	160 mm (Elec.) Drill	2
5	410 HP Dozer	8
6	320 HP Dozer	2
7	85 t RD	96
8	35 t RD	26
B	**HEMM for Coal**	
1	3.8-4.2 m^3 Elec. Hyd. Shovel	4
2	2.8 m^3 Elec. Hyd. Backhoe	1
3	160 mm (Elec.) Drill	5
4	320 HP Dozer	6
5	35 t RD	47
C	**Common for HEMM**	
1	280 HP Motor Grader	2
2	50 t Rough Terrain Crane	1
3	10 t Vibratory Roller for Haul Road	2
4	Jack Hammer Drill	10
5	3.96 m^3 / min Compressor	4
D	**HEMM for Misc. Activities &for Ecology & Environment**	
1	1.5 m^3 Diesel Hyd. Backhoe	2
2	8.5 m^3 / 10 t Tipper	8
3	28 KL Water Sprinkler	3
4	Mobile Env. Lab. Van	1
5	410 HP Dozer (for Reclamation)*	4

Infrastructure Facilities:

Existing

A) Magazine – Location, capacity and Licence no.

NT-ST OC has surrendered its license. At present required explosive is procured from the Magazine located in the leasehold area of the Barari Colliery. The specification of the Magazine is given below:

Location – west side of 6 Pit.

Capacity:

E- 25 (6) 962/ BI-1143	E-25 (6) 964/ BI-1145
Explosive class – 3. 1950 Kg.	Explosive Class – 3. 1950 Kg.
Class 6, Div- 1, 10,000 mts.	Class-6, Div I , 5000 mtrs.
Class 6, Div 3 5000 Nos.	Class 6, Div 2 5000 mtrs.
Class 6, Div 44000 Nos.	Class 6 Div 3 44, 000 Nos.
As any one time shall not exceed	At any one time shall not be exceed.
Not more than 10 times shall be in a month.	Not more than 5 times shall be in a month
Area - 6300 m^2	

B) Workshop

Existing:

NT-ST OC

Two workshops (one for NT OCP and other for STOCP) with independent store have been functioning with all required facilities including required manpowers.

Jeenagora OC

The repair and maintenance of excavation equipment are being done at the Jeenagora OCP Excavation Workshop. This workshop has the following facilities:

1. Washing of dumpers.
2. Welding.
3. Charging of batteries.
4. Auto repair shed.

5. Dumper shed.
6. Diesel fuelling shed.

North Tisra UG

There is a Pit Head Workshop. Help is taken for major works from Area Central Workshop. The colliery store is available. We are collecting materials from Lodna Regional Store and preserving the materials at Collieary Store from where the Mine is served.

Proposed:

A workshop has been proposed to render services to routine maintenance, minor as well as capital repair of the equipment envisaged for N.Tisra / S.Tisra (Expansion) OCP. Both Excavation Workshop and E & M Workshop will be for maintenance of departmental equipment. Storage facilities will be provided for storing spares and consumables required for the Project. Mobile crane and fork lift truck have been provided for material handling and transportation

C) Fuelling station:

Existing:

There is a Diesel fuelling shed is available at Jeenagora OC.

Proposed

For fuelling the vehicles, fuelling stations fully equipped with required facilities has been provided. Racking System for stores has been provided for proper placement of consumables.

D) Pumping and Drainage

Existing: The seams encountered in this project are IX/X, VIIIA, VIII, VII, V/VI/VII, V/VI, IV T, IV B, III, II T, II B & I. Most of the seams are developed to varying extent. Presently the quarry operates up to II seam for which 3 nos. of submersible pumps are deployed for dewatering the needs of the quarry. Boreholes for these pumps extend up to 112 M depth in I seam. These three boreholes are located on the dip most side of the present quarry boundary.

North Tisra UG

Underground water from faces and developed area is collected in underground main sump. Coal particles and other solid tiny particles are settled in the main Sump. The fresh water is discharged by main pumps to surface in tank through boreholes.

Details of the pumps are given as follows:

Seam	Pump No.	Details of Pumps			Location Dip/ Level	Delivery through pit/inc./ BH	Discharge at settling tank/Nala/ River
		GPM	Head	KW			
IV Bot.	1	1000	200 m	110	-2 Dip, 35L	BH	Tank
	2	600	150 m	110	M/D, 36L	BH	Tank
	3	600	150 m	110	1Dip, 36L	BH	Tank

- Pumping Hours/day : 16 hrs
- Make of Water in Monsoon : 2000 GPM
- Make of Water in Lean Period : 1400 GPM
- Installed Capacity of main Pumps : 2200 GPM
- Quantity of Water Discharged on Surface :

Jeenagora OC

Present pumping arrangement

Presently 3 Bore holes submersible pumps are in operation with capacity of 500 GPM.

Total 500 x 3 = 1500 GPM.

Period	Installed capacity in GPM	Total Discharge (KLD)	Quantity wise use (KLD)				
			Domestic	Industrial	Other	Sulungajore	Total
Lean	500	1600	70	200	15	1315	1600
Monsoon	1500	4800	70	100	15	4615	4800

NTST OC

- Installed capacity of main pumps discharging water to surface – 1600 GPM.
- Quantity of water being discharged to surface – 1000 GPM.
- Point of discharged of water – Surface
- Use of discharged water.

  Industrial use – 252 KLD.
  Domestic – 200 KLD.

Proposed: Considering the project area, ultimate depth and life of the mine, the pumping capacity has been proposed to cover the entire mining activities under single stage of pumping operation. With the basic considerations as above, make of water has been estimated as 446512 Cum. (98.26 million gallon.) and the pumping requirement for the mine works out as to 21.55 Cum (It includes 30% reserve pumping capacity) up to the end of the project.

Water settling tank / pond (cemented floor) of 0.6 million gallon capacity has been envisaged for this project. This tank will be suitably located between the outside edge of quarry and Tisra river. The pumped out quarry water will be discharged into the proposed settling tank. Dust / contamination will be settled in the pond. Overflow water will be discharged into theTisra Jore.

In a separate fire dealing report titled “Scheme for Dealing with Fire at Lodna Area below DP Rly. Line (XI/XII Seam Base)” a surface water reservoir will be provided near Bararee Colliery site. This water reservoir will act as a reservoir for this project too.

The proposed reservoir receives water from pumping discharge of various collieries of Lodna Area (viz. Joyrampur, Bararee, Bagdigi, Lodna & Jealgora). The water from respective collieries will be guided into the reservoir from where water will be pumped to fire dealing site / faces of the proposed opencast.

E) Proposed Surface Coal Handling

Feeder Breaker

Six (6) nos. of feeder breakers having each of 300 to 350 tph capacity have been proposed for sizing of ROM coal down to (-) 100 mm to handle proposed production. The proposed feeder breaker will be installed near the Railway siding which will be located at SW corner of the proposed opencast mine.

Belt Conveyor

The crushed coal will be carried out by an elevating belt conveyor for a distance of about 100 m.

Loading & Transport arrangements

Loading of coal at surface stock yard into tippers as well as at Railway siding into wagon will also be arranged by BCCL with leased out equipment. This is as per present practices prevailing in BCCL mines. The tippers for transportation of coal from surface coal dump to the site of feeder breaker and to transport sized coal from hopper of the feeder breaker to spread all along the length of the proposed Railway siding will be arranged and organised by BCCL management with leased out equipment.

Railway Siding

There will be two nos. of conventional Railway siding of full length for accommodating two nos. of full rake capacity (each of 58 box wagons) proposed for this OCP. The loop take up arrangement for this siding will be such that there will be single entry at one end and single exist point at other end drawn from Patherdih Rakhitpur main line.

F) Power Supply Arrangement

Existing:

At present North Tisra , South Tisra and Jeenagora colliery receive power at 11 kV from Goluckdih 33 kV sub-station of BCCL. For power supply to these three collieries , three Nos. of 11 kV feeders viz. North Tisra , South Tisra and Jeenagora feeders emanate from one 7.5 MVA 33 / 11 kV transformer installed at Goluckdih sub-station .

The existing electrical load on these three feeders is as follows

a) North Tisra Feeder

Feeding Sub-stn.	Installed Transformers	Power consumers
Chhat Talab	2500 kVA 11/3.3 kV	North Tisra u/g (6 Incl.)
No.6 sub-stn.	2 MVA 11/3.3 kV 500 kVA 11/.55 kV 500 kVA 11/.44 kV	North Tisra OCP
Borehole sub-stn.	500 kVA 11/.55 kV	Submersible pumps
LUJ sub-stn.	500 kVA 11/.55 kV	LUJ pit colliery
No.6 Feeder Breaker	2 x 500 kVA 11/.55 kV	No.6 Feeder Breakers

b) South Tisra Feeder

Feeding Sub-stn.	Installed Transformers	Power consumers
G.J sub-stn.	3150 kVA 11/6.6 kV 630 kVA 6.6/.44 kV	South Tisra OCP - Dragline - Drill
South Tisra sub-stn.	2 MVA 11/3.3 kV 500 kVA 11/.55 kV 250 kVA .55/.44 kV	South Tisra OCP

c) Jeenagora Feeder

Feeding Sub-stn.	Installed Transformers	Power consumers
B.J. sub-stn.	250 kVA 11/.44 kV 300 kVA 11/.55 kV	Light Submersible pump
No.9 Feeder Breaker	1000 kVA 11/.55 kV	No.9 Feeder Breakers
K.T. sub-stn.	1000 kVA 11/3.3 kV 500 kVA 11/.55 kV 250 kVA 11/.44 kV	Jeenagora OCP Submersible pumps Light
E.B. sub-stn.	1000 kVA 11/.55 kV 300 kVA .55/.44 kV	Submersible pumps Light

Existing NTST OCP receives power at 3.3 kV by two Nos. of overhead lines which run along the periphery of the quarry to feed quarry bed power consuming units. From the Golden Jeenagora sub-station two Nos. of 6.6 kV overhead lines run to the quarry bed to feed power to one Dragline and one Drill at 6.6 kV.

Jeenagora OCP receives power at 3.3 kV by two Nos. of overhead lines coming from K.T. sub-station and running along the periphery of the quarry.

No. 6 Incline and LUJ pit colliery receive power at 11 kV from North Tisra Feede

In the proposed scheme Existing North Tisra, South Tisra and Jeenagora Opencast mines will continue to work for about four years. Thereafter, they will be merged and expanded to one single project viz. North Tisra / South Tisra (Expansion) OCP. Existing underground mines viz. N.Tisra 6 Incline will also be closed in due course. LUJ Pit of N.Tisra is already closed. Till then the existing power supply system of these mines will continue.

The following existing substations being used for No.6 Incline , LUJ pit colliery, and North Tisra , South Tisra and Jeenagora Opencast mines are proposed to continue till the new expanded Opencast project comes :

Sub-station	Being used for
No.6 sub-station	North Tisra OCP & No.6 Incline
LUJ pit sub-station	LUJ pit underground colliery
South Tisra sub-station	South Tisra OCP
Golden Jeenagora sub-station	South Tisra OCP
K.T. sub-station	Jeenagora OCP

After merger of the two OCPs, these sub-stations will be removed along with their overhead line feeders.

At present one No. 7.5 MVA 33 / 11 kV transformer installed at Goluckdih 33 kV sub-station feeds power to different collieries of North Tisra , South Tisra and Jeenagora area . In the proposed scheme , to meet the increased power demand of the Noirth Tisra / South Tisra (Expansion) OCP (Approximately 3 MVA over existing load) , the installed transformer capacity of Goluckdih 33 kV sub-station is required to be strengthened. One more 7.5MVA 33 / 11 kV transformer is proposed to be installed at Goluckdih 33 kV sub-station for this purpose . Thus , two Nos. of 7.5 MVA 33 / 11 kV transformers installed at Goluckdih 33 / 11 kV sub-station shall be used to meet the power demand of the new North Tisra / South Tisra (Expansion) OCP. From each of these two transformers three Nos. of 11 kV feeders will emerge for North Tisra / South Tisra (Expansion) OCP. Other existing power consuming units connected to the existing 7.5 MVA transformer shall continue to receive power from this transformer in addition.

Proposed:

Following sub-stations are proposed to be installed for North Tisra / South Tisra (Expansion) OCP for its various power consuming units :

Quarry sub-station – I : For HEMMs and pumps in the quarry
Quarry sub-station – II : For HEMMs and pumps in the quarry
Feeder Breaker sub-station – I : For 3 Nos. of Feeder Breakers
Feeder Breaker sub-station – II : For 3 Nos. of Feeder Breakers
Workshop sub-station : For HEMM and E&M workshop
Office building sub-station : For office building and other infrastructures

Two Nos. of 11 kV sub-stations viz. Quarry Sub-station-I and Quarry Sub-station-II will be installed near two nos. of entries of the quarry. These two sub-stations shall receive power at 11 kV by two nos. of separate Overhead Line feeders from Goluckdih sub-station. All the quarry power consuming units shall be fed power from these two substations.

Two more 11 kV Feeders will emanate from Goluckdih sub-station and shall run along the quarry periphery to the proposed location of Feeder breakers and workshop. They will feed power to the Feeder Breaker Sub-station-I, Feeder Breaker Sub-station-II and Workshop at 11 kV.

ii) Quarry Power Supply :

Installed transformer capacity of Quarry Sub-station-I and Quarry Sub-station-II will be as follows :

2 MVA 11 / 6.6 kV Transformer - 2 Nos.
2 MVA 11 / 3.3 kV Transformer - 1 No.
250 kVA 11 / 0.415 kV Transformer - 1 No.

a) Power Supply to HEMMs :

From the proposed Quarry sub-station I and II, 6.6 kV and 3.3 kV overhead lines will run along the periphery of the quarry for power supply to HEMMs and other quarry power consuming units in the quarry bed.

G) Telecommunication

EPABX system with 200 lines is proposed to be installed for the project with telephone sets in the office building, other infrastructural building and at all other strategic points. RAX sets of BCCL network shall also be provided at all strategic points.

H) Existing Infrastructural facilities available (Road, water supply etc.) :

NT-ST OC

Non metal Road is available from the mine area to nearest DB Road (Lodna and Jharia) leading to Dhanbad - Sindri. The water supply to residential areas is only through borehole pumps. Mine water is used for industrial purposes like sprinkling in the road as well as for washing of HEMM.

Jeenagora OC

Pucca Road has been provided from mine area to the nearest Bhaga – Jeenagora D.B. Road, which connects office & work shop to area office and dispensary.

North Tisra UG

D.B.Road - Jharia-Lodna DB road passes through the middle of the property**.**

Company's Road. – Network of kuchcha/pucca colliery roads exist in the leasehold of the Mine.

Water supply – Drinking water is supplied from MADA (200 KLD) through pipe network. For other miscellaneous domestic work mine water is supplied (350 KLD).

I) Existing effluent treatment plant & sewage treatment plant (Mine & Colony) with quantity per month:

There is no such plant available in the Mine. However, domestic effluent is disposed off in soak pit and solid waste is dumped off in abandoned quarry.

J) Location of Hospital, School, habitation and their distance from the mine:

NT-ST OC

Location	Distance from OCP
Hospital Near Colliery OCP workshop	1.0 KM
School Near project office	1.0 KM
Habitation within lease hold area	1.2 to 3.0KM

Jeenagora OC

1. One Dispensary with duly qualified Doctor, Paramedical staff and other staff has been functioning inside the mine for the treatment of employees.
2. Well equipped Regional Hospital is available for the whole Lodna Area.
3. Primary Schools situated within half kilometres and High School with in 5 KM. Sulunga Basti is situated within 1 KM.

North Tisra UG

Sl. No.	Name of Feature	Location	Distance (Km.)
1.	Middle School	Madhuban, Lodna Section	2
2.	Colliery Hospital	MOCP Colony	1
3.	Regional Hospital,	Lodna	7
4.	Central Hospital	Dhanbad	16
5	Residential Buildings along DB Road, Tilabani Basti, Madhuban Lodna Area, Depo Dhowra.	Within leasehold area of the Mine.	

2.5. Details of coal beneficiation plant and its use after closure of mine

There are no coal beneficiation arrangements in the leasehold area.

CHAPTER – III

CLOSURE PLAN AND RELATED ACTIVITIES

3.1 Closure Planning details of mine

The progressive mine closure activities will continue as envisaged in the project report and as enumerated in the various approvals, permits, consents etc. It is very difficult to predict the various parameters which would be prevalent at the time of final mine closure and also to foresee the likely impacts due to closure of the mining activities (when the entire reserve in the block would get exhausted). However, broad mine closure activities need to be identified under the various heads.

The mines falling in the NTST-Jeenagora Group are covered in Cluster IX for the purpose of EMP.

3.1.1 Mined out land & proposed final land use

After completion of mining activities, the quarried area shall be reclaimed by developing ponds, water bodies and plantation, which will not only improve the aesthetic value of the area but also be used for some productive purpose like pisciculture and water supply to the local communities. Formation of water bodies which develops aquatic life and with the plantation around it will lead to restoration of ecology of the area.

At present opencast mine is being worked in IVT, IVB, III, IIT, IIB and I seams, which along with other seams(upto X Seam) have balance extractable reserve of about 145.08 MT.

The proposed conceptual post-mining land use plan vis-à-vis present land use is provided in Para 1.10.

a. Total Mined out area (Ha) – Present + Proposed----568.38 Ha
b. Backfilled area (Ha)---------- 403.93 Ha.

c. Balance left mined out area (Ha) which will not be backfilled--164.59 Ha.
d. The balanced left mined out area will be developed into ponds which will be used for Pisciculture & water supply to the local villagers.

As regards, the underground void, if any, which will remain at the time of closure of the mine, the same will get gradually filled with water. The necessary precautions for the safety of the neighboring mine would be taken care of before deciding the voids to get water filled. Further, the water filled in UG voids will help in maintaining the water level in the nearby area. The Pit/Shaft will be covered with RCC structure with suitable opening for future inspection by competent person.

3.2 Water quality management

3.2.1 Drainage pattern of the area (pre and post closure)

3.2.1.1 Existing drainage pattern

The area has an undulating topography with a gentle slope towards west. The maximum elevation of 202m has been observed in the North-eastern part while the minimum elevation is 163m in the south-western part. The drainage of the area is control by the southerly flowing Tisra Jore on the west.

3.2.1.2 Post closure drainage pattern

Major area of the mine will be quarried out. Kuccha garland drain will be made around the periphery of the quarry. This garland drain will be connected to Tisra Jore which is not likely to be disturbed by mining operation. Thus, this garland drain will drain off the rain water away from the mine. Various measures to prevent water pollution will be taken.

3.2.2 Water Quality Status of Surface and Ground Water

3.2.2.1 Present Practice

The samples were analyzed for relevant physical, chemical and bacteriological parameters for drawing up the base line data.

All the basic precautions and care were taken during the sampling to avoid contamination. Analysis of the samples was carried out as per established standard method and a procedure prescribed by the relevant IS codes and standard methods (AAPHA).

Standards followed

Standard for mine water - GSR-742(E):2000
Standard for surface water - IS 2296:1982
Standard for drinking water - IS 10500:1991

3.2.2.2 Present status of water quality

The monitoring of water quality under Baseline Environment Data Generation for Cluster IX has been conducted by CIMFR, Dhanbad by collecting water samples from ground water, surface water and mine water discharge / workshop discharge (if any) for the proposed project. The various purposes of the water environment monitoring are as follows:

- To assess the water quality characteristics for critical parameters;
- To evaluate the impacts on agricultural productivity, habitat conditions, creational resources and aesthetics in the vicinity ; and
- To facilitate predication of impact on water quality by project activities

The results as per CIMFR, Dhanbad Report are given subsequently.

To assess the quality of lotic system (surface water), water samples were collected from the following locations (Refer to CIMFR, Dhanbad Report):

Table 3.1: Sampling Locations for Water Quality Monitoring in Cluster –-IX

S.N.	Sample	Sample Code	Description	Sampling Site	Remark
1.	Surface Water	SW-1	Kashi Jore	Bararee	Core Zone
2.		SW-2	Kari Jore	Burragarh	Buffer Zone
3.		SW-3	Pond water	Hurriladih	Buffer Zone
4.	Drinking Water	GW-1	Groundwater	Lodna	Core Zone
5.		GW-2	Groundwater	Joyrampur	Core Zone
6.		GW-3	Groundwater	Sudamdih	Buffer Zone
7.	Effluent water	EW-1	Mine water	Jeenagora	Core Zone
8.		EW-2	Mine water	Hurriladih	Buffer Zone

The physico-chemical characteristics of surface water samples collected from three different locations in Cluster IX have been presented in Table 3.2.

Table 3.2: Physico-chemical characteristics of surface water in Cluster-IX Mining Area

S.N.	Parameter and Unit	SW-1	SW-2	SW-3	IS:2296
1.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	--
2.	Colour (True) (Hazen unit)	5.43	4.13	7.43	300
3.	pH (max) (min : 6.5)	7.9	7.5	7.4	8.5
4.	Conductivity (25^{o}C) µS/cm	1275	1262	623	--
5.	DO (mg/L) (minimum)	4.7	5.2	6.3	4
6.	BOD (3d, 27oC) (mg/L)	8.65	9.69	8.45	3
7.	Total Coliforms (MPN/100 mL)	312	232	423	5000
8.	Total Dissolved Solids (mg/L)	992	926	446	1500
9.	Oil and Grease (mg/L)	0.064	0.050	0.032	0.1
10.	Mineral oil (mg/L)	-	-	-	--
11.	Total Hardness (mg/L as $CaCO_3$)	562	368	156	--
12.	Chlorides (mg/L as Cl)	58.7	113.8	47.7	600
13.	Sulfates (mg/L as SO_4)	304.5	152.1	55.6	400

S.N.	Parameter and Unit	SW-1	SW-2	SW-3	IS:2296
14.	Nitrates (mg/L as NO_3)	29.3	19.2	2.52	50
15.	Free CO_2 (mg/L)	1.23	1.18	1.34	--
16.	Free NH_3 (mg/L as N)	0.14	0.45	1.12	--
17.	Fluorides (mg/L as F)	1.05	1.14	1.32	1.5
18.	Calcium (mg/L)	87.8	68.54	23.05	--
19.	Magnesium (mg/L)	83.3	47.85	23.82	--
20.	Copper (mg/L)	0.040	0.035	0.022	1.5
21.	Iron (mg/L)	0.167	0.134	0.054	50
22.	Manganese (mg/L)	0.045	0.054	0.026	--
23.	Zinc (mg/L)	0.076	0.078	0.067	15
24.	Boron (mg/L as B)	0.098	0.115	0.075	--
25.	Barium (mg/L)	0.086	0.096	0.074	--
26.	Silver (mg/L)	BDL	BDL	BDL	--
27.	Arsenic Total (mg/L)	0.016	0.012	BDL	0.2
28.	Mercury (mg/L)	BDL	BDL	BDL	--
29.	Lead (mg/L)	0.017	0.021	0.023	0.1
30.	Cadmium (mg/L)	BDL	BDL	0.006	0.01
31.	Chromium (VI) (mg/L)	0.036	0.043	0.033	0.05
32.	Selenium (mg/L)	BDL	BDL	BDL	0.05
33.	Cyanide (mg/L)	0.020	0.015	0.012	0.05
34.	Phenols (mg/L)	BDL	BDL	BDL	0.005
35.	Anionic detergents (mg/L as MBAS)	ND	ND	ND	1
36.	PAH (mg/L)	ND	ND	ND	--
37.	Pesticides (ug/L)	Absent	Absent	Absent	--
38.	Percent Sodium (%)	22.4%	43.7%	51.2%	--
39.	Sodium Absorption Ratio (SAR)	1.08	2.34	2.25	--

ND=Not Detected, BDL: Below detection limit

The analytical results of physico-chemical analysis of surface water samples collected from Kashi and Kari jores (stream) near Bararee and Burragar and ponds water near Hurriladih has been given in **Table 3.2**. To assess the quality of the surface water resource the results has been compared with the prescribed surface water standards IS-2296 for Class 'C' water (tolerance limit for stream water used drinking water sources with conventional treatment followed by disinfection). It can be seen that pH of the water is slightly alkaline in nature and found well within the prescribed limit of 8.5. In general the total dissolved solids and other analysed

parameters are found well within the threshold values. Concentration of sulphate varies between 55.6 and 304.5 mg L^{-1} and is below the prescribed value of 400 mg L^{-1} (IS-2296). The concentrations of the analysed heavy metals in the surface water resource are also found within the prescribed limits. It shows that the surface water of the area is fit for its designated use as a drinking water source with conventional treatment followed by disinfection.

The physico-chemical characteristics of ground water samples collected from three different locations in Cluster IX have been presented in Table 3.3.

Table 3.3: Physico-chemical characteristics of groundwater in Cluster-IX Mining Area

S.N.	*Parameters*	Station Code			IS: 10500
		W-1 (Lodna)	W-2 (JoyRampur)	W-3 (Sudamdih)	
1.	Colour, Hazen units	Colorless	Colorless	Colorless	Un-objectionable
2.	Odour	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable
3.	Taste	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity NTU Max	0.76	1.23	2.13	10
5.	Dissolved Solids mg/l, Max	1186	828	399	500
6.	pH Value	7.6	8.1	7.48	6. 5 to 8. 5
7.	Total hardness (as $CaCO_3$) mg/l, Max	749	553	213	300
8.	Calcium (as Ca) mg/l, Max	112.9	95.5	66.2	75
9.	Magnesium (as Mg) mg/l, Max	113.6	76.4	11.5	75
10.	Copper (as Cu) mg/l, Max	0.030	0.031	0.015	0.05
11.	Iron (as Fe) mg/l, Max	0.112	0.106	0.065	0.3
12.	Manganese (as Mn) mg/l, Max	0.054	0.038	0.164	0.1
13.	Chlorides (as Cl) mg/l, Max	63.1	17.7	84.5	250
14.	Sulphate (as SO_4) mg/l, Max	414	365	16.2	150
15.	Nitrate (as NO_3)	16.7	5.3	23.61	45
16.	Fluoride (as F) mg/l)	1.32	0.96	0.30	0.6 to 1. 2
17.	Phenolic Compounds (as C_6H_5OH) mg/l, Max	BDL	BDL	BDL	0.001
18.	Mercury (as Hg) mg/l, Max	BDL	BDL	BDL	0.001
19.	Cadmium (as Cd) mg/l, Max	0.010	0.013	0.009	0.01
20.	Selenium(as Se mg/l, Max	BDL	BDL	BDL	0.01
21.	Arsenic (as As) mg/l, Max	0.012	0.019	0.008	0.05

S.N.	*Parameters*	Station Code			IS: 10500
		W-1 (Lodna)	W-2 (JoyRampur)	W-3 (Sudamdih)	
22.	Cyanide (as Cn) mg/l, Max	BDL	BDL	BDL	0.05
23.	Lead (As Pb) mg/l, Max	0.039	0.028	0.015	0.1
24.	Zinc (as Zn) mg/l, Max	0.065	0.059	0.063	5
25.	Arionic detergents (as MBAS), mg/l, Max	0.064	0.055	0.037	0.2
26.	Chromium (as Cr^{6++}) mg/l, Max	0.040	0.038	0.044	0.05
27.	Polynuclear aromatic hydrocarbon (PAH) mg/l, Max	ND	ND	ND	
28.	Mineral Oil mg/l, Max	BDL	BDL	BDL	0.01
29.	Residual, free chlorine, mg/l, Min	0.14	0.12	0.016	0.2
30.	Pesticides	Absent	Absent	Absent	Absent
31.	Radioactive materials a) Alpha emitters uc/ml, Max b) Beta emitters uc/ml, Max	ND	ND	ND	10^{-8} 10^{-7}

ND=Not Detected, BDL: Below detection limit

To assess the status of drinking water quality of IX area, three ground water samples were collected from hand pump at Lodna, Joyrampur and Sudamdih in May 2011 and analysed for parameters as per the drinking water standards (BSI 1993). The hydro-chemical parameters of the groundwater of the study area were compared with the prescribed limit of Indian Standard for drinking water (BIS 1991) to asses the suitability for drinking and public health purposes (**Table 3.3**). The analytical results show that most of the analysed parameters are well within desirable limits and water is potable for drinking uses. pH of the analysed groundwater are found well within the safe limit of 6.5 - 8.5, prescribed for drinking water by BIS (1991). The turbidity is one of the important physical parameters for water quality defining the presence of suspended solids in water which causes the muddy or turbid appearance of water body. The consumption of high turbid water may cause a health risk as excessive turbidity can protect pathogenic microorganisms from effects of disinfectants and also stimulate the growth of bacteria during storage. In the study area the turbidity in the groundwater are found below the recommended value of 5 NTU. The total dissolved solid (TDS) and Total Hardness (TH) exceed the desirable limit of 500 mg L^{-1} and 300 mg L^{-1} in the groundwater samples of Lodna and Joyrampur but below the desirable limit in the groundwater samples of Sudamdih. However, TDS is well within

the maximum permissible limit of 1000 mg L^{-1} in Joyrampur groundwater. Concentration of Ca, Mg, SO_4 and F are also slightly exceeding the desirable limit in the groundwater of Lodna area though it is below the maximum permissible limit of IS-10500. The other analysed parameters like Cl, NO_3, Na etc. were found below the desirable level.

Heavy metal analysis in the groundwater samples indicated that all the analyzed heavy metals like As, Cd, Cr, Pb, Zn, Mn and Fe are found either below the detection limit or less than the desirable limit for drinking water.

The physico-chemical characteristics of effluent water samples collected from three different locations in Cluster IX have been presented in Table 3.4.

Table 3.4: Physico-chemical characteristics of effluent (mine water) in Cluster-IX Mining Area

S.N.	Parameter	EW-1 (Jeenagora)	EW-2 (Hurriladih)	Inland Surface water IS:2490
1.	Colour and odour	Colorless	Colorless	Of Annexure-1
2.	Suspended solids mg/l, max.	39.8	54.8	100
3.	pH value	7.7	8.3	5.5 to 9.0
4.	Temperature (^{0}C)	26.4	25.8	Shall not exceed 5ºC above the receiving water temperature
5.	Total Dissolved Solids mg/l	502	711	2100
6.	Oil and grease, mg/l max.	2.87	2.65	10
7.	Total residual chlorine, mg/l max.	0.28	0.19	1.0
8.	Ammonical nitrogen (as N), mg/l max.	6.76	5.87	50
9.	Total nitrogen (as N), mg/l max.	8.56	9.24	100
10.	Free ammonia (as NH_3), mg/l max.	4.23	5.34	5.0
11.	Biochemical oxygen demand, BOD (3 days at 27ºC), mg/l max.	5.67	5.54	30
12.	Chemical oxygen demand, mg/l max.	67.8	75.3	250
13.	Arsenic (as As), mg/l max.	0.012	0.027	0.2
14.	Mercury (as Hg), mg/l max.	0.008	0.012	0.01
15.	Lead (as Pb), mg/l max.	0.034	0.043	0.1
16.	Cadmium (as Cd), mg/l max.	0.012	0.015	2.0
17.	Hexavalent chromium (as Cr^{+6}), mg/l max.	0.037	0.030	0.1
18.	Total Chromium (as Cr), mg/l max.	0.065	0.068	2.0
19.	Copper (as Cu), mg/l max.	0.032	0.029	3.0
20.	Zinc (as Zn), mg/l max.	0.098	0.088	5.0
21.	Selenium (as Se), mg/l max.	0.009	0.012	0.05

S.N.	Parameter	EW-1 (Jeenagora)	EW-2 (Hurriladih)	Inland Surface water IS:2490
22.	Nickel (as Ni), mg/l max.	0.025	0.031	3.0
23.	Cyanide (as CN), mg/l max.	0.009	0.012	0.2
24.	Fluoride (as F), mg/l max.	1.67	0.97	2.0
25.	Dissolved phosphates (as P), mg/l max.	0.67	0.54	5.0
26.	Sulphide (as S), mg/l max.	0.95	0.76	2.0
27.	Phenolic compounds (as C_6H_5OH), mg/l max.	0.072	0.054	1.0
28.	Radioactive materials a. α emitters micro cure, mg/l max. b. β emitters micro cure, mg/l max.	ND	ND	 10^{-7} 10^{-6}
29.	Manganese (as Mn)	0.097	0.070	2 mg/l
30.	Iron (as Fe)	0.314	0.348	3 mg/l
31.	Vanadium (as V)	0.116	0.122	0.2 mg/l
32.	Nitrate Nitrogen	93.05	39.78	10 mg/l

ND=Not Detected, BDL: Below detection limit

Mine water samples discharged from Jeenagora and Hurladih underground mine were collected to assess the effluent water quality. The analytical results were compared with the inland surface water quality standard as per the IS-2490 and presented in **Table 3.4**. The mine water of the area is found to be alkaline in nature and measured pH was well within the prescribed limit of 5.5 to 9.0 as per IS:2490. Total Dissolved Solid Concentration in the discharged mine water were also found much below the recommended limit of 2100 mg L^{-1} for inland surface water as per IS:2490. The suspended sediment are found 39.8 and 54.8 mg L^{-1} respectively in the mine water of Jeenagora and Hurriladih which is less than the permissible limit of 100 mg L^{-1}. Concentration of heavy metals in the mine water of the area are also to be found within the permissible limit as per IS:2490.

3.2.2.3 Practice after the closure

The above practice of monitoring of quality of water would be continued for a period of 3 years after cessation of mining activities in the area. If required, corrective action/steps would be taken to mitigate any adverse effect on local water regime. The responsibility of maintaining the quality of drinking water will be entrusted on the State Authorities after 3 years of mine closure.

3.2.3 Measures for Control of Pollution (Details for Pollution Control Arrangement)

3.2.3.1 Impact due to Water Pollution and its Management

The mine discharge water may contain high-suspended solids and other pollutants. The treatment scheme thus needs to focus on the removal of suspended solids from the water. Mine water must be treated to meet the prescribed standards before being discharged into water bodies. When the water is used for agricultural or domestic work, it shall undergo further treatment, as established by Scientific Studies conducted in this regard. The important factors to be considered in selecting the appropriate method for treatment are as follows:

(a) Settling tank will be provided to collect the mine discharged water for settling the suspended solids.

(b) The flow and the quality of mine water vary seasonally. Therefore settling tank should be so constructed that it will be able to absorb these fluctuations.

(c) The mine water must be neutral in nature before discharge and therefore necessary neutraliser may be provided to maintain the pH of the settling pond water.

(d) In order to reduce the dependence on fresh water sources for meeting the demands of water in the mining related operations, the entire mining water will be utilised. The effluent free mine water will be utilised in water spraying for dust suppression, hydraulic stowing, equipment washing and other industrial requirements.

(e) Mine water discharge and drainage in the core zone has been planned to be regulated in a manner so that impact on surface and other water bodies of the area is not affected. No major diversion of surface drainage channel is required. Expected increase of solids particles due to surface handling of coal shall be controlled by:

i. Construction of garland drains around the OB dump & coal stock area

ii. Construction of settling tanks of adequate size for removal of particulate matters

iii. De-silting of settling ponds and drains at regular intervals

iv. Effluents from washing areas, garage and workshop will be collected in garlands and routed through a settling ponds and oil and grease trap. The solid wastes generated shall be treated as per the provisions of Hazardous Waste Management Act. The water shall be recirculated for washing.

3.2.4 Water Balance of the area

Hydrogeology and Aquifer characteristics of the area

Groundwater occurrence and storage in study area are mainly controlled by the geological setup of the area. The ability of geological formation to store and transmit water is dependent on its formation parameters, such as porosity and hydraulic conductivity. Based on these two parameters, the rock formation of the area may be classified as hard and soft rocks. Hard rocks (mainly crystalline and consolidated sedimentary rocks) are characterized by very little porosity. Ground water in such rocks circulated to a limited extent through the secondary openings represented by joints, cracks, fissures and such other planes of discontinuity. Soft rocks represented by sandstone, pebbles and loose sand, posses higher degree of primary porosity and as such characterized by higher water storage capacity. As greater part of the study area is underlain by Precambrian crystalline rocks, the weathered residual of the hard rocks as well as the fractures, joints, fissures, faults and other zones of discontinuity are the principle repositories of ground water in the area. The weathered zone is usually of limited thickness, fractures and joints generally close up with depth. The thickness of weathered mantle in the hard rock zone of area is about 10-20 meter in the topographic lows. Ground water in the weathered and fracture zones of hard rocks occur under unconfined condition. Ground water circulating through fracture zone is sometimes held under pressure. Depth of the water table in the hard rock of the area generally ranges from 3.0m to 15.0m below ground level.

The Gondwana sediments form the semi-consolidated formations and are better water potential zone. The splintery shales of Talchir and basal pebbles bed, the variegated Barren Measure shales and the sandstones are the major litho units of the Gondwana Formations. Gondwana sandstones in general, are known to constitute good aquifers at many places. Ground water occurs under unconfined condition in the weathered mantles varying depths from 4.23 – 12.34m as observed in the dugwells and semi-confined condition in the deeper aquifers. Depth of water level for pre-monsoon period varies from 5–12m below ground level and it stretches to a deeper depth of 7-12m in some places. The pre-monsoon water level rises due to recharge and becomes 2 - 8 m below ground level around the area during post-monsoon period.

Rainfall is the principal recharge source to groundwater. The area experiences an average annual rainfall of about 1200-1400 mm. Besides rainfall, the mine water discharge from the local mining areas and existing water bodies including water logged in abundant mine quarries are also contributed to the ground water recharge as return flow. In the study area, ground water is withdrawn usually by means of open dug wells and small diameter hand operated tube wells for domestic and irrigation purposes. The tube wells are most often deeper (25m – 58m) than the dug wells and tap the aquifer below the weathered mantle. As the area is being located in the hot-tropical belt, the temperature regime is very high; the daily maximum reaches to over 45^0C in summer. Due to excessive heat, the loss of moisture through evaporation is considerably high (60-65%). During the wet monsoon seasons, the net evaporation is less than the precipitation, resulting in surplus water which loss through either surface runoff or being part of the subsurface storage. The surface run-off and sub-surface storage of water depends upon various factors including the amount of rainfall, topography of the area, land use pattern, soil type, slope, physiographic, drainage pattern and hydro-geomorphology of the catchment/ sub-catchment. The study area is having gentle slope towards south and south east. Water received on the slopes, gets collected in low-lying area and is thus ultimately absorbed in the top soil cover and become part of the ground water flow according to the slope to form seasonal streams/nallas.

In the mining area, the water levels are bound to be affected and disturbed. The mining area of JCF area is highly disturbed and the permeability of individual geological units is spatially variable and depends on lithology, fracturing and attenuation with depth. The porous and more open-jointed sandstone members tend to form aquifers, the shaly members are aquitards, which may be leaky but are poorly permeable & form poor permeable barriers to the vertical groundwater movement.

Water quality monitoring will be done for three years after closure. The sampling stations shall be one number mine water with quarterly frequency and two numbers ground water samples in core and buffer zone with quarterly frequency.

3.2.5 Acid Mine Drainage Source

Not Applicable

3.2.6 Water Management

3.2.6.1 Existing mine water discharge details

a. Mine water is pumped out in a settling tank. Clean water coming out from the settling tank is used for dust suppression, stowing and other Industrial uses.
b. Excess pumped out mine water is allowed to flow into the surface water bodies.
c. Drains are provided around the coal stock to collect run-off for diverting into settling pond before discharge into the natural water courses.

Present pumping arrangement in opencast mine:

- Make of water:
  Monsoon: 8M Gallons/day
  Lean period: 1 M Gallons/ day.
- Installed capacity of main pumps discharging water to surface.: 1600 GPM
- Pumping hours/day : 18 hrs.

Pumps Installed for Dewatering and Domestic supply:

Type of Pumps	Total Nos.	Capacity (GPM)
Submersible Pump	1	1000
Pontoon Pump	2	300

3.2.7. Post closure Mine water discharge

Once the reserve is exhausted, the entries into the mine would be securely sealed for safety purposes. However, if for the safety of the future mine or any neighboring mine, pumping is required from the worked seams, then the arrangements for pumping will be kept intact and the water shall be discharged into the surface water bodies after passing the same through settling tank on the surface. The accumulated water in underground workings may be utilized to meet water shortage in nearby areas.

3.3 Air quality management

3.3.1 Present practice

a. At present air borne dust is suppressed by:

- Sprinkling water on the various roads of the mine where the vehicles ply.
- Water sprinkling at the various points where coal is handled.
- Proper loading of trucks to avoid any spillage of coal.
- Proper maintenance of I.C. engines.

The monitoring of air quality under Baseline Environment Data Generation for Cluster IX has been conducted CIMFR, Dhanbad and test results of air samples are furnished in Table 3.6A and 3.6B.

Table 3.5: Details of Sampling Locations

Stn. Code	Location	Source of Air Pollution
CORE ZONE		
CA_1	North Tisra	Mining and transportation of coal, domestic works and poor condition of road, heavy vehicular movement.
CA_2	Jeenagora	Domestic, background pollutants due to agricultural, domestic works and mining and transportation activities in buffer zone.
CA_3	Barari	Mining and transportation of coal, domestic works and poor condition of road, vehicular movement
CA_4	Lodna	Household Coal burning and poor condition of road and heavy vehicular movement, etc.

Stn. Code	Location	Source of Air Pollution
BUFFER ZONE		
BA_1	Golakdih	Mining and transportation of coal, coal burning and poor condition of road, heavy vehicular movement.
BA_2	Simlabahal	Mining and transportation of coal, domestic works and poor condition of road, heavy vehicular movement
BA_3	Patherdih	Mining and transportation of coal, domestic works and poor condition of road.
BA_4	Bhaga Mining Institute	Mining and transportation of coal, domestic works and poor condition of road, vehicular movement.

Table 3.6A: Ambient Air Quality in Cluster-IX Mine Area

Core Zone – North Tisra (CA_1)

(Pre-monsoon Season: April 2011 to June 2011)

Period			Parameters (µg/m^3)			
Month	Weeks	Date	$PM_{2.5}$	PM_{10}	SO_2	NO_x
2011-April	*1st Week*	6/4/2011	57.9	111.4	30.3	55.7
		8/4/2011	58.4	106.2	31.9	55.4
	2nd Week	11/4/2011	51.8	89.3	30.9	52.9
		13/04/2011	61.2	111.3	23.9	50.6
	3rd Week	21/04/2011	47.2	81.4	33.8	47.9
		23/04/2011	52.4	90.3	29.8	58.7
	4th Week	28/04/2011	49.2	84.9	31.4	49
		30/04/2011	53.0	91.4	25.2	44.8
2011-May	*1st Week*	4/5/2011	61.7	110.2	32.3	49.7
		6/5/2011	57.0	103.7	27	50.7
	2nd Week	12/5/2011	61.3	105.7	31.9	56.7
		14/05/2011	61.4	113.7	23.9	58.3
	3rd Week	18/05/2011	58.6	104.7	29.2	57.1
		20/05/2011	56.4	100.7	21	47.2
	4th Week	25/05/2011	56.5	97.4	27.1	50.2
		27/05/2011	60.8	112.6	26.6	54.4
2011-June	*1st Week*	5/06/2011	61.4	105.8	28.8	53.6
		7/06/2011	60.9	110.8	28.1	55.3
	2nd Week	11/06/2011	65.8	117.5	30.6	57.2
		13/06/2011	56.6	97.5	26.1	54.4
	3rd Week	19/06/2011	48.5	83.7	21.5	43.1
		22/06/2011	49.7	85.7	21.7	38.4
	4th Week	27/06/2011	50.2	86.5	27.4	38.8
		29/06/2011	52.0	89.6	19.3	42.6

Minimum	**47.2**	**81.4**	**19.3**	**38.4**
Maximum	**65.8**	**117.5**	**33.8**	**58.7**
Average	**56.3**	**99.7**	**27.4**	**50.8**
Std. Deviation	**5.5**	**11.7**	**4.3**	**6.3**
98th Percentile	**63.9**	**115.8**	**33.1**	**58.5**

Table 3.6B: Ambient Air Quality in Cluster-IX Mine Area

Core Zone – Jeenagora (CA_2)

(Pre-monsoon Season: April 2011 to June 2011)

Period			Parameters (µg/m³)			
Month	**Weeks**	**Date**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**NO_x**
2011-April	*1st Week*	6/4/2011	60.8	110.6	28.2	52.1
		8/4/2011	60.6	104.4	27.6	56.3
	2nd Week	11/4/2011	50.8	92.4	26.2	49.2
		13/04/2011	51.5	92	23.6	48.5
	3rd Week	21/04/2011	57.1	98.4	25.9	48.1
		23/04/2011	49.5	85.4	32.4	50.5
	4th Week	28/04/2011	51.3	88.4	36.3	45.3
		30/04/2011	48.9	84.3	28.9	48.3
2011-May	*1st Week*	4/5/2011	53.7	92.5	28.2	47.2
		6/5/2011	55.3	95.4	28.4	47
	2nd Week	11/5/2011	54.5	93.9	29.2	47.5
		13/05/2011	53.9	93	26.3	46.3
	3rd Week	18/05/2011	61.0	105.1	29.1	52.2
		20/05/2011	52.1	89.9	27.2	47.5
	4th Week	25/05/2011	57.6	99.3	32.4	45.3
		27/05/2011	69.1	130.3	35	50.4
2011-June	*1st Week*	6/6/2011	60.8	104.9	36.1	49.6
		8/06/2011	59.5	114.5	35.9	53.1
	2nd Week	11/6/2011	39.7	68.4	27.6	41.7
		13/06/2011	48.3	83.3	30.2	51.5
	3rd Week	20/06/2011	40.8	70.4	22.3	40.1
		22/06/2011	43.3	74.7	25.3	38.2
	4th Week	27/06/2011	50.1	86.3	24.2	32.9
		29/06/2011	48.3	83.3	25.7	37.7
Minimum			**39.7**	**68.4**	**22.3**	**32.9**
Maximum			**69.1**	**130.3**	**36.3**	**56.3**
Average			**53.4**	**93.8**	**28.9**	**46.8**
Std. Deviation			**7.7**	**15.8**	**4.2**	**6.1**
98th Percentile			**65.3**	**123.0**	**36.2**	**54.8**

Table 3.7: National Ambient Air Quality Standards
(As per MoEF Notification on* 16th November, 2009*)

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial, Residential, rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulpher Dioxide (SO_2), µg/m^3	Annual* 24 hours**	50 80	20 80	- Improved West and Gaeke - Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), µg/m^3	Annual* 24 hours**	40 80	30 80	-Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM_{10} µg/m^3	Annual* 24 hours**	60 100	60 100	-Gravimetric -TOEM - Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM_2 µg/m^3	Annual* 24 hours**	40 60	40 60	-Gravimetric -TOEM - Beta attenuation
5	Ozone (O_3) µg/m^3	8 hours* 1 hour**	100 180	100 180	-UV photometric - Chemiluminescence -Chemical Method
6	Lead (Pb) µg/m^3	Annual* 24 hours**	0.50 1.0	0.50 1.0	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide(CO) mg/m^3	8 hours* 1 hour**	02 04	02 04	-Non Dispersive Infra Red (NDIR)Spectroscopy)
8	Ammonia(NH_3) µg/m^3	Annual*	100	100	- Chemiluminescence

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		
			Industrial, Residential, rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
		24 hours**	400	400	- Indophenol blue method
9	Benzene(C_6H_6) µg/m^3	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(o) Pyrine (BaP)-Particulate phase only, ng/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11	Arsenic(As), ng/m^3	Annual*	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel(Ni), ng/m^3	Annual*	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

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

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note – Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limit specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation

3.3.2 Practice after the closure of the mine

a. As the sources of dust and fume generation would no longer be present, the present practice of arresting the air pollution, as enumerated above may be discontinued. However, water sprinkling would be done on the roads, which remain in use after the mine closure.

b. Quality of air would be monitored for a period of 3 years after cessation of mining activity. 3 samples at fortnight frequency for 3 years, one sample in core zone and one sample each in upwind and downwind direction will be collected and analyzed.

3.4 Dump Reclamation

External dump

The external OB dumps shall be formed in suitable lifts of appropriate height keeping an overall slope not exceeding 36^0 from the horizontal. In course of mining and after the completion of the final lift, the external OB dump shall be biologically reclaimed. The dumps shall be afforested by selecting proper plant species in consultation with State Forest Department.

As per new Guidelines for Preparation of Mine Closure Plan GOI (Ministry for Coal) Dated 7th January, 2013 all efforts should be made and reflected (in the Project Report/Mining Plan) to keep land requirement bare minimum for external OB dumping to minimise land degradation. This may necessitate increase of dump height to the maximum extent keeping in view the safety requirement with special emphasis on stability analysis. After back filling of quarry voids, the left out void may be allowed to be filled with water. This will help to recharge and stabilize the water table in the neighbourhood and the local populace will benefit from it.

Internal Dumps

The residual voids, if any, will serve as a lagoon and may be utilised as water reservoir for the locality. The entire area shall be suitably fenced. Most of the back filled area shall be afforested by selecting proper plant species in consultation with State Forest Department. A part of the back filled area would also be developed for agricultural purpose with the help of the concerned State Authority.

The underground unit is not likely to generate any solid waste during the mining operation.

3.5 Details of Surface Structures proposed for dismantling

3.5.1 Infrastructure details

As far as possible, industrial structures will be utilized by the adjacent mines. However, if these structures are not found fit at the end of mine life, the same will be dismantled and salvaged. The equipments will be removed and used somewhere else. Every effort will be made to restore the area to economic utilization value in line with mine closure plan.

A. SERVICE BUILDINGS: The service buildings/ structures, viz. workshop, stores, office building, cap-lamp room, Pit top office, winding rooms, etc. are to be demolished after collecting all re-useable items, or be used for some other projects and the land covered by them restored for productive use. However, it has to be ensured that as and when a service building is vacated/ abandoned, the same should be demolished to prevent any unauthorized occupation.

B.OTHER INFRASTRUCTURES: All other infrastructures like sub-stations, transformers, community services, pump-houses, water-treatment/ filtration plants, waterlines, power lines, roads etc. will be utilized for the neighbouring projects.

However, possibility shall be explored for handing over the buildings and other infrastructures including the reclaimed land to the State Government for the benefit of local villagers and strengthening the area infrastructures.

The end use of these facilities shall be decided by the State Government with the help of District Authorities and Village Panchayat. The peripheral village community facilities developed by the Mine Authorities will be left to the Local Body/ State Government for their management and public use.

Prior to surface demolition/ restoration, a surface audit will be undertaken on all surface structures, spoil heaps etc. to assess whether there is any hazardous material that could cause problem, i.e. explosive, asbestos, chemical, oil, etc.

A list of surface and UG assets (Plant & Machinery) will be prepared and made available to potential purchasers or transferred to other new/ working mines of the company. This will ensure that the assets perform during their economic life.

3.5.2 Post closure disposal/Re-use of the Buildings, Plants & Machineries

a. Disposal or reuse of existing HEMM, CHP, workshop and railway siding for OC

   Since the opencast is proposed to be operated through outsourced HEMM, disposal will not be required.

b. Disposal or reuse of haulage, ventilation, workshop and railway siding for UG.

   At the time of closure of the mine, it is expected that most of the equipments would complete its rated life and would be surveyed off as per the Company's guidelines. The surveyed off equipments would be auctioned as per prevalent norms.

   However, if some of the equipments would not have covered their rated life, they would be diverted to the neighbouring projects for gainful utilisation.

   There is no railway siding in the leasehold.

c. Disposal or reuse of transmission lines and sub-station

As per the electricity demand of the existing neighbouring projects, an analysis would be made as to whether the existing sub-station and transmission lines could be gainfully used or not. If the scope of gainful utilization is not found, they will be dismantled and the usable items/spares/conductors etc. would be dispatched to needy Areas/Projects.

d. Disposal or reuse of residential and non-residential buildings

At the time of final closure, a list of surface buildings would be prepared in detail. Thereafter following steps would be taken in chorological order in respect of the available buildings:

- An assessment would be made to find that whether the available buildings can be used by the existing neighboring projects or any new project that might have come up in the vicinity.
- In case, the listed assets cannot be utilized by the nearby project, efforts would be made to sale these assets after making the list available to potential purchasers and asking the interested purchasers to submit sealed bids.
- Thereafter, the state agencies/local agencies may be asked to take possession of the buildings, if they required few of them.
- When there would be no takers, the buildings would be demolished and usable items would be recovered for future use.

Table 3.8 Proposals for Infrastructure Facilities

Sl. No.	Particulars	Action Suggested
A	CHP	This will be dismantled and land will be covered with plantation
B	Workshop	-Do-
C	Railway Sidings	There is a proposal of Rly. Siding in the project.
D	Colony	These will be handed over to the State Government if fit for use or will be dismantled.
E	Details of non-residential buildings	-Do-

F	Other facilities (ETP /STP)	-Do-

3.6 Safety and Security Arrangement

3.6.1 Mine entry

After closure of the mining activities, all the entries to the mine will be effectively sealed off to avoid any accident and to prevent access to any unauthorized person. The area that is not reclaimed shall be properly fenced/ sealed to prevent any unauthorized entry into the area. Flags/Boards with warning signals shall be posted at vulnerable places to avoid chances of accidents. However, the guidelines / instructions from DGMS, if any, will be followed.

Sealing details and dimensions shall also be prepared for the purpose. The minimum thickness of mine sealing will be 100cm RCC (M20) with nominal reinforcement. For incline entry, the mine entry path of 5 m will be filled with debris and clay before sealing the mine.

Details of fencing around abandoned quarry, indicating the length of the fencing

As explained earlier the proposed OCP patches will not be backfilled and the void will act as water reservoir. It is proposed to develop a water lagoon in the area. The water lagoon may be handed over to State Authorities for conversion into a picnic spot.

The void of the quarry would be properly fenced to avoid any inadvertent entry of animals or human beings. Sufficient Boards and danger signs shall be placed all around.

Later on, the responsibility of keeping the fencing secured would be entrusted on the State Authorities.

The entry into the mine is the haul road. This haul road will remain for entry into the picnic spot. Both side of this haul road will be afforested.

3.6.2 Slope stability arrangement for high wall and back filled dumps

During operation of the mine, overall slope will be maintained at an angle not exceeding 22^0- 28^0. Vegetation cover will also be provided along the slopes to arrest any failure.

As regards stability of back-filled dumps, the final level of reclaimed backfill will be matched with the levels of surrounding areas leaving a final residual void which will serve as a lagoon which may be utilised as water reservoir for the locality.

During operation, the external and internal OB dump will be developed with 40 m berm width and maximum height of 60m in case of external OB dump and the overall dump slope shall not exceed **22^0- 28^0**. The waste dumps will be provided with toe wall and garland drains. The dump will be technically reclaimed and vegetation will be grown after spreading the top soil. The above measures will prevent slope failure and improve the aesthetic value.

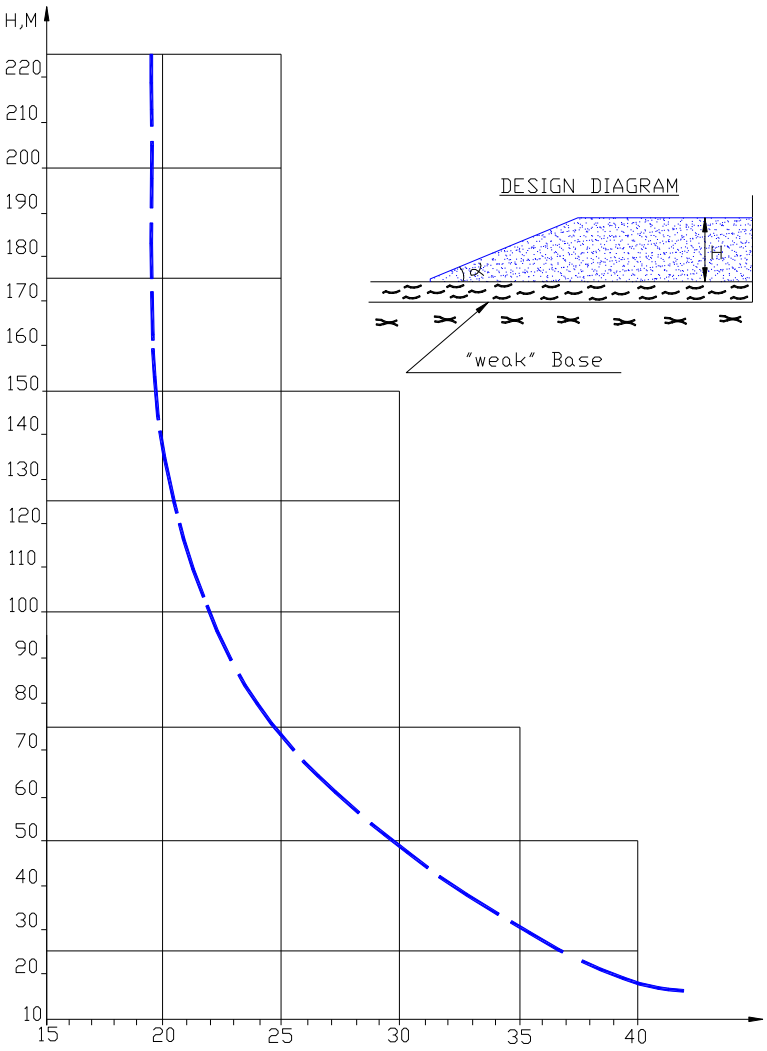


Fig. 5.5.4. Graph illustrating dependence of stable slope angle (α) on height (H) of ex-site dumps formed on "weak" Base

3.6.3 Providing one time lighting arrangement

Sufficient lighting as per standard is provided at all the required places, i.e., pit office, haulage room, fan house, cap lamp room, mine entry, workshop, sub-station haul road in quarry etc.

After closure of the mine, the lighting arrangements will be kept maintained at all locations which are not required to be demolished or dismantled like sub-stations, transformers, community services, pump-houses, water-

treatment/ filtration plants, waterlines, power lines, roads etc. to be utilised for the neighbouring projects and local communities.

3.6.4 Survey records of workings

All the mine workings including subsidence areas, roads, ponds, tanks etc. shall be resurveyed and records shall be updated. Copy of such records shall also be submitted to the appropriate competent authorities, such as DGMS and State Authorities.

Maintenance of records pertaining to Progressive Mine Closure

The Mine management shall maintain following Progressive mine closure plans for every 5 year period:

A Progressive mine closure plan for surface activities

This plan shall be maintained at a scale of 1: 4000 showing the entire progressive mine closure activities (surface) carried out on yearly basis. The plan shall be updated on annual basis and shall be signed by appropriate authorities from the Project and the Area. After every annual renewal, the plan shall be placed before HOD (Env.) of the Company for scrutiny and approval.

The UG unit is likely to be closed soon and entire Group is considered as an OC Unit for the purpose of Closure. However, if , for any reasons , whatsoever, UG Operation is continued, a progressive mine closure plan showing the UG activities shall be maintained. This plan shall also be updated on annual basis and signed by all the above mentioned officials.

Besides the above plan, a progressive mine closure register shall also be maintained by the mine management. This register shall carry details of the progressive mine closure activities carried out on yearly basis. The details to be maintained in the said register shall cover inter alia the name of activity, place, period of execution, executing agency, expenditure incurred, proof of expenditure incurred, final status of the area where activity was executed, plan on which such activity has been shown etc.

The entries into the said register shall be signed by the appropriate authorities from the Project and the Area. At the end of the year the said register (along with two plans) shall be placed before HOD (Env.) of the Company for scrutiny and approval.

3.6.5 Disposal management of hazardous material

At the time of closure, assessment would be made as to find whether there is any hazardous material that could cause problem. Such hazardous material e.g. explosives, chemicals, oil etc. shall be appropriately disposed off.

3.7 Entrepreneurship development Program

As the mine progresses, more and more local people gets indirectly dependent on the mine for their sustainable income. After closure of mine there would be no source of income for these people. In order to ensure that these people do not suffer in the post closure period, the Project authorities in consultation with BCCL (HQ) shall make efforts to develop entrepreneurial skills in the local people by imparting skill development/vocational training programs. It is expected that after developing adequate entrepreneurial skills, the local people would be able to run their own business in the post closure period and maintain a sustainable income for their livelihood.

3.8 Miscellaneous activities

In future, the prevalent geo-mining/environmental conditions in and around the project area may require execution of some other progressive mine closure activities not covered in the preceding paragraphs. Such activities may be carried out by the mine after observing the needful formalities and obtaining approval of HOD (Env.) of the Company.

3.9 Execution of progressive mine closure activities and 5 yearly monitoring

After observing the necessary administrative/financial formalities, the mine authorities shall execute the identified progressive mine closure activities,

whenever and wherever required. The executed activities shall be shown on the above said plans and recorded in the said registers.

The executed progressive mine closure activities shall be monitored on 5-yearly basis by 3rd party (ISM, CMPDI, NEERI etc.).

The 5 yearly return from escrow fund would be equal to expenditure incurred on progressive mine closure activities during last 5 years or 80 % of total deposited amount in the escrow account (including interest) whichever is less. The said return would be subject to above said monitoring of progressive MCP by a third party (ISM/CMPDI/NEERI etc.).

As the 5 yearly return from escrow fund is linked with the expenditure incurred on progressive mine closure activities during last 5 years, it is very important that progressive mine closure records, plans, expenditure details along with proof are properly maintained.

At this juncture it is important to note that some of the progressive mine closure activities, enumerated in the preceding paragraphs, are legal obligations specified in Project reports, EMP, permissions obtained from statutory bodies such as CPCB, SPCB, DGMS etc. The Project authorities are bound to comply with these obligations.

3.10 Re-deployment of work force

The current manpower of the project is 1752. And at present, it is very difficult to assess the manpower of the project, which will remain at the time of closure of mining activities in the presently worked seams. As some of the seams of the block is still virgin and is most likely to be mined in future, the remaining manpower will be gainfully utilized in continuing mining activity.

3.11 Emancipation from the community facilities and the facilities to the PAPs

3.11.1 The Project affected Persons (PAPs) and also the local communities are being provided many civic facilities, such as educational facilities, health

facilities, and drinking water. As some of the seams of the block are still virgin and are most likely to be mined in future, these facilities, in all probability, will be kept maintained.

3.11.2 However, at the time of final closure after exhaustion of entire mineable reserve these facilities will be entrusted upon the local bodies/Trust of PAPs/State bodies after consultation with local people and state authorities so that same could continue even after the mine closure. If needed, a lump sum reasonable amount would also be paid to the local bodies/Trust of PAPs/State bodies after proper approval for proper upkeep and maintenance of various community facilities.

3.11.3 To ensure that no financial loss due to the closure of mining activity in the presently worked seam occur to the local community engaged indirectly to the existing mine, following steps would be taken:

- It has been seen in past that in the event of closure of a mine, the local people indirectly dependent on the mine switch over their economic/professional activities in the existing/new or expansion mines located in the nearby area. Local management, if needed, extends some basic helps to them in such type of switching over. Hence, it is expected that in this project also the transition of the local people from one area to the other area for their sustenance would not be any problem.

- It is proposed that reclaimed and afforested land will be handed over to State Forest Dept. for the benefit of local ecosystem. The forest wealth can also be utilised by local people or tribal in the form of fruits and fodders.

- The proposed picnic spot would be handed over to a society of local people for commercial use of the picnic spot by them.

CHAPTER – IV

ECONOMIC REPURCUSSION

4.0 Economic Repercussions of closure of mine

4.1 Manpower of the project

The total proposed manpower strength of NT-ST-Jeenagora Group of Mines is 1752 (as per UCE of Proposed NTST Expansion OCP, October, 2011).

Table 4.1Present Manpower

Manpower	Strength (Nos.)
EXECUTIVE	87
NON EXECUTIVE	1665
TOTAL	1752

Post Closure Manpower

It has been proposed to monitor and implement the post-closure activities departmentally. Departmental manpower will be needed after closure of the mine for monitoring and implementation of the post closure activities. Manpower required for the same is given in Table- 4.2.

Table 4.2: Manpower required for monitoring and implementation of Mine Closure Activities

Sl. No.	Category of Manpower	Requisite heads
1	Officer-in-charge/ Manager (Mining)	2
2	Overman-in-charge	3
3	Foreman/Overseer-in-charge	3
TOTAL		**8**

4.2 Assessment of income scenario of local people

As NT-ST-Jeenagora Group of Mines is basically an opencast mining project in the long run, a lot of surface excavation will be undertaken. Moreover, the basic mining infrastructures have been made on the company acquired land. So there will be displacement of some local people from this project. Sufficient fund has been provided in the Jharia Action Plan to rehabilitate and resettlement of the project affected people of this project.

After the closure of the mine, the manpower deployed in the mine will be further redeployed in other mines of BCCL to make no loss of sustenance income of the eligible employee.

4.2.1 At present, it is very difficult to assess the manpower of the project, which will remain at the time of closure of mining activities in the existing project.

4.2.2 The local communities are being provided many civic facilities, such as educational facilities, health facilities, and drinking water. At the time of final closure after exhaustion of entire mineable reserve these facilities will be entrusted upon the local bodies/Trust of PAPs/State bodies after consultation with local people and state authorities so that same could continue even after the mine closure. If needed, a lump sum reasonable amount would also be paid to the local bodies/Trust of PAPs/State bodies after proper approval for proper upkeep and maintenance of various community facilities.

4.2.3 To ensure that no financial loss due to the closure of mining activity in the presently worked seam occur to the local community engaged indirectly to the existing mine, following steps would be taken:

- It has been seen in past that in the event of closure of a mine, the local people indirectly dependent on the mine switch over their economic/professional activities in the existing/new or expansion mines located in the nearby area. Local management, if needed, extends some basic helps to them in such type of switching over. Hence, it is

expected that in this project also the transition of the local people from one area to the other area for their sustenance would not be any problem.

- It is proposed that reclaimed and afforested land, if any, will be handed over to State Forest Dept for the benefit of local ecosystem. The forest wealth can also be utilised by local people in the form of fruits and fodders.

CHAPTER – V

TIME SCHEDULE FOR POST-CLOSURE ACTIVITIES

5.1 It is very difficult to predict the various parameters which would be prevalent at the time of final mine closure (when the entire block reserve would get exhausted) and therefore a mine closure activity schedule cannot be rigidly prepared at this point of time.

5.2 The closure of mine involving technical aspects, environmental aspects, socio-political aspects and financial assurances as implementing post-closure activities will run for three years. The time schedule envisaged for completion of all closure activities is presented in the following table in the form of bar chart.

Table 5.1 Implementation Schedule for post-closure activities for NT-ST-Jeenagora Group of mines.

Sl. No.	Major Activities	Time Period	Year-wise Phasing			
			Y1	Y2	Y3	Y4
1	Technical aspects	2 years				
2	Environmental aspects	2 years				
3	Post closure environment monitoring	3 years				
4	Socio-political aspects	3 years				

5.2.1 Technical Aspects:

i) **Safety & security**: In the mine closure plan, action will be taken to cover all the safety aspects including management of fire & subsidence and mine inundation.

i) **Management of pit slopes and waste dump**:
The same has been addressed in detail in the Para No. 3.4 and in Para. 3.6.2.

ii) **Management of hydrology and hydro-geology**: After closure of mining activities, the workings will be waterlogged which will help in maintaining the water table in the surrounding areas and may become a source of water supply to the neighbouring areas.

iii) **Closure of Mine Entries**: After closure of the mining activities, all the entries to the mine will be effectively sealed off to avoid any accident and to prevent access to any unauthorized person. The area that is not reclaimed shall be properly fenced/ sealed to prevent any unauthorized entry into the area. However, the guidelines / instructions from DGMS, if any, will be followed.

iv) **Disposal of mining machinery**: All the opencast machineries, which will have residual life, will be shifted to the other collieries of the area/company. The salvaging and shifting operation of mining machinery and other equipment will be done considering the ground realities during the period 1 (one) year advance of final mine closure.

v) **Details of surface structure proposed to be dismantled**:
As far as possible, industrial structures will be utilised by the adjacent mine. However, if these structures are not found fit at the end of mine life, the same will be dismantled and salvaged. The equipments will be removed and used somewhere else. Every effort will be made to restore the area to economic utilization value in line with mine closure plan.

A. **Service Buildings**: The service buildings/ structures, viz. workshop, stores, office building, Site office, rooms, etc. are to be demolished after collecting all re-useable items, or be used for some other projects and the land covered by them restored for productive use. However, it has to be ensured that as and when a service building is vacated/ abandoned, the same should be demolished to prevent any unauthorized occupation.

B. **Other Infrastructures**: All other infrastructures like sub-stations, transformers, community services, pump-houses, water-treatment/ filtration plants, waterlines, power lines, roads etc. will be utilized for the neighbouring projects.

However, possibility shall be explored for handing over the buildings and other infrastructures including the reclaimed land to the State Government for the benefit of local villagers and strengthening the area infrastructures. The end use of these facilities shall be decided by the State Government with the help of District Authorities and Village Panchayat. The peripheral village community facilities developed by the Mine Authorities will be left to the Local Body/ State Government for their management and public use.

Prior to surface demolition/ restoration, a surface audit will be undertaken on all surface structures, spoil heaps etc. to assess whether there is any hazardous material that could cause problem, i.e. explosive, asbestos, chemical, oil, etc.

A list of surface and OCP assets (Plant & Machinery) will be prepared and made available to potential purchasers or transferred to other new/ working mines of the company. This will ensure that the assets perform during their economic life.

5.2.2 Environment Aspects

i) **Mined-out land and proposed final land use:** At NT-ST-Jeenagora Group of mines it is proposed to extract coal by opencast method. The existing infrastructures, if not usable, will be dismantled and the land will be graded & will be handed over to the local authorities for community use.

ii) **Air & Water quality management:** Appropriate air and water pollution control measures will be taken to contain the air and water pollution for maintaining the ambient air and water quality within the stipulated standards besides making the mining operation eco-friendly in the project. These measures (both preventive and suppressive) are enumerated in Para 3.2.3 of the present report.

iii) **Management of waste:** The solid wastes generated by the mine during the coal production are non-hazardous and non-toxic in nature. The above solid wastes will be disposed off by backfilling the mined out area and then re-vegetating without causing any siltation problem on surface water bodies.

However, scientific studies shall be undertaken regarding applicability of solid wastes for various uses. Toxic solid wastes like used oil, used batteries, oily sludge, besides filters and filter materials containing oil during maintenance of vehicles, will be generated by the mining project. Used oil will be stored in drums safely for disposal through auction to the authorized re-processors. Similarly, used batteries will be stored safely for auction to the authorized re-processors. The oily sludge, besides filter and filter materials, will be disposed off in impervious layer lined pits without causing environmental hazards.

iv) **Management of final voids**: It will be dealt as per the directive provided in the EMP.

v) **Land reclamation and rehabilitation:** If any cracks or void is created due to mining activities, it will be restored to original profile by filling up cracks/ voids. It is proposed that the site restoration should be kept progressive so that the restoration is more or less similar to the rate of mining.

vi) **Reclamation of forest/ vegetation and plantation:** 17 Ha of forest land is required for the project. Moreover, regular plantation will be taken up during the life of the mine to create green barrier. The plant species will be selected in consultation with the state forest department.

The objective of restoration of post mining area will be determined through consultation with local community and the Government authority, so that the potential/ required end use of the mined out land is determined in advance. Such usage may be agriculture, forestry, amenity development or nature reserve.

5.2.3 Post Closure Environment Monitoring

After cessation of mining and its related activities, there will be no effect on ambient air and water quality due to this mine as proper mitigation measures for air and water pollution control are to be taken by the authorities of the mine. However, the air and water quality parameters in the mined out area will be monitored by some external agency for next three years after closure of the mine.

Air and water samples will be taken from the specified sampling stations at regular frequency for 3 consecutive years after the closure of the mining project. 1 sample of mine water will be collected and analyzed with fortnightly frequency and 2 samples of ground water from core & buffer zones with monthly frequency. Similarly, 1 air sample will be taken at core zone, and 1 air sample each in upwind and downwind directions of the project at fortnightly frequency.

5.2.4 Socio-Political Aspects

i) **Re-deployment of work force**: Due to closure of mining operations, the persons directly employed in the mine will be surplus. Suitable manpower re-deployment plan may be formulated by the mining company sufficiently before closure of mine for re-deployment of the work force in other units of the company. Alternatively, they would be given option of voluntary retirement.

ii) **Civic facilities**: It is proposed that the civic facilities developed during the mining phase will be transferred to the local government/ municipality so that the region transforms smoothly into post mining phase. A one-time payment should be made by the mine for obtaining its release from providing these facilities, which will there from be taken care of by the local and state bodies.

iii) **Channelisation of available water**: If the mine has sufficient water, this can be used for domestic and agriculture purpose by the local community. The water from this area shall be discharged after treatment for domestic and agricultural usages.

iv) **Emancipation for project affected population**: The village/ basti which are to be rehabilitated at North Tisra, Jeenagora OCP and South Tisra as per Master Plan of JCF (March'08) are given in Table No. 5.2A, 5.2B and 5.2C:

Table 5.2A Phasewise Rehabilitation as per Master Plan of JCF (March'08)

PHASE-I					
Village/Site	**BCCL**	**Pvt.**	**Enchr**	**Oth**	**Total**
BCCL Colony No. 1/O1	142	47	47	5	241
SG Section Basti /O3	41	0	0	0	41
Tilaboni Basti/O2	15	122	122	6	265
Tilaboni Basti/O2	0	153	0	0	153
Total(Phase-I)	**198**	**322**	**169**	**11**	**700**
PHASE-II(Block-II))					
Total(Phase-II)	**0**	**0**	**0**	**0**	**0**
Total(Phase I+II)	**198**	**322**	**169**	**11**	**700**

Table 5.2B Phasewise Rehabilitation as per Master Plan of JCF (March'08)

PHASE-I					
Village/Site	**BCCL**	**Pvt.**	**Enchr**	**Oth**	**Total**
Central Sulunga Colony No.1/ O9	90	1	5	1	97
E.B. Section colony no. 1/O1	19	9	0	0	28
E.B. Section colony no. 1/O1	0	0	10	0	10
EB Sec. Colony No. 2/O2	58	0	0	1	59
Khas Jeenagora Colony No.1/O3	88	0	0	0	88
Khas Jeenagora & Kalisthan /O5	40	0	0	1	41
Khas Jeenagora Colony No. 2/ O4	107	0	0	5	112
Khas Jeenagora Colony no. 3/ O6	64	43	10	1	118
Khas Jeenagora Colony no. 4/O7	13	0	0	1	14
Total(Phase-I)	**479**	**53**	**25**	**10**	**567**
PHASE-II(Block-II))					
Total(Phase-II)	**0**	**0**	**0**	**0**	**0**
Total(Phase I+II)	**479**	**53**	**25**	**10**	**567**

Table 5.2C Phasewise Rehabilitation as per Master Plan of JCF (March'08)

PHASE-I					
Village/Site	**BCCL**	**Pvt.**	**Enchr**	**Oth**	**Total**
B.J. & S.T. Section/ O3	110	85	42	3	240
Huchuktand Basti/O1	29	95	24	2	150
No.1 Pit S.T. Section /O2	38	21	0	0	59
Total(Phase-I)	**177**	**201**	**66**	**5**	**449**
PHASE-II(Block-II))					
Total(Phase-II)	**0**	**0**	**0**	**0**	**0**
Total(Phase I+II)	**177**	**201**	**66**	**5**	**449**

5.3 Although, it is very difficult to conclusively predict the likely impacts due to closure of the mining activities in the in the leasehold area of the Instant Project and the likely activities that would be taken up at that point of time, but a broad mine closure activity schedule may be prepared as per guidelines of Ministry of Coal. The post closure implementing activities will run for three years. The activities given overleaf as per the given bar chart are most likely to be implemented.

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN NT- ST JEENAGORA GROUP OF MINES(OC)

(LIFE OF THE MINE: 30 YEARS)

S.N	Activity	Time Frame	Year								
			1st Phase	2nd Phase	3rd Phase	4th Phase	5th Phase	Final Phase	Post Closure Phase		
			1st - 5th	6th - 10th	11th -15th	16th-20th	21st - 25th	26th - 30th	PC1	PC2	PC3
A	**Dismantling of Structures**										
	Service Buildings	2 years									
	Residential Buildings	2 & ½ years									
	Industrial structures like CHP, Workshop, field sub-station, etc.	2 & ½ years									
B	**Permanent Fencing of mine void and other dangerous area**										
	Random rubble masonry of height 1.2 metre including leveling up in cement concrete 1:6:12 in mud mortar	2 years									
C	**Grading of highwall slopes**										
	Levelling and grading of highwall slopes	2 years									
D	**OB Dump Reclamation**										
	*Handling/Dozing of OB Dump and backfilling	Throughout the life of the mine including 3 years after cessation of mining operation									

S.N	Activity	Time Frame	Year								
			1st Phase	2nd Phase	3rd Phase	4th Phase	5th Phase	Final Phase	Post Closure Phase		
			1st - 5th	6th - 10th	11th -15th	16th-20th	21st - 25th	26th - 30th	PC1	PC2	PC3
	*Technical and Bio-reclamation including plantation and post care	Throughout the life of the mine including 3 years after cessation of mining operation									
E	**Landscaping**										
	Landscaping of the open space in the leasehold area for improving its esthetics and eco value	Throughout the life of the mine including 3 years after cessation of mining operation									
F	**Plantation**										
	Plantation over cleared area obtained after dismantling	2 years									
	*Plantation around the quarry area and in safety zone	Throughout the life of the mine including 3 years after cessation of mining operation									
	*Plantation over the external OB Dump	Throughout the life of the mine									
G	**Post Closure Env Monitoring / testing of parameters for three years**										
	Air Quality	3 years									
	Water Quality	3 years									

S.N	Activity	Time Frame	Year								
			1st Phase	2nd Phase	3rd Phase	4th Phase	5th Phase	Final Phase	Post Closure Phase		
			1st - 5th	6th - 10th	11th -15th	16th-20th	21st - 25th	26th - 30th	PC1	PC2	PC3
H	***Entrepreneurship Development (Vocational/skill development training for sustainable income of affected people**	Throughout the life of the mine									
I	***Miscellaneous and other mitigative measures**	Throughout the life of the mine including 3 years after cessation of mining operation									
J	**Post Closure Manpower cost for supervision**	3 years									

NOTE: *: To be covered under Progressive Mine Closure activities also**.**

NOTE: The progressive mine closure will be done as per the provisions made out in the Project report and as per the situation/requirement that may arise in course of execution of the Project Report.

CHAPTER – VI

MINE CLOSURE COST

6.0 Mine Closure activities would be a constant exercise for the mine which would begin with the commencement of mining operations and continue till post closure. The mine closure activities would naturally entail certain expenditures, which will have to be borne by the mine operator. There would be two types of expenditures on account of mine closure activities in respect of NT-ST-Jeenagora Group of mines:

6.1 Revenue expenditures

This would cover the activities which are being executed along with normal mining operation and would continue to be executed in course of execution of the project. The cost of progressive mine closure activities is already part of the project cost.

6.2.1 Expenditures to be incurred just prior to actual mine closure and in the post closure period

6.2.2 As per MOC guidelines, a corpus escrow account @ ₹ 1.0 lakhs (August, 2009 Price Level) per Ha (for UG) and @ ₹ 6.0 lakhs (for OC) of the project area shall be opened with the coal controller organization to meet the expenses of final mine closure. The current Guidelines read as:

"It has been estimated that typically closure cost for an opencast mine will come around Rs. 6.00 lakh per Hectare of the project area and it would be Rs. 1.00 lakh per Hectare for underground mine project area at current price levels (August, 2009) and these rates will stand modified based on Wholesale Price Index as notified by Government of India from time to time".

In NT-ST-Jeenagora Group of Mines, the proposed project area is about 1431.0Ha. Therefore, the entire 1431.0Ha of project area (existing and

proposed) has been considered for the calculation of closure cost of the area based on OC norms.

The money deposited in the Escrow Account has to deal with the following:

- Cost of closure activities.
- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring.
- Creation of a corpus fund for the final mine closure

6.2.2 As per the above guidelines these rates will stand modified based on Whole Price Index as notified by Government of India from time to time. Thus the total expenditure on this front may be calculated in following manner:

- The total amount for mine closure activity in respect of the proposed NT-ST-Jeenagora Group of Mines = 1431.0 Ha X ₹6.00 lakhs X 1.35416 =₹11626.875 lakhs

*** The amount has been escalated based on WPI of July, 2013(175.5) vis-à-vis WPI of August '09(129.6).**

6.2.3 It is difficult to conclusively predict the mining parameters on a long term basis owing to rapidly changing mining technology, developments in the field of clean coal technologies and R&D activities in development of alternative energy sources.

As per the latest Guidelines issued by the MoC, GoI(dt. 07.01.2013) the *"annual closure cost is to be computed considering the total project area at the above mentioned rates and dividing the same by the entire life of the mine in years for new projects and balance life of mine in years for operating/existing mines."*

Jharia Coalfield is characterized by occurrence of a number of working coal horizons, giving a leverage of extended working life of the mines. Some more seams can come in the lap of workable horizons due to improvement in mining

technology in times to come. The underground mines in leasehold of JCF are generally small capacity mines, giving a false impression of very long lives due to small level of current production level. There may be a strategy in future to amalgamate the mines for higher production level to attain the economics of scale. The existing OC Mines working at shallow depth may be worked at a greater depth, In such a situation, the life of the mine arrived at with current level of production for the balance reserve may not be workable in the long run.

In view of the above, for the purpose of mine closure cost calculations, the life of the mine has been taken from formulated project report of NT-ST-Jeenagora Group of Mines as mentioned in the approved TOR/Form-I. Since the proposed life of the NT-ST-Jeenagora Group of Mines was calculated as 30 years, the life of NT-ST-Jeenagora group will be also 30 years.

To arrive, at the annual cost, to be deposited in each year in an escrow account, the mine closure cost has been divided by 30, as shown below:

- Amount to deposited in 1st year will be--------₹ 387.563 lakhs
- Amount to be deposited in 2nd year will be—₹ 387.563 (1 + 5%)^1 lakhs
- Amount to be deposited in 3rd year will be—₹ 387.563 (1 + 5%)^2 lakhs

6.2.4 In the above fashion, an amount will be deposited every year up to the last year of mine life by applying the following formula:

- Amount to be deposited in Nth year will be --- ₹ 387.563 (1 + 5%) ^(n-1) lakhs

6.2.5 The amount calculated by the above formula shall be deposited every year by BCCL in the Escrow Account opened with the Coal Controller organisation in a scheduled Bank. An agreement, outlining detailed terms and conditions of operating the said Escrow Account shall be executed amongst BCCL, the Coal Controller and the commercial Bank.

6.2.6 Thus, total amount that shall be deposited for final mine closure activities **NT-ST-Jeenagora Group of Mines** during the considered period of 30 years stands out to be ₹ 25749.206 lakhs as per the present status of the mine. The Break-Up cost of Mine Closure of NT-ST-Jeenagora Group of Mines Yearwise is given in Table No. 6.1.

Table No. 6.1 Yearwise Break-Up Mine Closure Cost

Year	Amount to be deposited per year ₹ in Lakhs
1	387.563
2	406.941
3	427.288
4	448.652
5	471.085
6	494.639
7	519.371
8	545.339
9	572.606
10	601.237
11	631.298
12	662.863
13	696.007
14	730.807
15	767.347
16	805.715
17	846.000
18	888.300
19	932.715
20	979.351
21	1028.319
22	1079.735
23	1133.721
24	1190.407
25	1249.928
26	1312.424
27	1378.045

Year	Amount to be deposited per year ₹ in Lakhs
28	1446.948
29	1519.295
30	1595.260
Total	25749.206

6.2.7 Based on the existing mine closure planning norms, the above calculated cost at WPI of July 2013 on mine closure may be tentatively grouped under different heads as given in Table No. 6.2 as per the guidelines of CMPDI(HQ).

Table 6.2 Break up Costs of Mine Closure Activities

Sl. No.	Activity	Mine Closure Cost (₹ in Lakhs)
A	**Dismantling of Structures**	
	Service Buildings	51.498
	Residential Buildings	687.504
	Industrial Structures like CHP, Workshop, field sub-station, etc.	77.248
B	**Permanent Fencing of Mine Void and other dangerous area**	
	Random Ruble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	386.238
C	**Grading of Highwall slopes**	
	Levelling and grading of highwall slopes	455.761
D	**OB Dump Reclamation**	
	Handling/Dozing of external OB Dump into mine void	22829.246
	Bio-Reclamation including soil spreading, plantation and maintenance	102.997
E	**LANDSCAPING**	
	Landscaping of the cleared land for improving its aesthetics	77.248
F	**Plantation**	
	Plantation over area obtained after dismantling	128.746
	Plantation around fencing	51.498
	Plantation over the cleared external OB Dump	5.150

Sl. No.	Activity	Mine Closure Cost (₹ in Lakhs)
G	**Monitoring/Testing of parameters for three years**	
	Air Quality	56.648
	Water Quality	51.498
H	**Entrepreneurship Development(Vocational/skill development training for sustainable income of affected people**	66.948
I	**Miscellaneous and other mitigative measures**	514.984
J	**Manpower Cost for Supervision**	205.994
	TOTAL	**25749.206**

6.2.8 Thus, total amount that shall be deposited for final mine closure activities of **NT-ST-Jeenagora Group of Mines** mine during the period of 30 years has been estimated as **₹ 25749.206 lakhs** based on UG norms at WPI of July 2013.

6.2.9 *Mining is to be carried out in a phased manner initiating afforestation/reclamation work in the mined out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 80% of the total deposited amount including interest accrued in the ESCROW account may be released after every five years in line with the periodic examination of the Closure Plan as per Clause 3.1 of the Annexure of the Guidelines. The amount released should be equal to expenditure incurred on the Progressive mine closure in past five years or 80% whichever is less. The balance amount shall be released to mine owner/leaseholder at the end of the final Mine Closure on compliance of all provisions of Closure Plan. This compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organisations, court etc. and certified by the Coal Controller.*

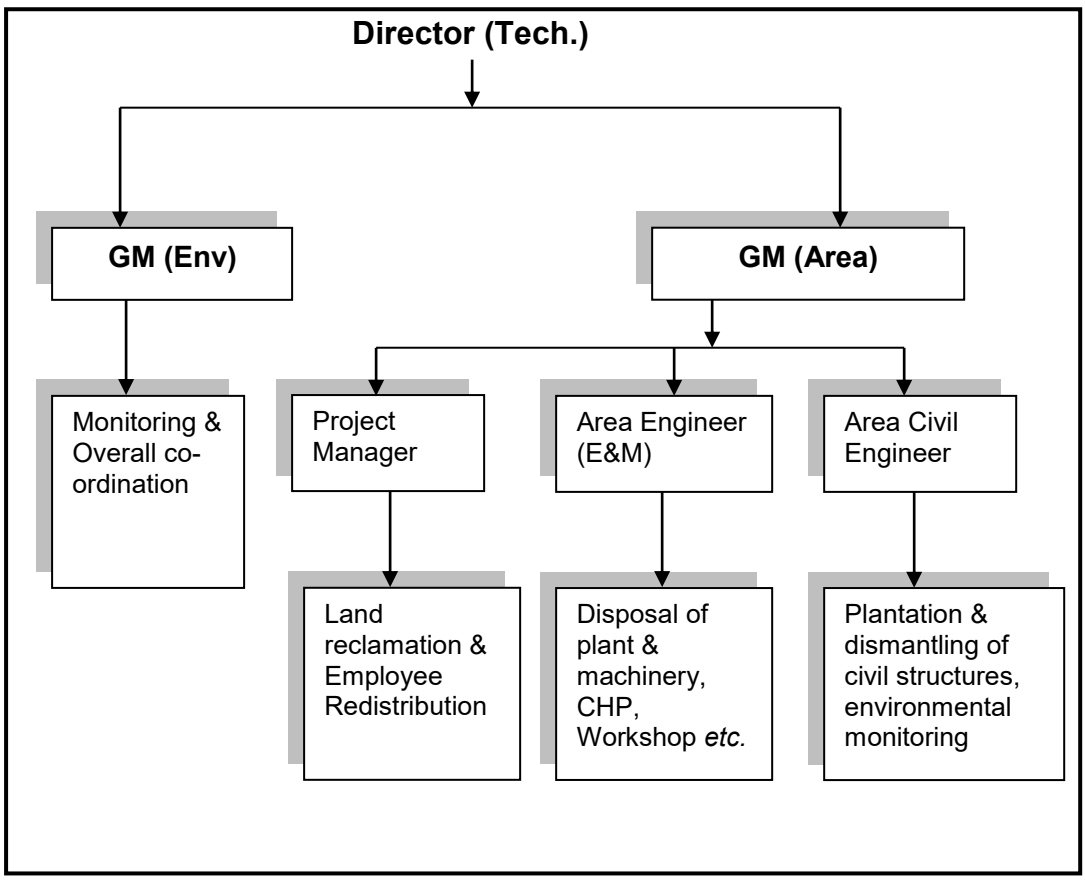
6.2.10 However, the additional amount beyond the escrow account, if any estimated later on, will be provided by the mine operator after estimating the final mine closure cost five years prior to mine closure (as per the mine closure guideline)**.**

CHAPTER-VII

IMPLEMENTATION PROTOCOL

7.1 As the mine closure activities would continue even after cessation of mining activities, an organization consisting of different discipline would be formed to undertake the implementation of mine closure activities as well as monitoring of the same**.** Such activity shall continue for a period of three years after the closure of mining activity in the mine. Once the closed mine becomes stabilized in respect of safety, environmental and social aspects, the monitoring team would be withdrawn.

7.2 For implementing the mine closure activities and monitoring thereof, the following organisational structure at Corporate level has been proposed:



7.3 Environmental monitoring for three years after closure of mine will be carried out to evaluate the environmental quality of the area. If need be, proper mitigation measures will be taken up after evaluating the environmental quality. Before closure of the mine, Area GM will prepare survey and disposal report and the same will be submitted to DGMS for acceptance.

7.4 When the mine closure activities would take final shape and the entire are under influence is brought to an acceptable shape, BCCL would obtain a mine closure certificate from Coal Controller to the effect that the protective, reclamation and rehabilitation works in accordance with the approved mine closure plan/final mine closure plan have been carried out for surrendering the reclaimed land to the State Government concerned.

CHAPTER – VIII

PLANS ENCLOSED

The following underground and surface plans have been enclosed along with this mine closure report plan:

a. Location Plan of Cluster IX
b. Surface cum Topographical plan of Cluster IX showing surface features, contours, roads, depot/siding, OB dumps, quarries (working/old/discontinued), subsidence, plantations, habitations, vacant land, surface water bodies, natural drainage and mine discharge water channels
c. Geological Plan of Cluster IX
d. Working plan of IV B Seam- North Tisra UG
e. Surface Plan of existing NTST OC.
f. Final Stage Dump Plan of NTST Expansion OCP

भारत कोकिंग कोल लिमिटेड
(एक मिनीरत्न कंपनी)
(कोल इण्डिया लिमिटेड की एक अनुषंगी कंपनी)
(भारत सरकार का उपक्रम)

बीसीसीएल BCCL
भारत कोकिंग कोल लिमिटेड
Bharat Coking Coal Limited

Bharat Coking Coal Limited
(A Miniratna Company)
(A Subsidiary of Coal India Limited)
(A Government of India Undertaking)

बोर्ड सचिवालय/Board Secretariat

क्रांक : बीसीसीएल/सीएस/एफ-1(A)/35 (H) दिनांक: 15.01.2026

सेवा में,
महाप्रबंधक(परियोजना व योजना),
बीसीसीएल, कोयला भवन, धनबाद।

विषय: **Certified copy of Minutes of 434th Board Meeting held on 03.01.2026.**

Dear Sir,

We send herewith certified copy of Minutes of Item No. 434.PoT-1 of 434th Meeting of the Board of Directors of Bharat Coking Coal Limited held at Registered office, Koyla Bhawan, Dhanbad on 03.01.2026 for taking necessary action at your end.

You are requested to send the Action Taken Report (ATR) on the above, duly approved by the concerned Director, for placing before the next Board Meeting as per the format given below. Soft copy of the same in MS word format to the mail id cos.bccl@coalindia.in .

Format of ATR:

Department:			
Item No.	**Subject**	**Decision of the Board**	**Action Taken**

भवदीय,

Encl: As above

बी.के.पारूई
कंपनी सचिव

भा.कोo कोo लि.
19/L
15-1-26
16-1-
महाप्रबंधक (योo एवं परि.)

Sri Pandey

Item No. 434.PoT-1

Approval of Mining Plan along with Mine Closure Plan of Cluster IX Group of Mines, Lodna Area.

Background:

Cluster-IX Group of Mines is located in Jharia Coalfield, Dhanbad under the administrative control of Lodna Area of BCCL. The area under consideration falls within the Mukunda exploration block in the eastern part of Jharia coalfield, District-Dhanbad, Jharkhand.

Presently following mines are situated within leasehold of Cluster IX:

1. NT-ST Expansion OCP
2. Amalgamated Joyrampur Colliery (OC)

Previously, separate MP/MCP for both NTST & Joyrampur Colliery are prepared and approved for implementation of guidelines issued by Ministry of Coal, Govt. of India.

Life of the mine:

By OC	4 Years
By UG	NIL
Overall	4 Years

Previously, the MP along with MCP for Cluster IX group of Mines was prepared in line with Guidelines for Preparation of Mining Plan and Mine Closure Plan for Coal and Lignite Blocks 2025 – reg. vid F No CPAM 34011/28/2019 CPAM [E343762] dated 31st January and same was approved by BCCL Board in its 429th Board Meeting held on 15.11.2025.

The said Mining Plan along with Mine Closure Plan of Cluster IX Group of Mines was prepared considering Leasehold /Project area of 1942.12 Ha. including forest land of 4.62 Ha.

Subsequently, an objection was raised by MoEF regarding forest clearance certificate regarding the said forest land. Hence, to continue mining activities under the said mining plan a revised Mining Plan along with Mine Closure Plan has been prepared excluding the said forest land area of 4.62 Ha and thus the revised project area is now under mining plan is 1942.12 – 4.62 = 1937.50 Ha.

All other mining parameters remains the same as in approved MP/MCP dated 15.11.2025.

Decision:

During deliberation the Board was apprised that the instant proposal has been deliberated in detail in 52nd ESC (T) meeting held on 03.01.2026 and after deliberation ESC (T) has recommended the said proposal for approval.

Certified to be True Copy

B. K. Paru
Company Secretary
Bharat Coking Coal Limited
Koyla Bhawan
Dhanbad-826005

Considering the recommendation of ESC (T) the Board agreed with the proposal for the Mining Plan along with Mine Closure Plan of Cluster-IX Group of Mines (Rated Capacity 10.21MTPA & Peak Capacity 12.768 MTPA), Leasehold/Project area 1937.50 Ha excluding forest land of 4.62 Ha, balance Life of 04 years with total Mine Closure cost ₹285.9153643 Crs, including already deposited amount being ₹118.93248 Crs. till FY 24-25).

Action: GM (P&P)

Certified to be True Copy

B. K. Parui
Company Secretary
Bharat Coking Coal Limited
Koyla Bhawan
Dhanbad- 826005

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.

MINING PLAN AND MINE CLOSURE PLAN

FOR

CLUSTER IX GROUP OF MINES

(LODNA AREA)

Mukunda Opencast Block (2210 Ha)

Jharia Coalfield, Dhanbad, Jharkhand

BHARAT COKING COAL LIMITED

Koyla Bhawan, Koyla Nagar
Dhanbad - 826005, India

(Rated Capacity – 10.21 MTPA)
(Peak Capacity - 12.768 MTPA)

DECEMBER - 2025

CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD.
REGIONAL INSTITUTE NO.- II
DHANBAD

QCI-NABET Scheme Certificate No.: NABET/APA-MPPA/RA/015
Website : www.cmpdi.co.in
E-mail : rdri2.cmpdi@coalindia.in

MINING PLAN AND MINE CLOSURE PLAN
FOR
CLUSTER IX GROUP OF MINES

Index of Chapters

	PARTICULARS	PAGE NO.
	Index of Chapters	i
	Index of List of Plans/Drawings attached enclosed as Plates	ii
	List of Abbreviations used	iii
Sl. No.	***Chapters***	***Page No.***
1	**Project Information** (*Introduction with Locations, Topography & Communication*)	I – 1 – 11
2	**Exploration, Geology, Seam Sequence, Coal Quality & Reserves**	II – 1 – 22
3	**Mining**	III – 1 – 17
4	**Safety Management** (*Manpower, Safety and Supervision*)	IV – 1 – 6
5	**Infrastructure Facilities proposed and their Location** (along with Coal handling, Washing & Mode of Dispatch)	V – 1 – 17
6	**Land Requirement**	VI – 1 – 8
7	**Environment management**	VII – 1 – 15
8	**Progressive and Final Mine Closure Plan**	VIII – 1 – 24



Index of List of Plans

Sl No.	Description	Plate No.
1	Location Plan	G-I
2	Surface Plan	G-II
3	Geological Plan	G-III
4	Graphic Litholog of Boreholes	G-IV
5	Floor Contour Plans of IX/X Seam	G-VI(A))
6	Floor Contour Plans of I seam	G-VII(A)
7	Initial Stage Plan	MIN-I
8	Final Stage Quarry Plan	MIN-II
9	Final Stage Dump Plan	MIN-III

List of Abbreviations used in the report

BCCL	-	Bharat Coking Coal Limited
RF	-	Representative Factor
MECL	-	Mineral Exploration Corporation Limited
UVM	-	Unit Volatile Matter
UHV	-	Useful Heat Value
GCV	-	Gross Calorific Value
BH	-	Bore Hole
B&P	-	Bord and Pillar
SDL	-	Side Discharge Loader
DB	-	District Board
SOP	-	Standing on Pillar
OC	-	Open Cast
OB	-	Over Burden
HEMM	-	Heavy Earth Moving Machinery
CMR	-	Coal Mines Regulations
DGMS	-	Directorate General of Mines Safety
UG	-	Underground/Ungraded
GPM	-	Gallon Per Minute
HT/LT	-	High/Low Tension
HP	-	Horse Power
DVC	-	Damodar Valley Corporation
BOD	-	Biological Oxygen Demand
MCP	-	Mine Closure Plan

Chapter 1 : Project Information

	Parameters	*Details*
1.1	INTRODUCTION	**BACKGROUND OF THE MINING COMPANY:** Bharat Coking Coal Limited, a subsidiary of Coal India Limited, is a Central Public Sector undertaking, owned by the Govt. of India, engaged for extraction of coal and allied activities in Jharkhand and West Bengal. It occupies an important place in coal mining industry in India, as it produces bulk of the coking coal mined in the country. BCCL meets major portion of the total prime coking coal requirement of the integrated steel sector. BCCL was incorporated in January, 1972 to operate coking coal mines operating in the Jharia & Raniganj Coalfields, taken over by the Govt. of India on 16th Oct, 1971 to ensure planned development of the scarce coking coal resources in the country. Lodna Area of BCCL is located in the South-eastern part of the Jharia coalfield. It is situated at a distance of 11 Km from Dhanbad Railway station and about 5 K.M away in North East direction from Bhaga Railway station. Prior to nationalization all the mines were being operated by large nos. of private colliery owners. Presently following mines are situated within leasehold of Cluster IX: 1. NT-ST Expansion OCP 2. Amalgamated Joyrampur Colliery (OC) CMPDI, RI-2 has been advised to prepare Mining Plan and Mine Closure Plan of Cluster IX group of mines with existing leasehold boundary as per existing EC and this

<table>
<tr><td></td><td></td><td>message was conveyed by GM (Env), BCCL through GM (P& P), BCCL to CMPDI, RI-2 on 08.09.2025.

In view of the above, Mining Plan and Mine Closure Plan of Cluster IX group of mines with existing leasehold boundary (without considering external OB dump area outside the leasehold boundary of Cluster IX) as per existing EC consisting of the following mines has been taken up by CMPDI, RI-2.
1. NT-ST Expansion OCP
2. Amalgamated Joyrampur Colliery (OC)

The coal production from last 5 years from 2020-21 to 2024-25 for erstwhile different mines within the leasehold of Cluster -IX is given below:

<table>
<tr><th rowspan="2">Production</th><th colspan="3">Coal Production in MTe.</th></tr>
<tr><th>Amal. NT-ST JG Colliery</th><th>Amal. Joyrampur Colliery</th><th></th></tr>
<tr><td>2020-21</td><td>2.26</td><td>0.00</td><td></td></tr>
<tr><td>2021-22</td><td>3.81</td><td>0.00</td><td></td></tr>
<tr><td>2022-23</td><td>6.05</td><td>0.00</td><td></td></tr>
<tr><td>2023-24</td><td>4.60</td><td>0.71</td><td></td></tr>
<tr><td>2024-25</td><td>5.34</td><td>0.81</td><td></td></tr>
</table>
</td></tr>
<tr><td>1.1.1</td><td>Name of Coal / Lignite Block</td><td>The area under consideration falls within the Mukunda exploration block in the eastern part of Jharia coalfield, District: Dhanbad, Jharkhand.</td></tr>
<tr><td>1.1.2</td><td>Name of the Coalfield/Lignite Field</td><td>Cluster-IX Group of Mines are located in Jharia Coalfield, Dhanbad</td></tr>
<tr><td>1.1.3</td><td>Base date of Mining Plan / Mine Closure Plan</td><td>The base date of the Mining plan & Mine closure plan is considered as April 2025.</td></tr>
</table>

1.1.4	Linked End Use Plant	The present production from the mine is linked to power plants / steel plants through washery. The coal is dispatched through GoI 6 & GoI 9 siding, located within leasehold boundary (within 2 Km) of the NT ST Expansion OC, to the Patherdih Coal Washery.
1.1.5	Distance of End use plant from the pit head of the project in "km"	The coal is dispatched through GoI 6 & GoI 9 siding to the Patherdih Coal Washery which is locate 4-5 km from pit head.
1.1.6	Mode of Coal Transport	In Quarry 1, Coal transportation is done by MDO agency. In Quarry 2, the coal produced from the mine is transported contractually by trucks from mine site to the railway siding.

1.2 LOCATION, TOPOGRAPHY AND COMMUNICATION

	Parameters	*Details*
1.2.1	Location of coal deposit (District and State)	The area under consideration is located in eastern part of Jharia coalfield, District: Dhanbad, Jharkhand. The colliery area lies between Latitude 23º40'55" to 23º44'9" (N) and Longitude 86º24'33" to 86º27'25" (E). The area falls in Survey of India Toposheet No. 73I/6.
1.2.2	Communication: PWD roads, railway lines, Air	**NATIONAL HIGHWAY & PWD ROADS** The proposed project area is about 5 Km west of Jharia town and can be approached by Dhanbad-Jharia-Sindri road and Jharia-Baliapur road **RAILWAY LINES** The proposed Mine is situated about 4 to 5 km from Patherdih Railway Station of East Central Railway **MAJOR TOWNSHIP** The proposed project area is about 15 Km south of

		Dhanbad town and about 5 Km west of Jharia town
1.2.3	Availability of power supply	At present, the colliery is receiving power at 11 KV from 33 kV Main DG Sub station Jealgora Lodna Area. There are three nos. 10 MVA Transformer installed at Main Sub-station which is supplying power to different substation of colliery.
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level	Chatkari Jore which is a tributary of Damodar River is flowing from north to south through the middle of the proposed quarry. The drainage of the block is mainly controlled by southerly flowing Chatkari Jore which is a tributary of Damodar River. The another small nala, Tisra Jore is flowing from north to south and meet with the Chatkari Jore near bore hole GL-9. The highest elevation (199.17 m) has been observed near borehole no. NGK-17 in the north-eastern part, whereas, the lowest ground elevation (161.44 m) has been observed in the southern corner of the block around borehole No GL-5. The area under consideration falls in the sub-humid region of the state of Jharkhand. The maximum temperature rises as high as 48°C during summer (April to middle of June) and falls down to minimum of 6°C during winter (December to January). The area receives fair to moderate rainfall, the average annual precipitation being 140 cm, most of which is received between June to September. The highest flood levels of Chatkari Jore recorded in the year 1995, is 160.96 m. above MSL.
1.2.5	Important surface features within the project area	Important surface features and major diversion or shifting involved in the mine is given below:

	and major diversion or shifting involved	**Road:** DB Road passes along the western boundary. No diversion of DB Road needed. **Jore:** The Tisra jore is flowing from east to west through the middle of proposed quarry. This jore needs to be diverted for the operation of the quarry. The diversion of the Tisra jore will be done through northside of the quarry considering topography and existing drainage pattern of the area. Chatkari jore flows southwards within the Colliery and also controls the drainage system of the area. Diversion of the Chatkari jore is proposed in the eastern side of Quarry 2. The eastern boundary of proposed OB dump has been delineated taking 60 m from the diverted route of Chatkari jore. **No. of Villages/Houses to be shifted** 12246 Project Affected Families (PAFs) within proposed quarry area of Cluster IX mine will have to be shifted as per data submitted by Colliery Authority.

1.3 DETAILS OF THE ALLOTMENT AGREEMENT

	Parameters	*Details*	
1.3.1	Name of the Allottee	Bharat Coking Coal Limited	
1.3.2	Details of allotment / vesting order	Lease period-30 Years, as per relaxation granted by the Central Govt. U/S-31 of MMDR Act, 1957 vide letter No. 13016/05/2002-CA dt. 10.08.04 issued by the Ministry of Coal and Mines, Dept. of Coal, GoI.	
1.3.3	Name and address of the applicant	**Regd. Office** Bharat Coking Coal Limited, Koyla Bhawan, Koylanagar, P.O.	**Principal Place of Business** Jharkhand and some part in

		BCCL Township, Dhanbad (JH)	West Bengal
1.3.4	Name of the previous allottee of the Block	NA	
1.3.5	Date of Mining Opening permission granted by CCO	Nationalised Coal Mine	
1.3.6	Rated Capacity as per CMDPA	10.21 MTY.	
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any)	Details of the production programme has been provided in Chapter 3.	
1.3.8	End Use of Coal/Lignite as per allotment order if any	Quarry 1 Section is worked by MDO Agency. Quarry 2 • Coal is dispatched via road and rail through 6 and 9 No. sidings until the proposed Patherdih–Rakhitpur railway siding becomes operational. • 90% of coal will be sent to Patherdih Coal Washery via rail and proposed conveyor belts. • 10% will be supplied to crockeries and other consumers by road.	
1.3.9	Cardinal Point co-ordinates (WGS84) of the Block boundary	Given in Annexure of Chapter 2	

1.4 DETAILS OF THE PREVIOUS APPROVAL OF MINING PLAN

	Parameters	*Details*
1.4.1	Whether any mining plan has been previously approved	N.A.
1.4.2	Title of the Mining Plan	N.A.
1.4.3	Base Date	N.A.
1.4.4	Submitted By	N.A.
1.4.5	Approval Reference, with Date	N.A.
1.4.6	Conditions, if any	N.A.
1.4.7	Scheduled year of start of production	N.A.

1.4.8	Proposed year of achieving the targeted production	N.A.
1.4.9	Date of actual commencement of mining operations, if operations already started	N.A.
1.4.10	Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations	N.A.
1.4.11	Planned production and actual levels achieved in last 3 years (Coal in Mte)	N.A.
1.4.12	Statutory obligation vis-à-vis compliance status in a tabular form	N.A.
1.4.13	Reasons for difference between the planned and actual production levels	N.A.

1.5 PARAMETERS OF APPROVED MINING PLAN VIS-À-VIS PROPOSED MINING PLAN

	Parameters	**Approved Mining Plan**	**Proposed Mining Plan**
1.5.1	Allocated Block Area in "Ha"	N.A.	2210 Ha (Mukunda Opencast Block)
1.5.2	Allocated Block Area Projectised "Ha"/Quarry Area	N.A.	588.31 Ha (Quarry 1 = 275.26 Ha Quarry 2 = 313.05 Ha)
1.5.3	Proposed Lease area "Ha" (Besides, Mineralised zone Lease area may encompass other areas under the definition of a mine)	N.A.	Leasehold Area = 1942.12 Ha. Forest Land = 4.62 Ha Leasehold Area considered for this mining plan = 1942.12 – 4.62 = 1937.50 Ha
1.5.4	Project Area "Ha"	N.A.	1937.50 Ha
1.5.5	Life of the Project "Yrs"	N.A.	Overall = 4 Year Quarry 1 : 4 years Quarry 2 : 4 years
1.5.6	Minimum and Maximum Depth of working "m"	N.A.	Quarry 1 : 120-190 Quarry 2 : 70 -170

1.5.7	Geological Block "Ha"	N.A.	2210 Ha
1.5.8	Production Target "MTPA"	N.A.	Rated Capacity: 10.21 Peak Capacity: 15.31 (@ 150% of the rated capacity)
1.5.9	Seams Available "As per GR"	N.A.	XVIA to I Seams
1.5.10	Seams not considered for Mining with Reasons	N.A.	In Quarry 2, Seam below IX/X seam is not considered for mining.
1.5.11	Gross Geological Reserve "Mt" (as per GR)	N.A.	1428.18 Mt
1.5.12	Net Geological Reserve "Mt" (as per GR)	N.A.	1285.35 Mt
1.5.13	Blocked Reserve "Mt"	N.A.	78.04 Mt
1.5.14	Net geological Reserve within the delineated quarry "Mt"		36.89 Mt (Quarry 1 : 27.13 Mt Quarry 2 : 9.76 Mt)
1.5.15	Extractable Reserve "Mt"	N.A.	34.55 Mt. (Quarry 1 : 25.77Mt Quarry 2 : 8.78 Mt)
1.5.16	% of Extraction / recovery	N.A.	30%
1.5.17	Production till date (till the base date of the proposed Mining Plan) Reserves "Mt"	N.A.	--
1.5.18	Balance Extractable reserves "Mt"	N.A.	34.55 Mt. (Quarry 1 : 25.77Mt Quarry 2 : 8.78 Mt)
1.5.19	Grade Range	N.A.	Non Coking–G5 to G9 Coking- W-I to W-IV
1.5.20	OB in MM^3	N.A.	Quarry 1 : 104.17 Mm^3 Quarry 2 : 171.57 Mm^3 Total = 275.74 Mm^3
1.5.21	SR MM^3/te	N.A.	Quarry 1 : 4.04 Quarry 2 : 19.54 Overall SR : 7.98
1.5.22	Mining Technology	N.A.	Shovel-Dumper combination
1.5.23	Coal Beneficiation envisaged	N.A.	N.A.
1.5.24	Handling of Rejects	N.A.	N.A.

1.5.25	Land use pattern "Ha"	N.A.	
i.	Excavation Area		588.31
ii.	Top Soil Dump Area		10.62
iii.	External Dump Area		543.50
iv.	Safety Zone		267.1
v.	Other Use		15.00
vi.	Infrastructure Area		45.36
vii.	Green Belt		34.82
viii.	Undisturbed Area		432.79
	Total		**1937.50**
1.5.26	Reason for revision	-	1. To comply the statutory requirement as per the Rule 22A of Mineral Concession (Amendment) Rules 2020 2. To comply the Guidelines for Preparation of Mining Plan and Mine Closure Plan for Coal and Lignite Blocks 2025 – reg. vid F No CPAM-34011/28/2019 - CPAM [E343762] dated 31st January, 2025 3. To facilitate 20% capacity enhancement for getting Environmental Clearance of Cluster IX Group of Mines as per Clause 7(ii) of EIA Notification 2006.

1.6 : SUSTAINABILITY (Indicative)

	Parameters	Details
1.6.1	No. of Project Affected People(PAPs)	The no. & scope of activities that are to be undertaken under Sustainability will be decided by BCCL Management on Case to case basis.
1.6.2	No. of Working-aged persons	
1.6.3	No. of Skilled/Semi Skilled /Unskilled persons profession wise, gender wise, age wise and location wise *	
1.6.4	No. of persons in Vulnerable Groups (Women, Children, Handicap etc.)	
1.6.5	Repurposing of land proposed	Plantation will be carried out on 1029.65 Ha of land.
1.6.6	Assessment of possible GHG emissions	• The mines in the analysed cluster are mainly categorized as degree-I or degree-II gassy mines, with methane being the primary GHG released during coal extraction. Methane is trapped in coal seams and released when accessed via underground (UG) or open-cast (OC) mining methods. According to the Coal Mines Regulations, 2017, methane production is regulated based on the level of inflammable gas detected and its rate of emission per tonne of coal. For degree-I mines, the methane emission rate is 1.0 m^3/tonne, while for degree-II mines, it is less than 10.0 m^3/ton

		• The Global Warming Potential (GWP) is used to quantify the impact of different gases relative to CO_2. Methane has a GWP of 21 over 100 years, meaning one tonne of methane is equivalent to 21 tonnes of CO_2. Additionally, 1 cubic meter of methane corresponds to 0.6802 kg. • Blasting activities, which use ammonium nitrate-based explosives, have a minimal contribution to GHG emissions. Various mitigation measures, such as large-scale plantations in reclaimed areas, will help sequester CO_2 and further reduce the environ -mental impact of coal mining operations.
1.6.7	Tentative measures to curtail GHG emissions	• Proposed Plantation on 1029.65 Ha in Cluster - IX • Offsetting CO_2 by Energy Efficient Appliances Installations • Offsetting CO_2 by Introducing Electric Vehicle.
1.6.8	Efforts to achieve net zero, wherever applicable	In addition to 1.6.7, other measures are being planned to achieve net zero.

Chapter 2: Exploration, Geology, Seam Sequence, Coal Quality and Resource

<table>
<tr><th></th><th>Parameters</th><th>Details</th></tr>
<tr><td>2.1</td><td colspan="2">DETAILS OF THE BLOCK</td></tr>
<tr><td>2.1.1</td><td>Name of the Geological Report with month and year of preparation,</td><td>“Geological Report on exploration for coal in Mukunda Open Cast Block” Jharia coalfield, Dhanbad (July, 1981)”</td></tr>
<tr><td>2.1.2</td><td>Name of GR Preparing Agency</td><td>CMPDI</td></tr>
<tr><td>2.1.3</td><td>Particulars of adjacent Area/ blocks: North, South, East, West</td><td>Cluster-IX group of mines share their boundary with following collieries/villages:
<table>
<tr><td>North</td><td>Kuya, Ghanoodih and Rajapur collieries.</td></tr>
<tr><td>South</td><td>Non-coal Bearing area.</td></tr>
<tr><td>East</td><td>Sulunga Bustee and Pahari-gora (Non-coal Bearing area).</td></tr>
<tr><td>West</td><td>Amalgamated Simlabahal-East Bhuggatdih Colliery, Hurrladih Colliery and Jama-doba Colliery of Tata Steel.</td></tr>
</table></td></tr>
<tr><td>2.1.4</td><td>Location of the Block District / State</td><td>Dhanbad District, Jharkhand</td></tr>
<tr><td>2.1.5</td><td>Area of the Block "Ha"</td><td>2210 Ha as per Colliery record</td></tr>
<tr><td>2.1.6</td><td>Area of the geological block projectised "in Ha" (Area of the geological block considered for liquidation of coal resource)</td><td>
<table>
<tr><td>Quarry 1</td><td>275.26 Ha</td></tr>
<tr><td>Quarry 2</td><td>313.05 Ha</td></tr>
<tr><td>Total</td><td>588.31 Ha</td></tr>
</table></td></tr>
<tr><td>2.1.7</td><td>Balance area yet to be projectised "Ha"</td><td>1353.81 Ha</td></tr>
<tr><td>2.1.8</td><td>Likely geological Resource in the area yet to be projectised "MTPA"</td><td>1172.06 Mt.</td></tr>
</table>

2.1.9	Cardinal Point Co-ordinates of the non-coal/lignite bearing area/ Coal/lignite bearing area within the existing mining lease outside the allotted Geological Coal/Lignite block. (Duly certified in line with Para 2.7 (c) of the Guideline, if fresh mining lease required)	Given In Annexure-A
2.1.10	Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/ allotted block boundary/ existing mining lease and Where the project area extends beyond the block boundary, a certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) should be supported with a certificates i) As the State government is the custodian of exploration data under provisions of Rule 16 of MCR 1960, a No Objection Certificate from Mines and Geology Department of concerned State Government (ii) A certificate in proof of the non-existence of coal or lignite in the area beyond the vested or allocated boundary from CMPDIL (iii) In case of existence of coal or lignite, a certificate of technical-viability issued or certified by	Not Applicable.

	CMPDIL (iv) In case of Coal bearing area, an undertaking or Affidavit by the project proponent that they will rehandle the OB in a specified time period.	
2.1.11	KML file of the Proposed lease area, Project Area and geological block.	Available Given in Annexure-B
2.1.12	Whether the proposed project area is confined within the allotted block boundary/existing mining lease, if not, the reason for deviation from allotted block boundary, may be given.	Yes
2.1.13	If the project area extends outside the allotted block boundary/existing mining lease, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished lease, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished	Not Applicable.
2.1.14	Type of the Project (Operating under implementation) and year of Starting.	Operating. Presently Opencast Mining Operation with Shovel-Dumper combination is going on in the Cluster IX Group of Mines via Outsourcing Mode / MDO Mode. In the Quarry 1, MDO Mode of Operation in the NT-ST Colliery. One Hired HEMM (Patch-D) is running in leasehold of Amalgamated Joyrampur Colliery in the Quarry 2.

2.2	EXPLORATION, GEOLOGY AND ASSESSMENT OF RESERVE	
2.2.1	Regional geological set up of the area, geology, structure, stratigraphic sequence, characteristics of the litho-logical units (coal seams/partings/overburden).	The Jharia coalfield (453 Km2) is sickle shaped on plan and occurs in the form of syncline with its axis trending broadly in E-W direction and plunging towards west. The southern flank of this coalfield is truncated by boundary fault having maximum throw about 2.5 Km at Mohuda Basin. The non-coal bearing Talchir formation is mainly exposed along the northern and western portion of the coalfield. The Barakar formation covering an area of 218 Km2 which is exposed in the northern, eastern and south-eastern part of the coalfield area contains over 40 coal horizons including local and persistent seams, some of which are exclusively store house of metallurgical coal in India. The Barakar formation is successively overlain by Barren Measure formation which is devoid of workable coal seams. This is mainly exposed in the central part of the coalfield. The Barren Measure is overlain by the coal bearing Raniganj formation (54 Km2). These are exposed within a sub elliptical basin the south-western part of the coalfield.
2.2.2	Local geology, Structure, Stratigraphic sequence, Characteristics of the litho-logical units (coal seams /partings/overburden).	The area under consideration is located in the eastern flank of the Jharia coalfield, and it is primarily covered by the Barakar formation which is overlain by thin layers of sandy soil and clay. Based on available borehole data, thickness of soil ranges between 1.39 m. (ST-16) to 8.50 m. (LJ-4) with average thickness of about 4.75 m. The rocks of Barakar formation

		consist of grits, fine to coarse grained sandstone, intercalation of sandstone and shale, sandy shale, grey shale, carbonaceous shale and number of coal seams. Coal seams XVI A to I occur within the project area. As per the information provided by the collieries seams above seam XIV have been almost exhausted by earlier mining activities and effect of fire. In addition to that seam X A is not persistent and is almost exhausted within the leasehold Therefore seams XIV to I are under the purview of this Geological note for their extraction by opencast method (Plate No. G-III). Good rock exposures are rather few except in old quarries and it has not been possible to precisely delineate the incrop position of the seams because of the extensive goaf, fire and subsided ground which have severely affected the original topography. Incrop positions of the coal seams have been extrapolated on the basis of geological data viz. geological cross section, floor contour and quarry/incline positions and are interpretative. Geology and correlation of the seams have been established mainly on the basis of sub-surface data obtained from borehole and mine workings.
2.2.3	Geological Block Area "Ha"	Mukunda Open Cast Block, 2210 Ha
2.2.4	Status of Exploration of the block	Seam Below IV seam is partly explored in the western part of the area
2.2.5	Area covered by 'detailed' exploration within the block (sq. km)	The entire area under consideration detailed exploration up to basement except for seams IVT, IV B, III, IIT, IIB & I in western part (Joyrampur part) of the area

<table>
<tr><td>2.2.6</td><td>Whether entire lease area has been covered by detailed' exploration.</td><td>The entire area under consideration has been covered by detailed exploration except for seams IVT, IV B, III, IIT, IIB & I in western part (Joyrampur part) of the area and
In eastern part (Incrop side), the area under consideration has been fully explored by detailed exploration upto seam I.
“Geological Report on exploration for coal in Mukunda Open Cast Block” Jharia coalfield, Dhanbad (July, 1981)” is prepared by CMPDI.</td></tr>
<tr><td>2.2.7</td><td>No. of boreholes drilled within the mining area of the block</td><td>A total of 123 boreholes have been drilled within Mukunda Opencast block, out of which 94 boreholes fall within the leasehold of Cluster-IX group of mines involving a total meterage of 23,631.72 meters.
<table>
<tr><th>Sl. No</th><th>Year of commencement of drilling</th><th>No. of BH in Leasehold Area</th><th>Meterage drilled in Leasehold Area</th></tr>
<tr><td>1</td><td>1980</td><td>94</td><td>23,631.72</td></tr>
<tr><td colspan="2">Total</td><td>94</td><td>23,631.72</td></tr>
</table></td></tr>
<tr><td>2.2.8</td><td>Whether any further exploration/study is required or suggested and time frame in which it is to be completed</td><td>In the western part, Detailed Exploration is to be done in the below V/VI seam. The upper seam upto IX as base is worked by Opencast method and area is also previously worked by underground mining method upto VIIIA seam.</td></tr>
<tr><td>2.2.9</td><td>Year wise future programme of exploration</td><td>Not applicable.</td></tr>
<tr><td>2.2.10</td><td>Overall borehole density within the mining area (no./ sq. km) approx.</td><td>05 BHs/Km^2.</td></tr>
<tr><td>2.2.11</td><td>No. of Seams available as per GR</td><td>The lay and deposition of coal seams is based primarily on the data available in the</td></tr>
</table>

		"Geological report Mukunda Open Cast Block" Jharia coalfield, Dhanbad (July,1981, prepared by CMPDI, RI-2, Dhanbad) and also on the boreholes drilled at later stage as well as updated mine data provided by colliery authorities. Coal seams XVIA to I occur within the Open Cast block. Incrop of seam XVIA touches the Western corner of the colliery boundary from outside and therefore does not lie within the colliery. As per the information provided by the collieries seams above seam XIV have been almost exhausted by earlier mining activities and effect of fire. Therefore, seams XIV to I are under the purview of this Geological note for their extraction by opencast method.
2.2.12	Seams not considered for Mining with Reasons	Seams XIV to IX/X have been proposed to be projectized in Quarry 2 (Amalgamated Joyrampur quarry) of the leasehold area. Seam below IX/X seam is not considered for mining as the depth of seam is more.
2.2.13	Dip of the Seam	The general strike of the seams is normally NNW-SSE swinging to N-S covering major part of the block and finally to E-W in the southern extremity of the block. The dip direction is towards WSW, W and N respectively and its amount generally varies from 4° to 12° respectively. Local variation in the strike and dip have been observed particularly near incrops and faults. The relevant details of strike and dip of seams can be seen from the floor contour plans and geological cross sections

2.2.14	Seam wise thickness, depth and reserve	
	Seam wise summary of in-band thickness (I-100) based on borehole data, depth range and reserve within Cluster IX leasehold are given in Table- 2.6 for their extraction by opencast method. 10 percent of the net geological resource available within the proposed quarry has been considered as mining losses. Therefore, 90 percent of net geological resource available within the proposed quarry has been considered as mineable reservel in joyrampur part and 5 percent in NTST part.	
2.2.15	Methodology of resources estimation (also mention if any software package has been used).	The reserve has been estimated through "MINEX" software. 1. The reserve has been calculated using "Detailed resource reporting" menu of **MINEX 6.5** software along with separate template for each individual seam. 2. A deduction of 10% from the 'gross reserves' of coal has been made to account for unidentified geological uncertainties like structural disturbances, washout zones etc. to arrive at the 'net geological reserves.' 3. The seam wise status of developed depillared areas in addition to virgin patches has been identified on the basis of seam working plan supplied by the concerned area/colliery officials. These have been clearly marked on the seam folio plans and floor contour plans of all the seams. 4. Heave Zone: The areas falling within the heave zone of a fault has been

		excluded for the purpose of reserve estimation. 5. Reserve is calculated within the proposed project boundary demarcated by the mining department. **Status of fire** It is very difficult to know the extent underground fire and its quantitative and qualitative affect upon the seam under consideration. However, quantitative assessment of coal has been derived based on data as provided by the colliery authority regarding the extent of fire and percentage of coal damage due to fire. Since the effect of fire upon each seam are not uniform, hence we considered the data of seam wise percentage of damage coal due to fire as provided by colliery authority. All the seams above seam IX/X has been under fire in Amalgamated Joyrampur Quarry. Seam IX/X has been considered to be under fire in northern part of the leasehold (Kujama) and seams above IV top has been considered to be under fire in eastern part of the leasehold (NT-ST). Tentative loss of coal due to fire within extent of fire as provided by the colliery authorities is given below: **Seam wise percentage of loss of coal resource due to fire within limit of fire**

Seam	Percentage of coal resource loss in Amalgamated NT-ST Colliery	Percentage of coal resource loss in Kujama Colliery	Percentage of coal resource loss in Amalgamated Joyrampur Colliery
XIV	-	-	Given in Annexure-I
XIII B	-	-	
XIII A	-	-	
XIII	-	-	
XI/XII & XI/XII/ XIII		-	
IX/X	80	70	-
VIII A	60	-	-
VIII	60	-	-
VII	60	-	-
V/VI	50	-	-

Grade of coal within the fire affected area cannot be assessed or confirmed, however the grade of coal within the fire area has been considered as per available data in Geological Report of Mukunda OCP (1981), which may be deteriorated later due to burning effect of fire and cannot be confirmed.

Coal resource estimation of individual seam within the proposed quarry limit has been assessed by taking the area of each seam extent marked in individual floor contour plan/seam folio plan and considering all the assumptions as discussed above.

2.2.16 Average GCV "KCal/kg"

Seam	Average Thickness (m)	Average Ash% (Coking)	Average GCV(Kcal/Kg)
XIV	7.67	20.09	-
XIIIB	2.76	31.49	-
XIIIA	2.73	23.24	-
XIII	3.20	21.74	-
XI/XII	7.74	23.08	-
XI/XII/XIII	12.37	23.00	-
IX/X	8.19	31.87	-

		VIII A	2.22	27.32	-
		VIII	2.38	28.54	5920
		V/VI/VII/VIII	17.29	33.12	-
		VII	7.68	32.25	-
		VII Top	3.30	36.07	5275
		VII Bot	5.37	34.55	5903
		V/VI/VII	16.58	34.65	-
		V/VI	7.40	34.74	5545
		IV Top	6.32	-	4602
		IV Bot	3.13	30.4	4652
		III Top	3.59	-	4653
		III Bot	10.15	-	5109
		III	17	-	4933
		II Top	2.38	-	4767
		II	6.60	-	4870
		II Bot	2.84	-	4900
		I	5.38	-	5082
2.2.17	Gross Geological Reserve of the block "Mt"	1,428.18 Mt.			
2.2.18	Net Geological Reserve of the block "Mt" (Including Indicated Reserve)	1,285.35 Mt.			
2.2.19	Mineable Reserve of the block "Mt"	36.89			
2.2.20	Blocked Reserve “Mt”	78.04 Mt.			
2.2.21	Corresponding extractable Reserve of the block "Mt"	34.55 Mt. (In Proved Category)			
2.2.22	Percentage of Extraction	30% (from Vertical Resource)			
2.2.23	Resource already depleted (upto Base date of Mining Plan)	Nil			
2.2.24	Balance Resource (as on Base Date)	34.55 Mt.			

2.2.25 Sequence of Coal Seams (within the colliery boundary)

Table-2.1

Seam/Parting	Vertical Thickness (m)		Average Thickness (meter)	No. of BH intersection
	Minimum	Maximum		
XVI A	-	2.19(MJ-12)	2.19	1
P	-	40		
XVI	2.16(GL-10)	3.25(MJ-6,12)	2.95	5
P	65	76	72	
XV A	0.60(MJ-1)	1.61(JBJ-2)	1.17	15
P	28	43	35	
XV	5.68(NGK-31)	11.25(JBJ-1)	8.12	18
P	2	7	4	
XIV A	0.85(NGK-31)	3.75(GL-2)	2.22	18
P	14	25	20	
XIV	6.72(GL-10)	10.63(MJ-12)	8.49	18
P	11	26	18	
XIII B	0.67(GL-2)	5.8(JBJ-2)	2.81	21
P	1	47	10	
XIII A	1.2(MJ-9)	6.24(LJ-2)	3.94	25
P	5	52	17	
XIII	2.50(GL-9)	6.10(JBJ-3)	3.90	15
P	1	35	21	
XI/XII	4.65	10	7.50	24
XI/XII/XIII	11.45(JBJ-2)	19.8(MJ-8)	14.12	16
P	10	39	24	
X A	0.25(LJ-3)	5.66(MJ-14)	2.43	43
P	14	63	41	
X	2(MSR-20)	4.13(GL-10)	3.04	3
P	2	40	17	
IX	2.5(GL-5)	6.58(GL-10)	4.99	3
IX/X	2.8(JBJ-2)	15.88(GL-7)	9.38	52
P	8	50	21	

Seam/Parting	Vertical Thickness (m)		Average Thickness (meter)	No. of BH intersection
	Minimum	Maximum		
VIIIA	0.22(GL-10)	5.45(MSR-12)	2.37	60
P(VIIIA-VIII)	4	49	19	
P(VIIIA-V/VI/VII/VIII)	3	14	7	
VIII	1.02(ST-11)	6.92(NGK-29)	2.6	57
P(VIII-VIIT)	2	40	20	
P(VIII-VII)	3	24	9	
P(VIII-V/VI/VII)	1	40	7	
VIIT	1.11(MJ-12)	5.96(MJ-9)	3.27	24
P(VIIT-VIIB)	2	44	14	
VII	2.69(MSR-10)	9.57(ST-14)	7.29	26
P(VII-V/VI)	2	21	7	
VIIB	1.74(ST-15)	6.95(MJ-14)	3.42	22
V/VI/VII	15.43(LJ-4)	26.51(NGK-29)	18.24	9
V/VI	4.32(ST-2)	16.65(MSR-10)	7.38	49
P	20	36	29	
IVT	0.93(GL-8)	10.36(MJ-14)	5.95	69
P(IVT-IVB)	10	34	22	
P(IVT-III)	30	52	46	
IVB	0.47(LJ-2)	7.06(MSR10A)	3.17	49
P(IVB-III)	12	35	25	
P(IVB-IIIT)	10	20	15	
IIIT	3.59(NGK-12)	5.7(NGK-9)	4.42	3
IIIB	8.42(NGK-20)	10.35(NGK-9)	9.64	3
III	4.24(MSR-8)	23.88(MJ-8)	16.82	58
P?				
IIT	0.5(NGK-12)	6.65(MSR10A)	1.95	53
P	1	30	9	
IIB	0.3(NGK-4)	8.55(ST-13)	2.95	48
P	1	18	8	
I	1.21(NGK-31)	13.12(ST-9)	6.07	57

2.2.26 Net Geological Reserve of the Leasehold

Seamwise – Gradewise net geological reserve of coal and jhama within the leasehold of Cluster IX is given in Table-2.2(A), (B), (C), (D).

Table No.- 2.2 (A)

NET PROVED GEOLOGICAL RESOURCE OF COKING COAL WITHIN LEASEHOLD (Million Tonnes)									
COKING									
Seam	**S-I**	**S-II**	**W-I**	**W-II**	**W-III**	**W-IV**	**W-V**	**W-VI**	**TOTAL**
XIV	0.05	0.5	1.08	0.44	0.43				2.5
XIII B				0.31	0.76	1.62	0.15		2.84
XIII A		0.18	0.3	1.12	1.26	0.42			3.28
XIII		0.23	0.36	0.48	0.82	0.18			2.07
XI/XII/XIII		1.92	4.56	10.87	3.74				21.09
XI/XII		0.11	1.7	6.24	0.65	0.24			8.94
IX/X				0.32	24.68	60.38	15.28		100.66
VIIIA				3.36	10.85	16.96	0.91	0.12	32.2
V/VI/VII/VIII						24.84	3.5		28.34
VIII				0.38	10.77	22.34	1.28		34.78
V/VI/VII						23.44	2.78		26.22
VII					3.95	28.98	19.16		52.09
VIIT						18	10.23	1.33	29.56
VIIB				1.58	6.92	19.05	12.58	0.22	40.35
V/VI					0.19	61	41.65	0.53	103.37
I		0.02	0.23	3.14	9.21	24.43	3.88		40.93
TOTAL	**0.05**	**2.96**	**8.23**	**28.24**	**74.23**	**301.88**	**111.4**	**2.2**	**529.21**

Annexure VI

Table No.- 2.2 (B)

NET PROVED GEOLOGICAL RESOURCE OF NON COKING COAL WITHIN LEASEHOLD (Million Tonnes)															
SEAM	**NON COKING**														
	G1	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**	**G10**	**G11**	**G12**	**G13**	**G17**	**TOTAL**
VIIT					0.14	0.06	0.14	0.37	0.55	0.02					1.28
VIIB						0.29		0.78							1.07
V/VI					1.65	10.01	0.99								12.65
IVT							0.01	5.87	47.7	30.67	14.36	0.03			98.64
IVB							0.08	7.57	8.04	15.82	1.04				32.55
IIIT									3.28	3.57					6.85
III	2.41	0.95	0.45	0.69	1.63	3.02	20.27	120.25	39.22	21.44	7.37				217.7
IIIB							3.9	5.88	2.71	2.03					14.52
IIT						0.94	0.99	14.16	4.53	3.95	0.32				24.89
II									1.5				0.13	0.14	1.77
IIB							0.86	20.06	3.47	1.55	1.1				27.04
I		1.8	1.19	1.71	7.02	7.91	5.09	1.94	2.84	1.9	0.21				31.61
TOTAL	**2.41**	**2.75**	**1.64**	**2.4**	**10.44**	**22.23**	**32.33**	**176.88**	**113.84**	**80.95**	**24.4**	**0.03**	**0.13**	**0.14**	**470.57**

Annexure VI

Table No.- 2.2 (C)

INDICATED COAL RESERVE (Million Tonnes)	
IVT	18.55
IVB	14.97
III	169.03
IIT	16.66
IIB	8.99
I	42.84
TOTAL	**271.04**

Table No.- 2.2 (D)

NET GEOLOGICAL RESERVE OF JHAMA (Million Tonnes)	
XIII B	1.05
XIII A	9.08
XIII	1.34
XI/XII/XIII	1.31
IIB	0.38
I	1.37
TOTAL	**14.53**

Note: Above tables for leasehold area includes reserve of the Kujama part also.

2.2.27 Mineable Reserve within delineated quarry

Table: 2.3 (A)
Quarry 1

Seam wise/grade wise proved resource of coking coal within Given Floor limit (Million Tonnes					
SEAM NAME	**W II**	**W III**	**W IV**	**W V**	**TOTAL**
IX/X	0	1.064	1.9	0.1045	3.07
VIIIA	0	0.1235	0.133	0.019	0.28
V/VI/VII/VIII	0	0	0.703	1.5485	2.25
VIII	0.057	0.171	0.038	0	0.27
V/VI/VII		0	0.0095	1.3585	1.37
VII		0.5035	0.3705	0	0.87
V/VI		0	0.2945	0.1045	0.40
TOTAL	0.06	1.86	3.45	3.14	**8.51**

Table: 2.3 (B)
Quarry 1

Seam wise/grade wise proved resource of non-coking coal (Million Tonnes) in full coal zone											
SEAM NAME	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**	**G10**	**G11**	**G13**	**G17**	**TOTAL**
IVT	-	-	-	-	-	0.1045	0.266	0.152	-	-	0.52
IVB	-	-				0.1235	0.38	0	-	-	0.50
III	-	-	-	-	0.6175	1.3395	3.9805	5.928	-	-	11.87
IIT	-	-	-	0.1045	0.9785	0	0	0	-	-	1.08
II	-	-	-	0	0	0.931	0	0	0.0855	0.076	1.09
IIB	-	-	-	0.0855	0.874	0	-	-	-	-	0.96
I	0	0.0285	0.171	0.1615	0.19	0.2945	0.399		-	-	1.24
TOTAL	0	0.03	0.17	0.35	2.66	2.79	5.03	6.08	0.09	0.08	**17.26**

Table: 2.4 (A)
Quarry 2

Seam wise/grade wise proved resource of coking coal (Million Tonnes) in full coal zone								
Seam	**S-I**	**S-II**	**W-I**	**W-II**	**W-III**	**W-IV**	**W-V**	**Sub Total**
XV-A	Almost Exhausted (Extensively quarried, goaved, depillared and fallen within active fire zone. Resource cannot be assessed)							
XV	0.15							0.15
XIV-A	0.04	0.05						0.09
XIV	0.14	0.14						0.28
XIII-B	0.00	0.00		0.26	0.19	0.51	0.00	0.96
XIII-A	0.00	0.00		0.06	0.68	0.06	0.00	0.80
XIII	0.06	0.46	0.10	0.00	0.00	0.00	0.00	0.62
XI/XII/XIII	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.38
XI/XII	0.00	0.00	0.40	0.77	0.68	0.09	0.00	1.94
IX/X	0.00	0.00	0.00	0.00	0.00	2.97	0.00	2.97
Total	0.40	0.65	0.51	1.46	1.55	0.78	0.00	**8.19**

Table2.4 (B)

Quarry 2

Seam wise/grade wise proved resource of coking coal (Million Tonnes) in Coal+Jhama zone							
Seam	**S-II**	**W-I**	**W-II**	**W-III**	**W-IV**	**UG**	**Sub Total**
XIII-A	0	0	0.063	0.531	0		**0.59**

Table 2.4 (C)

Quarry 2

JHAMA RESOURCE (Mt)	
Seam	**Resource**
XIII-A	0.35
Total	**0.35**

Table 2.5
COMBINED QUARRY

SEAM NAME	QUARRY 1				QUARRY 2				CLUSTER IX QUARRY COMBINED			
	COAL	COAL IN COAL+JHAMA ZONE	SUB TOTAL	JHAMA	COAL	COAL IN COAL+JHAMA ZONE	SUB TOTAL	JHAMA	COAL	COAL IN COAL+JHAMA ZONE	SUB TOTAL	JHAMA
XV					0.15		0.16		0.16		0.16	
XIVA					0.09		0.09		0.09		0.09	
XIV					0.28	-	0.28		0.28		0.28	
XIII-B					0.96		0.96		0.96		0.96	
XIII-A					0.80	0.59	1.39		0.8	0.59	1.39	0.35
XIII					0.62		0.62		0.62		0.62	
XI/XII/XIII					0.38		0.38		0.38		0.38	
XI/XII					1.94	-	1.94		1.94		1.94	
X/IX	3.07		3.07	-	2.97	-	2.97		6.04		6.04	
VIIIA	0.28		0.28	-		-	-		0.28		0.28	
V/VI/VII/VIII	2.25		2.25	-		-	-		2.25		2.25	
VIII	0.27		0.27	-	-	-	-		0.27		0.27	
V/VI/VII	1.37		1.37	-	-	-	-		1.37		1.37	
VII	0.87		0.87	-	-	-	-		0.87		0.87	
V/VI	0.40		0.40	-	-	-	-		0.4		0.4	
IVT	0.52		0.52	-	-	-	-		0.52		0.52	
IVB	0.50		0.50	-	-	-	-		0.5		0.5	
III	11.87		11.87	-	-	-	-		11.87		11.87	
IIT	1.08		1.08	-	-	-	-		1.08		1.08	
II	1.09		1.09	-	-	-	-		1.09		1.09	
IIB	0.96		0.96		-	-	-		0.96		0.96	
I	1.24		1.24		-	-	-		1.24		1.24	
TOTAL	25.77	0	25.77	0	8.19	0.59	8.78	0.35	33.96	0.59	34.55	0.35

Annexure VI

2.2.28 Mineable Reserve of Jhama within delineated quarry

Table: 2.6

Resource of Jhama within Given Floor limits (in Mt)			
Seam	**Quarry 1**	**Quarry 2**	**Total**
XIII-A	-	0.35	**0.35**

ANNEXURE - A

Geo-Referenced Co-ordinates of the Project Boundary

ID	Latitude	Longitude
1	444529.707	2621286.080
5	443653.145	2620970.253
10	443548.288	2620772.906
15	443465.315	2620617.741
20	443246.058	2620423.161
25	443141.597	2620364.223
30	443027.882	2620247.551
35	442922.610	2620191.640
40	442789.568	2620107.415
45	442441.570	2619916.021
50	441955.189	2620077.975
55	441526.039	2620007.692
60	441396.837	2619609.782
65	441608.929	2619568.846
70	441628.648	2619378.906
75	441445.045	2619167.506
80	441004.530	2619193.112
85	440683.978	2619468.872
90	440503.430	2620038.038
95	440429.103	2621333.535
100	440282.908	2622420.419
105	439953.565	2622729.987
110	440005.593	2623809.992
115	440544.139	2624790.605
120	441254.313	2624892.162
125	441551.991	2624633.590
130	441630.606	2624390.643
135	441761.773	2624126.547
140	442297.248	2624240.447

145	442503.274	2624711.615
150	442763.749	2625399.072
160	444020.291	2624342.936
165	444708.026	2623272.406
170	444506.573	2623364.252
175	444501.124	2623241.538
180	444529.623	2623168.783
185	444552.383	2623085.923
190	444567.447	2622983.805
195	444459.583	2622976.751
200	444404.143	2622950.756
205	444454.791	2622858.439
210	444515.423	2622738.659
215	444574.978	2622637.311
220	444637.963	2622677.510
225	444625.034	2622713.111
230	444614.260	2622744.387
235	444595.380	2622835.774
240	444774.440	2622176.823
244	444529.707	2621286.080

Annexure VI

Chapter 3 : Mining

	Parameters	*Details*
3.1	**MINING METHOD**	
3.1.1	Existing method of mining if the mine is under operation	Presently Opencast Mining Operation with Shovel-Dumper combination is going on within the Cluster IX group of Mines. The Quarry 1 is in Operation in the leasehold of NT-ST Expansion OCP by Outsourcing Mode / MDO Mode of Operation. Opencast by Departmental mode is also running in the NT-ST Expansion OCP. Quarry 2 (Hired HEMM Patch-D) is running in leasehold of Amalgamated Joyrampur Colliery.
3.1.2	Proposed method of mining with justification on suitability of method of mining	**SEAMS TO BE WORKED** In this mining plan, Quarry 1 is proposed to extract the I Seam (bottom most seam) & all above occurring seams (IX/ X Seam) in the proposed quarry limit through opencast operation. Quarry 2 is proposed to extract the IX/X & all above occurring seams (upto XVA seam) in the proposed quarry limit through opencast operation. The seams below IX/X seam will be considered while in next phase of Mining Operation either by Underground or by Opencast. **CHOICE OF MINING METHOD** Based on existing geo-mining condition of the deposit and extensive experience of BCCL, Shovel-Dumper System of Mining has been proposed. The other mining systems have not been considered feasible for the proposed opencast as discussed below:

		• Dragline System and Shovel - In pit Crusher-Conveyor system is not found suitable due to small life and low production capacity of the project and multiseam / multiparting working etc. • Bucket Wheel Excavator System is not suitable for Cat. III & Cat. IV rocks. **Justification for Optimization of targeted capacity:** As per the current mining parameters of the mine, the rated capacity of the mine is 10.21 MTPA. The peak production from the mine may be 50% higher than the rated capacity (10.21 MTPA + 50%) which can be achieved by better utilization of resources and favorable geo-mining conditions. **Sequence of mining:** Cluster IX Mine is to be worked by two quarry *i.e* Quarry 1 and Quarry 2. The Quarry 1 lies in the leasehold of NT-ST Expansion OCP. Quarry 2 (Hired HEMM Patch-D) Lies in the leasehold of Amalgamated Joyrampur Colliery. In this mining plan, Quarry 1 is proposed to extract the I & all above occurring seams in the proposed quarry limit through opencast operation. Quarry 2 is proposed to extract the IX/X & all above occurring seams (upto XVA seam) in the proposed quarry limit through opencast operation. **<u>Boundary Delineation</u>:** The quarry limits of Quarry 1 on the surface is delineated considering dump space availability within leasehold boundary of Cluster IX as under:

North	Minimum distance of about 7.5 m from the leasehold boundary.
South	Minimum distance of about 7.5 m from the leasehold boundary.
East	The quarry benches of existing running opencast patches of NTST OC Mine up to base seam of patches and thereafter corresponding projected position upto I seam leaving the huge OB dump and eco-restoration park in the east side .
West	Minimum Distance of about 100 m from Railway Siding land.

The quarry limits of Quarry 2 on the surface is delineated as the Boundary of running Patch D within the leasehold boundary as under:

North	Minimum 100m from OB Dump.
South	Minimum 100m from OB Dump.
East	Minimum 60 m from the Diverted route of Chatkari Jore.
West	Minimum 100m from OB Dump.

Geological and Mineable reserves

The net geological reserves within leasehold boundary as well as within delineated quarry, blocked reserves within barrier & batter, mineable reserve within the delineated quarry & parting wise OB within the delineated quarry area given in the following tables:

Seam wise Mineable reserves of Quarry 1

SEAMS	Mineable Reserve (MT) within delineated quarry
IX/X	3.07
VIIIA	0.28
V/VI/VII/VIII	2.25
VIII	0.27
V/VI/VII	1.37
VII	0.87
V/VI	0.40
IVT	0.52
IVB	0.50
III	11.87
IIT	1.08
II	1.09
IIB	0.96
I Seam	1.24
Total	**25.77**

Mining Loss is kept 5% of Net geological reserve.

Coal Reserve may be locked in the Mining of which require re-handling of huge quantity of loose OB including Jhama) is not considered for mining.

Seam wise Mineable reserves of Quarry 2

Seams	Mineable Reserve (MT) within delineated quarry
XVA	0.00
XV	0.15
XIVA	0.09
XIV	0.28
XIIIB	0.96
XIIIA	1.39
XIII	0.62
XI/XII/XIII	0.38

XI/XII	1.94
XA	0.00
IX/X	2.97
Total	**8.78**

Note :

1. XVA seams are exhausted (extensively quarried, goaved, depillared) and fallen within active fire zone burnt within the delineated quarry area in the Quarry. Resource cannot be assessed)
2. XIVA, XV are almost exhausted (extensively quarried, goaved, depillared and fallen within active fire zone.
3. In XA seam, most of the borehole having thickness below 0.5 meter, only 2-3 borehole having thickness range 1-1.5 m so reserve not estimated due to inconsistent thickness.
4. Mining Loss is kept 10% of Net geological reserve.

Production Scheduling:

The calendar programme of mining operation has been formulated based on the adopted sequence of mine development and optimum condition of mining operation.

The year wise production from the Cluster IX mine is given below:

Year	COAL PRODUCTION PROGRAMME (MTe)		
	Quarry 1	**Quarry 2**	**Total Cluster IX**
2025-26	6.00	1.50	7.50
2026-27	7.50	2.71	10.21
2027-28	6.27	2.50	8.77
2028-29	6.00	2.07	8.07
Total	**25.77**	**8.78**	**34.55**

Note :

Production scheduling of Amalgamated NTST Kujama section as proposed in this Mining Plan differs from

		production scheduling given in approved Revised Project Report of Amalgamated NTST Kujama OCP (8.5 MTY). Production scheduling of Amalgamated NTST Kujama OCP (8.5 MTY) was formulated considering the following points: - 1. Two Hired HEMM Opencast Patches, namely Patch F & Patch B and one departmental patch were running within limit of Amalgamated NTST Kujama OCP (8.5 MTY) at the time of formulation of RPR. One Hired HEMM Opencast Patch namely Patch G was also proposed within the RPR limit. 2. During planning of Production scheduling of Revised Project Report of Amalgamated NTST Kujama OCP (8.5 MTY), it was considered that all patches will run upto their scheduled completion time. 3. The Scheduled completion time of hired HEMM Patch F, as per contract, was Sept. 2023 and the time for hired HEMM Patch B, as per contract was June 2026. 4. During planning of Production scheduling of Revised Project Report of Amalgamated NTST Kujama OCP (8.5 MTY), it was also considered that mine will initially run in the dip side of Patch F. Accordingly, production scheduling was formulated considering smaller strike length initially and thus less coal production was proposed. It was also planned that after completion of Patch B, the mine will gradually advance towards north direction thus covering more strike length. It was also planned that mine will advance towards further north side after completion of Patch G, running in Kujama Section, thereby further increase in strike length.

		Keeping in view of mine advance as stated in last paragraph, coal production scheduling including built up period was planned in the RPR. However, the mining of patch B has been completed much earlier i.e June 2024 thereby achieving the contract quantity. The mining of patch F has also been completed in Feb. 2024 after achieving the contract quantity. Now as the larger strike length is available for coal production, the production schedule of Cluster has been re-scheduled. Keeping in view of larger strike length available in initial period, after early completion of Patch B, it is possible to achieve higher coal production from the planned coal quantity as envisaged in approved RPR subject to acquisition of land required for OB dump, infrastructure and completion of related R&R activities on time. Accordingly production scheduling has been planned in this Mining Plan and this production program may be achievable & sustainable, if acquisition of land required for OB dump, infrastructure and completion of related R&R activities done in time. In this context this is also to be mention that MDO agency has achieved 5.24 Million Tonne in 2024-25 in Amalgamated NTST Kujama OCP. The approved RPR for the Amalgamated NTST Kujama project envisaged a production capacity of 8.50 MTPA, along with a year-wise production plan. This approved plan formed the basis for awarding the MDO contract, under which the project is presently being executed in the MDO mode. Subsequently, in view of certain favourable conditions as detailed in the preceding paragraph, the production plan has been modified in the instant Mining Plan. The revised production schedule differs from that of the approved RPR

		which was the underlying basis for the award and operative terms of the existing MDO contract. Given that the approved RPR formed a contractual reference for the MDO agreement, any quantity variation in the production schedule may have implications on the contractual obligations, commercial provisions and performance parameters of the awarded contract. **FINAL PIT SLOPE AND BENCH PARAMETER** The working benches of OB and coal will be kept at a slope angle of 70^{o} and 80^{0} respectively during operation. The final pit slope of the Quarry 1 has been planned at west side of running quarry is 27^{o} and 45° in the all other sides. Bench height for internal OB dumps will be 30 m and slope of individual dump benches will be 37^{0}. Width of berm between two adjacent benches will be about 30 m. In the Quarry 2, final pit slope of the Quarry 2 has been planned at running quarry is 27^{o}. Bench height for OB dumps will be 30 m and slope of individual dump benches will be 37^{0}. Width of berm between two adjacent benches will be about 30 m. Height of the coal bench will be equal to seam thickness subject to maximum bench height as 10 m. Bench width for working benches in Coal and OB has been proposed as 30 m and nonworking benches has been proposed as 10 m. The effect of inter bench access roads on the quantity of Coal extracted and OB removed is not incorporated in the Pit layout determination. However, a scientific study should be carried out before starting a mechanised opencast working, including its method of working, ultimate pit slope, dump slope and

monitoring of slope stability with reference to DGMS (Tech.) circular No. 03 of 2020 dated 16.01.2020.

Mining Parameter of the Quarry

Sl. No.	Description	Unit	Quarry 1	Quarry 2
1	Area of Excavation	Ha	275.26	313.05
2	Strike Length (On surface)	km	3.60	2.25
3	Dip rise width (On Surface)	km	1.10	1.50
4	Min and Maximum depth	m	120-190	70-170
5	Base of quarry		Floor of I seam	Floor of IX/X seam
6.	Mineable Coal	M. Te	25.77	8.78
7.	Overburden including Rehandling OB	M. Cum	104.17	171.57
8.	Av. Stripping Ratio	cum/te	4.04	19.54

DESCRIPTION OF ALL MINING OPERATION

a) Wining

Coal Extraction:

Considering the thickness range, number of seams to be worked, dip and strike of the seams, status of exploitation of seams and status of production level, Shovel is proposed to be used for extraction of coal after proper drilling and blasting.

All the seams considered for exploitation will be mined in separate single benches where ever possible.

		Drilling in coal benches will be done by 100 mm/ 160mm drills or as decided by the outsourcing agency. After proper drilling & blasting, the blasted coal will be loaded by Shovels on to dumpers or as decided by the outsourcing agency for transportation up to the surface stock yard. **OB Excavation** Variation in thickness of OB will make it difficult to maintain uniform bench height in OB horizons. However, it is proposed to have a ceiling on OB bench height from safety reasons. The height of the bench generally shall not exceed the boom height of shovel. O.B. will be excavated in benches after proper drilling & blasting. Drilling in OB benches will be done by 160mm drills or as decided by the outsourcing agency. The blasted OB will be dozed, heaped and loaded by shovel on to dumpers or as decided by the outsourcing agency for transportation to OB dumps. Dumping will be done by End-Tipping method. The OB removal is proposed totally by shovel dumper combination with rear dumper. **b) Transport** **Coal Transportation:** It has been proposed that Coal will be transported from coal face to surface coal dump by 35t/ 60t dumpers or as decided by the outsourcing agency. The present production from the mine is linked to power plants through Gol 6 and Gol 9 siding, located within Amalgamated NTST Kujama OC mine. The coal produced from the mine is transported contractually by trucks from surface coal dump to the railway siding.

		Proposed coal transportation system is elaborated in Chapter-5. **OB Transportation** The OB will be transported from face to OB dumps by dumpers through haul roads to accommodate maximum OB. **c) Elements of drilling & blasting in OB & Coal** **Drilling** Provision for secondary blasting should be kept to a minimum level. Proper blasting design of the OB and coal bench will reduce the necessity of secondary blasting. The burden and spacing of each bench should be designed in such a manner that it should produce the necessary powder factor for OB and coal. **Blasting** The drilling and blasting operations for loosening of coal and OB are necessary before excavation by shovels. The sufficient number of dozers will be provided in the project to carry out the site preparation. The blast-hole drilling will be done in patterns decided in advance depending on the strata hardness and the requirement of DGMS for drilling on the developed galleries. DGMS circulars issued in this regard may be referred (DGMS (Tech) Circular No. 3 & 4 of 1980, DGMS (Tech) Circular No. 11 of 1979 etc.). The standard practice involving the electric detonators for the initiation of detonating cord, detonating relays to achieve hole-to-hole delays, use of Heavy ANFO, slurry or emulsion explosives as the column charge will be used for blasting as per the DGMS circular. The blast hole pattern (along with Burden & Spacing) will depend on actual site condition. However, specific

consumption of explosives has been envisaged as 0.3 kg/cum. for OB from Shovel benches and 0.2 kg/cum. for coal from coal seams.

Parting wise OB in Quarry 1 and Quarry 2 is summarised below

QUARRY 1

Partings	Volume in M.Cum
A. Rehandling of LOOSE OB	9.21
B. INSITU OB	
Top OB & OB above X/IX	16.95
Parting Between X/IX & VIIIA	7.81
Parting Between VIIIA & V/VI/VII/VIII group (V/VI,VII.V/VI/VII, VIII,V/VI/VII/VIII) including parting in between these seams	14.06
Parting Between V/VI/VII/VIII group (V/VI,VII.V/VI/VII, VIII,V/VI/VII/VIII) & IVT	17.2
Parting Between IVT & IVB	9.85
Parting Between IVB & IIIT/III/IIIB	20.78
Parting Between IIIT/III/IIIB & IIT/II/IIB	7.76
Parting Between IIT/II/IIB & I	2.09
Total Insitu OB	96.50
Total OB (Rehandling OB converted to Insitu OB)	**104.17**

QUARRY 2

Partings	Volume in M.Cum
Top OB	14.78
Parting Between XV & XIVA	0.65
Parting Between XIVA & XIV	16.64
Parting Between XIV & XIIIB	22.45
Parting Between XIIIB & XIIIA	10.34
Parting Between XIIIA & XIII	11.3
Parting Between XIII & XI/XII	26.18
Parting Between XI/XII & XA	35.18
Parting Between XA & IX/X	34.05
Total	**171.57**

OB PRODUCTION SCHEDULE

OB PRODUCTION SCHEDULE (MM³)			
Year	**Quarry 1**	**Quarry 2**	**Total Cluster IX**
2025-26	24.25	29.32	53.57
2026-27	30.31	52.95	83.26
2027-28	25.35	48.85	74.20
2028-29	24.26	40.45	64.71
Total	**104.17**	**171.57**	**275.74**

Note:

1. There may be some element of approximation in estimation of Loose OB dump due to less available RL data for Loose OB dump.

2. The effect of inter bench access roads on the quantity of coal extracted and OB removed is not incorporated in the Pit layout determination

OB Dumping strategy:

Quarry 1

The base of the proposed opencast mine is I seam floor. No coal seam lies below this seam. Therefore, it has been proposed to backfill the decoaled I seam floor. The OB quantity accommodated in internal dump is 3.88 M.Cum. Balance 97.01 MCum OB will be accommodated in the external dump within the leasehold. External OB dump height has been proposed upto 90 m above surface level (3 tiers of 30 m each). 3.28 MCum dump is accommodated in the Dump in the NTST Colliery.

The total quantity of OB dumping is given below :

Year	Quarry 1			
	Internal Dump	External Dump within leasehold	Dump in NT-ST	Total
2025-26	0.60	23.65	-	24.25
2026-27	0.80	29.51	-	30.31
2027-28	1.10	22.75	1.50	25.35
2028-29	1.38	21.10	1.78	24.26
Total	**3.88**	**97.01**	**3.28**	**104.17**

Quarry 2

It has been decided by BCCL management to mine out IX/X & all occurring seams within quarry limit (upto XVA seam) by opencast mining in the West Section. The proposed section has a life of four (4) years considering the seams & area as stated above. The internal dumping may be done in the base of the seam seam (IX).

45.53 M.Cum dump will be accommodated in the internal Dump and rest 126.04 M.Cum of OB will be accommodated in the OB dump within the leasehold. Internal dumping will start from the year 2027-28.

Year	Internal Dump	External Dump within leasehold	Total
2025-26	-	29.32	29.32
2026-27	-	52.95	52.95
2027-28	22.76	26.09	48.85
2028-29	22.77	17.68	40.45
Total	**45.53**	**126.04**	**171.57**

<table>
<tr>
<td></td>
<td></td>
<td>Existing Dump No. and Dump Area is summarised below
<table>
<tr><th>Dump No.</th><th>Dump Area (Ha)</th><th>Loose Dump Volume (M.Cum)</th></tr>
<tr><td>Dump 1</td><td>21.33</td><td>3.38</td></tr>
<tr><td>Dump 2</td><td>62.37</td><td>23.01</td></tr>
<tr><td>Dump 3</td><td>17.11</td><td>5.88</td></tr>
<tr><td>Dump 4</td><td>11.80</td><td>4.87</td></tr>
<tr><td>Dump 5</td><td>52.85</td><td>9.21</td></tr>
<tr><td>Total</td><td>165.46</td><td>46.35</td></tr>
</table>
<u>Life of Mine</u>
The balance life of mine for opencast project is 4 years at projected level of production keeping in view dump space available within leasehold boundary of Cluster IX

EQUIPMENT CONFIGURATION

There is already an opencast mining running by MDO mode in the Quarry 1. The equipment configuration will be decided accordingly by the MDO agency to achieve the projected production.

In the Quarry 2, the equipment configuration will be decided accordingly by the Hired HEMM / departmentally to achieve the projected production.</td>
</tr>
<tr>
<td>3.1.3</td>
<td>Coal production capacity proposed “Mtpa”</td>
<td>10.21 MTPA</td>
</tr>
<tr>
<td>3.1.4</td>
<td>Justification for optimization Coal production capacity</td>
<td>Considering the area available for quarry operation, availability of quantity of coal and OB in proposed quarry area, the coal production capacity as proposed in the report is justified.</td>
</tr>
</table>

		As per the current mining parameters of the mine, normative coal production capacity of the proposed opencast operation of Cluster IX Group of Mines has been estimated at 10.21 MTY. This will be achieved in 2026-27.
3.1.5	Calendar year from which the production will start	It is running mines and production has already been started from Pre-nationalisation area.
3.1.6	Year of Achieving rated production	2026-27 (2nd Year)
3.1.7	Tentative Coal production Plan "MT"	

Year	COAL PRODUCTION PROGRAMME (MTe)		
	Quarry 1	Quarry 2	Total Cluster IX
2025-26	6.00	1.50	7.50
2026-27	7.50	2.71	10.21
2027-28	6.27	2.50	8.77
2028-29	6.00	2.07	8.07
Total	**25.77**	**8.78**	**34.55**

OB PRODUCTION SCHEDULE (MM³)			
Year	**Quarry 1**	**Quarry 2**	**Total Cluster IX**
2025-26	24.25	29.32	53.57
2026-27	30.31	52.95	83.26
2027-28	25.35	48.85	74.20
2028-29	24.26	40.45	64.71
Total	**104.17**	**171.57**	**275.74**

3.1.8	Peak/Rated Capacity	By OC- 10.21 Mtpa By UG- Nil		
	- By OC	Overall- 10.21 Mtpa (Rated Capacity)		-
	- By UG	Overall- 10.21 + 50% Mtpa (Peak Capacity), 12.768		-
	- Overall	MTPA	-	-

3.1.9	Life of the mine: - By OC - By UG - Overall	By OC- 4 years By UG- Nil Overall Production Life - 4 years
3.1.10	Whether the proposed external OB dump site is coal/lignite bearing: If so, whether coal/lignite below waste disposal area is extractable.	No external OB dump site is lying within non coal bearing area
3.1.11	Whether negative proving for coal / lignite in the proposed site for OB dump /infrastructure has been done.	Coal Seam available in the Proposed site for External OB Dump within leasehold area. Rehandling may be done to excavate coal below OB Dump.
3.1.12	Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals.	Not Available
3.1.13	Type of Equipment / HEMM Proposed	HEMM will be decided by owner/ mine management. If the mine is run by outsourcing company, it will be decided by outsourcing company.

Annexure VI

Chapter 4 : Safety Management

	Parameters	*Details*
4.1	**Safety and Health Management System Audit**	Elaborate safety measures have been laid out as per statute concerning safety in mines. In addition to existing provisions, reference has been made here to some special precautionary measures which have been considered important and require special attention for the safety of men and machinery. Safety of men and machine deployed in the mining area should be properly taken care of irrespective of whether the mining activities are performed by departmental or by outsourcing option. All the provisions and precautionary measures as stipulated in CMR 2017, (especially Reg. 106 to 110) and orders made there under shall be strictly complied with. The important safety aspects have been deliberated subsequently. In addition to those relevant clauses as stipulated in Act & Regulation, all clauses and sub clauses as mentioned in the permission granted by DGMS, Min. of Labour and Employment, GOI for working of said Mines shall be followed strictly. The other rules / regulation applicable to mining industry shall be comply with like CEA Regulation 2023, Explosive Act etc.
4.1.1	**Important safety aspects:** Major Risks and uncertainties to the project viz. Proximity to river, adjacent working,	**a) Proximity to river** Chatkari Jore which is a tributary of Damodar River is flowing from north to south through the middle of the proposed quarry. The Tisra jore is flowing from east to west.

	geo-mining disturbances, slope stability and remedial measures suggested. It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc.	**b) Adjacent working** Some undergrounds workings are reported in the east and west section of the quarry. The excavation of the respective seams may lead to inrush of water into the quarry from connected galleries. The standard procedures, permission from DGMS should be obtained before the start of work in the proposed quarries. **c) Geo-mining disturbances** Based on boreholes/colliery data 17 nos. of faults have been interpreted within the project area. Throw of these faults varies from 2m to 90m. In the southern boundary of west section, a major faults of throw of 90m occur. forming southern boundary of quarry. A dyke of 10 m thickness of strike 7.7 Km running from north –south is found in the western portion of the leasehold. **d) Slope stability and remedial measures suggested** The slopes of the quarry and dumps have been proposed on the basis of experience in the adjoining areas. However, to ascertain optimum slope angles for stability of quarry batter and OB dumps a scientific study needs to be carried out (Ref. Regulation 106(2) of CMR 2017). Recommendation of this study report should be followed strictly to avert any slope failure in the mine. DGMS (Tech.) circular No. 03 of 2020 dated 16.01.2020 and other circular issued by DGMS from time to time for slope stability should be adhered to in letter and spirit. Monitoring being the most effective mitigation measures against any impending slope failure, a constant vigil in this regard should be maintained during active mine operation.

		e) Disaster management Mining is a hazardous industry. There is risk to life and property associated with various mining and allied activities of the project. The mining plan has been drawn in conformity with the prevailing statutory provisions as per Mines Act, 1952 & CMR 2017 applicable for safety in mines. A detailed study has been carried out covering identification and assessment of risk, and recommendation of measures to prevent damage to life and property against such risks. Safety Audit is an integrated component of Risk Assessment and Safety Management, which is required to be undertaken on regular basis by System Study and Safety Audit (SYSSA). Such System Study and Safety Audit (SYSSA) should be conducted at least once in every year, after every major accident or disaster or dangerous occurrence, before implementation of any new technology or use of any new system or machinery in the mine. Such Study may be subject wise as well as an integrated report of the mine incorporating all subjects such as mining, mechanical, electrical, personel, occupational Health & Hygiene, and any other subject applicable to the mine and the system prevailing or to be used therein. **Risk Reduction Programme (RRP)** is an ongoing process to achieve Zero Harm Status of Safety in any mine and should be incorporated in the Disaster Management Programme.

		f) Danger from inrush of water Chatkari and Tisra jore flowing within the leasehold area . The excavation of the respective seams may lead to inrush of water into the quarry from connected galleries. For safety point of view the quarry edge of Quarry-2 is proposed at a distance of 60m from the diverted route of Chatkari Jore. But along with standard procedures permission from DGMS should be obtained before the start of work in the proposed quarries along the Chatkari Jore. Adequate precaution has been taken into account while deciding the quarry boundary and the final pit floor limit so that the operational area of the quarry does not come within 60m of any operational underground workings which is likely to contain an accumulation of water or other liquid matter or any material that is likely to flow when wet. A 60m distance between the said workings shall mean the shortest distance between the workings of the same seam or between any two seams or sections, as the case may be, measured in any direction whether horizontal, vertical or inclined. **g) Existing underground mine fire** Surface fire / Underground fire is reported within the leasehold area of Cluster IX Mine. In addition to all statutory provisions, following measures for fire fighting and prevention of fires should be established and maintained in the mine premises. 1) Organisation of special cell for systematic observations to examine and prevent fire. 2) Removal of spillage of coal on benches and cleaning of coal horizons to prevent cases of coal heating. 3) Storage of lubricants and cotton waste in

		enclosed fireproof containers in working places. 4) Provision of fire extinguishers The recommendation made in the DGMS (Approval) Circular No. 02, 2013 should strictly be followed in the mine to prevent fire in HEMM. It says that "all types of fire fighting and fire suppression system including automatic fire detection and suppression systems to be used in HEMMs, materials and chemicals to be used in fire fighting or suppression system in mines both on surface and below ground including oil and gas mines/fields shall conform to the following minimum requirement". a) All types of fire fighting and fire suppression systems including automatic fire detection and suppression systems to be used in HEMMs, materials and chemicals to be used in fire fighting or suppression systems shall have valid test certificate(s) from any Government or Government approved Laboratory in compliance with relevant Indian Standards. b) All material used in the fire fighting/ fire suppressant systems shall be non-toxic and in no manner harmful to human beings during handling and use. The high pressure storage vessels and hoses, if used with fire-fighting and fire suppressant systems, shall conform to the requirements stipulated in the relevant Indian Standards.
4.1.2	A Commitment from the Company Board that entire mining operation will be carried out as per the	A Commitment from the Company Board that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required and the company will approach the

	Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required the company will approach the concerned authorities.	concerned authorities for the same. The same will be furnished as a part of Annexure during the approval of the Mining Plan.

Chapter 5: Infrastructure Facilities

	Parameters	*Details*		
5.1	Mine infrastructure required e.g. Equipment maintenance planning, Office buildings, Workshop, Power supply arrangement, Water supply etc.	**Sl. No.**	**Facilities/Infrastructure to be retained**	**Area, Ha**
		1	**Road Infrastructure** • D.B. Road – This road exists and is located approximately 2.5 km from NTST Expansion OC and 3.5 km from Amalgamated Joyrampur Colliery. • National Highway (NH-32) – The Dhanbad–Bokaro highway (NH-32) is the nearest national highway to the mine. • Colliery Roads – A network of colliery roads exists within the mining area to facilitate vehicle movement.	NA
		2	**Rail Infrastructure** • The Lodna Area is approximately 15 km from Dhanbad Railway Station. • The nearest railway station is Bhaga Station, located about 2.5 km from Joyrampur Colliery.	NA
		3	**Existing Effluent Treatment Plant & Sewage Treatment Plant** • Oil and grease trap will be uninstalled at the workshop.	NA
		4	**Water Filter Plant** • One water filtration plant exists approximately 3 km from Denobili More.	NA

5 Pit / Shaft in the Leasehold Area

- The current status of pits and inclines within the Lodna Area mines is detailed as follows.

LODNA COLLIERY

SL	Name of PIT/INCLINE	SUNKED UPTO	DEPTH OF PIT (IN Mtr)	R.L. AT TOP	R.L. AT BOTTOM	STATUS
1	NO. 4 INC	XIII SEAM	2	174	172	NOT FILLED UP
2	NO. 2 INC	XIII SEAM	3	177	174	BEING FILLED UP
3	NO. 14 INC	XI/XII/XIII	2.95	177.45	174.5	FILLED UP
4	4 PIT N. BARAKAR	XI/XII/XIII	13	174	144	FILLED UP WITH MITTI AND SAND
5	3 PIT N. BARAKAR	XI/XII/XIII	13	174	144	FILLED UP WITH MITTI AND SAND
6	1 PIT NILORIPATHRA	XI/XII/XIII	42	178	130	FILLED UP
7	2 PIT NILORIPATHRA	XI/XII/XIII	42	178	130	FILLED UP
8	1 PIT SURATAND	XI/XII/XIII	69	176	107	FILLED UP
9	2 PIT SURATAND	XI/XII/XIII	69	176	107	FILLED UP
10	1 PIT N. BARAKAR	XI/XII/XIII	90	182	02	FILLED UP
11	2 PIT N. BARAKAR	XI/XII/XIII	70	182	112	FILLED UP
12	7 PIT NEW STD.	XIII SEAM	48	102	114	CONDITION NOT KNOWN
13	4 PIT NEW STD.	XI/XII/XIII	104	102	88	CONDITION NOT KNOWN
14	2 PIT KALISTHAN	XIII SEAM	70	190	120	BLANKETTED
15	3 PIT BENAHIR	XII SEAM	130	190	00	BLANKETTED
16	2 PIT BENAHIR	XII SEAM	130	190	60	BLANKETTED
17	7 PIT BENAHIR	XIVA SEAM	44	190	146	BLANKETTED
18	9 PIT BENAHIR	XIV SEAM	70	190	120	BLANKETTED
19	1 PIT BHAGA	XIV SEAM	66	184	128	FENCED
20	4 PIT BHAGA	XIVA SEAM	108	183	82	NOT FENCED
21	2 PIT BHAGA	XI/XII SEAM	187	183	-4	NOT SEATED OR FENCED
22	16 SEAM SHAFT	XVI SEAM				NOT SEATED OR FENCED
23	OLD INC	XIII SEAM				NOT FILLED UP
24	3 PIT AIR SHAFT	XIII SEAM	38	172	136	FILLED UP
25	10 INC	XIII SEAM	38	180.8	177	NOT FENCED
26	18 INC	XIII SEAM	2	187.88	185.00	NOT FENCED
27	4 PIT NS	IX/X SEAM	54.80	177.80	123	FILLED UP WITH SAND
28	2 PIT NS	XI/XII/XIII	44.95	180.95	136	FILLED UP
29	13 INC	XIII SEAM				DOZZED
30	15 INC	XIII SEAM				DOZZED
31	3 PIT BHAGA	XIV SEAM	96	184	88	FENCED
32	1 PIT	VIII	181.51	180.08	-1.45	WORKING PIT
33	0 PIT	XI/XII	80.81	180.8	99.99	WORKING PIT

34	7 PIT	IX/X	158.42	179.85	21.43	WORKING PIT
35	8 PIT	VIII	210.44	170.52	-13.82	WORKING PIT

JEAL GORA COLLIERY

SL	Name of PIT/INCLINE	SUNKED UPTO	DEPTH OF PIT (IN Mtr)	R.L. AT TOP	R.L. AT BOTTOM	STATUS
1	1 PIT	XIV SEAM	143	491.15	339.62	RETURN ROUTE/UP CAST
2	2 PIT	XI/XII SEAM	210	488.04	280.45	INTAKE ROUTE/DOWN CAST
3	3 PIT	XIV SEAM	155	486.03	323.23	WORKING PIT
4	4 PIT	XIV SEAM	100.5	484.63	376.13	SEALED
5	4 PIT	XIV SEAM	102.5	484.09	373.50	SEALED
6	2 INC	XV SEAM		484.7		SEALED
7	3 INC	XVI SEAM		484.85		SEALED
8	4 INC	XVI SEAM		481.25		SEALED

JOYRAMPUR COLLIERY

SL	Name of PIT/INCLINE	SUNKED UPTO	DEPTH OF PIT (IN Mtr)	R.L. AT TOP	R.L. AT BOTTOM	STATUS
1	KJ 3 PIT	V/VI SEAM	103.6	170.10	-13.84	WORKING
2	KJ 4 PIT	VIII SEAM	170.8	177.85	13.84	WORKING
3	LJ 5 PIT	V/VI SEAM	193.9	171.8	-13.62	WORKING
4	LJ 6 PIT	VIIIA SEAM	121.6	171.02	53.1	VENTILATING PIT
5	PJ 3 PIT	IX/X SEAM	85.8	173.05	88.05	ABONDONED & WATER LOGGED
6	KJ 4 PIT	IX/X SEAM	87.99	172.0	84.04	ABONDONED & WATER LOGGED
7	EL 1 PIT	IX/X SEAM	114.3	170.74	56.44	ABONDONED & PARTLY FILLED UP
8	EL 2 PIT	IX/X SEAM	118.20	188.8	50.54	ABONDONED & PARTLY FILLED UP
9	KJ 1 PIT	XI/XII SEAM	60	167.4	107.4	FILLED UP WITH OB
10	INC NO. 2	XI/XII SEAM		176.5	109.25	CLOSED WITH STOPPING

BARAREE COLLIERY

SL	Name of PIT/INCLINE	SUNKED UPTO	DEPTH OF PIT (IN Mtr)	R.L. AT TOP	R.L. AT BOTTOM	STATUS
1	1 PIT	XIV SEAM	58.84	174.85	116.11	FILLED UP WITH MITTI
2	2 PIT	XIII SEAM	132.32	173.02	40.7	FILLED UP WITH MITTI
3	3 PIT	XIII SEAM	75.15	168.07	90.52	UPTO XIIIA SEAM FILLED WITH MITTI
4	6 PIT	VIII SEAM	201.52	168.67	-32.85	WORKING
5	CAG BHULAN	XIV SEAM	85.34	170.04	84.7	FILLED UP SAND
6	2 PIT BHULAN	XIII SEAM	117.35	173.9	56.55	COVERED WITH RCC SLAB

7	8 PIT	XV SEAM	134.11	179.36	45.25	COVERED WITH RCC SLAB
8	LAXMI INC-1	X SEAM		161.22		MOUTH COVERED BY BRICK WORK
9	LAXMI INC-2	X SEAM		160.22		SECOND OUTLET
10	LAXMI INC-3	X SEAM		157.26		VETILATING INCLINE
11	7 PIT	XIII SEAM	39.8	163.03	123.23	FILLED UP WITH MITTI
12	EROP INC	XIII SEAM		159.37		FILLED UP WITH MITTI
13	13B INC	XIII SEAM		168.56		
14	22 NO. INCLINE	XIII SEAM		100.07		FILLED UP WITH MITTI
15	41 NO. INCLINE	XIII SEAM		183.32		FILLED UP WITH MITTI

NORTH TISRA COLLIERY

SL	Name of PIT/INCLINE	SUNKED UPTO	DEPTH OF PIT (IN Mtr)	R.L. AT TOP	R.L. AT BOTTOM	STATUS
1	NO. 1 PIT	V/VI SEAM	99.69	192	92	FILLED UP WITH MITTI & UNDER FIRE
2	NO. 2 PIT	V/VI SEAM	91.77	108	104	FILLED UP WITH MITTI & UNDER FIRE
3	LUJ PIT	V/VI SEAM	92.9	150	87.5	SEALED AT IX/X BOTTOM & RUNNING
4	CENTRAL PIT	VII SEAM	44.55	192	148	FILLED UP WITH MITTI & UNDER FIRE
5	CT PIT	V/VI SEAM	56.33	188	130.5	FILLED UP WITH MITTI & UNDER FIRE
6	116 INCLINE	IV BOTTOM		186		WORKING
7	216 INCLINE	IV BOTTOM		165		SEALED
8	316 INCLINE	IV BOTTOM		185		WORKING
9	NO. 7 INC	I SEAM		183		FILLED UP WITH MITTI
10	NO. 6 INC	I SEAM		181		FILLED UP WITH MITTI
11	NO. 11 INC	I SEAM		193		FILLED UP WITH MITTI
12	NO. 12 INC	I SEAM		194		FILLED UP WITH MITTI
13	ENTRY THR 0 INCLINE	IX/X SEAM		157		WORKING

		6	**Workshop** **Amalgamated NT ST** Excavation Workshop and E & M Workshop are in the scope of outsourcing agency. **Amalgamated Joyrampur OCP** There is one small departmental E&M and excavation work shop exists in the mine.	
		7	**Magazine**: - There is Magazine exists in the premises of Bhulan Bararee Magazine. Add. General Manager, Lodna Area is the licence holder of both the magazines. Bhulan Bararee Magazine is being used as a central magazine since 08.10.2010.	
		Sl. No.	**Facilities/Infrastructure to be Dismantled**	**Area, Ha**
			NIL	

5.2	Power supply & illumination.	**5.2.1 PRESENT POWER SUPPLY** **I. Power Supply:** At present, the colliery is receiving power at 11 KV from 33 kV Main DG Sub station Jealgora Lodna Area. There are three nos. 10 MVA Transformer installed at Main Sub-station. Which is supplying power to different substation of colliery. **<u>NT ST Jenagora & Amalgamated Joyrampur colliery:-</u>** **II. Existing Power Supply System: -** Presently, there are seven nos. substation are installed at NT-ST Jenagora & Amalgamated Joyrampur Colliery to cater all electrical equipment & lighting loads. • **NT-ST Jenagora Colliery Substation: -** There are seven nos. Transformer are installed at this sub-station, which are receiving power at 11 kV from main substation. Details are as given below: - A. 2 MVA,11KV/3.3KV Transformer Located at 9 no Siding. B. 3.15MVA,11KV/3.3KV Transformer Located at 9 no Siding. C. 750 KVA,11KV/440V Transformer Located at 9 no Siding. D. 500 KVA,11KV/440V Transformer Located at 6 no Siding. E. 2.5 MVA,11KV/3.3KV Transformer Located at NTST. F. 2 MVA,11KV/3.3KV Transformer Located at NTST. G. 7.5 MVA,11KV/3.3KV Transformer Located at KT Substation. These transformers are supplying power to Pump and lighting load of colliery. Details of pump motor are as under:- a. 710 KW,3.3KV ,3 Phase IM. b. 336 KW,3.3KV,3 Phase IM. c. 650 KW,3.3KV,3 Phase IM. d. 670 KW,3.3KV,3 Phase IM. e. 215 KW,3.3KV,3 Phase IM.

f. 160 KW,3.3KV,3 Phase IM.
g. 650 KW,3.3KV,3 Phase IM.

- **Bararee & Amalgamated Joyrampur Sub-station:-**

There are Four nos. Transformers. These transformer are installed at Bararee sub station, which are receiving power at 11 kV through Bararee feeder from DG main substation, Jealgora.
Details are as given below:-

A. 1.5 MVA,11kv/3.3KV transformer.
B. 1.5 MVA,11KV/550V:- transformer.
C. 2 MVA,11KV/3.3KV transformer.
D. 50 KVA,550V/220V transformer.

These transformers are supplying power to Pump and lighting load of colliery. Details of Pump are as under:-

a. 375KW,3.3KV,3Phase IM.
b. 700KW,3.3KV,3Phase IM.
c. 700KW,3.3KV, 3Phase IM.
d. 550V Motor Submersible-1.
e. 550V Motor Submersible-2.
f. 550V Motor Submersible-3.

- **Bagdigi & Amalgamated Joyrampur Substation:-**

There are Eight nos. Transformer, These transformer are installed at Bagdigi sub station, which are receiving power at 11 kV through Lodna 02 Nos. feeder from DG main substation, Jealgora.

A. 1 MVA,11KV/550V transformer.
B. 1 MVA,11KV/3.3KV transformer.
C. 250 KVA,3.3KV/440V transformer.
D. 20 KVA,550V/220V transformer.

		E. 50 KVA,550V/220V transformer. F. 50 KVA,550V/220V transformer. G. 50 KVA,550V/440V transformer. H. 50 KVA,550V/440V transformer. These transformers are supplying power to Pump and lighting load of colony w/s,colliery. Details are as Under:- a. 60HP,550V,3 Phase IM b. Lighting load of Dwarika Paswan Colony c. Lighting load of Workshop and Office d. Lighting load of 5 No colony e. Lighting load of Radha chakki colony f. Lighting load of Naresh Barahi Colony g. Lighting load of Baba Patti Colony • **Pit-2 Jealgora & Amalgamated Joyrampur Substation:-** There are Five nos. Transformer, These transformers are installed at 2 Pit Jealgora sub station, which are receiving power at 11 kV through 01 No. and 02 No. feeder from DG main substation Jealgora. A. 750KVA,11KV/550V transformer. B. 1000KVA,11KV/440V transformer. C. 2MVA,11KV/2.2KV transformer. D. 750KVA,11KV/550V transformer. E. 2MVA,11KV/2.2KV transformer. These transformers are supplying power to Pump and lighting load of colony and colliery. Details are as Under:- a. 50HP,550V 3 Phase IM b. Submersible pump-1 c. Submersible pump-2

		d. 250HP,550V SD Starter e. 175HP,550V Auto Starter f. Lighting load of colony near 2 Pit • **Joyrampur Colliery& Amalgamated Joyrampur Substation:-** There are Seven nos. Transformer, These transformer are installed at Joyrampur sub station and 5 No Pit sub station, which are receiving power at 11 kV through 01 No. and 02 No. feeder from DG main substation Jealgora. A. 1MVA,11KV/550V transformer. B. 250KVA,11KV/440V transformer. C. 300KVA,11KV/440V transformer. D. 250KVA,11KV/440V transformer. E. 200KVA,11KV/440V transformer. F. 1MVA,11KV/550V transformer. G. 500KVA,11KV/550V transformer. These transformers are supplying power to Pump and lighting load of colony and colliery. Details are as under:- a. 50V Submersible-1, located at 5 No pit. b. 550V Submersible-2, located at 5 No pit. c. 125KW,550V 3 Phase IM, located at water board. d. 150HP,550V 3 Phase IM, located at water board. e. Lighting load of Pani tanki Colony f. Lighting load of BR Company Colony g. Lighting load of kali mandir,buddha mandir, office h. Lighting load of Hospital Line i. Lighting load of 2 no Dhowra j. Lighting load of Munda Patti k. Lighting load of Dharmendar Singh colony and Alakdiha Thana l. Lighting load of ATS-1

m. 5 KVA Welding Machine.

n. Lighting load 16 No colony.

- **Lodna Power House Substation:-**

There are Four nos. Transformer, which are receiving power at 11 kV through Lodna 02 No. feeder from DG main substation, Jealgora.

A. 3.15MVA,11KV/3.3KV
B. 3.15MVA,11KV/3.3KV
C. 500KVA,11KV/550V
D. 250KVA,3.3KV/440V

These transformers are supplying power to Pump and lighting load of colony and colliery. Details are as under:-

a. Lighting Masjid Patti,8No, Lodna W/S
b. Power House Lighting
c. Madhuban Lighting
d. T2-out & Baniahir Lighting
e. 16 No Lighting

III. Existing Electrically Operated HEMM Equipment in Amalgamated NTST amalgamated Joyrampur Colliery: Nil

5.2.2 PROPOSED POWER SUPPLY:

In the proposed system the existing supply system will continue as per requirements.

5.3	Drainage & Pumping: Assessment of Volume of Water for Pumping, Pumping Capacity and Pump Selection	**Present Pumping Arrangement** Mine wise details of Existing pumps running at Amalgamated NTST and Amalgamated Joyrampur are shown below: -

1. **NT-ST-JG**

SN	Description/Rating	Make	Location	GPM
1	710KW,3.3KV ,3Phase IM	BHEL	Patch-B	4000GPM
2	336KW,3.3KV,3Phase IM	CG Power	Patch-B	1000GPM
3	650KW,3.3KV,3Phase IM	Kirloskar	Patch-B	2000GPM
4	670KW,3.3KV,3Phase IM	CG Power	Patch-B	3000GPM
5	215KW,3.3KV,3Phase IM	MA	NT Patch	
6	160KW,3.3KV,3Phase IM	Marathon	NT Patch	
7	650KW,3.3KV,3Phase IM	Kirloskar	Patch-F	2000GPM

2. Bararee & Amal. Jayrampur

SN	Description/Rating	Make	Location	GPM
1	375KW,3.3KV,3Phase IM	Kirloskar	Patch-D1	2000GPM
2	700KW,3.3KV,3Phase IM	Kirloskar	Patch-D1	4000GPM
3	700KW,3.3KV,3Phase IM	Marathon	Patch-D1	4000GPM
4	550V Motor Submersible-1		Bararee	
5	550V Motor Submersible-2		Bararee	
6	550V Motor Submersible-3		Bararee	

3. Bagdigi & Amal. Joyrampur

SN	Description/Rating	Make	Location	GPM
1	60HP,550V,3 Phase IM		Bagdigi pump House	600GPM

4. Pit-2 Jealgora & Amal. Jayrampur

SN	Description/Rating	Make	Location	GPM
1	150HP,550V 3 Phase IM		Pump House	Multistage
2	Submersible pump-1		jeanagora	
3	Submersible pump-2		jeanagora	

5. Joyrampur Colliery& Amal. Jayrampur

SN	Description/Rating	Make	Location	GPM
1	550V Submersible-1		5 No pit	
2	550V Submersible-2		5 No pit	
3	125KW,550V 3 Phase IM		Water Board	
4	150HP,550V 3 Phase IM		Water Board	

Proposed Pumping Arrangement

A. Amalgamated NTST

Estimation of Surface Make of Water for Quarry

Sl. No.	Particulars	Unit	Value
1	**Water accumulation in the quarry:**		
1.1	**Maximum daily rainfall, h :**	m	0.170
1.2	**Catchment Areas :**		
a)	Maximum depth, d :	m	190
b)	Total Quarry Area to be Excavated, A	m^2	3147000
c)	Maximum exposed area at any point of time = A1 (33% of total quarry area)	m^2	1038510
d)	Area beyond Excavation = A2 (5% Of A)	m^2	157350
e)	Internal Dump Area A3	m^2	350000
1.3	**Assumed Run-off co-efficient:**		
a)	For level terrain with thick soil cover	n_1	0.60
b)	For area beyond Excavation	n_2	0.10
c)	For Internal dump area	n_3	0.15
1.4	**Volume of Water accumulation in mine Q :**		
a)	Volume of water likely to fall in Quarry, Q = ($A_1xn_1xh + A_2xn_2xh + A_3xn_3xh$) Cum/day per day	Cum/day	117528
b)	Considering 10% seepage from surrounding strata, total water accumulation will be $Q_1 = 1.1Q$	Cum/day	129281
2.1	**Pumping capacity in Quarry :**		
a)	Water accumulation in the quarry,	Cum/day	129281
b)	Pumping capacity required to dewater the above accumulated water in 5 days with 18 hours of pumping per day.	Cum/min	24
		gpm	5300
		Say	5300
c)	Considering 25% as stand- bye capacity	gpm	1325
d)	Total pumping capacity	gpm	6625
		lps	418
2.2	**Pump selection**		
a)	Working pumps 03 nos. of Centrifugal pump, multistage, 200 lps (720 Cum/hr), 280 m head complete with 825 kW, 6.6 kV motor and starter (NFLP) along with valves and accessories.		
	Standby pump 01 no. of Centrifugal pump, multistage, 200 lps (720 Cum/hr), 280 m head complete with 825 kW, 6.6 kV motor and starter (NFLP) along with valves and accessories		

The proposed pumping system for NT-ST Colliery will consist of a total of **three main** and **one standby pump —** each with a capacity of **200 lps** and a head of **280 meters**

B. Amalgamated Joyrampur Colliery

Estimation of Surface Make of Water for Quarry

Sl. No.	Particulars	Unit	Value
1	**Water accumulation in the quarry:**		
1.1	**Maximum daily rainfall, h :**	m	0.170
1.2	**Catchment Areas :**		
a)	Maximum depth, d :	m	120
b)	Total Quarry Area to be Excavated,	m^2	3130000
c)	Mined out area(Maximum Exposed Area at any point of time)=A1	m^2	1032900
d)	Area beyond Excavation = A2 (5% Of A)	m^2	156500
e)	Internal Dump Area A3	m^2	0
1.3	**Assumed Run-off co-efficient:**		
a)	Mined out area	n_1	0.60
b)	For area beyond Excavation	n_2	0.10
c)	For Internal dump area	n_3	0.15
1.4	**Volume of Water accumulation in mine Q :**		
a)	Volume of water likely to fall in Quarry, Q = ($A_1xn_1xh + A_2xn_2xh + A_3xn_3xh$) Cum/day per day	Cum/day	109347
b)	Considering 10% seepage from surrounding strata, total water accumulation will be $Q_1 = 1.1Q$	Cum/day	120281
2.1	**Pumping capacity in Quarry :**		
a)	Water accumulation in the quarry,	Cum/day	120281
b)	Pumping capacity required to dewater the above accumulated water in 5 days with 20 hours of pumping per day.	Cum/min	22
		gpm	4900
		Say	5000
c)	Considering 25% as stand- bye capacity	gpm	1225
d)	Total pumping capacity	gpm	6225
		Say	6500
2.2	**Pump selection :2000 gpm 360 m 800 kW 6.6 kV**		
a)	Working pumps 4 nos. of 2000 gpm each		
b)	Stand bye pump 01 no. of 2000 gpm		

		The proposed pumping system for Amalgamated Joyrampur Colliery will consist of a total of **Five pumps — Four main pumps** and **one standby pumps —** each with a capacity of **2000 GPM** and a head of **360 meters**.

5.4	Coal Handling Arrangement: Brief detail of the CHP/Mode of Dispatch, Coal quality and Coal staking and handling arrangement	**Amalgamated NTST**
		
		Coal handling is managed by an outsourcing agency. As per the approved project report, the transportation and handling system includes:
		
		• **Crushing:**
		  ○ Non-coking coal: up to (–)100 mm
		  ○ Coking coal: up to (–)200 mm
		  ○ Processed using a semi-mobile crushing plant and secondary roll sizer
		• **Conveying:**
		  ○ Crushed coal transported via belt conveyors
		• **Storage:**
		  ○ Overhead bunkers with capacities of:
		  ▪ 15,000 tonnes for non-coking coal
		  ▪ 6,000 tonnes for coking coal
		  ○ Fed by travelling tripper conveyors
		• **Loading:**
		  ○ Coal loaded into railway wagons using Rapid Loading Systems
		
		Amalgamated Joyrampur Colliery
		
		• Coal is dispatched via road and rail through 6 and 9 No. sidings until the proposed Patherdih–Rakhitpur railway siding becomes operational.
		• 90% of coal will be sent to Patherdih Coal Washery via rail and proposed conveyor belts.
		• 10% will be supplied to crockeries and other consumers by road.

5.5	Coal washing and the proposed handling/disp	Currently, no coal washing facility is available at the mine site.

<table>
<tr><td></td><td>osal of rejects.</td><td></td></tr>
<tr><td>5.6</td><td>Water consumption and Wastewater generation (for coal handling/ washing as applicable, manpower engaged, utilities, firefighting requirements, HEMM washing/ maintenance, dust suppression as well as plantation, etc.)</td><td>Summarized break Up of Source of water along total water consumption and waste water generation in Cluster IX group of mine is shown in below table: -
<table>
<tr><th rowspan="2">Sl. No.</th><th rowspan="2">Description</th><th>Water Use</th><th rowspan="2">Source of water</th></tr>
<tr><th>Cubic meter per year</th></tr>
<tr><td>1</td><td>Drinking and Domestic use</td><td>4110630</td><td>Source-Mine water</td></tr>
<tr><td>2</td><td>Imitation</td><td>120450</td><td>Peripheral Villages</td></tr>
<tr><td>3</td><td>Dust Suppression</td><td>127750</td><td>Mine water</td></tr>
<tr><td>4</td><td>Green belt development</td><td>60590</td><td>Mine water</td></tr>
<tr><td>5</td><td>Recharge</td><td>155125</td><td>Natural Pond</td></tr>
<tr><td>6</td><td>Runoff</td><td>7709530</td><td>Get discharged to natural drainage to maintain the e-flow</td></tr>
<tr><td>7</td><td>Others like firefighting, HEMM washing, work shop use, Haul Road and CHP requirement and losses</td><td>501145</td><td>Mine water</td></tr>
<tr><td colspan="2">Total water utilization cubic metre per year</td><td colspan="2">12785220</td></tr>
</table></td></tr>
<tr><td>5.7</td><td>Other infrastructures for air pollution control (fog cannons, fixed water spraying</td><td>Water Sprinkling: Frequent and regular water sprinkling is carried out on coal transportation roads, service roads, and all dust-prone areas (like loading and unloading points) to suppress and arrest coal dust. Mechanical sweeper to sweep collect the dust at roads.

Covered Transportation: The transportation of coal and overburden (OB) is done by trucks/tippers that are covered with tarpaulin sheets to prevent the spread of dust during transit.</td></tr>
</table>

	systems, cold fog, Vertical Greenery System (VGS), wind barriers, or other relevant technologies)	**Greenbelt Development:** Extensive tree and avenue plantations are developed along roads and around industrial and residential areas to create green barriers that help control air pollution. **Air Quality Monitoring:** Ambient air quality monitoring stations are established in core and buffer zones of the mining areas. Monitoring for parameters like PM_{10}, $PM_{2.5}$, SO_2, and NOx is regularly conducted by NABL Accredited laboratory of Central Mine Planning & Design Institute Limited or CMPDIL to ensure compliance with permissible limits.

Sl. No.	Type of Pollution Control Device	Quantity
1	Mobile Water Sprinkler	Departmental- 28 KL – 01 Nos. Outsourced 16 KL Converted- 06 Nos.
2	Truck Mounted Fog cannon	Departmental- 10 KL- 01 Nos. Outsourced 12 KL- 02 Nos with fire fighting
3	Fixed/ Trolley Mounted Fog Canon	02 Nos.
4.	Mechanical Sweeper	01 Nos.
5.	Fixed Water Sprinkler	Installed at Crusher at Siding
6.	PM_{10} Analyser	02 Nos.

Annexure VI

Chapter 6: Land Requirement

6.1 LAND REQUIREMENT

6.1.1 Total Land requirement for Project Area

The breakup of project area (indicative) and their use area are given below:

Ownership wise land distribution	Utilization wise land distribution	Unit (Ha)
Tenancy	Agricultural	157.09
	Township	
	Grazing	
	Barren	
	Water Bodies	
	Road	
	Plantation	
Govt. Non Forest	Agricultural	185.51
	Barren	
	Road	
	Plantation	
	Township	
	Water Bodies	
BCCL	Agricultural	1594.90
	Water Bodies	
	Service Building	
	Road	
	Plantation	
	Township	
Forest		NIL
Total		**1937.50**

6.1.2 : Existing Mining use details of Project Area

Type	Land use (Existing)	Land use (Post Closure)	Agricultural Land	Plantation	Water Body	Public / Company Use	Forest land returned	Un-disturbed	Total
Excavation Area	372.01	588.31							588.31
Backfilled Area	15.69	168.99		168.99					168.99
Excavated Void	-	25.52			25.52				25.52
Without plantation	-	-						393.8	393.8
Top Soil Dump		10.62				10.62			10.62
External Dump	244.89	543.50		543.50					543.50
Safety Zone	111.91	267.1						267.1	267.1
Haul Road between quarries	37.8								
Road Diversion									
Diversion/ below River/ Nala		3.5				3.5			3.5
Settling pond	2.02								
Road/Rail & Infrastructure area	45.36	45.36				45.36			45.36
Rationalisation area/GM Govt. land									
JORE/drains	15	11.5				11.5			11.5
Embankment									
Green Belt	61.1	34.82		34.82					34.82
Water Body/Garland Drain	0.3								
UG Entry									
Undisturbed/ Mining right for UG/Barren Land	845.66	432.79						432.79	432.79
Resettlement*/ Habitation (Disputed land) / Pvt Land	176.45								
Pit Head Power Plant									
Water harvesting									
Agricultural Land									
Coal dump	25								
Total	**1937.50**	**1937.50**	**0**	**747.25**	**25.52**	**70.98**	**0**	**1093.7**	**1937.50**

(i) Details of Land usage

a. Pre-mining

S. No.	Land Use	Within ML	Outside ML	Total
		Area (Ha)	Area (Ha)	
1	Agricultural Land	0	0	0
2	Forest land	0	0	0
3	Waste land	249.51	0	249.51
4	Grazing land	0	0	0
5	Surface Water Bodies	17.32	0	17.32
6	Settlements	221.81	0	221.81
7	Other (Specify)	1448.86	0	1448.86
Total		**1937.50**	**0**	**1937.50**

b. Land Use During Mining (Present ongoing Land use)

S. No	Type of land use		Present Mining land use (in Ha)
1	Running Quarry	Backfilled	15.69
		Not Backfilled	356.32
2	Abandoned Quarry	Backfilled	0
		Not Backfilled	0
3	External OB Dump		244.89
4	Service building/ Mine Infrastructure		111.91
5	Homestead land		176.45
6	Coal dump		25.0
7	Road and rail including Haul Road		83.16
8	Ag/Fallow Land/Social Forestry		63.34
9	Forest land		0
10	Plantation	Plantation	61.1
		Grass Carpeting	37.72
11	Water Body		17.32
12	Barren Land/Encroached Land		744.6
Total			**1937.50**

c. Post-Mining

S. No.	Land use category	Present	Post closure	Land Use			
				Plantation	Water Body	Public / Company use	Undisturbed
1	External OB Dump	244.89	543.50	543.50			
2	Top Soil Dump	0	10.62	10.62			
3	Excavation/Quarry Area	372.01	419.32	0	25.52	393.8	
4	Backfilled Area	0	168.99	168.99			
5	Roads/Rail	83.16	45.36			45.36	
6	Built Up Area	313.36	-				
7	Green Belt	162.16	34.82	34.82			
8	Safety Zone	0	267.1	267.10			
9	Undisturbed Area	761.92	447.79		11.50	3.50	432.79
	TOTAL	**1937.50**	**1937.50**	**1025.03**	**37.02**	**442.66**	**432.79**

6.1.3 Surface features over the block area

Important surface features in the mine are discussed below:

Road:

Dhanbad-Sindri DB Road passes along southern boundary of the Colliery from east to west.

River/ Nala/Jore

The Tisra jore is flowing from east to west through the middle of proposed quarry. This jore needs to be diverted for the operation of the quarry. The diversion of the Tisra jore will be done through northside of the quarry considering topography and existing drainage pattern of the area. Chatkari jore flows southwards within the Colliery and also controls the drainage system of the area. Diversion of the Chatkari jore is proposed in the eastern side of proposed Quarry 2. The Diversion work of Chatkari jore is to be taken from 2026-27.

6.1.4 No. of villages/Houses to be shifted

The village/ location wise affected people who are to be rehabilitated within proposed leasehold boundary of revised mine of Cluster IX are below:

Sl. No	Site name & no.	Total No. of Houses	Land for Resettlement	
			BCCL (Ha)	Non BCCL (Ha)
1	Bagdigi Basti /O1	715	0	19.31
2	Bagdigi Colony / O2	162	1.68	0.74
3	Bagdigi Colony / O2	43	0	0.56
4	Along Jore Side Colony/11	65	0.56	0.81
5	Along Jore Side Colony /11	13	0	0.17
6	Bazaar Dhowrah /12	14	0	0.18
7	Brahman Basti / O2	21	0	0.57
8	Chhata Dhowra & Durga Mandir /O5	52	0.83	0
9	Chiraiyatand Colony /O1	130	2.08	0
10	Colony near 1 pit / O4	108	1.04	0.56
11	Colony near Bararee School / Bagan Dhowra / O3	70	0.66	0.38
12	Digwadih New Colony / O8	129	2.06	0
13	Dom Dhowra / O6	55	0.88	0
14	East side of DB Road /O9	136	0	3.67
15	Mudivita Village/10	85	0	2.21
16	Mudivita Village/10	6	0	0.16
17	Naya Dhowra Colony/ O7	53	0.74	0.19
18	1&2 Pit Area/11	188	2.43	0.47
19	Bagdigi Basti / 12	206	0.1	4.86
20	Bucharkhana Area / O1	126	0.86	1.54
21	Buriband /14	62	0.99	0
22	Check Post area /O6	44	0.7	0
23	North Jealgora 3&4 Pit/ O2	152	2.43	0
24	Stadium Area colony/O8	18	0.29	0
25	Sweeper Dhowra /O9	120	1.12	0.65
26	Central Sulunga Colony No.1/ O9	97	1.44	0.09
27	E.B. Section colony no. 1/O1	28	0.3	0.24
28	E.B. Section colony no. 1/O1	10	0	0.13
29	EB Sec. Colony No. 2/O2	59	0.93	0
30	Khas Jeenagora Colony No.1 /O3	88	1.41	0
31	Khas Jeenagora & Kalisthan /O5	41	0.64	0
32	Khas Jeenagora Colony No. 2/ O4	112	1.71	0
33	Khas Jeenagora Colony no. 3/ O6	118	1.02	1.29
34	Khas Jeenagora Colony no. 4 /O7	14	0.21	0
35	6 pit Dhowra & Atta Chaki /O1	23	0.37	0
36	6 pit Dhowra & Atta Chaki /O1	96	0	1.25
37	Around Area Office/WS & No. 2 Basti/ O3	137	2.19	0

Sl. No	Site name & no.	Total No. of Houses	Land for Resettlement	
			BCCL (Ha)	Non BCCL (Ha)
38	Beer Company Locality/O5	89	1.39	0
39	Durga Mandir Area /O4	107	1.68	0
40	Hazaribagh Colony near Hospital /O2	73	1.17	0
41	Hazaribagh Colony near Hosptal /O2	47	0	0.61
42	2 pit Bhaga Colony/ 28	80	0.7	0.97
43	16 no incline Jore side Colony / 22	33	0.26	0.46
44	2 No. Incline Colony / 23	13	0.21	0
45	2 No. Incline Colony / 23	310	0	4.03
46	3 pit basti /O9	71	0	1.92
47	3 pit basti /O9	6	0	0.08
48	4 pit Colony / 24	213	3.41	0
49	5 No. Colony/ (C- 17)	112	1.79	0
50	8 pit area colony / 19	59	0.94	0
51	8 pit area colony / 19	74	0	0.96
52	Balugada Colony / 26	41	0.66	0
53	Balugada Colony / 26	3	0	0.04
54	Chalchalia Labour Colony /25	59	0.94	0
55	Chalchalia Labour Colony/ (C-13)	135	0.96	0.92
56	Firkuband Colony / 30	60	0.37	1
57	Hanumangari Basti/14	71	0	1.92
58	Indira Chowk Road side Basti /O7	7	0	0.19
59	Indira Chowk Road side Basti /O7	19	0	0.51
60	Jealgora Barrier Colony / 18	100	1.6	0
61	Jeenagora Branch site / 20	12	0.19	0
62	Jeenagora Branch site / 20	30	0	0.39
63	Jharia Club & road side Basti /O8	143	0.8	2.51
64	Joyrampur / Badigi Barrier / 21	23	0.37	0
65	Kalidham Colony / 27	18	0.29	0
66	Kujama Village /O2	64	0	1.73
67	Kujama Village /O2	72	0	1.65
68	Lodna Village /O1	2493	8.59	29.62
69	Lodna Village /O1	50	0	0.99
70	Nadiapar Kujama Basti /O4	124	0.53	2.46
71	New Bhaga Bast / 11	233	3.73	0
72	New Colony Baniahir /13	205	3.28	0
73	Niluri Patra Bastee /O5	109	0.37	2.32
74	Office Compelx Area / 31	196	2.06	1.54
75	Office Compelx Area / 31	21	0	0.27
76	Suratand Basti /O6	79	0	2.13
77	Suratand Basti /O6	129	0	2.36

Sl. No	Site name & no.	Total No. of Houses	Land for Resettlement	
			BCCL (Ha)	Non BCCL (Ha)
78	Tar Plant Area / 12	12	0.19	0
79	Tar Plant Area / 12	19	0	0.39
80	BCCL Colony No. 1/O1	241	2.27	1.88
81	SG Section Basti /O3	41	0.66	0
82	Tilaboni Basti/O2	265	0.24	4.88
83	Tilaboni Basti/O2	153	0	4.13
84	B.J. & S.T. Section/ O3	240	1.76	2.84
85	Huchuktand Basti/O1	150	0.46	2.88
86	No.1 Pit S.T. Section /O2	59	0.61	0.57
87	16 No. Dhowra Area/13	145	2.32	0
88	7 Pit Old Hospital Area /10	217	1.41	1.68
89	Durga Mandir Colony /O4	93	1.22	0.18
90	Guest House Area/ O7	52	0.78	0
91	Jealgora Bastee/O3	471	0	12.72
92	Jealgora Colony /O5	117	1.87	0
93	5 No. Colony/29	151	1.5	1.54
94	GM Bunglow & Road Side Bastee/15	58	0.93	0
95	Phus Bungla Road side Bastee /10	135	0.24	3.24
96	Phus Bungla Road side colony /16	58	0	1.57
97	Puranadih Village /O3	143	0	3.86
98	Shalimar Colony/17	47	0.75	0
Total		**12246**	**83.184**	**143.948**

6.1.5 Population to be affected by the project.

12246 Project Affected Families (PAFs) within proposed Quarry area of revised mine of Cluster IX will have to be shifted as per data submitted by Colliery Authority. All these R & R within proposed leasehold boundary of revised mine of Cluster IX are covered under Revised Jharia Master Plan.

6.1.6 Proposed Rehabilitation programme.

The PAFs which comes under JRDA rehabilitation plan (Jharia Master Plan) and will be shifted to the site 2A (BCCL) (under Mouza Palani) and 1A (Non BCCL) (under Mouza Belgaria, Amagarha(P) & Shabagara) situated adjacent to the Dhanbad Baliapur Hirak ring road as mentioned in the Jharia Master Plan

.**Note:** *The above data is as per the data supplied by area/ mine official and may be verified by conducting proper socio-economic survey of the area before commencement of actual rehabilitation program.*

6.2	**DETAILS OF LEASE**	
6.2.1	Status of Lease	Active
6.2.2	Existing Lease Area "Ha"	1942.12
6.2.3	Period for which Mining Lease has been granted/~~is to be renewed/is to be applied for.~~	30 Years, as per relaxation granted by the Central Govt. U/S-31 of MMDR Act,1957 vide letter No. 13016415 2002 CA dt. 10.08.04 issued by the Ministry of Coal & Mines Deptt. Of Coal, Govt. of India.
6.2.4	Date of expiry of earlier Mining Lease, if any	Not applicable
6.2.5	Whether the lease boundary/required boundary is same as mentioned in the allotment order	Mining lease has been granted by nationalisation. The applied lease area includes the existing lease area.
6.2.6	Lease Area (~~applied~~/required) as per the Mining Plan under consideration (Ha)	1937.50 Ha
6.2.7	Whether the applied lease area falls within the allotted block	Applied lease area is falling inside the allotted block
6.2.8	Area (Ha) of lease which falls outside the delineated block/sub-block	Not Applicable
6.2.9	**Details of outside area:**	No outside block area has been considered for project area of this mine
	▪ Whether forms part of any other coal block	Not Applicable
	▪ Whether it contains any coal/lignite reserves	Not Applicable

6.2	**DETAILS OF LEASE**	
	▪ Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others(specify)	Not Applicable
6.2.10	**Whether some part(s) of the allotted block has not been applied for mining lease.**	The whole area in the existing lease area has been proposed for mining lease
	- Total area in Ha of such part(s).	Not Applicable
	- Total reserves in such part(s). (Mt)	Not Applicable
	- Brief reasoning for leaving such part(s)	Not Applicable

Chapter 7: Environmental Management

<table>
<tr><td></td><td>Parameters</td><td>Details</td></tr>
<tr><td></td><td colspan="2">ENVIRONMENTAL MANAGEMENT</td></tr>
<tr><td>a.</td><td>Commitment from the project proponent that the company will comply Environment and Forest Condition stipulated in the respective clearances</td><td>
<u>Air Quality Management:</u>
Sources
i. Operational Phase
<table>
<tr><td>(i)</td><td>Drilling & Blasting</td><td>:</td><td>Noise, Dust and SO_2, NOx</td></tr>
<tr><td>(ii)</td><td>Handling of coal</td><td>:</td><td>Noise, Dust and SO_2, NOx</td></tr>
<tr><td>(iii)</td><td>Movement of vehicles</td><td>:</td><td>Noise, Dust and SO_2, NOx</td></tr>
</table>
ii. Post Operational Stage
<table>
<tr><td>(i)</td><td>Movement of dozers for physical reclamation of subsided area</td><td>:</td><td>Noise, Dust and SO_2, NOx</td></tr>
<tr><td>(ii)</td><td>Movement of vehicles for shifting and salvaging operation of OC Machineries and other equipment</td><td>:</td><td>Noise, Dust and SO_2 , NOx</td></tr>
<tr><td>(iii)</td><td>Movement of vehicles for clearing of coal and other materials</td><td>:</td><td>Noise, Dust and SO_2 NOx</td></tr>
</table>
Impact Assessment
The ambient air quality is influenced due to the presence of PM_{10}, $PM_{2.5}$, SO_2, NO_2, etc., which are generated from above sources in operational and post operational stage.
Further, the ambient air quality is affected to a varying degree due to the mining activities of other nearby opencast and underground coalmines of the same coalfield. The concentration of pollutants may vary depending upon the various micro-meteorological parameters and the seasons of a year.
</td></tr>
</table>

Fortnightly Ambient Air Quality Monitoring of mines of Cluster IX is being carried out at following stations as part of routine Environmental Monitoring by

Station Name: A14, Bhowrah North		Zone: Buffer		Category: Industrial Area	
Sl. No.	Dates of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
1	09.03.25	128	66	<10	27
2	26.03.25	102	53	<10	22
3	03.04.25	108	60	<10	33
4	18.04.25	110	58	11	29
5	06.05.25	125	68	<10	32
6	22.05.25	116	62	11	30
	NAAQS Standard	100	60	80	80

CMPDI RI-II, Dhanbad:

Station Name: A12, Kusmatand Village		Zone: Core		Category: Industrial Area	
Sl. No.	Dates of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
1	08.03.25	85	46	11	26
2	22.03.25	87	45	10	30
3	15.04.25	89	47	<10	22
4	26.04.25	89	43	10	24
5	15.05.25	83	47	10	24
6	30.05.25	85	47	<10	23
	NAAQS Standard	100	60	80	80

Core Zone:

i. **Jeenagora (A13) : Industrial Area**

Buffer Zone:

i. **Kusmatand Village (A12): Industrial Area**

ii. **Bhowrah North (A14) : Industrial Area**

iii. **Hurriladih UGP (A28) : Industrial Area**

Air quality monitoring data at above stations for the period March 2025 to May 2025 is as given in the following tables.

Station Name: A13, Jeenagora		Zone: Core		Category: Industrial Area	
Sl. No.	Dates of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x
1	07.03.25	120	60	<10	26
2	22.03.25	96	56	<10	21
3	15.04.25	107	56	<10	22
4	25.04.25	95	51	<10	24
5	15.05.25	124	698	11	26
6	30.05.25	118	62	<10	28
	NAAQS Standard	100	60	80	80

Station Name: A28 Hurriladih UGP		Zone: Buffer		Category: Industrial Area	
Sl. No.	Dates of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_2
1	09.03.25	95	56	<10	31
2	29.03.25	92	49	<10	26
3	03.04.25	109	56	<10	27
4	18.04.25	103	53	<10	30
5	06.05.25	94	50	10	31
6	16.05.25	89	47	<10	33
	NAAQS Standard	100	60	80	80

Following measures will be adopted to mitigate Air pollution in Cluster IX mines:

i. PM_{10} analyser is proposed to be installed at Cluster IX OC mines.
ii. Gaseous pollutants generation minimized by proper oxygen balance in explosives.
iii. At the points of dust generation, 50 m. Fog Cannon shall be installed.
iv. Water sprinkling on surface roads, coal handling area, loading site, railway siding and coal stock yard to be done for minimizing fugitive dust emission
v. Development of Greenbelt around quarry.
vi. Plantation will be done on external dump and reclaimed area.
vii. Regular maintenance of HEMM.
viii. Controlled blasting will usually be done in daytime during the shift change over period.

ix. Appropriate design of the geometry of blast holes.

x. Coal transportation will be done through covered trucks/conveyor belt to washery and also to the siding.

xi. Wheel washing facility with complete recirculation system

xii. Wet Drilling.

Water Quality Management:

Mining and its related activities create water quality problems. The impact of mining at the project on both mine effluent and ground water sources are given subsequently.

Sources

(i)	Sanitary (domestic) wastewater	:	Suspended solids and BOD.
(ii)	Water pumped out from Mine	:	Suspended solids of coal, clay and oil.
(iii)	Surface run-off passing through coal stockpiles	:	Suspended solids.
(iv)	Storm water from leasehold area and built-up area	:	Suspended solids.

Water Quality Report

Any adverse impact or pollution consequence of water will have serious effect on the environment. Hence, it becomes important to assess the water quality periodically in the mining area.

Thus, to assess the water quality, samples were collected from Following Six (06) location (for mine water) and analysed for physico-chemical characteristics as per Schedule VI of MoEFCC General Standards for discharge.

1. **Mine Discharge of Jeenagora (MW9)**
2. **Mine Discharge of LODNA (MW18)**
3. **Mine Discharge of JOY RAMPUR (MW19)**
4. **Mine Discharge of NT ST (MW20)**
5. **Mine Discharge of BARAREE (MW21)**
6. **Mine Discharge of JEALGORA (MW22**

The water sampling points were selected by consultation between BCCL & JSPCB officials. The different sources of water were identified for water quality characterization considering their likely impact on these water sources due to project activities. Based on these considerations, it was thought necessary to assess the existing quality of discharge of mine water in the study area.

Name of the Cluster: Cluster-IX		Name of the Station: Mine Discharge of Jeenagora (MW9)						
Sl. No.	Parameters	March ,2025		April,2025		May,2025		As per MOEF General Standards for schedule VI
		1stFN	2ndFN	1stFN	2ndFN	1stFN	2ndFN	
		01.03.25	25.03.25	01.04.25	21.04.25	05.05.25	20.05.25	
1	Total Suspended Solids (mg/l)	35	36	36	34	36	39	*100 (Max)*
2	pH	8.01	8.03	7.79	7.78	7.91	7.85	*5.5 - 9.0*
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	*10 (Max)*
4	COD (mg/l)	36	32	36	36	44	40	*250 (Max)*

Name of the Cluster: Cluster-IX		Name of the Station: Mine Discharge of LODNA (MW18)						
Sl. No.	Parameters	March ,2025		April,2025		May,2025		As per MOEF General Standards for schedule VI
		1stFN	2ndFN	1stFN	2ndFN	1stFN	2ndFN	
		01.03.25	26.03.25	07.04.25	28.04.25	13.05.25	26.05.25	
1	Total Suspended Solids (mg/l)	58	56	36	34	49	47	*100 (Max)*
2	pH	7.44	7.51	7.64	7.59	7.72	7.77	*5.5 - 9.0*
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	*10 (Max)*
4	COD (mg/l)	44	40	32	36	32	36	*250 (Max)*

Name of the Cluster: Cluster-IX		Name of the Station: Mine Discharge of JOY RAMPUR (MW19)						
		March ,2025		April,2025		May,2025		As per MOEF General Standards for schedule VI
Sl.	Parameters	1stFN	2ndFN	1stFN	2ndFN	1stFN	2ndFN	
		01.03.25	25.03.25	07.04.25	21.04.25	13.05.25	26.05.25	
1	Total Suspended Solids (mg/l)	51	56	31	29	42	44	*100 (Max)*
2	pH	7.69	7.71	7.56	7.54	8.07	8.05	*5.5 - 9.0*
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	*10 (Max)*
4	COD (mg/l)	44	36	40	44	40	36	*250 (Max)*

Name of the Cluster: **Cluster-IX**		Name of the Station: **Mine Discharge of NT ST (MW20)**						
		March ,2025		**April,2025**		**May,2025**		**As per MOEF General Standards for schedule VI**
Sl. No.	**Parameters**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	
		01.03.25	25.03.25	07.04.25	28.04.25	13.05.25	26.05.25	
1	Total Suspended Solids (mg/l)	39	41	41	39	36	38	*100 (Max)*
2	pH	7.88	7.86	7.44	7.43	7.91	7.92	*5.5 - 9.0*
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	*10 (Max)*
4	COD (mg/l)	32	36	48	44	40	44	*250 (Max)*

Name of the Cluster: **Cluster-IX**		Name of the Station: **Mine Discharge of BARAREE (MW21)**						
		March ,2025		**April,2025**		**May,2025**		**As per MOEF General Standards for schedule VI**
Sl.	**Parameters**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	
		01.03.25	25.03.25	07.04.25	21.04.25	13.05.25	26.05.25	
1	Total Suspended Solids (mg/l)	42	46	42	41	41	42	100 (Max)
2	pH	7.83	7.79	7.81	7.82	7.79	7.75	5.5 - 9.0
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	10 (Max)
4	COD (mg/l)	40	44	48	40	36	40	250 (Max)

Name of the Cluster: **Cluster-IX**		Name of the Station: **Mine Discharge of JEALGORA (MW22)**						
		March ,2025		**April,2025**		**May,2025**		**As per MOEF General Standards for schedule VI**
Sl.	**Parameters**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	**1stFN**	**2ndFN**	
		01.03.25	25.03.25	07.04.25	21.04.25	13.05.25	26.05.25	
1	Total Suspended Solids (mg/l)	47	46	43	45	44	43	100 (Max)
2	pH	8.01	8.04	7.52	7.57	7.94	7.93	5.5 - 9.0
3	Oil & Grease (mg/l)	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	10 (Max)
4	COD (mg/l)	36	40	44	40	32	36	250 (Max)

Water pollution control measures:

I. Industrial water treatment Plant has been proposed for treatment for Industrial water.
II. Soak pit cum sceptic tank will be provided for treatment of waste water
III. Proper Rain water harvesting system will be provided.

		IV. Leak proof containers for storage and transportation of waste oil/grease V. Regular testing of surface and ground water will be carried out as part of Routine Environmental monitoring. VI. Garland drains will be made around the periphery of the quarry and OB dump to collect and carry the contaminated water to treatment/settling pond shall be provided. VII. Oil & Grease trap to treat effluent from Workshop. VIII. Entire domestic effluent will be treated in septic tanks and soaked into soak pits. IX. Properly designed system to collect and divert the storm water shall be provided. **Ground water resources** In coal mines, the different aquifers overlying the working coal seam would be contributing groundwater to the mine by gravity drainage which need to be pumped out for safe operation of the mines. Generally steep draw down cone would be formed in poor potential aquifers thereby the influence area is to small distance and reverse is established in respect of aquifers with high hydraulic conductivity. The Impact of mining activities is likely to be pronounced in the dip side which are estimated by utilising aquifer and mine parameters at final mine depth. It may be appropriate to mention here that the presence of prominent boundaries/water bodies, faults and also interfringing of sandstone and shale beds may restrict the propagation of draw down cone. Further, the ground water level decline is more in the close vicinity of the pit. The effect will be pronounced in the down – dip side and milder in the up – dip side. But this effect will be temporary in nature and once the project is over, after 2-3 rains, the regime will regain its almost original status. Any shortage of water in the affected villages during the temporary period will be supplemented through supply of treated water pumped out from the mine.

Water conservation measures

i. Provision of Rain water Harvesting system has been made for conservation of water.

ii. Settling pond for surface run-off with drainage system shall be provided.

iii. Closed water circuit will be provided.

Impact on Noise level

Fortnightly Noise Level Monitoring in Cluster IX Collieries is being carried out at following stations as part of Routine Environmental Monitoring by CMPDI RI-II, Dhanbad:

Location of sampling sites

1. **Jeenagora (N13)**
2. **Kusmatand Village (12)**
3. **Bhowrah North (N14)**
4. **Hurriladih UGP (N28)**

Noise level data at the aforementioned stations is as given below:

Name of the Project : **Cluster -IX**			Month**: MARCH,2025**			
Sl. No.	**Station Name/Code**	**Category of area**	**Date**	**Noise level(Day) dB(A)LEQ**	**Noise level(Night) dB(A) L_{EQ}**	***Permissible Limit of Noise level in *) dB(A)***
1	Kusmatand Village (N12)	Residential area	08.03.25	43.2	31.8	*Industrial Day-75dB, Night-70dB Residential Day-55 dB Night-45dB*
2	Kusmatand Village (N12)	Residential area	22.03.25	42.8	31.9	
3	Jeenagora (N13)	Industrial area	07.03.25	62.4	44.8	
4	Jeenagora (N13)	Industrial area	22.03.25	60.3	45.4	
5	Bhowrah North(N14)	Industrial area	09.03.25	57.1	45.1	
6	Bhowrah North(N14)	Industrial area	26.03.25	58	45.2	
7	Hurriladih UGP (N28)	Industrial area	09.03.25	52.7	52.8	
8	Hurriladih UGP (N28)	Industrial area	29.03.25	44.1	44.3	

Name of the Project : **Cluster -IX**			Month: **APRIL,2025**			
Sl. No.	***Station Name/Code***	***Category of area***	***Date***	***Noise level(Day) dB(A) L_{EQ}***	***Noise level(Night) dB(A)L_{EQ}***	***Permissible Limit of Noise level in *) dB(A)***
1	*Kusmatand Village (N12)*	*Residential area*	*15.04.25*	*43.2*	*32.1*	***Industrial Day-75dB, Night-70dB Residential Day-55 dB Night-45dB***
2	Kusmatand Village (N12)	Residential area	26.04.25	42.9	32.2	
3	Jeenagora (N13)	Industrial area	15.04.25	62.5	45.1	
4	Jeenagora (N13)	Industrial area	25.04.25	60.3	45.7	
5	Bhowrah North(N14)	Industrial area	03.04.25	57.1	45.4	
6	Bhowrah North(N14)	Industrial area	18.04.25	57.9	45.6	
7	Hurriladih UGP (N28)	Industrial area	03.04.25	52.8	44.4	
8	Hurriladih UGP (N28)	Industrial area	18.04.25	52.9	44.7	

Name of the Project : **Cluster -IX**			Month: **MAY,2025**			
Sl. No.	**Station Name/Code**	**Category of area**	**Date**	**Noise level (Day) dB(A) Leq**	**Noise level (Night) dB(A) Leq**	***Permissible Limit of Noise level in *)dB(A***
1	Kusmatand Village (N12)	Residential area	15.05.25	51.8	40.3	*Industrial Day-75dB, Night-70dB Residential Day-55 dB Night-45dB*
2	Kusmatand Village (N12)	Residential area	30.05.25	51.8	40.7	
3	Jeenagora (N13)	Industrial area	15.05.25	65	41.6	
4	Jeenagora (N13)	Industrial area	30.05.25	62.7	42.2	
5	Bhowrah North(N14)	Industrial area	06.05.25	59.4	60.3	
6	Bhowrah North(N14)	Industrial area	22.05.25	41.9	42.0	
7	Hurriladih UGP (N28)	Industrial area	06.05.25	54.9	41.0	
8	Hurriladih UGP (N28)	Industrial area	16.05.25	55.0	41.2	

Noise pollution control measures

i. Adequate and regular maintenance of plants and machineries will be carried out.

ii. The noise absorbing pads at foundations will be provided.

iii. Green belt has been proposed to prevent the propagation of sound and also to dampening its intensity.

iv. Proper blasting techniques by designing a suitable blasting pattern after actual field observation would be followed to minimize adverse effects of ground vibration and noise if required.

v. Personal protective gears are given to workmen exposed to dusty and noise work environment.

Hazardous Waste:

Details of Hazardous waste generated and their method of disposal:

Sl.No.	Waste description	Method of disposal
1.	Used oil	Will be stored in drums safely in store for disposal through auction to the authorized re-processors
2.	Oil and grease	
3.	Used batteries	To be stored safely for auction to the authorized re-processors.
4.	Oily sludge	To be disposed in impervious layer lined pits.
5.	Filters & filter materials containing oil during maintenance of vehicles	

i. Door to door Municipal Solid Waste will be collected and subsequently this waste will be disposed by Municipal Corporation as per existing Rules.

ii. Sewage will be treated in Septic Tank cum Soak Pit prior to disposal.

Socio-Economic Issues:

The project is likely to give a boost to the economy of the area by providing primary and secondary employment to local people . The infra-structural

		facilities including healthcare facilities provided by the project will benefit local villagers. The progressive mine closure activity is likely to significantly reduce the impact of mining activity on the land apart from increasing the green cover and surface water availability. The yearly CSR expenditure as per existing CIL Policy ie 2% of average net profit of the company for the immediate three preceeding years or 2.00 per tonne of coal production of previous year whichever is higher, which is proposed to be spent in vicinity of Cluster IX group of mines will help in bringing about better socio-economic benefits to the local population. **Top Soil Management** **i. Topsoil storage and preservation:** i. Following three zones are developed in the topsoil mound during storage: ii. Aerobic zones: Soil is active in this zone iii. Transition zone: Fluctuates between predominantly aerobic and anaerobic status. iv. This zone is inactive and low in biological activity as well as organic content. v. Stripping of Top Soil: Standard method of stripping will be used. The operation must be planned to mininmise the movement of machines and vehicles to avoid compaction and damage of soil structure. Further careful control of operation is necessary to ensure planned stripping depths of the topsoil and sub-soil. These soils should be stripped and stored separately. Intermingling of these soils during stripping is not a good practice. vi. It is essential that topsoil stripping should be carried out when it is dry as far as possible to reduce the risk of compaction and damage to the soil structure by smearing and remoulding. Prolonged rainfall is unsuitable. The best part of the year is when evapo-transportation exceeds precipitation i.e during the months of March-September.

		vii. Geometry of Topsoil Heap: The heap should be constructed to facilitate the following: viii. To provide the maximum surface area for mantaining greater level of Biological activity. ix. To have slopes capable of sustaining vegetation to avoid erosion and gully formation. Space constraints imposed by the site factors and soil texture would generally dictate the overll size and shape of the heap. As a rule of the thumb, the following stack geometry may be mantained as far as possible to preserve the topsoil and increase the shelf life. i. Height: ii. 4.0m (Max) for sand soil iii. 2.0 to 3.0 for loamy soil iv. Slope: v. Wide slope of 1 in 3 (i.e 18.5^0 to the horizontal) vi. It is advisable to avoid the topsoil storage, specifically the longterm one. However if storage is unavoidable upon completion of the surface of the heap, the following steps are to be followed to keep the soil in good health and to increase its shelf life : vii. Surface ripping with suitable sub-soiling machine for the purpose of aeration and relieving surface compaction. viii. Immediate cultivation of suitable low maintanance species like dwarf grasses to prevent erosion and guily formation. ix. Maintenance of surface vegetation actively by seeding, mowing, and weed control operation. **Topsoil redistribution: -** After the final grading, the topsoil would be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the post mining land uses, contours, and surface water drainage system.

Biological reclamation

For successful biological reclamation of the reclaimed area, preference will be given to endemic species and mixed culture. The species will be selected carefully from the following groups for quick reclamation :

i. Nitrogen fixing tree species for fuel wood, timber and fodder

ii. Fruit bearing tree species

iii. Tree species with dense foliage for shade

Flowering and ornamental tree species.

Year	PLANTATION		Total Plantation
	Area (Ha)	Trees/ saplings	
During active mining			
Up to Base year	98.82	247050	247050
2025-26	5	12500	12500
2026-27	10	25000	25000
2027-28	30	25000	25000
2028-29	50	25000	25000
Post Mining Closure			
2029-30	200	625000	625000
2030-31	300	750000	750000
2031-32	335.83	864575	864575
Post Closure Monitoring			
2032-33	0	0	0
2033-34	0	0	0
TOTAL	**1029.65**	**2574125**	**2574125**

Monitoring & Management Organisation:

To have a close watch on the environmental condition and implementation of the various measures suggested, a multi-disciplinary approach is essential.

ORGANISATION CHART

Sl. No.	Measures/Actions		Agency
1.	Environmental Pollution Control	1	General Manager, Lodna Area

					2	Nodal Officer, (Environment), Lodna Area	
					3	Project Officer, Amalgamated NTST Kujama OC mine	
					4	Area Manager (Civil), Lodna Area	
					5	Environment Cell (BCCL H.Q.)	
			2.	Environmental Monitoring	1	General Manager, Lodna Area	
					2	Area Manager (Civil), Lodna Area	
					3	Nodal Officer, (Environment), Lodna Area	
					4	Project Officer, Amalgamated NTST Kujama OC mine	
					5	Environment Cell of BCCL Headquarters	
					6	Environmental Laboratory of CMPDI, RI-II, Dhanbad	
			3.	Reclamation	1	Project Officer, Amalgamated NTST Kujama OC mine	
					2	Nodal Officer (Environment), Lodna Area	

Annexure VI

Chapter 8 : Progressive & Final Mine Closure Plan

- Mine Closure Plan has two components viz. i) Progressive or Concurrent Mine Closure Plan, and ii) Final Mine Closure Plan. Progressive mine Closure Plan would include various land use activities to be done concurrently and sequentially during the entire period of the mining operations, whereas the Final mine Closure activities would start towards the end of mine life, and may continue even after the reserves are exhausted and/or mining is discontinued till the mining area is restored to an acceptable level. The Mine Closure details of the Mining Plan should be oriented towards the restoration of land back to its original condition as far as practicable.

- Mining is to be carried out in a phased manner along with reclamation and afforestation work in the mined-out area.

- This Progressive mine closure plans shall be reviewed after a period of every five years. These plans would be examined periodically in every five years period and to be subjected to the third-party monitoring by the agencies approved by the Central Government, like Central Mine Planning and Design Institute Ltd. (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian Institute of technology (IIT-ISM) or any other institutes/organizations/agencies specified from time to time for the purpose.

- Various project specific activities viz. mined-out land details & their technical and biological restoration plan, water quality management, infrastructure to be retained and demolished, disposal of mining machinery, etc. have been furnished in the relevant paras. As the backfilling of the mine void is not being carried out as part of regular mining operation, it shall not be included in the list of progressive mine closure activities. However, in case, if the backfilling of mine void is being carried out specifically for closure of the mine in future due any reason, the same shall be included in the list of activities to be taken up for mine closure.

	Parameters	*Details*
8.1	**Land Degradation and restoration Schedule**	

8.1.1 Land Degradation and Technical Reclamation (Cumulative Area "Ha")

Stage/Year		Land Degraded (Ha)				Technically Reclaimed Area (Ha)			
		Excav	**Dump (Extn+ Top Soil)**	**Infra/ others***	**Total**	**Backfill**	**Dump (Extn+ Top Soil)**	**Batter /Infra/ others**	**Total**
Up to Base year*		356.32							
Y-1	2025-26	414.31	130	0	544.31	10	130	0	140
Y-2	2026-27	472.3	260	0	732.3	20	260	0	280
Y-3	2027-28	530.3	400	0	930.3	95	400	0	495
Y-4	2028-29	588.31	543.50	0	1136.43	168.99	543.50	0	717.11
Total		**848.71**	**544.50**	**0**	1136.43	**168.99**	**543.50**	0	**712.49**
Post Mining Closure									
Y-5	2029-30								
Y-6	2030-31								
Y-7	2031-32								
Y-8	2032-33								
Y-9	2033-34								
Total		**848.71**	**543.50**	**0**	1136.43	**168.99**	**543.50**	0	**712.49**

8.1.2 **Biological Reclamation (Cumulative in "Ha")**

Stage/Year		Biologically Reclaimed Area (Ha)					Forest land (Return)	Un Disturbed/ To be left for Public/com Use	Total (Ha)
		Agriculture	Plantation	Water Body	Public Company Use	Total			
Up to Base year*			98.82			98.82			98.82
Y-1	2025-26		103.82			103.82			103.82
Y-2	2026-27		113.82			113.82			113.82
Y-3	2027-28		143.82			143.82			143.82
Y-4	2028-29		193.82			193.82			193.82

Post Mining Closure									
Y-5	2029-30		393.82			393.82			393.82
Y-6	2030-31		693.82			693.82			693.82
Y-7	2031-32		1029.65			1029.65			1029.65
Post Closure Monitoring									
Y-8	2032-33		1029.65			1029.65			1029.65
Y-9	2033-34		1029.65			1029.65			1029.65
Total			**1029.65**			**1029.65**			**1029.65**

8.2 **Post Closure Water Quality management**:

Plantation will be carried out on the OB Dumps to avoid erosion and siltation of water bodies.

Routine Environmental Monitoring will be carried out for water quality analysis of following samples:

S. No.	Sample	Frequency
1	Mine Water	Fortnightly
		Half Yearly
2.	Surface Water	Quarterly
3.	Ground Water	Quarterly

If any discrepancy from statutory standards is observed, necessary corrective measures will be undertaken by the management.

8.3 **Post Closure Air Quality management**:

Plantation over quarry will be undertaken. Fortnightly Air Quality Monitoring will be carried out at 04 Air Quality monitoring Stations during three years post closure period.

8.4 **Waste Management** (Figures in MM^3)

Stage /Year		**OB Removal (Cumulative) (M.Cum)**			**External Dump (Cumulative) (M.Cum)**		**Internal Backfilling (Cumulative) (M.Cum)**		**Embankment (Cumulative) (M.Cum)**	
		Top Soil	OB	Total	Top Soil	OB	Top Soil	OB	Top Soil	OB
Up to Base year*		NA								
Y-1	2025-26	0.20	53.37	53.57	0.20	66.13	-	0.6		
Y-2	2026-27	0.40	136.43	136.83	0.40	137.75	-	1.40		
Y-3	2027-28	0.60	210.43	211.03	0.60	213.29	-	25.26		

Y-4	2028-29	0.78	274.96	275.74	0.78	231.49	-	49.41		
	Total	**0.78**	**274.96**	**275.74**	**0.78**	**231.49**	**-**	**49.41**		
	Post Mining Closure									
Y-5	2029-30									
Y-6	2030-31									
Y-7	2031-32									
Post Closure Monitoring										
Y-8	2032-33									
Y-9	2033-34									
	Total	**0.78**	**274.96**	**275.74**	**0.78**	**231.49**	**-**	**49.41**		

8.5 **Top Soil Management –** (Including Action Plan for Top Soil Management)

(All Figures are Cumulative and in MM^3)

Stage/Year		Top Soil Removal Plan	Top Soil Used				
			Spreading Over Embankment	Spreading Over Backfill area	Spreading over External OB Dump area	Used in Green Belt Area	Total Utilised
Up to Base year*		NA					
Y-1	2025-26	0.2	0	-	0.2	-	0.2
Y-2	2026-27	0.4	0	-	0.4	-	0.4
Y-3	2027-28	0.6	0	-	0.6	-	0.6
Y-4	2028-29	0.78	0	-	0.78	-	0.78
Post Mining Closure							
Y-5	2029-30						
Y-6	2030-31						
Y-7	2031-32						
Post Closure Monitoring							
Y-8	2032-33						
Y-9	2033-34						
Total		**0.78**			**0.78**		**0.78**

Top Soil removed will be used in Plantation activities, Spreading over External OB Dump area, Spreading Over Backfill area and also in Green Belt Area.

8.6	Management of Coal Rejects.	There is no washery.

<table>
<tr><td>8.7</td><td>Restoration of Land used fort Infrastructure</td><td>All the other infrastructure related to the opencast coal mining operation will be dismantled, after end of the mineable reserve/ mine life. The list of infrastructure to be dismantled at the end of the mine life is given in the following table:
<table>
<tr><th>Sl. No.</th><th>Particulars</th></tr>
<tr><td>1.</td><td>Workshop, Mine Office & Stores</td></tr>
</table>
</td></tr>
<tr><td>8.8</td><td>Disposal of Mining Machinery</td><td>After end of production life of Cluster IX group of mines, all mining machinery will be shifted to other mines of BCCL as per requirements.</td></tr>
<tr><td>8.9</td><td>Safety & Security</td><td>Fencing around Opencast Workings:
i) The top edge of the opencast working shall be kept fenced with wire rope strands or barbed wire, supported by posts of timber, iron or concrete (movable). The gap between the adjacent rope strand or wires shall not be more than 0.30 m and bottom most rope, strand or wire shall not be more than 0.25 m and the topmost rope, strand or wire shall not be less than 1.0 m from ground level.
ii) At the finishing stage, opencast working shall be fenced with a masonry wall using lime mortar not less than 0.40 m thick and not less than 1.2 m high, with a parapet top.</td></tr>
<tr><td>8.10</td><td colspan="2">Abandonment Cost and Financial Assurance</td></tr>
<tr><td>8.10.1</td><td colspan="2">Abandonment Cost: Cost of Activities to be taken up for closure of the mine</td></tr>
</table>

Activity Cost for Mine Closure Plan of Cluster-IX

Head	Parameters	Unit	Quantity	Avg. Escalated Rate in Crs.	Escalated Amount in Crs.
Progressive Closure	Barbed wire fencing around the mine (Pit and Dump)	m	20000	0.0001867	3.7340000
	Waste Management	MCum	0	-	-
	Filing of Void -Rehandling of Dump (Not carried out as part of regular mining operation)	MM3	0	0.0905126	-
	Top soil Management	MM3	0.63	9.0512625	5.7022954
	Technical and Biological Reclamation of mined out land and OB Dump.	Ha	300	0.1131408	33.9422400
	Plantation over Virgin Area including green belt	Ha	34	0.1131408	3.8467872
	Manpower Cost and supervision	LS	4	0.5657039	2.2628156
	Toe wall around the dump	m	5000	0.0019800	9.9000000
	Garland Drain	m	3000	0.0001335	0.4005000
	Stowing	LS	1	-	-
	Subsidence Monitoring and Management	LS	1	0.9051263	0.9051263
	Isolation Stoppings	LS	1	-	-
	Water Quality Management	LS	1	0.9051263	0.9051263
	Air Quality Management	LS	1	1.4314078	1.4314078
	Any other activities				-
	Sub Total (A)				***63.0302986***
Dismantling of Infrastructure & Disposal / rehabilitation of Mining Machinery	Dismantling of Workshop	LS	1	1.5467327	1.5467327
	Dismantling of CHP	LS	0	1.1314078	-
	Dismantling of mine structures	LS	1	1.1314078	1.1314078
	Dismantling of Civil structures	LS	1	1.1314078	1.1314078
	Rehabilitation of dismantled facilities	LS	1	1.5467327	1.5467327
	Dismantling of pumps and Pipes/ other facilities	LS	1	1.1314078	1.1314078
	Dismantling of stowing bunkers, provisioning of pumps for bore well pumping arrangement	LS	1	0.2262816	0.2262816
	Dismantling of UG equipment	LS	1	0.0905126	0.0905126

Activity Cost for Mine Closure Plan of Cluster-IX

Head	Parameters	Unit	Quantity	Avg. Escalated Rate in Crs.	Escalated Amount in Crs.
	Rearranging water pipelines to dump top park Agricultural land	LS	1	0.0565704	0.0565704
	Dismantling of Power lines	LS	1	1.1314078	1.1314078
	Sub Total (B)				***7.9924612***
Safety and Security	Barbed wire fencing around mine (Pit and dumps)	m	30000	0.0001867	5.6010000
	Concrete wall with masonry / concrete pillars around the pit	m	2000	0.0016971	3.3942000
	Securing entries (shaft/inclines)	LS	1	0.3394223	0.3394223
	Securing of Inclines	Nos	0	0.0133073	-
	Appropriate fencing around the water body	m	4000	0.0004526	1.8104000
	installation of bore well pump	LS	0	0.0009452	-
	Stabilisation' viz., benching, pitching etc of side walls of the water body	LS	1	0.3394223	0.3394223
	Toe Wall around the dump	m	15000	0.0019800	29.7000000
	Garland drain	m	15000	0.0001335	2.0025000
	Drainage Channel from main OB dump	m	0	0.0003960	-
	Sub Total (C)				***43.1869446***
Technical and Biological Reclamation of Mined Out of land and OB Dump	Filing of Void	Mm3	0	0.0169711	-
	OB Rehandling for backfilling	Mm3	0	0.0169711	-
	Terracing, blanketing with soil and vegetation of External OB Dump	Ha	0	0.0000679	-
	peripheral road, gates, view point, cemented steps on bank	m	10000	0.0016971	16.9710000
	Expenditure on development of Agricultural land			-	-
	Landscaping and Plantation	Ha	685	0.1131408	77.5014480
	Sub Total (D)				***94.4724480***
Post Closure management and supervision	Power Cost	LS	1	0.5657039	0.5657039
	Post Mining Water quality management	samples	38	0.0022628	0.0859864
	Post Mining Air quality management	LS	288	0.0067884	1.9550592
	Subsidence monitoring for 5 years	LS	1	1.1314078	1.1314078
	Waste Management	LS	1	0.5657039	0.5657039

Activity Cost for Mine Closure Plan of Cluster-IX

Head	Parameters	Unit	Quantity	Avg. Escalated Rate in Crs.	Escalated Amount in Crs.
	Manpower Cost and supervision	Years	5	0.1697112	0.8485560
	Sub Total (E)				***5.1524172***
Sustainability	Skill Development and Trainings (Alternative Source of livelihood)	LS	**The no. & scope of activities that are to be undertaken under Sustainability will be decided by BCCL Management on Case to case basis.**		72.08079468
	Fruit bearing, medicinal & local species plantation / Afforestation	LS			
	Agriculture and other Allied Activities	LS			
	Eco-Tourism Development	LS			
	Flora and fauna Conservation/Wildlife conservation	LS			
	Water Resource Management/Conservation	LS			
	Clean Energy Projects	LS			
	Art and Culture	LS			
	Women Empowerment	LS			
	Welfare of aged and disabled people	LS			
	Sustainable Living	LS			
	Sanitation	LS			
	Sub Total (F)				***72.0807947***
				Grand Total:-	***285.9153643***

Notes w.r.t. Cost of activities calculation:

1. The cost shown above is only an estimated cost and the exact cost for these activities can be established at the time of execution only. If the total cost at the time of execution of above-mentioned activities exceed the total estimated cost, the shortfall shall be borne by the company.
2. The number & scope of activities, which have to be undertaken under Sustainability Head, are provided on a Lump sum basis; however, BCCL Management will decide these activities in accordance with the guidelines.
3. In line with the guidelines, BCCL will have to carry out a Social Impact assessment study for the mine and determine the Zone of Impact and subsequently, carry out the activities in Sustainability head. The activities to be undertaken in Sustainability

head will have to be decided by the Mine Closure Advisory Committee as per para 4.12 of MPG-25.

Mine Closure Advisory Committee: -

The project is falling in Dhanbad district. As per para 4.12 of MPG-25 the project officials will have to approach DC, Dhanbad district to constitute advisory committee as detailed under to oversee community development and livelihood plans & efforts:

	Chairman	Members	Reference
Advisory Committee	District Collector, or District officer (as authorised by D.C.)	• Sarpanch/Secretary of Local Gram panchayats, • Representative of reputed NGO (in consultation with D.C.), • Nodal Officer (Mine Closure)- BCCL • Project officer of the mine • Retired Forest Officer– Member • Two nominated member - if deemed appropriate by DC	Para 4.12 of MPG- 25

Roles of Committee:

a) Facilitating periodical meetings and open forums to collaboratively envision and concrete sustainable ideas, consultations, and collaborative decision making.

b) Promoting initiatives that build local knowledge, skills, and resources, such as training programs or alternative livelihood projects, to help the community transition successfully post-mining.

c) Ensuring engagement of local communities and self-help groups in Operation & Maintenance of the project and public spaces.

d) Ensuring greening of project area through best suited species of plantation and sustainable tourism practices by promoting Geo-Tourism.

e) Proactive participation of local community in the domain of selecting skills to

be developed to generate alternate economic resources to ensure 'Just Transition'.

f) Promote transparency and accountability in community-driven initiatives

.

8.10.2	Financial Assurance: Amount to be deposited in Escrow account as a security against the mine activities to be carried out of the closure of the mine	
	Parameters	*Details*

Mine Closure Cost Calculation for Cluster IX Group of Mines			
WPI as on base date	**May-24**		**153.5**
WPI as on	**Sep-25**		**155**
Escalation rate of Closure cost			**1.0097719**
	UG	OC	
Base Rate of Closure Cost "Rs . Crs/Ha"	0.020	0.14000	
Closure Cost "Rs. Crs/Ha"	0.0201954	0.1413680	
Project Area	0	1937.50000	
Amount to be deposited into Escrow Account "Rs. in Crs.	0.0000000	273.9005000	
Amount already deposited into Escrow Account "Rs. in Crs.	2.0735000	116.8589800	
Net Amount to be deposited into Escrow Account "Rs. in Crs.	0.0	154.9680200	
Rate of compounding of Annual Closure Cost (@5%)	5.00%	5.00%	
Balance Life of the project "in yrs"	0	4	
Annual Closure Cost	0.0000000	38.7420050	
Amount to be deposited into Escrow Account after compounding @ of 5% "Rs. in Crs"		**166.9828843**	

Amount to be deposited into Escrow Account Anually (Rs. in Crores)

FYear	Year	UG	OC	Advance Amount Adjustment**	Total
2025-26	1	0.0000000	38.7420050	20.4001900	18.3418150
2026-27	2	0.0000000	40.6791053		40.6791053
2027-28	3	0.0000000	42.7130605		42.7130605
2028-29	4	0.0000000	44.8487135		44.8487135
Total UG		**0.0000000**	**166.9828843**		**146.5826943**

* Total Advance amount of Rs. 20.40019 Crores for FY 2025-26 has already been deposited in escrow account of NTST Jeenagora Group of Mines (7.71734Cr) and Amalgamated

Joyrampur OC(12.68285 Cr.) by BCCL. Therefore, the same is adjusted and contribution of Rs.18.2394358 Cr is required in 2025-26.

* Final WPI of Sept 2025 (155) is used.

* Balance production life of OC part is taken as 04 years as on date.

Before amalgamation mine closure plan for 5 mines namely NTST Jeenagora Group of Mines, Joyrampur UG, Bararee UG, Lodna UG and Amalgamated Joyrampur OC were prepared and approved by BCCL Board. As per the approved Mine Closure Plan the total deposited amount in all Escrow Accounts till 31.3.2025 was Rs. 118.93 crores. Thus after amalgamation either these five escrow accounts will be merged into a single escrow account in the name of Combined Cluster IX Group of Mines or a new escrow account have to be opened in the name of Combined Cluster IX Group of Mines. The amount already accrued in all 5 accounts shall be adjusted against the new closure cost calculated.

The amount calculated above shall be deposited every year by BCCL in the Escrow Account in the name of Combined Cluster IX Group of Mines.

Thus, total amount that shall be deposited for final mine closure activities of **Combined Cluster IX Group of Mines during the life of 04 years stands out to be Rs. 166.9828843 Crores** as per the present status of the mine.

The amount already deposited in the escrow account will also be available for mine closure activities and should be included to arrive at the total funds available for mine closure activities.

Particulars	**Amount for UG (in ₹ Crs.)**	**Amount for OC (in ₹ Crs.)**
Amount Already Deposited in Escrow Account	2.0735	116.8589800
Amount to be Deposited in the Escrow Account in the Future	0	166.9828843
Total Amount available for Mine Closure Activities	2.0735	283. 8418643
Grand Total	**285.9153643**	

The amount deposited in five Escrow Accounts is appended below:

NTST JEENAGORA GRP OF MINES (in ₹ Lakhs)				
Year	**As per Accounts**	**UG**	**OC (Abandoned Quarry)**	**Total**
2013-14	387.563		387.563	387.563
2014-15	406.941		406.941	406.941
2015-16	427.288		427.288	427.288
2016-17	448.652		448.652	448.652
2017-18	471.085		471.085	471.085
2018-19	494.639		494.639	494.639
2019-20	519.371		519.371	519.371
2020-21	545.339		545.339	545.339
2021-22	572.16		572.16	572.16
2022-23	601.237		601.237	601.237
2023-24	631.298		631.298	631.298
2024-25	662.863		662.863	662.863
Total	**6168.436**	**0**	**6168.436**	**6168.436**

JOYRAMPUR UG (in ₹ Lakhs)				
Year	**As per Accounts**	**UG**	**OC (Abandoned Quarry)**	**Total**
2013-14	18.862	6.431	12.431	18.862
2014-15	6.753	6.753		6.753
2015-16	7.091	7.091		7.091
2016-17	7.445	7.445		7.445
2017-18				
2018-19				
2019-20				
2020-21				
2021-22				
2022-23				
2023-24				
2024-25				
Total	**40.15**	**27.72**	**12.431**	**40.151**

BARAREE COLLIERY (in ₹ Lakhs)				
Year	**As per Accounts**	**UG**	**OC (Abandoned Quarry)**	**Total**
2013-14	163.594	23.844	139.750	163.594
2014-15	25.04	25.04		25.040
2015-16	26.29	26.29		26.290
2016-17	27.6	27.6		27.600
2017-18				
2018-19				
2019-20				
2020-21				
2021-22				
2022-23				
2023-24				
2024-25				
Total	**242.52**	**102.77**	**139.750**	**242.524**

LODNA COLLIERY (in ₹ Lakhs)				
Year	**As per Accounts**	**UG**	**OC (Abandoned Quarry)**	**Total**
2013-14	61.638	16.95	44.69	61.638
2014-15	17.80	17.80		17.799
2015-16	18.69	18.69		18.689
2016-17	19.62	19.62		19.623
2017-18				
2018-19				
2019-20				
2020-21				
2021-22				
2022-23				
2023-24				
2024-25				
Total	**117.75**	**73.06**	**44.69**	**117.75**

AMALGAMATED JOYRAMPUR OC (in ₹ Lakhs)				
Year	**As per Accounts**	**UG**	**OC (Abandoned Quarry)**	**Total**
2013-14				
2014-15				
2015-16				
2016-17				
2017-18	560.9780	3.796	557.18	560.98
2018-19	585.0410		585.0410	585.0410
2019-20	614.2930		614.2930	614.2930
2020-21	645.0080		645.0080	645.0080
2021-22	677.2580		677.2580	677.2580
2022-23	711.1210		711.1210	711.1210
2023-24	746.6770		746.6770	746.6770
2024-25	784.0110		784.0110	784.0110
Total	**5324.387**	**3.796**	**5320.591**	**5324.387**

The money deposited in the Escrow Account has to deal with the following:

- Cost of closure activities.
- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring.
- Creation of a corpus fund for final mine closure

Mine Closure Plan of following five mines have been approved by BCCL Board are mentioned below:

Name of Mine	BCCL Board No.	Date	Escrow A/c at Bank of Baroda, Dhanbad Branch
NTST Jeenagora Group of Mines	304th Board of BCCL	03.02.2014	150100009046
Joyrampur UG Mine	305th Board of BCCL	12.03.2014	150100009049
Bararee Colliery	303rd Board of BCCL	04.01.2014	150100008940
Lodna Colliery	303rd Board of BCCL	04.01.2014	150100008942
Amalgamated Joyrampur OC	336th Board of BCCL	09.12.2017	150100011026

- **Implementation of the approved Mine Closure Plan shall be sole responsibility of the mine owner**.

Mining is to be carried out in a phase manner i.e. continuation of mining activities from one phase to another indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 50% of the total deposited amount including interest accrued in the escrow account may be released after every five years in line with the periodic examinations of the closure plan. The amount released should be equal to expenditure incurred on the progressive mine closure in past five years or 50% whichever is less. The balance amount shall be released to the mine owner//leaseholder at the end of the final mine closure on compliance of all provisions of Closure Plan. This compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations order made by the central or state government, statutory organizations, court etc. and certified by the coal controller.

Final Mine Closure would be considered to be completed only after acceptance of the third party audit report by the coal controller on the compliance of all provisions on Mine Closure Plan. Any institute/ Organization/ Agency as may be notified by the Government for this purpose may be engaged for third party audit.

Annexure VII

Gmail

Environment Lodna Area <envlodna@gmail.com>

Fwd: Mechanically covered trucks for transportation of coal

ARUN KUMAR <gmlodna.bccl@coalindia.in> 19 April 2022 at 13:32
To: agmofficelodna <agmofficelodna@gmail.com>, planninglodna <planninglodna@gmail.com>, TAPAS KUMAR BANDOPADHYAY <tapas.bandopadhyay@coalindia.in>, Pankaj Kumar <pankaj.k3407@coalindia.in>, envlodna <envlodna@gmail.com>

For information and necessary action

From: "Rakesh Dwivedi" <rdwivedi.cil@coalindia.in>
To: "b bhadale" <b.bhadale@tatamotors.com>
Cc: "Pradeep Kumar Sinha" <gmenm.bccl@coalindia.in>, "KUMAR RANJEEV" <gmenv.bccl@coalindia.in>, "ARUN KUMAR" <gmlodna.bccl@coalindia.in>, "Nand Kishore Bharati" <gmcmc.bccl@coalindia.in>, "Shailendra Kumar Singh" <tstodtop.bccl@coalindia.in>, agmofficelodna@gmail.com
Sent: Tuesday, April 19, 2022 12:03:12 PM
Subject: Mechanically covered trucks for transportation of coal

To Sri Bapu Saheb Bhadale
Nodal Officer (Commercial Vehicles)
Tata Motors, Mumbai

Dear Sir,

REF: BCCL Work order no 191 DT 25-11--2011 for 173 nos Tata Tippers (Hywa) LPK2518

Our company Bharat Coking Coal Ltd, a Subsidiary of Coal India Ltd is engaged in the business of mining coking coal . Large no of tipping trucks of Tata make are in operation in our mines for transportation of coal and for reference a` work order issued to Tata Motors for procurement of tipping trucks has been referred above.
Ministry of Environment and Forest, Government of India has issued statutory directives to deploy tipping trucks with a mechanical system for covering the trucks to ensure that there is no spillage during coal transportation. This issue raised with Tata Motors officials and we were informed that Tata Motors would look into the matter

WE will be grateful if you confirm the availability of such mechanically covered tipping trucks in your company. Kindly let us no if it is possible to retrofit the operating Tata Moto Tippers with mechanical covers,

An early reply will be highly appreciated

Dr R. Dwivedi,
General Manager (E&M)/Solar
Bharat Coking Coal Limited
Dhanbad

Avenue Plantation







CSR, R&R AND TRANSPORTATION PLAN OF CLUSTER IX

As per EC Condition (Specific Condition No. IX)

Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet form

Bharat Coking Coal Limited
(A Mini Ratna Company)
Lodna Area
Dhanbad

CIL'S POLICY FOR CORPORATE SOCIAL RESPONSIBILITY (CSR)

Introduction:

Bharat Coking Coal Limited is a subsidiary of Coal India Limited, a Maharatna Company. The company is currently operating in 12 administrative areas in Jharia Coalfields encompassing around 226 peripheral villages mainly in the District of Dhanbad, Jharkhand and in some part of West Bengal. 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 Km of the Project sites. This has resulted into a harmonious relationship between Coal India and the peripheral Communities. The Strategic CSR of BCCL states that the company's main objective is to improve the quality of life of people living in and around its command areas. The key areas of CSR invention are rural development, livelihood generation and skill development. It has a long history of philanthropic activities which were converged to align with the Corporate Social Responsibility mandate of the Companies Act 2013. Rural development, livelihood generation and skill development are thrust areas of the BCCL‟s CSR interventions.

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 abled 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, agroforestry, 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

Policy on CSR

CIL has well defined CSR policy framed on DPE's guidelines and on the Companies Act, 2013. The policy has CIL Board's approval. The Budget on CSR is allocated based on 2% on the average net profit of the company during the three immediate preceding financial years or R. 2.00 per tonne of coal produced in the previous year whichever is higher.

CSR Activities at Lodna Area: An Overview

- Healthcare
- Medical Camp
- Clinics at project level
- Health Awareness Programme
- Education
- Infrastructure Development
- Sanitation
- Environment protection
- Prime Minister's National relief fund (Contribution)
- Water Supply
- Electrical Supply

1. Healthcare:

Various health camps have been organized by Lodna Area for free health checkup and awareness of people in nearby villages. Some of the localities benefited from such camps include Belgaria, Golden Pahari, Bararee, Lodna etc.

Details of various free health checkup camps organized along with location and number of beneficiaries is given below:

Sl.No	Date	Camps	Place	No. of Beneficiaries
1	11.09.2017	Health Camps	Colony within cluster Cluster IX	50
2	13.09.2017	Health Camps	Colony within cluster Cluster IX	69
3	15.09.2017	Health Camps	Colony within cluster Cluster IX	22
4	18.09.2017	Health Camps	Colony within cluster Cluster IX	42
5	20.09.2017	Health Camps	Colony within cluster Cluster IX	67

6	22.09.2017	Health Camps	Colony within cluster Cluster IX	42
7	27.09.2017	Health Camps	Colony within cluster Cluster IX	19
8	11.10.2017	Health Camps	Colony within cluster Cluster IX	38
9	13.10.2017	Health Camps	Colony within cluster Cluster IX	42
10	18.10.2017	Health Camps	Colony within cluster Cluster IX	14
11	20.10.2017	Health Camps	Colony within cluster Cluster IX	21
12	23.10.2017	Health Camps	Colony within cluster Cluster IX	22
13	25.10.2017	Health Camps	Colony within cluster Cluster IX	35
14	27.10.2017	Health Camps	Colony within cluster Cluster IX	18
1	08.4.2019	Health Check up camp	New Kids Garden School, Jealgora	220
2	26.4.2019	Random Bl. Sugar Camp	Jealgora Regional Hospital	18
3	27.4.2019	HbA1C & Random Bl. Sugar Camp	Jealgora Regional Hospital	26
4	20.7.2019	HbA1C & Random Bl. Sugar Camp	Jealgora Regional Hospital	17
5	23.7.2019	HbA1C & Random Bl. Sugar Camp	Jealgora Regional Hospital	12
6	01.10.2019	Lipid Profile Camp	Jealgora Regional Hospital	19
7	02.10.2019	Health Check up camp	Mega Health check up camp at Belghoria	111
8	11.11.2019	Cardiac Health Check up camp	Jealgora Regional Hospital	55

9	30.11.2019	Breast Cancer & Cervical Cancer Awareness camp for Female of Lodna Area	Lodna Area (VTC)	73
10	01.12.2019	AIDS Awareness Programme	Jealgora Regional Hospital	10
11	26.12.2019	HbA1C	Jealgora Regional Hospital	26
12	27.12.2019	Health Check up camp for Female	Jealgora Regional Hospital	13
13	23.01.2020	Health Check up & RBS	New Kids Garden School, Jealgora	300
14	15.02.2020	HbA1C	Jealgora Regional Hospital	12
15	08.02.2022	Diabetes Detection Camp	Jealgora Regional Hospital	12
16	12.02.2022 & 15.02.2022	Diabetes Detection Camp	Jealgora Regional Hospital	65
17	07.3.2022	Diabetes Detection Camp	Jealgora Regional Hospital	40
18	24.3.2022	Awareness camp on World TB Day	Jealgora Regional Hospital	80
19	07.4.2022	Health & Life Style awareness Camp on World Health Day	Jealgora Regional Hospital	130
20	12.4.2022	Diabetes Detection Camp	Jealgora Regional Hospital	16
21	25.4.2022	Awareness camp on World Malaria Day	AMO Office, JRH	20
22	04.5.2022	School Health Checkup Camp	Kasturba Gandhi School, Bhowra	245
23	10.5.2022	Pulmonary Function Test	Jealgora Regional Hospital	23
24	17.5.2022	Diabetes Detection Camp	Jealgora Regional Hospital	26
25	27.5.2022	Medical Camp for Women	MOCP	26
26	31.5.2022	Awareness Camp on World No Tobacco Day	Jealgora Regional Hospital	30
27	07.6.2022	BMI & Diabetes Detection Camp	Jealgora Regional Hospital	25

28	23.6.2022	Diabetes Detection Camp	Jealgora Regional Hospital	37
29	29.6.2022	Routine Health Checkup & Stress management (above 50 years)	Jealgora Regional Hospital	20
30	04.7.2022	Awareness Camp on Asthma	Jealgora Regional Hospital	16
31	11.7.2022	Pulmonary Function Test	Jealgora Regional Hospital	11
32	12.7.2022	Sexual and Reproductive Health awareness camp	Jealgora Regional Hospital	20
33	21.7.2022	Blood Donation and Medical Health Checkup Camp	Nunudih Basti	133
34	29.7.2022	Awareness Camp on World ORS Day	Naya Prathamik Vidyalaya, Jamadoba	95
35	01.8.2022	Bone Mass Density Camp	Jealgora Regional Hospital	90
36	05.8.2022	Breast feeding awareness camp	Nunudih	35
37	05.8.2022	Spirometry Camp	Jealgora Regional Hospital	11
38	13.8.2022	Awareness Camp on organ Donation on Organ Donation Day	Jealgora Regional Hospital	15
39	05.9.2022	Diabetes Screening Camp	Jealgora Regional Hospital	24
40	06.9.2022	Pulmonary Function Test Camp	Jealgora Regional Hospital	6
41	07.9.2022	Nutrition awareness Camp for Neonatal Nutrition Awareness week	Azad Nagar	25
42	14.10.2022	Awareness Camp on Mental Health	Jealgora Regional Hospital	30
43	11.10.2022	Spirometry Camp	Jealgora Regional Hospital	22
44	11.10.2022	Routine Health Check Up & Stress Management Camp above 50 Years	Jealgora Regional Hospital	30

45	21.10.2022	School Health Camp	Jealgora Regional Hospital	95
46	01.12.2022	AIDS Awareness Camp	Jealgora Regional Hospital	15
47	18.12.2022	Diabetes Awareness Camp & Screening Camp	Jealgora Regional Hospital	44
48	03.01.2023	Mega Camp on HTN, Type II DM, Cancer Screening- on counselling, Diet Advice	Jealgora Regional Hospital	75
49	18.09.2023	Diabetes Detection Camp	Jealgora Regional Hospital	26
50	29.10.2023	Diabetes Detection Camp	Jealgora Regional Hospital	30
51	15.11.2023	Diabetes Detection Camp	Jealgora Regional Hospital	28
52	25.11.2023	Diabetes Detection Camp	Jealgora Regional Hospital	21
53	20.12.2023	Diabetes Detection Camp	Jealgora Regional Hospital	27
54	05.02.2024	Yoga Camp	Jealgora Regional Hospital	60
55	10.02.2024	Diabetes Detection Camp	Jealgora Regional Hospital	32
56	20.07.2024	Routine Health Camps	NTST Jeenagra/MOCP	38
57	02.09.2024	Routine Health Camps	Badgidi Basti	83
58	15 Nov & 16 Nov 2024	Hypertension screening camps	BIT Sindri	18
59	23.01.2025	TB Awareness Programme	DAV School Banihur	5
60	17.05.2025	World Hypertension Day	Jealgora Regional Hospital	46
61	20.06.2025	PFT Test	Jealgora Regional Hospital	3
62	30.06.2025	Deworming Camp	SDM Secondary School, Bhaga	51
63	10.07.2025	Routine Health Check up Camp	Jealgora Regional Hospital	9
64	21.07.2025	Routine Health Check up Camp	Nunudih Basti	36
65	29.08.2025	Deworming Health Camp	DAV School Banihur	131
66	24.09.2025	Blood grouping camp	Lodna Area Office	44
67	24.10.2025	Routine Health Camps	Jealgora Guest House	49
Total Number of Beneficiaries				3737

2. Education (School Grants):

For empowering the children of nearby villagers/ Project affected persons, Lodna Area management provide school grants to nearby schools annually, details of which are as follows:

Sl. No.	Name of School	Financial Year	Amount (Rs)
1.	**L P School, Golden Jeenagora**	2017-18	93,000
		2018-19	2,79,000
		2019-20	93,000
		2021-22	1,80,000
2.	**Middle School, North Tisra**	2017-18	2,49,000
		2018-19	7,47,000
		2019-20	2,19,000
		2021-22	4,20,000
3.	**Jealgora School of Learning, Jealgora**	2017-18	2,37,000
		2018-19	7,11,000
		2019-20	2,37,000
		2021-22	4,20,000

3. Infrastructure development Work (Welfare and CSR) done in Lodna Area, BCCL

Financial Year 2017-18			
Sl. No.	**Name of work**	**Amount (Rs.) in Thousand**	**Head**
1.	CHANGING OF WINDOW AND DOOR AND FLOOR OF HANDLOOM JHARCRAPT AT OLD WORKSHOPNTC UNDER LODNA AREA.	34.463	Welfare Building
2.	REPARING AND MAINTENANCE OF COMMUNITY CENTER SHIV MANDIR HANUMAN MANDIR, ATTACHAKKI, ALAKDIHA TOP AND KATTAGHAR JEENAGORA UNDER LODNA AREA.	86.098	Welfare Building
3.	W/WASH, C/WASH, PAINTING OF COMMUNITY CENTER PANCHDEO MANDIR AT NOONUDIH UNDER LODNA AREA	72.971	Welfare Building
4.	W/WASH, C/WASH, PAINTING AND OTHER CIVIL WORK AT CHHAT TALAB JOYRAMPUR UNDER LODNA AREA	21.205	Welfare Building
5.	W/WASH, C/WASH, PAINTING OF MANAS MANDIR NEAR JEENAGORA STADIUM UNDER LODNA AREA.	99.005	Welfare Building
6.	C/WAS, PAINTING OF COMMUNITY CENTRE, SHIV MANDIR AT BAGDIGI 5 NO. UNDER LODNA AREA.	27.794	Welfare Building
7.	REPARING AND MAINTENANCE OF COMMUNITY CENTER BURAH BABA SHIV MANDIR AT JOYRAMPUR UNDER LODNA AREA.	69.300	Welfare Building
8.	W/WASH C/WASH, PANTING AND MISC CIVIL WORK AT SHIV MANDIR PIRKUBANDH SANTOSHI AND HANUMAN MANDIR AT BHAGA NO-4 UNDER LODNA AREA.	42.834	Welfare Building
9.	W/WASH C/WASH, PANTING ROOF REPARING AND RENOVATION OF CHABUTRA AT DURGA MANDIR AT P.G.PAHARI NT OCP UNDER LODNA AREA.	97.344	Welfare Building

10.	W/WASH C/WASH, PANTING ETC AT COMMUNITY CENTER SHIV MANDIR NHS QRT, DENOBLI MORE UNDER LODNA AREA.	36.130	Welfare Building
11.	W/WASH C/WASH, PANTING etc. AT COMMUNITY CENTER D/M AT BHAGA UNDER LODNA AREA	31.745	Welfare Building
12.	REPAIRING OF SHIV MANDIR AND YUTH CLUB AT BAGDIGI COLLIERY UNDER LODNA AREA.	69.305	Welfare Building
13.	C/WASH PAINTINGUNDER MISC CIV WORK AT (SEWING AND COMPUTER SEC) AT KHUTTA DHOWRA BARAREE UNDER LA	45.647	Welfare Building
14.	W/WASH C/WASH,PAINTING AND MISC CIVIL WORK AT RAKSHA KALI DHAM N.S LODNA UNDER LODNA AREA.	244.613	Welfare Building
15.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK LODNA AT LODNA MASJID, LODNA COLLIERY LODNA UNDER LODNA AREA	351.865	Welfare Building
16.	W/WASH, C/WASH, PAINTING OF COMMUNITY CENTER (D/M) AT LODNA AND BHAGA UNDER LODNA AREA	77.225	Welfare Building
17.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT COMMUNITY CENTER (D/M) SECTOR-1,11 AND PG PAHARI NTG/ST OCP UNDER LODNA AREA.	98.381	Welfare Building
18.	W/WASH, C/WASH, PANTING AT COMMUNITY CENTER (D/M) JEENAGORA AND JOYRAMPUR UNDER LODNA AREA.	37.862	Welfare Building
19.	W/WASH, C/WASH, PANTING AT BAGDIGI AND CHHATTA DHOWRAH BARAREE AT LODNA AREA.	59.695	Welfare Building
20.	REP OF SEPTIC TANK, B/WALL AND MISC CIVIL WORK AT COMMUNITY CENTER (D/M) LODNA UNDER LODNA AREA.	86.34	Welfare Building
21.	MAINTENANCE OF COMMUNITY CENTER BURA BABA SHIV MANDIR AT JOYRAMPUR UNDER LODNA AREA. (G.S.T)	83.394	Welfare Building
22.	REST PERMANENENT ROOF AND REPAIRING OF DAMAGED CHABUTRA AT JAMUNA SAHAY SMIRTI LODNA UNDER LODNA AREA.	199.275	Welfare Building
23.	REP/MAINTANANCE OF COMMUNITY CENTER (LNH-417) AT BHAGA UNDER LODNA AREA	69.20	Welfare Building
24.	REPARING/MAINTANANCE OF SHIV MANDIR NEAR BANIAHIR DAV SCHOOL AND SHIV SHAKTI NAGAR NEW COLONY UNDER LODNA AREA.	135.279	Welfare Building
25.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT SHIV MANDIR PIRKU BANDH.	2.908	Welfare Building
26.	W/WASH,C/WASH, PAINTING ETC AT COMMUNITY CENTER SHIV MANDIR NHS QRT DENOBILI MORE	4.376	Welfare Building
27.	ROOF REPARING BY CGI SHEET ,OTHERS CIVILWORK AT KHAPRA DHOWRAH LODNA COLLIERY	35.537	Welfare Building
28.	W/WASH,PAINTING,OF COMMUNITY CENTER SHIV MANDIR A BAGDIGI 05NO UNDER LODNA AREA	3.367	Welfare Building
29.	DISTEMPARING,W/WASH, C/WASH,PAINTING AT COMMUNITY CENTER(shivmandir)BAGAN DHOWRAH BARAREE UNDER LODNA AREA	55.651	Welfare Building
30.	W/WASH,C/WASH,PAINTING,ROOF REPARING AND RENOVATION OF CHABUTRA AT DURGA MANDIR AT P.G.PAHARI NT OCP	11.792	Welfare Building

31.	W/WASH, C/WASH, PAINTING OF COMMUNITY OF COMMUNITY CENTER D/M AT BHAGA UNDER LODNA AREA.	3.845	Welfare Building
32.	W/WASH,C/WASH,PAINTING AND MISC CIVIL WORK AT BY QRT COMMUNITY CENTER (SHIV MANDIR)AT LODNA COLLIERY UNDER LODNA AREA.	31.125	Welfare Building
33.	W/WASH, C/WASH, PAINTING OF COMMUNITY CENTER (D/M) AT BHAGA UNDER LODNA AREA.	3.845	Welfare Building
34.	W/WASH, C/WASH, PAINTING AND RENOVATION OF NOORANI MASJID UNDER LODNA AREA.	184.104	Welfare Building
35.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK at panchdeo mandir noonudih under Lodna Area.	39.539	Welfare Building
36.	REPARING AND MAINTANCE OF COMMUNITY CENTER SHIV MANDIR HANUMAN MANDIR ATTACHAKI, ALAKDIHA.	1.630	Welfare Building
37.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT SANTOSHI MANDIR AND SHIV MANDIR 04NO BHAGA PIRKUBANDH UNDER LODNA AREA.	37.857	Welfare Building
38.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT 3S CLUB BHAGA UNDER LODNA AREA.	20.716	Welfare Building
39.	WORK OF W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK WITH WIRING AT COMMUNITY CENTER BURHA BABA MANDIR AT JOYRAMPUR COLLY.	177.656	Welfare Building

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT 3S CLUB BHAGA UNDER LODNA AREA.	10.973+0	Other welfare works
2	WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT BARAREE MASJID UNDER LODNA AREA.	234.736	Other welfare works
3	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK WITH WIRING AT COMMUNITY CENTER (BURA BABA MANDIR) AT JOYRAMPUR COLLIERY UNDER LODNA AREA.	69.974	Other welfare works
4	W/EASH, C/WASH, PAINTING AND MISC CIVIL WORK AT SHAHID SAMARAK BAGDIGIH UNDER LODNA AREA.	35.612	Other welfare works
5	Work of W/Wash C/Wash painting and misc. Civil work at Panchdeo Mandir noonudih under Lodna Area.	74.649	Other welfare works
6	Community Centre Shiv Mandir Bararee / Denobili More Under Lodna Area.	3.243	Other welfare works

Financial Year 2018-19

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1	C/WASH, PAINTING AND MISC. CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR AND HANUMAN MANDIR) AT DUMARITAND NEWCOLONY UNDER LODNA AREA.	92.8	welfare Building
2	REVALIDATION OF W/WASH, C/WASH, PAINTING AND MISCE CIVIL WORK AT SONTOSHI MANDIR AND	63.431	welfare Building

	SHIV MANDIR 04NO AT PIRKUBANDH BHAGA UNDER LODNA AREA.		
3	W/WASH, C/WASH, PAINTING REPAIRING AND MISC WORK AT COMMUNITY CENTER(S/M) AT MOCP COLONY SECTOR-1 UNDER LODNA AREA.	203.453	welfare Building
4	W/WASH,PAINTING AND MISCE CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR)AT SOUTH TISRA NEAR OLD VTC JEENAGORA UNDER LODNA AREA.	18.96	welfare Building
5	W/WASH,PAINTING AND MISCE CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR) AND HANUMAN MANDIR ATTACHAKKI,MORE ALAKDIHA TOP,WEIGH BRIDGE LODNA AREA.	246.628	welfare Building
6	W/WASH, PAINTING ETC OF COMMUNITY CENTER (SHIV MANDIR) BAGDIGI NO-5 UNDER LODNA AREA.	27.939	welfare Building
7	REPAIRING/MAINTANCE OF MAZDOOR SMRITI MACE AT NOONUDIH PLAY GROUND UNDER LODNA AREA.	82.569	welfare Building
8	REPAIRING AND MAINTENANCE OF JAMUNA SAHAY SIMIRITI COMMUNITY CENTER LODNA COLLIERY UNDER LODNA AREA	253.425	welfare Building
9	PROVIDING OF COVERING OF NTC MIDDLE SCHOOL BY BRICK WALL GRILL AND GATE AT PG PAHARI UNDER LODNA AREA.	178.979	welfare Building
10	W/WASH C/WASH, PAINTING AND MISCE CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR) ATBYE QRT LODNA AND EST BARAREE JEENAGORA UNDER LOPDNA AREA.	56.366	welfare Building
11	W/WASH C/WASH,PAINTING AND MISCE CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR) NEAR DURGA MANDIR BAGDIGI COLLIERY UNDER LODNA AREA.	24.306	welfare Building
12	W/WASH C/WASH,PAINTING AND MISCE CIVIL WORK AT RAKSHA KALI MANDIR N.S LODNA UNDER LODNA AREA.	268.562	welfare Building
13	W/WASH C/WASH, PAINTING AND MISCE CIVIL WORK AT NOORANI MASZID BENIAHIR NEW COLONY UNDER LODNA AREA.	138.821	welfare Building
14	Grading front side pcc with chequred tile snowsenand painting and etc wrok at mocp sector-111 community center (d/m) under lodna area.	140.488	welfare Building
15	REPARING MAINTENANCE OF MANDIR OF PG PAHARI Buildings SHIFTING OF STC SHIV MANDIR AT PG PAHARI UNDER LDNA AREA.	177.364	welfare Building
16	REPAIRING/MAINTENANCE (WHITE WASH)OF CENTRAL WORK SHOP JEALGORA UNDER LODNA AREA	36.742	welfare Building
17	REPAIRING OF COMMUNITY CENTER NEAR D TYPE BLOCK AT MOCP UNDER LODNA AREA	152.109	welfare Building
18	REPAIRING SHIV MANDIR SULUNGA JEENAGORA UNDER LODNA AREA	156.611	welfare Building
19	DISTEMPERING, W/WASHING, PAINTING AND MISC CIVIL WORK OF COMMUNITY CENTER (D/M) OF MOCO SCETOR-1, SCETOR-11 AND PG PAHARI UNDER LODNA AREA.	44.28	welfare Building
20	REPAIRING DRAIN AND GARBAGE CLEANING NEAR JEALGORA 07 PIT DURGA MANDIR UNDER LODNA AREA.	116.91	welfare Building
21	REPARING/ MAINTENANCE INCLUDING ROOF REP AT JEENAGORA KALI THAN CLUB UNDER LODNA AREA.	62.561	welfare Building

22	W/WASH, C/WASH, PAINTING AT COMMUNITY CENTER (DURGA MANDIR) AT JOYRAMPUR UNDER LODNA AREA.	27.715	welfare Building
23	W/WASH, C/WASH, PAINTING AT COMMUNITY CENTER (DURGAMANDIR) AT JEENAGORA UNDER LODNA AREA.	19.238	welfare Building
24	W/WASH, C/WASH, PAINTING AT MISC CIVIL WORK AT MANAS MANDIR JEALGORA UNDER LODNA AREA.	134.789	welfare Building
25	W/WASH, C/WASH, PAINTING AT COMMUNITY CENTER (durga mandir)AT BHAGA UNDER LODNA AREA.	18.580	welfare Building
26	Revised Estimate of Shree Raksha Kali Dham NS LODNA	18.340	welfare Building
27	PIPE LINE HADI PATTI TO LALAH HIGH SCHOOL LODNA UNDER LODNAAREA	57.251	welfare Building
28	W/WASH,C/WASH,PAINTING AND MISC CIVIL WORK WITH ROOFGRADING AT COMMUNITY CENTER BURHA BABA MANDIR AT JOYRAMPUR COLLIERY UNDER LODNA AREA.	182.718	welfare Building
29	CLEANING AND REPAIRING OF DRAIN AT LODNA MORE SHANTOSHI MANDIR UNDER LODNA AREA.	263.932	welfare Building
30	RREVISED ESTIMATE OF COMMUNITY CENTER D TYPE BLOCK AT MOCP UNDER LODNA AREA.	12.859	welfare Building
31	W/WASH,C/WASH,PAINTING AT COMMUNITY CENTER DURGA MANDIRAND KALI MANDIR AT BAGDIGI COLLIERY UNDER LODNA AREA.	10.778	welfare Building
32	REPARING OF DAMAGED CHHAT GHAT AND STEP AT JOYRAMPUR COLLIERY UNDER LODNA AREA	44.036	welfare Building

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1.	SPECIAI REPARING AND MAINTENANCE OF J.L.N STADIUM JEALGORA INCLUDING MAINTENANCE OF VARANDAH, MODLE ROOMAND V.I.P ROOM AT GUEST HOUSE.	354.20	Other Welfare Work
2.	BCCL KE LAL LADLI CENTRE OF LA TO BE INCURRED DURING MONTH FROM MARCH 2018 TO JULY 2018.	7.700	Other Welfare Work
3.	GRANT OF RS-15000/=TO MEET THE EXPAND OF SHRI SHRI DURGA PUJA AT BARAREE COLLY THE 2018.	5.00	Other Welfare Work
4.	W/WASH,C/WASH,PAINTING OF COMMUNITY CENTER (DURGA MANDIR AND KALI MANDIE) ATCHHATA DHOWRAH BARAREE AND NOONUDIH UNDER LODNA AREA.	25.215	Other Welfare Work
5.	W/WASH,C/WASH,PAINTING OF COMMUNITY CENTER (DURGA MANDIR AND KALI MANDIR)AT BAGDIGI COLLERY UNDER LODNA AREA.	46.607	Other Welfare Work
6.	Payment of rs- 20000/= Lodna Colly puja committee.	10.00	Other Welfare Work
7.	W/W C/W PAINTING OF N S LODNA WORK SHOP KALIMANDIR AND COMPOUND WALL AT LA.	19.567	Other Welfare Work
8.	W/WASH, C/WASH, PAINTING NG AND MISC CIVIL WORK AT GOKUL PARK NTC UNDER LODNA AREA.	29.670	Other Welfare Work
9.	REPAIRING OF DAMAGED CHHAT AND STEP AT JOYRAMPUR COLLIERY UNDER LODNA AREA.	53.120	Other Welfare Work
10.	CLEANING AND REPARING OF WALL AT ALINDI TOLLA SULUNGA JEENAGORA UNDER LODNA AREA.	33.500	Other Welfare Work

11.	W/W C/W PAINTING OF COMMUNITY CENTER KALIMANDIR KT SECTION JEEN AND OLD WORK SHOP UNDER LA.	23.716	Other Welfare Work
12.	ADMN APPR EST OF CHHAT TALAB STEP AT MALLAH PATTI UNDER LODNA AREA.	109.248	Other Welfare Work

Financial Year 2019-20

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1.	REVISED ESTIMATE OF REPAIRING AND MAINTANANCE OF JAMUNA SAHAY SMRITI COMMUNITY CENTER LODNA COLLIERY UNDER LODNA AREA.	20.819	Welfare Building
2.	REPAIRING AND MAINTENANCE OF CHHAT TALAB STEP AT MALLAH PATTI UNDER LODNA AREA.	83.094	Welfare Building
3.	CLEANING AND REPARING OF DRAIN AT LODNA MORE TO SANTOSHI MANDIR UNDER LODNA AREA.	482.731	Welfare Building
4.	COMMUNITY CENTER (SHIV MANDIR)AT BAGAN DHOWRAH BARAREE,BARAREE OFFICE AND DENOBOLI MORE DIGWADIH NEAR BHULI TYPE QRT UNDER LODNA AREA	215.664	Welfare Building
5.	CLEANING AND REPAIRING OF WALL AT KALINDI TOLLA SULUNGA JEENAGORA UNDER LODNA AREA	63.248	Welfare Building
6.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT GOKUL PARK NTC UNDER LODNA AREA.	58.817	Welfare Building
7.	W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT NOORANI MASZID BANIAHIR NEW COLONY UNDER LODNA AREA.	13.258	Welfare Building
8.	REPARING AND MAINTANANCE OF J.L.N STADIUM JEALGORA.	34.425	Welfare Building
9.	W/WASH, C/WASH, PAINTING AT COMMUNITY CENTER (DURGA MANDIR) AT BHAGA UNDER LODNA AREA.	35.517	Welfare Building
10.	REVALIDATION OF DISTEMPRING, W/WASH, PAINTING AND MISC CIVIL WORK OF COMMUNITY CENTER D/M OF MOCO SECTOR-1, SECTOR-11 AND P.G PAHARI LODNA AREA.	68.281	Welfare Building
11.	REPARING AND MAINTENANCE OF RAKSHA KALIDHAM AT N.S.LODNA UNDER LODNA AREA	391.236	Welfare Building
12.	C/WASH, PAINTING, AND OTHERS MISC CIVIL WORK OF COMMUNITY CENTER ATBARAREE MASJID UNDER LODNA AREA.	375.834	Welfare Building
13.	W/WASHING, C/WASHING, PAINTING AND OTHER CIVIL MISC WORK OF COMMUNITY CENTER(S/M) AT MOCP SECTOR-1 NTC UNDER LODNA AREA.	82.663	Welfare Building
14.	REPAIRING OF WELL WATER TANK AND PROVIDING OF PIPE LINE FROM MAIN MINE PIT WATER PIPE TO WATER TANK AT NEARSOUTH TISRA RAILWAYGATE LODNA AREA.	133.718	Welfare Building
15.	REVISED ESTIMATE OF CLEANING AND REPAIRING OF DRAIN AT LODNA MORE TO SONTOSHI MANDIR UNDER LODNA AREA.	47.611	Welfare Building
16.	W/WASH,C/WASH,PAINTING AND MISC CIVIL WORK AT MANAS MANDIR JEALGORA UNDER LODNA AREA	335.451	Welfare Building

17.	ROOF AND CCEQUREWD TILES WORK OF COMMUNITYCENTER (D/M$K/M) AT MOCP SECTOR-1 UNDERLODNA AREA.	356.493	Welfare Building
18.	REPARING/MAINTENANCE OF COMMUNITY CENTENR NEAR 7 PIT JEALGORA UNDER LODNA AREA.	127.10	Welfare Building
19.	W/WASHING,C/WASHING,PAINTING AT COMMUNITY CENTER(DURGA MANDIR AND KALI MANDIR)AT CHHOTTO DHOWRAH BARAREE AND NOONUDIH UNDER LODNA AREA.	30.738	Welfare Building
20.	W/WASH,C/WASH,PAINTING AND MISC CIVIL WORK OF COMMUNITY CENTER(SHIV MANDIR)BAGDIGI 05NO UNDER LODNA AREA	41.202	Welfare Building

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1.	Repairing and maintenance of chhat talab step at Mallah patti under LA.	199.815	Other Welfare Work
2.	C/W PAINTING AND MISC CIVIL WORK AT COMMNIITY SHAD AT LODNA COLLY AND COMMINITY CHABUTRA BHAGA.	17.327	Other Welfare Work
3.	SNOWCEM DISTEMPER PAINTING ETC IN MAHABIR MANDIR AT JOYRAMPUR COLLY UNDER LA.	12.11	Other Welfare Work
4.	W/WASH,C/WASH,PAINTING AND MISCE CIVIL WORK OF SHAHID SMARAK (LAL MAIDAN) BARAREE UNDER LODNA AREA.	90.491	Other Welfare Work
5.	REPAIRING AND MAINTENANCE OF COMMUNITY CENTER (KALI MANDIR) JOYRAMPUR B.R COMPANY UNDER LODNA AREA.	58.39	Other Welfare Work
6.	REPAIRING AND MAINTENANCE OF SHIV MANDIR AT BHAGA NO-5 MAHABIR STHAN UNDER LODNA AREA.	28.889	Other Welfare Work
7.	REPAIRING AND MAINTENANCE OF COMMUNITY CENTER AT PIRKU BANDH BANIAHIR UNDER LODNA AREA.	35.581	Other Welfare Work
8.	PROVIDING OF COMPOUND WALL AND HOORING WORK OF COMMUNITY CENTER (D/M) AT STC UNDER LODNA AREA.	143.099	Other Welfare Work
9.	BCCL KE LAL AND BCCL KI LADLI CENTER OF LA TO BE FROM MAY 2019 TO AUG 2019.	11.132	Other Welfare Work
10.	PCC ROAD APPROACH OF KALI MANDIR AT GOKUL PAEK,NT-ST UNDER LODNA AREA.	232.851	Other Welfare Work
11.	W/WASHING,C/WASHING,PAINTING,AND MISCE CIVIL WORK ATCOMMUNITY CNTER (SHIV MANDIR) ATTA CHAKKI MORE AND ALEKDIHA O.P JOYRAMPUR UNDER LODNA AREA.	73.313	Other Welfare Work
12.	PROVIDING OF PAVER BLOCK IN THE FRONT SIDE OF KALI MANDIR AT GOKUL PARK NTC UNDER LODNA AREA.	223.400	Other Welfare Work
13.	REVISED ESTIMATE PROVIDING OF COMPOUND WALL AND FLOORING WORK OF COMMUNITY CENTER D/MAT STC UNDER LODNA AREA.	11.468	Other Welfare Work

Financial Year 2020-21

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1.	RENOVATION OF KALI MANDIR SHIFTED FROM DB ROAD AT GOKUL DHAM NEAR NTC OLD WORKSHOP UNDER LODNA AREA	183.871	Welfare Building

2.	For W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK OF COMMUNITY CENTER SHIV MANDIR BAGDIGI 05 NO UNDER LODNA AREA.	69.524	Welfare Building
3.	For W/WASH, C/WASH, PAINTING AND MISC CIVIL WORK AT SHIV MANDIR AND HANUMAN MANDIR AT DUMARIYATAND NEW COLONY UNDER LODNA AREA.	73.564	Welfare Building
4.	FOR REPAIRING AND MAINTENANCE OF SHIV MANDIR AT BHAGA NO-5 MAHABIR STHAN UNDER LODNA AREA.	46.021	Welfare Building
5.	FOR W/WASH, C/WASH PAINTING ETC AT MANAS MANDIR JEALGORA UNDER LODNA AREA.	141.836	Welfare Building
6.	FOR W/WASH, C/WASH PAINTING AND MISC CIVIL WORK AT COMMUNITY CENTER (SHIV MANDIR) AT SHIV SHAKTI NAGAR BANIAHIR DAV UNDER LODNA AREA.	241.599	Welfare Building
7.	FOR W/WASH, C/WASH PAINTING AND MISC CIVIL WORK OF PANCHANAN TEMPLE AT GOKUL DHAM.	55.914	Welfare Building
8.	FOR REPAIRING AND MAINTENANCE INCLUDING WHITE WASH,COLOUR WASH,AND PAINTING ERC AT COMMUNITY CENTER(SHIVMANDIR AND KALI MANDIR)AT SAIT KOTHI JEENAGORA.	101.80	Welfare Building
9.	FOR W/WASH, C/WASH PAINTING AND MISC CIVIL WORK AT COMMUNITY CENTER SHIV MANDIR ATTACHAKKI MORE AND ALAKDIHA OP JOYRAMPUR UNDER LODNA AREA.	73.313	Welfare Building
10.	FOR REPAIRING AND MAINTENANCE RAKSHA KALIDHAM AT N.S LODNA UNDER LODNA AREA.	164.704	Welfare Building
11.	FOR W/WASH,C/WASH, PAINTNG AT COMMUNITY CENTER DURGA MANDIR AND KALIMANDIR AT CHHATA DHOWRA BARAREE AND NOONUDIH UNDER LODNA AREA.	61.660	Welfare Building
12.	FOR REPAIRING AND MAINTENANCE OF COMMUNITY CENTER PIRKUBANDH BANIHIR UNDER LODNA AREA.	65.488	Welfare Building
13.	FOR REPAIRING AND MAINTENANCE OF COMMUNITY CENTER NEAR 07 PIT JEALGORA UNDER LODNA AREA.	172.628	Welfare Building
14.	FOR W/WASH, C/WASH, PAINTNG AND MISC CIVIL AT COMMUNITY CENTER DURGA MANDIR LODNA COLLIERY UNDER LODNA AREA.	55.820	Welfare Building
15.	FOR W/WASH, C/WASH, PAINTNG OF COMMUNITY CENTER SHIV MANDIR AT LODNA BAZAR, 40NO DHOWRAH, KHAPRA DHOWRA AT LODNA COLLIERY UNDER LODNA AREA.	140.672	Welfare Building
16.	FOR REPAIRING DAMAGED WALL FOR ASH PIT AND Buildings GARBAGE CLEANING NEAR GUEST HOUSE JEALGORA UNDER LODNA AREA.	49.089	Welfare Building
17.	FOR REPAIRING AND MAINTENANCE OF KALI MANDIR JEENAGORA RAILWAY CROSSING PAHALWAN DHOWRAH UNDER LODNA AREA.	45.413	Welfare Building
18.	FOR W/WASH,C/WASH,PAINTING ETC WORK AT COMMUNITY CENTER HANUMAN MANDIR AT EAST BARAREE JEENAGORA COLLIERY UNDER LODNA AREA.	25.106	Welfare Building
19.	FOR/WASH,C/WASH,PAINTING AND MISC CIVIL	40.536	Welfare Building

	WORKS AT SHAHID SMARAK BAGDIGIH UNDER LODNA AREA.		
20.	FOR /WASH,C/WASH,PAINTING OF COMMUNITY CENTER DURGA MANDIR AND KALI MANDIR AT BAGDIGI COLLIERY UNDER LODNA AREA.	57.009	Welfare Building
21.	FOR COLOUR WASHING, PAINTING, WALL TILES AT 1ST FLOOR INCLUDING PARTIAL PORTION WIRING AT NOORANI MASZID NEW COLONY BANIAHIR UNDER LODNA AREA.	164.780	Welfare Building
22.	FOR CLEANING AND REPAIRING OF DRAIN AT BYE QRT NEAR SHIV MANDIR LODNA UNDER LODNA AREA.	148.513	Welfare Building
23.	FOR /WASH,C/WASH,PAINTING AND MISC CIVIL WORK AT COMMUNITY CENTER(SHIVMANDIR) BYE QRT LODNA COLLIERY UNDER LODNA AREA.	33.230	Welfare Building
24.	FOR W/WASH, C/WASH, PAINTING AND OTHER MISC CIVIL WORK OF SHIV MANDIR AT MOCPSECTOR-1 NTC UNDER LODNA AREA.	13.317	Welfare Building
25.	FOR PROVIDING OF B/WALL AND SHED AT HANDLOOM CENTER AT JHARCRAFT NTC UNDER LODNA AREA.	230.938	Welfare Building
26.	FOR W/WASH, C/WASH, PAINTING AND OTHER MISC CIVIL WORK AT JEENAGORA PEHADIGORA MANDAL DHOWRA (shiv mandir) UNDER LODNA AREA.	24.532	Welfare Building
27.	FOR REPAIRING/MAINTENANCE OF COMMUNITY CENTER NEAR 07 PIT JEALGORA UNDER LODNA AREA.	13.316	Welfare Building
28.	FOR RENOVATION OF KALI MANDIR (SHIFTED FROM DB ROAD) AT GOKULDHAM NEAR NTC OLD WORKSHOP UNDER LODNA AREA.	194.00	Welfare Building
29.	FOR REVALIDATION OF PROVIDING OF PAVER BLOCK IN THE FRONT SIDE OF KALI MANDIR AT GOKUL PARK NTC UNDER LODNA AREA.	326.878	Welfare Building
30.	FOR W/WASH, C/WASH, PAINTING OF SHIV MANDIR AT PIRKUBANDH NEAR LODNA MORE UNDER LODNA AREA.	10.027	Welfare Building
31.	FOR PROVIDING OF PAVER BLOCK IN THE FRONT FACE OF TOILET AT GOKUL PARK UNDER LODNA AREA.	26.659	Welfare Building
32.	FOR C/WASH, PAINTING, AND OTHERS MISC CIVIL WORK OF COMMUNITY CENTER (H/M) AT MOCP SECTOR-11 UNDER LODNA AREA.	23.407	Welfare Building
33.	FOR REPAIRING AND MAINTENANCE OF J.L.N STADIUM JEALGORA FOR THE URGENT FUNCTION SCHEDULE TO BE HELD IN THE STADIUM UNDER LODNA AREA.	243.496	Welfare Building
34.	FOR W/WASH,C/WASH,PAINTING ETC OF SHIV MANDIR BHAGA NO-2 UNDER LODNA AREA.	12.017	Welfare Building
35.	FOR DISTEMPARING, PAINTING ETC OF TEMPLE SITUATED NEAR COLLIERY OFFICE BAGDIGI UNDER LODNA AREA.	15.919	Welfare Building

Sl. No.	Name of work	Amount (Rs.) in Thousand	Head
1.	Payment for fooding and lodging arrangement of Work migrate labour returning to Jharkhand from other States as directed by State and district admn.	220.150	Welfare Work
2.	Payment for fooding and lodging arrangement of Work migrate labour returning to jharhand from other states as directed by State & district administration authorities.	250.613	Welfare Work

3.	FOR W/WASH,C/WASH,PAINTING OF SHIV MANDIR AT LODNA BARAREE 40NO DHOWRAH KHAPRA DHOWRAH AT LODNA COLLIERY UNDER LODNA AREA.	34.633	Welfare Work
4.	FOR W/WASH,C/WASH,AND PAINRING AT COMMUNITY CENTER DURGA MANDIR LODNA COLLIERY UNDER LODNA AREA.	34.633	Welfare Work
5.	Repairing and Maintenance of Raksha Kali Dham at NS Lodna Area.	194.350	Welfare Work
6.	FOR W/WASH, C/WASH, PAINTING AND OTHER MISC CIVIL WORK OF KALI MANDIR AT SOUTH TISRA KT OF JEENAGORA RAILWAY PHATAK UNDER LODNA AREA.	15.632	Welfare Work
7.	FOR W/WASHING, C/WASHING AND PAINTING OF SHIV MANDIR AT PG PAHARI UNDER LODNA AREA.	25.226	Welfare Work
8.	TCR for the work rep of damaged dran at PG pahari NT ST Work under lodna.	58.045	Welfare Work
9.	FOR C/WASH, PAINTING AND OTHER CIVIL WORK OF COMMUNTY CENTER (H/M) AT MOCP SECTOR-11 UNDER LODNA AREA.	9.100	Welfare Work

Financial Year 2021-22

Sl. no	**Name of the work**	**Amount**	Head
1.	R/M of 03 Nos Shiv Mandirs under Lodna Area	49.055	Welfare Building
2.	R/M of Shiv Mandir at Paharigora, under Lodna Area	7.539	Welfare Building
3.	R/M of raksha kali dham Lodna Area	82.919	Welfare Building
4.	R/M of Hari Mandir @ Jeenagora under Lodna Area	41.709	Welfare Building
5.	R/M 3 Nos Community Centre Dumariyatand under Lodna Area	32.539	Welfare Building
6.	R/M of temple at Bagdigi under Lodna Area	14.781	Welfare Building
7.	R/M of Kali Mandir at Gokul Park under Lodna Area.	14.797	Welfare Building
8.	R/M of Shiv Mandir at alakdiha OP under Lodna Area	19.559	Welfare Building
9.	R/M of Hanuman Mandir at Gokul Dham under Lodna Area	40.864	Welfare Building
10.	R/M of Shiv Mandir Bhaga No. 2 under Lodna Area	9.012	Welfare Building
11.	R/M of Shiv Mandir @ PG Pahari under Lodna Area.	12.415	Welfare Building
12.	Rep. of Shiv Mandir @ jeenagora under Lodna Area	33.474	Welfare Building
13.	R/M of Mandir at Noonudih & Bararee under Lodna Area.	20.540	Welfare Building
14.	R/M of Lodna Masjid under Lodna Area	258.224	Welfare Building
15.	R/m of durga kali mandir @ MOCP Sect 1 under Lodna Area.	44.745	Welfare Building
16.	R/M of Burha Baba Mandir under Lodna Area.	44.938	Welfare Building
17.	Misc. civil works of toilet @ Gokul Park under LOdna Area.	29.917	Welfare Building
18.	R/m of Jeenagora weigh bridge under Lodna Area.	32.620	Welfare Building
19.	R/M of Shiv Mandir b@ PIrkubandh under Lodna Area.	8.333	Welfare Building
20.	R/M of durga Mandir @ Bhaga under Lodna Area.	15.118	Welfare Building

21.	R/M of Shiv Mandir @ Baniahirunder Lodna Area.	68.479	Welfare Building
22.	R/M of Kali Mandir and Durga mandir under lodna Area	36.467	Welfare Building
23.	R/M Durga Mandir @ Lodna Colliery under Lodna Area.	36.820	Welfare Building
24.	R/M of Durga Mandir at MOCP Sector 1 under Lodna Area	25.373	Welfare Building

4. Water Supply:

Treated mine water is being supplied through water pipelines and water tankers to the nearby villagers, from the different collieries of Lodna Area under Cluster IX.

Apart from this colliery have their own water treatment plants as well to supply the water to nearby villagers. Details of villages, where water is being supplied and corresponding nos. of beneficiaries (Family) are given below:

Sl. No.	Colliery name	Water supplied to nearby villages (Cum./day)	Name of beneficiary villages
1.	Amal. Joyrampur Colliery	10839	Parga, Mukunda, Surunga, Nunudih Basti, Bazar Dhowra, Lodna Bazar



Mine water being used by nearby public for domestic purposes Chatt Talab

CSR Expenditure:

Details of CSR expenditure of Cluster IX for different activities for last two years is given below:

Name of Activity	Year (Expenditure in lakhs)	Year

	2019-20	2020-21	2021-22	2022-23 to 24-25
Expenditure on Filter Plants and Domestic water supply	51.61	50.16	14.16	Nil
MADA water supply	725.26	693.80	444.00	1708.00
Hospital	8.03	14.25	30.09 (including medicine and surgical equipment)	Nil
For the use of Community Centres/Auditoriums	27.57	30.24	4.88	Nil
Stadium and Sports	18.29	6.51	10.58	Nil
Handloom Centre	3.5	1.98	Nil	Nil
Other Misc. Work	2.62	6.2	Nil	Nil

Approved CSR Expenditure for FY 25-26 under Lodna Area		
Sl. No.	Activity details	Estimated Expenditure (in Rs. Lakhs)
1.	Providing and Laying Water Pipes Lines at 2 No. Pit Jealgora to Dumariatand Basti	13.21
2.	Upgradation of Utkramit Madhya Vidyalaya Surunga	30

Details of CSR expenditure of whole BCCL

CSR Budget & Expenditure Summary from 2015-16 to 2020-21

Sl. No.	Fin. Yr.	Obligation as per CSR Policy of Company (₹ in crore)	Expenditure (₹ in crore)
1	2015-16	33.01	30.67
2	2016-17	26.85	11.45
3	2017-18	9.98	2.75
4	2018-19	6.52	3.43
5	2019-20	6.21	6.01
6	2020-21*	5.54	2.39

*Unaudited provisional expenditure for the FY 2020-21

Details of CSR expenditure of whole BCCL for FY 2021-22

FY 2021-22		
Sl No	Particulars	Expenditure incurred(in Rs. Lakh)
1	Depository mode Financial assistance to D.C., Dhanbad for combating COVID-19 situation in Dhanbad	100.00
2	Depository mode Financial assistance to Jharkhand State Disaster Mitigation Fund for distributing home isolation kits to COVID-19 patients	25.00
3	Procurement of masks & hand wash/ sanitizers for distribution amongst public for combating COVID-19	0.72
4	Fooding through Administration department for Doctors and Frontline workers at Covid Ward, CHD, Dhanbad and other miscellaneous COVID-19 expenditure like temporary contract of doctor etc.	36.45
5	Additional financial liability on submission of fresh bills for the work "Boarding and lodging of doctors and paramedical staff engaged in COVID-19 Hospital, CHD"	22.62
6	Cleaning and sanitization of temporary quarantine centres for doctors and paramedic staff engaged in treatment of COVID 19	2.15
7	Training of Youths in Various Plastic Engineering Courses through Central Institute of Plastics Engineering and Technology (CIPET)	14.00
8	Development of 500 Nos. of Aanganwadi Centres in Dhanbad	75.00
9	SVA Survey Expenditure (All Areas)	6.96
10	Distribution of blankets during winter season	3.58
11	Submission of fresh bills for project "Training of mining sirdar for SC/ST PAPs" by PB Area	3.26
12	Submission of fresh bills for "Operation of COVID quarantine centre" by Bastacolla Area	3.80
13	Upgradation of public toilets and approach road in Central Hospital, Dhanbad	3.15
14	Submission of final bills for "Gymnasium at Ambedkar Academy, Dhanbad"	2.35
15	Reversal of Financial Liablity (medical camps)	(8.52)
16	Amount for Aanganwadi deposited in Unspent CSR Account	188.50
17	Amount for CIPET deposited in Unspent CSR Account	14.00
	Total	**493.02**

REHABILITATION AND RESETTLEMENT PLAN

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

As per EC granted to Cluster IX, R&R of 12246 nos. of PAFs are involved. They should be rehabilitated to safe areas at the cost of Rs 126092.027 Lakhs as per the approved Jharia Action Plan.

Following will be the R&R package that will be given to affected families as per approved Master Plan

A very attractive R&R package, for the affected people who are to be shifted from endangered areas, has been proposed in the Master plan and has been approved both by Govt. of Jharkhand and Govt. of India. **But no employment will be offered for any rehabilitation under this Master Plan.**

It may be noted that this R&R package is offered for safety of the people living in endangered areas and not for project implementation and mining of coal and thereby gaining any type of profit.

R&R package for non-BCCL authorized families:

a) Land Compensation:

Head of every displaced house shall be given compensation for his land at the market rate.

b) House Compensation:

Every head of displaced house will get replacement value for his house and other structures over the homestead land, the value of which shall be estimated on the basis of PWD civil rates. (Pucca house: Rs. 4.8 lakhs/unit and for Kutcha house: Rs. 1.37 lakhs/unit).

c) Other Benefits:

Head of each house will be provided a plot of 100 sq.m land at the proposed township. In case his requirement of land is more than 100 sq.m, additional land may be provided, on payment basis as per market rate if land is available. If this offer is not acceptable, head of each house shall be provided a constructed flat of around 40 m2 as super built up area in a triple storied building. A house owner not opting for a plot will be offered equivalent cash compensation in lieu of free plot.

d) Basic amenities:

Each township will be provided with all basic amenities and infrastructural facilities like Primary school, High school, Bank, Post office, Community centre, Shopping centre, Hospital, Playground, Children Park, Water supply, Sewage disposal & sanitation, Road, Culverts & Drains, and Power Supply etc.

e) Income generation benefit:

Head of each house shall be paid 250 days/year wage as per State Govt.’s minimum wage rate for a period of 2 years.

f) Shifting Allowance:

The head of every house is proposed to be paid 0.10 lakhs as shifting allowance from their present living places to the resettlement sites.

R&R package for non-BCCL unauthorized families (encroachers):

a) No compensation will be paid to the house owner having no home stead land (Unauthorized). Instead the following benefits will be provided to them.

b) Head of each house will be provided a constructed house on 27 sq.m land as super built up area in triple storey building in resettlement site with all basic amenities like Primary school, High school, Bank , Post office, Community centre, Shopping centre, Hospital, Play ground & children park, Water Supply, Sewage disposal & sanitation, Road, Culverts & Drains, Power Supply etc.

c) **Income generation benefit**: Head of each house shall be paid 250 days/year wage as per State Govt.'s minimum wage rate for a period of 2 years.

d) **Shifting Allowance:** The head of every house is proposed to be paid 0.10 lakhs as shifting allowance from their present living places to the resettlement sites.

R&R package for BCCL families:

a) BCCL families from the endangered areas to be rehabilitated in satellite townships in non-coal bearing areas outside JCF with all basic infrastructural facilities.

b) For each BCCL house 160 sq.m (including for all amenities) resettlement land has been proposed.

Coal Transportation Plan

Coal produced in the coal face in the different mines of Lodna Area is first dumped in the different coal dumps of the concerned colliery at the surface. From the individual coal dump, coal is then shifted to either railway siding of Amal. NT-ST-JG Colliery for rail dispatch or directly sent via road sell to power plants/steel plants.

- Rly. Siding (GOL 6 & 9)

Distance from coal dumps of NT-ST-JG Colliery to Railway Siding: **1-2 km**

Production Details												
S. No	**Name of Mine**	**Normative (MTY)**	**Peak (MTY)**	**Leasehold Area (Ha.)**	**2015-16 (Tonn.)**	**2016-17 (Tonn.)**	**2017-18 (Tonn.)**	**2018-19 (Tonn.)**	**2019-20 (Tonn.)**	**2020-21 (Tonn.)**	**2021-22 (Tonn.)**	**2022-23 (upto sept.) (Tonn.)**

1.	Amal. NT-ST-JG Colliery	6.0	7.8	755.15	**3826689**	**3839054**	**3192316**	**2484642**	**2534760**	**2264372**	**3813224**	**2548384**

Coal Transportation in Cluster-IX

Coal Dispatched by Rail & Road in FY 2016-17

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	0	2965	2965

Coal Dispatched by Rail & Road in FY 2017-18

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	6311	12806	19117

Coal Dispatched by Rail & Road in FY 2018-19

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	**1776382**	**1068535**	2844917

Coal Dispatched by Rail & Road in FY 2019-20

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	1885804	699044	2584848

Coal Dispatched by Rail & Road in FY 2020-21

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	1006475	954089	1960564

Coal Dispatched by Rail & Road in FY 2021-22

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)

Amal. NT-ST-JG Colliery	3343480	679293	4022773

Coal Dispatched by Rail & Road in FY 2022-23 (upto sept.)

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Amal. NT-ST-JG Colliery	2307976	425418	2733394

Coal Dispatched by Rail & Road in FY 2024-25

Colliery Name	Dispatch by Rail (Te)	Dispatch by Road (Te)	Total Dispatch (Rail + Road) (Te)
Cluster IX	5294516	81200	5375716

Linkage: Coal produced in Lodna Area is dispatched to different organization like- power plants, steel plants etc.

Details of some of the Power/Steel/Fertilizer Plant which are supplied coal from Railway Siding and by road sale are as follows:

- Maithon Power Limited
- Patherdih Washery
- Steel Plant
- DVC
- Fertilizers
- RTPS
- Haldia
- APNL
- Others

Transportation Plan:

Action has been taken for formulating adequate transportation plan for conveyor-cum-rail system of dispatch. CMPDIL has been requested to prepare the plan. However, CMPDIL had submitted that such transportation plan can be completed only after implementation of Master Plan and dousing of the fire. The copy of the reply submitted by CMPDI is attached.

Transportation is being done by covering vehicle with tarpaulin cover and it is made mandatory in Transportation contracts.

cmpdi

A Mini Ratna Company

Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Registered Office : Gondwana Place, Kanke Road, Ranchi -834031(Jharkhand)
Corporate Identity No. U14292JH1975GOI001233

पत्रांक: सा.प्र.कार्या.-2/नवीकरण/सायम-30/1150

दिनांक: 20.06.2015

प्रेषक,
एस. के.
उप महाप्रबंधक (पर्यावरण)
सी. एम. पी. डी.आई
कोयला भवन
धनबाद ।

प्रेषित,
[illegible]

विषय: Study of installation of Rail-cum-Conveyor System in BCCL for transportation of coal.

महोदय,

This has reference to your letter no. BCCL/GM(Env)/F-EC/13/822, dated 25.06.2013 for conducting the study and preparation of plan for installation of Rail-cum-Conveyor System for coal transportation in BCCL as a part of compliance of environmental clearance (EC) conditions stipulated by MoEF & CC in EC orders of different clusters. In this regard, we would like to inform you the following:

a. As per EC clearance order transportation plan for Rail-cum-Conveyor system should dovetailed with Jharia Action Plan (Master Plan). The system of transportation is required to be installed in 2nd phase of EC implementation i.e. after completion of Master Plan (10 years) and 5 years of gestation period.

b. JISDA has issued direction to RITES for traffic survey and data collection to initiate feasibility study regarding Diversion of Railway lines from fire affected and subsidence prone areas.

c. Coal transportation route / conveyor installation layout will be finalized after liquidation of coal mine fire, rehabilitation of 595 unstable sites, road and rail route alignment and location of Rly. Sidings of BCCL.

CMPDI will be able to submit the plan / study for installation of Rail-cum-Conveyor System in BCCL for transportation of coal only after diversions and re-alignments of roads and railway lines and relocation of railway sidings.

This is for your kind information.

सादर

[illegible]
[illegible]

Ex Amendment 3 is
for employment purpose
[illegible]

फोन: (+91) 0326-2230800 फैक्स: (+91) 0326-2230109
वेब साइट / Website : www.cmpdi.co.in
ई-मेल / Email : [illegible]@cmpdi.co.in



Transportation Plan







COVERED TRANSPORTS

Environment Action Plan:

Sustainable coal production is the main objective of Lodna Area, BCCL i.e. meeting the energy demand of the nation while protecting and preserving the environment and ecology as well. For taking care of environment; cluster-IX has given full efforts to comply the conditions of Environmental clearance granted with cluster-IX group of mines. An Environment Management Cell has been formed under the chairmanship of General Manager, Lodna Area for ensuring the compliance of the conditions laid down in EC.

Apart from the above Environment Management Cell, dedicated workforce is being engaged in various environment protection work such as biological reclamation of stabilized OB dumps, Block plantation, Avenue plantation along the roads, development of Herbal garden and Sneha Smriti Upavan etc.
Details of officials in Environment Department, Lodna Area is as follows:
Executive: 02
Non-Executives: 03

Sneha Smriti Upavan: A garden of fruit bearing plants is being developed as Sneha Smriti Upavan in the memory of ancestors at NT-ST-JG Colliery.

It was inaugurated by General Manager, Lodna Area, BCCL.




स्नेह स्मृति उपवन
Before


स्नेह स्मृति उपवन
Now



Pictures of Sneha smriti upavan

Jharkraft in Lodna Area:

REELING AND SPINNING TRAINING PROJECT: This is a skill Development cum employment generation project under "*Swaavlambee* Project" of BCCL targeting groups of unemployed and willing to work women from *Mukunda, Alakdiha, Gareia , Panchmohali* and *Nootangram* villages belonging to Dhanbad District. These villages were chosen because they are located in the command area of BCCL, a project was estimated to generate employment for a group of thirty women from a village. For this purpose, BCCL and JHARCRAFT entered into an agreement for implementation of the project.

Objectives of the project

1. Skill enhancement through Training and shortening the learning curve of skilled and semi-skilled women.

2. Self-Employment generation and enhancing employability of women groups in the villages.

As per the agreement with CIL, TISS was entrusted the responsibility to undertake the work of generating data through a baseline survey in the peripheral villages of BCCL. Accordingly TISS conducted a sample survey in 42 villages in and around BCCL in the year 2013 to assess community needs that could be addressed through CSR initiatives.

Based on the results of the baseline survey, a skilled development and employment generation project was envisioned for unemployed women of these villages. In order to facilitate the identified groups of women of these villages with employment opportunities, initiatives have been taken to take the help of JHARCRAFT, a Government of Jharkhand undertaking. Five groups of women each group comprising of thirty (30) women were identified at Mukunda, Alakdiha, Gareria, Panchmohali and Nootangram village.

Mukunda Training Centre

The centre was inaugurated in the month of January, 2016 and training started from the month of March, 2016. The facility was provided in the adjoining centre of Mukunda Hospital operated by BCCL. The centre is spacious to facilitate trainings and store needful logistics like raw material, equipment & finished products.

Twenty-five women have been trained and are participating in the process of manufacturing at the Mukunda Centre. They reside in the radius of five kilometers from the centre and are

between twenty-five to thirty-five years old. Most are either illiterate or barely educated, only one was reported to be a graduate. The women largely belong to Other Backward Classes, Scheduled Caste and Scheduled Tribe and monthly average income ranges from Rs. 15000 to Rs. 30000 per month. According to the beneficiaries, they are currently not employed anywhere else other than the training centre. None of them have started a self-employment venture as a result of the reeling and spinning training because according to the beneficiaries, the handlooms are unaffordable for them.

The beneficiaries explained that they were uninitiated to the workings of the handloom craft and thus were hesitant to join the training and commit two years for the same. Since the beneficiaries had not contributed to the household income prior to this initiative, their family members were uncertain about the viability of the project as well. It was only after the detailed information dissemination by the „*mukhiya*" and the BCCL personnel that the women decided to join the training. The beneficiaries were also assured an increase in income as a consequence of the training program. The beneficiaries noted that their main motivation for engaging with this program was to gain a unique skill which could be used for income generation at any time in the future.

The training was conducted in a facility adjoining the Mukunda hospital operated by BCCL. The centre was found to be spacious enough to facilitate trainings and store resources. The facility houses 20 large handlooms along with a storage room for raw materials such as thread, needles, parts of the handlooms and also the finished materials. The women spent approximately five to six hours a day at the facility weaving fabrics. Even though the agreement between BCCL and Government of Jharkhand states that JHARCRAFT will be solely responsible for the purchase of the finished products and will also bring business for the beneficiaries evidence from secondary research conducted and perspectives from KIIs on the field, indicate that JHARCRAFT has been unable to uphold this aspect of the agreement in its totality. Nevertheless, JHARCRAFT has been instrumental in providing training to the beneficiaries and the trainer is still involved with the production of fabric so that he can provide assistance to the beneficiaries when required.

According to secondary research, JHARCRAFT is, however, not able to provide the optimum market for the produce of the centre. Handloom is learnt over many years whereas these women had spent only two years practicing the craft. Consequently the quality of the product was not at par with market standards On the other hand, the women expected get gainful employment after the completion of the project. Resulting in uncertainty due to the lack of it. This is also breach of contract as they agreed to sale the output of the centre. The beneficiaries unanimously noted that the trainer was a highly skilled professional trainer who had been integral in the growth of their artisan skills. They were well aware of the procedures of the agreement and the roles of JHARCRAFT and BCCL officials. In addition, they were found to have successfully grasped intricate concepts from their syllabus. They also mentioned that post the initial training period, they practiced the nuances of handloom reeling and spinning and are still in the process of honing their craft. They express their gratitude to the involved parties to help them work on the handloom machines post the training.

Apart from facilitation in acquiring a new skill, the reeling and spinning training project has also helped in self-esteem boost, development of entrepreneurship andenhancement in quality of life. The beneficiaries shared that they had never gone out of their house without a male companion but now are able to access the banking services without any assistance post the training program. They also shared instances of realizing the importance of quality education after exposure to myriad of delegates and officials from the well renowned organisations such as BCCL and their partners. The beneficiaries have now tried to chart out a plan to provide quality education to their children and hope this training program will aid them in contributing to the increase in their household income.

As regards to achievement of stated milestones, disappointment was expressed by beneficiaries, as there have been no financial gains to the women in spite of working for more than five hours a
day for twenty days in the month. They earn a bare minimum income of INR 350- INR 600 per month which is less than minimum wages and far less than the benefit promised to them. Conclusively, there is a marginal increase in the household incomes as reported by the beneficiaries. Corrective measures for the same are yet to be taken from the all the stakeholders.



Annexure VIII









Pictures of jharcraft, Lodna Area



Multiskill development institute at karmatand township



Handcrafts / sewing training centre





R&R Colony



Middle school inside Karmabasti township – Construction Funded through Ludna Area



Karmabasti Township Shopping Complex



Jawahar Lal Nehru Stadium which was constructed and maintained by Ludna Area – For public use


Alagdiha, Jharkhand, India


Karmatand, Jharkhand, India


Alagdiha, Jharkhand, India




Karmatand, Jharkhand, India


Karmatand, Jharkhand, India


Karmatand, Jharkhand, India





List of Environmental measure works which is being done at cluster-IX regularly

1. Air, Water and Noise monitoring by CMPDIL regularly and taking proper measures for controlling Air, Water and Noise pollution.
2. Coal Production based on calendar plan.
3. Regular Water Sprinkling for dust suppression within mine and on the main transportation road.
4. Developing green belt by avenue plantation as well as block plantation.
5. 3 tier Ecological restoration.
6. Rain water harvesting.
7. Making of embankment and toe wall.
8. Analysis of Pollution load reduction by CMPDI.
9. Tarpaulin Covered coal transportation.
10. Fire delineation study by IIT (ISM) Dhanbad and CMPDI.
11. Subsidence management.
12. Implementation of Mine Closure Plan prepared by CMPDI.
13. Conducting PME/IME of workers engaged in mining activities regularly.
14. Source Apportionment Study by NEERI Nagpur.

cmpdi
A Mini Ratna Company

Central Mine Planning & Design Institute Limited
A Subsidiary of Coal India Limited, Govt. of India Public Sector Undertaking
Gondwana Place, Kanke Road, Ranchi - 834 031, Jharkhand (INDIA)

Letter No : CMPDI/22/SCC(L)/

Dated: 09/02/2022

सेवा में,

उप महाप्रबन्धक (पर्यावरण)
सी. सी. एल. एच
धनबाद झारखंड
पिनकोड-826005

विषय: Revised Report of Cluster IX group of Mines on "Study to analyze the Extent of Reduction of Pollution Load every year by reducing coal transportation by Road".

(Your Email dated 12th Jan 2022)

महोदय,

Please find attached soft copy of the Revised report on "Study to analyze the Extent of reduction of pollution load every year by reducing coal transportation by Road" for the cluster (X).

Sl. No.	Name of the Cluster	Peak Production (MTY)
1	Cluster – IX	8.512

धन्यवाद,

भवदीय, संलग्नक यथोपर

(Abhijit Sinha)
महाप्रबन्धक (पर्यावरण)

प्रतिलिपि
1. श्रीमान निदेशक अन्वेषण-II, सीएमपीडीआई, रांची- For Kind information.

Phone No. : +91 651 2230010 Fax No. : +91 651 2210447
E-mail: cmpdi.cmpdi@gmail.com
Website/Website Address: www.cmpdi.co.in

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.

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

CLUSTER IX GROUP OF MINES

(NT/ST Expan. OCP, Amalgamated Joyrampur OC,)

Peak Production : 8.512 MTPA
Lease Hold Area : 1942.12 Ha

Bharat Coking Coal Limited

(February, 2022)

Prepared by

Environment Division

Central Mine Planning & Design Institute Limited

CMPDI (HQ)

Gondwana Place

Kanke Road, Ranchi-834008

CONTENTS

CHAPTER NO.	TITLE	PAGE No.
I	INTRODUCTION	1-8
II	FUGITIVE DUST GENERATION DUE TO MOVEMENT OF COAL	9-14

Chapter – I

Introduction

1.1 Genesis:

MOEF provided Environmental Clearance to the various mines of the Cluster EC granted vide.J-11015/307 / 2010 -IA.II(M) ; dated 21st May 2013, Amended vide J-11015/307 / 2010 -IA.II(M) dated 01.03.2018 .

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

1.2 Methodology:

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

1.3 General Information about the Cluster:

1.3.1 Brief Description:

Cluster-IX group of mines of BCCL is a group of nine mines consisting of opencast and underground mines. BCCL is the proponent of the cluster and it is under the administrative control of Coal India Limited. Coal India Limited is a Public Sector Undertaking of Government of India and functioning under the Ministry of Coal, Govt. of India.

The history of coal mining in Jharia Coalfield was started since eighteenth century. The only energy source during those years, the mining was carried out through manual and semi-manual methods resulting into large scale degradation of land, forests and environment. The unscientific mining resulted into large scale mine

fires, subsidence and land degradation. The mines of Jharia Coalfield were taken over mines by BCCL from the erstwhile private mine owners. Most of the mines had their history from pre-nationalization period.

During the takeover of the mines in 1972 in BCCL from private mine owners, the data like leasehold area, underground mine planning, production capacity were unknown. However, most of the mines were further reorganized.

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

1.3.2 Nature and Size of the Cluster:

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

Table 1.1: Details of the Mines of Cluster – IX

Sl No	Name of Mine	Production Capacity (MTY)		Lease Hold Area (Ha)
		Normative	Peak	
1	Amalgamated Joyrampur Colliery (OC)	2.512	3.25	1186.97
2	NT-ST Expansion OCP	6.0	7.8	755.15
	Total		8.512*	1942.12

1.3.3 Impact of Fire Control on Ambient Air Quality:

Due to unscientific mining prior to nationalization there are unstable sites identified in the BCCL. Out of 595 unstable sites identified in the Master Plan, 98 sites affected area of 2.246 Km2 consisting of 12246 no. of houses/families are affected. The affected families will be rehabilited in adjacent non coal bearing area at a cost of Rs. 126092.027 lakhs.

1.3.4 Impact of Resettlement on Ambient Air Quality:

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

1.4 Meteorological Data

The meteorological data recorded during the monitoring period is very useful for proper interpretation of the baseline information and it provides an input for prediction models of air quality dispersion. The transport and diffusion of the pollutants in the atmosphere are governed by meteorological factors. Factors like wind velocity, wind direction and atmospheric stability are known as primary/basic meteorological parameters since the dispersion and diffusion of pollutants depend mainly on these factors. Factors like ambient temperature, humidity, rainfall, atmospheric pressure, etc. are known as secondary meteorological parameters as these factors control the dispersion of the pollutants indirectly by affecting the primary factors. Thus, to assess the air pollution impact it becomes essential to collect data of the above mentioned meteorological parameters in the study area.

1.4.1 METHODOLOGY

Data of micrometeorological and microclimatic parameters were recorded by installing an Automatic Weather station at the roof of Moonidih Project Office (inside the premises of existing Moonidih washery) to represent the prevailing micrometeorological aspects of the study area. Automatic Weather station (Make: Ecotech & Model: WM-721) was used to record Ambient temperature, Relative humidity, atmospheric pressure, Cloud cover, Rainfall, wind speed and direction continuously during the study period.

During the study period, hourly reading of wind velocity, wind direction, temperature, relative humidity, cloud cover and rainfall data were recorded and reported.

1.4.2 DATA PRESENTATION

Wind Rose diagram during the study period has been in the Fig. 1.1 for the period from 09th December 2020 to 09th March 2021.

1.4.3 DATA COLLECTION AND ANALYSIS

Meteorological data collected at meteorological station representing the study area during the study period (09th December 2020 to 09th March 2021) reveals the following status:

(i) <u>Wind Speed/Direction</u>

Generally, moderate winds prevailed throughout the season. Moderate Winds prevailed 33.23 % times. Generally, during the night time calm conditions were observed. Wind speed readings throughout the season were ranging from ≤ 0.5 m/sec to 10.3 m/sec. The seasonal average wind speed was observed to be 0.63 m/sec. The wind pattern of the study period is presented below:

The analysis of wind pattern during the season showed that the predominant wind directions were from South South West (SSW) & followed by South West having frequencies 9.30 %, & 6.40 % respectively.

The calm conditions prevailed 50.58%. The analysis of wind speeds during the study period indicated that the low speed of 0.50 - 1.50 m/sec occupied 33.23% while wind speed of 1.50 - 3.50 m/sec occupied 15.69 % and > 3.50 m/sec were recorded as 0.46 % of the total occupancy respectively.

(ii) Temperature

Temperature values ranged between 6.5 ^{O}C to 40.3^{O}C. The seasonal average temperature value during this period was found to be 22.20 ^{O}C.

(iii) Relative Humidity

The daily average relative humidity values were in the range of 12.1 to 94.1%. The seasonal average humidity value was found to be 58.9 %.

(iv) Cloud Cover

Mostly clear sky was predominant during the study period.

(v) Atmospheric Pressure

The average atmospheric pressure value has been found to be around 750.12 mm Hg.

(vi) Rainfall

Total 20 mm rainfall was recorded during the study period. The maximum daily rainfall observed during the season was found to be 4 mm.

1.4.3 SUMMARY

The sky was mostly clear during the study period. The readings of wind velocity were ranging from ≤ 0.5 m/sec to 10.3 m/sec. Predominant wind was blowing from South South West (SSW) direction. The seasonal average wind speed was observed to be 0.63 m/sec. The maximum temperature recorded was 40.3^{O}C and the minimum is 6.5 ^{O}C. The daily average relative humidity values were in the range of 12.1 to 94.1%. %.

Table 1.2: SEASONAL WIND DISTRIBUTION (DEC'2020 -MARCH' 2021)
Period: 09th December '2020 –09th March '2021

	Directions / Wind Classes (m/s)	0.50 - 1.50	1.50 - 3.50	>= 3.50	Total (%)
1	N	0.55	0.23	0.00	0.78
2	NNE	0.51	0.14	0.00	0.64
3	NE	0.83	0.28	0.00	1.10
4	ENE	0.55	0.14	0.00	0.69
5	E	0.97	0.23	0.00	1.20
6	ESE	0.64	0.41	0.00	1.06
7	SE	1.38	0.60	0.05	2.02
8	SSE	3.31	1.66	0.00	4.97
9	S	4.46	1.56	0.00	6.03
10	SSW	6.30	2.85	0.14	9.30
11	SW	4.00	2.25	0.14	6.40
12	WSW	3.22	2.44	0.14	5.80
13	W	2.16	1.15	0.00	3.31
14	WNW	1.43	0.60	0.00	2.02
15	NW	1.33	0.74	0.00	2.07
16	NNW	1.56	0.41	0.00	1.98
	Sub-Total	33.23	15.69	0.46	49.38
	Calms				50.5752
	Missing/Incomplete				0.04602

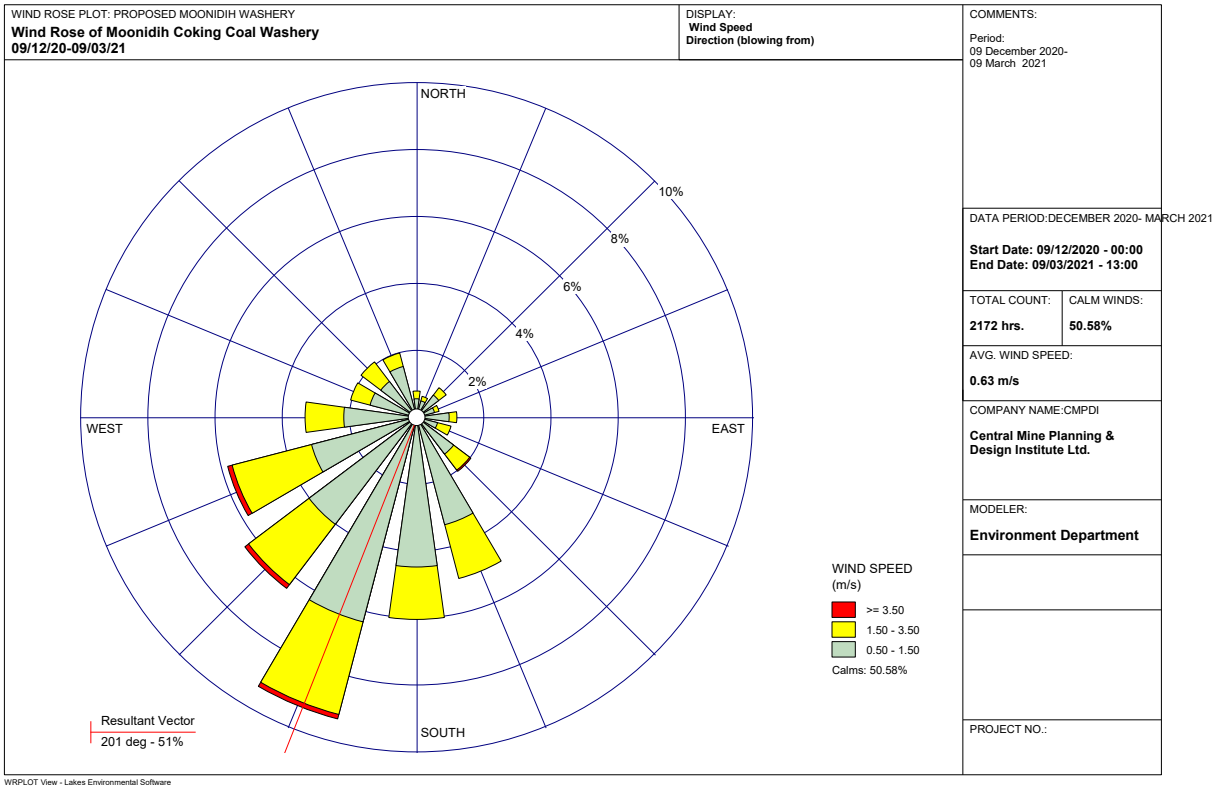


Figure No.-1.1 Wind Rose diagram for the period 9th December 20 to 9th March 2021

Chapter – II

Fugitive Dust Generation Due To Movement of Coal

2.1 Introduction

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

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

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

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

2.2 Movement of Coal

Distance travelled by coal and subsequent release of fugitive dust during its journey towards the consumer end has been described and dust load has been worked out.

2.2.1 Dust Generation :

Table: 2.1 Dust Generation (Kg/day)

	Dust generated per day (Kg/Day)										
Sl No.	**Name of the Mine**	**Year**	**Location**	**Distance from Face to Siding (Km)**	**Coal Transferred (Te)**	**Daily Coal Production (Te/Day)**	**Capacity of the Dumper**	**Vehicle Kilometre Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
1	**NT-ST(Exp.) OCP**	18-19	6/9 no. siding	3.5	2484642	7529.21818	20.00	2635.23	0.53	1396.670	
			Total for 18-19			**7529.22**				**1396.670**	0.19
		19-20	6/9 no. siding	3.5	2534760	7681.09091	20.00	2688.38	0.53	1424.842	
			Total for 19-20			**7681.09**				**1424.842**	0.19
		20-21	6/9 no. siding	3.5	2264372	6861.73333	20.00	2401.61	0.53	1272.852	
			Total for 20-21			**6861.73**				**1272.852**	0.19

* In terms of PM 10 expressed as kg/day **Average distance has been considered **Emission rate for PM_{10} has been taken from the S&T work (funded by MoC) carried out by CMPDI during 2002-2007.

2.3 Optimum Coal Transportation scheme in the Present Scenario:

Phase – I (for 10 + 05 Years)

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

2.4 Conceptual Plan of Proposed Integrated Coal Transportation Network for the Cluster:

Phase – II (after 15 Years):

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

During 2020-21, the combined daily coal production of the Cluster was 6862 tones resulting in 1273 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.19 kg/te.

As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of 4785 kg/day for daily coal production of 25794 tonnes (8.512 MTY) during Phase –II.

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

Cluster	Mines in Operation in Phase - II	Production Capacity (MTY)	Proposed Transport Infrastructure in Phase – II
IX	**Amalgamated Joyrampur Colliery (OC)	3.25	**Coal transport by Conveyor to Railway Siding**
	NT-ST Expansion OCP	7.8	
		8.512*	

*Peak of the cluster will remain same, as peak of individual will be achieved in different year. ** Mining is not in operation

2.5 Conclusion:

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

Phase – I :(2020-21 to 2028 -29):

1. During Phase – I, business as usual (BAU) scenario will prevail and the existing road cum rail transport network system will be used for coal dispatch to the consumers. During 2020-21, the combined daily coal production of the Cluster was 6862 tones resulting in 1273 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.19 kg/te.
2. The generation of fugitive dust due to transportation of coal by road can be further reduced by enforcing covering of loaded trucks, periodical removal of loose materials lying on the road surface and black topping of coal transportation roads.
3. Avenue plantation, effective wetting of the road surface and proper maintenance of roads will further result in mitigation of the impact of road generated dust on ambient air quality.
4. Better road condition, by the use of Mechanical Sweeper or vacuum cleaner dust generation may be minimized.

Phase – II :(From 2029-30 Onwards):

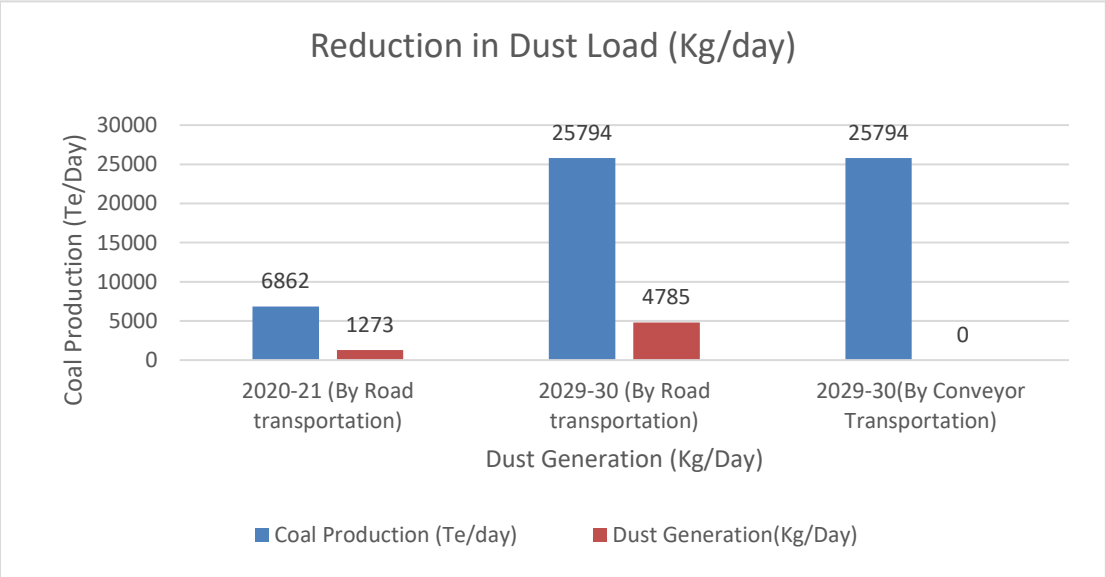
1. As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of 4785 kg/day for daily coal production of 25794 tonnes (8.512 MTY) during Phase –II.
2. During Phase –II, dust load will further reduce due to quenching of mine fire and domestic coal consumption after resettlement of general population dwelling within the command area of cluster, as a result of implementation of Jharia Action Plan. It will result in significant improvement in ambient air quality.

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

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

Year	Coal Production (Te/day)	Dust Generation(Kg/Day)
2020-21 (By Road transportation)	6862	1273
2029-30 (By Road transportation)	25794	4785
2029-30(By Conveyor Transportation)	25794	0

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



Annexure X

भारत कोकिंग कोल लिमिटेड
एक मिनिरत्न कम्पनी
(कोल इंडिया लिमिटेड का एक अंग)
महाप्रबंधक का कार्यालय, लोदना क्षेत्र
पी.ओ.- भेगा, जिला - धनबाद (झारखण्ड)
पंजीकृत कार्यालय: कोयला भवन, कोयला नगर,
धनबाद- 825005, (झारखण्ड)
CIN: U10101JH1972GOI000918

Bharat Coking Coal Limited
A MINI RATNA Co.
(A Subsidiary of Coal India Ltd)
Office of the General Manager, Lodna Area
P.O. Bhuga, Dist. Dhanbad (Jharkhand)
Regd Off: Koyla Bhawan, Koyla Nagar, Dhanbad 825005,
CIN: U10101JH1972GOI000918

Ref. No.: BCCL/LA/GM/2021/ 177 Date: 30/10/2021

OFFICE ORDER

An Environment Management Cell (EMC) of Lodna Area is hereby constituted with following members:

1. General Manager, Lodna Area	-- Chairman
2. Addl. General Manager, Lodna Area	-- Vice Chairman
3. Project Officer – Amal NT-ST-JG/Amal. Joyrampur/ Kujama Colliery	-- Member
4. Area Manager (Environment), Lodna Area	-- Member
5. Area Safety Officer, Lodna Area	-- Member
6. Area Manager (Planning), Lodna Area	-- Member
7. Area Finance Manager, Lodna Area	-- Member
8. Area Personnel Manager, Lodna Area	-- Member
9. Area Manager (Survey), Lodna Area	-- Member
10. Area Manager (E&M), Lodna Area	-- Member
11. Area Manager (Excavation), Lodna Area	-- Member
12. Area Manager (Estate), Lodna Area	-- Member
13. Assistance Manager (Environment), Lodna Area	-- Member

Environment Management Cell will monitor & co-ordinate with project officers to ensure the compliance of conditions imposed in Environment Clearance granted by Ministry of Environment, Forest & Climate Change.

30/10/21
General Manger
Lodna Area

Copy to:

1. Dy.GM / HOD (Env.), KB, BCCL
2. All Project Officers, Lodna Area
3. Executive concerned
4. Office copy

Scanned with CamScanner

Scanned with CamScanner

(7)

Ph: 0326-2204933

झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद्
Jharkhand State Pollution Control Board
HIG-1, Housing Colony, Dhanbad-826001

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

From,

Regional Officer,
Dhanbad

To,

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

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

Sir,

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

Encl-A/a.

Your's faithfully,

6/7/13

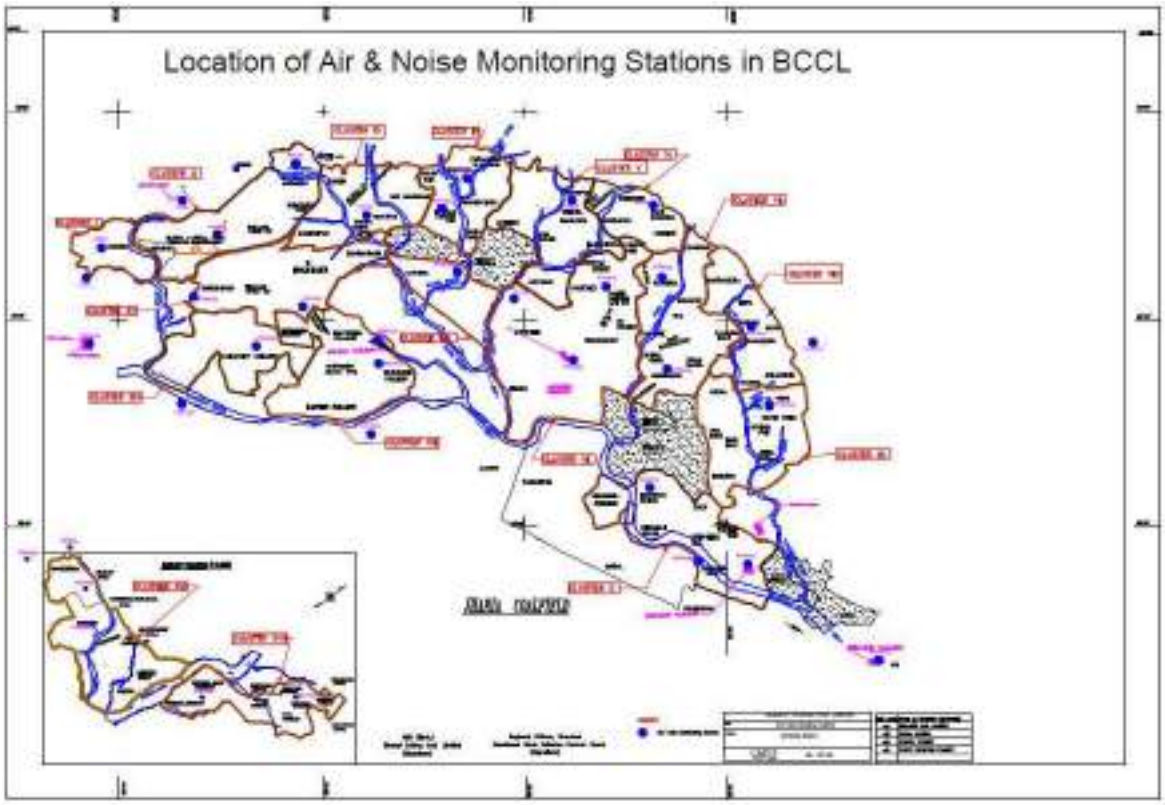
(Dinesh Prasad Singh)
Regional Officer.

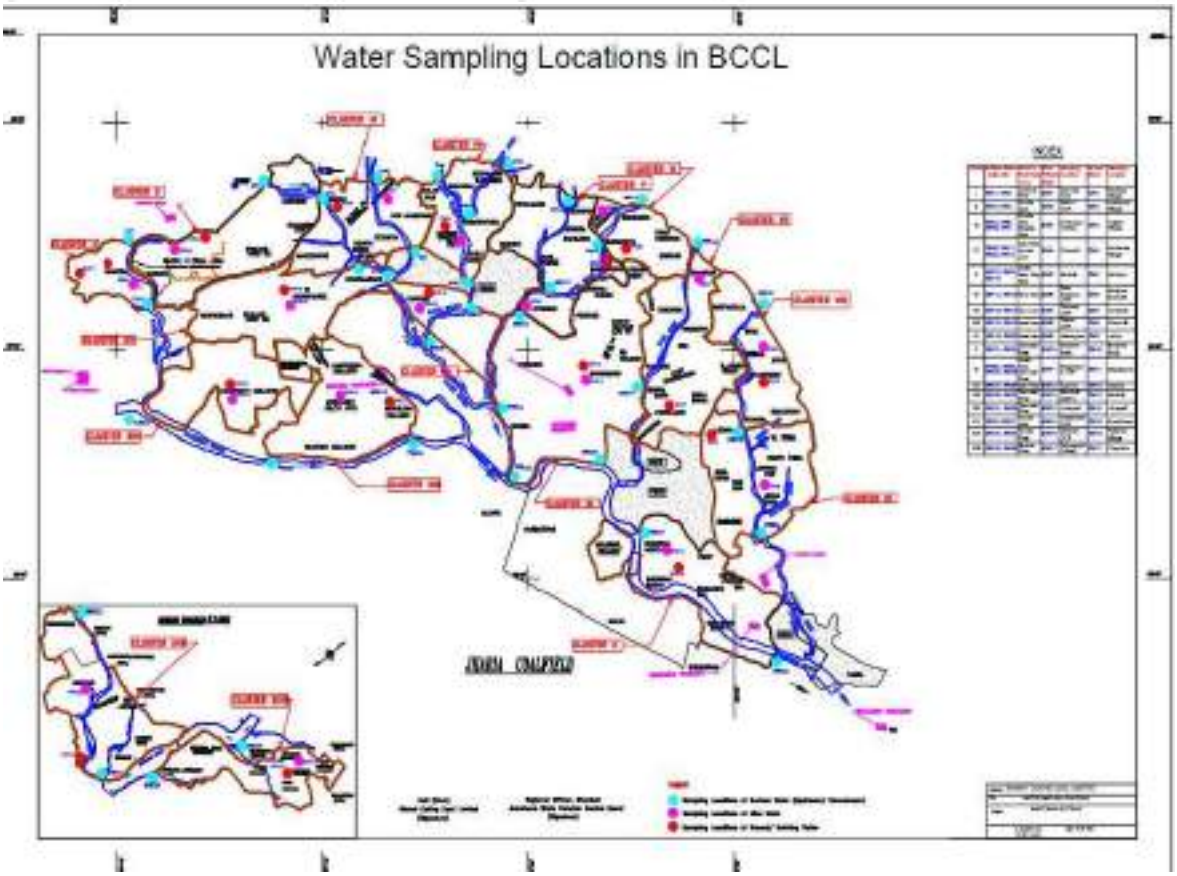
Memo..... Dhanbad, dated.....

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

Encl-A/a.

(Dinesh Pd. Singh)
Regional Officer.


Location of Air & Noise Monitoring Stations in BCCL


Water Sampling Locations in BCCL

Annexure VIII

Annexure XI

BHARAT COKING COAL LIMITED
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
OFFICE OF THE GENERAL MANAGER
LODNA AREA-X

Ref No. : BCCL/LA/GM/2022/280 Date: 01.06.2022

To
The Regional Officer
Jharkhand State Pollution Control Board (JSPCB)
H.I.G-1, Sardar Patel Nagar
Hirapur Dhanbad-826001
Dhanbad

Sub: Regarding Consent for location for installation of CAAQMS.

Dear Sir,

As per compliance directive of Chairman and Member Secretary, JSPCB the CAAQMS installation has been proposed at the Lodna Area Office. The location has been proposed after evaluation of convenience, security, public display at Lodna Area Office and sampling coverage for Cluster IX group of mines. The location plan is enclosed.

You are kindly requested to give consent to the proposed location so the process of procurement and installation can be done.

Received

General Manager
Lodna Area

Enclosure: Location Plan for CAAQMS

Cc to:
1. HoD (Env.), BCCL HQ, Koyla Bhawan
2. AGM,Lodna Area.
3. AM (Env.), Lodna Area

Scanned with CamScanner

Scanned with CamScanner

Annexure - III

BHARAT COKING COAL LIMITED
(A SUBSIDIARY OF COAL INDIA LIMITED)
OFFICE OF THE GENERAL MANAGER
LODNA AREA

Ref. No: - BCCL/Lodna/Env./2022/281 Dated:- 01.06.2022

To
The Regional Officer
Jharkhand State Pollution Control Board (JSPCB)
H.I.G-1, Sardar Patel Nagar
Hirapur Dhanbad-826001
Dhanbad

Subject- Regarding exclusion of Continuous PM_{10} Monitoring Analyser from CAAQMS.

Respected sir,

Two nos. of mines exist under cluster IX, namely NT-ST (Exp.) OCP & Amal. Joyrampur Colliery. As per conditions laid down in CTOs and ECs, Process of Procurement and installation of CAAQMS will be initiated shortly for Cluster-IX of BCCL. As, 02Nos. of PM_{10} analysers are already installed in Cluster –IX, one at NT-ST (Exp.) OCP and other at Amal. Joyrampur Colliery with analyser ID 1000012 and 1000011 respectively and are already monitoring PM10 values continuously.

So exclusion of Continuous PM_{10} Monitoring Analyser from CAAQMS is required and procurement of CAAQMS will be done with exclusion of Continuous PM_{10} Monitoring Analyser with others parameters like SO_2, NOx, $PM_{2.5}$ etc. Will remain same.

This is for your kind information and necessary action please.

Received 02/06/2022

Faithfully yours

01/6/22
General Manager
Lodna Area
(Cluster-IX,BCCL)

Copy to:
1. HoD (Env.),BCCL
2. AGM,Lodna Area.
3. AM (Env.), Lodna Area
4. File.

Scanned with CamScanner

Scanned with CamScanner

“Source apportionment of ambient air particulate matter in Jharia coalfields region, Jharkhand”

Sponsor

Bharat Coking Coal Limited (BCCL)



CSIR-National Environmental Engineering

Research Institute, Nagpur

April 2022

Principal Investigator

Dr. Rajesh Biniwale
Senior Principal Scientist
CSIR-National Environmental
Engineering Research Institute
Nagpur-440020, Maharashtra
rb_biniwale@neeri.res.in

Scientific Team

Dr. Yogesh Pakade
Er. S.A. Praveen
Dr. Rakesh Kadaverugu
Dr.Anirban Middey
Dr. A. D. Bhanarkar

Project Team

Mr. Pankaj Kaware

Mr. Ariz Ahmed

Ms. Anshu Pandey

Ms. Samiksha Ashtikar

Ms. Shruti Pande

Ms. Punam Bagde

Ms. Pratiksha Thombre

Mr. Mohit Mahurkar

Mr. Rahul Pawar

Ms. Smita Aditya

Mr. Ankush Rai

Mr. Vijay Selvaraj

Chapter 6 Recommendation

6.1. Mine industries

1. The project proponent might consider installing conveyor systems for transporting the coal from the coal handling plant to the railway siding or to the nearest thermal power plant (if feasible).
2. A sufficient number of plants should be planted around the mine pit to arrest the movement of particulate matter or dust into the surrounding areas.
3. Scientific studies might be necessary to design a green belt with an optimized dimension of plot size and direction as per the prevailing meteorology. Similar studies are required to design a wind barrier for optimized benefits.
4. Adequate dust control measures should be in place, like mechanized sweeping, water sprinkling or mist spraying systems on the haul roads and at loading sites. Long-range misting or fogging canons are also should be in place.
5. Dust suppression measures at all operations of mining should be ensured.
6. Ensuring the complete coverage of the trucks and railway wagons that carry coal with a tarpaulin sheet is necessary.
7. In the long-run mobilization of closed trucks to carry the coal is preferable.
8. The coal transport roads should not be left with open curb sides. End to end covering up of curb side is essential to avoid the re-suspension of coal due to the truck movement.

6.2. Area Sources

Area sources are mainly domestic sources of fuel (coal, wood, kerosene, LPG) burning, trash/MSW combustion, bakeries, hotels/restaurants etc. and re-suspension of dust. Based on the survey and assessment, the following recommendations emerge:

1. Construction and demolition of buildings in the urban area give high local dust contribution resulting health problems. These practices need to follow compliance guidelines to reduce emissions.
2. Road and pavement should be well constructed to suppress road dust. The standard specifications and code of practice for road construction should be followed and implemented as per the Indian Road Congress (IRC) guidelines or international standard guidelines.
3. Strategically placed green cover in urban and semi-urban areas can help to improve localair quality.
4. Manage agricultural residues, including strict enforcement of bans on open burning
5. Strictly enforce bans on the open burning of household waste.
6. Use clean fuels – electricity, natural gas, liquefied petroleum gas (LPG) in cities, and LPG and advanced biomass cooking and heating stoves in rural areas; substitution of coal by briquettes
7. Use incentives to improve the energy efficiency of household appliances, buildings, lighting, heating and cooling; encourage roof-top solar installations
8. Promote the use of electric vehicles

9. Encourage centralized waste collection with source separation and treatment, including gas utilization.
10. There is a substantial population that also uses available coal. These houses could be given a combination of improved chulla or free/subsidised power for cooking purposes.
11. Hotels and dhabas need to be educated and compulsorily asked to use LPG for its cooking purposes.
12. The trash and MSW burning is very common. Some of the places contain a mix of plastics and thermocol. The combustion of these materials is very harmful to human health.
13. Coal depot pollution is due to open storage and unregulated buying, selling and transportation. These coal depots are responsible for nearby air pollution peaks. However, the contribution of the same need to be assessed.

6.3. Line Source

The vehicular sector in cities has been seen to be a major source of gaseous and fine particulate matter. The action plan for this sector would need a combination of efforts:

1. Vehicle inspection and maintenance: Enforce mandatory checks and repairs for vehicles.
2. Improved public transport: Encourage a shift from private passenger vehicles to public transport.
3. Set up a mechanism of Inspection and Maintenance programme for all vehicles in the district through RTO with automated system assessment.
4. The Inspection & Maintenance (I & M) centre shall also test all vehicles for their inbuilt emission tests.
5. All commercial vehicles should be phased out after 8 years of age or subjected to two years extension after rigorous I&M tests
6. All private vehicles should be subjected to proper assessment and fitness tests through I&M centres.
7. All autos and buses shall also be subjected to I&M tests
8. Dhanbad city does not have a designated place for truck parking and maintenance related activities. A separate designated place should be allocated to prevent illegal parking and repair shops on the roads and kerbside.
9. Dhanbad city does not have a designated place for Auto-rikshaw. A separate designated place should provide to prevent traffic congestion and control vehicle emission.
10. Major haul trucks with heavy loads should not pass through the main city. The plan being made should be implemented in the next 1-1.5 years.
11. Overloading is a common phenomenon in the region resulting in poor road quality. This can be avoided through online checking when vehicles leave industries with a guarantee that the vehicle is not carrying more material than its designated loads.

6.4. Others

- There is a need to explore various options for controlling air pollutants to tackle increased emissions in future.
- The local authority should stress sustainable and affordable public transport keeping clean air goals in mind.
- Frequent (time to time) arrangement of campaign/awareness programmes for lawmakers, stakeholders, health professionals, academicians to brainstorm about the future scenario and importance of clean air.
- Strategic installation of continuous air quality monitoring systems at various locations of urban, semi-urban and rural areas to check the existing air quality and information dissemination to the general public.

Annexure -1

[A] Cumulative receptor sample of PM_{10} for source profiling with fitting parameters

Source contribution estimate	**Source profiles**	**Std Error**	**R-square**	**Chi-square**
82.7% mass	Unpaved road	0.056	0.96	2.41
	Coal combustion	0.643		
	Light Duty vehicle	1.60		
	Heavy Diesel vehicle	2.19		
	Residential combustion	5.59		
	Iron and steel industry	7.16		
	Agriculture soil dust	0.212		
	Solid waste	1.37		

[B] Cumulative receptor sample of $PM_{2.5}$ for source profiling with fitting parameters

Source contribution estimate	**Source profiles**	**Std Error**	**R-square**	**Chi-square**
88.1% mass	Residential combustion	3.34	0.98	2.44
	Coal combustion	0.094		
	Light Duty vehicle	0.30		
	Heavy Diesel vehicle	1.91		
	Agriculture soil dust	0.10		
	Flyash	0.51		

Annexure -2

Emission Inventory Data

Name of Mine:

S.no	Operation	Quantity Kg/day	Type of fuel & quantity (litre/day)	Moisture content %	Silt content %	Details
Point source						
1	Drilling					Hole dia ---mm & Frequency ---/day
2	Blasting					----/day
3.	Overburden loading					Drop height ----m; Frequency ------/day
4	Coal loading					Drop height ----m; Frequency -----/day
5	Overburden unloading					Drop height -----m; Frequency ----/day
6	Coal unloading					Drop height ----m; Frequency ------/day
7	Top soil removal					
8	Crushing					
9	DG sets					
Line source						
10	Transfer of coal through haul road					Average speed ------- km/hr & frequency -------/day Distance ---- km Width ------m
11	Transfer of OB through haul road					Average speed -----km/hr & frequency -------/day Distance -----km
12	Transport road					Average speed -----km/hr Distance ------ km
13	Haul Road length (km)					-----Km
Area Source						
14	Stockyard					Unloading freq. -------/day & Coal Loading ------T/day Area -------- m^2
15	Workshop (m^2)					Area
16	Exposed pit (km^2)					
17	Colony					Fuel for cooking :-----

Project Report

On

Delineation of Surface Coal Fire and associated Land Subsidence in Jharia Coalfield (2022-2024), Jharkhand using satellite based remote-sensing techniques

A collaborative project between

National Remote Sensing Centre (NRSC)
Indian Space Research Organisation (ISRO)
Hyderabad - 500 037

Bharat Coking Coal Limited

Bharat Coking Coal Limited
Koyla Bhawan, Koyla Nagar
Dhandbad, Jharkhand

May, 2025

CHAPTER VI

RESULTS

6.1 Coal Fire Maps and Mine-Wise fire area statistics

The Landsat images of 2022 to 2024 used to prepare the coal mine fire area maps to indicate thermal anomalies as identified through a 100m spatial resolution TIRS band and 30m spatial resolution SWIR 1/2 and NIR band. The anomalies are identified based on the surrounding areas; hence, any small fires through fissures with minor differences in temperature as compared to the surroundings go undetected, or any fire with a size lower than the detectable limit also goes undetected. A few other limitations of the methodology are mentioned in Chapter 8. The Coal fire maps, as shown in Figure 11-13 for 2022 to 2024 in comparison to previous similar studies, show the trend in shift of coal fire zones.

To understand the dynamic spatial extent of the fire pockets, a total fire area comparison between the 2020 block-wise fire area distribution and distribution for the subsequent years is shown in Table 4. The table highlights the year-on-year increment and decrement by assigning a red or green color to the cell. The red indicates an increase in the total fire area for a block as compared to the previous year, and the green indicates a decrease in the total fire area for a block as compared to the previous year. The total fire area was 1.85 sq.km, 4.54 sq.km, 5.00 sq.km, and 3.91 sq.km for 2020,2022, 2023, and 2024 respectively.

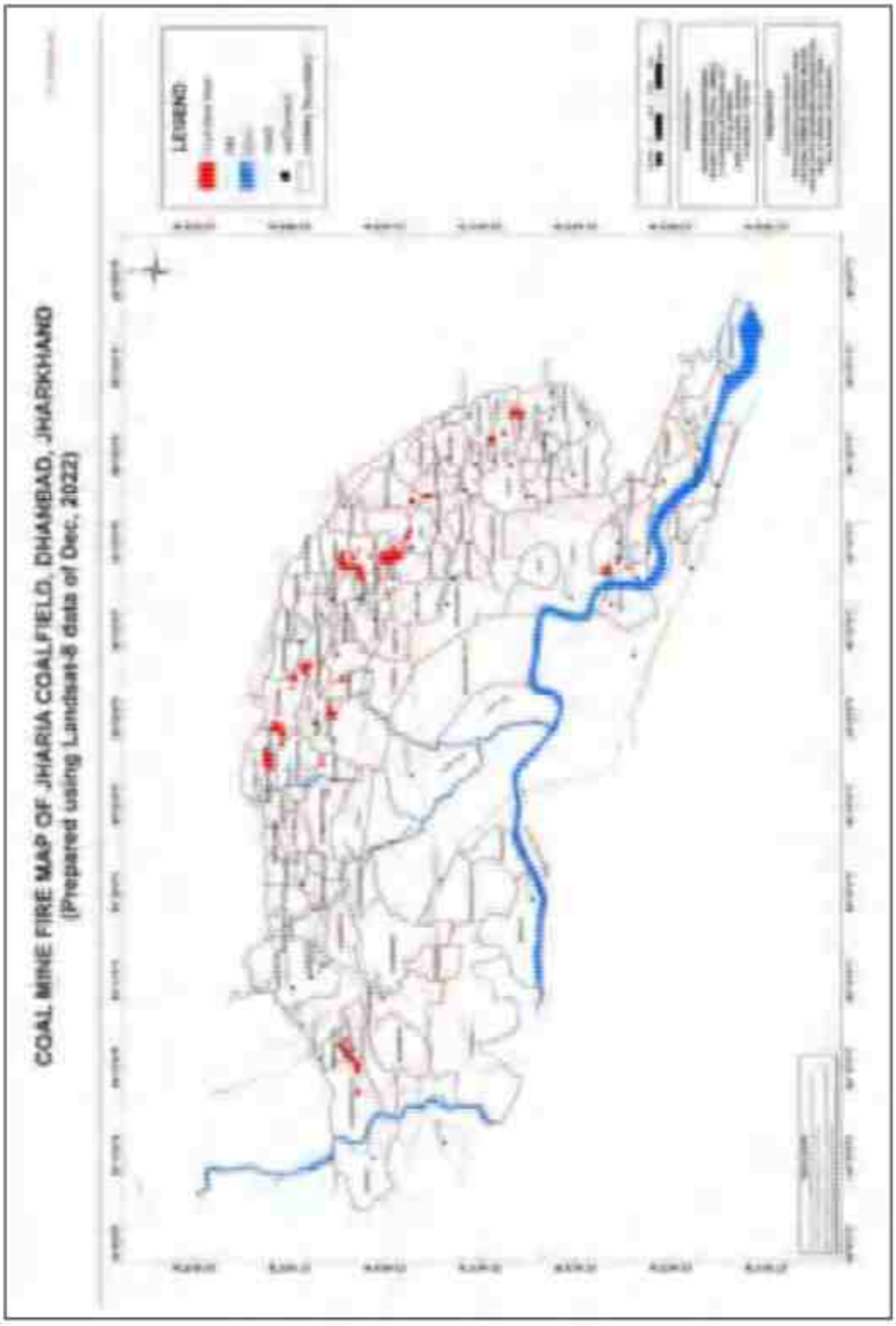


Figure 11. Coal fire map of the Jharia Coalfield (from Landsat-8 Data of Dec 2022)

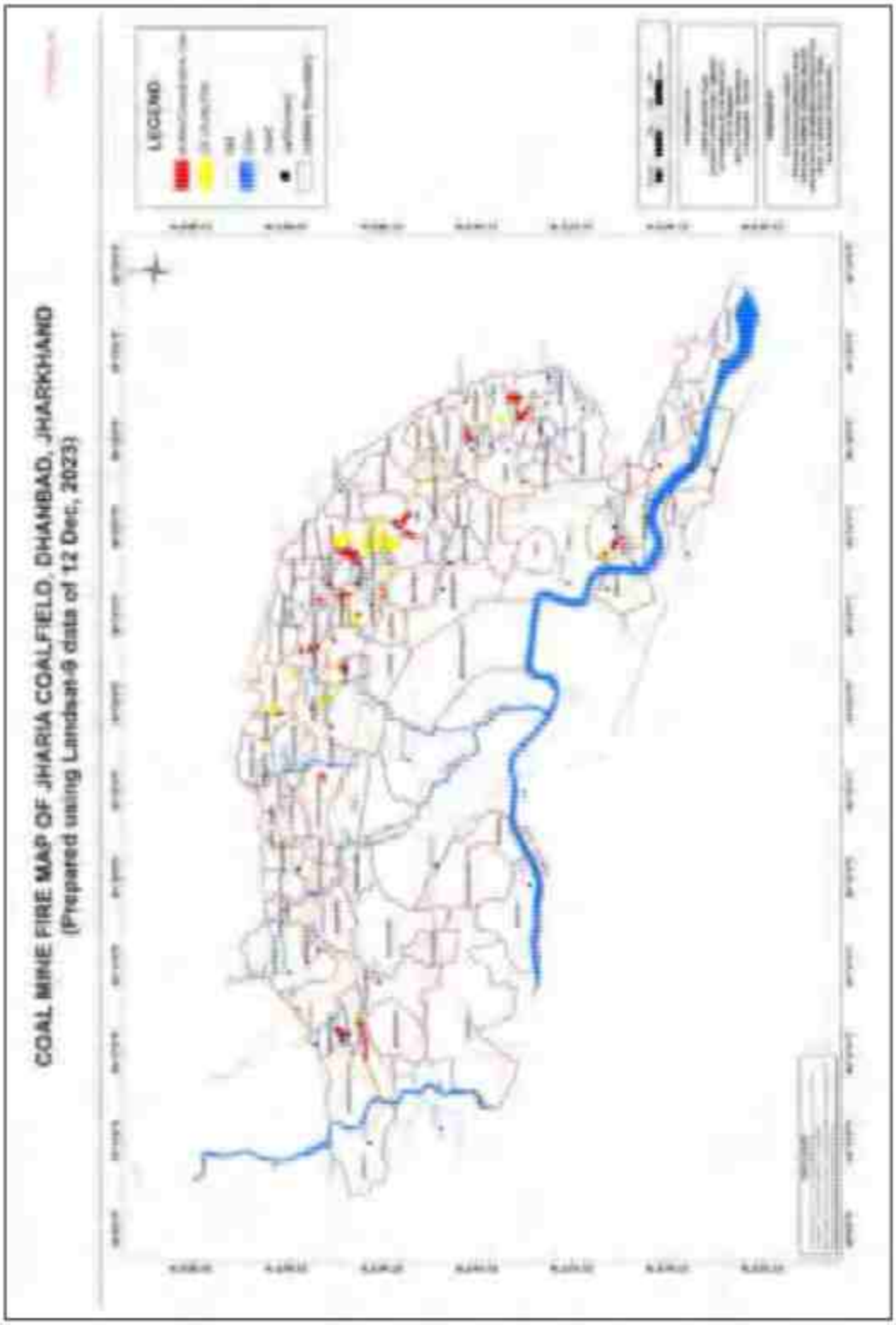


Figure 12. Coal fire map of the Jharia Coalfield (from Landsat-9 Data of Dec 2023)

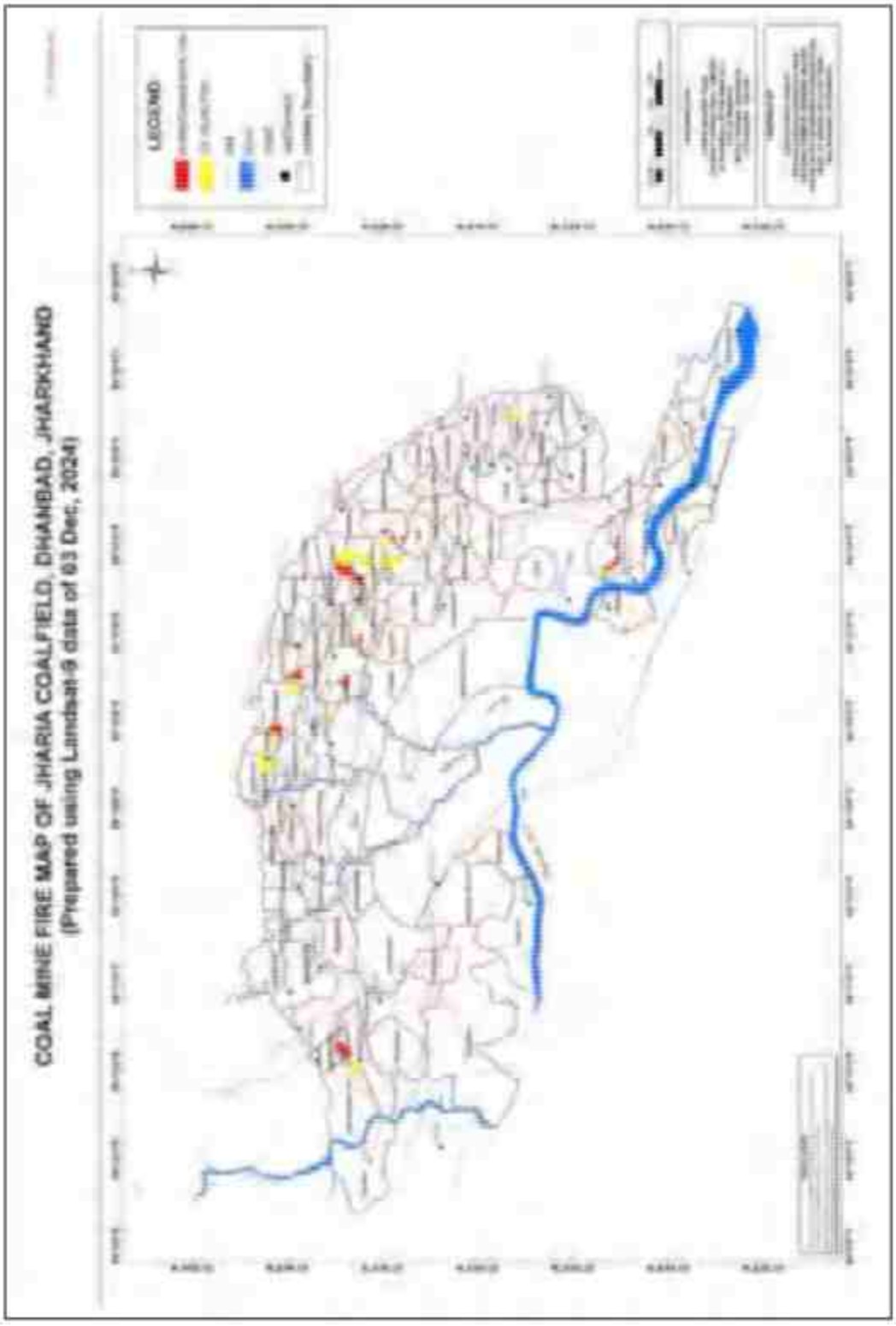


Figure 13. Coal fire map of the Jharia Coalfield (from Landsat-9 Data of Dec 2024)

Based on the figure 11 and 12, cardinal direction-wise fire zones distribution is as follows:

- For the coal fire map of 2023, the eastern side of the covering regions such as Jharia OCP, Kujama, Tisra (North and South), and Bhowrah (North and South) contains large patches of coal fire areas and regions with high increase in fire area in comparison to 2020 and 2022.
- The western side of Nudkhurkee OCP, Block-II OCP, and Benedih OCP, with fire patches covering both the active mine and Overburden dump areas, shows a shift from the northern region to the south region, which may be indicative of a shift in the mining zone. The fire patch area for the western side has remained approximately similar in comparison to 2022 but has primarily increased as compared to 2020.
- The North-Eastern side from Kusunda, Ena, covering Godhar, Alkusa till Basuria and Bansdeopur, etc., is the most significant contributor to the total coal fire area for the Jharia coal mines, with most portions seeing a significant increase in fire patches in comparison with 2022 and a very high increase in regions of Gopalichuck and Kusunda. The portion has remained the largest contributor for the years 2020 and 2022 as well.
- The Northern side from Loyabad to Katras, consisting of areas such as Sendra-Bansjora, Mudidh, Keshalipur, and Katras, sees scattered small to large fire patches of the coal fire area. The total coal fire area has slightly decreased, specifically for West Mudidh and Keshalipur, but the small patches have scattered even further in comparison to 2022.

Table 4: The tables show Year on Year mine wise comparison for total fire area for 2022-2024, where red indicates increase in fire area and green indicates decrease in fire area compared to previous year. Zero indicates no fire or fire is below the detection resolution of Landsat images.

S.I.	COLLIERY AREA NAME	FIRE AREA 2020 (SQ. KM.)	FIRE AREA 2022 (SQ. KM.)	FIRE AREA 2023 (SQ. KM.)	FIRE AREA 2024(SQ. KM.)
1	AKASH KINARI	**0.000**	**0.000**	**0.000**	**0.000**
2	ALKUSHA	**0.046**	**0.073**	**0.022**	**0.066**
3	AMLABAD	**0.000**	**0.000**	**0.003**	**0.000**

4	ANGARAPATRA	0.036	0.083	0.000	0.116
5	BAGDIGI	0.000	0.000	0.000	0.000
6	BANSDEOPUR	0.000	0.052	0.123	0.044
7	BARAREE	0.040	0.000	0.000	0.000
8	BASTACOLLA	0.000	0.080	0.000	0.023
9	BASURIA	0.012	0.000	0.058	0.032
10	BENEDIH OCP	0.020	0.256	0.168	0.208
11	BERA	0.000	0.000	0.000	0.000
12	BHAGABAND	0.000	0.000	0.000	0.000
13	BHATDIH	0.000	0.000	0.000	0.000
14	BHOWRAH. N	0.006	0.203	0.275	0.196
15	BHOWRAH. S	0.023	0.027	0.156	0.013
16	BHURUNGIA	0.000	0.000	0.000	0.000
17	BLOCK-II OCP	0.034	0.065	0.285	0.086
18	BULLIHARY	0.000	0.003	0.000	0.000
19	BURRAGARH	0.000	0.000	0.000	0.000
20	CHANDAN OCP	0.000	0.000	0.000	0.000
21	DAMODA	0.000	0.000	0.000	0.000
22	DHANSAR	0.000	0.000	0.000	0.000
23	DHARAMABAND	0.000	0.000	0.000	0.000
24	DOBARI	0.000	0.000	0.000	0.000
25	E. BASURIA	0.000	0.000	0.000	0.000
25	E. KATRAS	0.000	0.000	0.000	0.000
26	E.BHUGGATDIH	0.020	0.054	0.053	0.024
27	ENA	0.004	0.115	0.335	0.203
28	GASLITAND	0.156	0.079	0.018	0.009
29	GODHAR	0.132	0.299	0.353	0.374
30	GOLUCKDIH	0.000	0.051	0.062	0.022
31	GONDUDIH	0.000	0.000	0.000	0.013
32	GONHOODIH	0.001	0.029	0.000	0.000
33	GOPALICHUCK	0.000	0.082	0.255	0.107
34	GOVINDPUR	0.000	0.000	0.000	0.000
35	HURRILADIH&STD	0.000	0.000	0.000	0.000
36	IISCO	0.000	0.000	0.000	0.000
37	INDUSTRY	0.000	0.000	0.000	0.000
38	JEALGORA	0.000	0.000	0.000	0.000
39	JEENAGORA	0.000	0.000	0.000	0.000
40	JOGIDIH	0.000	0.000	0.000	0.000
41	JOYRAMPUR	0.011	0.000	0.000	0.000
42	KANKANEE	0.057	0.084	0.140	0.090
43	KATRAS-CHOITUDIH	0.214	0.090	0.067	0.038
44	KENDUADIH	0.001	0.133	0.158	0.110
45	KESHALPUR	0.134	0.232	0.040	0.177
46	KHARKHAREE	0.000	0.000	0.000	0.000
47	KHAS KUSUNDA	0.000	0.000	0.000	0.000
48	KORIDIH BLOCK-	0.000	0.000	0.000	0.000

	IV OCP				
49	KUJAMA	0.000	0.026	0.123	0.029
50	KUSTORE	0.014	0.033	0.039	0.021
51	KUSUNDA	0.399	0.858	1.030	0.711
52	KUYA	0.000	0.000	0.000	0.000
53	LODNA	0.000	0.000	0.000	0.000
54	LOHAPATTY	0.000	0.000	0.000	0.000
55	LOYABAD	0.000	0.006	0.003	0.000
56	MADHUBAND	0.000	0.000	0.000	0.000
57	MAHESHPUR	0.000	0.000	0.000	0.000
58	MOONIDIH PROJECT	0.000	0.000	0.000	0.000
59	MUDIDIH	0.220	0.197	0.194	0.109
60	MURAIDIH OCP	0.006	0.000	0.000	0.009
61	MURULIDIH	0.000	0.000	0.000	0.000
62	MURULIDIH 20/21 PIT	0.000	0.000	0.000	0.000
63	N. TISRA	0.031	0.097	0.123	0.041
64	NICHITPUR	0.000	0.000	0.000	0.000
65	NUDKHURKEE OCP	0.000	0.400	0.039	0.154
66	PATHERDIH	0.000	0.000	0.000	0.000
67	PHULARITAND	0.000	0.000	0.000	0.000
68	POOTKEE	0.000	0.000	0.000	0.000
69	RAMKANALI	0.000	0.011	0.000	0.016
70	S. JHARIA-R. OCP	0.010	0.005	0.085	0.020
71	S. TISRA	0.021	0.210	0.367	0.157
72	S.GOVINDPUR	0.000	0.000	0.000	0.000
73	SALANPUR	0.000	0.000	0.000	0.000
74	SENDRA-BANSJORA	0.110	0.350	0.152	0.248
75	SHATABDI OCP	0.005	0.000	0.000	0.000
76	SIMLABAHAL	0.000	0.000	0.000	0.000
77	SITANALA	0.000	0.000	0.000	0.000
78	SUDAMDIH	0.000	0.000	0.000	0.000
79	TASRA-IISCO	0.000	0.000	0.000	0.000
80	TETULMARI	0.011	0.000	0.232	0.253
81	TETURIA	0.000	0.000	0.000	0.000
82	TISCO	0.000	0.000	0.000	0.004
83	W. GODHAR	0.000	0.000	0.000	0.002
84	W. MUDIDIH	0.085	0.265	0.050	0.192
	Total	1.85	4.54	5.00	3.91

The classification of the coal fire area was based on field observation of whether the fire existed in the open cast mining areas/ old mining areas or the overburden dump of the active mine area. The larger patches of anomalies identified

by the Landsat images were meticulously separated from mine fires or Overburden dump fires after the field. The classified maps of 2023 and 2024 are shown in Figures 12 and 13. The spatial extent statistics and block-wise fire distribution for the separate classes of mine fire and Overburden dump fire for 2023 and 2024 are also shown in Tables 5 and 6, respectively. The bar graph-based statistical figure for block-wise increment and decrement of the fire area of the two classes is shown in Figures 14 and 15.

Table 5: Mine-wise area under coal fire classified in two classes of mine fire and Overburden dump fire for 2023 (grey cells in the table indicate the area has no fire or the fire is below detection resolution of satellite).

S.I.	Mine Area Name	Mine Fire (sq. km)	Overburden Fire (sq. km)
1	ALKUSHA	0.020	0.002
2	AMLABAD		0.003
3	BANSDEOPUR	0.123	
4	BASURIA	0.058	
5	BENEDIH	0.168	
6	BHOWRAH. N	0.161	0.115
7	BHOWRAH. S	0.023	0.133
8	BLOCK-II	0.242	0.043
9	E.BHUGGATDIH		0.053
10	ENA	0.307	0.028
11	GASUTAND		0.018
12	GODHAR	0.139	0.214
13	GOLUCKDIH		0.062
14	GOPALICHUCK	0.105	0.150
15	KANKANEE	0.089	0.051
16	KATRAS	0.056	0.012
17	KENDUADIH	0.096	0.062
18	KESHALPUR		0.040
19	KUJAMA	0.123	
20	KUSTORE		0.039
21	KUSUNDA	0.109	0.922
22	LOYABAD	0.002	0.000
23	MUDIDIH		0.194
24	N. TISRA	0.015	0.107
25	NUDKHURKEE	0.002	0.037
26	S. JHARIA		0.085
27	S. TISRA	0.367	
28	BANSJORA	0.152	
29	TETULMARI	0.013	0.219
30	W. MUDIDIH	0.036	0.014
	Total	**2.41**	**2.60**

Table 6: Mine-wise area under coal fire classified into two classes of mine fire and Overburden dump fire for 2024 (grey cells in the table indicate the area has no fire or the fire is below detection resolution of satellite).

S.I.	Mine Area Name	Mine Fire (sq. Km)	Overburden Fire (sq. Km)
1	ALKUSHA	0.060	0.006
2	ANGARAPATRA		0.116
3	BANSDEOPUR	0.021	0.023
4	BASTACOLLA		0.023
5	BASURIA		0.032
6	BENEDIH-OCP	0.203	0.005
7	BHOWRAH. N	0.127	0.069
8	BHOWRAH. S		0.013
9	BLOCK-II OCP	0.040	0.046
10	E.BHUGGATDIH		0.024
11	ENA	0.169	0.034
12	GASLITAND		0.009
13	GODHAR	0.185	0.189
14	GOLUCKDIH		0.022
15	GONDUDIH		0.013
16	GOPALICHUCK	0.058	0.049
17	JEENAGORA		0.001
18	KANKANEE	0.074	0.016
19	KATRAS-CHOITUDIH		0.038
20	KENDUADIH	0.105	0.005
21	KESHALPUR		0.177
22	KUJAMA	0.029	
23	KUSTORE		0.021
24	KUSUNDA	0.056	0.655
25	MUDIDIH		0.109
26	MURAIDIH OCP		0.009
27	N. TISRA	0.012	0.028
28	NUDKHURKEE OCP		0.154
29	RAMKANALI		0.016
30	S. JHARIA-R. OCP	0.006	0.014
31	S. TISRA	0.033	0.124
32	SENDRA-BANSJORA	0.157	0.091
33	TETULMARI	0.130	0.123
34	TISCO		0.004
35	W. GODHAR		0.002
36	W. MUDIDIH	0.066	0.127
	Total	**1.53**	**2.38**

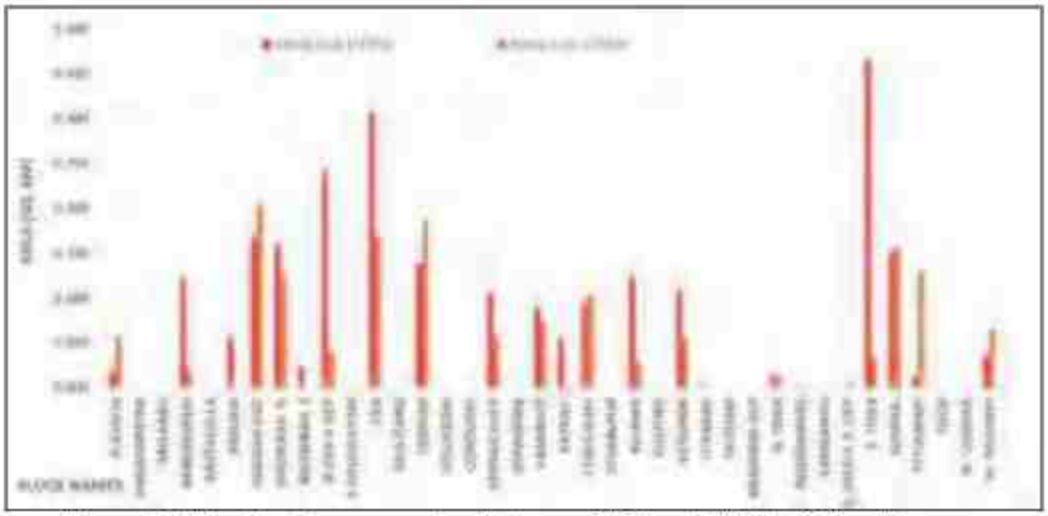


Figure 14. Block-wise comparison between 2023 and 2024 of Mine fire area.

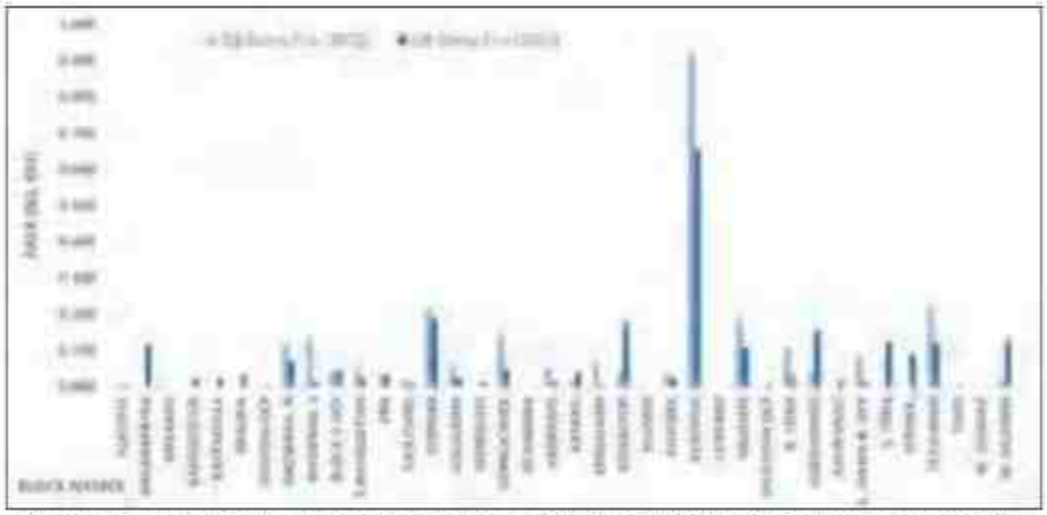


Figure 15. Block-wise comparison between 2023 and 2024 of Overburden dump fire area.

A similar cardinal direction-wise analysis of 2024 in comparison to 2023 provides a larger picture while at the same time allowing for focused analysis of the portions, with further distribution of fire area to two classes enabling us to provide further details on the regions of increasing and decreasing fire which helps the user in area-wise objective specific mitigation strategy.

- The eastern side of the mining extent has seen a significant decrease in overall fire area, number of fire patches, and specifically active mine fire from 2023 to 2024, with a significant decrease in active mine fire area for South Tisra Block, the Bhowrah active mining fire area regions and extent is approximately unchanged from 2023 to 2024.

- The western side has also seen a decrease in total fire area and active mine fire portions but an increase in the Overburden dump fire for the Nudkhurkee OCP block, which is part of a single mining area covering the Benedih OCP and Block-II OCP as well.
- The north-eastern side, while still being the highest contributor to the total fire area, has seen a slight decrease in the extent, specifically in the active mine fire areas due to Basuria and Bansdeopur blocks. At the same time, the Kusunda, Ena, and Gopalichuck portions have remained mainly similar for both classes.
- The northern portion has seen a significant increase in approximately all the parameters about coal mine fires, including the number of blazing fires in active mines, total mining area, and the extent to the two separate classes of mine fire. Although the northern portion was always the second largest contributor to the total mine fire area for the Jharia coalfield, the increase has made its contribution comparable to that of the north-eastern side, which was not observed in previous years—a large portion of Overburden dumps fire in the regions of Keshalpur, West. Mudidh and Angartapatra and the newly identified active mine fire regions of Sendra-Bansjora are the few key changes from 2023. The Overburden dump fire area of Mudidh and the active mine fire area of Kankanee have primarily remained as they were in 2023.

The ground temperature measurements for the fire area were taken for both years using the handheld thermal sensor, and the sensed temperature for a few of the Overburden dump fire and mine fire areas are shown in figures 16 and 17 for 2023 and 2024, respectively with the respective field location shown in figure 10. The surface temperature reading was taken for most of the fire locations using the handheld thermal sensor, where the Overburden dump fire temperature ranged from 100° to 500° C degrees. In comparison, the mine fire either contained only fissures/ cracks where the temperature ranged from 300° to 500°C or fissures/cracks along with blazing fire where the temperature was very high, surpassing the detectable limit of 650° C of the temperature for few locations.

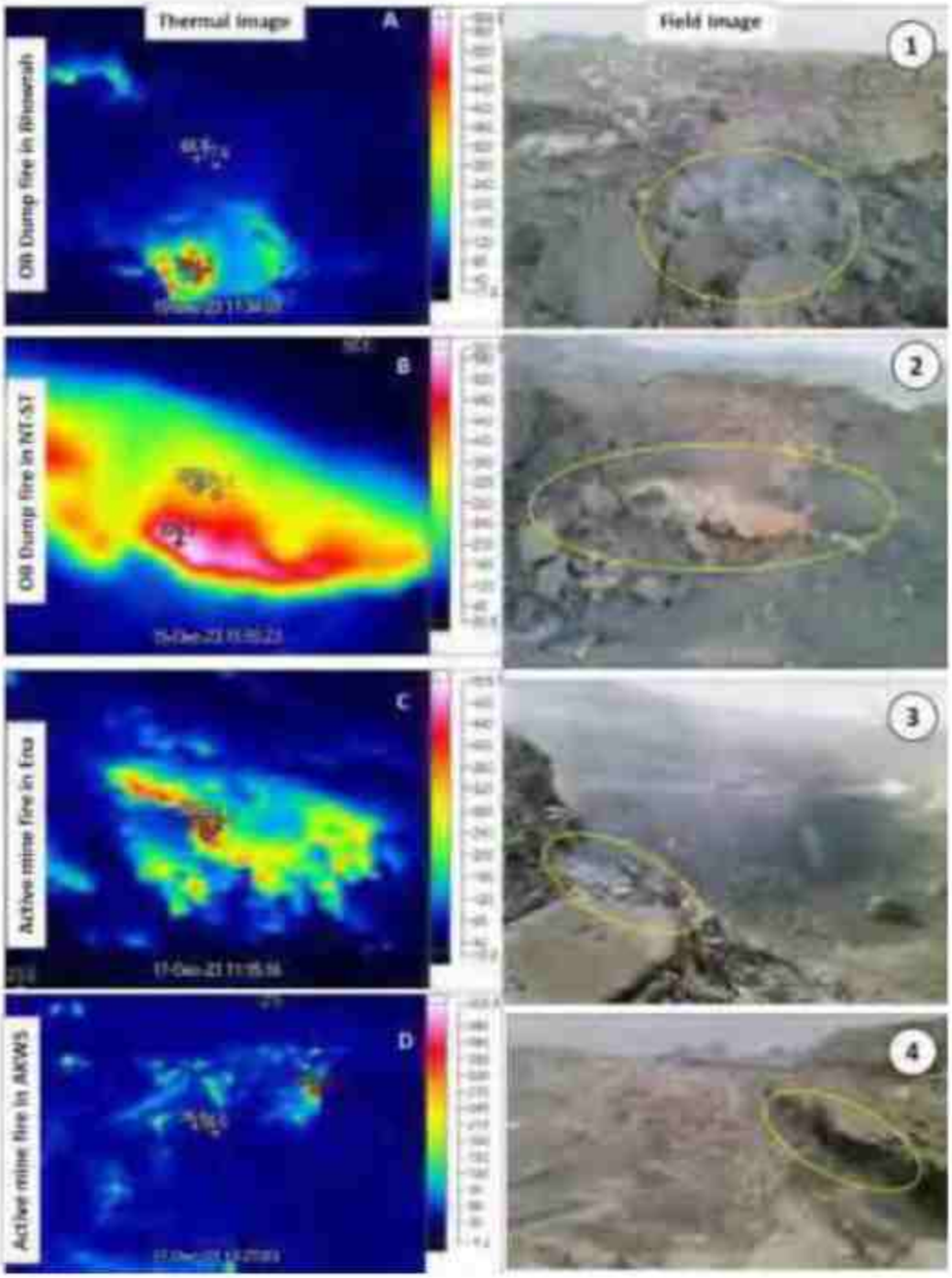


Figure 16. Thermal images and ground photographs from field survey for 2023 (yellow polygon shows the location from where thermal measurements are taken).

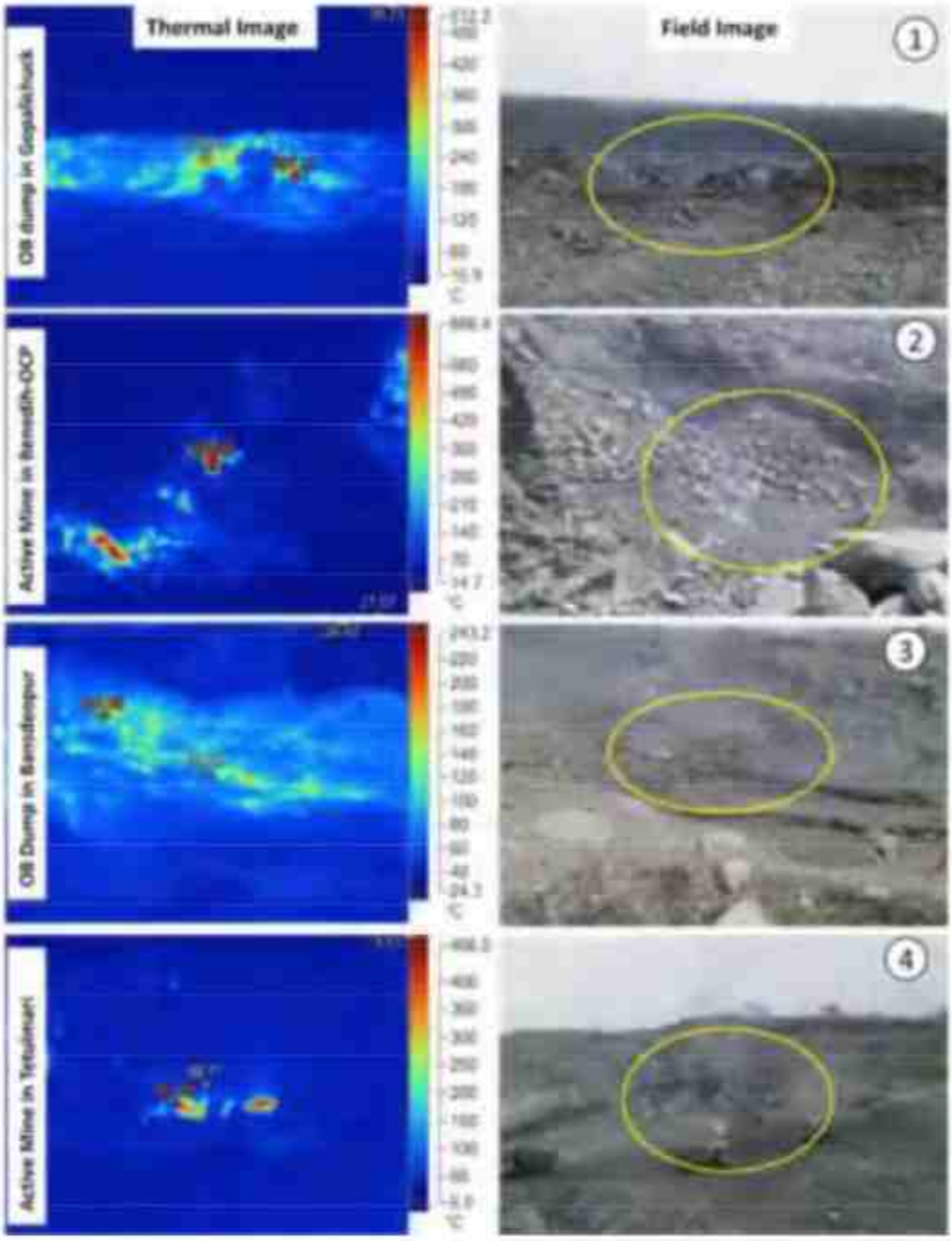


Figure 17. Thermal images and ground photographs from field survey for 2024 (yellow polygon shows the location from where thermal measurements are taken).

6.2 Subsidence Maps and Field images

The interferogram pair-by-pair processing for the seven acquired ALOS-PALSAR-2 L Band SLCs was carried out, and through the visual interpretation of the interferograms, the possible subsidence area was identified. The ground-based signature could be identified for the areas of Basuria, ENA, Dobari, and Nudkhurkee OCP as the bending of the treeing at the edge of the mine or settling of old Overburden dump or fall of loose material from Overburden dump areas. A few field photographs are shown in Figure 18, and the Jharia subsidence map is in Figure 19.



Figure 18. Field photographs for identified ground evidence for the subsidence areas for four different locations with (a) showing slanting trees, (b) showing falling of loose material, (c) edge of the mine slanting trees and (d) showing large crack due to mining activities.

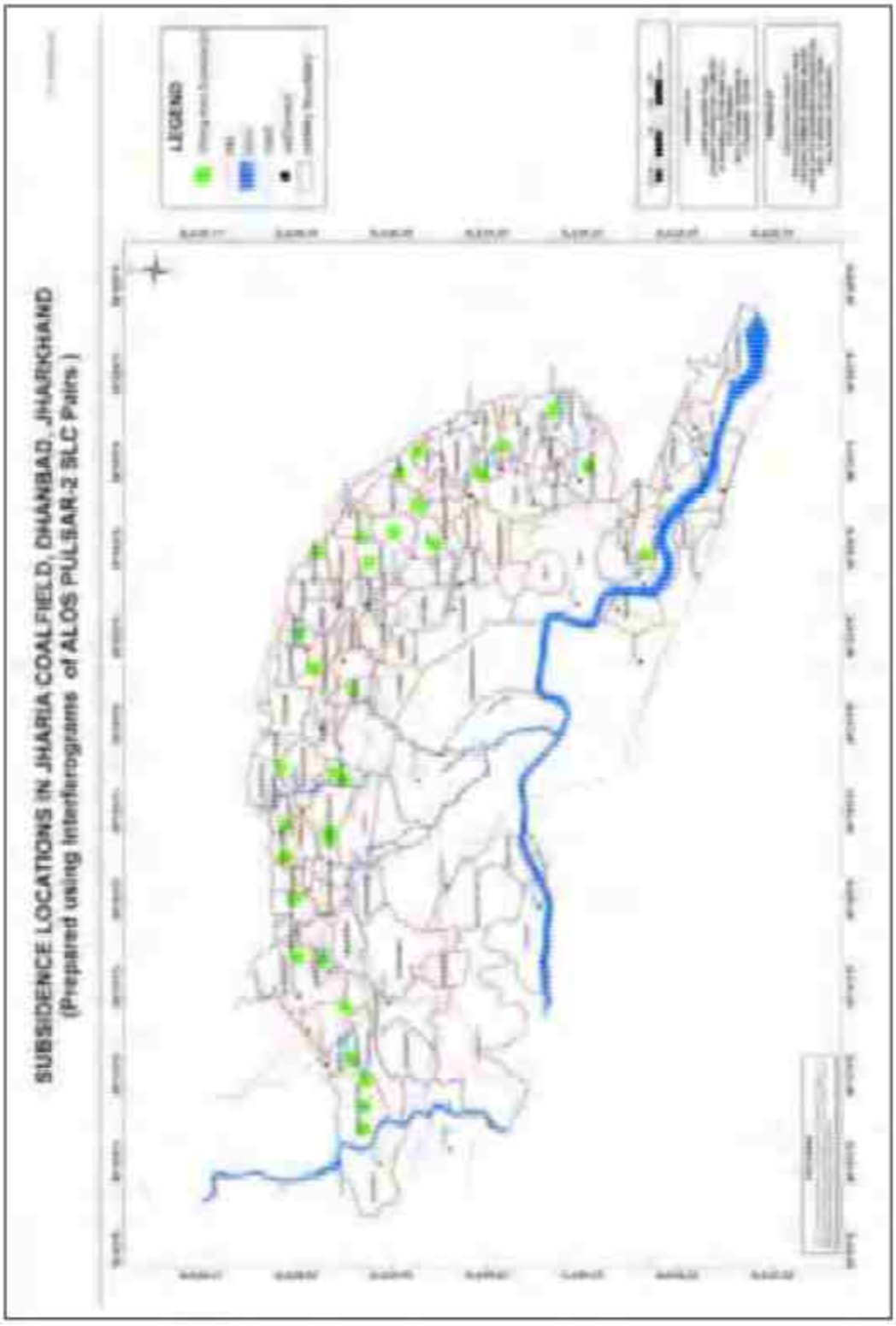


Figure 19. Subsidence map of the Jharia Coalfield (from ALOS PALSAR-2 data)

CHAPTER VII

DISCUSSION AND CONCLUSIONS

7.1 Discussion

7.1.1 Coal fire analysis

The present status of the fire in the Jharia Coal Fields for the period of 2022 to 2024 shows an increase in fire area for 2022 in comparison to 2020 (although field verification was not carried out in 2022) and an increase for 2023 in comparison to 2022 in approximately 0.5 sq. km where the cardinal direction-wise fire zones distributions were analysed in section 6.1. The identification of two classes in mine fire areas and overburden dump fire areas allowed for a deeper look into the areas of increment and decrement, which were analysed for the years 2023 and 2024, as shown in Figures 14 and 16. There is a decrease in total fire area of approximately 1.0 sq. km for 2023 and 2024 and a decrease in fire area in the two subclasses as well.

The identification of anomalous pixels from the Landsat images has changed from the previous analysis, where the coarse resolution of 100m x 100m of TIRS bands was solely used by converting it into radiant temperature through Planck's radiation function to using the fire color composite of medium resolutions of 30m x 30m bands of SWIR and NIR bands to identify the bright pixels indicative of fire along with the previous methodology. The change in the strategy has allowed for the identification of areas with fire patches covering smaller spatial extent while validating the identified areas through both methodologies for each other. As the identifiable overall resolution decreased, the total identified areas of coal fires increased, contributing to the increase in overall fire from previous years.

All the fire areas identified were field verified, and the accuracy of identification through satellite imagery is still consistently very high, strengthening the outcomes of the methodology for the identification of fire areas. The Fluke Ti300 thermal sensor provides a temperature estimate of the identified fire zones and a causative relationship between the satellite-measured temperature and the actual surface temperature.

7.1.2 Subsidence analysis

An attempt to identify subsidence zones in the Jharia Coalfield was also carried out using ALOS-PALSAR-2 L-band microwave data using a differential interferometric technique. Seven scenes of PALSAR-2 data spanning 2021 to 2024 were used to identify the subsidence in the region and separately identify them from the terrain changes due to mining. Verifying the subsidence zones as seen from data is difficult as it requires visible signatures of subsidence in the form of cracks on the ground and damage to anthropogenic structures. In this study, data analysis and consequent field verification resulted in identifying a few subsidence areas within the BCCL mine boundary. The two main areas of subsidence lie in the old Overburden dump area of Nudkhurkee OCP and the old Overburden dump area of Dhansar, while the other subsidence point lies in the active mine areas or Overburden dump areas; no subsidence was identified in the human habitation zones. No quantitative estimates of the subsidence have been carried out in the study.

7.2 Conclusions

The change in the areal extent of fire as identified by the Landsat images and block-wise distribution calculated for 2023 and 2024 and compared with old data of 2020 and non-verified maps of 2022, where an increase in the fire area for 2023 was majorly contributed by the north-eastern and easter sides and decrease for 2024 was due to eastern side while the central area of focus being the northern side due to substantial increase in the fire area from 2023 to 2024. The persistent coal fire zones from 2022 to 2024 in the North-eastern sides were also identified and verified during the field.

The accuracy of the generated maps, as verified from the field, was very high, and the causative relationship between the temperature measurement from the handheld thermal sensor and the identified higher fire pixel anomalies was satisfactory, with a higher degree of anomalies relating to the higher measured temperatures on the surface. The results section also discussed the temperature range for Overburden dump areas and active mine fire areas.

No subsidence was observed in the human habitation zones, and the main areas of subsidence do not seem to have consequences of the near settlements, while

the active mining area subsidence and new Overburden dump subsidence can be of concern for the mining area personnel due to constant failure of the loose material

Note: *The minimum mapable unit from satellite image it 30m by 30m or 0.0009 km^2. Estimations of fire extent (in terms of sq.km.) for the present study carried out for 2023-2024. They may differ from the actual ground area under fire. These estimations are made for comparative purpose only, to indicate the increase or decrease of areal extent of fire. Hence, they should not be quoted as fire area on the ground.*

CHAPTER VIII

LIMITATIONS

Delineation and mapping of coal fire from thermal data of remote sensing platforms carries with it some inherent limitations which needs to be understood in order to decipher the results obtained from it. This will assist is deducing the correct information and remove any ambiguity associated with the results. The key limitations of the data and the results obtained are as follows:

1) An anomalous pixel from LANDSAT data represents an area of 30m x 30m for the fire area composite and 100m x 100m for TIRS bands based radiant temperature (resampled to 30m x 30m spatial resolution) on the ground whose temperature is considerably higher than its surroundings. This can be attributed to two circumstances, namely the area has a very high intensity fire located within a smaller pocket or there are a number of low intensity fires spread across it. In both the mentioned cases the actual areal extent of the fire on the surface differs, but appears as a single anomalous pixel in the data. Hence, representation of fire affected ground area by means of pixel area is ambiguous and hence should be considered with caution.

2) There are locations as observed during the fieldwork, where coal seams are affected by active fires along vertical/semi-vertical sections of open cast mines. In such cases, the actual areal expression of the fire affected area as seen by the sensor changes considerably and the representation from the same is not accurate.

3) As discussed in section 4.1.2, thresholding the data to separate the fires from the non fire areas, is a statistical technique. However, this method is dependent on how the temperature of non-fire background area is distinctive from the fire temperature.

4) The background temperatures vary with the time of the day when the data are collected, topography, and season of the year when the data is acquired. Night-time data has lower background temperature as compared to day-time. Similarly a data collected in October-November will have a considerably lower background temperature than that collected in May-June due to seasonal temperature variations. Hence, identification of the background temperature range becomes essential in

estimation of threshold temperature and the same varies depending upon the discussed controlling factors.

6) Due to the mitigation measures taking place in various mines, it is seen that in a number of places the fire affected seam is excavated and dumped as overburden. However, these overburden dumps retains the excavated burning coals and thus are seen to have active fires occasionally. There lies a possibility that the same will be identified as anomalous pixels and hence, although the fire is not a part of any active coal seam, it will be included as a fire affected area in the final map.

7) Considering the precision of DInSAR data for different wavelengths, topographic and atmospheric errors, slow subsidence rates may not be detected. Further, the displacement measured is along the line of sight of the sensor and not vertical displacement.

8) Temporal decorrelation and noise due to adverse land use and land cover may affect DInSAR based detection and monitoring of land subsidence. Changes vegetation pattern over time can cause significant decorrelation between the master and slave image, thus producing a very low coherent output. Under such conditions, subsidence information may not be retrieved

9) Verification of the subsidence zones as detected from the interferometric technique is sometimes difficult due to lack in observable signatures of subsidence such as cracks on the ground and damage to anthropogenic structures.

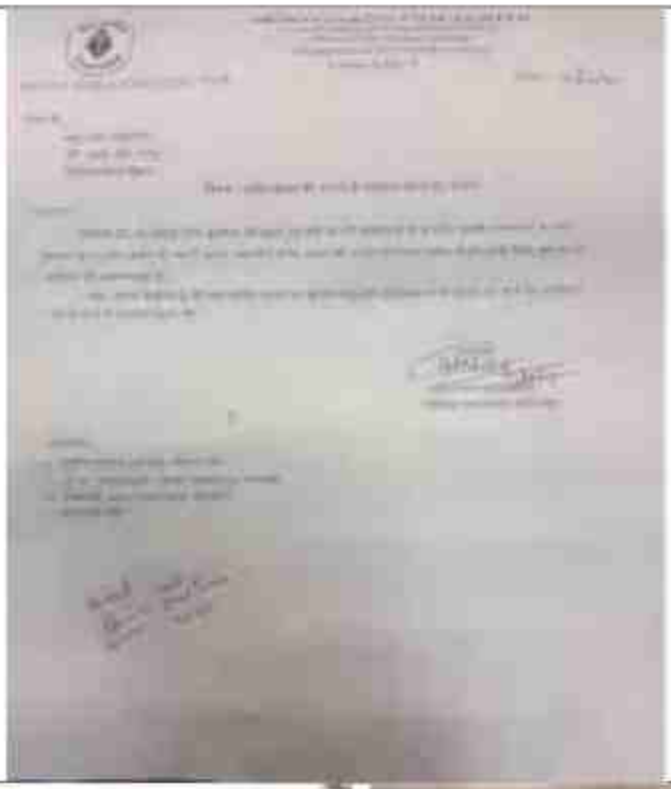
Therefore, in quantitative estimation of fire affected areas and areas denoted as subsidence, the above-mentioned limitations need to be taken into account diligently, as it is inevitable that the area estimate will not define the actual fire/subsidence affected area on the ground. However, the areal extent estimated from the data can be "like to like" compared to earlier estimates of similar studies to understand the change and dynamism of the fire in terms of area affected and spatial disposition.

References

1. Gangopadhyay, P.K., Lahiri-dutt, K., Saha, K. (2005): "Application of remote Sensing to identify coal fires in the Raniganj coal belt, India." *Int. Jour of Applied Earth Observation and Geoinformation.*
2. Gangopadhyay, P.K., Malthuis.B, Van Dink (2005): "Aster Derived emissivity and coal-fire related surface temperature anomaly a case study in Wuda, North China." *Int. Jour. of Remote Sensing*, vol-26, No.-24, pp-5555-5571.
3. Schmugge, T., French, Ritchie, J.C., Rango, A., Pelgrum, H. (2002): "Temperature and emissivity separation from multispectral thermal infrared observation," *Remote Sensing of Environment*, 79, pp-189-198.
4. Saraf A.K., Prakash A., Sengupta, S., Gupta, R.P (1995): "Landsat-TM data for estimating ground temperature and depth of sub-surface coal fire in the Jharia coalfiled, India," *Int. Jour. Remote sensing vol-16, no-12*, 2111-2124.
5. Gangopadhyay P.K., (2003): "Coalfire detection and monitoring in Wuda, North China, A multispectral and multi-sensor approach:-Ph.D. Thesis, ITC Netherland.
6. Gangopadhyay, P.K., Van der Meer, F., Van Dijk, P.M. and Saha, K., 2012. Use of satellite-derived emissivity to detect coalfire-related surface temperature anomalies in Jharia coalfield, India. International journal of remote sensing, 33(21), pp.6942-6955.
7. Gupta, R.P. (2003): "Remote Sensing Geology", *Springer-Verlag Third ed.*pp-183-216.
8. Kealey, P.S and Hook S.J(1993): "Separating temperature and emissivity in thermal infrared Multispectral Scanner Data: Implication for recovering land surface temperatures", *IEE Transaction on Geoscience and Remote Sensing,vol.31,no-6,*pp-1155-1164
9. Zhang, J., Wagner, W., Prakash, A., Mehl,H. and Voigt,S.(2004): "Detecting coal fires using remote sensing techniques," *Int. Jour. Remote sensing, vol-25, no-6,* pp 3193-3220.
10. Bhattacharya, A. and Reddy, C.S.S. (1995): Inventory and monitoring of underground and surface coal mine fire in Jharia coalfield, Bihar using thematic mapper thermal IR data: Geosciences Group, *Official report, NRSA.*
11. Coal mine fire delineation and surface features mapping using satellite data in Jharia coal field, Dhanbad, Jharkhand. Geology and Geophysics division. *Official report, NRSA, 2006*
12. Coal mine fire delineation and surface features mapping using satellite data in Jharia coal field, Dhanbad, Jharkhand. Geosciences Group. *Official report, NRSC, 2014*

13. Coal mine fire delineation and surface features mapping using satellite data in Jharia coal field, Dhanbad, Jharkhand. Geosciences Group. *Official report, NRSC, 2017.*
14. Delineation of Surface Coal Fire and Land Subsidence in the Jharia Coalfields, Dhanbad, Jharkhand from Remote Sensing Data, *Official Report, NRSC, 2020.*
15. Roy, P., Guha, A. and Kumar, K.V., 2015. An approach of surface coal fire detection from ASTER and Landsat-8 thermal data: Jharia coal field, India. International journal of applied earth observation and geoinformation, 39, pp.120-127.
16. UAV Thermal and Optical Data for Coal Mine Fire Mapping. Official Report, NRSC, 2024
17. Carnec C, Massonnet D, King C (1996) Two examples of the use of SAR interferometry on displacement fields of small spatial extent. Geophysical Research Letters 23:3579–3582, 10.1029/96gl03042.
18. Bürgmann R, Rosen PA, & Fielding EJ (2000). Synthetic aperture radar interferometry to measure Earth's surface topography and its deformation. Annual review of earth and planetary sciences, 28(1), 169-209

Annexure XIV











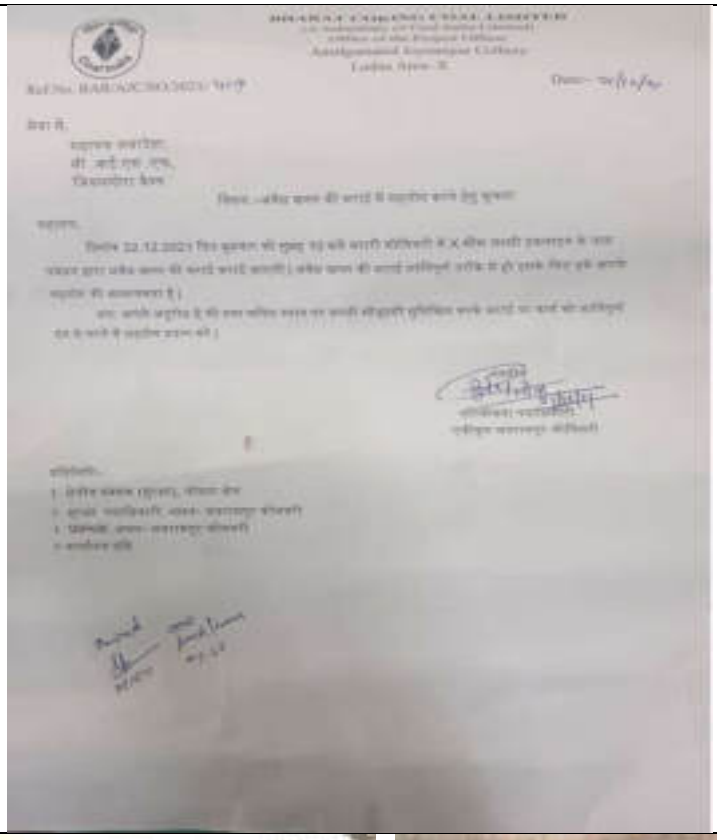








Water Pool Created on Gokul Park









Lodna, Near Raksha Kali Mandir









Water Pool Created on Gokul Park

Based on the figure 11 and 12, cardinal direction-wise fire zones distribution is as follows:

- For the coal fire map of 2023, the eastern side of the covering regions such as Jharia OCP, Kujama, Tisra (North and South), and Bhowrah (North and South) contains large patches of coal fire areas and regions with high increase in fire area in comparison to 2020 and 2022.
- The western side of Nudkhurkee OCP, Block-II OCP, and Benedih OCP, with fire patches covering both the active mine and Overburden dump areas, shows a shift from the northern region to the south region, which may be indicative of a shift in the mining zone. The fire patch area for the western side has remained approximately similar in comparison to 2022 but has primarily increased as compared to 2020.
- The North-Eastern side from Kusunda, Ena, covering Godhar, Alkusa till Basuria and Bansdeopur, etc., is the most significant contributor to the total coal fire area for the Jharia coal mines, with most portions seeing a significant increase in fire patches in comparison with 2022 and a very high increase in regions of Gopalichuck and Kusunda. The portion has remained the largest contributor for the years 2020 and 2022 as well.
- The Northern side from Loyabad to Katras, consisting of areas such as Sendra-Bansjora, Mudidh, Keshalipur, and Katras, sees scattered small to large fire patches of the coal fire area. The total coal fire area has slightly decreased, specifically for West Mudidh and Keshalipur, but the small patches have scattered even further in comparison to 2022.

Table 4: The tables show Year on Year mine wise comparison for total fire area for 2022-2024, where red indicates increase in fire area and green indicates decrease in fire area compared to previous year. Zero indicates no fire or fire is below the detection resolution of Landsat images.

S.I.	COLLIERY AREA NAME	FIRE AREA 2020 (SQ. KM.)	FIRE AREA 2022 (SQ. KM.)	FIRE AREA 2023 (SQ. KM.)	FIRE AREA 2024(SQ. KM.)
1	AKASH KINARI	**0.000**	**0.000**	**0.000**	**0.000**
2	ALKUSHA	**0.046**	**0.073**	**0.022**	**0.066**
3	AMLABAD	**0.000**	**0.000**	**0.003**	**0.000**

4	ANGARAPATRA	**0.036**	**0.083**	**0.000**	**0.116**
5	BAGDIGI	**0.000**	**0.000**	**0.000**	**0.000**
6	BANSDEOPUR	**0.000**	**0.052**	**0.123**	**0.044**
7	BARAREE	**0.040**	**0.000**	**0.000**	**0.000**
8	BASTACOLLA	**0.000**	**0.080**	**0.000**	**0.023**
9	BASURIA	**0.012**	**0.000**	**0.058**	**0.032**
10	BENEDIH OCP	**0.020**	**0.256**	**0.168**	**0.208**
11	BERA	**0.000**	**0.000**	**0.000**	**0.000**
12	BHAGABAND	**0.000**	**0.000**	**0.000**	**0.000**
13	BHATDIH	**0.000**	**0.000**	**0.000**	**0.000**
14	BHOWRAH. N	**0.006**	**0.203**	**0.275**	**0.196**
15	BHOWRAH. S	**0.023**	**0.027**	**0.156**	**0.013**
16	BHURUNGIA	**0.000**	**0.000**	**0.000**	**0.000**
17	BLOCK-II OCP	**0.034**	**0.065**	**0.285**	**0.086**
18	BULLIHARY	**0.000**	**0.003**	**0.000**	**0.000**
19	BURRAGARH	**0.000**	**0.000**	**0.000**	**0.000**
20	CHANDAN OCP	**0.000**	**0.000**	**0.000**	**0.000**
21	DAMODA	**0.000**	**0.000**	**0.000**	**0.000**
22	DHANSAR	**0.000**	**0.000**	**0.000**	**0.000**
23	DHARAMABAND	**0.000**	**0.000**	**0.000**	**0.000**
24	DOBARI	**0.000**	**0.000**	**0.000**	**0.000**
25	E. BASURIA	**0.000**	**0.000**	**0.000**	**0.000**
25	E. KATRAS	**0.000**	**0.000**	**0.000**	**0.000**
26	E.BHUGGATDIH	**0.020**	**0.054**	**0.053**	**0.024**
27	ENA	**0.004**	**0.115**	**0.335**	**0.203**
28	GASLITAND	**0.156**	**0.079**	**0.018**	**0.009**
29	GODHAR	**0.132**	**0.299**	**0.353**	**0.374**
30	GOLUCKDIH	**0.000**	**0.051**	**0.062**	**0.022**
31	GONDUDIH	**0.000**	**0.000**	**0.000**	**0.013**
32	GONHOODIH	**0.001**	**0.029**	**0.000**	**0.000**
33	GOPALICHUCK	**0.000**	**0.082**	**0.255**	**0.107**
34	GOVINDPUR	**0.000**	**0.000**	**0.000**	**0.000**
35	HURRILADIH&STD	**0.000**	**0.000**	**0.000**	**0.000**
36	IISCO	**0.000**	**0.000**	**0.000**	**0.000**
37	INDUSTRY	**0.000**	**0.000**	**0.000**	**0.000**
38	JEALGORA	**0.000**	**0.000**	**0.000**	**0.000**
39	JEENAGORA	**0.000**	**0.000**	**0.000**	**0.000**
40	JOGIDIH	**0.000**	**0.000**	**0.000**	**0.000**
41	JOYRAMPUR	**0.011**	**0.000**	**0.000**	**0.000**
42	KANKANEE	**0.057**	**0.084**	**0.140**	**0.090**
43	KATRAS-CHOITUDIH	**0.214**	**0.090**	**0.067**	**0.038**
44	KENDUADIH	**0.001**	**0.133**	**0.158**	**0.110**
45	KESHALPUR	**0.134**	**0.232**	**0.040**	**0.177**
46	KHARKHAREE	**0.000**	**0.000**	**0.000**	**0.000**
47	KHAS KUSUNDA	**0.000**	**0.000**	**0.000**	**0.000**
48	KORIDIH BLOCK-	**0.000**	**0.000**	**0.000**	**0.000**

	IV OCP				
49	KUJAMA	**0.000**	**0.026**	**0.123**	**0.029**
50	KUSTORE	**0.014**	**0.033**	**0.039**	**0.021**
51	KUSUNDA	**0.399**	**0.858**	**1.030**	**0.711**
52	KUYA	**0.000**	**0.000**	**0.000**	**0.000**
53	LODNA	**0.000**	**0.000**	**0.000**	**0.000**
54	LOHAPATTY	**0.000**	**0.000**	**0.000**	**0.000**
55	LOYABAD	**0.000**	**0.006**	**0.003**	**0.000**
56	MADHUBAND	**0.000**	**0.000**	**0.000**	**0.000**
57	MAHESHPUR	**0.000**	**0.000**	**0.000**	**0.000**
58	MOONIDIH PROJECT	**0.000**	**0.000**	**0.000**	**0.000**
59	MUDIDIH	**0.220**	**0.197**	**0.194**	**0.109**
60	MURAIDIH OCP	**0.006**	**0.000**	**0.000**	**0.009**
61	MURULIDIH	**0.000**	**0.000**	**0.000**	**0.000**
62	MURULIDIH 20/21 PIT	**0.000**	**0.000**	**0.000**	**0.000**
63	N. TISRA	**0.031**	**0.097**	**0.123**	**0.041**
64	NICHITPUR	**0.000**	**0.000**	**0.000**	**0.000**
65	NUDKHURKEE OCP	**0.000**	**0.400**	**0.039**	**0.154**
66	PATHERDIH	**0.000**	**0.000**	**0.000**	**0.000**
67	PHULARITAND	**0.000**	**0.000**	**0.000**	**0.000**
68	POOTKEE	**0.000**	**0.000**	**0.000**	**0.000**
69	RAMKANALI	**0.000**	**0.011**	**0.000**	**0.016**
70	S. JHARIA-R. OCP	**0.010**	**0.005**	**0.085**	**0.020**
71	S. TISRA	**0.021**	**0.210**	**0.367**	**0.157**
72	S.GOVINDPUR	**0.000**	**0.000**	**0.000**	**0.000**
73	SALANPUR	**0.000**	**0.000**	**0.000**	**0.000**
74	SENDRA-BANSJORA	**0.110**	**0.350**	**0.152**	**0.248**
75	SHATABDI OCP	**0.005**	**0.000**	**0.000**	**0.000**
76	SIMLABAHAL	**0.000**	**0.000**	**0.000**	**0.000**
77	SITANALA	**0.000**	**0.000**	**0.000**	**0.000**
78	SUDAMDIH	**0.000**	**0.000**	**0.000**	**0.000**
79	TASRA-IISCO	**0.000**	**0.000**	**0.000**	**0.000**
80	TETULMARI	**0.011**	**0.000**	**0.232**	**0.253**
81	TETURIA	**0.000**	**0.000**	**0.000**	**0.000**
82	TISCO	**0.000**	**0.000**	**0.000**	**0.004**
83	W. GODHAR	**0.000**	**0.000**	**0.000**	**0.002**
84	W. MUDIDIH	**0.085**	**0.265**	**0.050**	**0.192**
	Total	**1.85**	**4.54**	**5.00**	**3.91**

The classification of the coal fire area was based on field observation of whether the fire existed in the open cast mining areas/ old mining areas or the overburden dump of the active mine area. The larger patches of anomalies identified

by the Landsat images were meticulously separated from mine fires or Overburden dump fires after the field. The classified maps of 2023 and 2024 are shown in Figures 12 and 13. The spatial extent statistics and block-wise fire distribution for the separate classes of mine fire and Overburden dump fire for 2023 and 2024 are also shown in Tables 5 and 6, respectively. The bar graph-based statistical figure for block-wise increment and decrement of the fire area of the two classes is shown in Figures 14 and 15.

Table 5: Mine-wise area under coal fire classified in two classes of mine fire and Overburden dump fire for 2023 (grey cells in the table indicate the area has no fire or the fire is below detection resolution of satellite).

S.I.	Mine Area Name	Mine Fire (sq. km)	Overburden Fire (sq. km)
1	ALKUSHA	0.020	0.002
2	AMLABAD		0.003
3	BANSDEOPUR	0.123	
4	BASURIA	0.058	
5	BENEDIH	0.168	
6	BHOWRAH. N	0.161	0.115
7	BHOWRAH. S	0.023	0.133
8	BLOCK-II	0.242	0.043
9	E.BHUGGATDIH		0.053
10	ENA	0.307	0.028
11	GASLITAND		0.018
12	GODHAR	0.139	0.214
13	GOLUCKDIH		0.062
14	GOPALICHUCK	0.105	0.150
15	KANKANEE	0.089	0.051
16	KATRAS	0.056	0.012
17	KENDUADIH	0.096	0.062
18	KESHALPUR		0.040
19	KUJAMA	0.123	
20	KUSTORE		0.039
21	KUSUNDA	0.109	0.922
22	LOYABAD	0.002	0.000
23	MUDIDIH		0.194
24	N. TISRA	0.015	0.107
25	NUDKHURKEE	0.002	0.037
26	S. JHARIA		0.085
27	S. TISRA	0.367	
28	BANSJORA	0.152	
29	TETULMARI	0.013	0.219
30	W. MUDIDIH	0.036	0.014
	Total	**2.41**	**2.60**

Table 6: Mine-wise area under coal fire classified into two classes of mine fire and Overburden dump fire for 2024 (grey cells in the table indicate the area has no fire or the fire is below detection resolution of satellite).

S.I.	Mine Area Name	Mine Fire (sq. Km)	Overburden Fire (sq. Km)
1	ALKUSHA	0.060	0.006
2	ANGARAPATRA		0.116
3	BANSDEOPUR	0.021	0.023
4	BASTACOLLA		0.023
5	BASURIA		0.032
6	BENEDIH-OCP	0.203	0.005
7	BHOWRAH. N	0.127	0.069
8	BHOWRAH. S		0.013
9	BLOCK-II OCP	0.040	0.046
10	E.BHUGGATDIH		0.024
11	ENA	0.169	0.034
12	GASLITAND		0.009
13	GODHAR	0.185	0.189
14	GOLUCKDIH		0.022
15	GONDUDIH		0.013
16	GOPALICHUCK	0.058	0.049
17	JEENAGORA		0.001
18	KANKANEE	0.074	0.016
19	KATRAS-CHOITUDIH		0.038
20	KENDUADIH	0.105	0.005
21	KESHALPUR		0.177
22	KUJAMA	0.029	
23	KUSTORE		0.021
24	KUSUNDA	0.056	0.655
25	MUDIDIH		0.109
26	MURAIDIH OCP		0.009
27	N. TISRA	0.012	0.028
28	NUDKHURKEE OCP		0.154
29	RAMKANALI		0.016
30	S. JHARIA-R. OCP	0.006	0.014
31	S. TISRA	0.033	0.124
32	SENDRA-BANSJORA	0.157	0.091
33	TETULMARI	0.130	0.123
34	TISCO		0.004
35	W. GODHAR		0.002
36	W. MUDIDIH	0.066	0.127
	Total	**1.53**	**2.38**

Fire Dealing Photographs






GPS Map Camera
Tisra, Jharkhand, India
Pccm+grx, Tisra, Jharkhand 828131, India
Lat 23.723113° Long 86.436154°
Saturday, 15/11/2025 12:28 PM GMT +05:30
Google


GPS Map Camera
Tisra, Jharkhand, India
Pc9h+h75, Tisra, Jharkhand 828131, India
Lat 23.719132° Long 86.428487°
Saturday, 29/11/2025 10:45 AM GMT +05:30
Google


Tisra, Jharkhand, India
Pc9h+h75, Tisra, Jharkhand 828131, India
Lat 23.719004° Long 86.428646°
Saturday, 29/11/2025 10:45 AM GMT +05:30
Google



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.

GROUNDWATER LEVEL & QUALITY REPORT

FOR CLUSTERS OF MINES, BCCL

(Assessment year – 2025-26)

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

Geology Department

Regional Institute-II

CMPDI, Dhanbad

MARCH – 2026

Job no - 200425004

PERSONS ASSOCIATED

Poulomi Baksi
Manager (Geology)
Geology Department
CMPDI RI-II, Dhanbad

Jayjit Banerjee
Dy. Manager (Geology)
Geology Department
CMPDI RI-II, Dhanbad

Kumar Vaibhav
Manager (Environment)
Regional Institute - II
CMPDI, Dhanbad



CMPDIL
CENTRAL MINE PLANING & DESIGN INSTITUTE
HYDROGEOLOGY SECTION, EXPLORATION DEPARTMENT
GONDWANA PLACE, KANKE ROAD, RANCHI, JHARKHAND– 834031

(Accredited Groundwater Professional Institutions by CGWA)

(Accredited as a GWCO by QCI-NABET)

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

CONTENT

Sl. No	Contents	Page No
1	Annexure-I Details of The Report	1
2	Annexure-II Groundwater Level and Quality Report for Cluster of Mines of BCCL	2-130
3	**Chapter-1.0 Introduction**	2-7
4	1.1 Location details and brief about the report	2
5	1.2 Objective of the study	2
6	1.3 Scope of the report	2
7	1.4 Topography and Drainage	4
8	1.5 Details regarding Wetland	4
9	1.6 Climate & Rainfall	5-7
10	**Chapter-2.0 Geology & Hydrogeological Set-up of the Area**	7-10
11	2.1 Regional Geology of the Coalfield	7
12	2.2 Hydrogeological setup	8
13	2.3 Aquifers Description	8-9
14	2.4 General Aquifer Parameters	9-10
15	**Chapter-3.0 Ground Water Level data of the Cluster of Mines of BCCL**	11-43
16	3.1 Historical groundwater level	12
17	3.2 Groundwater level scenario (mining/non-mining)	13
18	3.3 Quarterly groundwater level, Cluster of mines during 2023-24	13
	A. Ground Water Levels of Cluster-I	14-15
	B. Ground Water Levels of Cluster-II	16-17
	C. Ground Water Levels of Cluster-III	18-19
	D. Ground Water Levels of Cluster-IV	20-21
	E. Ground Water Levels of Cluster-V	22-23
	F. Ground Water Levels of Cluster-VI	24-25
	G. Ground Water Levels of Cluster-VII	26-27
	H. Ground Water Levels of Cluster-VIII	28-29
	I. Ground Water Levels of Cluster-IX	30-31
	J. Ground Water Levels of Cluster-X	32-33
	K. Ground Water Levels of Cluster-XI	34-35
	L. Ground Water Levels of Cluster-XIII	36-37
	M. Ground Water Levels of Cluster-XIV	38-39

	N. Ground Water Levels of Cluster-XV	40-41
	O. Ground Water Levels of Cluster-XVI	42-43
	P. Ground Water Levels of Cluster-XVII	
19	**Chapter-4.0 Ground water level scenario**	44
20	**Chapter-5.0 Details of Piezometers**	45-46
21	**Chapter-6.0 Groundwater Quality**	46-48
22	**Chapter-7.0 Stage of Groundwater extraction**	49-50
23	**Chapter-8.0 Impact of Mining on Ground Water Regime**	51
24	8.1 General consequences of Coal Mines on ambient Hydrogeological Regime	51
25	8.2 Potential consequences of OC & UG coal mines on Hydrogeological Regime	51
26	8.3 Estimation of Radius of Mine Influence zone	52
27	**Chapter-9.0 Conservation measures & future strategy**	52-53
28	**Chapter-10.0 Existing / Proposed Rainwater harvesting structures in BCCL coal mines**	54-59
29	**Annexure-III List of RAMSAR Wetlands as given on official website of MoEF & CC**	60
30	**Annexure-IV Rainfall Data**	61-62
31	**Annexure-V Location of Hydrograph Stations (Dug Wells)**	63-64
32	**Annexure-VA Deatils of Hydrograph Stations (Dug Wells)**	65-68
	Annexure-VB Historical Water Level data of Hydrograph Stations	69-71
33	**Annexure-VI Ground Water Level Hydrographs**	72-88
	Annexure-VIA Piezometer Hydrographs	89-94
33	**Annexure-VII Ground Water Quality analysis data**	95-130
34	Abbreviations	131

LIST OF TABLES

Fig No	Contents	Page No
1	Regional Geological Succession of JCF	8
2	Generalized Hydrogeological Units developed in the study Area	9
3	Aquifer parameters considered for the study Area	10
4	Historical Groundwater Level	12
5	Depth to water table	13

6	Average hydraulic gradient	13
7	GW level data Cluster wise	44
8	GW level data in Piezometers	45-46
9A, B	Block / Cluster wise GW Development scenario	49-50

LIST OF PLATES

Sl No	Plate No	Contents	Scale
1	I	Location Map of Groundwater Level Monitoring stations	1:205000
2	II	Location Map of Groundwater Quality Monitoring stations	1:205000
3	III	Location Map of Proposed Piezometers	1:205000
4	IVA	Water table Contour Map of JCF, Pre Monsoon (May'23)	1:205000
	IVB	Water table Contour Map of JCF, Post Monsoon (Nov'23)	1:205000
5	VA	Depth to Groundwater Level map of JCF, Pre Monsoon (May'23)	1:205000
	VB	Depth to Groundwater Level map of JCF, Post Monsoon (Nov'23)	1:205000
6	VI	Drainage Map (Part of Raniganj Coalfield under BCCL Command Area)	1:180,000

LIST OF FIGURES

Table No	Contents	Page No
1 & 2	Historical Rainfall trend at Jharkhand	6-7
3 to 15	Existing / Proposed Rainwater Harvesting Structure	54-59

Annexure – I

DETAILS OF THE REPORT

Sl No.	ITEMS	INFORMATIONS
1	Geographical Area	Jharia Coalfield (JCF): 453.0 sq. km. Raniganj Coalfield (BCCL area): 19.64 sq. km.
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 part
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: 1185.40 mm (year 2024) 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 50 m upto 650 m
7	Hydrogeological properties (Aquifer Pump Test)	Unconfined Aquifer: Hydraulic Conductivity – 0.50 - 0.90 m/day Transmissivity – 10 - 42 m^2/day
		Semi-confined to confined Aquifer: Hydraulic Conductivity – 0.0006-1.44 (0.05 avg.) m/day Transmissivity – 0.06 – 15.0 m^2/day
8	Groundwater Level Monitoring Network	Out of total 139 nos. of monitoring stations 73 nos. located within core mining area and rest comes within Buffers zone. 55 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 18 Nos. of Groundwater monitoring well (Dug Wells) in RCF (CV Area).
9	Groundwater Levels Below Ground Level (bgl)	JCF area: Pre-monsoon – 1.30 to 10.74 m (Avg. 6.07 m bgl) in '2025-26 Post-monsoon – 0.75 to 9.30 m (Avg. 3.56 m bgl) in '2025-26 RCF area (part): Pre-monsoon – 1.60 to 9.30 m (Avg. 4.55 m bgl) in '2025-26 Post-monsoon – 0.95 to 4.25 m (Avg. 2.10 m bgl) in '2025-26
10	Groundwater Quality	Potable as per BIS (**Annexure- VIII**)
11	Piezometers	Piezometers (23 nos.) to monitor impact of coal mining on groundwater regime within the coalfield area (JCF & part of RCF)
12	Stage of Groundwater Development (CGWB)	Dhanbad District-Safe to Over-exploited category (GWRE:2023-24)

GROUNDWATER LEVEL & QUALITY REPORT FOR CLUSTER OF MINES OF BCCL

1.0 INTRODUCTION

1.1 LOCATION DETAILS AND BRIEF ABOUT THE PROJECT

The 16 nos. Cluster of mines (Cluster-I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XIII, XIV, XV XVI and XVII) of BCCL is located in the Jharia coalfield in Bokaro and Dhanbad districts of Jharkhand and part of Raniganj coalfield in Dhanbad district of Jharkhand.

The area of Jharia Coalfield (JCF) is 453 sq. km. and Raniganj Coalfield (RCF part) is 19.64 sq. km. (CV area). 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 conduct hydrogeological study by quarterly monitoring of groundwater level and quality of the Jharia coalfield and Raniganj coalfield (part) within BCCL command area for 16 Cluster of mines. The data collected shall be submitted to the MoEF&CC, CPCB & SPCB within stipulated timeframe. The work is being done yearly and required 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 been taken into account for hydro-geological investigation of the study area.

i) To monitor the groundwater levels four times/year during (May, August, Nov and Jan).
ii) To monitor the groundwater quality during April 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-/18/1086-1088/H) दिनांक : 14.06.2018

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 is covered with hills and thin forest. In general, the altitude of the study area varies from 220 m above mean sea level (AMSL) in Barora area (Cluster-I) to 160 m AMSL in Sudamdih area (Cluster-X). Pediplains have 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) area, 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 southeasterly 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-western part. Two reservoirs, Maithon dam on Barakar River and Panchet dam on 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 gets flooded by water, either permanently or seasonally. The primary factor that distinguishes **wetlands** from other landforms or water bodies is its characteristic vegetation (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 available 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 up to 45^{o} C and falls between 10^{o} C to 5^{o} 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 station is computed and then monthly district rainfall series is constructed by considering arithmetic average of all the station rainfall values within the district. The monthly rainfall series of the state is 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 is utilized for identification of the mean spatial patterns and rainfall intensity trends. From mean and standard deviation (SD), the coefficient of variation (CV) is calculated using following equation:

Coefficient of variation (CV) = [Standard Deviation / Mean] × 100

The analysis has been 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 be seen 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 received 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 and September along with southwest monsoon season and annual rainfall. The trend lines are 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. The monthly rainfall during June, July, August and September as well as seasonal rainfall show decreasing trend. During the last 30 years, highest rainfall of 390.3 mm was received in June in the year 1994, 492.1 mm was received in July in the year 2017, 431.5 mm was received in August in the year 1997, while highest rainfall of 395.2 in September was received in the year 1995. Highest annual rainfall of 1587.9 mm was received in the year 1999 and highest southwest monsoon rainfall of 1364.6 mm was received in the year 1994 (Climate Research and Services, IMD, Ministry of Earth Sciences, Pune, Jan'2020).

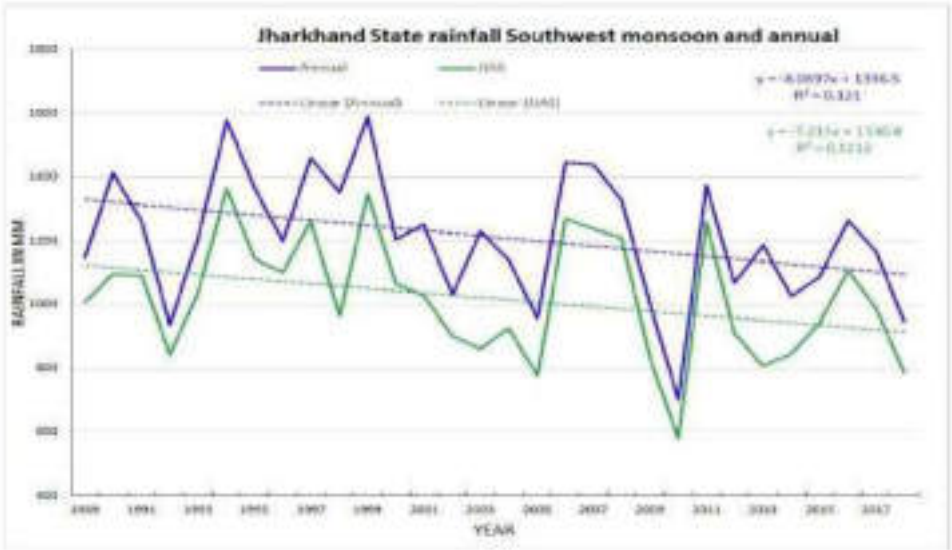


Fig-1.

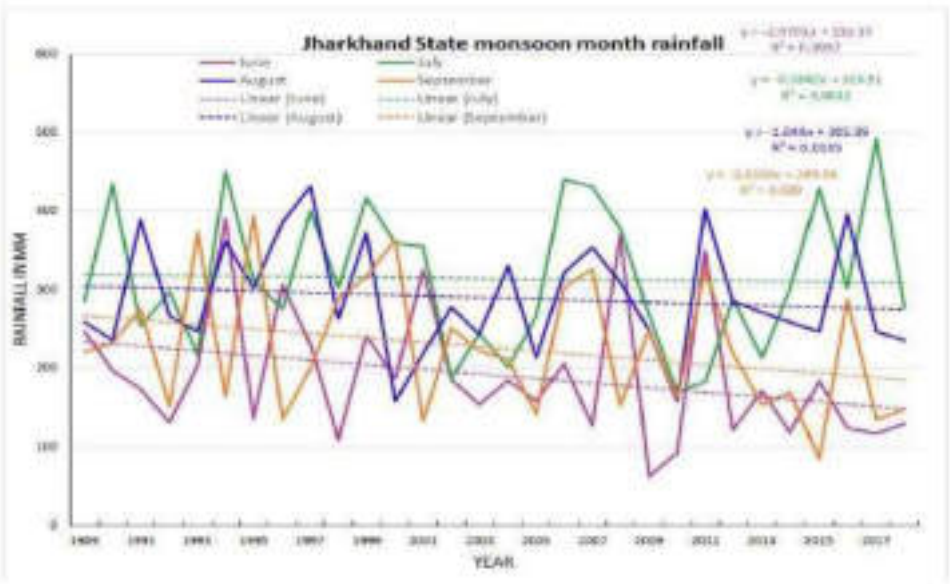


Fig-2.

2.0 GEOLOGY AND HYDROGEOLOGICAL SETUP OF THE AREA

2.1 REGIONAL GEOLOGY

The Jharia Coalfield covering an area of 453 sq. km. is located in Dhanbad District, Jharkhand. The non-coal bearing Talchir Formation is exposed in patches along the northern fringe of the Coalfield. The Barakar Formation (Coal Bearing horizon) overlies the Talchir and covers the most part of the Jharia Coalfield and have an area of 218 sq. km. This is successively overlain by the non-coal bearing Barren Measures Formation which is mainly exposed in the central part of the Coalfield. This, in turn, is 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 at 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 this, only 35 sq. km. comes under leasehold area of BCCL within 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

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, are mainly composed of sandstone, which 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 constitute of fine to coarse grain sandstone having primary porosity of inter-granular void space. The secondary porosity formed due to presence of faults, fracture, joints, etc. Sandstones of Gondwana formation in JCF and RCF are very hard, compact and cemented and form less potential aquifer, particularly in 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 been 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 is 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 more potential than semi-confined to confined aquifer.

SEMI-CONFINED TO CONFINED AQUIFER

The semi-confined to confined aquifer consisting of sandstone bed is sandwiched between coal seams/shale beds and thus, multiple aquifer system developed due to presence of multiple number 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 potentiality.

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	50 to 650 m	Multiple Sandstone horizons in Barakar formation	Multiple Barakar sandstone, Barren Measure, Raniganj sandstone, Talchir shale and Metamorphics

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 to 0.90 m/day as computed from pumping tests on the wells. The transmissivity of the unconfined aquifer ranges from 10.68 m^2 /day to 41.48 m^2 /day.

SEMI-CONFINED TO CONFINED AQUIFER

The sandstone partings in-between impervious layers of shale and coal seams is 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) and also various piezometers within Cluster of mines BCCL during 2022-23. 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 determined from piezometers constructed in BCCL

Sl no.	Piezometer No.	Aquifer / Formation	Depth of the well (Meters)	Aquifer thickness (Meters)	Static Water Level (Meters)	Discharge (LPS)	Test duration (Minutes)	**K** (m/day)	**T** (m^2/day)
1	PZ-1A	Phreatic Aquifer	40	15	12.15	4.70	275	9.71×10^{-1}	14.6
2	PZ-1B	Barakar Formation (JCF)	115	30	27	2.85	275	6.33×10^{-2}	1.9
3	PZ-2A		87	15	28.1	1.5	960	5.88×10^{-2}	0.88
4	PZ-3A		172	42	17.55	3.0	157	4.04×10^{-2}	1.70
5	PZ-4A		70	18	15.55	1.65	167	5.00×10^{-2}	0.89
6	PZ-8A		140	24	68.72	1.05	275	6.53×10^{-2}	1.57
7	PZ-9B		100	30	34.68	2.45	390	6.68×10^{-2}	2.00
8	PZ-10A		135	30	5	4.7	865	1.52×10^{-1}	4.55
9	PZ-11A	Barren Measure Formation (JCF)	300	66	60.60	3.05	300	3.9×10^{-2}	2.57
10	PZ-13A	Ranigunj Formation (JCF)	80	24	30.9	1.75	400	6.37×10^{-2}	1.53
11	PZ-14B		162	24	12.15	2.75	475	7.48×10^{-2}	1.80
12	PZ-16A	Barakar Formation (part of RCF)	90	18	31.5	2.0	385	5.59×10^{-2}	1.01

3.0 GROUND WATER LEVEL MONITORING

To collect the representative groundwater levels in the study area, CMPDI has established a monitoring network of total 139 monitoring stations out of which 73 located within core zone and rest falls in Buffer zone. Total 105 nos. dug well within JCF and 34 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 data collection in all monitoring stations has been done on quarterly basis (May'25, Aug'25, Nov'25 and Jan'26).

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 on 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 be 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 of CMPDI monitoring stations given from 2005 to 2024 (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
	2022	0.42	11.90	5.12	0.29	11.12	3.32	0.03	7.2	1.80
	2023	1.70	11.38	6.33	0.60	8.03	3.77	0.10	6.55	2.56
	2024	1.95	12.50	6.73	0.65	8.22	3.80	1.30	4.28	2.93
	2025	1.30	10.74	6.07	0.75	9.30	3.56	0.29	5.99	2.51
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
	2022	1.73	2.68	2.20	1.63	2.2	1.91	0.10	0.48	0.29
	2023	2.10	9.50	5.22	1.50	5.18	3.06	0.60	4.32	2.16
	2024	2.14	10.26	5.17	1.14	7.34	3.10	1.00	2.92	2.07
	2025	1.60	9.30	4.55	0.95	4.25	2.10	0.25	5.85	2.45

I. GROUND WATER LEVEL OF CLUSTER-IX

Mines of cluster-IX are under administrative control of Lodna Area of B.C.C.L in western part of Jharia Coalfield which 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). 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. All above the mines are contiguous in nature and the environmental impact is overlapping in ambient environment due to cumulative effect of mining activities. The life of the project has been worked out to be up to 30 years considering annual production target 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 their tributaries are controlling the drainage pattern of the area. The area comes under the watershed of Chatkari Jore.

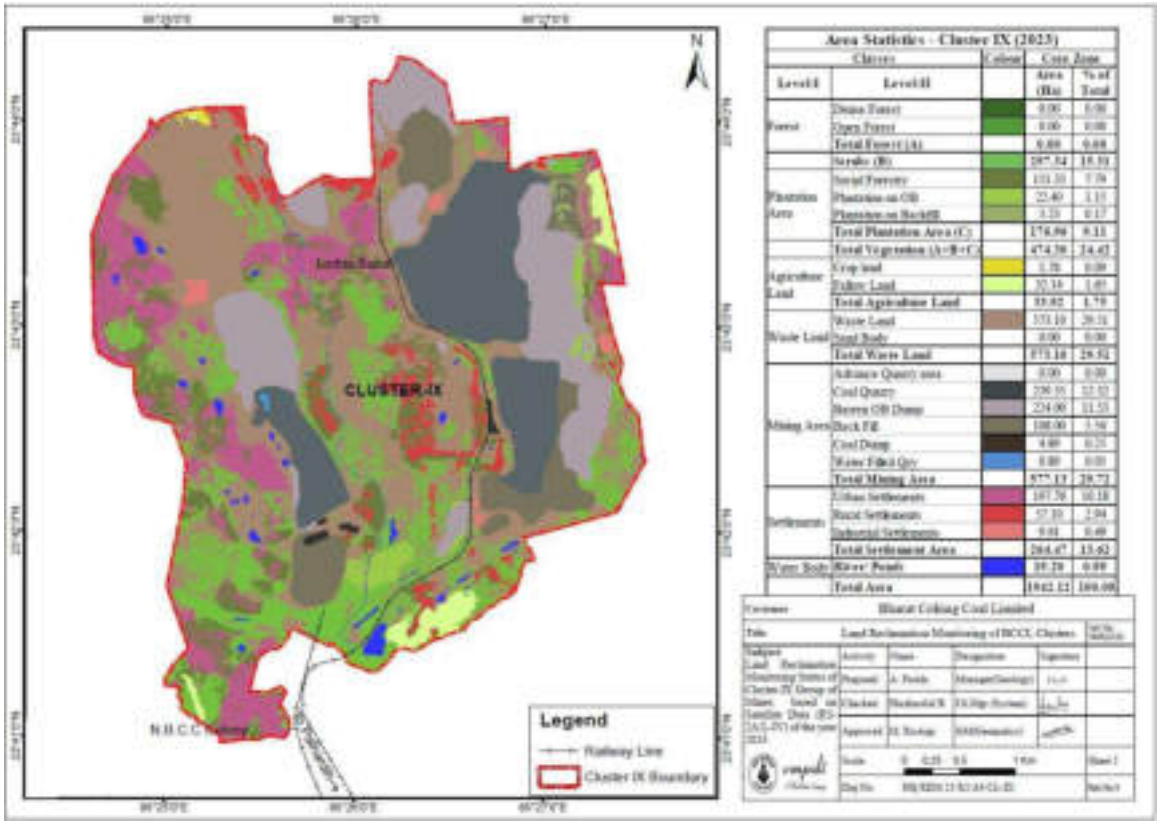
Monitoring stations (**D005, D007, D039 and D074**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has been done in the months of May'25, August'25, and Nov'25 and January'26. The Ground water level data is presented in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2025-26				2024-25				2023-24			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	D005	Jiyalgora	8.70	4.53	6.02	7.35	8.20	4.08	5.90	6.54	8.40	3.36	7.01	8.95
2	D007	Golden Pahari	9.82	2.70	3.52	5.67	9.03	1.88	3.64	5.18	9.03	2.17	5.67	6.57
3	D039	Tilaboni	3.20	2.51	2.77	2.87	8.52	2.52	3.28	5.75	7.50	1.85	3.05	1.75
4	D074	BhulanBararee	4.74	2.65	3.73	3.89	4.57	3.10	3.54	4.09	6.17	3.20	5.77	7.90
Average WL (bgl)			6.62	3.10	4.01	4.95	7.58	2.90	4.09	5.39	7.78	2.65	5.38	6.29

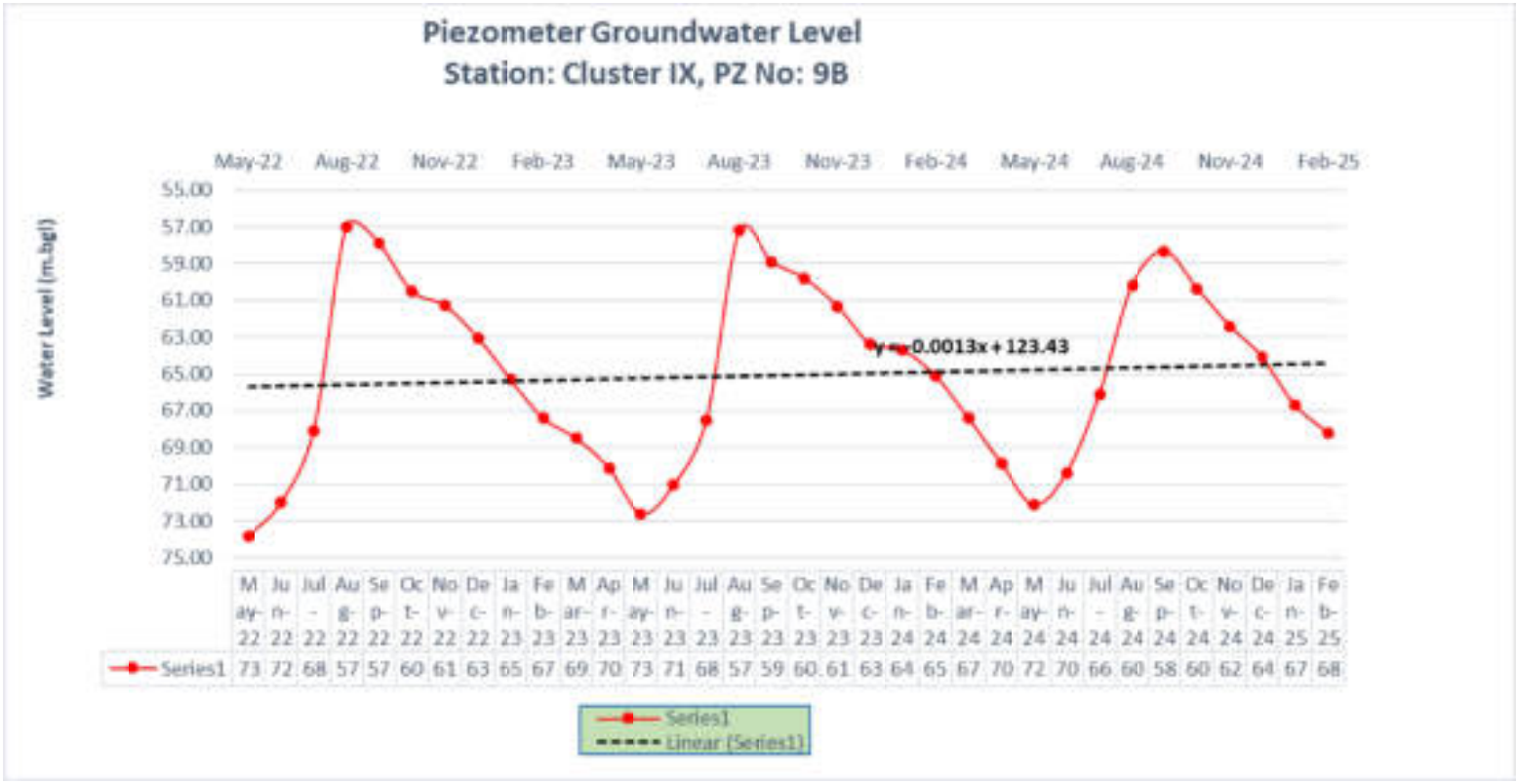
LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 3.20 m Max – 9.82 m
Post-monsoon GW Level (m): Min – 2.77 m Max – 7.01 m

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



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


Piezometer Groundwater Level
Station: Cluster IX, PZ No: 9B
Water Level (m.bgl)
May-22
Aug-22
Nov-22
Feb-23
May-23
Aug-23
Nov-23
Feb-24
May-24
Aug-24
Nov-24
Feb-25
55.00
57.00
59.00
61.00
63.00
65.00
67.00
69.00
71.00
73.00
75.00
y = 0.0013x + 123.43
May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23 Jun-23 Jul-23 Aug-23 Sep-23 Oct-23 Nov-23 Dec-23 Jan-24 Feb-24 Mar-24 Apr-24 May-24 Jun-24 Jul-24 Aug-24 Sep-24 Oct-24 Nov-24 Dec-24 Jan-25 Feb-25
Series1 73 72 68 57 57 60 61 63 65 67 69 70 73 71 68 57 59 60 61 63 64 65 67 70 72 70 66 60 58 60 62 64 67 68
Series1
Linear (Series1)

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SAMPLES

(Wherever not specified, characteristics are expressed in mg/l, maximum)

Ground Water Sampling at Monitoring Station Code : - D4 , JHARIA THANA

1.

Date of Sampling at Station: April 2025

Month & Year	**April 2025**	**Dug Well No.**	**D4**			**ULR No.**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**16.06.2025**
Project	**Jharia Coalfield**		**Sample Ref. No.**	**RI-II/HYDROGEOLOGY/24-25/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**	
Sampling Stations	**JHARIA THANA**	**Date of Sampling**		**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**			
			Period of Analysis			**TO**	

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**			**IS 10500: 2012**	
			GW19	**Range Of Testing**	**LDL**	**Acceptable Limit (Max)***	**Permissible Limit in the Absence of Alternate Source (Max)**
1	Colour, Hazen unit	APHA, 24th edition ,2120-c-Spectrophotometric Single Wavelength Method ,2023	2	1-500.0	1	5	15
2	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	110	2.0-800.0	2	75	200
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	88	2.0-1500.0	5	250	1000
4	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method	0.71	0.2-2.00	0.2	1	1.5
5	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	<0.2	0.2-10	0.2	1	No relaxation
6	Magnesium	APHA 24th edition, 3500-Mg B: Calculation Method	125	6.0-700	6	30	100
7	Nitrate , mg/l	APHA, 24th edition, UV-Spectrophotometric Method	22.24	0.5-45.0	0.5	45	No relaxation
8	Odour	APHA, 23rd Edition, , 2150-C	Agreeable	Qualitative	Qualitative	Agreeable	Agreeable
9	pH value	IS 3025, Part 11 : 1983 R 2023 Electrometric(pH Meter) Method	7.44	1-14	0.1	6.5-8.5	No relaxation
10	Sulphate, mg/l	APHA –24th edition, 4500 S , Turbidity Method	168	10.0-400.0	10	200	400
11	Taste	APHA,24th edition, 2160-C	Acceptable	Qualitative	Qualitative	Acceptable	Agreeable
12	Total Alkalinity ($c_ac_{O_3}$), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	296	4.0-2000.0	4	200	600
13	Total Dissolved Solids, mg/l	IS 3025, Part 16: 1984 R 2023 Gravimetric method	942	25.0-5000.0	25	500	2000
14	Total Hardness, mg/l	IS 3025, (Part 21): 2019 EDTA Method	790	4.0-2000.0	4	200	600
15	Turbidity, NTU	IS 3025, (Part 10):1984, R-2023 Nephelometric/Turbiditimetric Method	2.5	1-800	0.1	1	5
16	Zinc, mg/l	IS 3025(Part 49) : 1994,R:2019, AAS-Flame Method	<0.1	0.10 – 10.0	0.1	5	15

****All units in mg/L unless specified otherwise,*

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SAMPLES

(Wherever not specified, characteristics are expressed in mg/l, maximum)

Ground Water Sampling at Monitoring Station Code : - D41 , JOYRAMPUR

1.

Date of Sampling at Station: April 2025

Month & Year	**April 2025**	**Dug Well No.**	**D41**			**ULR No.**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**16.06.2025**
Project	**Jharia Coalfield**		**Sample Ref. No.**	**RI-II/HYDROGEOLOGY/24-25/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**	
Sampling Stations	**JOYRAMPUR**	**Date of Sampling**		**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**			
			Period of Analysis		**to**		

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**			**IS 10500: 2012**	
			GW26	**Range Of Testing**	**LDL**	**Acceptable Limit (Max)***	**Permissible Limit in the Absence of Alternate Source (Max)**
1	Colour, Hazen unit	APHA, 24th edition ,2120-c-Spectrophotometric Single Wavelength Method ,2023	1	1-500.0	1	5	15
2	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	164	2.0-800.0	2	75	200
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	132	2.0-1500.0	5	250	1000
4	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method	0.71	0.2-2.00	0.2	1	1.5
5	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	<0.2	0.2-10	0.2	1	No relaxation
6	Magnesium	APHA 24th edition, 3500-Mg B: Calculation Method	51	6.0-700	6	30	100
7	Nitrate , mg/l	APHA, 24th edition, UV-Spectrophotometric Method	8.49	0.5-45.0	0.5	45	No relaxation
8	Odour	APHA, 23rd Edition, , 2150-C	Agreeable	Qualitative	Qualitative	Agreeable	Agreeable
9	pH value	IS 3025, Part 11 : 1983 R 2023 Electrometric(pH Meter) Method	7.52	1-14	0.1	6.5-8.5	No relaxation
10	Sulphate, mg/l	APHA –24th edition, 4500 S , Turbidity Method	67	10.0-400.0	10	200	400
11	Taste	APHA,24th edition, 2160-C	Acceptable	Qualitative	Qualitative	Acceptable	Agreeable
12	Total Alkalinity (c_ac_o3), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	265	4.0-2000.0	4	200	600
13	Total Dissolved Solids, mg/l	IS 3025, Part 16: 1984 R 2023 Gravimetric method	838	25.0-5000.0	25	500	2000
14	Total Hardness, mg/l	IS 3025, (Part 21): 2019 EDTA Method	620	4.0-2000.0	4	200	600
15	Turbidity, NTU	IS 3025, (Part 10):1984, R-2023 Nephelometric/Turbiditimetric Method	2.3	1-800	0.1	1	5
16	Zinc, mg/l	IS 3025(Part 49) : 1994,R:2019, AAS-Flame Method	<0.1	0.10 – 10.0	0.1	5	15

****All units in mg/L unless specified otherwise,*

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SAMPLES

(Wherever not specified, characteristics are expressed in mg/l, maximum)

Ground Water Sampling at Monitoring Station Code : - D49 , TISRA THANA

Date of Sampling at Station: April 2025

Month & Year	**April 2025**	**Dug Well No.**	**D49**			**ULR No.**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**16.06.2025**
Project	**Jharia Coalfield**		**Sample Ref. No.**	**RI-II/HYDROGEOLOGY/24-25/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**	
Sampling Stations	**TISRA THANA**	**Date of Sampling**		**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**			
			Period of Analysis		**to**		

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**			**IS 10500: 2012**	
			GW27	**Range Of Testing**	**LDL**	**Acceptable Limit (Max)***	**Permissible Limit in the Absence of Alternate Source (Max)**
1	Colour, Hazen unit	APHA, 24th edition ,2120-c-Spectrophotometric Single Wavelength Method ,2023	2	1-500.0	1	5	15
2	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	118	2.0-800.0	2	75	200
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	98	2.0-1500.0	5	250	1000
4	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method	0.53	0.2-2.00	0.2	1	1.5
5	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	<0.2	0.2-10	0.2	1	No relaxation
6	Magnesium	APHA 24th edition, 3500-Mg B: Calculation Method	79	6.0-700	6	30	100
7	Nitrate , mg/l	APHA, 24th edition, UV-Spectrophotometric Method	17.58	0.5-45.0	0.5	45	No relaxation
8	Odour	APHA, 23rd Edition, , 2150-C	Agreeable	Qualitative	Qualitative	Agreeable	Agreeable
9	pH value	IS 3025, Part 11 : 1983 R 2023 Electrometric(pH Meter) Method	7.31	1-14	0.1	6.5-8.5	No relaxation
10	Sulphate, mg/l	APHA –24th edition, 4500 S , Turbidity Method	126	10.0-400.0	10	200	400
11	Taste	APHA,24th edition, 2160-C	Acceptable	Qualitative	Qualitative	Acceptable	Agreeable
12	Total Alkalinity ($c_ac_{o_3}$), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	229	4.0-2000.0	4	200	600
13	Total Dissolved Solids, mg/l	IS 3025, Part 16: 1984 R 2023 Gravimetric method	736	25.0-5000.0	25	500	2000
14	Total Hardness, mg/l	IS 3025, (Part 21): 2019 EDTA Method	620	4.0-2000.0	4	200	600
15	Turbidity, NTU	IS 3025, (Part 10):1984, R-2023 Nephelometric/Turbiditimetric Method	1.9	1-800	0.1	1	5
16	Zinc, mg/l	IS 3025(Part 49) : 1994,R:2019, AAS-Flame Method	<0.1	0.10 – 10.0	0.1	5	15

****All units in mg/L unless specified otherwise,*

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SAMPLES

(Wherever not specified, characteristics are expressed in mg/l, maximum)

Ground Water Sampling at Monitoring Station Code : - D5, JIYALGORA (NEAR P.O.)

Date of Sampling at Station: April 2025

Month & Year	**April 2025**	**Dug Well No.**	**D5**			**ULR No.**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**16.06.2025**
Project	**Jharia Coalfield**		**Sample Ref. No.**	**RI-II/HYDROGEOLOGY/24-25/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**	
Sampling Stations	**JIYALGORA (NEAR P.O)**	**Date of Sampling**		**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**			
			Period of Analysis			**TO**	

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**			**IS 10500: 2012**	
			GW 20	**Range Of Testing**	**LDL**	**Acceptable Limit (Max)***	**Permissible Limit in the Absence of Alternate Source (Max)**
1	Colour, Hazen unit	APHA, 24th edition ,2120-c-Spectrophotometric Single Wavelength Method ,2023	2	1-500.0	1	5	15
2	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	126	2.0-800.0	2	75	200
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	98	2.0-1500.0	5	250	1000
4	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method	0.63	0.2-2.00	0.2	1	1.5
5	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	<0.2	0.2-10	0.2	1	No relaxation
6	Magnesium	APHA 24th edition, 3500-Mg B: Calculation Method	66	6.0-700	6	30	100
7	Nitrate , mg/l	APHA, 24th edition, UV-Spectrophotometric Method	13.64	0.5-45.0	0.5	45	No relaxation
8	Odour	APHA, 23rd Edition, , 2150-C	Agreeable	Qualitative	Qualitative	Agreeable	Agreeable
9	pH value	IS 3025, Part 11 : 1983 R 2023 Electrometric(pH Meter) Method	7.52	1-14	0.1	6.5-8.5	No relaxation
10	Sulphate, mg/l	APHA –24th edition, 4500 S , Turbidity Method	135	10.0-400.0	10	200	400
11	Taste	APHA,24th edition, 2160-C	Acceptable	Qualitative	Qualitative	Acceptable	Agreeable
12	Total Alkalinity ($c_ac_{o_3}$), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	265	4.0-2000.0	4	200	600
13	Total Dissolved Solids, mg/l	IS 3025, Part 16: 1984 R 2023 Gravimetric method	738	25.0-5000.0	25	500	2000
14	Total Hardness, mg/l	IS 3025, (Part 21): 2019 EDTA Method	586	4.0-2000.0	4	200	600
15	Turbidity, NTU	IS 3025, (Part 10):1984, R-2023 Nephelometric/Turbiditimetric Method	2.9	1-800	0.1	1	5
16	Zinc, mg/l	IS 3025(Part 49) : 1994,R:2019, AAS-Flame Method	<0.1	0.10 – 10.0	0.1	5	15

****All units in mg/L unless specified otherwise,*

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

Annexure XVI

Six Monthly Compliance Report for Cluster IX group of Mines, BCCL for the period of Apr'25 to Sept'25

SHRIKANT KUMAR < amenv.lodna.bccl@coalindia.in >

Sun, 30 Nov 2025 4:58:59 PM +0530

To "ROR MoEFCC"<ro.ranchi-mef@gov.in>,"dhanbadjspcb"<dhanbadjspcb@gmail.com>,"CPCB Kolkata" <rdkolkata.cpcb@gov.in>

Cc "Anil Kumar Sinha"<gmlodna.bccl@coalindia.in>,"Avrendra Kumar"<gmenv.bccl@coalindia.in>,"envbccl2020" <envbccl2020@gmail.com>,"darpanparyavaran"<darpanparyavaran@gmail.com>,"Sanjeev Kashyap" <sanjeev.kashyap@coalindia.in>

Respected Sir,

Please find enclosed herewith a copy of the Six Monthly Environmental Clearance (EC) Compliance Report for Cluster IX group of mines, BCCL, for the period from April 2025 to September 2025, in accordance with the stipulated conditions of the Environmental Clearance.

File can also be accessed using following link: https://drive.google.com/file/d/1IwNlHhK8cFP8fDRsBUXoFaR6teRpRbAo/view?usp=sharing

Thanking you.

Yours faithfully,
Shrikant Kumar
Area Manager (Environment)
Cluster IX, Lodna Area
BCCL

1 Attachment(s)

EC_Compliance_Apr_25_Sept…
29.2 MB

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 – IX

(FOR THE MONTH MARCH, 2025)

E. C. no. J-11015/307/2010-IA.II (M) dated 01.03.2018



CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) **Mine Discharge of Jeenagora (MW9)**
ii) Mine Discharge of LODNA (MW18)
iii) **Mine Discharge of JOY RAMPUR (MW19)**
iv) **Mine Discharge of NT ST (MW20)**
v) **Mine Discharge of BARAREE (MW21)**
vi) **Mine Discharge of JEALGORA (MW22**

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
email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432125000001695F	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**				**Date of Issue**	30.04.2025
Project		**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**	**IS 3025 (Part-1) CMPDI/RI-II/LPM 13**	
Sampling Stations	**(i)**	**Jeenagora**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**			
			Date of Sampling	**01.03.25**	**25.03.25**	**PERIOD OF ANALYSIS 01.03.25 TO 30.03.2025**

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 M1434	**Second Fortnight** M1420		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	35	36	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.01	8.03	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	36	32	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

***All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.*

ANALYSED BY | (Kumar Vaibhav) ***REVIEWED BY*** | (Amit Raj Mishra) ***Authorised Signatory***

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 ----

Annexure XVII

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
email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**		TC1432125000001695F	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**30.04.2025**
Project	**LODNA**	**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**	**IS 3025 (Part-1) CMPDI/RI-II/LPM 13**		
Sampling Stations	**(i)**	**Mine Discharge of LODNA**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**			**Period of Analysis**	**01.03.25 TO 30.03.2025**
			Date of Sampling	**01.03.25**	**26.03.25**		

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 M1439	**Second Fortnight** M1427		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	58	56	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.44	7.51	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	44	40	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*
***All units in mg/L unless specified otherwise. **Grab sampling carried out for water samples.*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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
MINE EFFLUENT TEST REPORT

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

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**	**TC1432125000001695F**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**				**Date of Issue**	**30.04.2025**
Project	**JOYRAMPUR**	**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**	**IS 3025 (Part-1) CMPDI/RI-II/LPM 13**	
Sampling Stations	**(i)**	**Mine Discharge of JOYRAMPUR**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**		**Period of Analysis**	
			Date of Sampling	**01.03.25**	**25.03.25**	**01.03.25 TO 30.03.2025**

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 M1440	**Second Fortnight** M1423		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	51	56	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.69	7.71	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	44	36	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*
***All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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
MINE EFFLUENT TEST REPORT

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

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**		**TC1432125000001695F**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**30.04.2025**
Project	**NTST**	**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**	**IS 3025 (Part-1) CMPDI/RI-II/LPM 13**		
Sampling Stations	**(i)**	**Mine Discharge of NTST**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**			**Period of Analysis**	01.03.25 TO 30.03.2025
			Date of Sampling	01.03.25	25.03.25		

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 M1437	**Second Fortnight** M1418		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	39	41	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.88	7.86	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	32	36	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*
***All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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 ----

Annexure XVII

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
email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**		**TC1432125000001695F**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**30.04.2025**
Project	**BARAREE**	**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**		**IS 3025 (Part-1)**	**CMPDI/RI-II/LPM 13**
Sampling Stations	**(i)**	**Mine Discharge of BARAREE**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**			**Period of Analysis**	01.03.25 TO 30.03.2025
			Date of Sampling	01.03.25	25.03.25		

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 M1441	**Second Fortnight** M1419		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	42	46	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.83	7.79	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	40	44	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*
***All units in mg/L unless specified otherwise. **Grab sampling carried out for water samples.*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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 ----

Annexure XVII

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
email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	**03/2025**	**Cluster**	**Cluster IX**	**ULR No.**		**TC1432125000001695F**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**30.04.2025**
Project	**JEALGORA**	**Sampling Ref. No.**	**REM/BCCL/2025/03**	**Sampling Method**		**IS 3025 (Part-1)**	**CMPDI/RI-II/LPM 13**
Sampling Stations	**(i)**	**Mine Discharge of JEALGORA**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**			**Period of Analysis**	01.03.25 TO 30.03.2025
			Date of Sampling	01.03.25	25.03.25		

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 M1438	**Second Fortnight** M1424		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	47	46	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	8.01	8.04	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<4.0	<4.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	36	40	*250 (Max)*	4

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*
***Grab sampling carried out for water samples.*
***All units in mg/L unless specified otherwise.*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

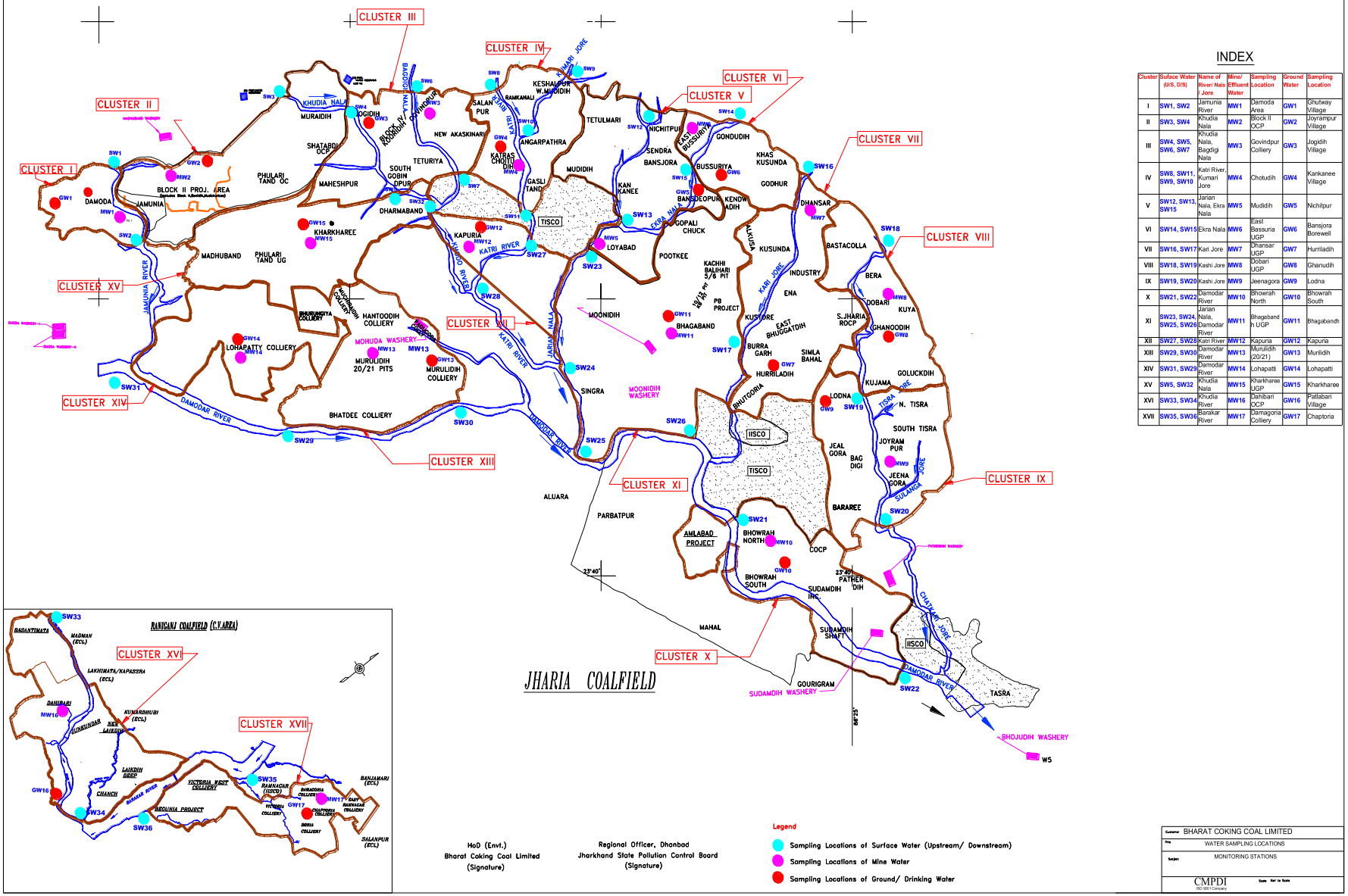
(Amit Raj Mishra)
Authorised Signatory

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 ----

Annexure XVII

Water Sampling Locations in BCCL



INDEX

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

Annexure XVII

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 – IX

(FOR THE MONTH FEBRUARY 2026)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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 – IX

(FOR THE MONTH JANUARY 2026)



CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

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 – IX

(FOR THE MONTH DECEMBER 2025)

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

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 – IX

(FOR THE MONTH NOVEMBER 2025)

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

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 – IX

(FOR THE MONTH OCTOBER 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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.

WATER QUALITY REPORT OF BHARAT COKING COAL LIMITED, CLUSTER – IX

(FOR THE MAR, 2025)

E. C. no. J-11015/307/2010-IA.II (M) dated 01.03.2018

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

Annexure XVIII

Letter and subsidence monitoring report



BHARAT COKING COAL LIMITED
(A subsidiary of CIL)
Regd. Office: Koyla Bhawan, Koyla Nagar, Dhanbad-826005
CIN No. U10101JH1972GOI000918
Office of the Project Officer
Amalgamated Jeypore Colony
Lodna Area

To whom it may concern

This is to certify that there is no mining induced subsidence movement occurred around the working area of Chasnalla UG Coal mining Project, Lodna Area, namely Amalgamated Jeypore Colony (OC) and NT-ST (Expansion) OCP after obtaining Environmental Clearance granted on 11.08.2015.

Project Officer
NT-ST (Expansion) OCP

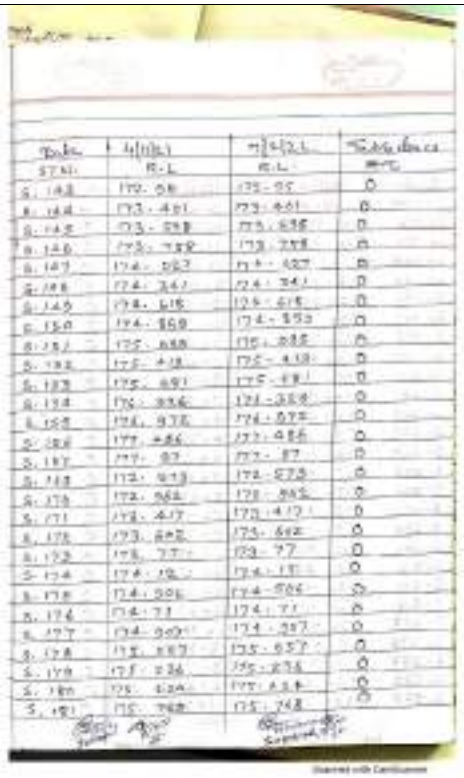
Manager/Project Officer
Amal. Jeypore Colony

Colliery surveyor
Amal. Jeypore Colony

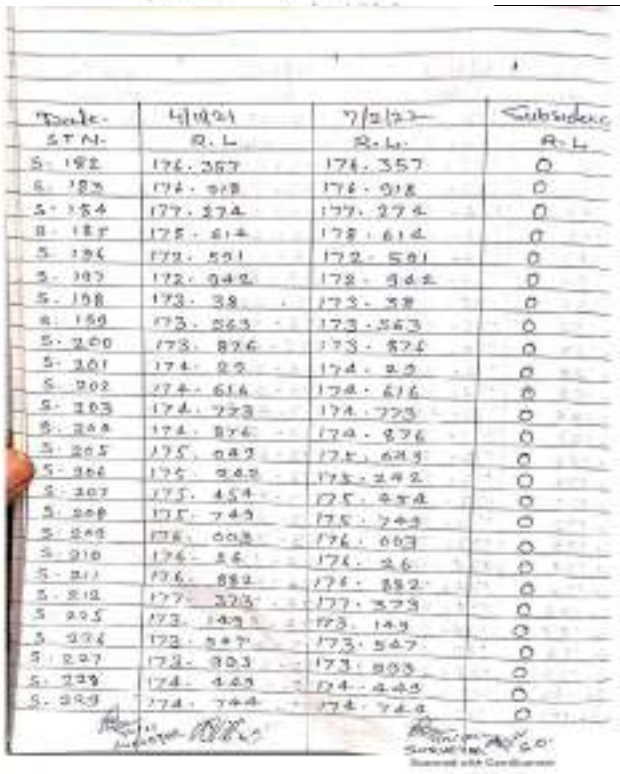


Subsidence Record
Location: Jeypore Block Area

STN.	R.L	R.L	Subsidence R.L
S-93	174.882	174.882	0
S-96	174.977	174.977	0
S-95	174.603	174.593	0
S-96	174.886	174.886	0
S-97	175.355	175.355	0
S-98	175.753	175.753	0
S-99	176.355	176.355	0
S-100	177.014	177.014	0
S-114	172.860	172.855	0
S-115	173.081	173.081	0
S-116	173.285	173.285	0
S-117	173.502	173.502	0
S-118	173.638	173.638	0
S-119	173.776	173.784	0
S-120	173.988	173.988	0
S-121	174.265	174.262	0
S-122	174.512	174.512	0
S-123	174.731	174.731	0
S-124	175.172	175.172	0
S-125	175.436	175.436	0
S-126	176.165	176.165	0
S-127	174.856	176.856	0
S-128	177.348	177.348	0
S-129	174.74	174.74	0
S-130	178.338	178.338	0
S-141	172.846	172.846	0
S-142	172.712	172.712	0



Date- STN-	4/10/21 R.L	7/2/22 R.L	Subsidence R.L
S-182	172.98	172.95	0
S-184	173.491	173.491	0
S-185	173.938	173.938	0
S-186	173.789	173.788	0
S-187	174.527	174.527	0
S-188	174.341	174.341	0
S-189	174.615	174.615	0
S-190	174.869	174.893	0
S-191	175.688	175.685	0
S-192	175.418	175.418	0
S-193	175.691	175.691	0
S-194	176.356	176.356	0
S-195	174.978	174.978	0
S-196	177.486	177.486	0
S-197	177.87	177.87	0
S-198	178.978	178.978	0
S-170	178.865	178.865	0
S-171	178.417	178.417	0
S-172	178.892	178.892	0
S-173	178.77	178.77	0
S-174	174.12	174.12	0
S-175	174.906	174.906	0
S-176	174.71	174.71	0
S-177	174.907	174.907	0
S-178	175.557	175.557	0
S-179	175.236	175.236	0
S-180	175.634	175.634	0
S-181	175.748	175.748	0



Date- STN-	4/10/21 R.L	7/2/22 R.L	Subsidence R.L
S-182	174.357	174.357	0
S-183	176.918	176.918	0
S-184	177.274	177.274	0
S-185	178.614	178.614	0
S-186	172.581	172.581	0
S-187	172.942	172.942	0
S-188	173.38	173.38	0
S-189	173.563	173.563	0
S-200	173.826	173.826	0
S-201	174.25	174.25	0
S-202	174.616	174.616	0
S-203	174.773	174.773	0
S-204	174.876	174.876	0
S-205	175.043	175.043	0
S-206	175.249	175.249	0
S-207	175.454	175.454	0
S-208	175.749	175.749	0
S-209	176.003	176.003	0
S-210	176.26	176.26	0
S-211	176.882	176.882	0
S-212	177.329	177.329	0
S-225	173.149	173.149	0
S-226	173.547	173.547	0
S-227	173.803	173.803	0
S-228	174.445	174.445	0
S-229	174.746	174.746	0

Annexure XIX

Certificate of high root density plant for controlling subsidence

This is to certify that BCCL has been doing plantation/ecological restoration under the guidelines of Forest Research Institute. The various species selected for the restoration are having a tap root system with branches which serve the purpose. These species have high root density and are already being planted at all the ecorestoration/plantation sites of BCCL. The various species having tap root system are given below.

S.No.	Species	Common name
1.	*Acacia nilotica*	Kikkar
2.	*Albizia odoratissima*	Kala siris
3.	*Bauhinia variegata*	Kachnar
4.	*Cassia fistula*	Amaltas
5.	*Ficus benghalensis*	Baniyan /bargad
6.	*Ficus racemosa*	Gular
7.	*Ficus religiosa*	Pipal
8.	*Cimelina arborea*	Ghamar
9.	*Lagerstroemea parviflora*	Jarul
10.	*Lannea coromandelica*	Zhingan
11.	*Madhuca latifolia*	Mahua
12.	*Mangifera indica*	Aam
13.	*Morus alba*	Shahtoot
14.	*Phyllanthus emblica*	Aonla
15.	*Pithecellobium dulce*	Jangal jalebi
16.	*Pongamia pinnata*	Karanj
17.	*Tamarindus indica*	Imli
18.	*Trema orientalis*	Tree
19.	*Terminalia arjuna*	Arjun
20.	*Terminalia bellerica*	Bahera
21.	*Dalbergia sissoo*	Shisham
22.	*Syzizion cuminii*	Jamun
23.	*Azadirachta indica*	Neem
24.	*Holoptelea integrifolia*	Indian elm
25.	*Butea monosperma*	Palash /dhak

Scientist / Scientist
वन पारिस्थितिकी एवं जलवायु परिवर्तन प्रभाग
Forest Ecology & Climate Change Division
वन अनुसंधान संस्थान, देहरादून - 248006
Forest Research Institute, Dehradun-248006

Scanned by CamScanner

भारत कोकिंग कोल लिमिटेड
'एक मिनी रत्न कंपनी'
(कोल इंडिया का एक अंग)
महाप्रबंधक का कार्यालय
लोदना क्षेत्र ,पो.-भागा
धनबाद -828301,(झारखंड)
वेबसाइट :www.bcclweb.in
ईमेल :gmlodna.bccl@coalindia.in
सी.आई.एन.:U10101JH1972GO1000918

बीसीसीएल

Bharat Coking Coal Limited
A Mini Ratan Company
(A Subsidiary of Coal India Limited)
Office of the General Manager
Lodna Area , PO-Bhaga
Dhanbad-828301 (Jharkhand).
Website: www.bcclweb.in
Email: gmlodna.bccl@coalindia.in
CIN:U10101JH1972GO1000918

OFFICE OF GENERAL MANAGER, LODNA AREA-X

Ref. No.- BCCL/LA/GM/Envt/2025-26/ 604 Date: 27/11/25

UNDERTAKING

This is to certify that no depillaring operation is being carried our below the township/ colony under Cluster IX.

27/11/25

General Manager
Lodna Area (Cluster IX)
BCCL

Annexure XXI

Transportation Plan for Conveyor

16

सेंट्रल माईन प्लानिंग एण्ड डिजाइन इंस्टीच्यूट लिमिटेड
(कोल इंडिया लिमिटेड की अनुषंगी कम्पनी / भारत सरकार की एक लोक उपक्रम)
रजिस्टर्ड कार्यालय : गोदावरी प्लेस, कांके रोड , राँची - 834031 (झारखंड) भारत
क्षेत्रीय संस्थान-2, पो.ऑ. सीसीएमएल टाउनशिप, कोयला नगर, धनबाद 826005 (झारखंड) भारत

cmpdi
A Mini Ratna Company

Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Registered Office : Gondwana Place, Kanke Road, Ranchi –834031(Jharkhand)
Regional Institute-II, P.O. BCCL Township, Koyla nagar, Dhanbad 826005(Jharkhand) India
Corporate Identity No. U14292JH1975GOI001223

पत्रांक: आर.आई.-2/पर्यावरण/एम-30/ 1150

दिनांक: 20.06.2015

सेवा में,
उप महाप्रबंधक (पर्यावरण)
बी. सी. सी. एल.
कोयला भवन
धनबाद ।

विषय: Study of installation of Rail-cum-Conveyor System in BCCL for transportation of coal.

महोदय,

This has reference to your letter no. BCCL/GM(Env.)/F-EC/13/622, dated 25.05.2013 for conducting the study and preparation of plan for installation of Rail-cum-Conveyor System for coal transportation in BCCL as a part of compliance of environmental clearance (EC) conditions stipulated by MoEF & CC in EC orders of different clusters. In this regard, we would like to inform you the following:

a. As per EC clearance order transportation plan for Rail-cum-Conveyor system should dovetailed with Jharia Action Plan (Master Plan). The system of transportation is required to be installed in 2nd phase of EC implementation i.e. after completion of Master Plan (10 years) and 5 years of gestation period.

b. JRDA has issued direction to RITES for traffic survey and data collection to initiate feasibility study regarding Diversion of Railway lines from fire affected and subsidence prone areas

c. Coal transportation route / conveyor installation layout will be finalized after liquidation of coal mine fire, rehabilitation of 595 unstable sites, road and rail route alignment and location of Rly. Sidings of BCCL.

CMPDI will be able to submit the plan / study for installation of Rail-cum-Conveyor System in BCCL for transportation of coal only after diversions and re-alignments of roads and railway lines and relocation of railway sidings

This is for your kind information.

भवदीय

(वि. कु. सिंह) 20/6/15
क्षेत्रीय निदेशक

Sri Awadhesh Ji
For compliance please.
29/6/15

फोन : (+91) 0326-2230650 फैक्स / Fax : (+91) 0326-2230508
वेब साइट / Website : www.cmpdi.co.in
ईमेल / Email : ri2@cmpdi.co.in



Impact Assessment of CSR projects undertaken by Bharat Coking Coal Limited, Dhanbad FY(2015-16)

By
National CSR Hub
Tata Institute of Social Sciences, Mumbai

RESEARCH TEAM AT NATIONAL CSR HUB

Project Director

Prof. B. Venkatesh Kumar

Senior Consultant

Ms. Dilnavaz Munshi

Project Co-ordinator

Ms. Dipty Nisha

Data collection, Analysis & Report Writing

Ms. Prachi Kathuria

Mr. Sumit Jagtap

Research Investigators

Mr. Monu Kumar

Mr. Ajay Kumar Singh

Mr. Dinesh Kumar

Mr. Suraj Kumar

Secretariat Support

Ms. Vaishali Gajbiye

Ms. Rajisha Ramankutty

Ms. Sushma Kir

ACKNOWLEDGEMENT

This Impact Assessment Study of CSR project of Bharat Coking Coal Limited, Dhanbad for the FY 2015-16 has been undertaken by National CSR Hub, Tata Institute of Social Sciences (TISS) as a part of the MoU with CIL and TISS.

At the outset, we would like to thank BCCL for granting this project to National CSR Hub, TISS. We express heartfelt gratitude to Director (Personnel), BCCL for giving us the opportunity to carry out the Impact Assessment study of CSR projects for the FY 2015-16. We express our gratitude to the General Manager, CSR and the entire CSR department of BCCL for their continuous support and guidance to the research team of NCSR Hub.

We also extend our gratefulness to respective area General Managers, Medical Officers (Health Department) and concerned project in-charge appointed by BCCL (CSR officials) for making all the arrangements for the study and making us comfortable with their warm hospitality.

Prof. B. Venkatesh Kumar
Director
National Corporate Social Responsibility Hub
TISS, Mumbai

EXECUTIVE SUMMARY

Bharat Coking Coal Limited is a subsidiary of Coal India Limited, a Maharatna Company. The company is currently operating in 12 administrative areas in Jharia Coalfields encompassing around 226 peripheral villages mainly in the District of Dhanbad, Jharkhand and in some part of West Bengal. The Strategic CSR of BCCL states that the company's main objective is to improve the quality of life of people living in and around its command areas. The key areas of CSR invention are rural development, livelihood generation and skill development. It has a long history of philanthropic activities which were converged to align with the Corporate Social Responsibility mandate of the Companies Act 2013. Rural development, livelihood generation and skill development are thrust areas of the BCCL's CSR interventions. As per the CSR guideline, BCCL has partnered with Tata Institute of Social Sciences to conduct evaluation studies for the completed CSR projects.

For the purpose of this report, impact assessment studies were carried out for four projects, namely, Scheme for Multi-Purpose Utilisation of Mine Water, Mobile Medical Van, Village Adoption and Construction of PCC/Bituminous Road.

The primary data collection for the impact assessment studies was completed in September 2017 by a six member team from TISS. Mixed research methodology was used while In-Depth Interviews, Household Surveys and focused group discussions were the main methods implemented to collect data. 1000 samples were collected from 13 operational areas of BCCL for the impact assessment study.

The objectives of the impact assessment were:

(i) To assess if the objectives of individual projects have been met;

(ii) To understand the continued relevance of the individual projects in their respective contexts; and

(iii) To identify issues in programmatic implementation and provide recommendation to fulfill the objectives efficiently.

Mobile Medical Van has aimed to provide quality health services to the rural poor residing in the operational areas of BCCL. The impact of the project on the community has been remarkable as it provides doorstep medical services to the poor, reduces the medical expenditures, reached the most remote villages and awareness generation. Limited health services, awareness campaigns and limited regularity are the major drawbacks of the project.

In the project Scheme for Multi-Purpose Utilisation of Mine Water, 352 samples were collected, 13 FGDs and 4 Key Informant Interviews (KII) were conducted. There is strong demand for the supply of mine water in the renovated ponds especially during water scarcity periods, which have been stopped for the last couple of months. The mine water is used for household and cattle consumption. Livelihood generation activities have not commenced as yet.

BCCL also adopted Lahbera village, situated in Jharia block of Dhanbad district and committed to the holistic development of the village. Various infrastructural and economic projects were implemented in the village. Although the project has been a huge success, a lapse in monitoring, incomplete projects and limited resources for employment generation have inhibited the successful completion of the project.

BCCL also constructed roads at 7 locations across Dhanbad districts. The roads had led to improved connectivity and enhanced hygienic living conditions, but lack of monitoring, limited connectivity and lack of participatory approach have been some of the shortcomings of the project.

TISS has also provided recommendation such as regular monitoring, creation of employment generation activities, the formation of SHGs etc. for efficient execution of future projects.

LIST OF ABBREVIATIONS

ADC	-	Adult Education Center
BCCL	-	Bharat Coking Coal Limited
CHC	-	Community Healthcare Center
CSR	-	Social Corporate Responsibility
CTP	-	Computer Training Program
FGD	-	Focused Group Discussion
GM	-	General Manager
HHI	-	Household Interviews
IDI	-	In – depth Interviews
IT	-	Information and Technology
KII	-	Key Informant Interviews
LVA	-	Lahbera – Village Adoption
MMV	-	Mobile Medical Van
MUMW	-	Scheme for multipurpose utilization of abandoned mine water
PCC	-	Plain Cement Concrete
PHC	-	Primary Health Care Center
SHG	-	Self Help Group
ST	-	Schedule Tribes
STC	-	Sewing Training Centre
STP	-	Sewing Training Program
EJ	–	Eastern Jharia
WJ	–	Western Jahria
WWD	_	Western Washery Division
CV	–	Chanch Victora

सेन्ट्रल माईन प्लानिंग एण्ड डिजाइन इन्स्टीच्यूट लिमिटेड
(कोल इण्डिया लिमिटेड की अनुषंगी कम्पनी / भारत सरकार का एक लोक उपक्रम)
गोन्डवाना प्लेस, कांके रोड, राँची - 834 031, झारखंड (भारत)
Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Gondwana Place, Kanke Road, Ranchi - 834 031, Jharkhand (INDIA)
CORPORATE IDENTITY NUMBER - U14292JH1975GOI001223

स्पीड पोस्ट द्वारा

संख्या: जियोम:आर.एस.सी.:24: 782

दिनांक 20.03.2023

सेवा में,
विभागाध्यक्ष (पर्यावरण)
भारत कोकिंग कोल लिमिटेड
कोयला भवन, कोयला नगर
धनबाद – 826 005
Tel:0326-2230028

विषय: Report on "Land Use / Vegetation cover mapping of Jharia Coalfield based on satellite data of the year 2022".

संदर्भ: Work order No.CIL/ENVT/2022-23/W.O./10899 dated 06.07.2022

महोदय,

In pursuance of the above work order, three copies of the report titled "Land Use / Vegetation cover mapping of Jharia Coalfield based on satellite data of the year 2022" are enclosed. The softcopy is sent via email.

Kindly acknowledge the receipt of the same and arrange to upload the report on website of BCCL.

भवदीय,

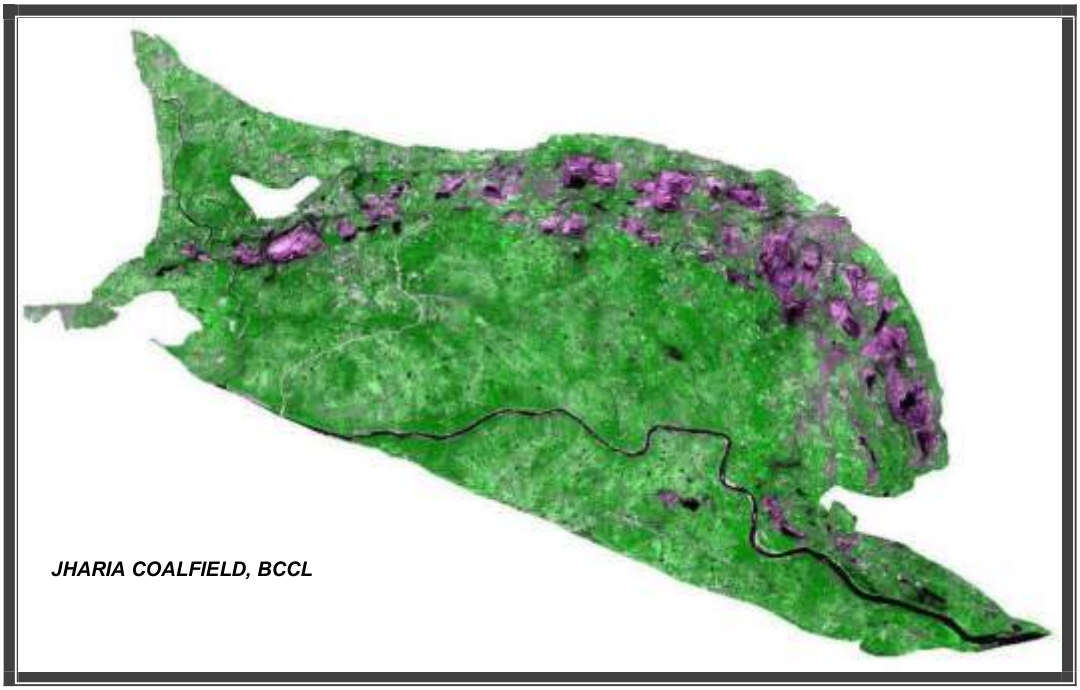
Encl.: As above.

20.3.23
महाप्रबंधक(Geomatics)

Copy by Speed Post to:
(1) The General Manager (ENV), CIL, Kolkata – *for kind information.*
(2) The Regional Director, Regional Institute-II, CMPDI, Koyla Nagar, Koyla Bhawan, Dhanbad – 826 005 – *along with a copy of the report.* ***Tel:0326-2230789***

फोन नम्बर/Phone No.
फैक्स नम्बर/Fax No.
ई-मेल/E-mail:
वेब साईट/Website

Report on
Land Use / Vegetation Cover Mapping of Jharia Coalfield based on Satellite Data of the Year 2022



Submitted to

Bharat Coking Coal Ltd (BCCL)

Dhanbad

March 2023

Report on
Land Use / Vegetation Cover Mapping of Jharia Coalfield based on Satellite Data of the Year- 2022

March 2023

Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi

Document Control Sheet

(1) Job No.	RSC/564922120
(2) Publication Date	March 2023
(3) Number of Pages	37
(4) Number of Figures	6
(5) Number of Tables	6
(6) Number of Plates	2
(7) Title of Report	Land use / Vegetation cover mapping of Jharia Coalfield based on satellite data for the year 2022.
(8) Aim of the Report	To prepare Land use and vegetation cover map of Jharia Coalfield on 1:50000 scale based on satellite data for monitoring the impact of coal mining on land use pattern and vegetation cover.
(9) Executing Unit	Remote Sensing Cell, Geomatics Division Central Mine Planning & Design Institute Limited, Gondwana Place, Kanke Road, Ranchi 834008
(10) User Agency	Coal India Ltd. (CIL) / Bharat Coking Coal Ltd. (BCCL)
(11) Authors	Smt. Ayesha Parida, Manager (Geology) Shri Rajneesh Kumar, General Manager (Geomatics)
(12) Security Restriction	Restricted Circulation
(13) No. of Copies	5
(14) Distribution Statement	Official

Chapter 4

Conclusion & Recommendations

4.1 Conclusion

In the present study, land use/vegetation cover map of Jharia coalfield is prepared based on Resourcesat–2A (IRS-R2A L4FX) Satellite data of February 2022 in order to monitor the changes in vegetation cover and land use pattern for effective natural resource management and its planning. The Land use/vegetation cover analysis will help to analyse and monitor the impact of mining and other industrial activities in the area.

Study reveals that with the updation of Jharia Coalfield Boundary, now it covers an area of about 440.25 km^2. Settlements coming under the coalfield boundary covers area of 43.43 km^2 which is 9.86% of the coalfield area. Vegetation cover constitutes 144.77 km^2 (32.89%), Mining activities is on 46.40 km^2 area which is 10.54% of the total Jharia Coalfield boundary area whereas agriculture and wasteland are on 112.02 km^2 (25.45%) and 81.76 km^2 (18.56%) respectively. Water bodies cover an area of 11.87 km^2 (2.70%) within Jharia Coalfield Boundary.

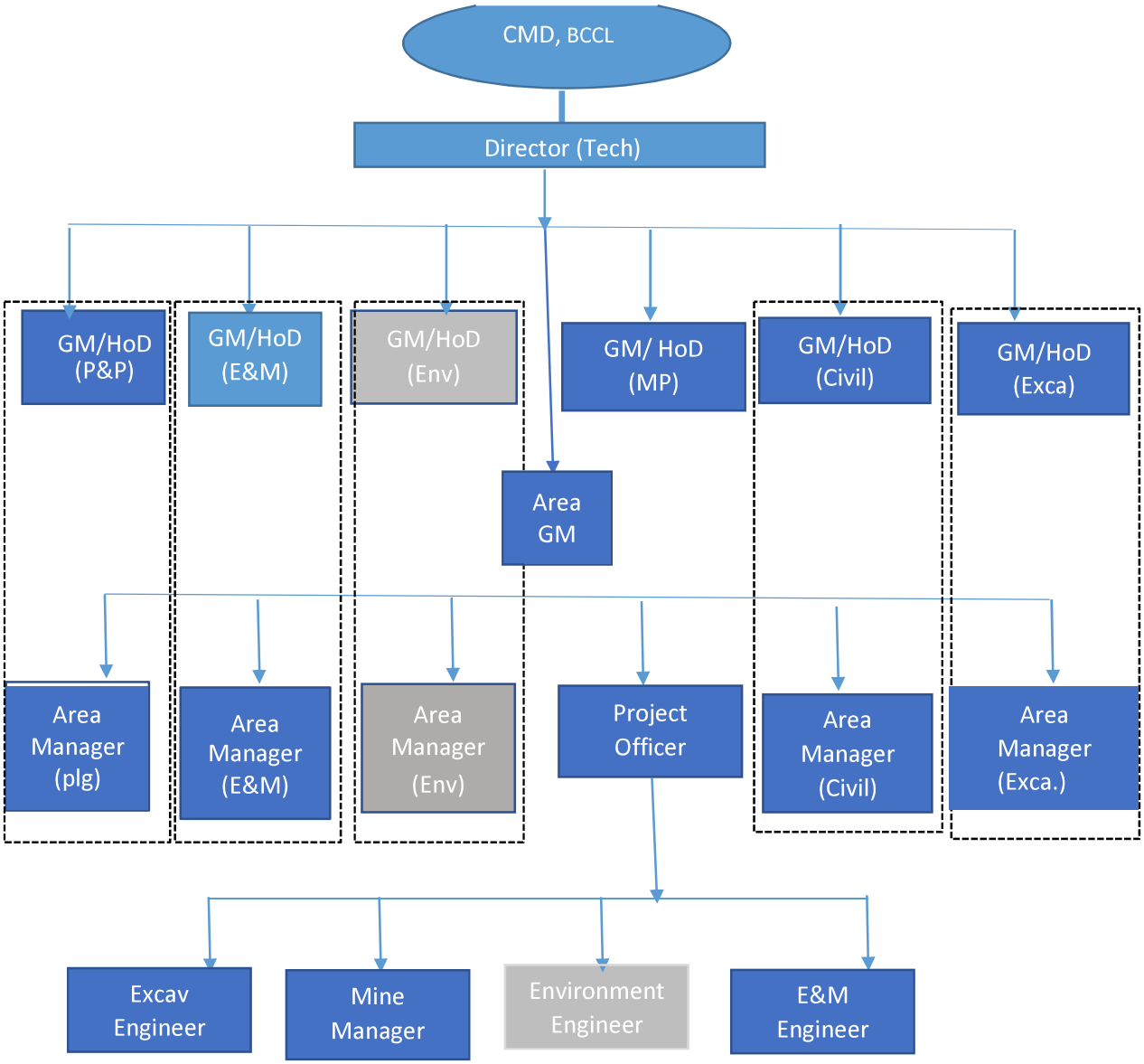
4.2 Recommendations

For eco-friendly sustainable coal mining in the Jharia Coalfield, it is recommended that;

a. Similar study should to be carried out regularly at interval of 3 years to monitor the change in land use/vegetation cover in the coalfield for assessing the impact of coal mining and to take the remedial measures required, if any.

b. Efforts for afforestation should be given thrust in the coalfield region especially on wasteland and mined out area to maintain the ecological balance in the region.

Annexure XXIV



Annexure XXV

ANNEXURE-A

Letter by Under Secretary Coal regarding quarterly basis monitoring of safety, Environment and Quality of coal in Board Meetings

No. 23/3/2015-NSO/BA
Government of India
Ministry of Coal
******

New Delhi, 26th April, 2017

To

CMDs of Coal India Limited/ NLC India Limited & all Subsidiaries.

Subject: Quarterly review in the Board Meetings – Safety, Environment & Quality.

Sir,

Ministry of Coal has identified four thrust areas – Safety, Environment, Quality & New Technologies. It is necessary that these areas are incorporated in the functioning of the coal companies and monitored at the Board level.

2. It has therefore been decided that agenda items on the performance of the concerned company on each of the three aspects, viz Safety, Environment and Quality of Coal shall be placed in the Board meeting, thoroughly discussed and monitored by the Board on quarterly basis along with quarterly accounts.

3. The agenda item on safety shall include the implementation and effectiveness of all safety related aspects / mechanism required as per law and directions of Ministry/ CIL. Similarly, the agenda item on environment shall consist of the compliance with regard to the conditions of environment clearance, forest clearance, water and air pollution norms, requirements of mining plan/ mining closure plan and reclamation of mined out areas as well as utilization of mined water. The quality aspect would include proper grading of coal & adherence to supply of declared grade of coal and elimination of grade slippage, etc.

4. Concerned Director (Technical) in the Company would be responsible to ensure the compliance to safety, environment and quality related aspects in the company. The Govt. nominee Director on the Board of the company is requested to see that the agenda items on these aspects are comprehensive and guide the discussion to ensure effective monitoring by the board.

You are requested to ensure compliance of these instructions.

Yours faithfully

(Sanjib Bhattacharya)
Under Secretary to the Government of India

Copy to all Govt nominee Directors of each company.

CS Scanned with CamScanner

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 – IX

(FOR THE MONTH FEBRUARY 2026)



CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00" N & 86^0 25' 48.00" E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65" N & 86^0 26' 42.10" E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00" N & 86°23' 54.00"E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18" N & 86^0 24' 6.21" E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**02/2026**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432126000002410F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**20.03.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.02.26	26.02.26	**Period of Analysis**	12.02.26 to 10.03.26	**Zone of Station:** **Core 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**
			A5319	A5397				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	141	136	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	76	72	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	22	18	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Page -1 of 1

Annexure XXVI

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	**02/2026**	**Cluster**		**ULR No.**	**TC1432126000002410F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**17.03.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	06.02.26	20.02.26	**Period of Analysis**	06.02.26 to 10.03.26	**Zone of Station:** **Bufer 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**
			A5288	A5366				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	95	97	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	43	47	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	20	33	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

Annexure XXVI

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: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**02/2026**	**Cluster**	**Cluster X**			**ULR No.**	**TC1432126000002410F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**20.03.2026**
Project	**Bhowrah North**		**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	10.02.26		24.02.26	**Period of Analysis**	10.02.26 to 10.03.26	**Zone of Station:**	**Bufer 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**
			A5305	A5383				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	132	136	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	69	71	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	26	15	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	02/2026	**Cluster**	Cluster IX	**ULR No.**	TC1432126000002410F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			**Date of Issue**	20.03.2026
Project	Hurriladih UGP	**Sample Ref. No.**	REM/BCCL/2026/02	**Sampling Method**	CMPDI/RI-II/LPM 11 , (IS 5182)
Date of Sampling	10.02.26	24.02.26	**Period of Analysis**	10.02.26 to 10.03.26	**Zone of Station:** Bufer 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
			A5306	A5384				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	126	118	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	65	67	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	13	12	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	27	32	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

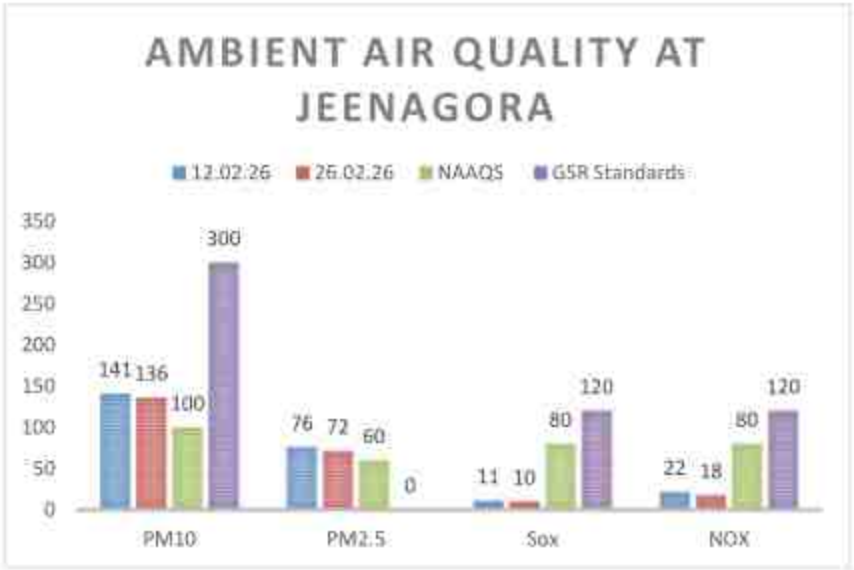
(Gaurav Kant)
REVIEWED BY

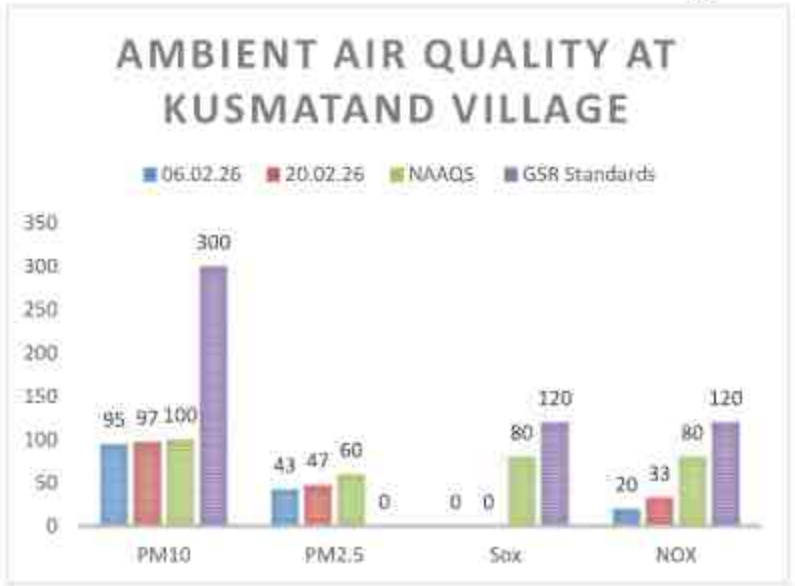
(Kumar Vaibhav)
Authorised Signatory

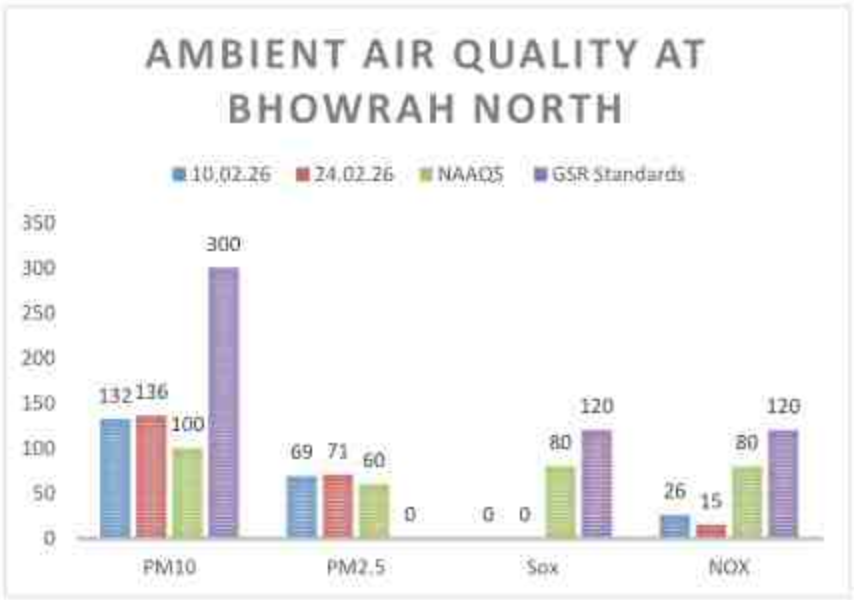
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

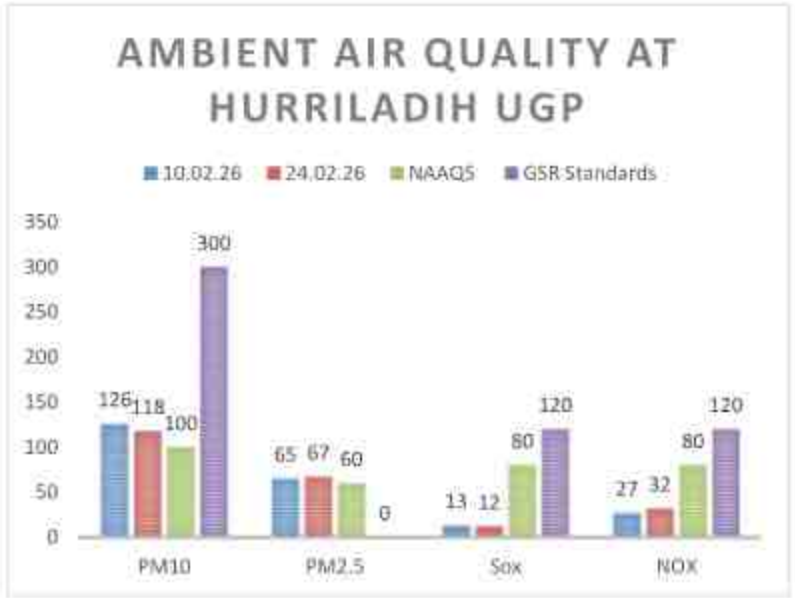
---- End of Report ----

Page -1 of 1

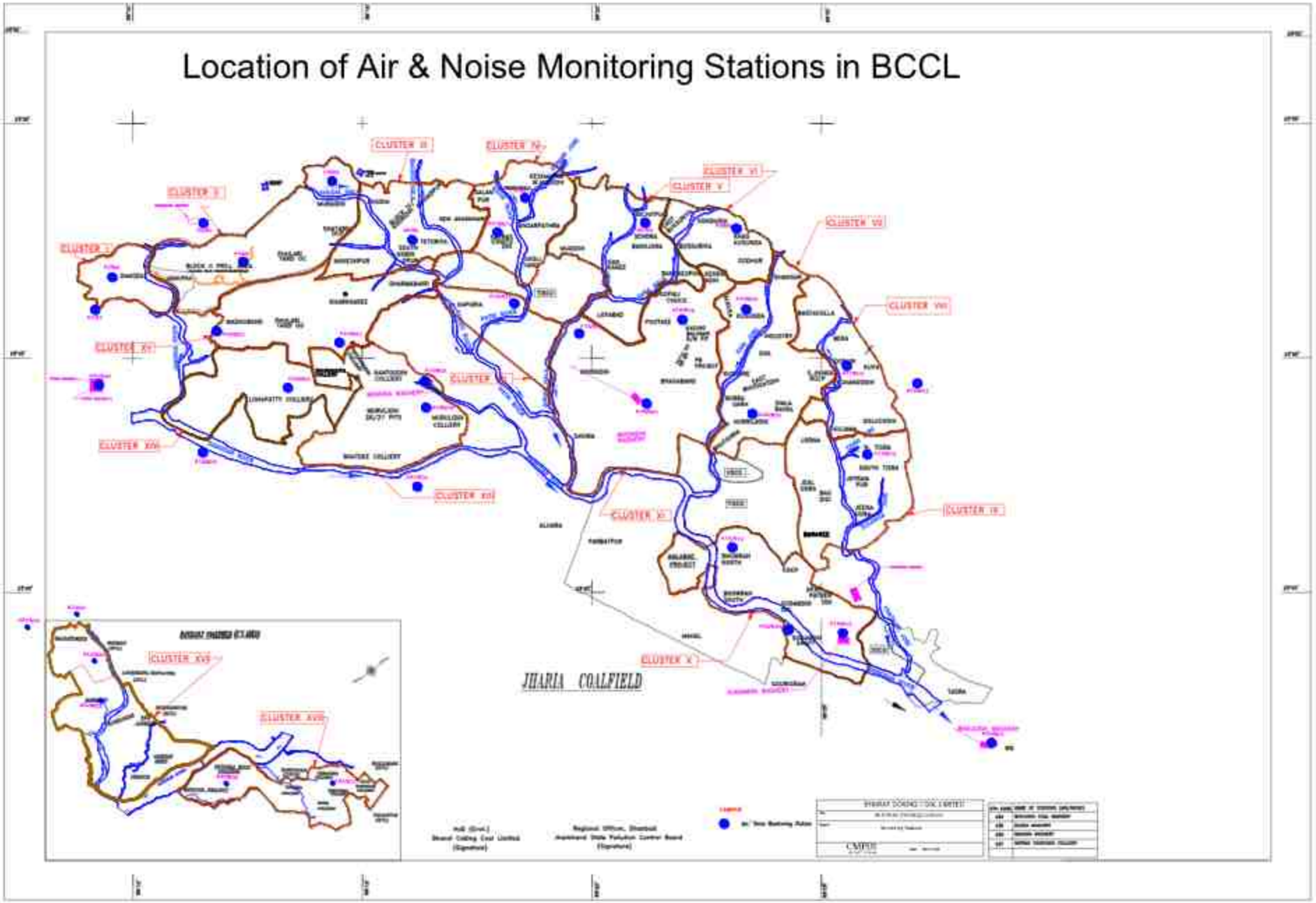








Annexure XXVI


Location of Air & Noise Monitoring Stations in BCCL
JHARIA COALFIELD

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 – IX

(FOR THE MONTH JANUARY 2026)



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00" N & 86^0 25' 48.00" E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65" N & 86^0 26' 42.10" E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00" N & 86°23' 54.00"E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18" N & 86^0 24' 6.21" E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**01/2026**	**Cluster**	**Cluster IX**	**ULR No.**	TC143212611800002358F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	13.01.26	28.01.26	**Period of Analysis**	13.01.2026 TO 25.02.2026	**Zone of Station:** **Core 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**
			A5157	A5235				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	145	129	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	75	68	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	21	35	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Page -1 of 1

Annexure XXVI

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	**01/2026**	**Cluster**		**ULR No.**	**TC143212611800002358F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.01.26	23.01.26	**Period of Analysis**	09.01.2026 TO 25.02.2026	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A5144	A5215	**Range Of ,Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	91	95	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	41	46	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	23	15	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL Indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**01/2026**	**Cluster**	**Cluster X**	**ULR No.**	**TC143212611800002358F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.01.26	27.01.26	**Period of Analysis**	12.01.2026 TO 25.02.2026	**Zone of Station:** **Bufer 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**
			A5151	A5229				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	125	128	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	66	67	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	23	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	01/2026	**Cluster**	Cluster IX	**ULR No.**	TC143212611800002358F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			**Date of Issue**	05.03.2026
Project	Hurriladih UGP	**Sample Ref. No.**	REM/BCCL/2026/01	**Sampling Method**	CMPDI/RI-II/LPM 11 , (IS 5182)
Date of Sampling	12.01.26	27.01.26	**Period of Analysis**	12.01.2026 TO 25.02.2026	**Zone of Station:** Bufer 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
			A5152	A5230				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	116	105	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	70	56	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	13	12	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	31	29	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

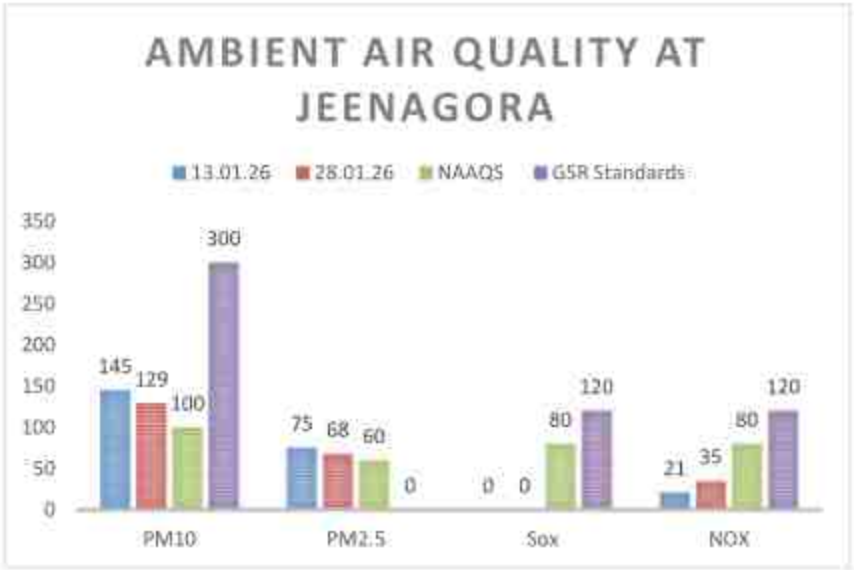
(Gaurav Kant)
REVIEWED BY

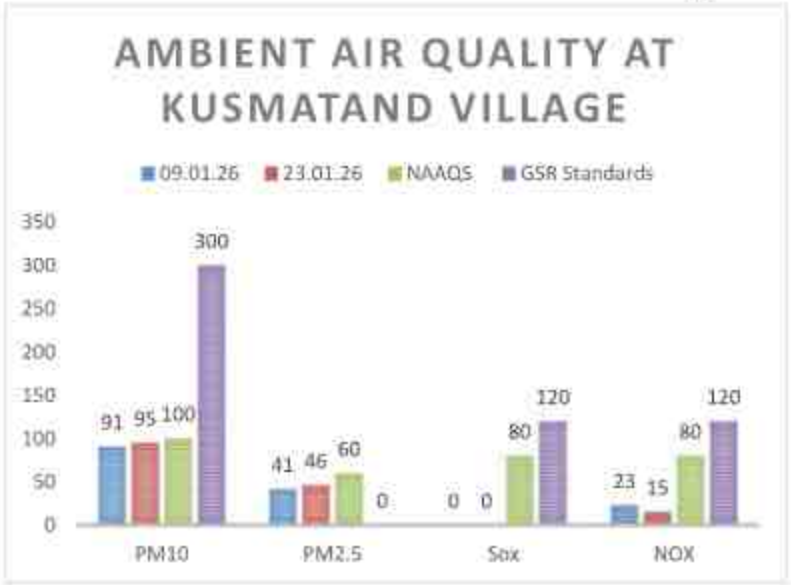
(Kumar Vaibhav)
Authorised Signatory

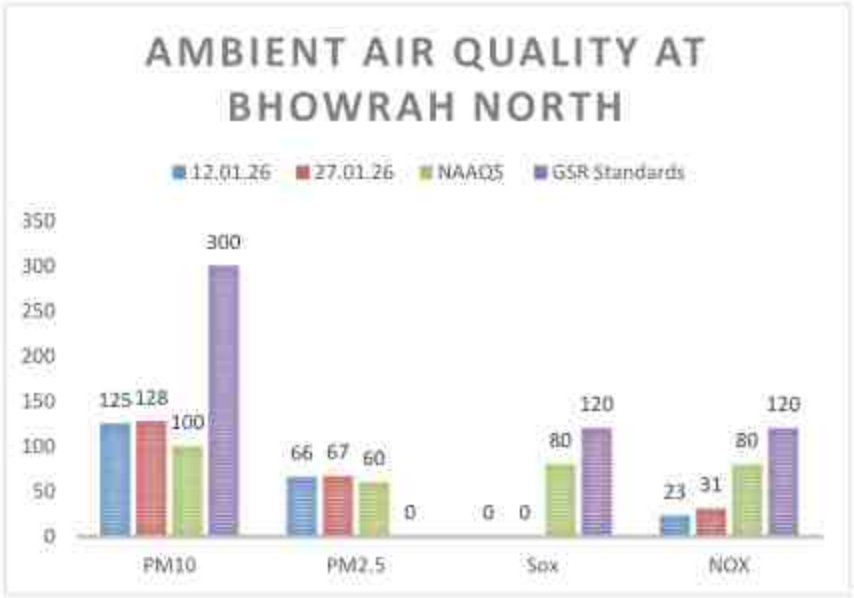
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

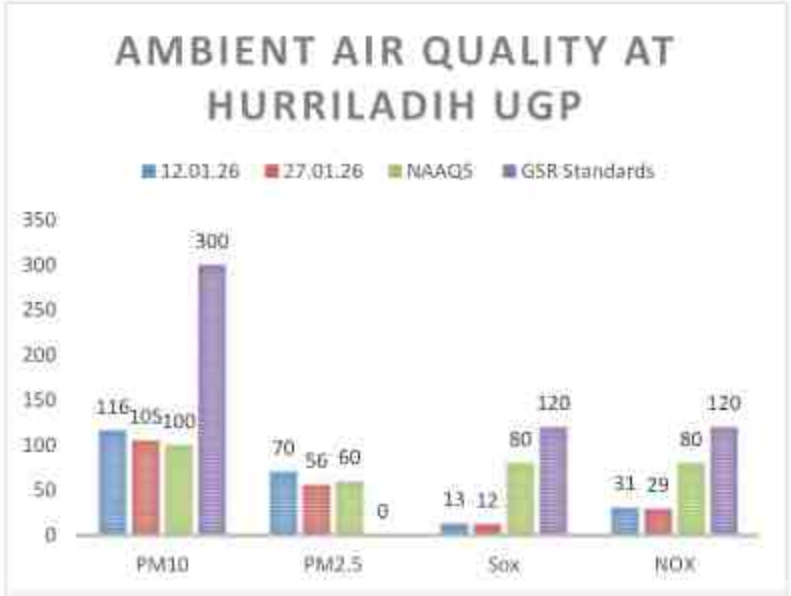
---- End of Report ----

Page -1 of 1

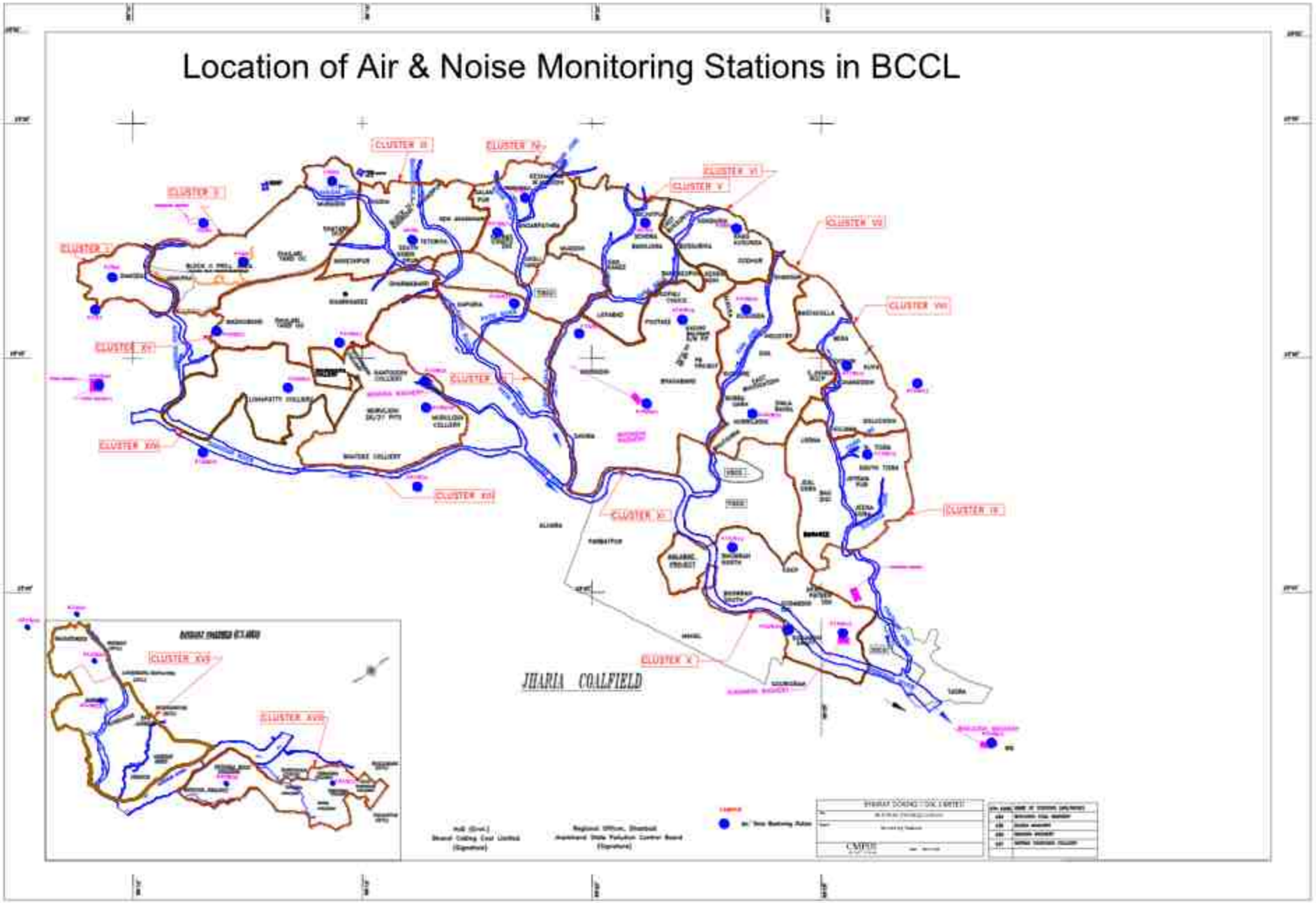








Annexure XXVI


Location of Air & Noise Monitoring Stations in BCCL
JHARIA COALFIELD

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 – IX

(FOR THE MONTH DECEMBER 2025)

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**12/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	11.12.25 TO 26.12.25	**Period of Analysis**	11.12.25 TO 20.01.26	**Zone of Station:**	**Core 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**
			A4849	**A4927**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	136	115	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	64	58	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	30	34	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***Note**: The results above relate to the samples tested as received. This report cannot 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 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	**12/2025**	**Cluster**		**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	05.12.25 TO 22.12.25		**Period of Analysis**	05.12.25 TO 20.01.26	**Zone of Station:** **Bufer 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
			A4820	A4897				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	72	78	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	36	38	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	28	20	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**12/2025**	**Cluster**	**Cluster X**			**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**13.02.2026**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/12**		**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	10.12.25 TO 25.12.25		**Period of Analysis**	10.12.25 TO 20.01.26		**Zone of Station:**	**Bufer 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**
			A4842	**A4920**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	110	103	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	52	54	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	32	27	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL Indicates Lower Detection Limit.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**12/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.12.25 TO 25.12.25		**Period of Analysis**	10.12.25 TO 20.01.26	**Zone of Station:** **Bufer 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**
			A4843	**A4921**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	116	109	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	67	56	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	24	26	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

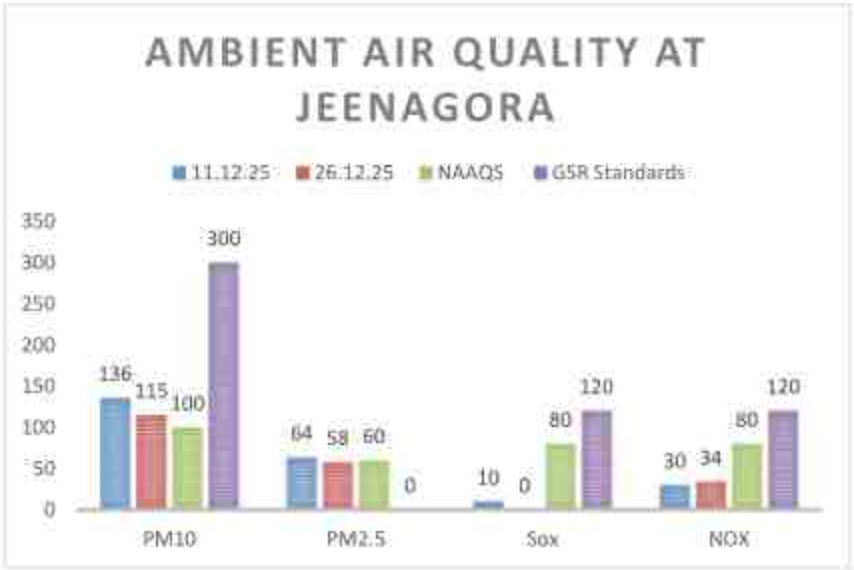
ANALYSED BY

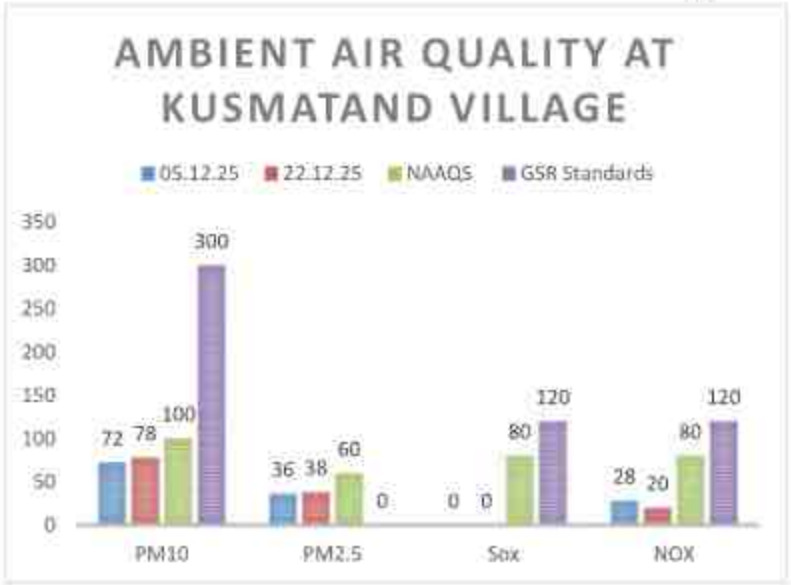
(Gaurav Kant)
REVIEWED BY

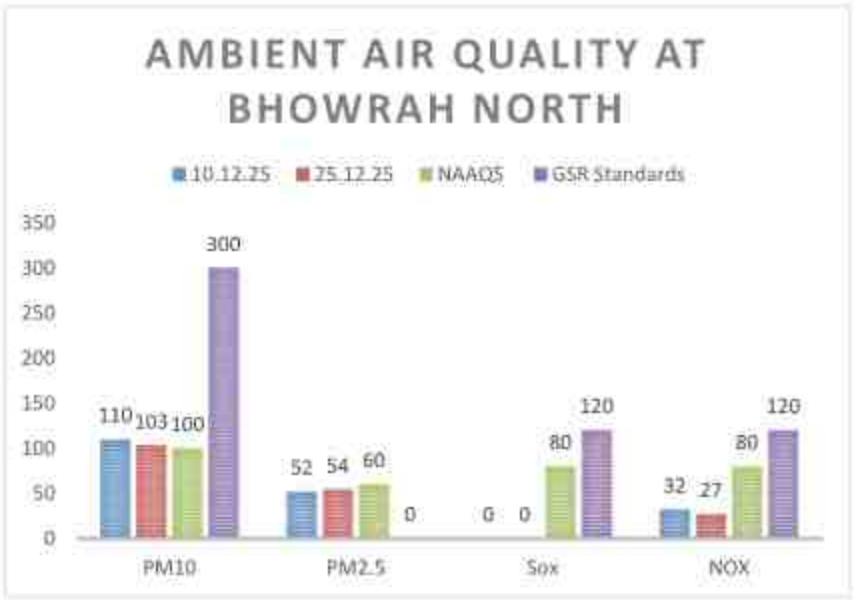
(Kumar Vaibhav)
Authorised Signatory

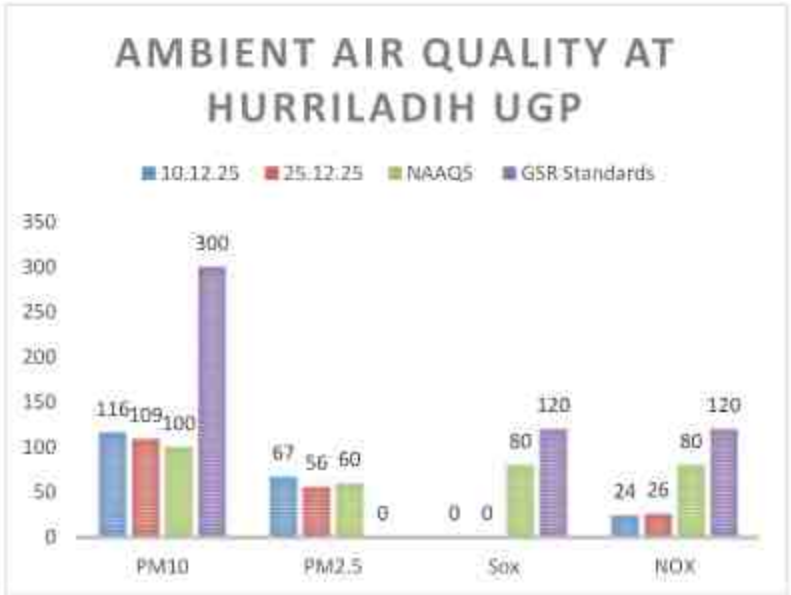
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

---- End of Report ----

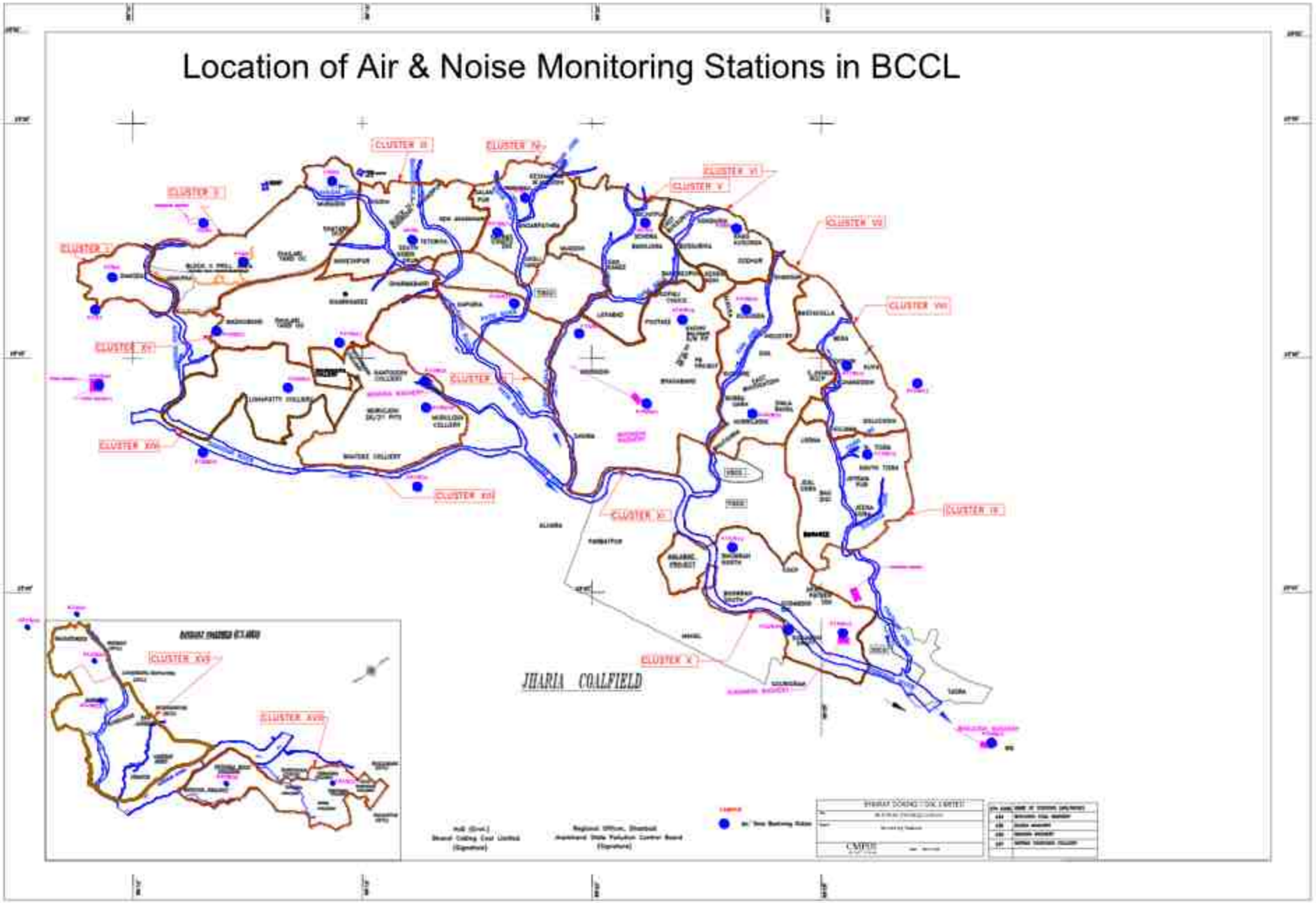








Annexure XXVI



Annexure XXVI

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 – IX

(FOR THE MONTH NOVEMBER 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**11/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432125900002248F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.2025 TO 25.12.2025	**Zone of Station:** **Core Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4846	A4924	**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	140	120	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	65	61	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	24	20	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***Note**: The results above relate to the samples tested as received. This report cannot 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 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	**11/2025**	**Cluster**		**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	07.11.25	21.11.25	**Period of Analysis**	07.11.25 TO 25.12.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4820	A4898	**Range Of .Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	75	82	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	38	41	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	25	18	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**11/2025**	**Cluster**	**Cluster X**	**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.25 TO 25.12.25	**Zone of Station:** **Bufer 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**
			A4843	A4921				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	115	107	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS-5182(Part 24):2019	55	58	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	26	21	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**11/2025**	**Cluster**	**Cluster IX**	**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.25 TO 25.12.25	**Zone of Station:** **Bufer 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**
			A4844	A4922				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	121	111	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	62	60	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	31	23	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

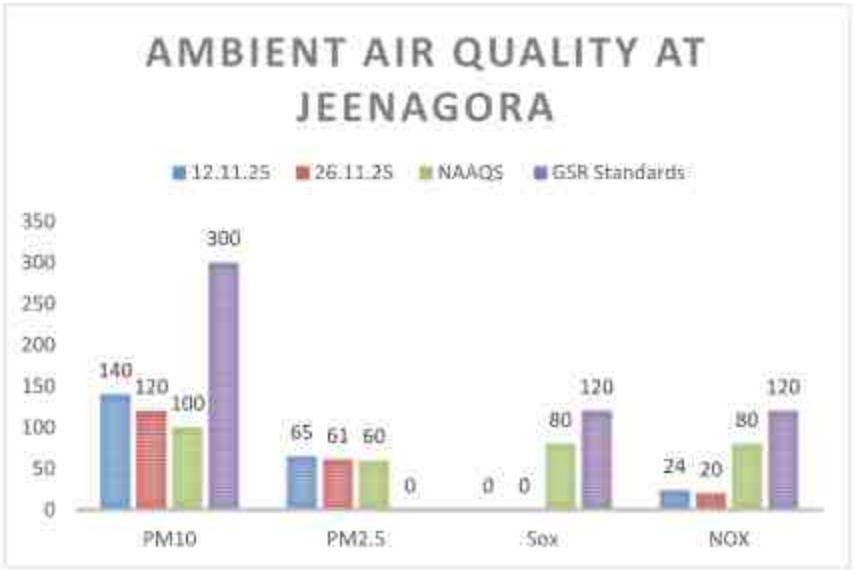
(Gaurav Kant)
REVIEWED BY

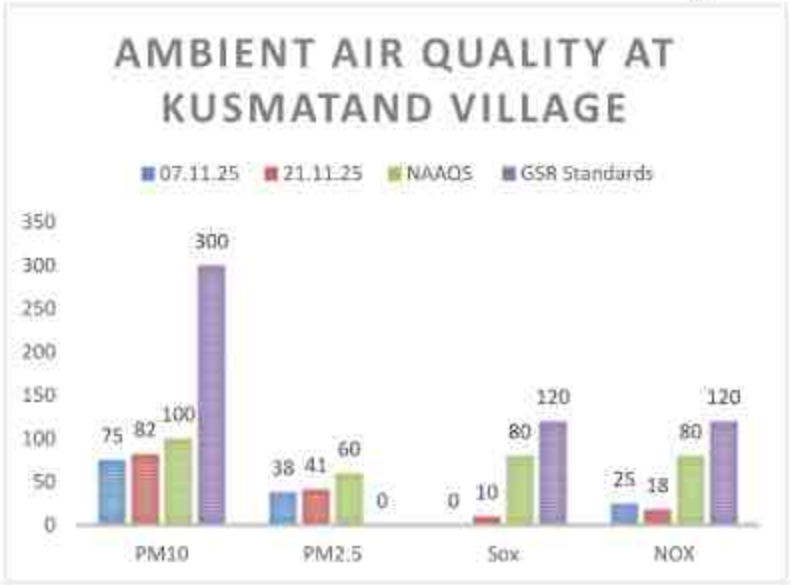
(Kumar Vaibhav)
Authorised Signatory

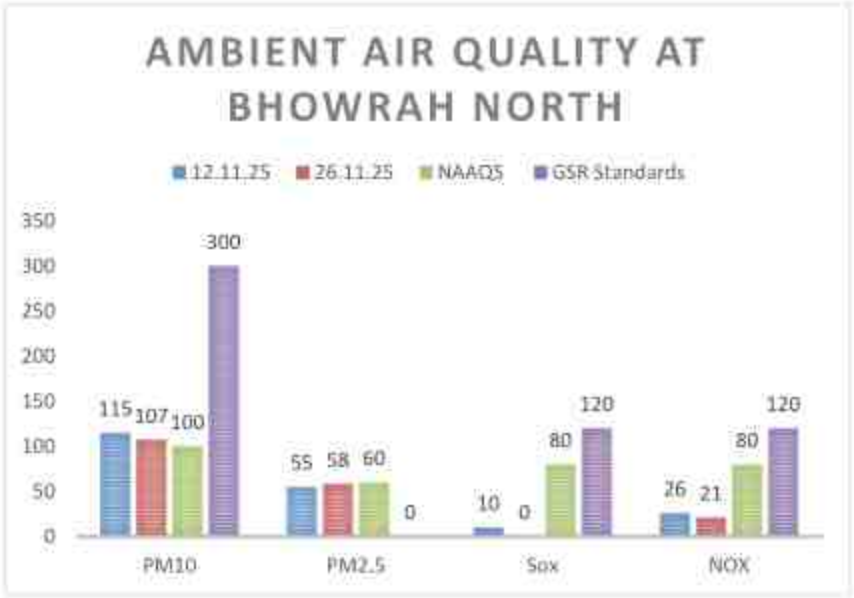
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

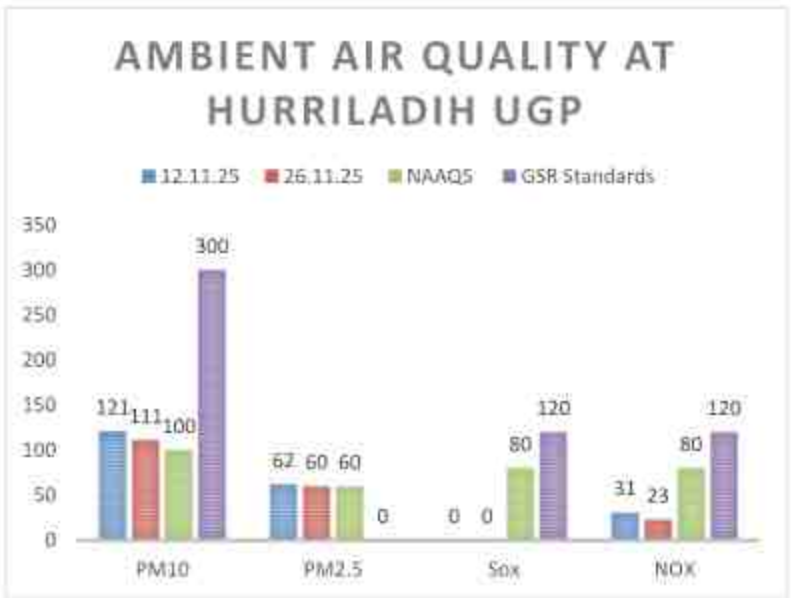
---- End of Report ----

Page -1 of 1

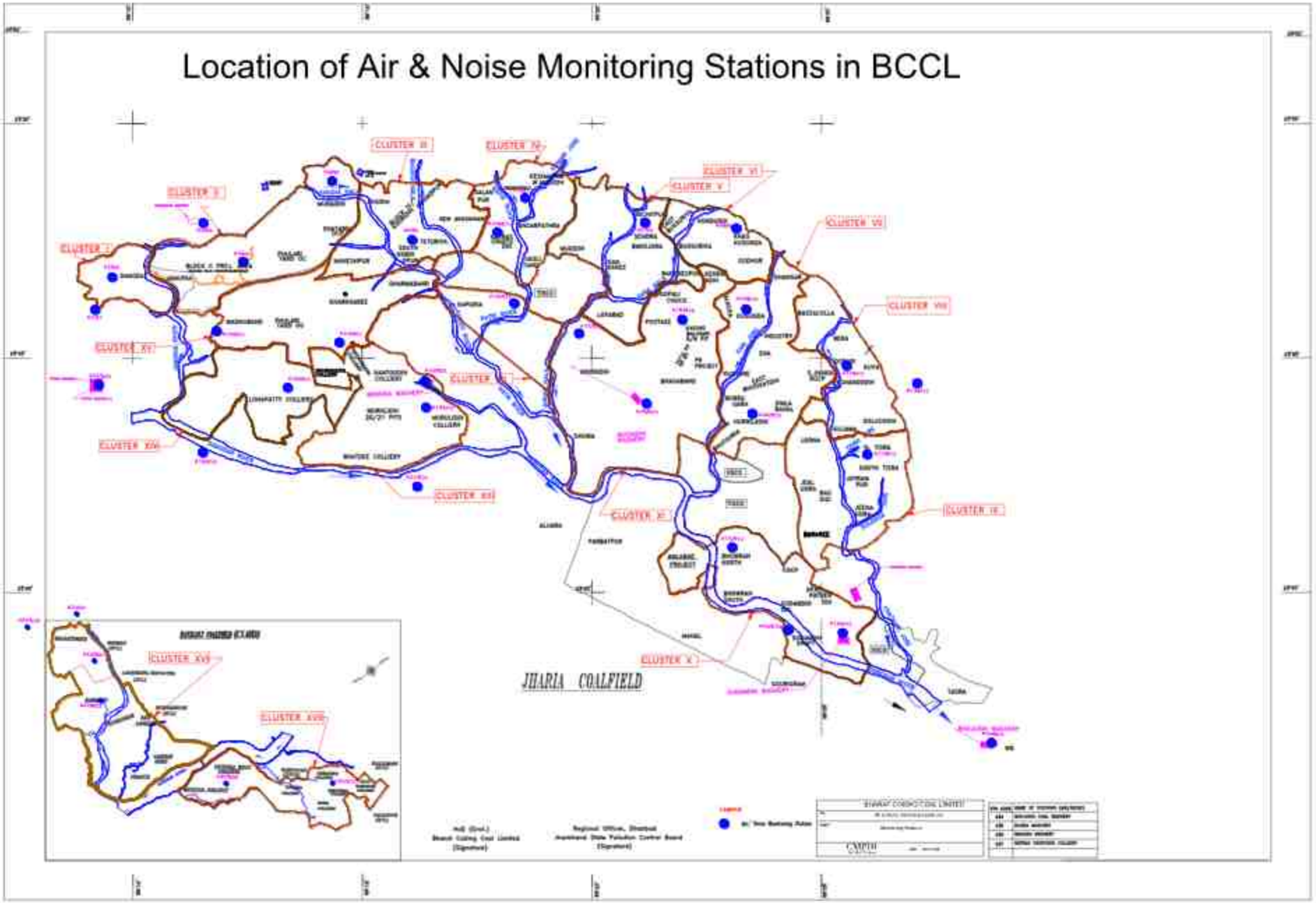








Annexure XXVI


Location of Air & Noise Monitoring Stations in BCCL
JHARIA COALFIELD

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 – IX

(FOR THE MONTH OCTOBER 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**10/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432125000002194F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.10.25	24.10.25	**Period of Analysis**	10.10.2025 to 25.11.2025	**Zone of Station:** **Core Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4677	A4744	**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	72	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	34	31	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	30	24	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

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

---- End of Report ----

Annexure XXVI

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	**10/2025**	**Cluster**		**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.10.25	24.10.25	**Period of Analysis**	09.10.2025 to 25.11.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4664	A4743	**Range Of .Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	68	70	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	30	35	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	26	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**10/2025**	**Cluster**	**Cluster X**	**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.10.25	22.10.25	**Period of Analysis**	10.10.2025 to 25.11.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4680	A4727	**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	67	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	29	34	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	31	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**10/2025**	**Cluster**	**Cluster IX**	**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.10.25	24.10.25	**Period of Analysis**	09.10.2025 to 25.11.2025	**Zone of Station:** **Bufer 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**
			A4696	A4726				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	77	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	34	33	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	20	26	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

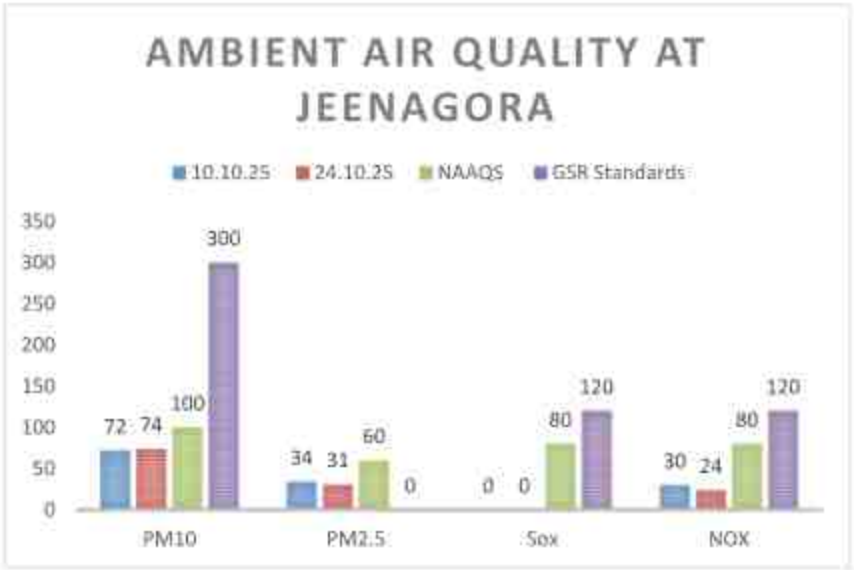
ANALYSED BY

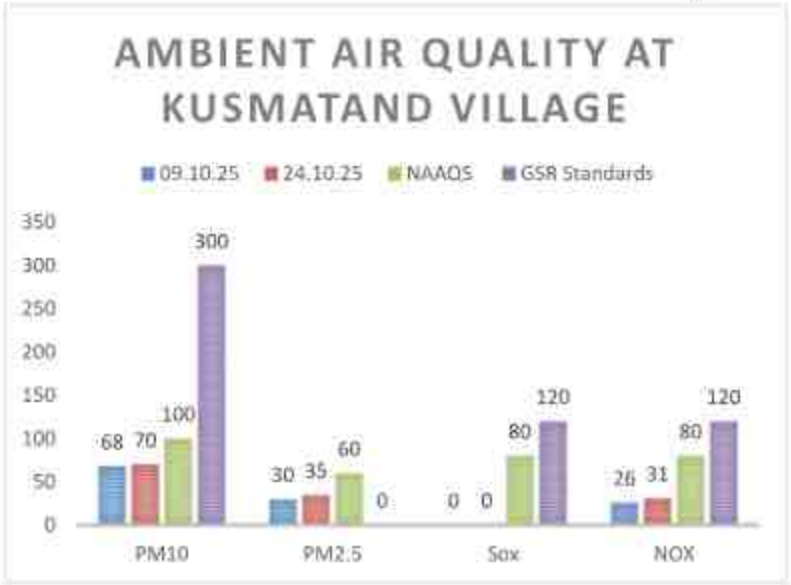
(Gaurav Kant)
REVIEWED BY

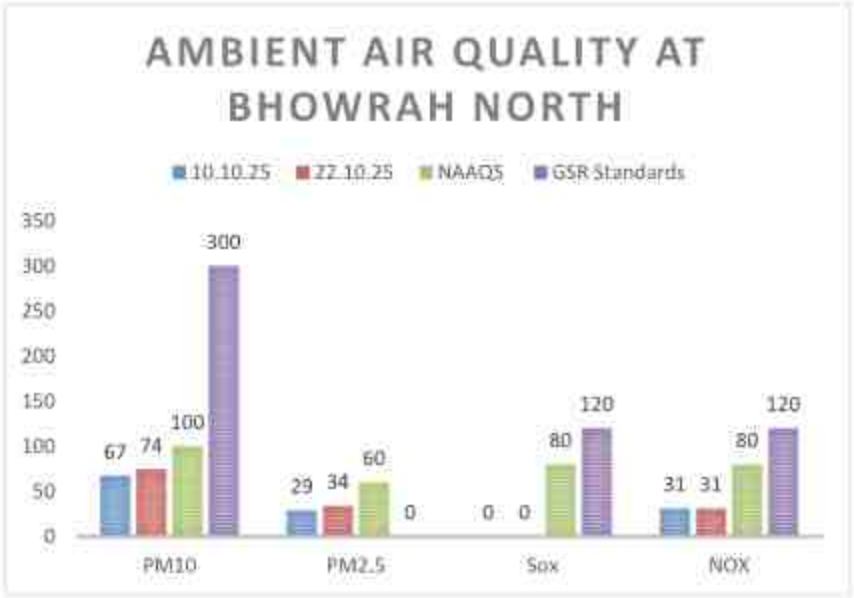
(Kumar Vaibhav)
Authorised Signatory

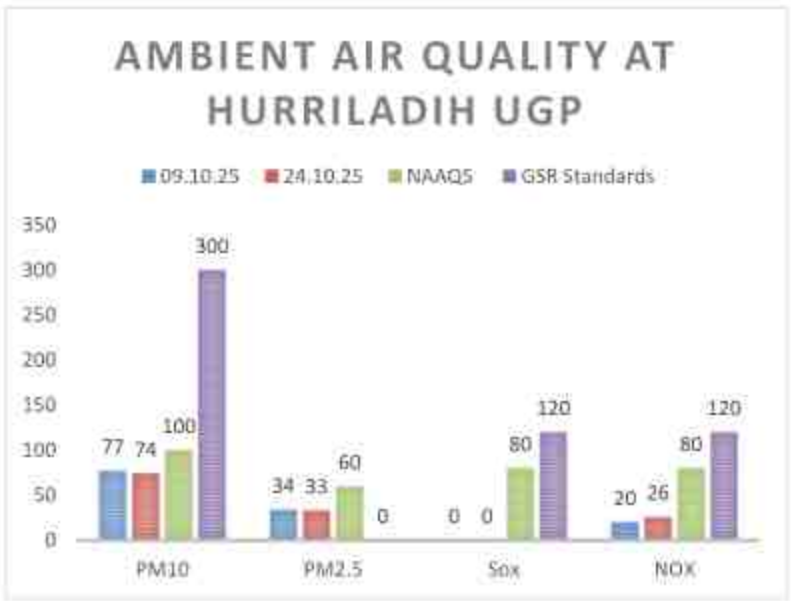
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

---- End of Report ----

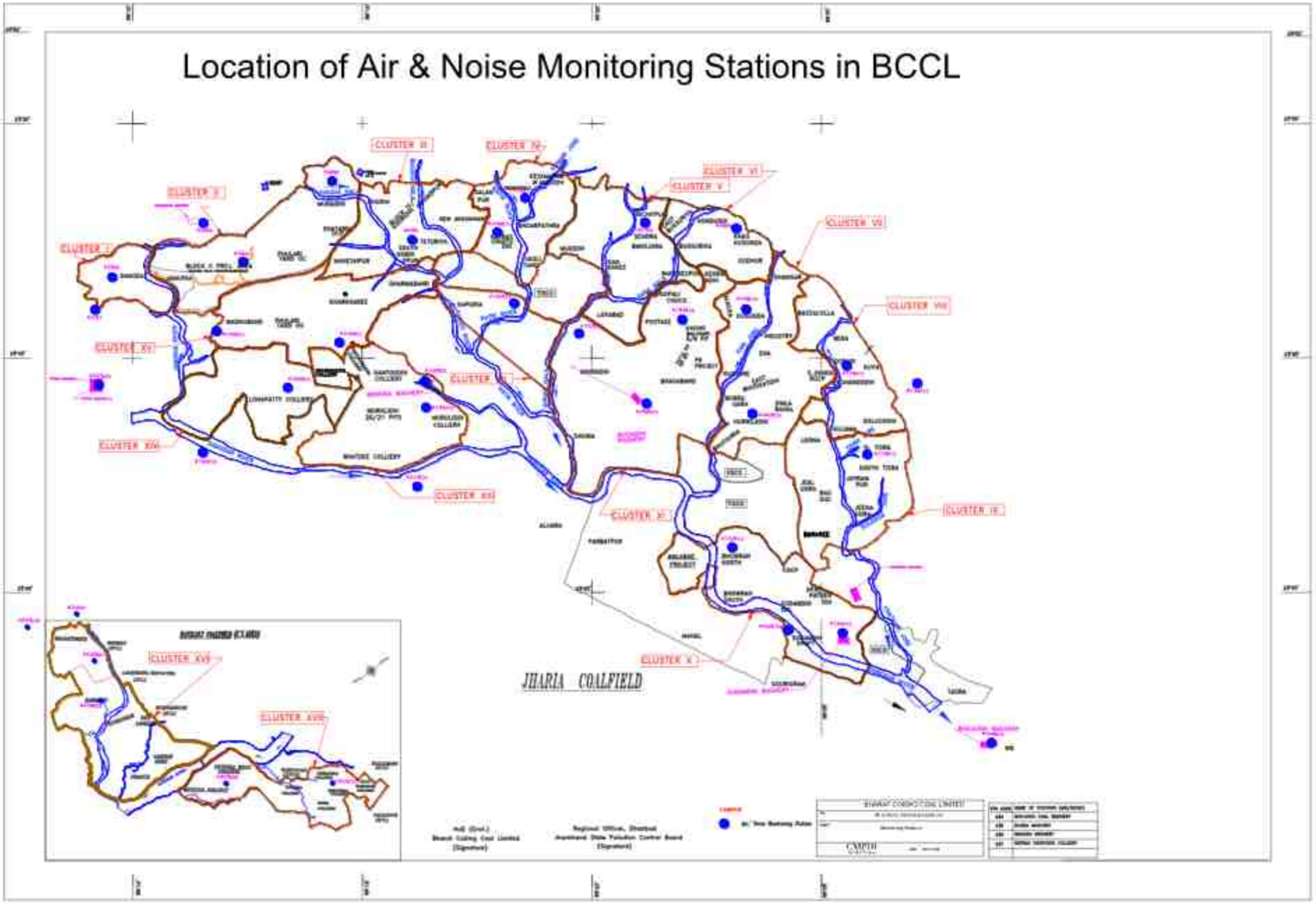








Annexure XXVI


Location of Air & Noise Monitoring Stations in BCCL
JHARIA COALFIELD

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 – IX

(FOR THE MONTH FEBRUARY 2026)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00" N & 86^0 25' 48.00" E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65" N & 86^0 26' 42.10" E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00" N & 86°23' 54.00"E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18" N & 86^0 24' 6.21" E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**02/2026**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432126000002410F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**20.03.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.02.26	26.02.26	**Period of Analysis**	12.02.26 to 10.03.26	**Zone of Station:** **Core 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**
			A5319	A5397				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	141	136	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	76	72	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	22	18	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Annexure XXVII

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	**02/2026**	**Cluster**		**ULR No.**	**TC1432126000002410F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**17.03.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	06.02.26	20.02.26	**Period of Analysis**	06.02.26 to 10.03.26	**Zone of Station:** **Bufer 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**
			A5288	A5366				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	95	97	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	43	47	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	20	33	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**02/2026**	**Cluster**	**Cluster X**			**ULR No.**	**TC1432126000002410F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**20.03.2026**
Project	**Bhowrah North**		**Sample Ref. No.**	**REM/BCCL/2026/02**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	10.02.26		24.02.26	**Period of Analysis**	10.02.26 to 10.03.26	**Zone of Station:**	**Bufer 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**
			A5305	A5383				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	132	136	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	69	71	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	26	15	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

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

Test Report for Ambient Air Samples

Month & Year	02/2026	**Cluster**	Cluster IX	**ULR No.**	TC1432126000002410F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			**Date of Issue**	20.03.2026
Project	Hurriladih UGP	**Sample Ref. No.**	REM/BCCL/2026/02	**Sampling Method**	CMPDI/RI-II/LPM 11 , (IS 5182)
Date of Sampling	10.02.26	24.02.26	**Period of Analysis**	10.02.26 to 10.03.26	**Zone of Station:** Bufer 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
			A5306	A5384				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	126	118	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	65	67	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	13	12	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	27	32	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

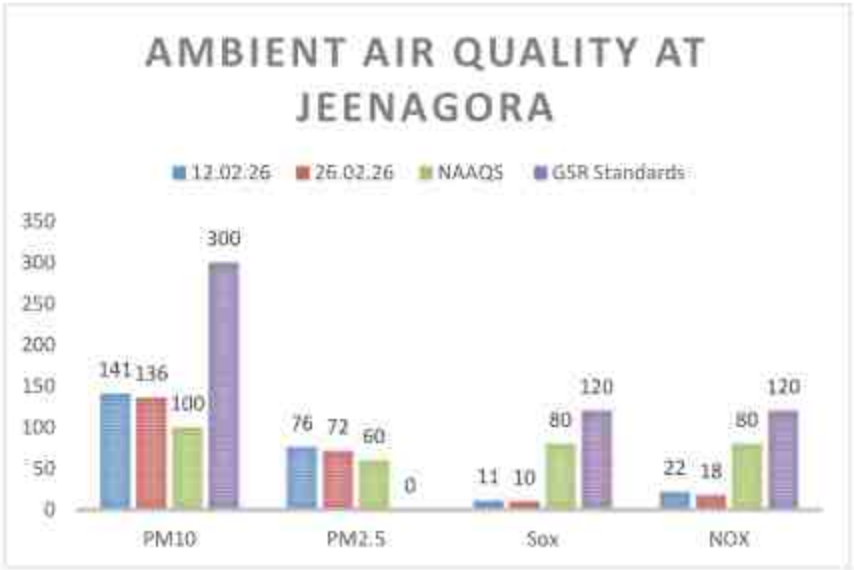
(Gaurav Kant)
REVIEWED BY

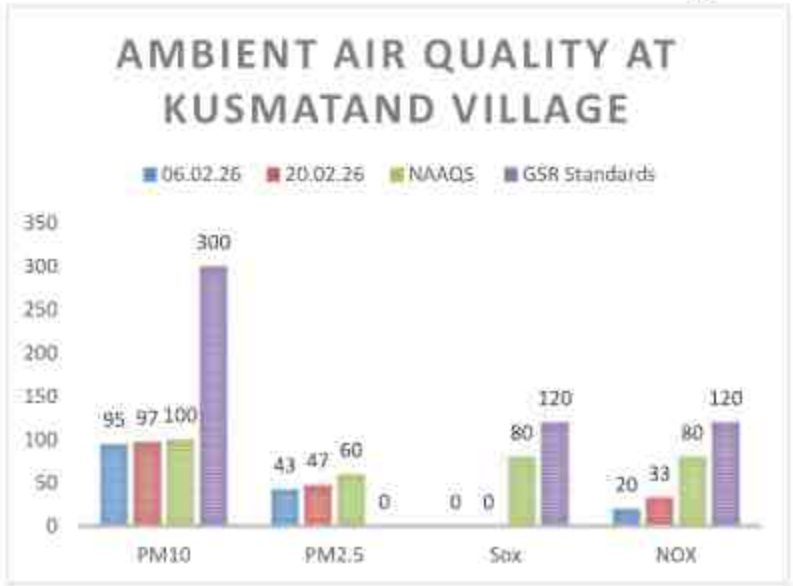
(Kumar Vaibhav)
Authorised Signatory

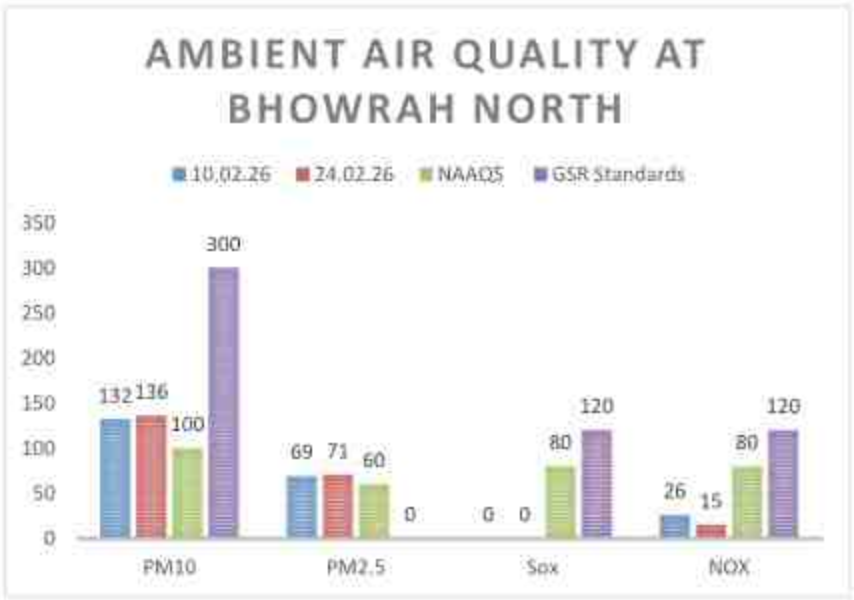
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

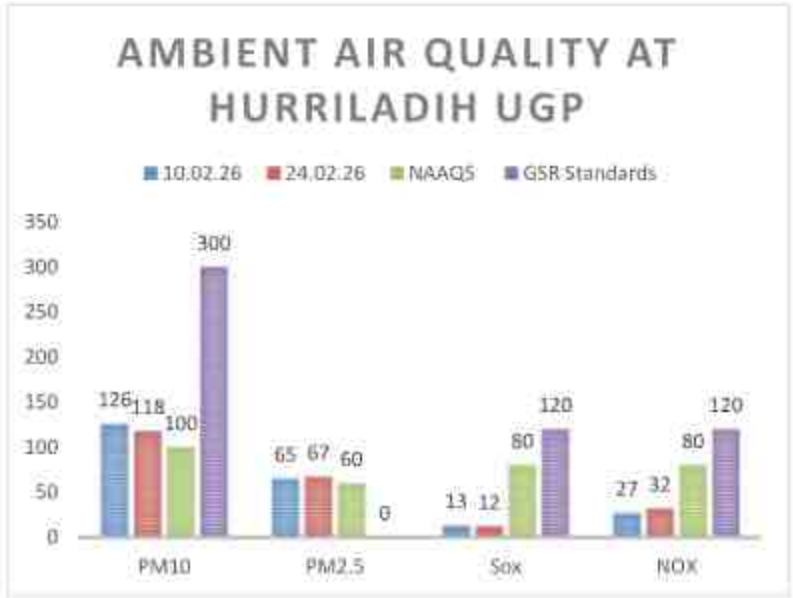
---- End of Report ----

Page -1 of 1

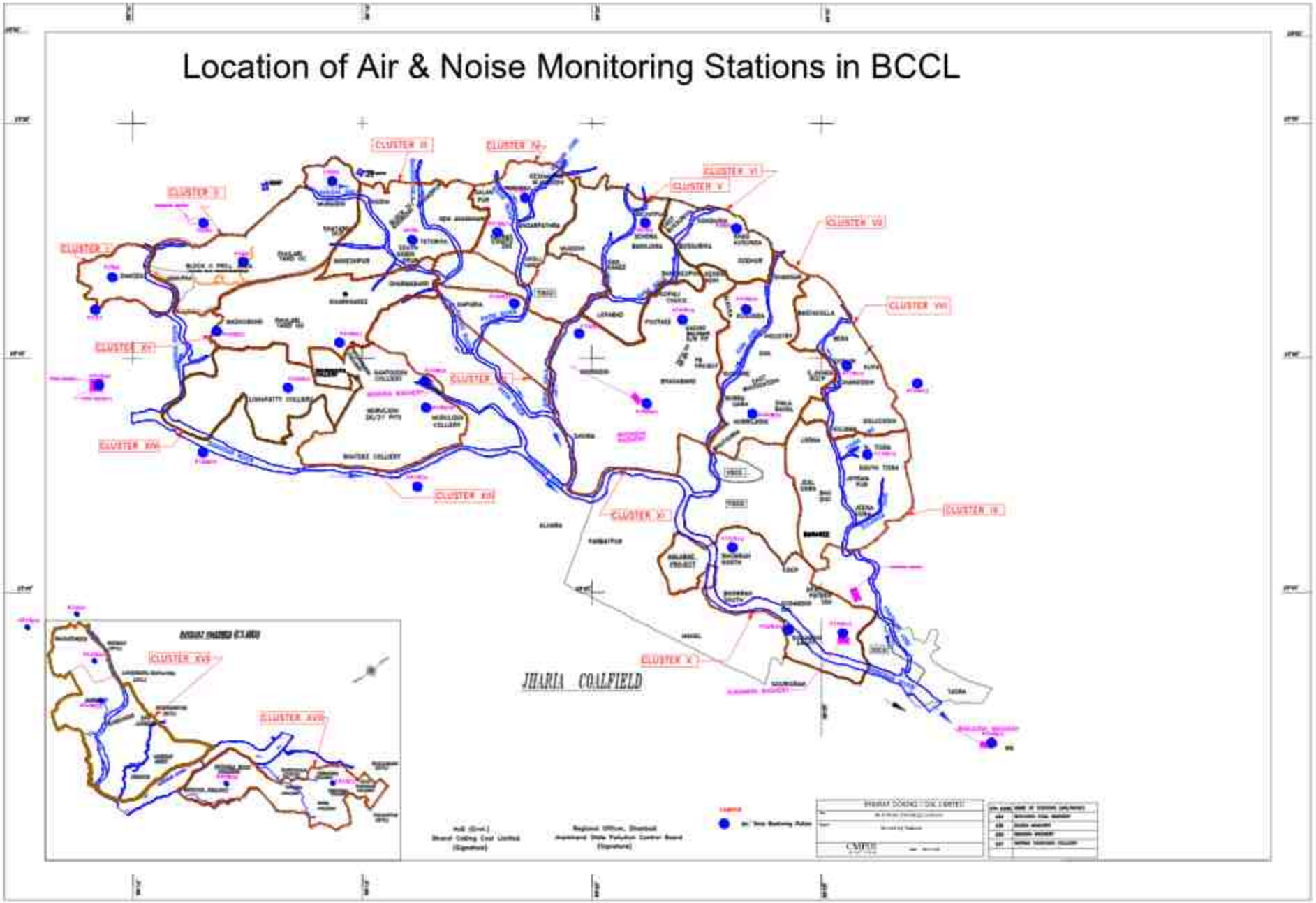








Annexure XXVII



Annexure XXVII

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 – IX

(FOR THE MONTH JANUARY 2026)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00" N & 86^0 25' 48.00" E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65" N & 86^0 26' 42.10" E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00" N & 86°23' 54.00"E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18" N & 86^0 24' 6.21" E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**01/2026**	**Cluster**	**Cluster IX**	**ULR No.**	TC143212611800002358F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	13.01.26	28.01.26	**Period of Analysis**	13.01.2026 TO 25.02.2026	**Zone of Station:** **Core 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**
			A5157	A5235				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	145	129	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	75	68	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	21	35	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Annexure XXVII

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	**01/2026**	**Cluster**		**ULR No.**	**TC143212611800002358F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.01.26	23.01.26	**Period of Analysis**	09.01.2026 TO 25.02.2026	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A5144	A5215	**Range Of ,Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	91	95	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	41	46	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	23	15	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL Indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**01/2026**	**Cluster**	**Cluster X**	**ULR No.**	**TC143212611800002358F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.03.2026**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2026/01**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.01.26	27.01.26	**Period of Analysis**	12.01.2026 TO 25.02.2026	**Zone of Station:** **Bufer 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**
			A5151	A5229				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	125	128	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	66	67	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	23	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

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

Test Report for Ambient Air Samples

Month & Year	01/2026	**Cluster**	Cluster IX	**ULR No.**	TC143212611800002358F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			**Date of Issue**	05.03.2026
Project	Hurriladih UGP	**Sample Ref. No.**	REM/BCCL/2026/01	**Sampling Method**	CMPDI/RI-II/LPM 11 , (IS 5182)
Date of Sampling	12.01.26	27.01.26	**Period of Analysis**	12.01.2026 TO 25.02.2026	**Zone of Station:** Bufer Zone

Sl. No.	Parameter	Method of Analysis	Observed Values (in µg/m³) A5152	Observed Values (in µg/m³) A5230	Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
1	PM_{10}	IS -5182(Part 23):2006, R-2017	116	105	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	70	56	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	13	12	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	31	29	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

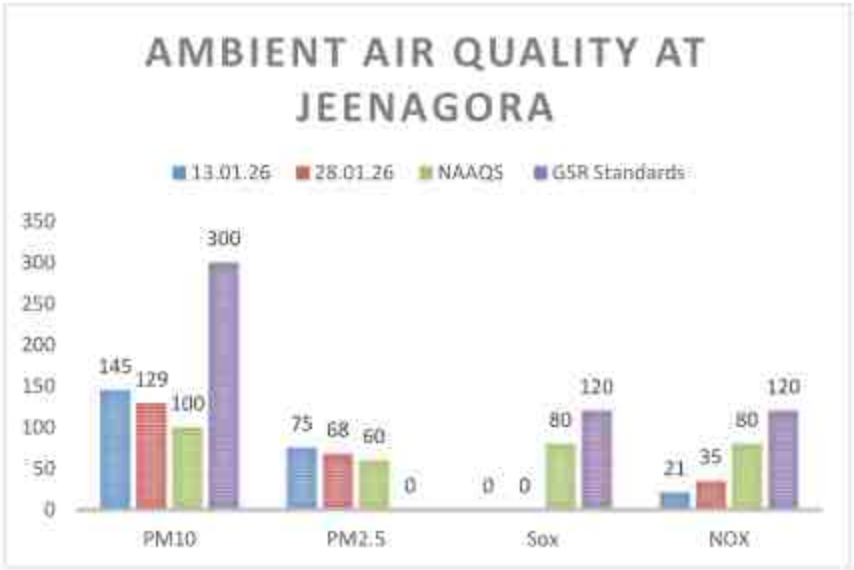
(Gaurav Kant)
REVIEWED BY

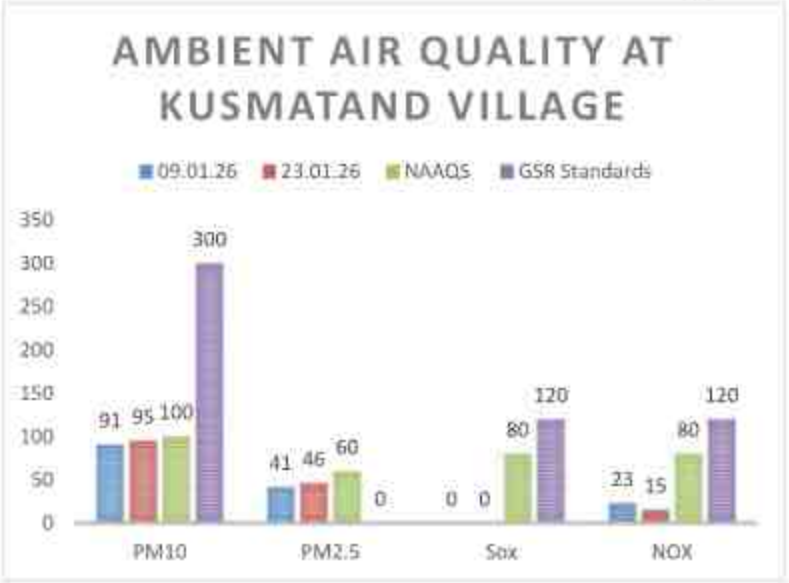
(Kumar Vaibhav)
Authorised Signatory

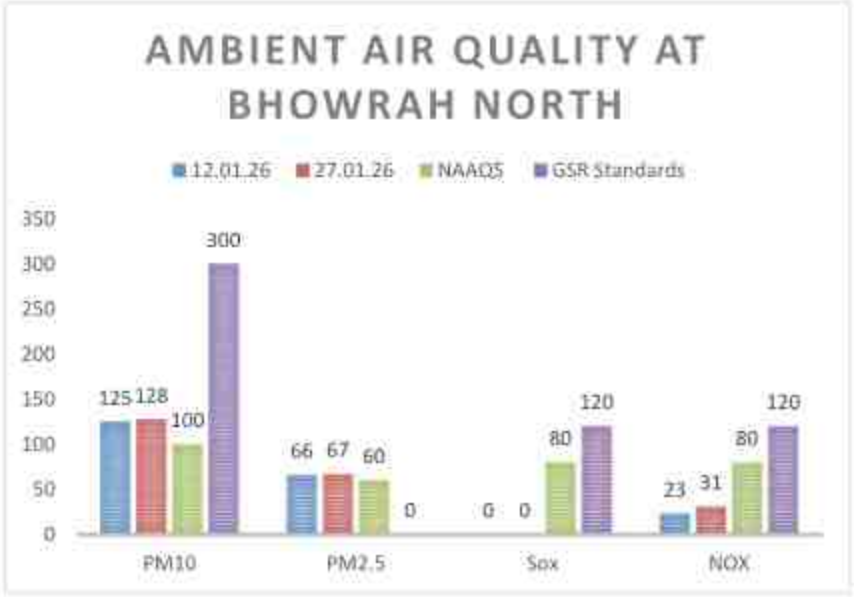
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

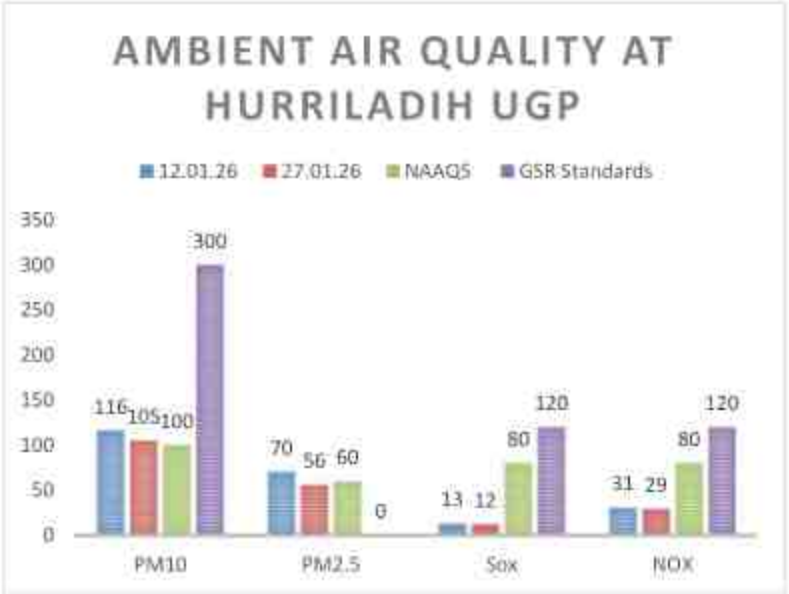
---- End of Report ----

Page -1 of 1

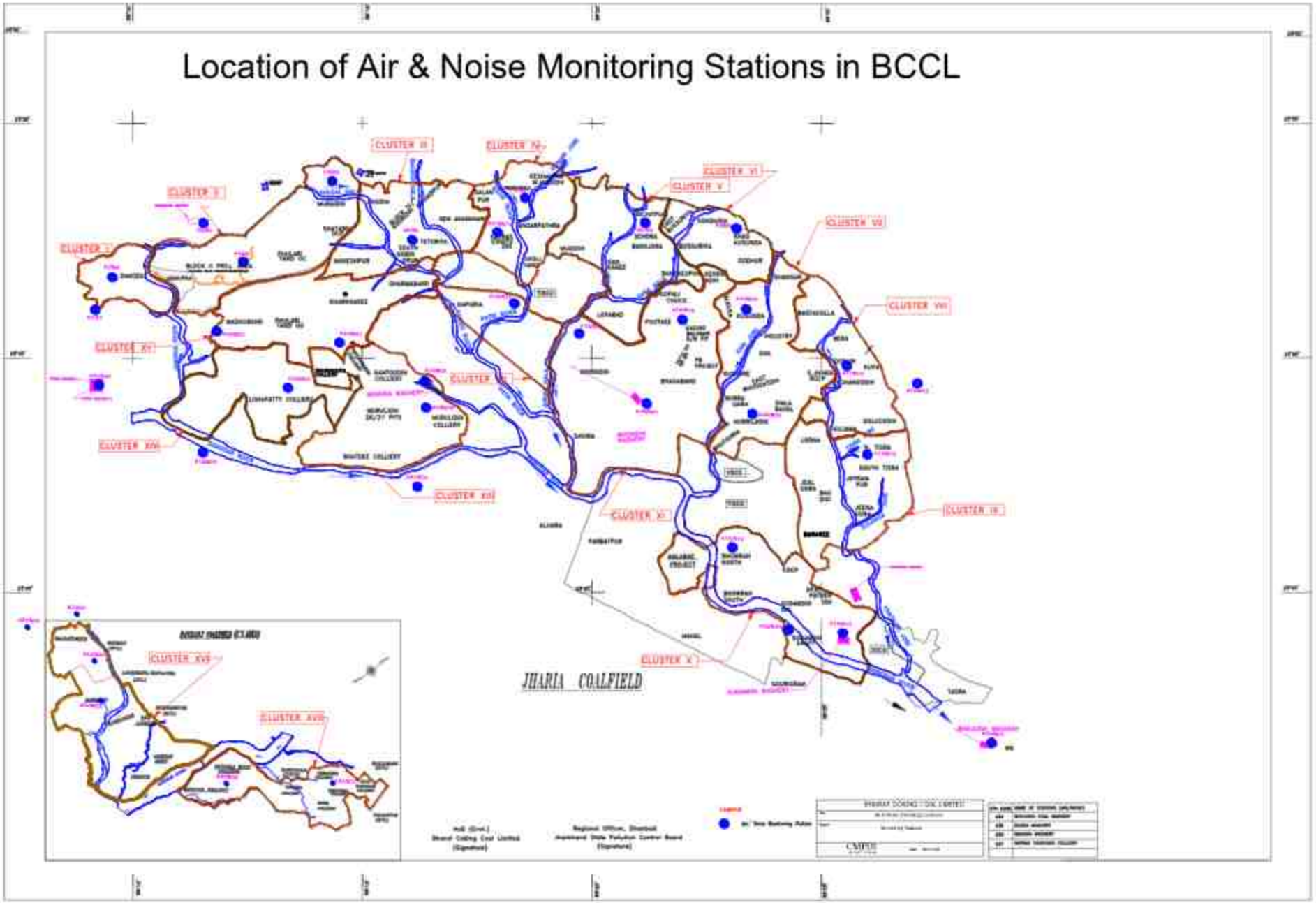








Annexure XXVII



Annexure XXVII

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 – IX

(FOR THE MONTH DECEMBER 2025)

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**12/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	11.12.25 TO 26.12.25	**Period of Analysis**	11.12.25 TO 20.01.26	**Zone of Station:**	**Core 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**
			A4849	**A4927**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	136	115	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	64	58	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	30	34	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Page -1 of 1

Annexure XXVII

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	**12/2025**	**Cluster**		**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	05.12.25 TO 22.12.25		**Period of Analysis**	05.12.25 TO 20.01.26	**Zone of Station:** **Bufer 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**
			A4820	**A4897**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	72	78	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	36	38	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	28	20	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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 Air Quality Test Report

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**12/2025**	**Cluster**	**Cluster X**	**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.12.25 TO 25.12.25		**Period of Analysis**	10.12.25 TO 20.01.26	**Zone of Station:** **Bufer 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**
			A4842	**A4920**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	110	103	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	52	54	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	32	27	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL Indicates Lower Detection Limit.*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**12/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC14321266500002304F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**13.02.2026**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/12**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.12.25 TO 25.12.25		**Period of Analysis**	10.12.25 TO 20.01.26	**Zone of Station:** **Bufer 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**
			A4843	**A4921**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	116	109	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	67	56	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	24	26	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit.*

ANALYSED BY

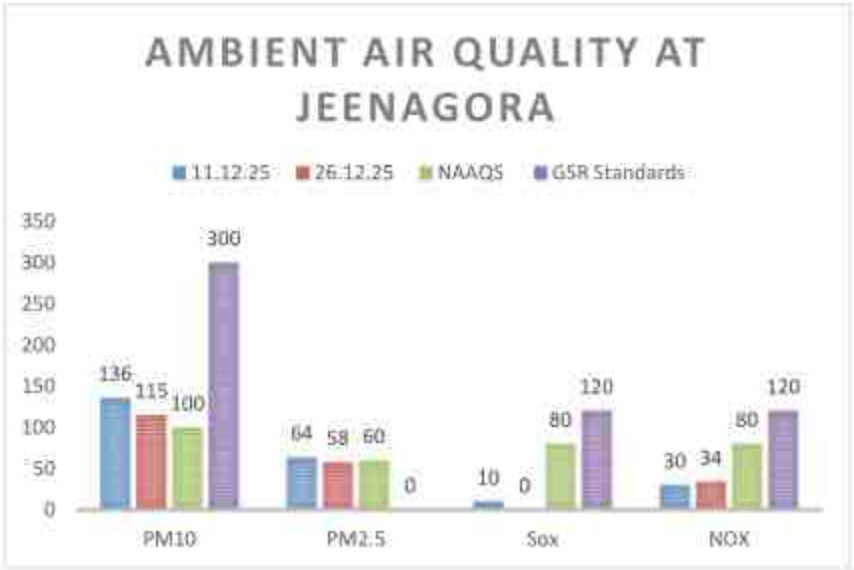
(Gaurav Kant)
REVIEWED BY

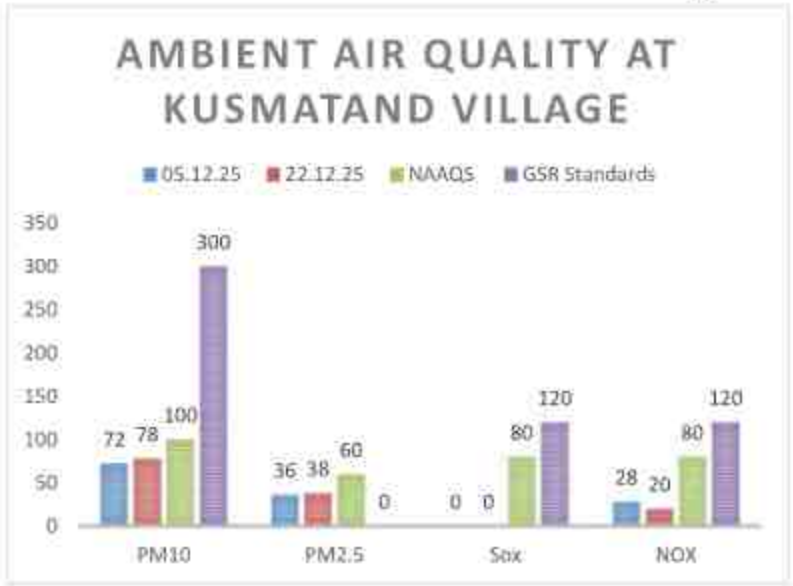
(Kumar Vaibhav)
Authorised Signatory

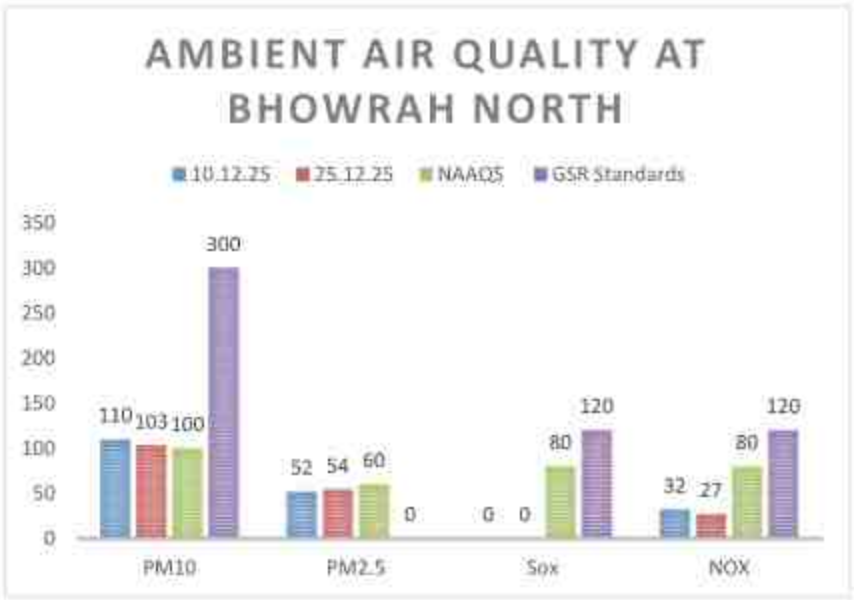
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

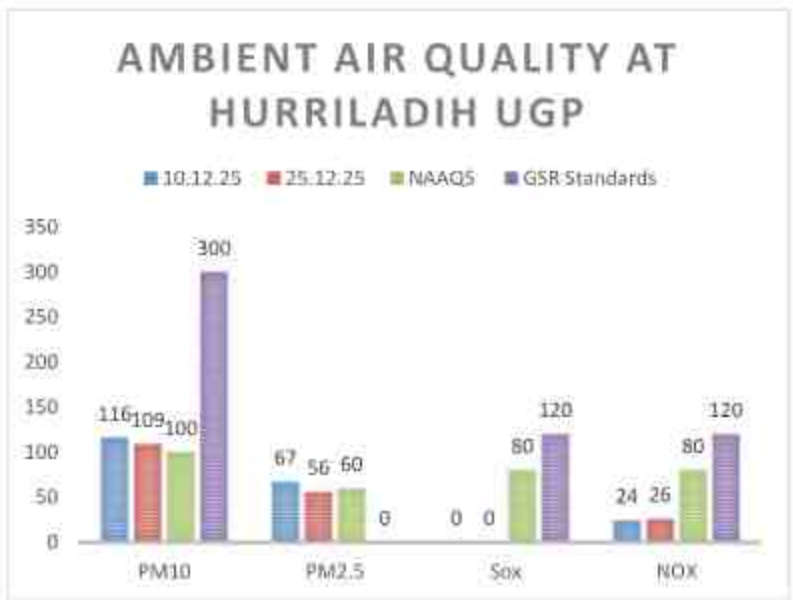
---- End of Report ----

Page -1 of 1

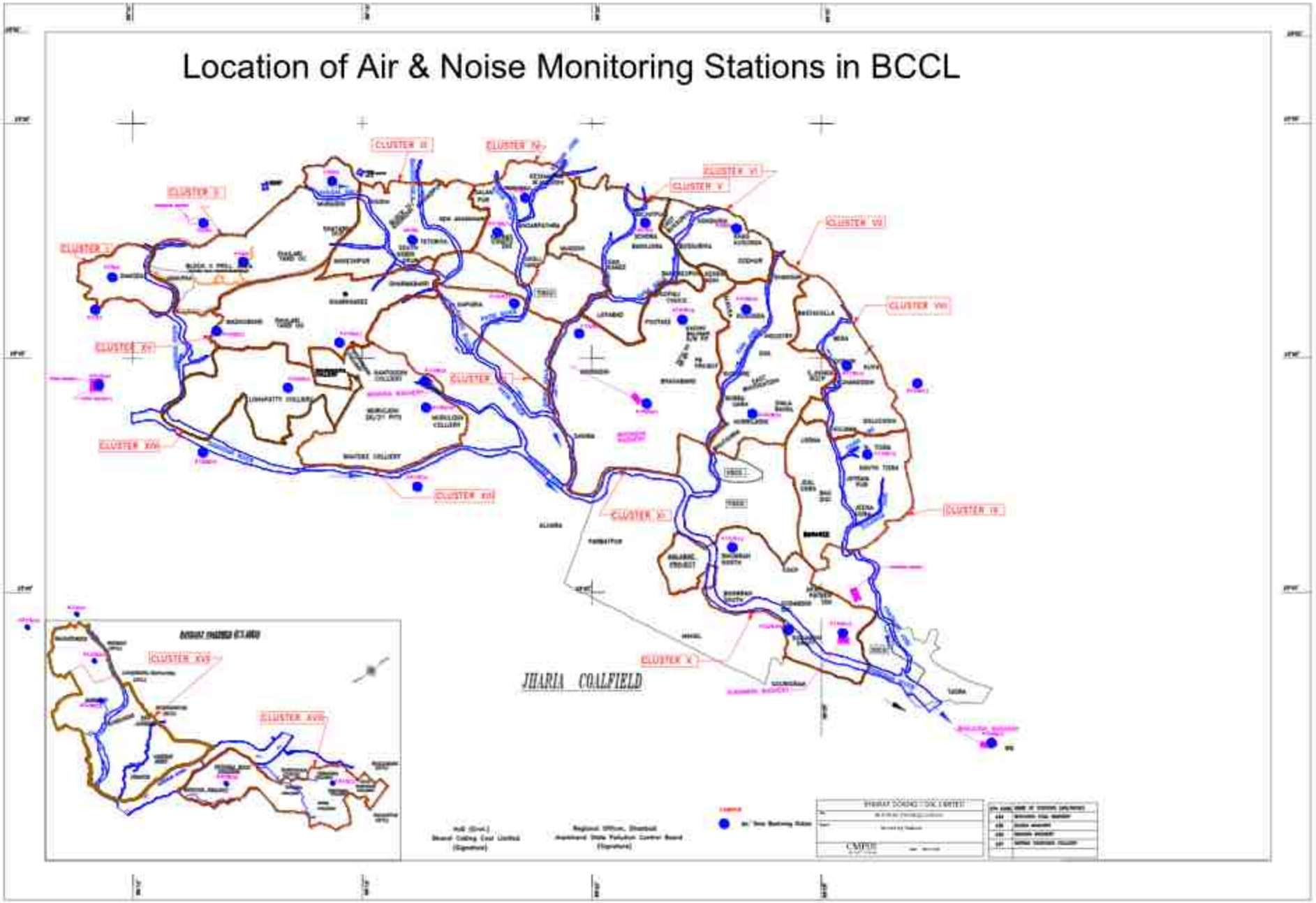








Annexure XXVII



Annexure XXVII

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 – IX

(FOR THE MONTH NOVEMBER 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**11/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432125900002248F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.2025 TO 25.12.2025	**Zone of Station:** **Core Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4846	A4924	**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	140	120	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	65	61	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	24	20	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***Note**: The results above relate to the samples tested as received. This report cannot 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 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	**11/2025**	**Cluster**		**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	07.11.25	21.11.25	**Period of Analysis**	07.11.25 TO 25.12.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4820	A4898	**Range Of .Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	75	82	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	38	41	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	25	18	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**11/2025**	**Cluster**	**Cluster X**	**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.25 TO 25.12.25	**Zone of Station:** **Bufer 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**
			A4843	A4921				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	115	107	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS-5182(Part 24):2019	55	58	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	26	21	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**11/2025**	**Cluster**	**Cluster IX**	**ULR No.**	**TC1432125900002248F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**12.01.2025**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/11**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	12.11.25	26.11.25	**Period of Analysis**	12.11.25 TO 25.12.25	**Zone of Station:** **Bufer 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**
			A4844	A4922				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	121	111	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	62	60	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	31	23	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

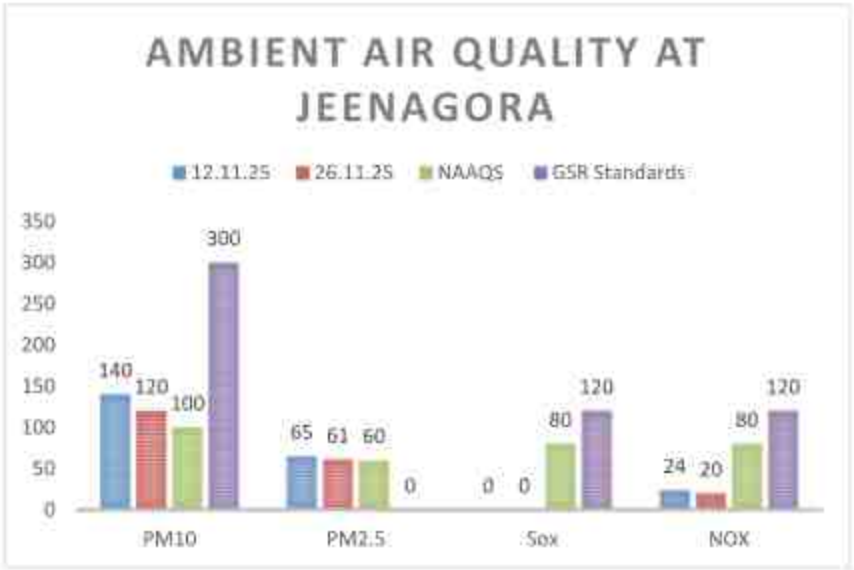
(Gaurav Kant)
ANALYSED BY ***REVIEWED BY***

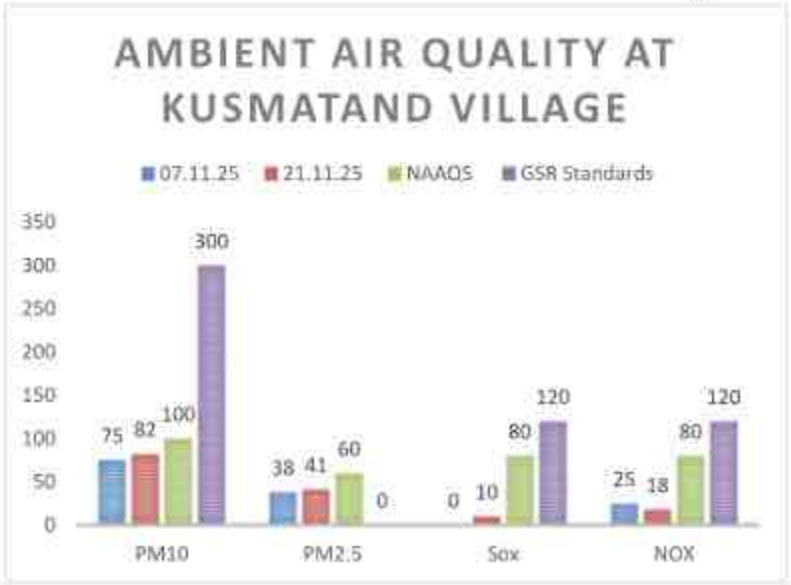
(Kumar Vaibhav)
Authorised Signatory

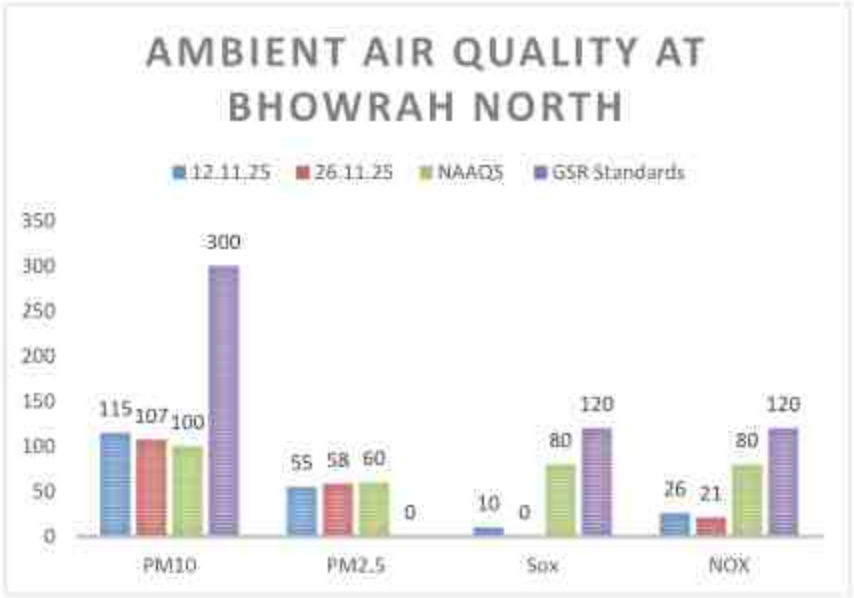
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

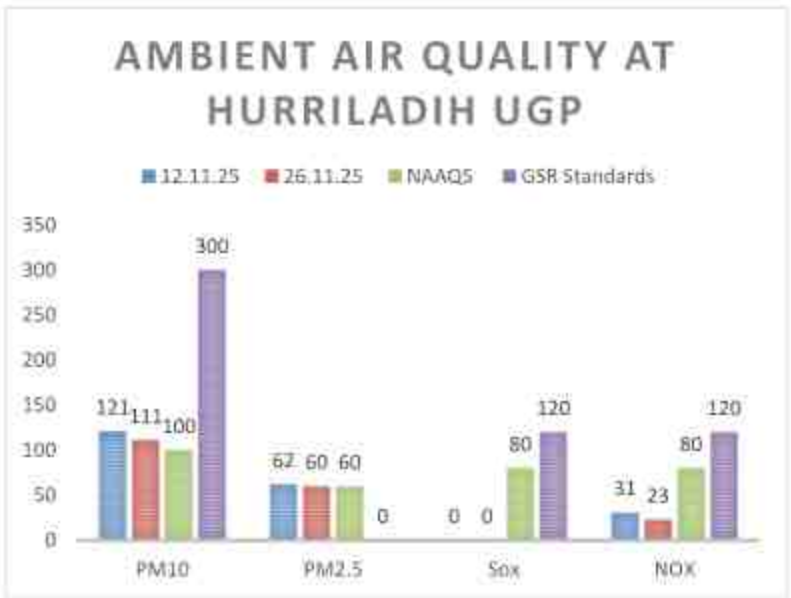
---- End of Report ----

Page -1 of 1

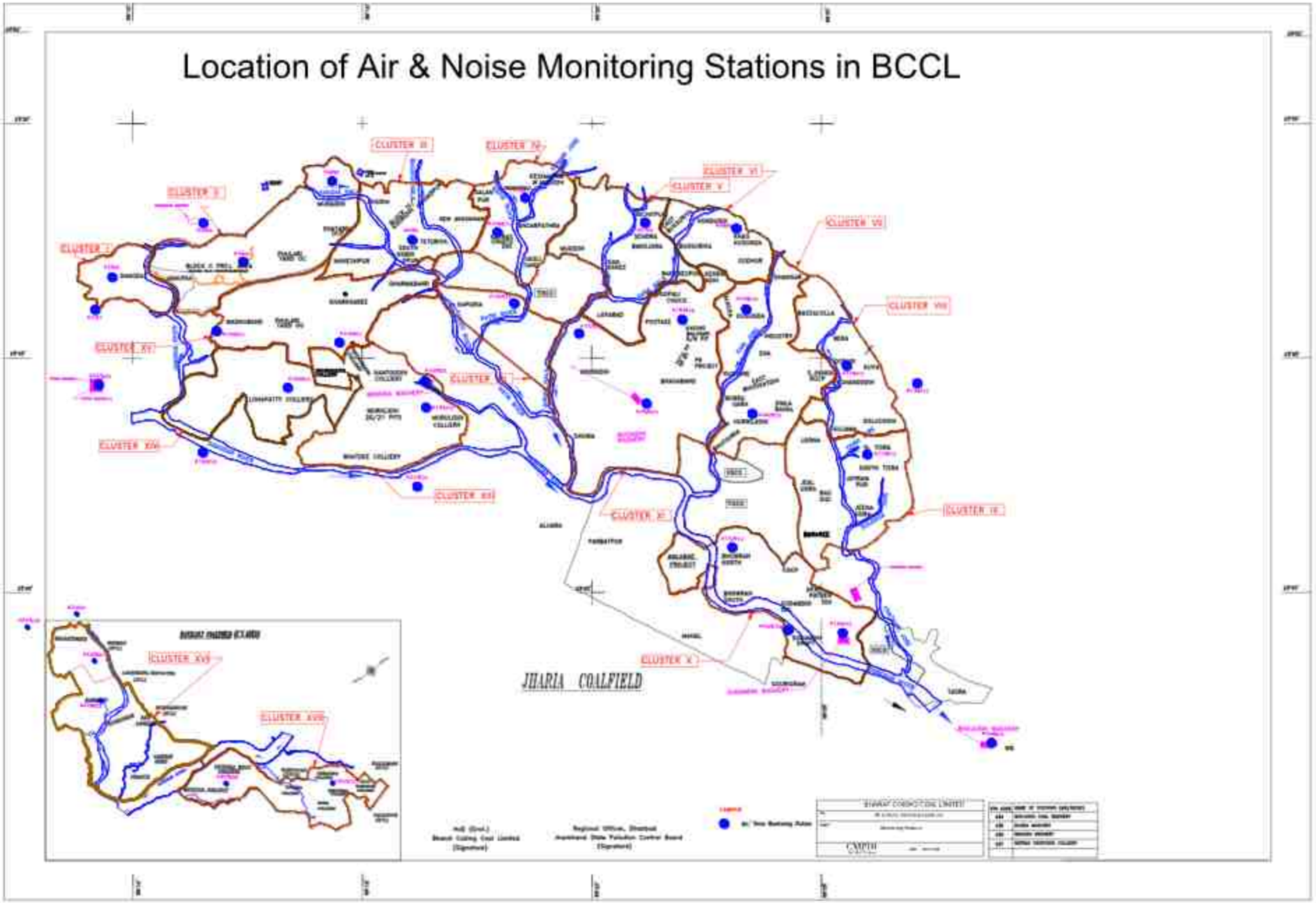








Annexure XXVII



Annexure XXVII

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 – IX

(FOR THE MONTH OCTOBER 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.

1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

Ministry of Environment, Forest and Climate Change while granting environmental clearance has given one of the General conditions that " Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets, 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) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23^0 42' 31.00'' N & 86^0 25' 48.00'' E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is $23^0$45' 4.65'' N & 86^0 26' 42.10'' E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00'' N & 86°23' 54.00''E. The sampler was placed at 1.5 m above the ground level of Project Office.

Iii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is $23^0$44' 4.18'' N & 86^0 24' 6.21'' E. The sampler was placed at a height of 1.5 m from the ground level of the mine 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	**10/2025**	**Cluster**	**Cluster IX**	**ULR No.**	TC1432125000002194F
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.10.25	24.10.25	**Period of Analysis**	10.10.2025 to 25.11.2025	**Zone of Station:** **Core 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**
			A4677	A4744				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	72	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	34	31	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	30	24	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*

***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

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

---- End of Report ----

Page -1 of 1

Annexure XXVII

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	**10/2025**	**Cluster**		**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Kusmatand Village**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.10.25	24.10.25	**Period of Analysis**	09.10.2025 to 25.11.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4664	A4743	**Range Of .Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	68	70	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	30	35	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	26	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

** LDL indicates Lower Detection Limit,*
***All units are in µg/m3, 24 hourly Average,*

ANALYSED BY (Gaurav Kant) ***REVIEWED BY*** (Kumar Vaibhav) ***Authorised Signatory***

***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

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone:0326-223-850
email: rdri2cmodi@coalindia.in

Test Report for Ambient Air Samples

Month & Year	**10/2025**	**Cluster**	**Cluster X**	**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	10.10.25	22.10.25	**Period of Analysis**	10.10.2025 to 25.11.2025	**Zone of Station:** **Bufer 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**
			A4680	A4727				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	67	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	29	34	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	31	31	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

ANALYSED BY

(Gaurav Kant)
REVIEWED BY

(Kumar Vaibhav)
Authorised Signatory

***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

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

Test Report for Ambient Air Samples

Month & Year	**10/2025**	**Cluster**	**Cluster IX**	**ULR No.**	**TC1432125000002194F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**05.12.2025**
Project	**Hurriladih UGP**	**Sample Ref. No.**	**REM/BCCL/2025/10**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	09.10.25	24.10.25	**Period of Analysis**	09.10.2025 to 25.11.2025	**Zone of Station:** **Bufer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)** A4696	A4726	**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
1	PM_{10}	IS -5182(Part 23):2006, R-2017	77	74	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	34	33	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	20	26	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

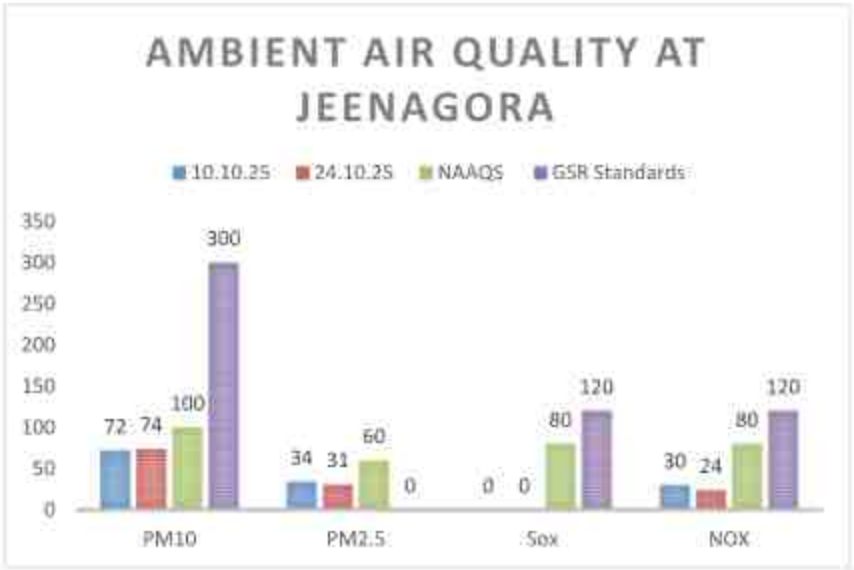
***All units are in µg/m3, 24 hourly Average, * LDL indicates Lower Detection Limit,*

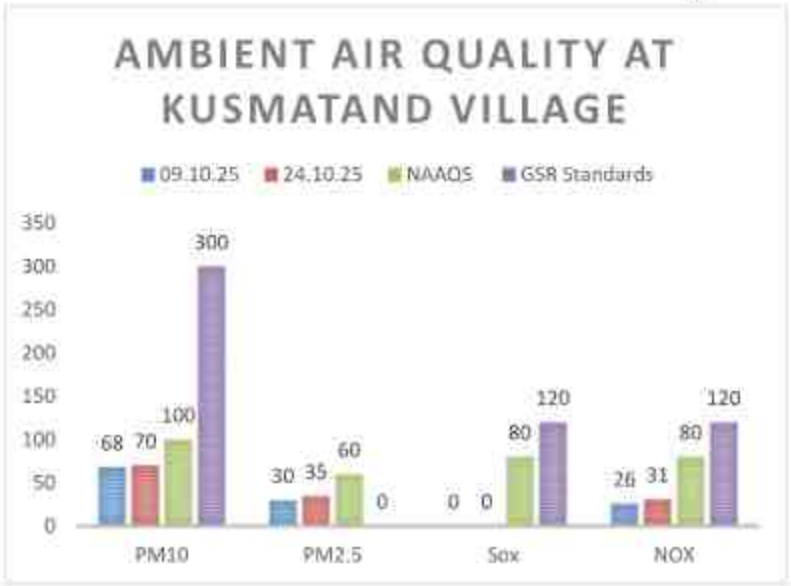
ANALYSED BY	(Gaurav Kant) ***REVIEWED BY***	(Kumar Vaibhav) ***Authorised Signatory***

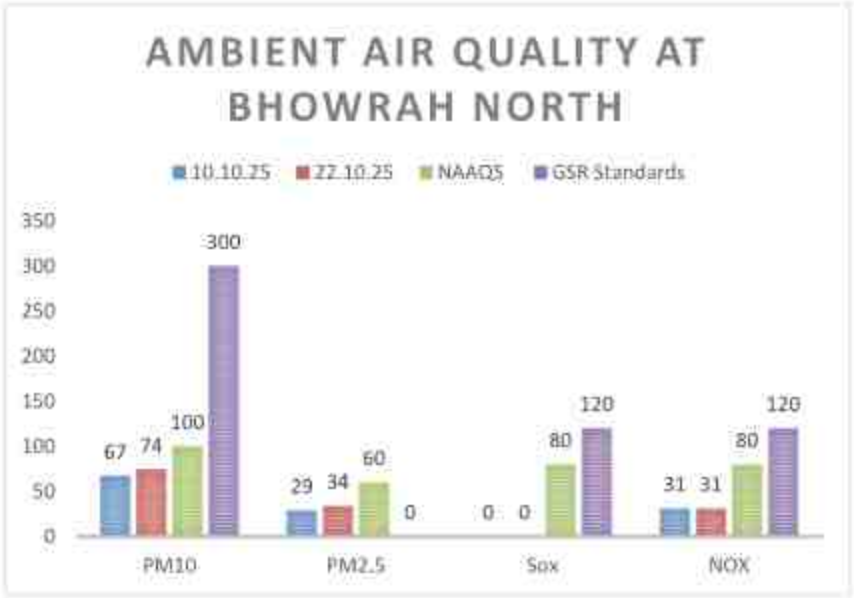
***Note**: The results above relate to the samples tested as received. This report can not be reproduced in part or full without the written permission of the HOD(Env) , CMPDI, RI-II.*

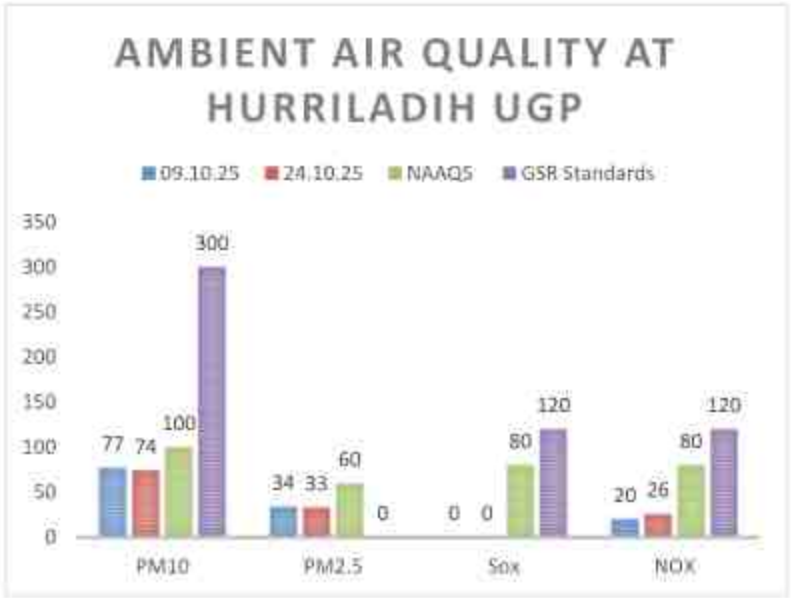
---- End of Report ----

Page -1 of 1

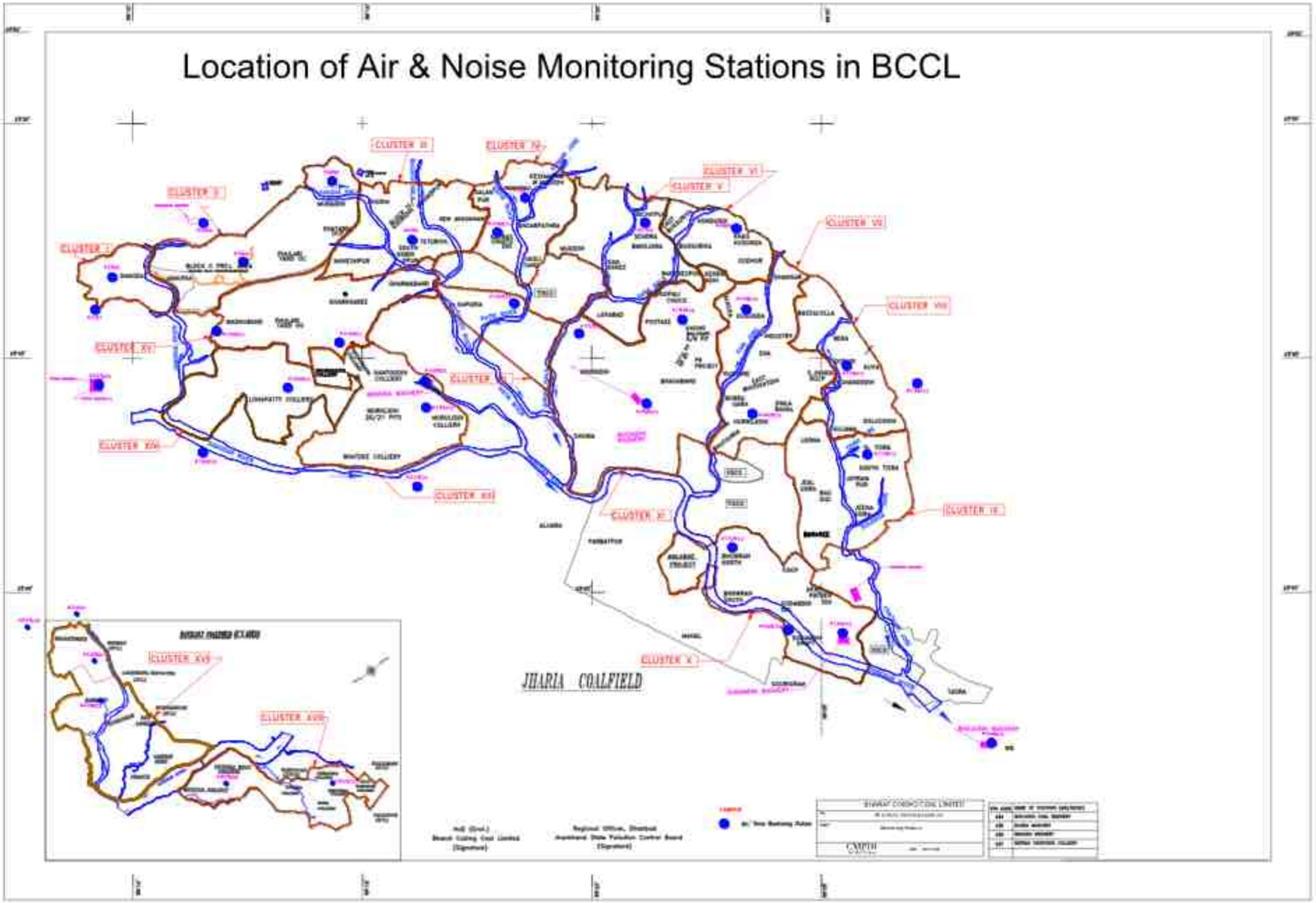








Annexure XXVII



Annexure XXVII

Annexure XXVIII

Form 59

[See rules 115 (2)]

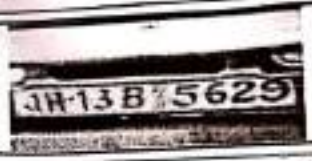
Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date	:	07/09/2022
Time	:	08:57:22 AM
Validity upto	:	06/03/2023

Certificate SL. No.	:	JH01002200003318
Registration No.	:	JH13B5629
Date of Registration	:	23/Oct/2014
Month & Year of Manufacturing	:	September-2014
Vehicle Mobile Number	:	*****7121
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0100220
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm



Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	- 1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.02

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile number[illegible] vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC ope[illegible]
60mm x 20 mm



Scanned with CamScanner

Scanned with CamScanner

Form 59

[See rules 115 (2)]

...tion Under Control Certificate

...ssued By :

...Government of Jharkhand

Date	:	14/07/2022
Time	:	08:50:51 AM
Validity upto	:	13/01/2023

Certificate Sl. No	:	JH01003440000032
Registration No.	:	JH10CC4908
Date of Registration	:	05/Feb/2010
Month & Year of Manufacturing	:	February-2010
Valid Mobile Number	:	******4222
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0100344
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MI observation	:	NA

Vehicle Photo with Registration plate
60 mm x 30 mm



Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.42

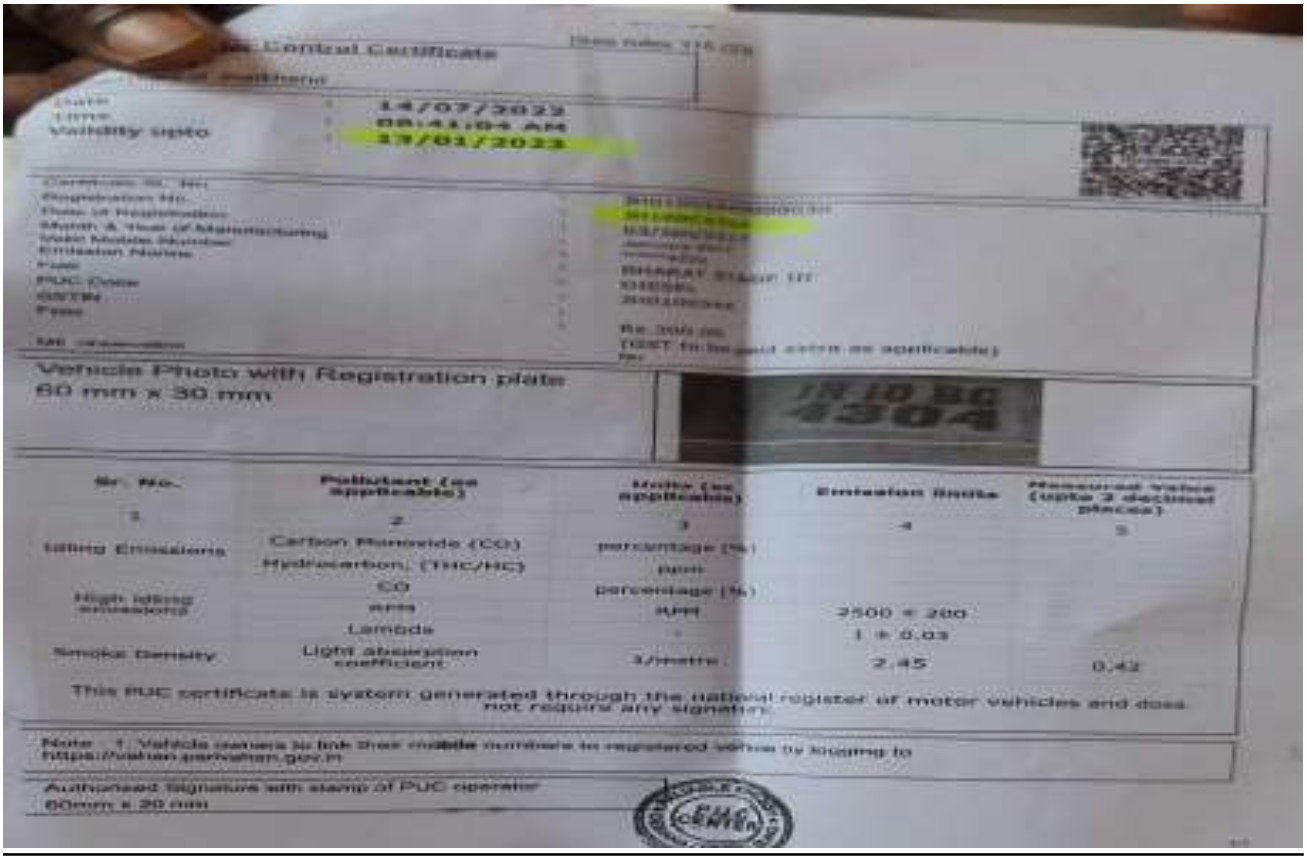
This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

RELIABLE ENERGY PUC CENTER BARWADA / DHANBAD

Scanned with CamScanner



Pollution Control Certificate

Valid upto: 14/07/2022
Time: 08:41:04 AM
Validity upto: 13/01/2023

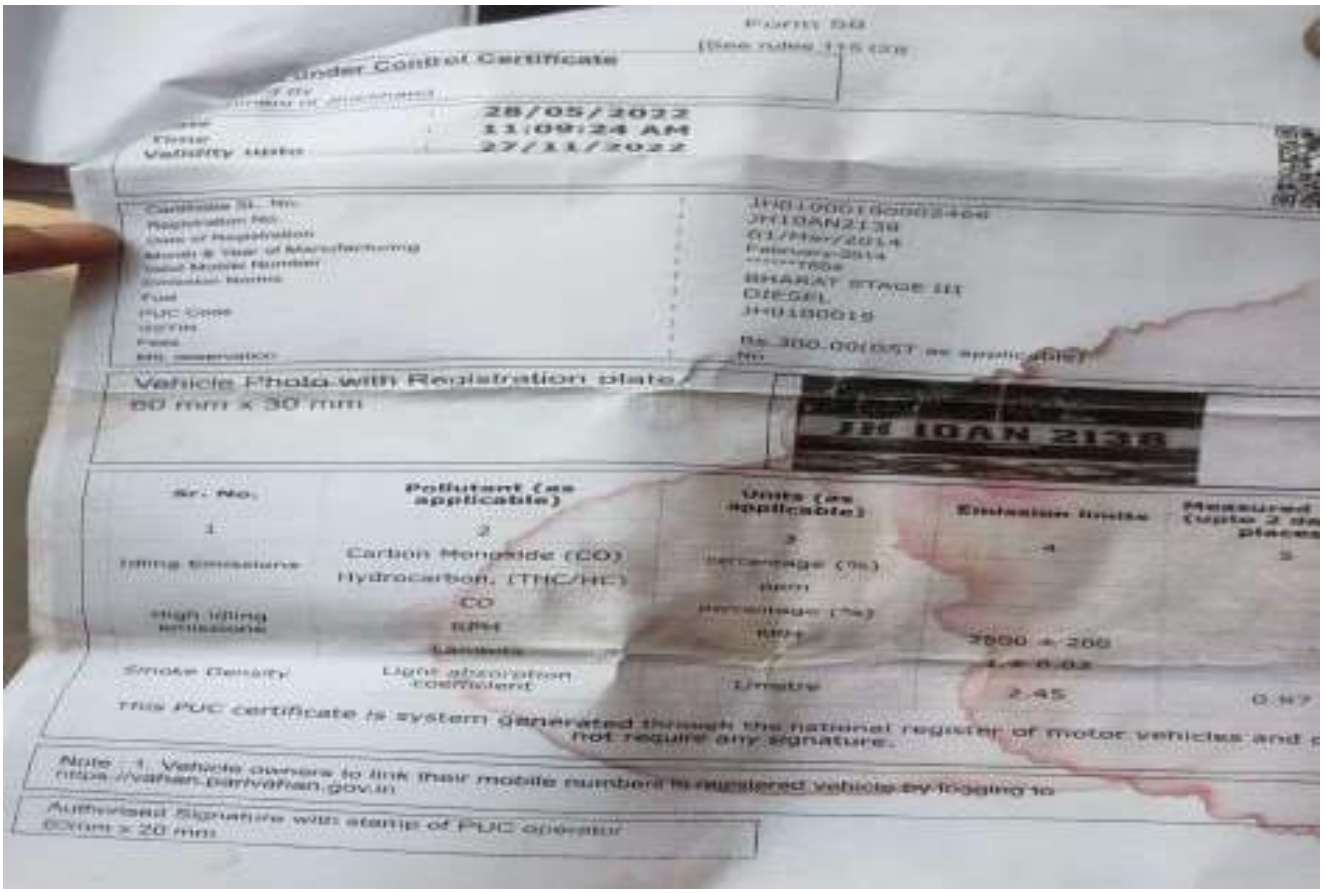
Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.42

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm



Pollution Control Certificate

Valid upto: 28/05/2022
Time: 11:09:24 AM
Validity upto: 27/11/2022

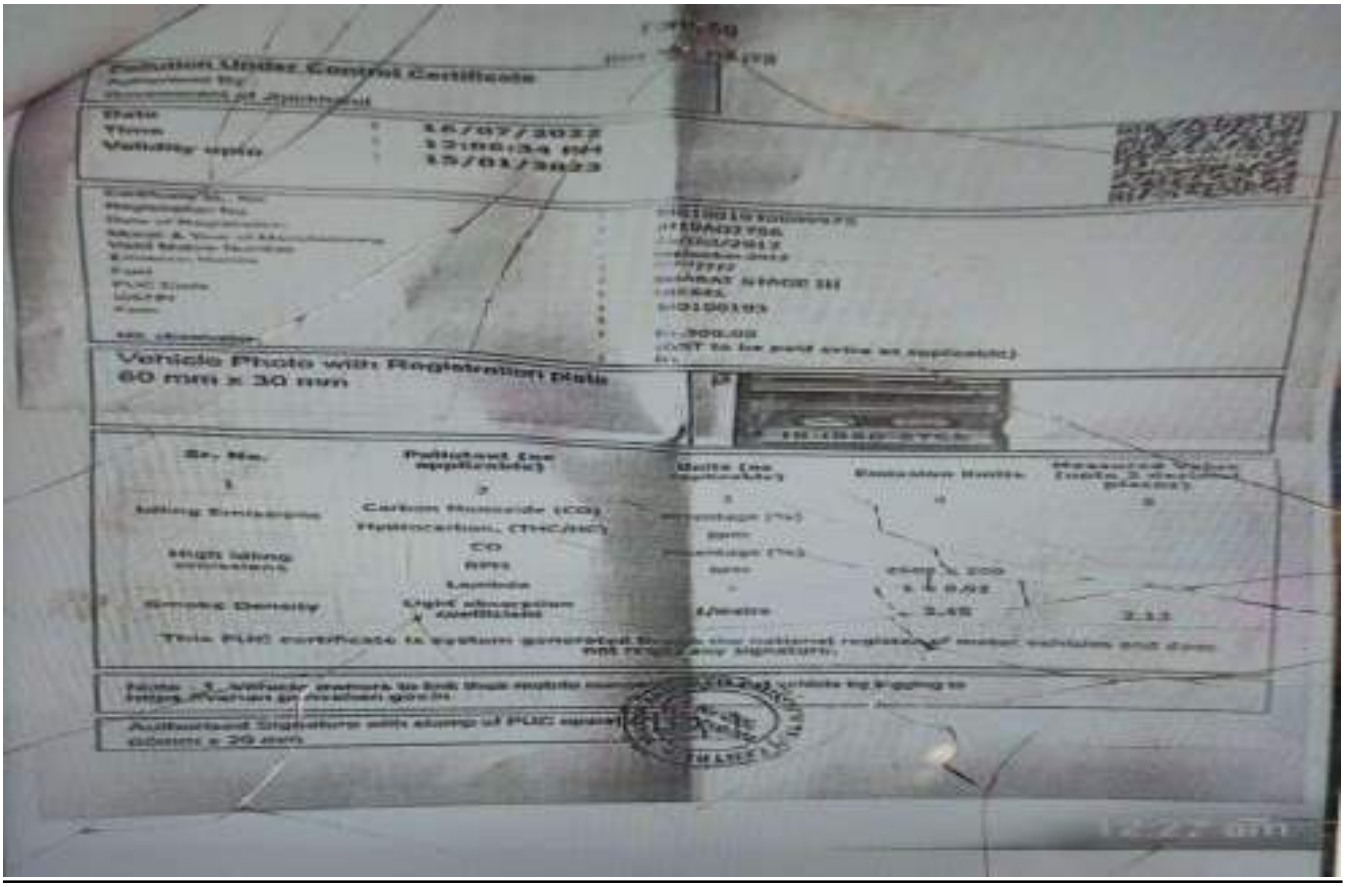
Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.47

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm



Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date : 16/07/2022
Time : 12:06:34 PM
Validity upto : 15/01/2023

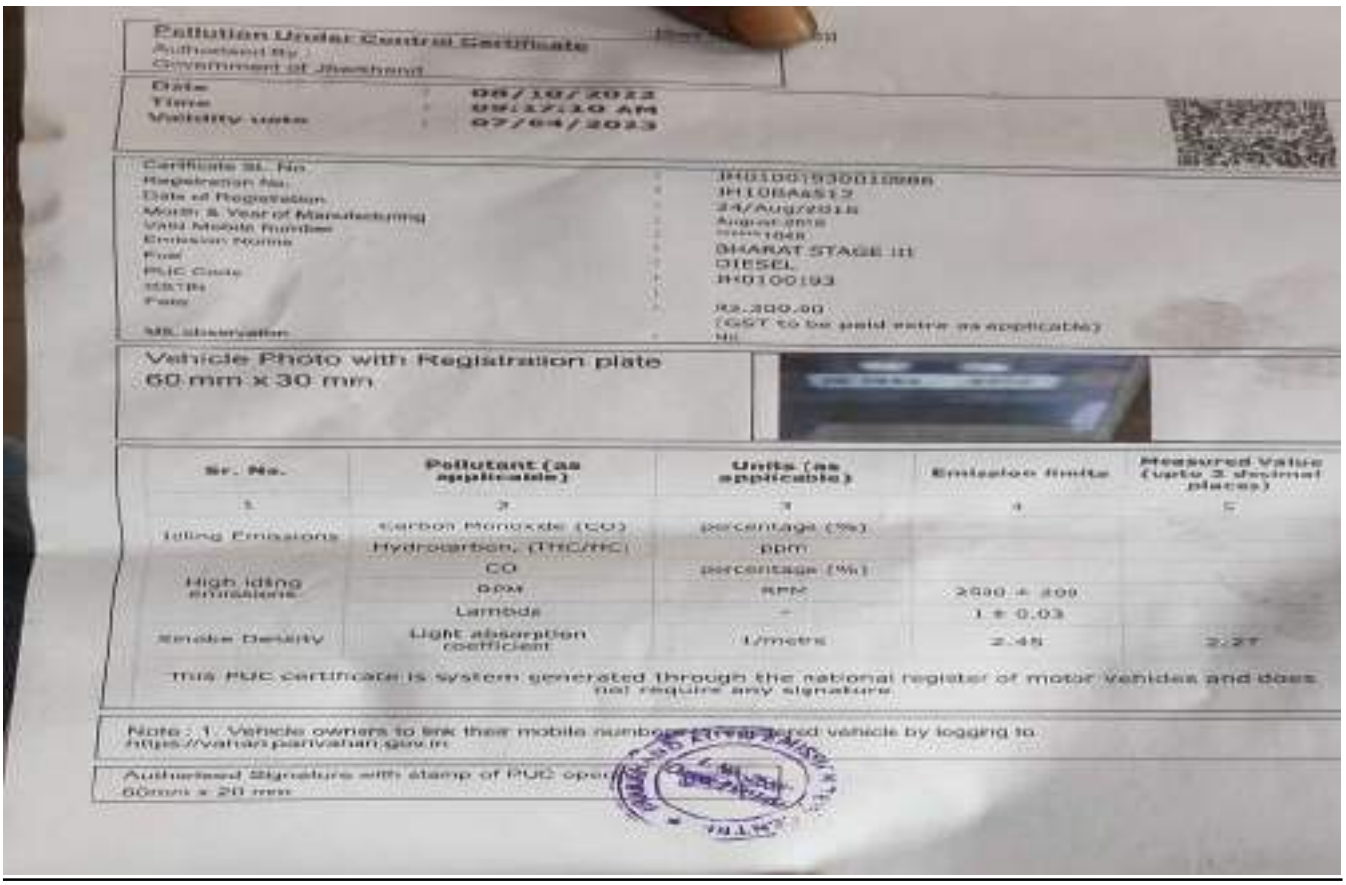
Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.13

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile number to their registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm



Pollution Under Control Certificate

Authorised By :
Government of Jharkhand

Date : 08/10/2022
Time : 09:17:10 AM
Validity upto : 07/04/2023

Certificate SL No	: JH01DD1930010008
Registration No.	: JH10BA5513
Date of Registration	: 24/Aug/2018
Month & Year of Manufacturing	: August,2018
Valid Mobile Number	: ******1048
Emission Norms	: BHARAT STAGE III
Fuel	: DIESEL
PUC Code	: JH0100193
HSRP	:
Fees	: Rs.300.00 (GST to be paid extra as applicable)
MS observation	: Nil

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.27

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile number to their registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

Form 59

(See rules 115 (2))

Pollution Under Control Certificate

Authorised By
Government of Jharkhand

Date	:	19/11/2022
Time	:	12:35:40 PM
Validity upto	:	18/05/2023

Certificate Sl. No	:	JH01D2200000[illegible]
Registration No	:	JH10AF1323
Date of Registration	:	18/Feb/2015
Month & Year of Manufacturing	:	February-2015
Valid Mobile Number	:	[illegible]
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0100008
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MI observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm



Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	ppm	RPM	3300 ± 300	
	Lamda		1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	2.35

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

Form 59

(See rules 115 (2))

Pollution Under Control Certificate

Authorised By
Government of Jharkhand

Date	:	17/09/2022
Time	:	11:04:50 AM
Validity upto	:	16/03/2023

Certificate Sl. No	:	JH01D2200003374
Registration No	:	JH10AQ9302
Date of Registration	:	09/Jul/2014
Month & Year of Manufacturing	:	July-2014
Valid Mobile Number	:	[illegible]886
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	JH0100220
GSTIN	:	
Fees	:	Rs.300.00 (GST to be paid extra as applicable)
MI observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm



Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	ppm	RPM	3300 ± 300	
	Lamda		1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.02

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm



Annexure XVII

Environmental Expenditure Breakdown for Cluster-IX

Capital Cost of Environment Management

Sl. No.	Item	Year	Cost (Lakhs)	Remarks
1.	2.70-3.5 m3 Diesel Hyd. Shovel (For reclamation and other Misc. jobs)	2013-14	217.00	-
2.	8 m3/te tipper	2013-14	264.00	-
3.	Dozer 355 dp	2016-17	613.00	-
4.	Water Sprinkler (10 KL & 28 KL)	2013-14	340.28	-
5.	**POLLUTION MONITORING**			-
	a) Respirable dust sampler	**CMPDIL has been hired for monitoring works and charges of monitoring paid to CMPDI is indicated in monitoring cost.**		
	b) Micro-meteorological station			
	c) Laboratory for testing			
	d) Acoustics for noise pollution control			
6.	Lab Equipment's for monitoring and analyzing air , dust , water , soil , noise , vibration & lighting standards			
7.	Domestic Effluent Treatment Plant (Septic tanks)	2017-18	5.00	-
8.	Industrial Effluent Treatment Plant	2012-13	2.00	-
9.	Procurement of 15 nos. of Rain Gun type fixed sprinkler for Railway Siding	2019-20	2.12	-
10.	Procurement of Truck Mounted Fog Cannon	2021-22	24.80	-
11.	Procurement of 02 nos. of PM10 Analyzer	2021-22	42.69	-
12.	Procurement of DWLR	2022-23	0.75	-
13.	Construction of rainwater Harvesting structures	2023-24	14.63	-
14.	Installation of Water flow meter	2023-24	25.14	-
15.	Installation of ETP	2023-24	4.90	-
16.	Procurement of Mechanical Sweeper	2024-25	4.90	-
17.	Procurement of COAAQMS	2025-26	60.00	-
18.	Toe wall construction	2025-26	50.00	-

Annexure XXIX

Revenue Cost of Environment Management

Sl. No.	Item	Actual cost incurred (lakhs)									Remarks
		FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	
1.	Air quality Monitoring Cost	Approx. 5.8428	Approx. 25.26503	Approx. 30.07068	Approx. 20.97	Approx. 8.53	Approx. 11.03	Approx. 20.88	Approx. 21.72	Approx. 21.22	As per information provided by Env department, HQ: Being done by CMPDIL RI-II Dhanbad
2.	Water quality Monitoring Cost										
3.	Noise Monitoring Cost										
4.	Green Belt Development	331.78572 (9292 nos. of Manpower with EMS @3570.66)	364.25468 (9944 nos. of Manpower with EMS @ 3663.06)	342.64941 (7434 nos. of Manpower with EMS @ 4609.22)	208.85581 (4079 nos. of Manpower with EMS @ 5120.27)	225.84768 (4832 nos. of Manpower with EMS @ 4674.00)	329.20915 (4723 nos. of Manpower with EMS @ 6970.34.00)	298.92 (4123 nos. of Manpower with EMS @ 7250.43)	Nil	Nil	Manpower Cost incurred on Green Belt Development
5.	Ecological Restoration	33.31425	5.49459	43.00402	47.77211	7.28	27.38	5.56	5.88	Nil	-
6.	CSR	1145	274	143	601	239	493.00	1,142.00	777.34	2,355.3	Being Done at M/S BCCL HQ
7.	Miscellaneous	189.32444	229.15276	318.48138	266.50	273.60	279.88	320.08	322.92	338.92	Protective measures taken for the prevention of dust generation from the waste material. Water Sprinkling on haul roads

1.	EMP Preparation Cost	Rs.107.21 Lakhs (As per information provided by Env. Deptt. HQ, BCCL)
2.	Toe wall Construction (2020-21)	Rs.2,30,000.00
3.	Separate Reservoir of Oil and water in O&G Trap	Rs.70,000.00
	Plantation Cost (16 Ha. of OB dump reclaimed by DFO, Dhanbad) - for the FY 2020-21	Rs.99,287.00
4.	Maintenance of Gokul park	Rs.1.2 lakh/year
5.	CTE of NT-ST-JG GROUP OF MINES	Rs.8,33,280.00
6.	CTO (upto March'23) of NT-ST-JG GROUP OF MINES	Rs.10,99,882.00
7.	CTE of Amal. Joyrampur OC	Rs.75,000.00
8.	CTO (upto June'22) of Amal. Joyrampur OC	Rs.3,37,500.00
9.	Plantation Cost (Approx.) (16 Ha. of OB dump reclaimed by DFO, Dhanbad)	Rs. 15,88,599.00 - for the FY 2020-21
10.	Plantation Cost (Approx.) (16 Ha. of OB dump reclaimed by DFO, Dhanbad)	Rs. 06,76,834.00 - for the FY 2021-22
11.	Avenue Plantation Cost FY 2020-21 DFO, Dhanbad	Rs. 12,29,190.00
12.	Avenue Plantation Cost FY 2021-22 by DFO, Dhanbad	Rs. 06,70,776.00
13.	Avenue Plantation Maintenance Cost FY 2022-23 by DFO, Dhanbad	Rs. 5,61,175.65
14.	Avenue Plantation Maintenance Cost FY 2023-24 by DFO, Dhanbad	Rs. 5,88,938.00
15.	CTO (upto March'27) of Cluster IX GROUP OF MINES	Rs. 11,00,000.00
16.	Jore Diversion Study (by CWPRS)	Rs. 25,00,0000.00

रविवार, दिसम्बर 15 जून 2013

रविवार, दिसम्बर 15 जून 2013

रविवार, दिसम्बर 15 जून 2013

था। यहीं नहीं, पूजा के बाद आदित्य का नाम अभिनेत्री कंगना रनौत के साथ जुड़ा।

अपने परिजनों को बताई। परिजनों ने मामले की जानकारी पुलिस को दी। पुलिस ने मेडिकल कराकर रेप का केस दर्ज कर लिया।

पर

ांच

जाएंगे। ों वह खती के मैनेजमेंट या होगा, तो न एक्सपर्ट्स में लाएंगे। के विभाग में इंटरनेट का का है। ऐसे लोग हाथ में धक से उन्हें लगता है। इस यह मान जगा के बीच ती दोनों साथ ाल एक और सूरज को लग भी जवाब में ीगे। सूरज के है? डीसीपी हद को सुझाव थ ही भी।

भारत कोकिंग कोल लिमिटेड
(कोल इंडिया लिमिटेड का एक अंग)

पर्यावरण विभाग

कोयला भवन : धनबाद

झारखंड

सभी संबंधित व्यक्तियों को सूचित किया जाता है कि भारत कोकिंग कोल लिमिटेड के क्लस्टर-9 को पर्यावरण एवं वन मंत्रालय के द्वारा पर्यावरणीय स्वीकृति दी गई है जो इस प्रकार है:-

क्रम संख्या	क्लस्टर (खान समूह) का नाम	स्वीकृति पत्र संख्या एवं दिनांक
1.	झरिया कोलफिल्ड में स्थित भारत कोकिंग कोल लिमिटेड का क्लस्टर-9 जिसका कुल खान पट्टा क्षेत्र 1942.12 हेक्टर है एवं उत्पादन क्षमता सामान्य 6.548 मिलियन टन प्रति वर्ष एवं अधिकतम क्षमता 8.512 मिलियन टन प्रति वर्ष है और जिसमें लोदना, जयरामपुर, बरारी, जियलगोरा, जिनागोरा, एन टी-एस टी एवं प्रस्तावित एन टी-एस टी विस्तार शामिल है।	J-11015/307/2010-IA.II(M) दिनांक 21 मई, 2013

पर्यावरणीय स्वीकृति की प्रतिलिपि झारखंड राज्य प्रदूषण नियंत्रण बोर्ड के पास उपलब्ध है तथा इसे पर्यावरण एवं वन मंत्रालय की आधिकारिक वेबसाईट http://envfor.nic.in और भारत कोकिंग कोल लिमिटेड के आधिकारिक वेबसाईट http://www.bccl.gov.in पर उपलब्ध है।



भारत कोकिंग कोल लिमिटेड
(कोल इंडिया लिमिटेड का एक अंग)

पर्यावरण विभाग

कोयला भवन : धनबाद, झारखण्ड

सभी सम्बंधित व्यक्तियों को सूचित किया जाता है कि भारत कोकिंग कोल लिमिटेड के क्लस्टर-9 को पर्यावरण एवं वन मंत्रालय के द्वारा पर्यावरणीय स्वीकृति दी गई है जो इस प्रकार है :-

क्रम संख्या	क्लस्टर (खान समूह) का नाम	स्वीकृति पत्र संख्या एवं दिनांक
1.	झरिया कोलफिल्ड में स्थित भारत कोकिंग कोल लिमिटेड का क्लस्टर-9 जिसका कुल खान पट्टा क्षेत्र 1942.12 हेक्टर है एवं उत्पादन क्षमता सामान्य 6.548 मिलियन टन प्रति वर्ष एवं अधिकतम क्षमता 8.512 मिलियन टन प्रति वर्ष है और जिसमें लोदना, जयराम-पुर, बरारी, जियलगोरा, जिनागोरा, एन टी-एस टी एवं प्रस्तावित एन टी-एस टी विस्तार शामिल है.	J-11015/307/2010- IA.II (M) दिनांक 21 मई, 2013

पर्यावरणीय स्वीकृति की प्रतिलिपि झारखंड राज्य प्रदूषण नियंत्रण बोर्ड के पास उपलब्ध है तथा इसे पर्यावरण एवं वन मंत्रालय की आधिकारिक वेबसाईट http://envfor.nic.in और भारत कोकिंग कोल लिमिटेड के आधिकारिक वेबसाईट http://www.bccl.gov.in पर उपलब्ध है.

ः सूत्रों का कहना है कि राज्य ... विलय का प्राक्रया पूरी की जाएगी। शिक्षक बीआरसी पहुंचे थे। पारा शिक्षकों का कहना था कि विद्यालय

रत कोकिंग कोल लिमिटेड
'एक मिनीरत्न कम्पनी'
(कोल इण्डिया लिमिटेड का एक अंग)
कोयला भवन, कोयला नगर, धनबाद
पर्यावरण विभाग

BHARAT COKING COAL LIMITED
(A Mini Ratna Company)
(A subsidiary of Coal India Limited)
Koyla Bhawan, Koyla Nagar, Dhanbad
Environment Department

s is to bring to notice of all concerned that the Environmental Clearance granted to Cluster-IX of Bharat king Coal Limited, located at Dhanbad District, Jharkhand vide letter-no.J- 11015/307/2010-IA.II(M), ted 21st May, 2013 has been amended as following by Ministry of Environmental, Forests and Climate ange Vide sanctioned Order No. J-11015/307/2010IA.II(M), dated 1st March, 2018.

Name of the Mine	Lease hold Area	Normative Capacity	Peak Capacity
Amalgamated Joyrampur Colliery (OC)	1186.97 ha	2.512 MTPA	3.25 MTPA
NT-ST Expansion OCP	755.15 ha	6.0 MTPA	7.8 MTPA
Cluster Total peak capacity of 8.512 MTPA on lease hold area of 1942.12 ha			

Environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may be seen at the website of the Ministry of Environment & Forests at http://envfor.nic.in and also on Bharat Coking Coal Limited official Website http://www.bcclweb.in

सभी सम्बंधित व्यक्तियों को सूचित किया जाता है कि भारत कोकिंग कोल लिमिटेड के क्लस्टर-9 को पर्यावरण एवं वन-मंत्रालय के द्वारा पर्यावरणीय स्वीकृति में बदलाव की गई है जिसकी स्वीकृति पत्र संख्या -11015/307/2010-IA.II (M) दिनांक 01 मार्च, 2018 है।

खान का नाम	खान पट्टा क्षेत्र	उत्पादन क्षमता सामान्य	अधिकतम क्षमता
अमलगमेटेड जयरामपुर कोलियरी (ओसीपी)	११८६.९७ हेक्टेर	२.५१२ मिलियन टन प्रति वर्ष	३.२५ मिलियन टन प्रति वर्ष
एन टी-एस टी विस्तार (ओसीपी)	७५५.१५ हेक्टेर	६.० मिलियन टन प्रति वर्ष	७.८ मिलियन टन प्रति वर्ष
क्लस्टर कुल अधिकतम क्षमता ८.५१२ मिलियन टन प्रति वर्ष एवं खान पट्टा क्षेत्र १९४२. १२ हेक्टेर			

पर्यावरणीय स्वीकृति की प्रतिलिपि झारखंड राज्य प्रदूषण नियंत्रण बोर्ड के पास उपलब्ध है तथा इसे पर्यावरण एवं वन मंत्रालय की आधिकारिक वेबसाईट http://envfor.nic.in और भारत कोकिंग कोल लिमिटेड के आधिकारिक वेबसाईट http://www.bccl.gov.in पर उपलब्ध है।

28.03.2018

Annexure XXXI

No. J-11015/307/2010-IA.II (M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
CGO Complex,
New Delhi-110510.

To

Dated: 21st May, 2013

General Manager (Environment)
M/s Bharat Coking Coal Ltd.
Koyala Bhawan,
Dhanbad-826005
Jharkhand

Sub. : - Cluster IX group of six mines (combined preproduction capacity of 6.548 MTPA with a peak capacity of 8.512 MTPA in a total combine ML area of 1942.12 ha) of M/S Bharat Coking Coal Limited located in Jharia Coal Field (EC based on TOR granted on 23.12.2010) -Environment Clearance –reg.

Sir,

This has reference to the letter no. 430II/40/2010-CPAM dated 05th October, 2010 of Ministry of Coal along with your application for Terms of Reference (TOR) and this Ministry's grant of TOR on 23.12.2010. Reference is also invited to the letters no. BCCL/GM (Env.)/ /F-EMP-Cluster-IX/2012/490 dated 16.06.2012, 28/29.12.2012 and 31.01.2013 on the above-mentioned subject.

2. The Ministry of Environment & Forests has considered the application. It is noted that the proposal is for **Cluster IX group of six mines (combined preproduction capacity of 6.548 MTPA with a peak capacity of 8.512 MTPA in a total combine ML area of 1942.12 ha) of M/S Bharat Coking Coal Limited located in Jharia Coal Field**, dist. Dhanbad, Jharkhand. The proponent has informed that:

21/12/2021
श्रीमति बबिता गोराई
पार्षद
वार्ड संख्या-49
धनबाद नगर निगम

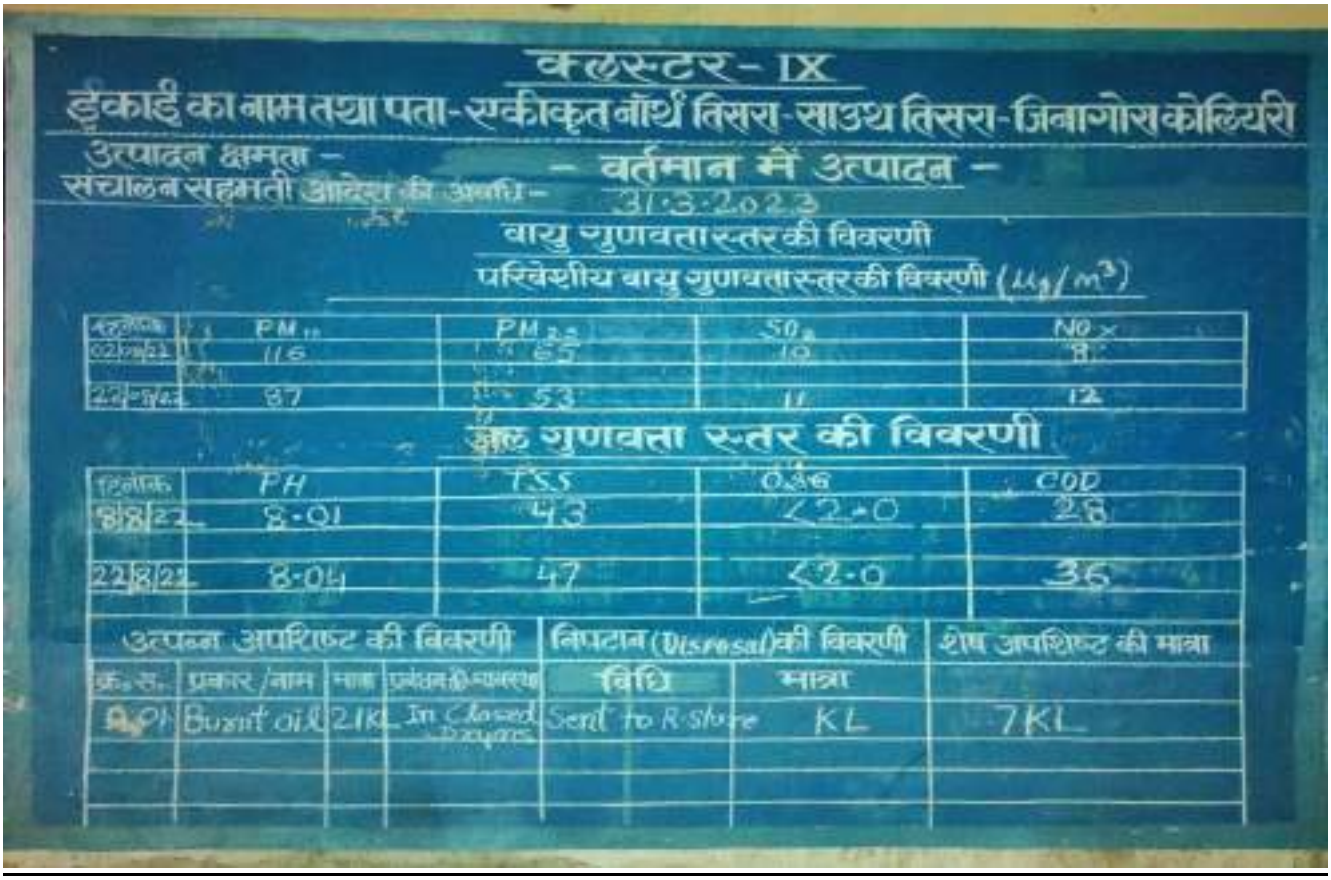
i. There are 6 underground mines (5 operating and 1 UG mine closed for operation only) and 2 OCP mines. The operating underground mines are Lodna UG, North Tisra(UG), Joyrampur (UG), Barari UG, Jealgora (UG), one Jeenagora Underground mine(closed for operation, mine not closed) and two opencast mines are Jeenagora OCP & proposed north Tisra/South Tisra expansion of OCP (NT/ST OCP). The cluster IX is in East-Central part of Jharia Coalfield Nearest Railway station is Bhaga Railway station which is located at 4 Km from Lodna area. Cluster IX mines of BCCL is located in the eastern part of Jharia Coal Field. The Cluster is bounded in the east by metamorphics, in the west by cluster cluster VII mines of BCCL and TISCO mines, in the north by Cluster VIII mines of BCCL and in the south by Cluster X mines of BCCL and metamorphics.

ii. As per the cluster approach, the production capacity of cluster IX is 6.548 MTPA (Normative) and 8.512 MTPA (Peak) in total lease area of 1942.12 ha.

iii. This proposal does not involve change in technology or change in product mix in the mines.

iv. This cluster is severely affected by mine fires and unstable areas. 2.245 sq km of habitated surface area is affected by mine fires and instability consisting of 98 unstable sites as per the approved Jharia Action Plan. In order to deal with the severe problem of fires and unstable sites, it is proposed to amalgamate/ merge some of the

Annexure XXXII



क्लस्टर - IX

इकाई का नाम तथा पता- एकीकृत बाँथें तिसरा-साउथ तिसरा-जिनागोरा कोलियरी

उत्पादन क्षमता –

संचालन सहमती आदेश की अवधि –

– वर्तमान में उत्पादन –

31.03.2023

वायु गुणवत्ता स्तर की विवरणी

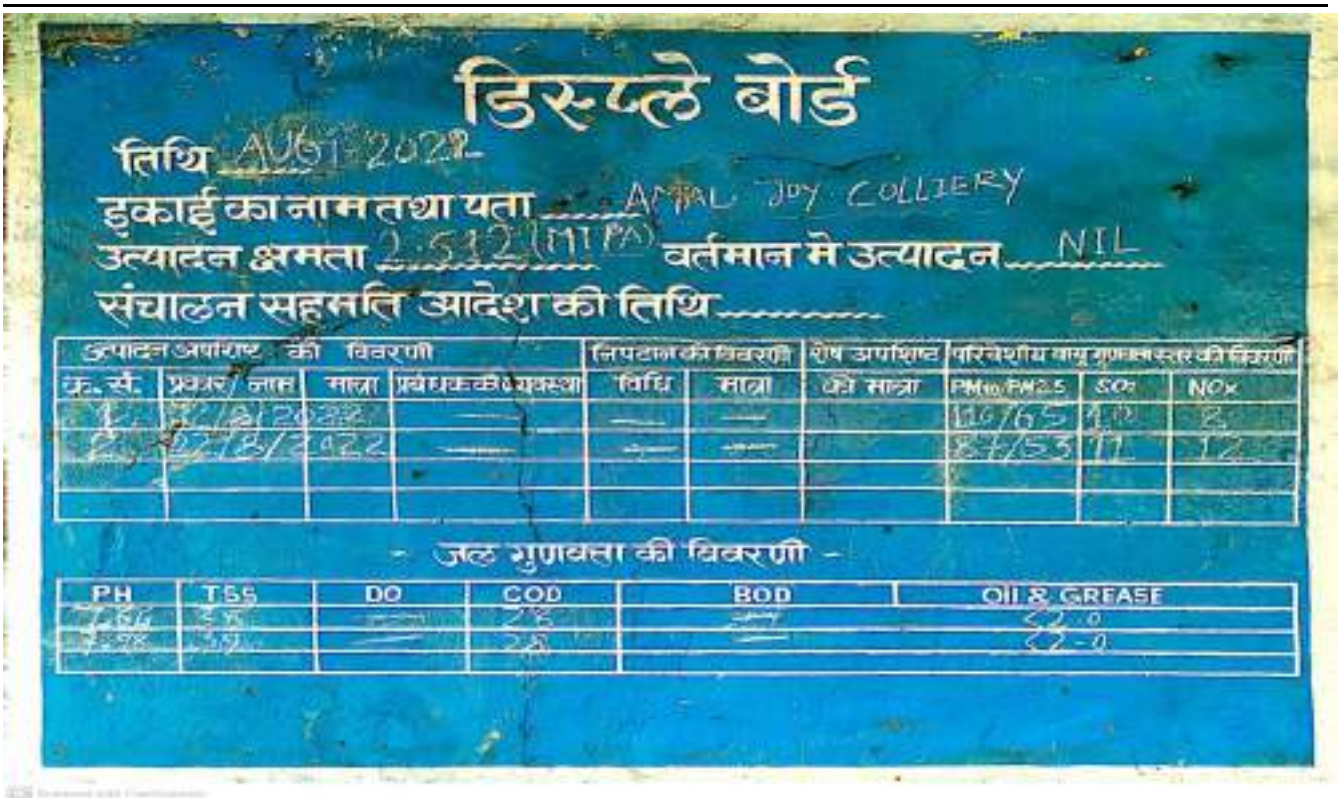
परिवेशीय वायु गुणवत्ता स्तर की विवरणी ($\mu g/m^3$)

दिनांक	PM_{10}	$PM_{2.5}$	SO_2	NO_x
21/8/22	116	65	10	8
22/8/22	87	53	11	12

जल गुणवत्ता स्तर की विवरणी

दिनांक	PH	TSS	O&G	COD
21/8/22	8.01	43	<2.0	28
22/8/22	8.04	47	<2.0	36

उत्पन्न अपशिष्ट की विवरणी				निपटान (Disposal) की विवरणी		शेष अपशिष्ट की मात्रा
क्र. सं.	प्रकार / नाम	मात्रा	प्रबंधन की व्यवस्था	विधि	मात्रा	
A.PH	Burnt oil	21KL	In Closed Drums	Sent to R Store	KL	7KL



डिस्प्ले बोर्ड

तिथि AUG-2022

इकाई का नाम तथा पता ANIAL JOY COLLIERY

उत्पादन क्षमता 2.512 (MTPA) वर्तमान मे उत्पादन NIL

संचालन सहमति आदेश की तिथि .....

उत्पादन अपशिष्ट की विवरणी				निपटान की विवरणी		शेष अपशिष्ट की मात्रा	परिवेशीय वायु गुणवत्ता स्तर की विवरणी		
क्र. सं.	प्रकार / नाम	मात्रा	प्रबंधन की व्यवस्था	विधि	मात्रा		PM10/PM2.5	SO_2	NO_x
1.	21/8/2022	—	—	—	—		116/65	10	8
2.	22/8/2022	—	—	—	—		87/53	11	12

जल गुणवत्ता की विवरणी –

PH	TSS	DO	COD	BOD	OIL & GREASE
8.01	43	—	28	—	<2.0
8.04	47	—	36	—	<2.0

भारत कोकिंग कोल लिमिटेड
'एक मिनी रत्न कंपनी'
(कोल इंडिया का एक अंग)
महाप्रबंधक का कार्यालय
लोदना क्षेत्र ,पो.-भागा
धनबाद -828301,(झारखंड)
वेबसाइट :www.bcclweb.in
ईमेल :gmlodna.bccl@coalindia.in
सी.आई.एन.:U10101JH1972GO1000918

बीसीसीएल
BCCL

Bharat Coking Coal Limited
A Mini Ratan Company
(A Subsidiary of Coal India Limited)
Office of the General Manager
Lodna Area , PO-Bhaga
Dhanbad-828301 (Jharkhand).
Website: www.bcclweb.in
Email: gmlodna.bccl@coalindia.in
CIN:U10101JH1972GO1000918

Ref. No: - BCCL/LA/GM/ENVT/2025-26/ 708 Dated:- 27/9/25

To,
The Member Secretary
Jharkhand State Pollution Control Board
T.A. Building, Ground Floor, HEC, Dhruva, Ranchi-864004.

Sub:-Submission of Environmental Statement for the financial year 2024-25 ending on the 31st March 2025 in respect of Cluster IX, Lodna Area BCCL.

Dear Sir,

Please find enclosed herewith the environmental statement for financial year 2024-25 ending on the 31st March 2025 in respect of Cluster IX, Lodna Area BCCL. in duly filled form V.

We request you to kindly accept it.

Encl:- As Above

Yours faithfully

General Manager
Cluster IX, Lodna Area ECCL

महाप्रबंधक
लोदना क्षेत्र–10, भा.को.को.लि.
General Manager
Lodna Area No.-X, B.C.C.L.

Copy to -

1. The regional Officer, JSPCB, Dhanbad.
2. Office Copy.

CamScanner

FORM –V

(Sec rule 14)

Environmental Statement For The Financial Year Ending The 31st March 2025

PART-A

(1)	Name and address of the Owner/Occupier of the industry/ Operation or Process:	Sri Nikhil Trivedi, General Manager, Cluster IX group of Mines, Lodna More, Bhaga, Lodna Area, Bharat Coking Coal Ltd
(2)	Industry Category primary-(STC Code) Secondary –(STC Code):	Primary
(3)	Production Capacity:	8.512 MTPA
(4)	Year of Establishment:	Pre Nationalisation (Pre 1973)
(5)	Date of last environmental statement submitted	30th September, 2024

PART –B

1. Water and Raw Material Consumption

Water Consumption	Daily In KL
1. Process	650
2. Cooling	NIL
3. Domestic	8200

Name of Products:	Process water consumption per unit of product point	
	During the previous financial year (2023-24)	During the current financial year (2024-25)
COAL	0.0206 KL/Tonne	0.3856 KL/Tonnes

2. Raw Material Consumption

Name of Raw Material	Name of Products	Consumption of Raw Materials Per unit of Product output.	
		During the previous financial year (2023-24)	During the current financial year (2024-25)
POL (Ltr/Tonne)	COAL	6.17	12.45
Explosive (Kg/Tonne)	COAL	1.85	10.09

*Industry may use codes if disclosing details of raw material would violate contractual obligations otherwise all industries have to name the material used.

CamScanner

PART-C

Pollution discharged to Environment/unit of output (Parameter as specified in the consent issued)

Pollution	Quality of pollutants Discharged (Mass/Day)	Concentration of pollution discharged (Mass/Volume)	Percentage of variation from prescribed stack with reason.
a) Water	Within permissible limit. Analysis report is enclosed as Annexure -1.	Within the limit.	The quality of water discharge meets the standards.
b) Air	Within permissible limit. Analysis report is enclosed as Annexure -1.	Within the limit.	The quality of air meets the standard.

PART-D

Hazardous Wastes (As specified under hazardous Wastes / Management and Handling rules, 1989)

Hazardous Wastes	Total Quantity (in Kg.)	
	During the previous financial year (2023-24)	During the current financial year (2024-25)
a) From Process	3 KL	5 KL
b) From pollution Control Facilities	NIL	NIL

PART –E

Solid Wastes

Solid Wastes	Total Quantity (in Kg.)	
	During the previous financial year (2023-24)	During the current financial year (2024-25)
a) From Process	OB-267.15 Mm^3	OB- 55.32 Mm^3

CamScanner

b) From pollution Control Facilities	NIL	NIL
1. Quantity recycled or reutilized with the unit. **2. Solid** **3. Disposal**	The overburden excavated during mining operations will be utilized for backfilling the mine voids subsequent to the cessation of mining activities	The overburden excavated during mining operations will be utilized for backfilling the mine voids subsequent to the cessation of mining activities

PART –F

Please specify the characterizations (in terms of composite and quantum) of hazardous as well as solid wastes and indicated disposal practice adopted for both these categories of waste.

Hazardous wastes generated mainly from workshops, such as burnt and spent oil, are being stored, transported, and managed in accordance with the Hazardous Waste (Management and Handling) Rules, and are finally disposed of through auctioning via the central store. Overburden (OB) generated as solid waste during mining operations will be systematically utilized for void filling at the end of the mining operations.

PART –G

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.

1. Water sprinkler tankers are being deployed for dust suppression in operational areas.
2. Mechanical sweepers are being operated to control road dust within the cluster leasehold.
3. An Effluent Treatment Plant (ETP) is being operated at Jealgora Regional Hospital for wastewater management.
4. A pressure filter is being run to ensure potable water supply.
5. Coal is being transported in covered carriers to minimize fugitive emissions.
6. Mobile water sprinklers and fog cannons are being used along major haul and transport roads for dust suppression.
7. Plantation is being maintained along the roads for dust control and ecological improvement.
8. Around 1 km of toe wall is being constructed along the overburden (OB) dump to control run-off and stabilize slopes.
9. Pucca roads has been constructed from South Tisra Workshop (non-operational) to North Tisra Checkpost to reduce dust generation.
10. Grass seeding is being undertaken on dormant OB dumps to prevent erosion and suppress dust.
11. Coal is being wetted before loading at railway sidings to reduce particulate emissions.
12. A PM10 analyser is being operated for continuous monitoring of ambient air quality.
13. Trolley-mounted fog cannons are being operated at GOL Siding No. 9 for localized dust mitigation.
14. Piezometers and flow meters have been installed to monitor and regulate groundwater levels.

CamScanner

PART –H

Additional measures/Investment proposal for environment protection including abatement of pollution, prevention of pollution.

Monitoring of various environmental parameters is being conducted continuously in accordance with the guidelines prescribed by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Jharkhand State Pollution Control Board (JSPCB).

Applications for consent to emit or continue emission under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981, as well as applications for consent to discharge or continue discharge under Sections 25/26 of the Water (Prevention and Control of Pollution) Act, 1974, will be submitted regularly. All conditions stipulated in the Consent to Operate granted by JSPCB will be rigorously adhered to.

PART –I

Any other particulars for improving the quality of the environment.

All directives issued by MoEF&CC and JSPCB are being complied with for continuous improvement of environmental quality.

General Manager
Cluster IX, Lodna Area
BCCL

महाप्रबंधक
लोदना क्षेत्र–10, भा.को.को.लि.
General Manager
Lodana Area No.-X, B.C.C.L.

CamScanner

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.

TRACE METAL CONCENTRATION OF AMBIENT AIR QUALITY REPORT OF BHARAT COKING COAL LIMITED,

(FOR THE HALF YEAR ENDING, DECEMBER, 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

(FOR THE Q.E. DECEMBER**, 2025)**

CONTENTS

SL. NO.	CHAPTER	PARTICULARS
1.	CHAPTER - I	EXECUTIVE SUMMARY INTRODUCTION
2.	CHAPTER-II	AIR SAMPLING & ANALYSIS
3.	**PLATES:** PLATE NO. - I	SURFACE PLAN SHOWING AIR & NOISE MONITORING LOCATIONS

EXECUTIVE SUMMARY

1.0 Introduction

The purpose of environmental monitoring is to assess the quality of various attributes that affects the environment around us. In accordance with the quality of these attributes appropriate strategy is to be developed to control the pollution level within the permissible limits. One of these major attributes is water.

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

3.0 Methodology of sampling and analysis

3.1 Heavy Metal in Ambient Air

Parameters chosen for assessment of Heavy metal in Ambient Air Quality were Cadmium (Cd), Mercury (Hg), Arsenic (As), Chromium (Cr), Nickel (Ni), and Lead (Pb). Respirable Dust Samplers (RDS) were used for sampling these heavy metals on EPM filter paper. These heavy metals are analyzed regularly on half yearly basis. The samples were analyzed in Environment Laboratory of CMPDI, RI-II, Dhanbad.

4.0 Results and interpretations

4.1 Heavy Metal in Ambient Air

The results of Heavy metal in Ambient Air Quality are presented in tabular form for each monitoring station. The concentration of heavy metals in ambient air is well within the permissible limit.

CHAPTER - I

INTRODUCTION

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

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

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

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

CHAPTER – II

AMBIENT AIR QUALITY MONITORING

2.1 Results and interpretations

The results of Heavy metal in Ambient Air Quality are presented in tabular form for each monitoring station. The concentration of heavy metals in ambient air is well within the permissible limit.

TRACE METAL CONCENTRATION IN AMBIENT AIR QUALITY

Name of the Company: **Bharat Coking Coal Limited** Year : **2025-26.**

PERIOD: **HALF YEAR ENDING DECEMBER, 2025**

HEAVY METAL ANALYSIS REPORT OF AMBIENT AIR QUALITY

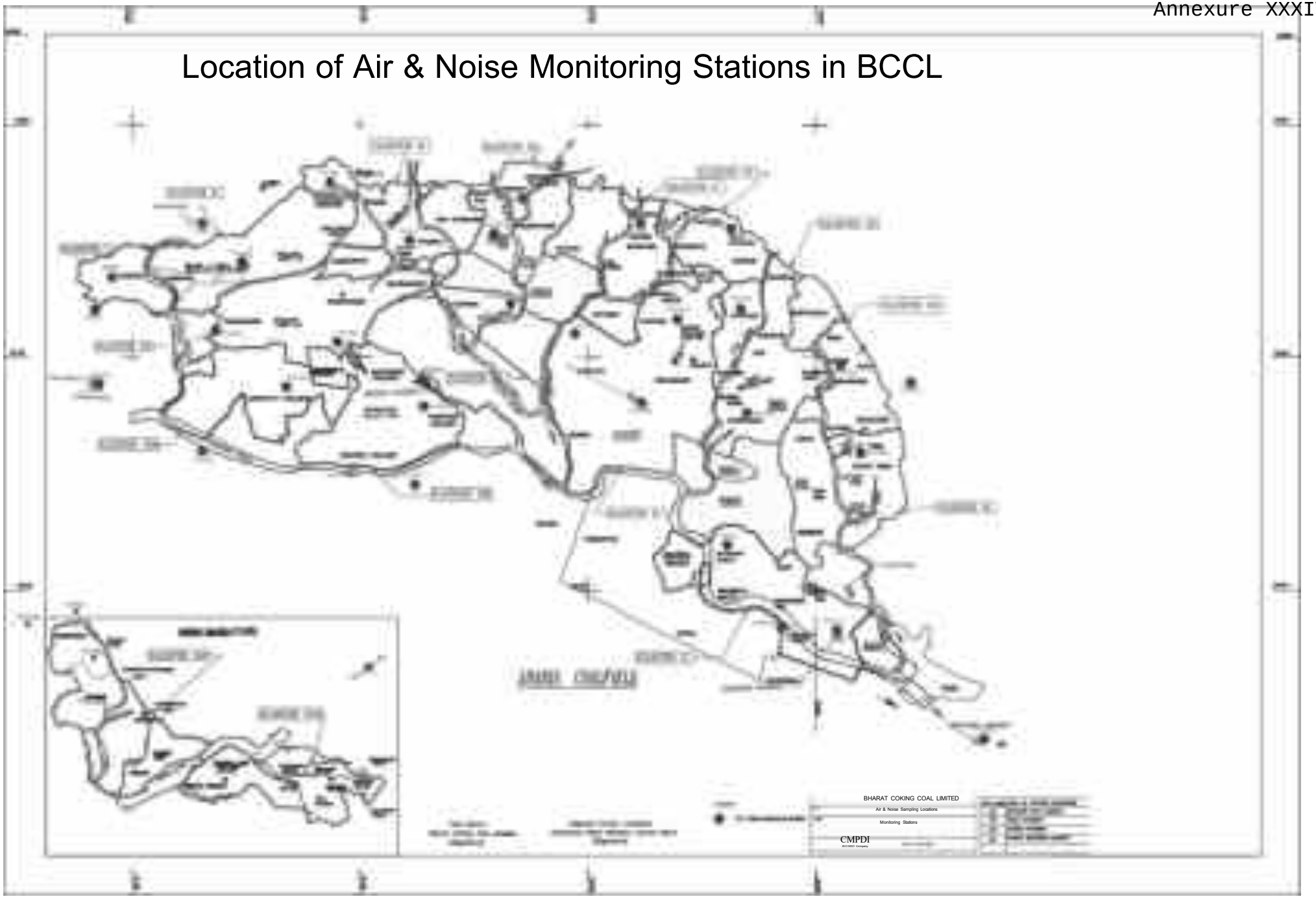
Results of 6 Heavy Metal for the month of NOV-2025								
SAMPLE CODE	**DATE**	**Station Name**	**Cd CONC. IN µg/m3**	**Hg CONC. IN µg/m3**	**As CONC. IN ng/m3**	**Cr CONC. IN µg/m3**	**Ni CONC. IN ng/m3**	**Pb CONC. IN µg/m3**
A1	24.11.25	Karmatand Village	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A2	18.11.25	Damoda	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A3	19.11.25	Madhuband Washery	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A4	25.11.25	Block-II	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A5	19.11.25	Muraidih	<0.001	<0.001	<1.0	<0.01	2.05	<0.005
A6	21.11.25	Block-IV	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A7	28.11.25	Govindpur/Ramkanali	<0.001	<0.001	<1.0	<0.01	<2.0	0.016
A8	24.11.25	Nichitpur	<0.001	<0.001	<1.0	<0.01	<2.0	0.005
A9	27.11.25	East Basseriya	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A10	24.11.25	Dhansar/Kusunda	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A11	21.11.25	Dobari	<0.001	<0.001	<1.0	<0.01	<2.0	0.005
A12	21.11.25	Kusmatand Village	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A13	26.11.25	Jeenagora	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A14	26.11.25	Bhowrah North	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A15	25.11.25	Sudamdih Washery	<0.001	0.001	<1.0	<0.01	<2.0	<0.005
A16	26.11.25	Pootki	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A17	27.11.25	Moonidih UGP	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A18	21.11.25	Rudih Basti	<0.001	<0.001	<1.0	<0.01	<2.0	0.007
A19	27.11.25	Murlidih 20/21	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A20	21.11.25	Lohapatti	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005

Results of 6 Heavy Metal for the month of NOV-2025								
SAMPLE CODE	**DATE**	**Station Name**	**Cd CONC. IN µg/m3**	**Hg CONC. IN µg/m3**	**As CONC. IN ng/m3**	**Cr CONC. IN µg/m3**	**Ni CONC. IN ng/m3**	**Pb CONC. IN µg/m3**
A21	20.11.25	Kharkharee	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A22	20.11.25	Dahibari	<0.001	<0.001	<1.0	<0.01	<2.0	0.020
A23	20.11.25	Basantimata	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A24	20.11.25	Gopinathpur	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A25	21.11.25	Guliardih	<0.001	<0.001	<1.0	<0.01	<2.0	0.005
A26	18.11.25	Begunia	<0.001	<0.001	<1.0	<0.01	<2.0	0.011
A27	17.11.25	Damagoria	<0.001	<0.001	<1.0	<0.01	<2.0	0.020
A28	26.11.25	Hurriladih	<0.001	<0.001	<1.0	<0.01	<2.0	0.014
A29	27.11.25	Moonidih Washery	<0.001	0.005	<1.0	<0.01	<2.0	<0.005
A30	24.11.25	Sitanala	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A31	25.11.25	Dumarda	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A32	20.11.25	Telmacho Bridge	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A33	24.11.25	Madhuband UGP	<0.001	0.001	<1.0	<0.01	<2.0	<0.005
A34	24.11.25	Bhojudih Washery	<0.001	0.015	<1.0	<0.01	<2.0	0.024
A35	17.11.25	Dugda Washery	<0.001	0.006	<1.0	<0.01	<2.0	0.016
A36	28.11.25	Mahuda	<0.001	0.005	<1.0	<0.01	<2.0	<0.005
A37	28.11.25	Katras Choitudih	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A38	26.11.25	Sinidih Workshop	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A39	25.11.25	Patherdih	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A40	20.11.25	Koyla Nagar	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A41	25.11.25	Sudamdih Shaft	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A42	20.11.25	RHB	<0.001	<0.001	<1.0	<0.01	2.04	<0.005
A43	17.11.25	Pandwabhita	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A44	17.11.25	Sadariadih	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005
A45	24.11.25	Bhojudih Buffer	<0.001	<0.001	<1.0	<0.01	<2.0	<0.012
A46	17.11.25	C.H.D	<0.001	<0.001	<1.0	<0.01	<2.0	<0.005

#BDL-Below detection limit

Metal	BDL	Standard as per NAAQS
Hg (µg/m^3)	0.001	*Standard Not defined
Cr(µg/m^3)	0.01	*Standard Not defined
As (ng/m^3)	1	6
Pb (µg/m^3)	0.005	0.5
Ni (ng/m^3)	2	20
Cd (µg/m^3)	0.001	*Standard Not defined

Location of Air & Noise Monitoring Stations in BCCL



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.

TRACE METAL CONCENTRATION OF AMBIENT AIR QUALITY REPORT OF BHARAT COKING COAL LIMITED,

(FOR THE HALF YEAR ENDING, JUNE, 2025)

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

(FOR THE Q.E. JUNE, 2025)

CONTENTS

SL. NO.	CHAPTER	PARTICULARS
1.	CHAPTER - I	EXECUTIVE SUMMARY INTRODUCTION
2.	CHAPTER-II	AIR SAMPLING & ANALYSIS
3.	**PLATES:** PLATE NO. - I	SURFACE PLAN SHOWING AIR & NOISE MONITORING LOCATIONS

EXECUTIVE SUMMARY

1.0 Introduction

The purpose of environmental monitoring is to assess the quality of various attributes that affects the environment around us. In accordance with the quality of these attributes appropriate strategy is to be developed to control the pollution level within the permissible limits. One of these major attributes is water.

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

3.0 Methodology of sampling and analysis

3.1 Heavy Metal in Ambient Air

Parameters chosen for assessment of Heavy metal in Ambient Air Quality were Cadmium (Cd), Mercury (Hg), Arsenic (As), Chromium (Cr), Nickel (Ni), and Lead (Pb). Respirable Dust Samplers (RDS) were used for sampling these heavy metals on EPM filter paper. These heavy metals are analyzed regularly on half yearly basis. The samples were analyzed in Environment Laboratory of CMPDI, RI-II, Dhanbad.

4.0 Results and interpretations

4.1 Heavy Metal in Ambient Air

The results of Heavy metal in Ambient Air Quality are presented in tabular form for each monitoring station. The concentration of heavy metals in ambient air is well within the permissible limit.

CHAPTER - I

INTRODUCTION

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

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

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

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

CHAPTER – II

AMBIENT AIR QUALITY MONITORING

2.1 Results and interpretations

The results of Heavy metal in Ambient Air Quality are presented in tabular form for each monitoring station. The concentration of heavy metals in ambient air is well within the permissible limit.

TRACE METAL CONCENTRATION IN AMBIENT AIR QUALITY

Name of the Company: **Bharat Coking Coal Limited** Year : **2025-26.**

PERIOD: **HALF YEAR ENDING JUNE, 2025**

HEAVY METAL ANALYSIS REPORT OF AMBIENT AIR QUALITY

Results of 6 Heavy Metal for the month of May-2025								
SAMPLE CODE	**DATE**	**Station Name**	**Cd** CONC. IN µg/m3	**Hg** CONC. IN µg/m3	**As** CONC. IN ng/m3	**Cr** CONC. IN µg/m3	**Ni** CONC. IN ng/m3	**Pb** CONC. IN µg/m3
A1	20.05.25	Karmatand Village	BDL	BDL	BDL	BDL	2.03	0.005
A2	19.05.25	Damoda	BDL	BDL	BDL	BDL	2.14	BDL
A3	20.05.25	Madhuband Washery	BDL	BDL	BDL	BDL	BDL	BDL
A4	19.05.25	Block-II	BDL	BDL	BDL	BDL	BDL	0.006
A5	16.05.25	Muraidih	BDL	BDL	BDL	BDL	2.25	BDL
A6	29.05.25	Block-IV	BDL	BDL	BDL	BDL	BDL	BDL
A7	30.05.25	Govindpur/Ramkanali	BDL	BDL	BDL	BDL	BDL	0.032
A8	26.05.25	Nichitpur	BDL	BDL	BDL	BDL	BDL	BDL
A9	27.05.25	East Basseriya	BDL	BDL	BDL	BDL	BDL	BDL
A10	16.05.25	Dhansar/Kusunda	BDL	BDL	BDL	BDL	BDL	BDL
A11	16.05.25	Dobari	BDL	BDL	BDL	BDL	BDL	0.006
A12	30.05.25	Kusmatand Village	BDL	BDL	BDL	BDL	BDL	BDL
A13	30.05.25	Jeenagora	BDL	BDL	BDL	BDL	BDL	BDL
A14	22.05.25	Bhowrah North	BDL	BDL	BDL	BDL	BDL	BDL
A15	20.05.25	Sudamdih Washery	BDL	0.001	BDL	BDL	BDL	0.030
A16	21.05.25	Pootki	BDL	BDL	BDL	BDL	BDL	0.015
A17	21.05.25	Moonidih UGP	BDL	BDL	BDL	BDL	BDL	BDL
A18	22.05.25	Rudih Basti	BDL	BDL	BDL	BDL	BDL	0.007
A19	28.05.25	Murlidih 20/21	BDL	BDL	BDL	BDL	BDL	BDL
A20	21.05.25	Lohapatti	BDL	BDL	BDL	BDL	BDL	BDL
A21	26.05.25	Kharkharee	BDL	BDL	BDL	BDL	BDL	BDL

Results of 6 Heavy Metal for the month of May-2025

Annexure XXXIV

SAMPLE CODE	DATE	Station Name	Cd CONC. IN µg/m3	Hg CONC. IN µg/m3	As CONC. IN ng/m3	Cr CONC. IN µg/m3	Ni CONC. IN ng/m3	Pb CONC. IN µg/m3
A22	29.05.25	Dahibari	BDL	BDL	BDL	BDL	BDL	0.010
A23	29.05.25	Basantimata	BDL	BDL	BDL	BDL	BDL	BDL
A24	30.05.25	Gopinathpur	BDL	BDL	BDL	BDL	BDL	BDL
A25	28.05.25	Guliardih	BDL	BDL	BDL	BDL	BDL	0.005
A26	27.05.25	Begunia	BDL	BDL	BDL	BDL	2.32	0.021
A27	26.05.25	Damagoria	BDL	BDL	BDL	BDL	BDL	0.030
A28	16.05.25	Hurriladih	BDL	BDL	BDL	BDL	BDL	0.010
A29	21.05.25	Moonidih Washery	BDL	0.005	BDL	BDL	BDL	BDL
A30	19.05.25	Sitanala	BDL	BDL	BDL	BDL	BDL	0.025
A31	30.05.25	Dumarda	BDL	BDL	BDL	BDL	BDL	BDL
A32	21.05.25	Telmacho Bridge	BDL	BDL	BDL	BDL	BDL	BDL
A33	27.05.25	Madhuband UGP	BDL	0.002	BDL	BDL	BDL	BDL
A34	19.05.25	Bhojudih Washery	BDL	0.01	BDL	BDL	BDL	0.033
A35	21.05.25	Dugda Washery	BDL	0.001	BDL	BDL	BDL	0.026
A36	22.05.25	Mahuda	BDL	0.002	BDL	BDL	BDL	BDL
A37	30.05.25	Katras Choitudih	BDL	BDL	BDL	BDL	BDL	BDL
A38	29.05.25	Sinidih Workshop	BDL	BDL	BDL	BDL	BDL	0.010
A39	20.05.25	Patherdih	BDL	BDL	BDL	BDL	BDL	BDL
A40	22.05.25	Koyla Nagar	BDL	BDL	BDL	BDL	BDL	BDL
A41	20.05.25	Sudamdih Shaft	BDL	BDL	BDL	BDL	BDL	0.020
A42	16.05.25	RHB	BDL	BDL	BDL	BDL	2.05	0.010
A43	16.05.25	Pandwabhita	BDL	BDL	BDL	BDL	BDL	BDL
A44	16.05.25	Sadariadih	BDL	BDL	BDL	BDL	BDL	0.005
A45	19.05.25	Bhojudih Buffer	BDL	BDL	BDL	BDL	BDL	BDL
A46	22.05.25	C.H. D	BDL	BDL	BDL	BDL	BDL	BDL

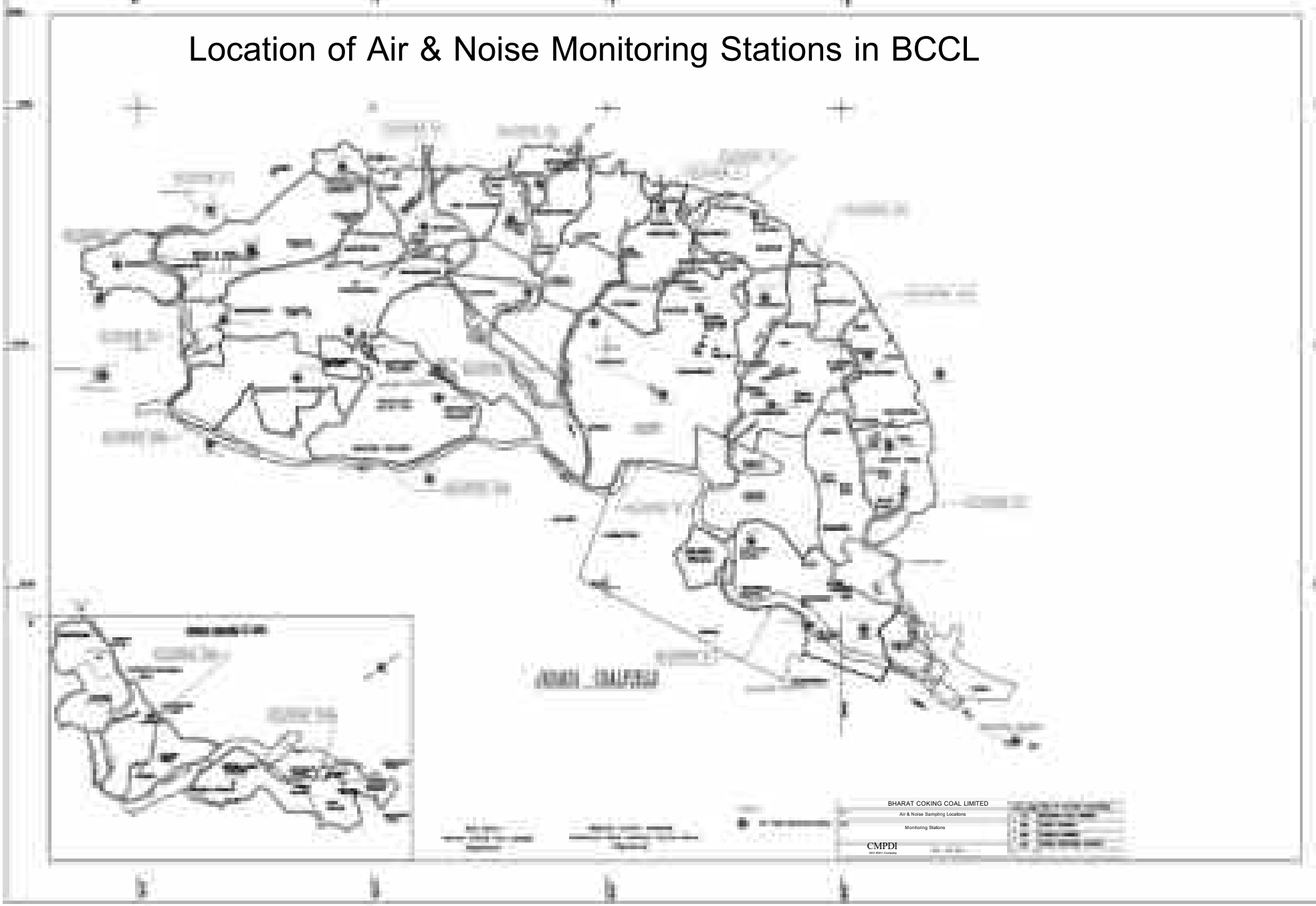
#BDL-Below detection limit

Metal	BDL	Standard as per NAAQS
Hg (µg/m^3)	0.001	*Standard Not defined
Cr(µg/m^3)	0.01	*Standard Not defined
As (ng/m^3)	1	6
Pb (µg/m^3)	0.005	0.5
Ni (ng/m^3)	2	20
Cd (µg/m^3)	0.001	*Standard Not defined





Location of Air & Noise Monitoring Stations in BCCL



Details of IME/PME between 2019 to March 2026		
Year	**IME**	**PME**
2018	Nil	1400
2019	380	1058
2020	133	495
2021	Nil	1100
2022	Nil	1027
2023	Nil	558
2024	34	882
2025	110	526
2026 (Till March)	--	23

Details of Safety equipments distributed between FY 2019-20 to FY 2025-26							
ITEMS	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**	**2025-26**
Wire Nettings	--	15000	--	35 Rolls	--	--	--
Mining Shoes	450	1326	1880	1080	1910	679	1057
Gumboots	--	240	--	--	0	120	295
Helmet	35	200	400	--	1200	352	146
Dust Mask	--	300	--	260	112	123	736
Folding Stretcher	--	--	10	10	--	--	--
Goggles	--	--	--	400	116	160	100
Ear Muffs	--	--	--	--	110	30	--
Fluorescent Jackets	--	1508	--	200	240	325	1256
Hand Gloves (HT)	--	36	--	--	42	10	11
Hand Gloves (LT)	5	35	--	--	15	4	20
First Aid Kits	--	400	--	200	5	1	179
Electric Arc Safety Suit	--	--	--	--	3	1	1
Life Jacket	--	--	--	--	3	5	10
Safety Belt	--	--	--	--	15	16	17

Bharat Coking Coal Limited

BHARAT COKING COAL LIMITED



COPRPORATE ENVIRONMENT POLICY 2025

Back Ground:

Bharat Coking Coal Limited (BCCL) subscribes to the view of Sustainable Development. Unless the environment can sustain all the developmental activities, any pursuit of development in isolation can cause irreparable damage to the ecosystem and associated environmental attributes.

The present policy is the revision of the Corporate Environment Policy 2019 and is complimentary to the National Environmental Policy, 2006.This modification in the present policy is the outcome of the experience gained since 2019 keeping in view the modifications / amendments made time to time in environmental policies and additional stipulations notified by MoEF&CC (Ministry of Environment, Forest& Climate Change) and other organizations concerning mine closure, reclamation of degraded land, environmental clearance etc. and also with the objective of revisiting the corporate policy. Government of India is signatory to few international conventions/agreements relevant to BCCL amongst others and activities associated with such conventions/agreements are embodied in the present policy

This Policy has a vision of Green Mining and mission of 100% compliance of environmental statutes applicable to coal mining industry.

Policy Statement: Bharat Coking Coal Limited(BCCL) is committed to promote low carbon, sustainable and socially inclusive coal mining by protecting the environment through integrated project planning & design, prevention/mitigation of pollution, conservation of natural resources, restoration of ecology & biodiversity, recycling/ proper disposal of wastes, addressing climate change and inclusive growth. It also aims to bringing awareness amongst its stakeholders for continual improvement in environmental performances following good environmental practices.

Objectives:

BCCL shall endeavour to-

1. Plan & design projects with due consideration to environmental and social concerns for Sustainable Development and reduction in emission intensity of its operations.

2. Conduct mining and associated operation in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects.

3. Prevent pollution in surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.

4. Ensure effective implementation of Environment Management Plans (EMPs) in all our mines / projects to mitigate pollution, conservation of natural resources and restoration of ecology & biodiversity.

5. *Ensure compliance of all statutory conditions prescribed by regulatory agencies.*
6. *Ensure waste management in each unit on the principle of REDUCE, REUSE, RECYCLE and SAFE DISPOSAL.*
7. *Put special thrusts on efficient energy utilization / renewable energy and other measures to reduce carbon foot-print.*
8. *Strive for continual improvement in our environmental performances by setting targets, measuring progress and taking corrective action.*
9. *Take measures to gainful repurposing of land and render productive post mining land use for ensuring environmentally sustainable closure of mine, keeping in view the social needs and requirement of the locals.*
10. *Take steps for dealing, prevention and control of coal mine fire and related subsidence.*
11. *Ensure implementation of activities applicable to BCCL arising out of International Conventions.*
12. *Create environmental awareness and ensure environmental education among the employees, local communities and other stakeholders through pro-active communication and training.*
13. *Promote R&D projects/innovations addressing various environmental concerns like minimization of carbon footprints of BCCL and environmental issues in mining & surrounding areas.*
14. *Establish eco-parks in the reclaimed mined areas and promote eco-mining tourism in the coalfield areas.*
15. *Ensure transparency in Environmental reporting / disclosure to stakeholders.*

Review of Environmental Policy:

In view of the present fast changing social, economic and environmental scenario, this policy shall be reviewed every 5 years to incorporate the changes in the legal, technical, environmental, economic and social inputs prevailing at that time. Whenever, there is change in National Environmental Policy or other National / State relevant policies, Acts etc, this Corporate Environmental Policy would be reviewed and suitably revised.

29/5/25

Chairman-cum-Managing Director,

BCCL

Place: Dhanbad

AIR QUALITY MONITORING SYSTEMS IN CLUSTER IX

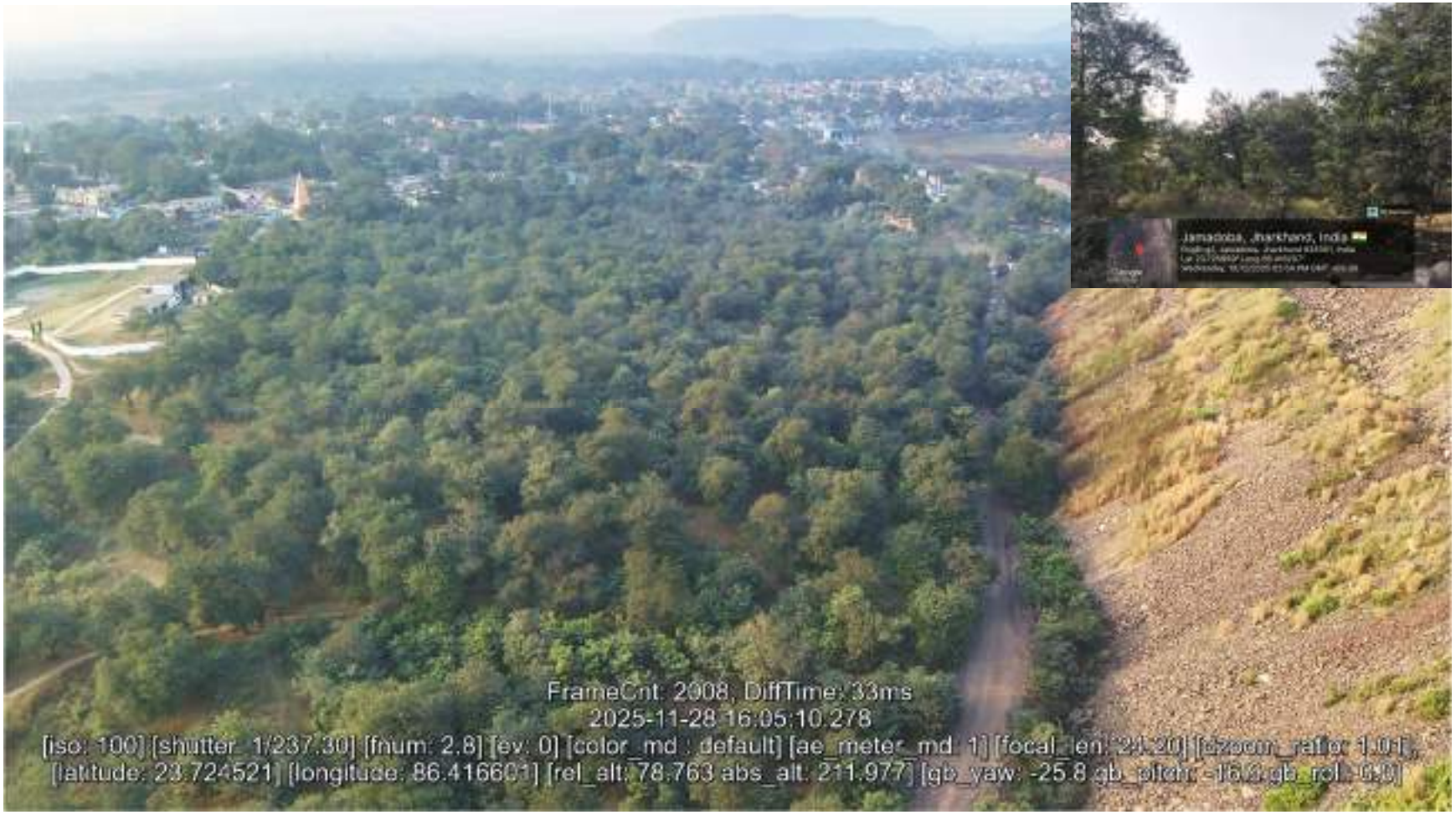








PLANTATION CARRIED OUT IN CLUSTER IX



Block Plantation done in Amal. Joyrampur Colliery

PLANTATION CARRIED OUT IN CLUSTER IX



Block Plantation done in Amal. Joyrampur Colliery

PLANTATION CARRIED OUT IN CLUSTER IX



Avenue plantation done along side block in Amal. Joyrampur Colliery

PLANTATIONS CARRIED OUT IN CLUSTER IX



Avenue plantation along pucca road from NTST workshop to CISF camp

PLANTATION CARRIED OUT IN CLUSTER IX



Plantation on OB near CISF Camp, Amal NTSTJG OCP

PLANTATION CARRIED OUT IN CLUSTER IX



Gokul park OB Slope plantation

PLANTATION CARRIED OUT IN CLUSTER IX



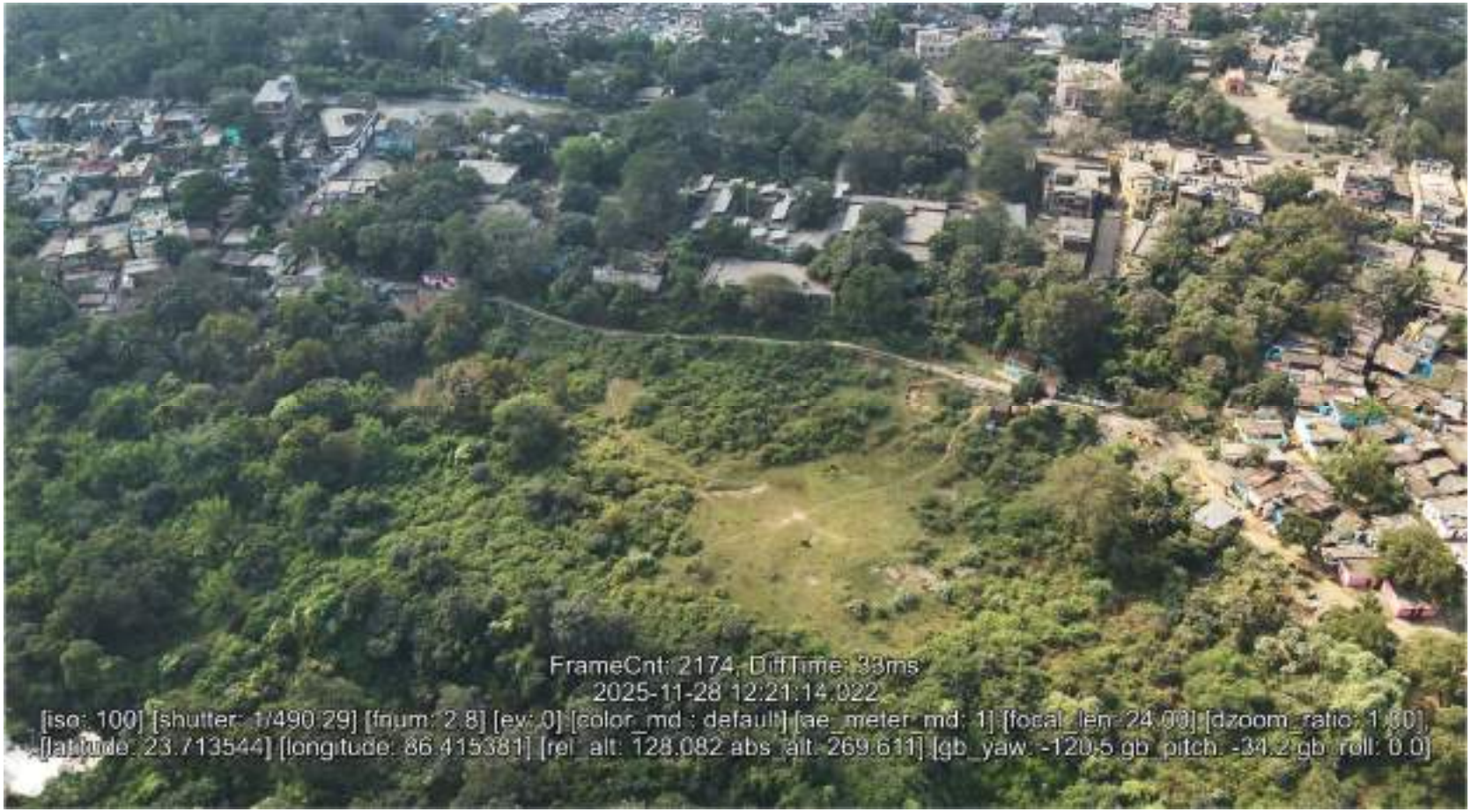
Plantation on OB near Amal NTSTJG Quarry

PLANTATION CARRIED OUT IN CLUSTER IX



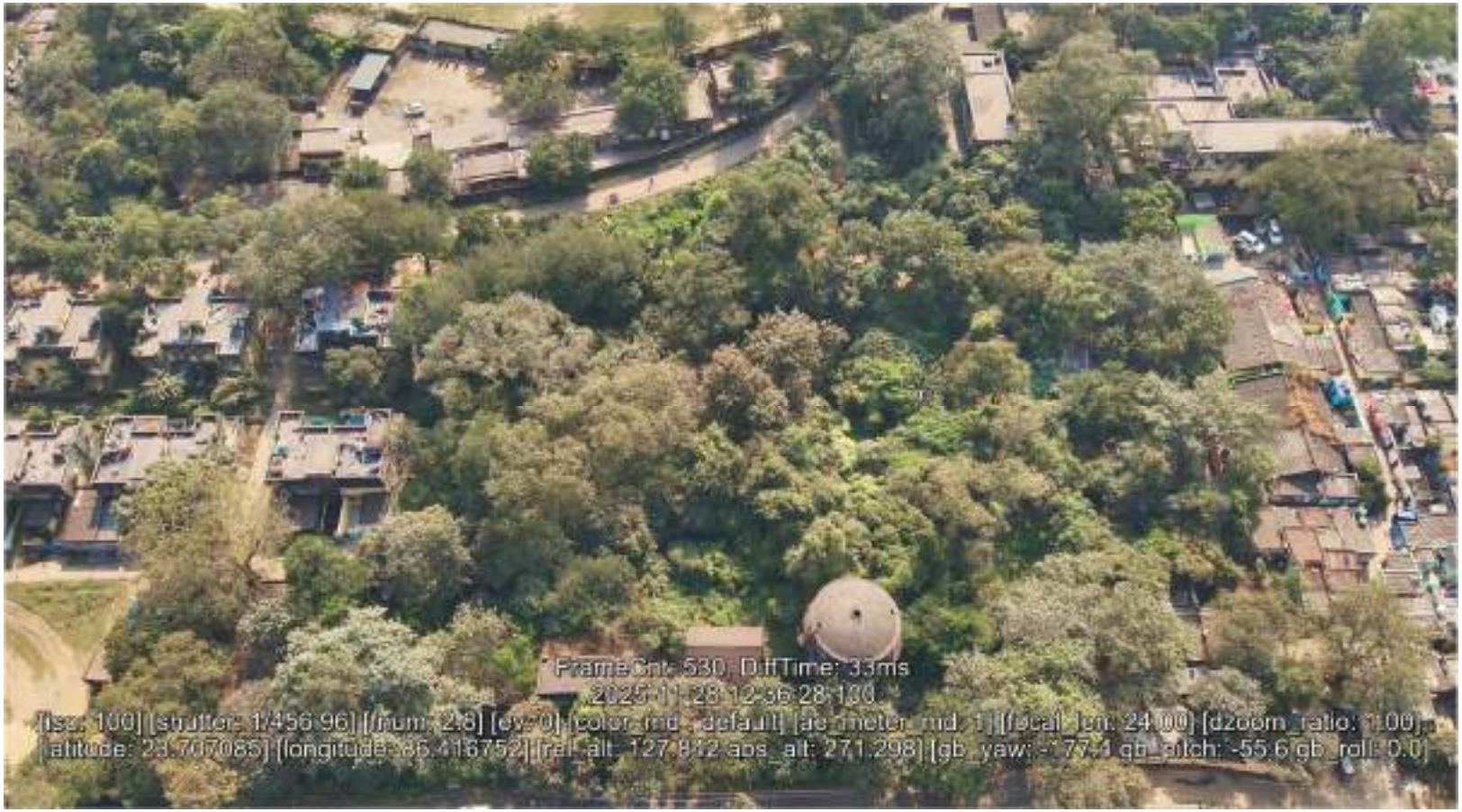
Plantation near Regional Hospital

PLANTATION CARRIED OUT IN CLUSTER IX



Plantation near Jealgora Basti

PLANTATION CARRIED OUT IN CLUSTER IX



Small plantation site next to Guest House, Lodna Area

PLANTATION CARRIED OUT IN CLUSTER IX



Green belt next to JRH, Hospital

PLANTATION CARRIED OUT IN CLUSTER IX



Plantation near the southern end of leasehold

PLANTATION CARRIED OUT IN CLUSTER IX



Plantation along railway siding

PLANTATIONS CARRIED OUT IN CLUSTER IX



AJC OB dump slope grassing near coal stock yard

PLANTATIONS CARRIED OUT IN CLUSTER IX



Grassing and toe wall near OB dump next to Lodna Ground

PLANTATIONS CARRIED OUT IN CLUSTER IX



Amal NTSTJG pit slope grassing

PLANTATIONS CARRIED OUT IN CLUSTER IX



Grassing done on OB next to NTSTJG OCP pit

PLANTATIONS CARRIED OUT IN CLUSTER IX



Grassing done on OB next to Railway siding

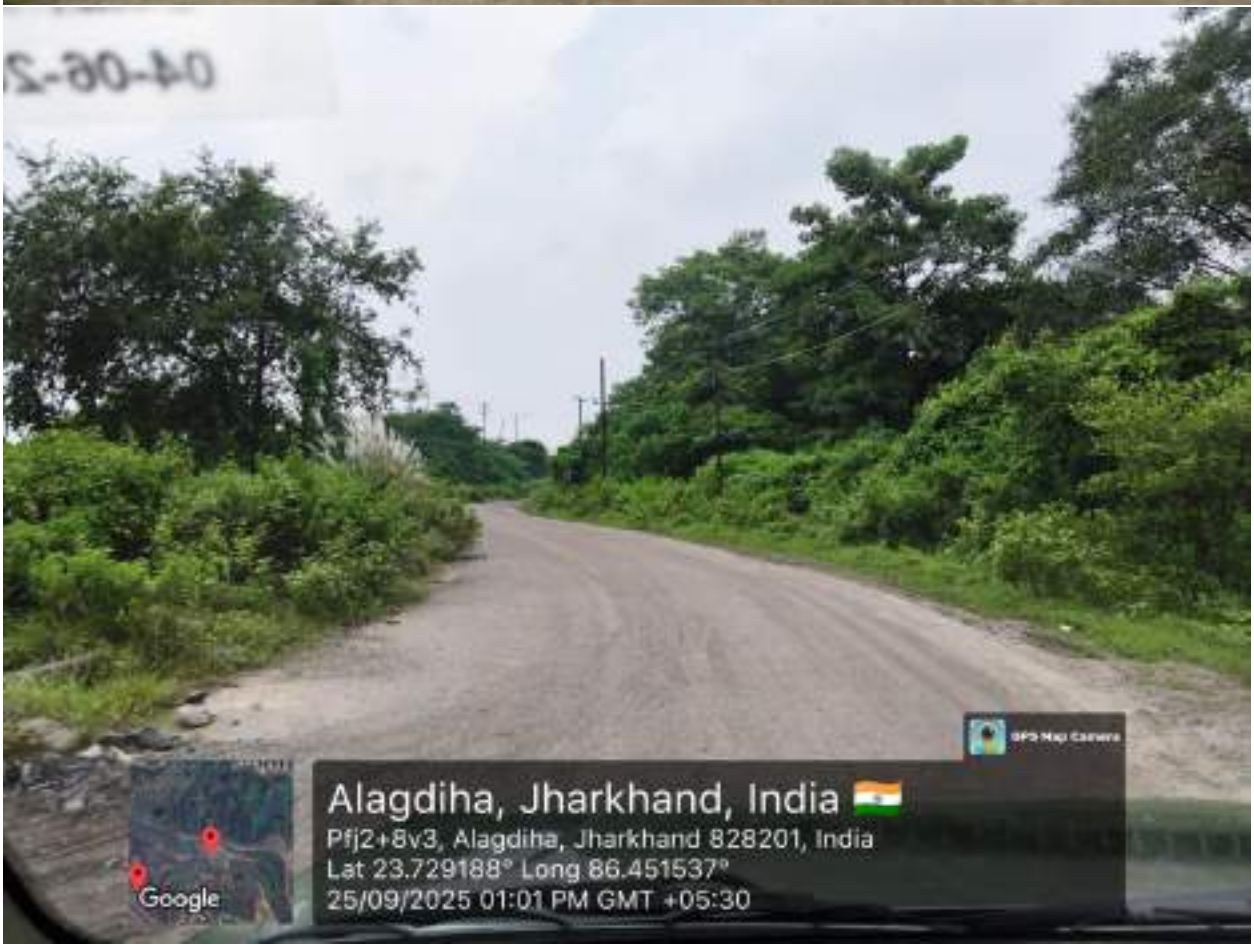
Annexure –IV

Photographs of Avenue Planation






Makunda, Jharkhand, India
Makunda, Jharkhand 828115, India
Lat 23.723162° Long 86.45322°
25/09/2025 12:59 PM GMT +05:30
Google


Alagdiha, Jharkhand, India
Pfj2+8v3, Alagdiha, Jharkhand 828201, India
Lat 23.729188° Long 86.451537°
25/09/2025 01:01 PM GMT +05:30
Google





Toe wall / re-clamated OB dump



Green belt on both sides of approach



Green belt





Grassing on OB dumps



CHATKARI JORE EMBANKMENT

EC COMPLIANCE







COVERED TRANSPORTS

EC COMPLIANCE





Wind breaker Green-net at railway siding

EC COMPLIANCE













Water Sprinkling being done at various locations within Cluster IX

EC COMPLIANCE



Crusher operational with fog canons and electric loaders





Toe wall / re-clamated OB dump



Toe wall under construction



Toe wall





Fire Subsidence site filling



Garland drain



Hooper and fog cannon

REVISED COMPREHENSIVE HYDROGEOLOGICAL REPORT (CHR) WITH GROUND WATER MODELLING (GWM)

TO OBTAIN 2nd RENEWAL OF NOC FROM CGWA FOR CLUSTER IX MINES, BCCL



SUBMITTED BY
BHARAT COKING COAL LIMITED
(*A Subsidiary of Coal India Limited*)
KOYLA BHAWAN, DHANBAD
JHARKHAND-826005

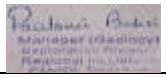
PREPARED BY

CENTRAL MINE PLANING & DESIGN INSTITUTE LIMITED
HYDROGEOLOGY SECTION OF EXPLORATION DIVISION, CMPDIL
GONDWANA PLACE, KANKE ROAD, RANCHI, JHARKHAND– 834031

(Groundwater Professional Institution accredited by CGWB)

April 2026

1. SALIENT FEATURE OF THE PROPOSAL

1.	*Application No.*	MIN/JH/2025/10955/R-2
2.	*Submission Date*	28.03.2026
3.	*Fresh or Renewal*	***2nd Renewal*** *(Copy of Work Order in* ***Annexure-I A)***
4.	*Existing or New /Proposed*	*Existing project*
5.	*If Renewal, date of validity of existing/last NOC*	*31/10/2025 (Copy of existing NOC in* ***Annexure-I B****)*
6.	*CTO issued date*	*copy attached as* ***Annexure-II***
7.	*Name of the Project with Address*	*Cluster-IX mines, Jharia Coalfield, BCCL*
8.	*State*	*Jharkhand*
9.	*District*	*Dhanbad*
3.	*Accredited by*	CMPDIL, Ranchi accreditations are: CGWA, NABET-QCI (**Fig-11**)
10.	*Block/ Taluka*	*Jharia Block*
11	*Category of Block/ Taluka (as per prevailing GWRE)*	*"Semi Critical" category*
12	*Quantum of GW applied (KLD)*	***35,028.0 KLD***
13	*Quantum of GW applied (m^3/year)*	***1,27,85,220.0 KLY***
14	*Alluvium/ Non-alluvium*	*Non-Alluvium*
15	*Ground water Modelling Required (Yes/No)*	*Yes*
16	*Name of Authorized signatory of Project & Designation*	*Name: Sri Nikhil B. Trivedi, GM, Lodna Area, Dhanbad* *Bharat Coking Coal Ltd. (BCCL)* 
17	*Consultant details with Name of Authorized signatory (if Institution)*	M/s. Central Mine Planning and Design Institute Ltd. (CMPDIL), Hydrogeology Section, Exploration Division, HQ, Ranchi: *Debasis Bandyopadhyay*  M/s. Central Mine Planning and Design Institute Ltd. (CMPDIL), Geology Department, Regional Institute-II, Dhanbad: *Poulomi Baksi* 
18	*In case the report is prepared jointly by accredited Institute and Individual consultant, name/details of chapters prepared by the Individual consultant*	*Comprehensive Hydrogeology report (CHR) and Groundwater Modelling (GWM) is prepared by CMPDIL,* Geology Department, Regional Institute-II, *Dhanbad.*
19	*Accreditation Certificate No. and Date/ Validity (In case jointly as per Point No. 14, No. and validity of both institution and individual are to be given)*	*CMPDIL, Ranchi accreditations are:* *CGWA/RGI/013: Validity 15.02.21 to 14.02.26* *QCI/NABET/ENV/GWCO/21/57: validity 14.10.21 to 13.10.26* *NABL accreditation of CMPDI, Lab.: TC-14321, validity 20.08.24 to 19.08.26* *CGWA/RGI/ACC/924/Institute/2023 validity: 08.02.2023 to 08.02.2026*

2. ABOUT THE PROJECT

Cluster-IX mines are under administrative control of Lodna Area, BCCL, located in eastern part of Jharia coalfield in Dhanbad district of Jharkhand. Cluster- IX consists of two mines namely; Amalgamated Joyrampur Colliery (OC) and North Tisra - South Tisra (NT-ST) Expansion OCP. The Leasehold area of the Cluster is located between latitude 23^0 40' 58" to 23^0 43' 59" N and longitude 86^0 25' 54" and 86^0 26' 08" E. All the above mines are contiguous in nature and the environmental impact is overlapping in the ambient due to cumulative effect of the mining activities. Leasehold area of the Cluster is 1942.12 Ha with an annual production capacity of 8.512 MTPA using opencast cum underground mining method. Copy of Work Order and existing NOC from CGWA is attached in **Annexure-I A & B** and CTE/CTO in **Annexure-II**.

Cluster-IX mines is covered in Survey of India toposheet no. 73 I/6 **(Plate-2.1)**. The cluster is approachable both by rail and road. Dhanbad railway station of Eastern Railway is at a distance of about 4 km from the cluster. The National Highway No.19 (NH-19) is at a distance of about 10 km from the cluster while the industrial town, Dhanbad, is about 4 km by road to the east of the area. Location map of the Leasehold Area and its Core zone are shown in **Figure-2.1 & 2.2**.

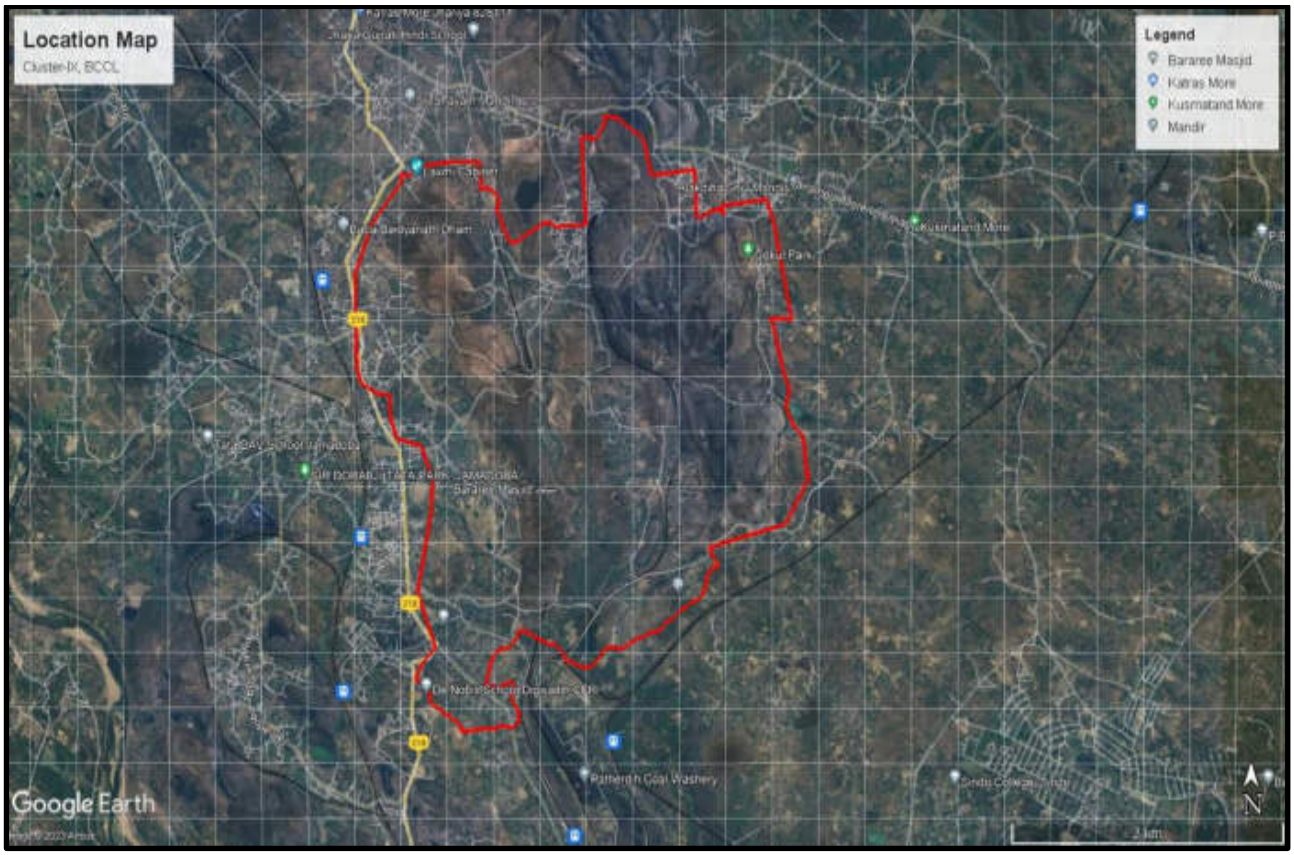


Figure-2.1: Location of the project on Google Earth.

Predicted Drawdown at the End of 12th year 2035 – 0.73 m (5509 Days)

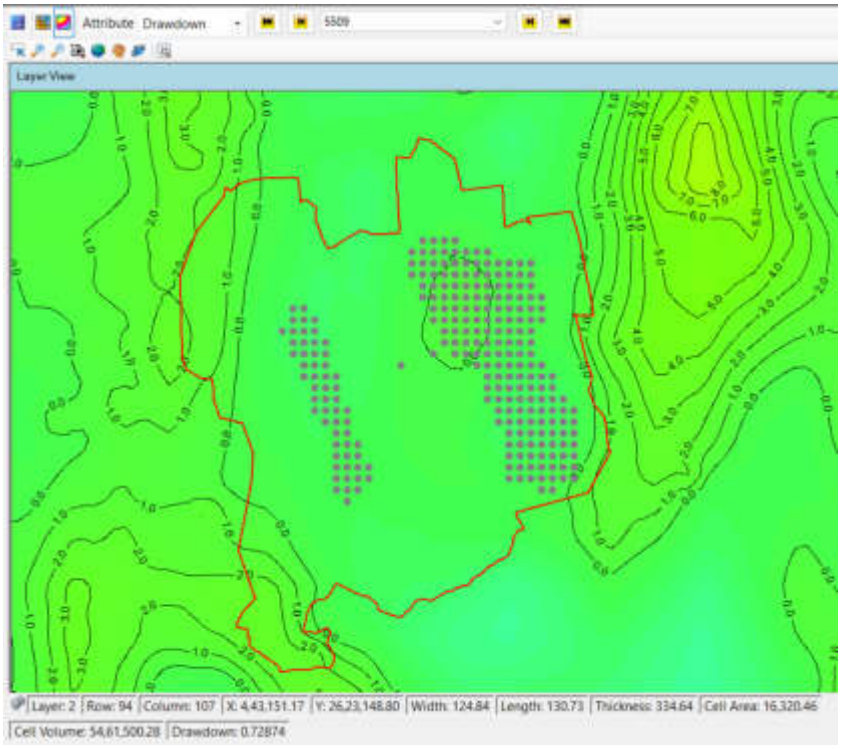


Figure 42: Predicted Drawdown after Closure– 12th year

CHAPTER - 6. CONCLUSION AND RECOMMENDATION

- The results of mathematical modeling have thrown light on the overall scenario of the ground water condition of the model area. Ground water modeling study reveals that the pumping in the first and second layer has very less effect on Aquifer system.
- The predicted drawdown in the Mine is **6.29 m** at the end of the 2nd year. The drawdown predicted here is specified for the active mine dewatering at the time of pumping. However, during the monsoon period and non-mining period the water level may raises to the nearest to original water level beyond the radius of the influence zone.
- The most important changes are in the recharge quantity which contributes major part of the mine dewatering and pumping of surround wells.
- The Aquifer response analysis reveals that the restoration of Ground water level has attained 3.40 m level at the end of 10th year.

Table 15: Aquifer Resilience Study

Time from Model start date	Drawdown with mine dewatering (Scenario 1)	Drawdown after stopping mine dewatering at 2nd Year (Scenario 2)	Drawdown after stopping all mine dewatering (Scenario 3)	Recovery percentage	Previous GWM report results
Start of proposed NoC (2025)	4.33	-	0.48	-	20.00(2024)
End of proposed NoC (2026)	6.29	-	0.58	-	
5th Year – 2952 Days	9.60	5.04	0.69	93%	
10th Year – 4778 Days	14.68	4.39	0.74	95%	
12th Year – 5509 Days	16.65	4.14	0.73	96%	

Model predicted Mine seepage	**24009**	**m^3/day**
The predicted drawdown in the Mine area (End of 2nd Year)	**6.29**	**m**
R - Radius of Influence in m (2nd Year)	**1629**	**m**

7. LIST OF REFERENCES/ BIBLIOGRAPHY

- Standard Operating Procedure for Ground Water Modelling & Report Preparation issued by CGWA during August 2024
- Central Ground Water Board Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti Government of India. AQUIFER MAPPING AND MANAGEMENT OF GROUND WATER RESOURCES In Berla Block, Bemetara District Chhattisgarh, North Central Chhattigarh Region, Raipur
- CMPDIL- Central Mine Planning and Design Institute, January 2025. Comprehensive Report on Groundwater Conditions in Both Core and Buffer Zone of Balgi UG Mines, South Eastern Coalfields for ground water clearance from CGWA, New Delhi
- DEM and/ or topographic contour map of the area (The details of elevation of the surrounding area) https://earthexplorer.usgs.gov/.
- Dupuit, J. (1863). Etudes Théoriques et Pratiques sur le mouvement des Eaux dans les canaux découverts et à travers les terrains perméables (Second ed.). Paris: Dunod.
- Geomorphology map (including drainage and water bodies) https://bhukosh.gsi.gov.in/Bhukosh/MapViewer.aspx.

Annexure XLII



भारत कोकिंग कोल लिमिटेड

BCCL

Bharat Coking Coal Limited

बोर्ड सचिवालय/Board Secretariat

पत्रांक: बीसीसीएल/सीएस/एफ 1(A) 317 (H) दिनांक: 07/07/2025

CSR DEPARTMENT
Sl No. 105 CH)
Date 07/07/25

सेवा में

महाप्रबंधक (सी एम आर)
बीसीसीएल, कोयला भवन, धनबाद।

विषय **Certified copy of Minutes of 425th Board Meeting held on 25.06.2025.**

Dear Sir,

We send herewith certified copy of Minutes of Item No. 425.PoT-6 of 425th Meeting of the Board of Directors of Bharat Coking Coal Limited held at Regd. Office, Koyla Bhawan, Dhanbad on 25.06.2025 for taking necessary action at your end.

You are requested to send the Action Taken Report (ATR) on the above, duly approved by the concerned Director, for placing before the next Board Meeting as per the format given below. Soft copy of the same in MS word format to the mail id cos.bccl@coalindia.in .

Format of ATR:

Department:			
Item No.	**Subject**	**Decision of the Board**	**Action Taken**

भवदीय,

Encl: As above

बी.के.पारूई
कंपनी सचिव

भारत कोकिंग कोल लिमिटेड
(एक मिनीरत्न कंपनी)
(कोल इंडिया लिमिटेड की एक अनुषंगी कंपनी)
(भारत सरकार का उपक्रम)

BCCL
भारत कोकिंग कोल लिमिटेड
Bharat Coking Coal Limited

Bharat Coking Coal Limited
(A Miniratna Company)
(A Subsidiary of Coal India Limited)
(A Government of India Undertaking)

Item No.425.PoT-6

Agenda note for approval of "Annual CSR Action Plan of FY 2025-26 and displaying the same on the website of BCCL.

Background:-

As per rule 5, sub-rule (2) of Companies (CSR Policy) Amendment Rule 2021, "The CSR Committee shall formulate and recommend to the Board, an Annual Action Plan is pursuance of its CSR Policy.

The proposal was put up before 43rd CSR Committee meeting held on 24.06.2025 and the proposal has been recommended for put up before Board for approval.

Decision:-

Board after detailed deliberation agreed with the recommendation of CSR Committee and approved the Annual CSR Action Plan for FY 2025-26 with total CSR budget amount of ₹28.83 Cr. (Rupees twenty eight crore eighty three lakhs only). Further it was advised by the Board to display the Annual Action Plan of 2025-26 on the website of BCCL.

Further, it was advised by the Board that the CSR committee shall implement and monitor the Action Plan as approved and a responsibility statement thereto may be submitted at the end of the year in the Board.

Action:- GM (CSR)

Certified to be True Copy

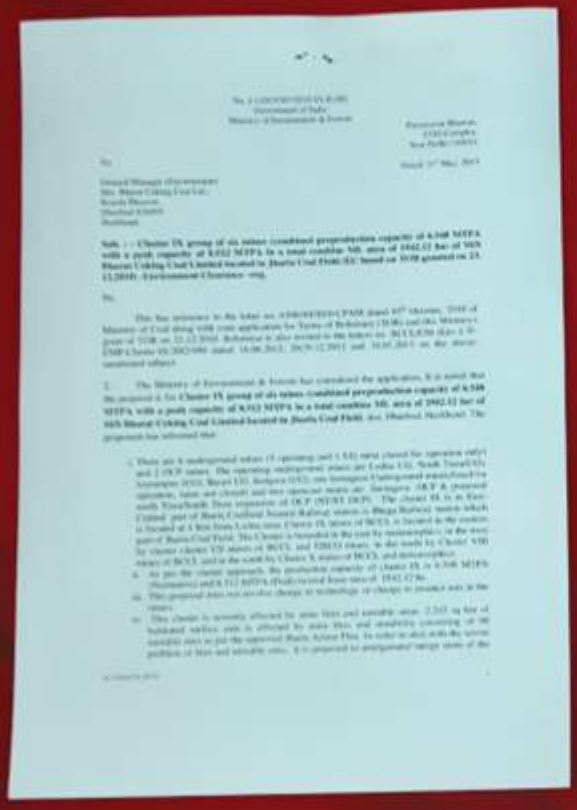
B. K. Paru
Company Secretary
Bharat Coking Coal Limited
Koyla Bhawan
Dhanbad- 826005

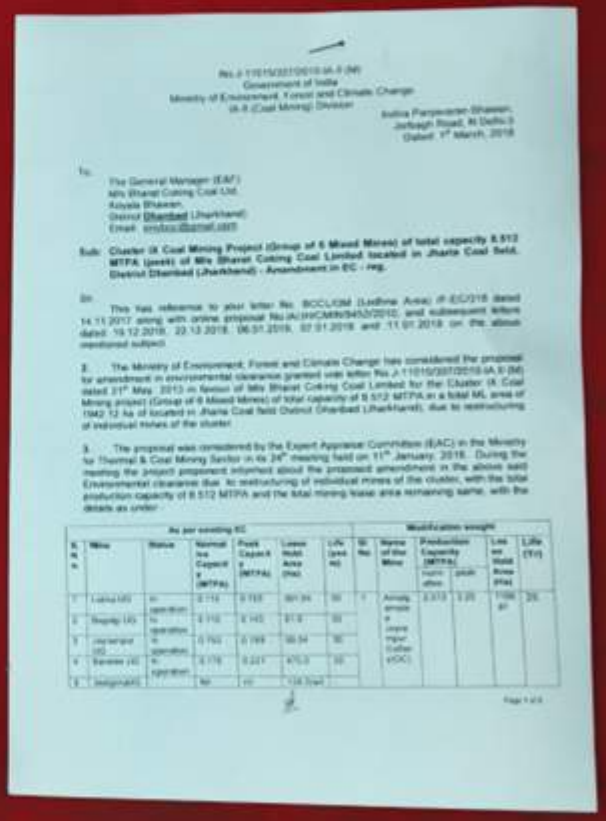
27	Construction of Shaded platform for Birsa Statue at Birsa Bridge **(EJ Area)**	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health and sanitation including contribution to the Swatch Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water Ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources and maintaining quality of soil, air and water including contribution to the Clean Ganga Fund set-up by the Central Government for rejuvenation of river Ganga	5.00	BCCL	1. Estimate preparation- under preparation 2. Approval of estimate--within 1 month after approval of action plan and obtainment of NOC (as applicable) 3. Tender call-with in 10 days of estimate approval 4. Award of work-with in 45 days of tender opening 5. Project period: 45 days	BCCL	Benefit to local polucace through promotion of art & culture,IANM
28	Providing And Laying Pit Water Pipe Line At 2 No. Pit Jealgora To Dumariatand Basti **(Lodna Area)**	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health and sanitation including contribution to the Swatch Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	13.21	BCCL	1. Estimate preparation- under preparation 2. Approval of estimate--within 1 month after approval of action plan and obtainment of NOC (as applicable) 3. Tender call-with in 10 days of estimate approval 4. Award of work-with in 45 days of tender opening 5. Project period: 60 days	BCCL	Benefit to approximately 1000 residents,IANM
29	Upgradation of Utkrahmit Madhya Vidyalaya Surunga **(Lodna Area)**	Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly and the differently abled and livelihood enhancement projects	30.00	BCCL	1. Estimate preparation- under preparation 2. Approval of estimate--within 1 month after approval of action plan and obtainment of NOC (as applicable) 3. Tender call-with in 10 days of estimate approval 4. Award of work-with in 45 days of tender opening 5. Project period: 120 days	BCCL	Benefit to 500 students ,IANM
30	Upgradation at Jharia Gujrati Sanskrit School, Jharia	Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly and the differently abled and livelihood enhancement projects	21.80	BCCL	1. Estimate preparation- under preparation 2. Approval of estimate--within 1 month after approval of action plan and obtainment of NOC (as applicable) 3. Tender call-with in 10 days of estimate approval 4. Award of work-with in 45 days of tender opening 5. Project period: 120 days	BCCL	Benefit to approximately 500 students,IANM
31	Construction of Indian Medical Association (IMA) multipurpose hall, Kumardubi **(CV Area)**	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health and sanitation including contribution to the Swatch Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	37.00	BCCL	1. Estimate preparation- under preparation 2. Approval of estimate--within 1 month after approval of action plan and obtainment of NOC (as applicable) 3. Tender call-with in 10 days of estimate approval 4. Award of work-with in 45 days of tender opening 5. Project period: 90 days	BCCL	Benefit to local populace,IANM
32	Providing three units of water purifier and one noiseless generator for Saraswati Vidyamandir Sr. Sec. School, Dugdha **(Washery)**	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health and sanitation including contribution to the Swatch Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	15.76	BCCL	1. Estimate preparation- prepared and approved 2. Tender call-with in 10 days of estimate approval 3. Award of work-with in 45 days of tender opening 5. Project period: 90 days	BCCL	Benefit to approximately 100 students,IANM

Annexure XLIV



Annexure XLIV





GPS Map Camera



Jaria, Jharkhand, India
PCW7+HVV, Jharia-Dhanbad Rd, Bakar Hatta, Jharia, Jharkhand 828111
Lat 23.746022° Long 86.412113°
20/01/26 11:01 AM GMT +05:30

Annexure XXXI

No. J-11015/307/2010-IA.II (M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
CGO Complex,
New Delhi-110510.

To

Dated: 21st May, 2013

General Manager (Environment)
M/s Bharat Coking Coal Ltd.
Koyala Bhawan,
Dhanbad-826005
Jharkhand

Sub. : - Cluster IX group of six mines (combined preproduction capacity of 6.548 MTPA with a peak capacity of 8.512 MTPA in a total combine ML area of 1942.12 ha) of M/S Bharat Coking Coal Limited located in Jharia Coal Field (EC based on TOR granted on 23.12.2010) -Environment Clearance –reg.

Sir,

This has reference to the letter no. 4301l/40/2010-CPAM dated 05th October, 2010 of Ministry of Coal along with your application for Terms of Reference (TOR) and this Ministry's grant of TOR on 23.12.2010. Reference is also invited to the letters no. BCCL/GM (Env.)/ /F-EMP-Cluster-IX/2012/490 dated 16.06.2012, 28/29.12.2012 and 31.01.2013 on the above-mentioned subject.

2. The Ministry of Environment & Forests has considered the application. It is noted that the proposal is for **Cluster IX group of six mines (combined preproduction capacity of 6.548 MTPA with a peak capacity of 8.512 MTPA in a total combine ML area of 1942.12 ha) of M/S Bharat Coking Coal Limited located in Jharia Coal Field**, dist. Dhanbad, Jharkhand. The proponent has informed that:

21/12/2021
श्रीमति बबिता गोराई
पार्षद
वार्ड संख्या-49
धनबाद नगर निगम

i. There are 6 underground mines (5 operating and 1 UG mine closed for operation only) and 2 OCP mines. The operating underground mines are Lodna UG, North Tisra(UG), Joyrampur (UG), Barari UG, Jealgora (UG), one Jeenagora Underground mine(closed for operation, mine not closed) and two opencast mines are Jeenagora OCP & proposed north Tisra/South Tisra expansion of OCP (NT/ST OCP). The cluster IX is in East-Central part of Jharia Coalfield Nearest Railway station is Bhaga Railway station which is located at 4 Km from Lodna area. Cluster IX mines of BCCL is located in the eastern part of Jharia Coal Field. The Cluster is bounded in the east by metamorphics, in the west by cluster cluster VII mines of BCCL and TISCO mines, in the north by Cluster VIII mines of BCCL and in the south by Cluster X mines of BCCL and metamorphics.

ii. As per the cluster approach, the production capacity of cluster IX is 6.548 MTPA (Normative) and 8.512 MTPA (Peak) in total lease area of 1942.12 ha.

iii. This proposal does not involve change in technology or change in product mix in the mines.

iv. This cluster is severely affected by mine fires and unstable areas. 2.245 sq km of habitated surface area is affected by mine fires and instability consisting of 98 unstable sites as per the approved Jharia Action Plan. In order to deal with the severe problem of fires and unstable sites, it is proposed to amalgamate/ merge some of the

Annexure XLV

F. No- 22020/02/2016-CRC-II(Part-III) [E-327780]
भारत सरकार /Government of India
कोयला मंत्रालय /Ministry of Coal
एम.पी.एस अनुभाग /MPS Section
*****

कमरा नंबर 622-ए, शास्त्री भवन,
नई दिल्ली, दिनांक 9th July, 2025

To,

1. **The Chief Secretary, Govt. of Jharkhand**
2. **The CMD, Coal India Ltd.**

Subject: Implementation of the Revised Jharia Master Plan for Dealing with Fire, Subsidence & Rehabilitation of affected families in Jharia Coalfield- Reg.

The term of Jharia Master Plan, 2009 was completed in August 2021. A Committee, under the chairmanship of the Secretary (Coal), was constituted on 25th August 2021, to review the Jharia Master Plan. Subsequently, another Committee, under the chairmanship of the Additional Secretary (Coal), was constituted on 12th December 2024, for implementation of Jharia Master Plan.

2. Based on the recommendations of both the Committees, the revised Jharia Master Plan has been formulated. The Cabinet Committee on Economic Affairs has approved the Revised Jharia Master Plan for dealing with Fire, Subsidence & Rehabilitation of affected families of Jharia Coalfield on 25th June 2025. CCEA has approved the following proposals:

(a) Implementation of Revised Jharia Master Plan by Coal India Ltd. with an outlay of ₹ 5940.47 Crores for initial phase from balance amount of ₹ 6663.02 Crore from Jharia & Raniganj Master Plan of 2009 available with Coal India Ltd. In addition to above fund, Coal India Ltd. will provide ₹ 500 Crore per year and interest earned thereon. Additional activities will also be undertaken from the available amount for completion of remaining activities as per Revised Jharia Master Plan.

(b) Restructuring of JRDA to ensure effective implementation of the Revised Jharia Master Plan with (a) Monitoring Committee under co-chairmanship of Secretary (Coal) and Chief Secretary, Government of Jharkhand. The said Committee shall monitor progress of milestones every quarter. (b) Implementing Committee under a CEO of Joint Secretary rank (Serving/Retired) from the Government of Jharkhand. JRDA to be restructured by the State Govt. of Jharkhand as per the organisation structure given at **Annexure-I.**

(c) Authorizing Coal India Ltd. to make changes in the Revised Master Plan, if required, including re-appropriation of funds from one head to another and norms for assistance for different components in consultation with Ministry of Coal for successful implementation of Revised Jharia Master Plan as per delegated financial authority for a Maharatna Company.

3. The initial phase of Revised JMP will be applicable for 81 most vulnerable sites (7 Mineable & 74 Non-Mineable) & 27 NRSC Fire sites of Jharia Coalfield, Dhanbad, Jharkhand. The total of 649 BCCL families, 1130 LTH families (subject to verification) &

13301 Non-LTH families (total 15080 families) living in the danger area of Jharia Coal Field will be directly benefited. The initial phase of the revised JMP is to be completed by December 2028. The summary of the revised Jharia Master Plan is given at **Annexure-II**.

4. The funding arrangement for the implementation of the initial phase of the Revised Jharia Master Plan is as follows:

(a) Funding arrangement -

Balance amount (as on 31.03.2025) from Jharia & Raniganj Master Plan of 2009.	₹ 6663.02 Crore
Additional funding by CIL @ ₹ 500 Crore/ Year (for 3 Years)	₹ 1500.00 Crore
Interest earned thereon	-
Revenues from proposed mineable areas	-
Total	₹ 8163.02 Crore

(b) All the surplus revenues from the seven mineable sites in Jharia coal field would be deposited in an escrow account. The moneys in this account will only be used with permission of CIL Board and primarily for the purpose of rehabilitation under JMP. Suitable sums from this account can also be used for the operations and functioning of BCCL with the approval of CIL Board.

(c) Funding of ₹ 500 Crore/ year from CIL will continue, and a corpus will be created for future phases, if required. Further, funding from the District Mineral Foundation (DMF) will be utilised by DC, Dhanbad, whenever required.

5. Satellite imagery and AI technology to be leveraged for scientific monitoring of implementation.

6. Additional components of the Revised Jharia Master Plan, along with the responsibilities and timelines, are given in **Annexure-III.**

7. It is requested to take necessary action to implement the above decisions in the prescribed time-frame.

This issues with the approval of Hon'ble Minister of Coal and Mines.

Digitally signed by
HITLAR SINGH
Date: 09-07-2025
09:47:33

(Hitlar Singh)
Under Secretary to the Govt. of India

Copy to-

1. The Cabinet Secretariat (Shri S.G.P. Verghese, Joint Secretary, Rashtrapati Bhawan, New Delhi-w.r.t. ref. no. CCEA/12/2025(i))
2. CEO, Niti Aayog
3. Secretary, Department of Expenditure, Ministry of Finance
4. Secretary, Department of Public Enterprises
5. Secretary, Department of Land Resources, Ministry of Rural Development
6. Secretary, Ministry of Road, Transport & Highways
7. Secretary, Ministry of Railways
8. CMD, Bharat Coking Coal Ltd.
9. DC, Dhanbad cum MD, JRDA

Copy for information to:

1. PS to Minister of Coal
2. PSO to Secretary (Coal)
3. PPS to Additional Secretary & Nominated Authority
4. PPS to OSD, O/o Advisor (P)
5. IFD, MoC

Annexure-I

Approved organisation structure of JRDA

Immediate steps shall be taken to strengthen JRDA by establishing a robust administrative structure with suitable manpower. The structure would ensure efficient and effective implementation of the Revised Jharia Master Plan.

1. **Monitoring Committee:**
   i. Secretary (Coal), Co-Chairman
   ii. Chief Secretary, Govt. of Jharkhand, Co-Chairman
   iii. Secretary, Mines, Govt. of Jharkhand, Member
   iv. Secretary, Department of Home, Jail & Disaster Management, Govt. of Jharkhand, Member
   v. Chairman, Coal India Ltd., Member
   vi. CMD, BCCL, Member
   vii. Director General, DGMS, Member
2. **Implementing Committee**

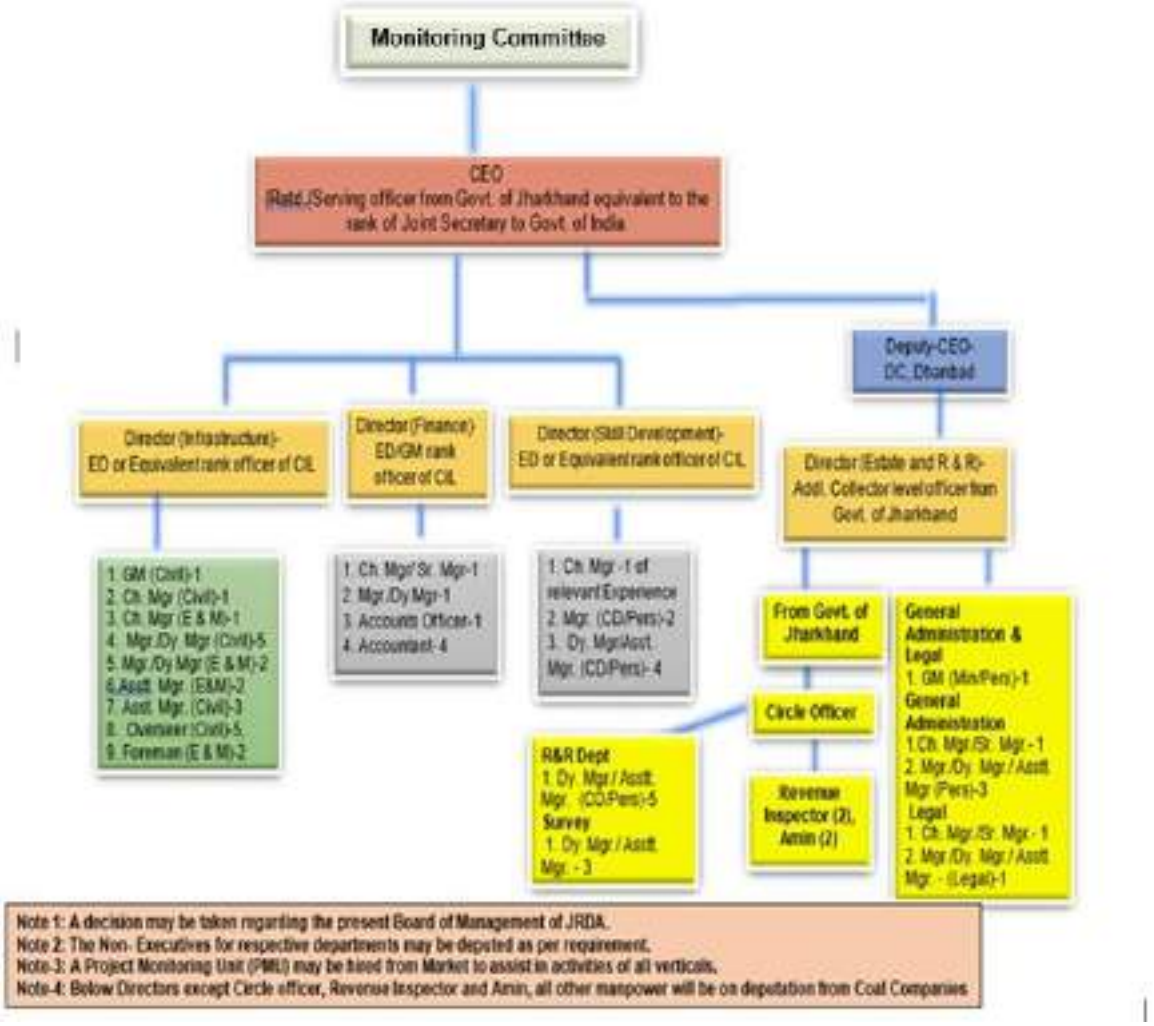
   (a) Leadership: CEO, JRDA would be a retired/serving Joint Secretary-ranked officer from Govt. of Jharkhand, for the term of Revised Jharia Master Plan. This will ensure strong and effective leadership for the duration of the plan.

   (b) Deputy CEO: The Deputy Commissioner (DC) of Dhanbad would serve as the Deputy CEO of JRDA, playing a key role in the local administration and decision-making processes.

   (c) Directors: JRDA to have four directors, each overseeing key verticals:
   i. Director (Infrastructure)-ED or Equivalent rank officer of CIL
   ii. Director (Finance) – ED/GM rank officer of CIL, JRDA
   iii. Director (Skill Development) – ED or Equivalent rank officer of CIL or Recruitment from market
   iv. Director (Estate and R &R) – Additional Collector Level officer from Govt. of Jharkhand

This structure is designed to ensure a coordinated, efficient, and transparent approach to the execution of the Revised Jharia Master Plan, with clear lines of authority and accountability. The involvement of key stakeholders at both the central

and state levels will facilitate smoother implementation and ensure that the plan meets its objectives in a timely and effective manner.



Annexure-II

Summary of Revised Jharia Master Plan

The Revised Jharia Master Plan (JMP) intends to effectively rehabilitate the affected people in Jharia Coalfield and deal with fire to prevent human loss & empower Coal India Ltd. to make changes in the Revised Master Plan within the approved outlay, if required, including re-appropriation of funds from one head to another in consultation with Ministry of Coal for successful implementation as per delegated financial authority. The report of experts will be the guiding the Revised Jharia Master Plan implementation.

1. Salient Features

1.1. The Revised JMP will be applicable for 81 most vulnerable sites in the initial phase & 27 NRSC Fire sites of Jharia Coalfield, Dhanbad, Jharkhand and 649 BCCL families, 1130 LTH families (subject to verification) & 13301 Non-LTH families (total 15080 families) living in the danger area of Jharia Coal Field will be directly benefited. It will be implemented by December 2028.

1.2. The objectives is to deal with fire in 27 fire-affected sites, rehabilitate people from 81 Most vulnerable sites, safeguard the people who will be moved from endangered areas to safer places with better amenities, save large amounts of coal from burning which provides scope for projectizing the available reserves eventually & protect environmental pollution and make the location environment friendly.

1.3. BCCL will implement fire dealing measures in a time-bound manner in 27 fire-affected sites or any other future outbreak.

1.4. Fire and unstable sites will be grouped into Mining Projects, which are considered suitable for mining by CIL, and Non-Mining Projects, which are not considered suitable for mining. Sites falling under Mining Projects will be rehabilitated using the CIL's R&R policy under the responsibility of BCCL and for non-Mining Projects, Jharia Master Plan will be implemented by JRDA. To maintain uniformity, affected non-LTH falling under Mining Projects will be given compensation as recommended for Jharia Master Plan, and top-up funding

above the CIL R&R package for encroachers will be provided from JMP fund. Therefore, Mineable sites will be dealt accordingly by BCCL.

1.5. A new option of cash compensation will be given in place of houses for both LTH & Non-LTH families will be provided. However, houses constructed will be allotted on first priority and after the exhaustion of existing houses, cash compensation will be paid. Ownership rights of houses will be given as per the long-term lease.

1.6. Committee for way ahead of Jharia Master Plan recommended that regarding compensation for the land to the LTH families, it should be determined under CBA Act or the Land Acquisition, Rehabilitation and Resettlement (LARR) Act, 2013. Sections 25 to 30 of the Act lay down the provisions for the determination of compensation for land acquired. Therefore, applying the provisions of the LARR Act, 2013 would be most practical, as it provides a legal framework for determining the price of land. JRDA will ensure that LTH families have proper documents in support of their legal possession of the land.

1.7. Once the house constructions are completed and houses are handed over to affected families, the services to be provided by either JRDA or State govt. Therefore, all Operations & Maintenance (O&M) of the assets will be carried out by JRDA & State Govt. A corpus will be created to support the effective management of the township created for the people to provide civic amenities.

1.8. After shifting of families, BCCL and JRDA will ensure that no new encroachment takes place in the Jharia Master Plan area and all acquired houses are demolished.

1.9. In earlier JMP, there was no legal provision for shifting of families residing in affected areas and no legal powers to JRDA. The Government of Jharkhand will empower JRDA with legal mandate to enforce rehabilitation and resettlement.

1.10. JRDA to be restructured with (a) Monitoring Committee under co-chairmanship of Secretary (Coal) and Chief Secretary, Government of Jharkhand. The Ministry of Coal will set and update weekly milestones along with the authority responsible for the implementation of the same. The said milestones will be monitored by the aforesaid Committee every quarter. (b) Implementing Committee under a CEO of Joint Secretary rank (Serving/Retired) from the Government of Jharkhand.

1.11. All the required amenities at rehabilitation sites, such as schools, hospitals, community centres, street lighting, tap water connections, permanent electricity connection to households, waste collection services, sewerage treatment plants etc. will be provided. Existing housing units will be maintained to make them in a liveable condition.

1.12. Skills will be provided to rehabilitated families and microenterprises will be developed to provide employment.

1.13. Belgaria Township to be notified as municipal body in long run. Resident Welfare Association (RWA) to be formed with seed funding for the corpus and support for 3 years.

1.14. Vacated sites will be taken into possession & ecologically restored through plantation, stabilization, and sustainable land use.

2. Cut-off date for entitlement:

Demographic surveys of 2019 is recommended by the Committee as final survey for entitlement. No revisions in the cut-off date is allowed. As per the survey, there are 1130 LTH families (subject to further verification of documents), 13301 Non-LTH families & 649 BCCL families who will be rehabilitated. BCCL and JRDA will take all measures to ensure that no new encroachment takes place in the Jharia Master Plan area and all acquired houses will be demolished and land to be possessed.

3. Compensation package:

	Types of Assistance	**LTH**	**Non-LTH**
a.	Compensation	Compensation for land and Assets + 50m^2 house or Rs. 5 Lakh cash*	38.92 m2 house **(each family will be allotted two units)** or Rs. 5 Lakh cash*
b.	Livelihoods grant	Rs. 1 Lakh	Rs. 1 Lakh
c.	Rental Assistance	Rs. 1 Lakh	Rs. 1 Lakh

d.	Cost of shifting	Rs. 50,000	Rs. 50,000
e.	One time grant in lieu of annuity/employment	Rs. 5 Lakh	-
	Total	Compensation +House/ Rs. 5 Lakh + Rs. 7.50 Lakh	House **(each family will be allotted two units)** /Rs 5 Lakh+ Rs. 2.50 Lakh

Note:

1. * Houses constructed will be allotted on first priority and after the exhaustion of existing houses, cash compensation will be paid.
2. Jharia Alternative Livelihoods Rehabilitation Fund will be set up as part of the rehabilitation plan to support livelihood activities. Along with the Livelihood Grant of ₹ 1 Lakh and loan up to ₹ 3 Lakh through a credit pipeline will be given to both LTH and Non-LTH families.

4. Outlay

Table-1

		FY	**Outlay (Amount in Cr)**
Revised Jharia Master Plan for Dealing with Fire, Subsidence & Rehabilitation in Jharia Coalfield	**Fire Dealing & Rehabilitation of BCCL families**	2025-26	369.27
		2026-27	1105.00
		2027-28	1100.83
		Sub Total	**2575.10**
	Rehabilitation (JRDA)	2025-26	1121.79
		2026-27	1121.79
		2027-28	1121.79
		Sub-Total	**3365.37**
		Total	**5940.47**

4.1. Fund provision for fire dealing of ₹ 2178.40 Cr includes blanketing, viability gap funding (deficit grant), scientific studies & project preparation cost. VGF (Deficit

grant) of ₹ 1114.20 Cr for one unviable site is required by BCCL. Resettlement Land Cost of ₹ 149.20 Cr & Infrastructural Cost of ₹ 247.50 Cr. Refer **Table-2** below for details.

4.2. Tentative fund requirement for rehabilitation of LTH & Non-LTH families in 81 high-risk vulnerable sites, calculated by JRDA based on two methods (i) using cost index of JCF (by CMPDIL) from 2008 to 2023 i.e.; increase of 238.66% and (ii) based on assumptions (a) average cost of asset on homestead land @ ₹ 25 Lakhs per family. (b) Average land of 6 decimals per family @ ₹ 2 Lakhs per decimal. (c) Other compensations as recommended by Committee for LTH families 3 adults per family are considered. (d) One Time grant of ₹ 5 Lakh in lieu of Annuity/Employment amt. for LTH Families as per 2nd Schedule point 4 (b) of LARR Act 2013. On average 3 adults are considered for each LTH family. Refer **Table-3** for detailed fund calculation. However, 2nd method has been considered for more actual estimates.

4.3. The estimates are tentative based on industry best practices, therefore, costs may vary based on market conditions.

Table- 2

Outlay for Fire Dealing & Rehabilitation on BCCL Part

(Amount in Rs. Cr.)

S. No.	Particulars	Amount	Remarks
1.	Infrastructural Cost	247.50	This is the cost amenities & infrastructure for BCCL houses.
2.	Resettlement Land Cost	149.20	The funding requirement for land required for amenities & infrastructure for BCCL houses.
3.	Project preparation Cost	12.50	It includes the Cost of Fire project preparation by CMPDI & other jobs by CMPDI. 1000 Eds have been provisioned per year for this job for 5 years.

4.	Fire Dealing	(A) Blanketing	1001.70	1. NRSC survey indicated 27 fire locations which were projectised by CMPDIL, accordingly 16 projects were found viable/ self-sustainable and are running at present. One project namely Mudidih has a viability gap of ₹ 1114.20 Cr and fire at other 10 non-viable projects /locations will be dealt by blanketing. 2. Cost of 1st phase of Blanketing followed by fencing/plantation at 74 JMP sites is 797.53 & 10 NRSC sites blanketing cost is ₹ ₹ 174.17 Cr. Also, a lumpsum amount of ₹ 30 Cr is kept for approach road.
		(B) Viability Gap Funding	1114.20	Viability Gap Funding for Mudidih Project.
5.	Scientific Studies		50.00	It includes surface fire study by NRSC & any other scientific studies, instrumentation if required & others.
	Sub Total		**2575.10**	

Table -3

Outlay for Rehabilitation on JRDA Part

Sl. No.	Particulars	Rate in ₹ Lakhs	No. of House Holds			Amount (in Cr)	Multiplying Factor as per LARR Act 2013 for Urban Areas	Final Amount (in Crore)	Remarks
			LTH	Non-LTH	Total				
1	House Construction Cost *					120		120	For completion of ongoing works of Belgaria Township.
2	House Compensation (LTH)	25	1130	0	1130	282.50	2	565	Based on increase in index on approved JMP. Multiplying factor of 2 is applied

Sl. No.	Particulars	Rate in ₹ Lakhs	No. of House Holds			Amount (in Cr)	Multiplying Factor as per LARR Act 2013 for Urban Areas	Final Amount (in Crore)	Remarks
			LTH	Non-LTH	Total				
									as per LAAR Act 2013.
3	Land Compensation (LTH)	2	1130	0	1130	135.60	2	271.20	Based on assumption of average 6 Decimal homestead land per family @ Rs.2 Lakhs / Decimal (Avg. rate assumed)
4	Resettlement Land Cost					150	1	150	For procurement of land for infrastructures. Rate taken as per the Govt. Land rate vide letter no. 2255, Dt. 20.07.2022
5	Infrastructural Cost					439.14	1	439.14	Estimated cost based on assessed requirements of basic Utilities such as water supply, electrical works, schools, health centres, parks, Anganwadi, sewerage disposal etc.
6	Cash compensation in lieu of house (LTH + NLTH)	5	3390	13101	16491	824.55	1	824.55	Amount as Per Committee Report, assuming all affected families will opt for cash compensation in lieu of house. On average 3 adults are assumed for each LTH Family.
7	Livelihood Grant (LTH + NLTH)	1	3390	13101	16491	164.91	1	164.91	Amount as Per Committee Report, Provision of additional Loan upto Rs.3 Lakhs through credit pipeline. On average 3 adults are assumed for each LTH Family
8	Rental assistance (LTH + NLTH)	1	3390	13101	16491	164.91	1	164.91	Amount as Per Committee Report. On average 3 adults are assumed for each LTH Family
9	Cost of Shifting (LTH + NLTH)	0.5	3390	13101	16491	8245.50	1	82.45	-do-
10	One Time Grant in Lieu of Annuity	5	3390	-	3390	169.50	1	169.50	Proposed as per Second Schedule Point 4.(b.) of LARR Act 2013. On average 3 adults are

Sl. No.	Particulars	Rate in ₹ Lakhs	No. of House Holds			Amount (in Cr)	Multiplying Factor as per LARR Act 2013 for Urban Areas	Final Amount (in Crore)	Remarks
			LTH	Non-LTH	Total				
	/Employment Amt. (for LTH) **								considered for each LTH Family
11	Additional Cost of Stamp Duty and Registration Fee ***							73.12	Proposed as per Second Schedule Point 11 of LARR Act 2014 (Stamp Duty @ 4% and Registration fees @ 3%)
12	Skill Development / Livelihood							80	Proposed
13	Survey and Valuation of Structures on Homestead Lands of LTH Families							11.30	Assumed 2% of the house compensation cost.
	Sub-Total							**3116.08**	
14	Add: Contingencies @ 3%							93.48	
15	Add: Supervision Charges @ 5%							155.80	
	Grand Total							**3365.36**	

Note:

1. * As per the Committee report no new houses to be constructed. The committed balance amount for this head is required for completion of the ongoing works.
2. For Sl. No. 6 to 11 on an average 3 adults are assumed for each LTH Family.
3. ** The Sl. No 10 is proposed to be incorporated as per Second Schedule Point 4.(b.) LARR 2013 Act.
4. *** The Sl.No 11 is proposed to be incorporated in line with point 11 of Second Schedule of the LARR 2013 Act.
5. This Budget estimate is for initial phase of 81 High Risk Sites only.
6. The data regarding quantum of land and valuation of assets for LTH is not available. For calculation, it is assumed that on average families will have 6 decimals of land and avg. cost of assets on homestead land is assumed as Rs.25 Lakhs / LTH family. The cost of homestead land is also assumed as Rs. 2 Lakhs per decimal. The above assumptions may vary in a wider range as per actual measurements.

5. Source of Funding:

Balance amount from Jharia Master Plan.	₹ 6663.02 Cr
Additional funding by CIL @ Rs 500 Cr/Year (for 3 Years)	₹ 1500.00 Cr
Interest earned thereon	-
Revenue from mineable areas	-
Total	₹ 8163.02 Cr

5.1. Funding of Rs 500 Cr/year from CIL will continue and a corpus is to be created for future phases of revised Jharia Master Plan, if required. Also. funding from the District Mineral Foundation (DMF) will be utilised by DC, Dhanbad, whenever required.

5.2. All the surplus revenues from the seven mineable sites in Jharia coal field will be deposited in an escrow account. The moneys in this account will only be used with permission of CIL Board and primarily for the purpose of rehabilitation under JMP. Suitable sums from this account can also be used for operations and functioning of BCCL with the approval of CIL Board.

6. Monitoring and Evaluation:

6.1. **Monitoring Committee:**

i. Secretary (Coal), Co-Chairman
ii. Chief Secretary, Govt. of Jharkhand-Co-Chairman
iii. Secretary Mines, Govt. of Jharkhand-Member
iv. Secretary, Department of Home, Jail & Disaster Management, Govt. of Jharkhand-Member
v. Chairman, Coal India Ltd.-Member
vi. CMD, BCCL-Member
vii. Director General, DGMS-Member

6.2. **Implementing Committee**

(a) Leadership: CEO, JRDA would be a Retired/Serving Joint Secretary-ranked officer from Govt. of Jharkhand, for the term of Revised Jharia Master Plan. This will ensure strong and effective leadership for the duration of the plan.

(b) Deputy CEO: The Deputy Commissioner (DC) of Dhanbad would serve as the Deputy CEO of JRDA, playing a key role in the local administration and decision-making processes.

(c) Directors: JRDA to have four directors, each overseeing key verticals:

i. Director (Infrastructure)-ED or Equivalent rank officer of CIL
ii. Director (Finance) – ED/GM rank officer of CIL, JRDA
iii. Director (Skill Development)-ED or Equivalent rank officer of CIL or Recruitment from market
iv. Director (Estate and R &R)- Additional Collector Level officer from Govt. of Jharkhand

6.3. Development of MIS-

BCCL has prepared MIS https://bcclweb.in/JMP for the whole system & complete data of 81 sites is in process of digitization. Initial data of 81 sites based upon the defined parameters has been captured. It is further being upgraded with geotagged photographs. Test run for all the areas of BCCL has been completed.

Annexure-III

Additional components of Revised Jharia Master Plan, along the responsibilities and timelines

(a) Short-term (within 6 Months)

S. No.	Milestones	Responsibility	Timelines
1.	Maintenance of existing units of houses to make them in liveable condition- Hiring of an agency for maintenance of houses and sewerage.	JRDA through an outsourcing agency	December 2025
2.	Deployment of Electric buses at rehabilitation sites for residents. Providing E-Rickshaw as a means of livelihood activity.	BCCL	Buses Implemented & E-Rickshaw by August 2025
3.	Additional infrastructures such as Schools, Hospitals, ICDS, PDS shops etc. shall be assessed and a comprehensive proposal shall be sent to State Govt. for approval.	JRDA	October 2025
4.	100 percent distribution of ration cards and enrolment to insurance schemes, UJJWALA Yojna, Ayushman Bharat, and old age pension schemes shall be achieved. Eligible families also to be provided with MNREGA job cards.	JRDA	December 2025
5.	Police post at Belgaria shall be established	JRDA with the help of SSP, Dhanbad	August 2025
6.	The representatives of MSME, MSDE, MoRD (NRLM) will jointly visit to interact with the DC, Dhanbad and BCCL teams and submit comprehensive proposal for Skill development & livelihood.	MSME, MSDE, MoRD	August 2025

7.	Development of Microenterprise- EOI to be floated for shortlisting the agency	BCCL	July 2025
8.	Career cum counselling centres shall be established for student and youths and Market mapping of skill requirement in Dhanbad city.	BCCL	August 2025
9.	Organisation of awareness drive about Revised Jharia Master Plan to encourage shifting	BCCL & JRDA	September 2025
10.	Verification of LTH families with support from district officials & uploading certified data on the portal	BCCL, JRDA	December 2025
11.	Stamp duty & Registration fee on the house to be allotted shall be Waived off	Govt. of Jharkhand	
12.	Establishment of an online grievance redressal system for convenient grievance registration, and sensitization of people about its usage.	JRDA	August 2025
13.	Resident welfare association (RWA) to be formed with seed funding for the corpus and support for 3 years	BCCL, JRDA	August 2025
14.	Coverage of all women above 18 years under Self Help Group (SHG) under NRLM (MoRD). Further creation of sufficient Panchayat Level Federations and Block Level Federations under NRLM	JRDA, MoRD	December 2025
15.	Approval of the individual electricity connections, infrastructure for street lighting and water pipelines from Damodar River.	JRDA through JBVNL & PHED	

(b) Medium-term (6 Months to One year)

S. No.	Milestones	Responsibility	Timelines
1.	Installation of Individual house electricity connections by providing smart meters.	JRDA through JBVNL	June 2026
2.	Installation of infrastructure for street lighting in all phases of construction		
3.	PM Surya Ghar Yojna for rooftop solar generation	BCCL	September 2025
4.	Development of four-lane Ring road around Jharia Coalfield- To submit requirement to the concerned department/ organization	BCCL & JRDA	December 2025
5.	Waste collection services, segregation, and recycling units shall be set up.	JRDA & BCCL for three years. Through RWA thereafter	June 2026
6.	Development Widening & maintenance of colony Roads and approach roads.	JRDA through PWD	June 2026
7.	Restructuring of JRDA headed by Retd./Serving Joint Secretary level officer from GoJH	Govt. of Jharkhand	December 2025
8.	Establishment of Skill Development centers at Karmatand Rehabilitation Site identified for handover by BCCL to JRDA	BCCL	December 2025
9.	Establishment of commercial dairy farming and Poultry farming with cooperatives and self-help	BCCL	June 2026

	groups with involvement of NRLM along with JRDA		
10.	Remaining house construction should be expedited, with quarterly targets set for efficient monitoring.	BCCL & JRDA	December 2025

c) Long-term (within Three Years)

S. No.	Milestones	Responsibility	Timelines
1.	Commissioning of Sewerage Treatment Plan in Belgaria	JRDA with concerned department of State Govt.	December 2026
2.	Installation of pipeline from Damodar Valley for supply of water in Belgaria. Permanent Tap water connections are to be provided in each household	JRDA with PHED	June 2028
3.	Belgaria Township to be notified as municipal body in long run.	JRDA with help of State Govt.	June 2027
4.	Additional Infrastructure Community centre, shopping complexes etc to be built.	JRDA	December 2026
5.	A sub-station (33 KV) and permanent electricity supply along with smart metering to be established at Belgaria township	JRDA through JBVNL	December 2026
6.	Taking possession of vacated sites & ecologically restoring through plantation, stabilization, and sustainable land use	BCCL	Part of fire & subsidence management plan
7.	Promoting self-employment ventures and MSME clusters by BCCL in collaboration with government/private firms, with technical support and advanced	BCCL	December 2026

	training from MSME centers in Jamshedpur.		
8.	Development of Microenterprise	BCCL	June 2026
9.	Expanding skill development through NSDC to cover one member from 18,000 affected families, with advanced technical support from nearby MSME Centers.	BCCL	June 2028

Report-II

PROFORMA FOR PROVIDING INFORMATION ON REHABILITATION

****

1.	No. of villages affected	:	98 Sites (2245600 SQM area)- As per EMP 2013				
2.	Families affected	:	SC	ST	OTH	TOTAL	
			BCCL- 5199 PRIVATE- 3821 Encroacher- 3137 Other- 89			12246	
3.	Compensation package offered per family	:	As per Govt. approved Master Plan				
	State/Centre norms		Project package				
4.	Budget estimate for rehabilitation	:					
	a) Total outlay	:	Rs. 126092 lakhs				
	b) Amount paid/used	:	Rs. 1366.66 Lakhs				
5.	Employment details	:					
	a) Total employment to be provided	:	NIL				
	b) Employment given so far	:	Nil				
6.	Rehabilitation & Resettlement details	:					
	a) No. of families rehabilitated	:					
	i) Name of the site		JRDA Site, Karmatand, Dhanbad				
	ii) Families rehabilitated	:	SC	ST	OTH	TOTAL	
			BCCL- 85 Other- 2280			2365	
	b) Families yet to be rehabilitated	:					
	i) Name of the site(s)	:					
	ii) No. of families	:	SC	ST	OTH	TOTAL	
						9861	
7.	Any other information	:					

DATE: 27/11/25

GM, Cluster IX, Lodna Area

Annexure XLVI

Date 21/12/2025

विषय:— डोजर ऑपरेटर को खुदाई के साथ डोजरिंग का काम करने के लिए सुरक्षावार्ता।

आज हाजरी घर के पास उपस्थित सभी डोजर ऑपरेटर को सुरक्षात्मक तरीके से डोजरीज का काम करने के लिए सुरक्षावार्ता सुनाई गई। सुनाई गई सुरक्षावार्ता का विस्तृत वर्णन निम्नलिखित में इस प्रकार वर्णित है।

1. डोजर ऑपरेटर को कार्य शुरू करने से पहले डोजर का ब्रेक, हॉर्न, लाईट AVA एवं अन्य कन्ट्रोल पाइन्ट का जांच करना है।

2. डोजर ऑपरेटर को डोजर को भिठान से Working Place में ले जाने से पूर्व ध्वनि संकेत देना जरूरी है।

3. जब डोजर का काम बन्द करना पड़े तब डोजर का ब्लेड को जमीन पर सिराकर रखना है।

4. डोजर ऑपरेटर को OB dump में डोजरीज का काम करते समय उम्पर की सुरक्षा के लिए उम्प के किनारे प्रर्याप्त ऊँचाई एवं प्रर्याप्त चौड़ाई का बर्म बनाना है।

5. डोजर में किसी प्रकार की गड़बड़ी पाई जाने पर इसकी खबर सुपरवाईजर या officer को देना जरूरी है।

6. अनाधिकृत व्यक्ति को डोजर पर नहीं चढ़ना है।

7. डोजर ऑपरेटर को डोजर के फिटर द्वारा O.K दिए जाने पर ही चलाना है।

8. डोजर ऑपरेटर को डोजर चलाते समय कम्पनी द्वारा प्रदान किये गए P.P.E का उपयोग करना है।

9. अगर डोजरिंग का काम आग के नजदीक हो है, तब डोजरिंग का काम शुरू करने से पहले विष्फ का निरीक्षण कर अच्छि प्रकार कर लेना है, तब इसके बाद Dozzing का काम शुरू करना है।

10. Dozer को Haul Road से जाने के समय इसका ब्लेड नीचे गिराते हुए ले जाना है।

1 [illegible]
2. Bhaskar Kakar
3 Muna Paswan
4. [illegible]
5. Bijay kumar
6 विनोद कुमार
7. सुखे राम
8 [illegible]

Annexure XLVI

Date:- 24/1/2025

विषय :- ऑपरेटर को सुरक्षा के साथ ऑपेल मशीन चलाने के लिए सुरक्षा वार्ता।

आज हाजरी घर के पास उपस्थित हुए ऑपेल ऑपरेटर को ऑपेल मशीन को सुरक्षित तरीके से चलाने के लिए सुरक्षावार्ता सुनाई गई। सुनाई गई सुरक्षावार्ता का लिखित वर्णन इस प्रकार है:-

1) ऑपेल मशीन को खान प्रबंधक द्वारा अधिकृत किए गए ऑपेल ऑपरेटर के द्वारा ही चलाना है।
2) ऑपेल ऑपरेटर को कम्पनी द्वारा प्रदान किए गए P.P.E का उपयोग करना है। P.P.E जैसे Mining Shoe, Helmet हैं, Jumper, Jacket इत्यादी।
3) मशीन के Working Area में किसी भी अनधिकृत व्यक्ति को प्रवेश नहीं करना है।
4) यदि अत्यधिक धूल उत्पन्न होती है, तब ऑपेल ऑपरेटर को ऑपेल के कन्ट्रोल स्विच को तुरन्त काट देना है।
5) ऑपेल को मार्च करते समय ऑपेल का बकेट अधिक से अधिक 1 मी० की ऊँचाई पर ही रखना है।
6) ऑपेल चलाने वाली जगह को खुली एवं साफ सुथरा रखना है जिससे कि आपातकालीन समय आने पर ऑपेल को आसानी से पीछे कर सुरक्षित किया जा सके।
7) ऑपेल ऑपरेटर को ऑपेल चलाते समय Reg. no 110 के अनुसार बनाए गए Code of Practice के नियमों को पालन करना है।
8) कोई भी ऑपेल या excavator मशीन को High voltage overhead wire को 3 मी० से कम Height में नहीं चलाना है।
9) यदि मशीन चलाने वाली Place में धूल आ गई है, तब मशीन को वहाँ से मार्किंग कर सुरक्षित जगह पर ही रखना है।
10) मशीन को चलाकर बन्द करके या करते समय मशीन के बकेट को जमीन पर गिराकर रखना है।

1) सुरेश दास
2) विरेन्द्र मुंडा
3) Jai Prakh Singh
4) S. N. Mandal
5) विशाल लकड़ा
6) सुरदेव ओराँव
7) Bimal Hembrom
8) जितेन्द्र सिंह
9) Lakhi Kant Bakhat

Annexure XLVI

विषय :- ड्रील ऑपरेटर को ड्रील मशीन को सुरक्षा से ऑपरेट करने के लिए सुरक्षावार्ता।

आज सेफ्टी वार के पाय उपस्थित हुए सभी ड्रील ऑपरेटर को ड्रील का ड्रीलिंग होल मारने के समय बरती जाने वाली सावधानियों के बारे सुरक्षावार्ता की गई है।

चुनी गई सुरक्षावार्ता का निम्नलिखित बिंदु इस प्रकार सम्मिलित है।

1) ड्रील ऑपरेटर को ड्रीलिंग होल करने समय कम्पनी द्वारा प्रदान किए गए P.P.E जैसे- माईनिंग शू, हेलमेट, फ्लेमरजेक्ट पहनना है।
2) ड्रील मशीन को कभी भी बेंच के किनारे के समानान्तर ड्रील मशीन को नहीं लगाना है।
3) ड्रील मशीन की ड्रीलिंग रॉड को चूला होल के रहते हुए ड्रीलिंग मशीन को मार्च नहीं कराना है।
4) ड्रीलिंग मशीन पर ऑपरेशन एवं मेन्टेनेन्स मशीन निर्माता द्वारा दिए गए निर्देशों एवं आदेशों पर पालन करना है।
5) Drill rig का ऑपरेशन खान प्रबंधन के द्वारा अधिकृत किए गए चालक को ही चलाना है।
6) Drill Operator को अपना Operation Ghat में किसी भी अनाधिकृत व्यक्ति को नहीं बैठने देना।
7) 4m से कम चौड़ी Drilling के बाद बेंच तथा कोई भी Ramp में मार्च नहीं करना है।
8) 1 in 5 से अधिक Gradient में drill rig को मार्च नहीं करना है।
9) Drill rig में किसी प्रकार की खराबी या गड़बड़ी होने पर इसकी सूचना Drill Operator को तुरंत Concerned Engineer या Foreman को देना है।
10) Drill hole से जाने के बाद Drill rig को सुरक्षित जगह पर पहुँचकर रखना है।

1) Bijay Kr Barman
2) L. Majhi
3. मो. अयूबम
4 मिठू विश्वास
5) आम सभी लिखी

Annexure XLVI

Date 15/12/2025

विषय – ड्रील ऑपरेटर को ड्रील मशीन को सुरक्षा से ऑपरेट करने के लिए सुरक्षावार्ता।

आज हाजरी घर के पास उपस्थित हुए सभी ड्रील ऑपरेटर को सुरक्षात्मक तरीके से ड्रील मशीन से ड्रीलिंग होल करने के लिए सुरक्षावार्ता सुनाई गई।

सुनाई गई सुरक्षावार्ता का विस्तृत वर्णन इस प्रकार नीचे लिखी गई है।

1. ड्रील ऑपरेटर को ड्रील मशीन से ड्रीलिंग होल करते समय कम्पनी द्वारा प्रदान किए गए PPE का उपयोग करना है।

2. ड्रील मशीन को कभी भी बेंच के किनारे के समानान्तर नहीं लगाना है।

3. ड्रील मशीन की ड्रीलिंग रॉड होल के अन्दर होते हुए कभी भी मारें नहीं करना है।

4. Drill m/c का ऑपरेशन, कार का ऑपरेशन m/c चलाने के लिए निर्धारित रूप से Competent person के रूप में खान मैनेजर द्वारा अधिकृत किए गए व्यक्ति को ही चलाना है।

5. ड्रील ऑपरेटर को Drill m/c के Manufacturer के द्वारा जारी गई ऑपरेटिंग निर्देशों एवं सुरक्षात्मक निर्देशों का पालन करना है।

6. ड्रील ऑपरेटर को अपने बेलिंग में किसी भी अनाधिकृत व्यक्ति को नहीं बैठाना है।

7. दीवार से कम चौड़ी बेंच या किनारे को Drill machine को कार्य नहीं करना है।

8. 11 to 5 के अतिरिक्त Production में Drill m/c को मांगना नहीं करना है।

9. Drill m/c में किसी प्रकार की खराबी या गड़बड़ी होने पर इसकी सूचना Drill Op को तुरन्त Concerned Engineer या foreman को देना है।

10. Drill m/c को ड्रील होल पूरा हो जाने के बाद Drill Operator के द्वारा Blasting Site Danger Zone से सुरक्षित जोन में पहुँचा कर रखना है।

1. विमल टुडू
2. [illegible]
3. [illegible]
4. संतोष मलिक
5. [illegible]
6. [illegible]
7. [illegible]
8. Kanhaiya Paswan
9. Nawab Alam
10. [illegible]

Scanned with OKEN Scanner


Annexure XLVI



Annexure XLVI



Annexure XLVI

