भारत कोकिंग कोल लिमिटेड
(एक मिनिरत्न कम्पनी)
(कोल इंडिया लिमिटेड का एक अंग)
महाप्रबंधक का कार्यालय
पूर्वी झरिया क्षेत्र, भौरा
जिला – धनबाद) झारखण्ड (, पिन –828302
दूरभाष –0326-2320077,
ईमेल- cgmej@bccl.gov.in
CIN: U10101JH1972GOI000918

BHARAT COKING COAL LIMITED
(A Mini Ratna Company)
(A Subsidiary of Coal India Ltd)
OFFICE OF THE GENERAL MANAGER
Eastern Jharia Area, Bhowra
Dist: Dhanbad (Jharkhand), PIN- 828302
Tel.:0326-2320077, Email- cgmej@bccl.gov.in
Regd.Off: Koyla Bhawan, Koyla Nagar,
Dhanbad-825005, Tel.:0326-2230190
CIN: U10101JH1972GOI000918,
FAX: 0326-2230050, Email – cos@bccl.gov.in

Ref. No.: BCCL/EJ/GM/Envt./2024/70

Date: 27/05/2024

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

Sub.: Six monthly compliance report of the conditions of Environmental Clearance granted to Cluster X group of mines of BCCL for the period from October 2023 to March 2024.
(Ref.: EC Order No.- J-11015/380/2010-IA.II(M) dated 06.02.2013 & EC amended Vide letter no.- J-11015/380/2010-IA.II(M) dated 12.06.2019)

Dear Sir,

Kindly find the enclosed here with the six monthly compliance report of the conditions of Environmental Clearance for the period from October 2023 to March 2024 in respect of Cluster X group of mines of BCCL.

Thanking You.

Encl.: Six monthly compliance report with annexure

Yours faithfully

General Manager
Eastern Jharia Area, BCCL
Cluster X

CC to:

1. Director, 1A Monitoring Cell, Paryavaran Bhawan, CGO Complex, New Delhi-110003.
2. Member Secretary, JSPCB, Ranchi
3. Regional Officer, JSPCB, Housing Colony, Dhanbad
4. GM / HOD (Envt.), BCCL, Koyla Bhawan, Dhanbad
5. AGM, E.J. Area
6. Project Officer- ASP, Bh(S), Bh(N)
7. Area Manager (Envt.), E.J. Area
8. Master File

ENVIRONMENTAL CLEARANCE COMPLIANCE OF CLUSTER-X

(GRANTED VIDE J-11015/380/2010-IA.II (M) Dated 06.02.2013 and EC AMENDED DATED 12.06.2019)

(Period: October 2023 to March 2024)

<table>
<tr><th>Sl. No.</th><th>A. Specific Conditions by MOEF:</th><th>Compliance</th></tr>
<tr><td>I.</td><td>The maximum production from the opencast and underground section in the cluster shall not exceed beyond that for which environmental clearance has been granted for the cluster X as below:</td><td>The production from the cluster is within the limit for which environmental clearance has been granted. The year wise and colliery wise production of coal in MTPA is as follows:

COAL PRODUCTION DATA (IN MT) OF CLUSTER X SINCE GRANT OF EC

<table>
<tr><th>Mine Name</th><th></th><th>EC Capacity (Peak)</th><th>2013-14</th><th>2014-15</th><th>2015-16</th><th>2016-17</th><th>2017-18</th><th>2018-19</th><th>2019-20</th><th>2020-21</th><th>2021-22</th><th>2022-23</th><th>2023-24</th></tr>
<tr><td rowspan="2">Bhowra North</td><td>UG</td><td>0.143</td><td>0.024</td><td>0.032</td><td>0.028</td><td>0.023</td><td>0.012</td><td>0.006</td><td>0.0065</td><td>0.000015</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>OC</td><td>0.546</td><td>0.143</td><td>0.01</td><td>0.028</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="2">Bhowra South</td><td>UG</td><td>0.377</td><td>0.037</td><td>0.032</td><td>0.025</td><td>0.022</td><td>0.01</td><td>0.007</td><td>0.0003</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>OC</td><td>1.2</td><td>0.185</td><td>0.11</td><td>0.28</td><td>0.413</td><td>0.458</td><td>0.892</td><td>0.318</td><td>0.675</td><td>0.261</td><td>0.362</td><td>7.068</td></tr>
<tr><td>ASP Colliery</td><td>OCP</td><td>0.709</td><td>0.139</td><td>0.085</td><td>0.219</td><td>0.267</td><td>0.277</td><td>0.239</td><td>0.175</td><td>0.225</td><td>0.406</td><td>0.432</td><td>4.108</td></tr>
<tr><td>Sudamdih Shaft</td><td>UG</td><td>0.24</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Amlabad UG</td><td>UG</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Total (Cluster X)</td><td></td><td>2.289*</td><td>0.528</td><td>0.269</td><td>0.580</td><td>0.725</td><td>0.757</td><td>1.145</td><td>0.500</td><td>0.900</td><td>0.667</td><td>0.794</td><td>1.117</td></tr>
</table>

*Combined production capacity of the Cluster X would remain at 2.289 tonne (peak)</td></tr>
<tr><td>II.</td><td>All the void /water bodies should be backfilled up to Ground level and no OB dump at the end of mining.</td><td>This activity is post closure mining activity and will be done as per approved mine closure plan. However, progressive backfilling is done, the year wise data of backfilling in Ha. is as follows:

UNIT WISE BACKFILLING DATA (IN HA) OF CLUSTER X

<table>
<tr><th>Mine Name</th><th>2013-14</th><th>2014-15</th><th>2015-16</th><th>2016-17</th><th>2017-18</th><th>2018-19</th><th>2019-20</th><th>2020-21</th><th>2021-22</th><th>2022-23</th><th>2023-24</th></tr>
<tr><td>Bhowra North-Mix</td><td>1.76</td><td>3.17</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0</td></tr>
<tr><td>Bhowra South- Mix</td><td>4.10</td><td>6.50</td><td>6.50</td><td>5.24</td><td>5.24</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>2.00</td><td>2.50</td></tr>
<tr><td>ASP Colliery - OC</td><td>1.93</td><td>0.96</td><td>0.6</td><td>0.58</td><td>0.51</td><td colspan="2">16.4</td><td colspan="2">3.56</td><td>0.00</td><td>0.00</td></tr>
<tr><td>Sudamdih Shaft</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Amlabad UG</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
</table>

After physical reclamation/backfilling, biological reclamation has been done which is as follows:

AREA OF ECOLOGICAL RESTORATION SITES / PLANTATION / BIOLOGICAL RECLAMATION (in Ha.)

<table>
<tr><th>Colliery / Mine Name</th><th>2013-14</th><th>2014-15</th><th>2015-16</th><th>2016-17</th><th>2017-18</th><th>2018-19</th><th>2019-20</th><th>2020-21</th><th>2021-22</th><th>2022-23</th><th>2023-24</th></tr>
<tr><td>Bhowra North</td><td>-</td><td>-</td><td>-</td><td>5.20</td><td>3.10</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Bhowra South</td><td>-</td><td>4.78</td><td>-</td><td>-</td><td>-</td><td>4.50</td><td>-</td><td>-</td><td>2.60</td><td>-</td><td>-</td></tr>
<tr><td>ASP Colliery</td><td>-</td><td>3.95</td><td>5.71</td><td>-</td><td>-</td><td>-</td><td>-</td><td>19.5</td><td>-</td><td>-</td><td>6.0</td></tr>
<tr><td>Sudamdih Shaft</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Amlabad UG</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total (in Ha.)</td><td>-</td><td>8.73</td><td>5.71</td><td>5.20</td><td>3.10</td><td>4.50</td><td>-</td><td>19.5</td><td>2.60</td><td>-</td><td>6.0</td></tr>
</table></td></tr>
<tr><td>III.</td><td>Extensive plantation should be provided on either side of Damodar River.</td><td>Dense plantation is present along the Damodar river which is under cluster X. Plantation work is in progress under Riverside plantation scheme in area of 22.10 Ha. (19.5 Ha river side plantation + 2.6 Ha under compensatory plantation) near Damodar river in consultation with District Forest Officer, Dhanbad. In addition to this, area of 6.0 Ha (out of this 4.02 Ha under river side plantation) was taken up for plantation work in 2023-24 under Cluster X.
List of plant species present along the bank of Damodar river are given below:</td></tr>
</table>

List of the plants species

S. No.	Botanical Name	Local Name	Hindi Name
1	*Acacia arabica*	Babul	Babul
2	*Adina cordifolia*	Karam	Karam
3	*Ailanthus excelsa*	Ghorkarani/ Ghorkaram	Ghorkarani/ Ghorkaram
4	*Alangium Lamarckii*	Dhela	Dhela
5	*Albizzia lebbek*	Siris	Siris
6	*Albizzia procera*	Safed Siris	Safed Siris
7	*Alstonia scholaris*	Chatni	Chatni
8	*Azadirachta indica*	Neem	Neem
9	*Bombax ceiba*	Semal	Semal
10	*Butea frondosa*	Palas	Palas
11	*Casearia tomentosa*	Beri	Beri
12	*Cassia fistula*	Dhanraj/Amaltas	Dhanraj/Amaltas
13	*Dalbergia sissoo*	Shisham	Shisham
14	*Eugenia jamb*	Jamun	Jamun
15	*Ficus religiosa*	Pipal	Pipal
16	*Lagerostroemia parviflora*	Sidha	Sidha
17	*Mitragyna parviflora*	Guri/Gurikaram	Guri/Gurikaram
18	*Terminalia arjuna*	Arjun	Arjun
19	*Phoenix acaulis*	Khejur	Khejur
20	*Ficus racemosa*	Gular	Gular
21	*Calotropis procera*	Calotropis	Calotropis
22	*Ricinus communis*	Castor	Castor

In addition to this, Action has been taken for the plantation or eco-restoration work as per the Road Map prepared by Forest Research Institute (FRI), Dehradun.

Details of Plantation in EJ Area (Cluster X)

DETAILS OF ECOLOGICAL RESTORATION / PLANTATION IN E.J. AREA

Colliery	Site Name	Area (Ha)	Taken up in	Plantation (No.)										
				2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Bh (N)	Bh N/BLA OB Site	5.2	2016-17	-	-	13000	2850		1360	500	200	300		18210
	New BLA Site	3.1	2017-18	-	-	-	4725	-	616	500	250	-	-	6091
Bh (S)	3 Pit OB Site	4.78	2014-15	12189		1000	2200	-		1500	200	-	-	17089
	Bhowra Chandan OB Site	4.5	2018-19	-	-	-	-	11500	1728	2000	800	-	-	16028
	Compensatory afforestation	2.6	2021-22	-	-	-	-	-	-	-	-	1150	-	1150
ASP Colliery	COCP/ Vrindavan Site	5.71	2015-16	-	6125	8150	3000	-	2650	250	2750	2200	-	25125
	Kamini Kalyan Herbal Garden	3.32	1980 (old)	375 (planted before 2014)		40	50	-	150	150	200	250	-	840
	Mohalbani OB Site	3.95	2014-15	10874		1000	1200	-	-	-	200	-	-	13274
	Gaurigram Site	19.5	2020-21	-		-	-	-	-	-	33000	-	-	33000
	Near kamini kalyan herbal park	1.98	2023-24	-		-	-	-	-	-	-	-	3366	3366
	Riverside plantation	4.02	2023-24	-		-	-	-	-	-	-	-	6834	6834
Plantation at other locations	Schools, along road, colony, etc.								1246	2380	2485	275	200	6586
Total		**52.66**		**23063**	**6125**	**23190**	**14025**	**11500**	**7750**	**7280**	**40085**	**4175**	**10400**	**147593**

IV.	Details of impact of mining on Damodar River should be assessed and provided;	CMPDI is carrying out the Environment Monitoring which comprises of sampling and analysis of water from Damodar River (SW 21 & SW 22) under surface water analysis. Result of upstream and downstream samples showing no major changes in water quality of

		Damodar river (report enclosed as Annexure –I).

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
SURFACE WATER ANALYSIS TEST REPORT

CMPDIL, RI-II
KOYLA BHAWAN COMPLEX
DHANBAD. -826005
Phone: 0326-223-850
email: rdri2.cmpdi@coalindiain

Month & Year	Quarter Ending Dec 2023	Cluster	X	ULR No.	TC101602300000480P TC101612300000481P
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			Date of Issue	11.03.2024
Project	Sample Ref. No.		REM/BCCL/23-24/SW /	Sampling Method	(IS 3025 , Part-1) CMPDI/RI-II/LPM 13
Sampling Stations	(i)	Upstream of Damodar River(SW21)	Date of Sampling	04.12.23	Period of Analysis
	(ii)	Downstream of Damodar River(SW22)	Date of Sampling	04.12.23	04.12.2023 to 09.01.2024

Sl. No.	Parameter	Method of Analysis	Observed Values S0023	Observed Values S0021	IS : 2296 INLAND SURFACE WATER [1982] Class 'C	Range of Testing	LDL
1	BOD (3 days 27°C), mg/l	IS 3025 (Part 44) : 1993, R-2019 , 3 day incubation at 27°C	<2.0	<2.0	3	2.00-100.00	2
2	Colour,Hazen Units	APHA 24th Edition , 2120-B-:2023	2	1	10	1-500.0	1
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 Argentometric Method	29	45	600	2.0-1500.0	5
4	Copper, mg/l	IS 3025 (Part 42) : 1992 R : 2019, AAS-Flame Method	<0.2	<0.2	1.5	0.2-10.0	0.2
5	Dissolved Oxygen, mg/L	IS 3025 (Part 38) : 1989, R:2003 Winkler Azide Method	6.9	7.0	4	1.0-10.0	0.1
6	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method,2023	0.60	0.64	1.5	0.2-2.00	0.2
7	Hexavalent Chromium, mg/l	APHA 24th Edition, 1,5-Diphenylcarbohydrazide Method IS 3025 (Part 52) : 2003,R-2023	<0.01	<0.01	0.05	0.01-1.4	0.01
8	Iron, mg/l	IS 3025 (Part 53):2003,R:2019, AAS-Flame Method	<0.2	<0.2	50	0.2-10	0.2
9	Nitrate , mg/l	APHA, 24th Edition, UV-Spectrophotometric Method,2023	8.81	9.16	50	0.5-45.0	0.5
10	pH value	IS 3025, (Part 11) : 1983 R-2023 Electrometric (Ph Meter) method	8.20	8.19	6.5-8.5	1.0-14.0	2
11	Sulphate, mg/l	APHA –24th Edition,4500- S, Turbidity Method,2023	33	38	400	10.0-400.0	10
12	Total Dissolved Solids, mg/l	IS 3025, (Part 16): 1984 R-2023 Gravimetric method	489	521	1500	25.0-10000.0	25
13	Zinc, mg/l	IS 3025(Part 49) : 1994, R : 2019, AAS-Flame Method	<0.1	<0.1	15	0.10 – 10.0	0.1

**Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit

***All units in mg/L unless specified otherwise Sample Collected in 5 Ltr jerricane , Color as observed is transparent

(Kumar Vaibhav) (Amit Raj Mishra)

Analysed by REVIEWED BY 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 2

V.	Impact of mining on ground water of the area (Impact Zone) should be provided;	Ground water monitoring is being carried out by CMPDI and the ground water analysis report is enclosed as Annexure – II.

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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 – 2023-24)

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

JHARIA COALFIELD AND RANIGANJ COALFIELD (PART)

For
(BHARAT COKING COAL LIMITED)
(A Subsidiary of Coal India Limited)
KOYLA BHAWAN (DHANBAD)

Prepared by
Geology Department
Regional Institute-II
CMPDI, Dhanbad

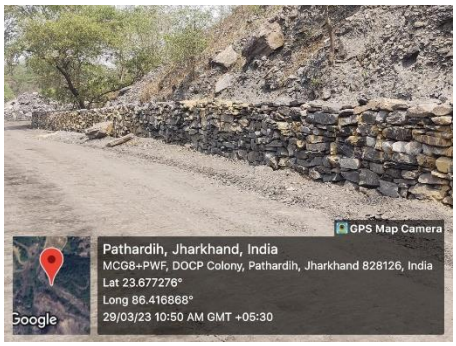
MARCH – 2024

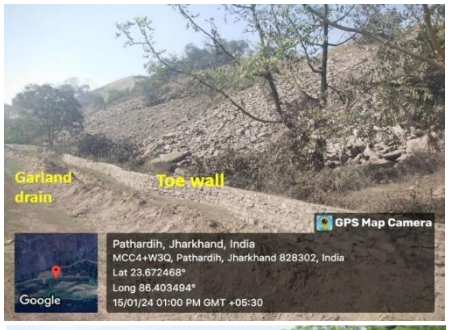
Job no - 200423004

VI.	A Garland drain should be provided and the drain water should not be discharged into Damodar River;	Garland drain and Toe wall/ retaining wall along the stabilized OB dump is present. Construction of Toe wall of 450 m was done in Bhowra South colliery and 365 m toe wall was constructed along OB dump in ASP colliery. Further, 330m Toe wall & approx. 600m

Garland drain was constructed along OB dump of Bhowra South Colliery. Further OB dump is being stabilized through biological reclamation/ ecological restoration technique. No mine water is being discharged into Damodar river.

Toe wall	Colliery	Length (in m)
Toe wall around OB Dump	Bhowra (S) colliery	450 m
Toe wall around OB Dump	Bhowra (S) colliery	330 m
Toe wall around OB Dump	ASP Colliery	365 m
Garland drain around OB dump	Bhowra (S) colliery	Approx. 600 m





VII. Excess water from mine after treatment should be supplied to the villagers;

An action plan for the utilization and treatment of surplus mine water has been prepared. In this regard 26 mines have been identified for implementation of the Phase-I of the action Plan. However, at present, surplus mine water is being supplied to nearby villages / locality for domestic purpose (non-drinking purpose). List of villages for supplied water is as follows:

S. No.	Colliery/Mine Name	Village list for supply of water
1	ASP Colliery	Sudamdih colony, Patherdih colony, Patherdih Basti, Patherdih Basti, Supkar Basti, Hattala basti, etc

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>2</td><td>Bhowra Group of mines (Bhowra North & Bhowra South)</td><td>Gaurkhuti, 12 no. basti, 13 no.basti, 35 no. basti; 6 no. Bhowra, Manjhi Basti, Gandhi Nagar, 19 no. Basti upar, 19 no. Basti niche, Bhowra 16 no., Bhowra 9 no. etc.</td></tr>
<tr><td>3</td><td>Amlabad colliery</td><td>Amlabad colony and nearby basti</td></tr>
</table>
</td></tr>
<tr><td>VIII.</td><td>Rejects of washery along with dry carbon slurry should be utilized in power plant and other recognized vendors;</td><td>Rejects of washery along with dry carbon slurry was used to sale to power plants and other vendors through local sales. At present, Sudamdih Washery is non-operating. Year wise produced dry carbon slurry is given below:
<table>
<tr><th>Year</th><th>Dry Carbon Slurry Produced (in metric Ton)</th></tr>
<tr><td>2013-14</td><td>43488</td></tr>
<tr><td>2014-15</td><td>6775</td></tr>
<tr><td>2015-16</td><td>9880</td></tr>
<tr><td>2016-17</td><td>12609</td></tr>
<tr><td>2017-18</td><td>6513</td></tr>
<tr><td>2018-19</td><td>4405</td></tr>
<tr><td>2019-20</td><td>2255</td></tr>
<tr><td>2020-21</td><td>Nil</td></tr>
<tr><td>2021-22</td><td>Nil</td></tr>
<tr><td>2022-23</td><td>Nil</td></tr>
<tr><td>2023-24</td><td>Nil</td></tr>
</table>
</td></tr>
<tr><td>IX.</td><td>There should be no discharge from the Washery (Slurry) in to the Damodar River. The entire washery water should be recycled;</td><td>All the washeries of BCCL are designed on Closed Circuit System to ensure no discharge from the washery premises.

Zero Discharge System at Sudamdih Washery</td></tr>
<tr><td>X.</td><td>Damodar River should be protected by plantation on both sides;</td><td>Dense plantation is present along the Damodar river which is under cluster X. Plantation work is in progress under Riverside plantation scheme in area of 22.10 Ha. (19.5 Ha river side plantation scheme + 2.6 Ha under compensatory plantation) near Damodar river in consultation with District Forest Officer, Dhanbad. In addition to this, area of 6.0 Ha (out of this 4.02 Ha under river side plantation) was taken up for plantation work in 2023-24 under Cluster X. List of plant species present along the bank of Damodar river are given in condition no. III.
In addition to this, Action has been taken for the plantation or eco-restoration work as per the Road Map prepared by Forest Research Institute (FRI), Dehradun.</td></tr>
</table>

		"To act as technical advisor/expert for the ecological restoration works being undertaken by BCCL on OB dumps/mined out areas (44.0 ha)" *of* **Ecological Restoration site: Bhowra (South) (8.73), EJ (Bhowra & Sudamdih) Area** **Submitted to** **Bharat Coking Coal Limited, Dhanbad** *A subsidiary of Coal India Limited* **by** **Forest Ecology & Environment Division** **Forest Research Institute** **Dehradun- Uttarakhand** **October, 2015**
XI.	A herbal garden with medicinal plants be developed;	Kamini Kalyan Herbal Garden with 3.32 Ha. area has been taken up and developed, it will be further enriched as thematic medicinal plants garden for conservation of germplasm and public awareness. Medicinal/ herbal plants have been planted as per BCCL Env. Dept. HQ guidelines. List of medicinal plants present in Kamini Kalyan herbal garden is: **S. No.** | **Biological Names** | **Local Names** | **Hindi Names** 1 | Aegle marmelos | Bel | Bel 2 | Alangium Lamarckii | Dhela | Dhela 3 | Albizzia lebbek | Siris | Siris 4 | Alstonia scholaris | Chatni | Chatni 5 | Azadirachta indica | Neem | Neem 6 | Bombax ceiba | Semal | Semal 7 | Butea frondosa | Palas | Palas 8 | Casearia tomentosa | Beri | Beri 9 | Dalbergia sissoo | Shisham | Shisham 10 | Emblica officinalis | Amla | Amla

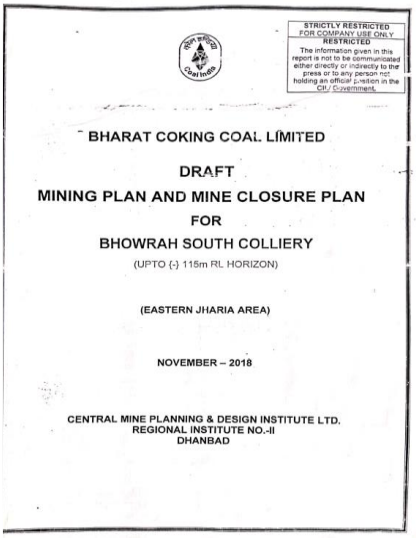
11	Eugenia jamb	Jamun	Jamun
12	Arotocarpus integrifolia	Kathal	Kathal
13	Ficus religiosa	Pipal	Pipal
14	Gmelina arborea	Gamhar	Gamhar
15	Mangifera indica	Mango	Mango
16	Pongamia glabra	Karanj	Karanj
17	Tectona grandis	Sagwan/Teak	Sagwan/Teak
18	Terminalia arjuna	Arjun	Arjun
19	Terminalia belerica	Bahera	Bahera
20	Dendro calamus strictus	Bans/Bamboo	Bans/Bamboo
21	Spondias mangifera	Amra	Amra
22	Saraca asoca	ashok	ashok
23	Cocos nucifera	Nariyal	Nariyal
24	Annona reticulata	Sarifaa	Sarifaa
25	Psidium guajava	amrud	amrud
26	Citrus limon	Nimboo	Nimboo
27	Ficus racemosa	Gular	Gular
28	Eucalyptus globulus	safeda	safeda
29	Neolamarckia cadamba	Kadamba	Kadamba
30	Alstonia scholaris	Chatri	Chatri
31	Araucaria heterophylla	Christmas tree	Christmas tree

List of medicinal herbs and shurbs present at Kamini Kalyan Garden

S. No.	Biological Names	Local Names	Hindi Names
1	*Ocimum tenuiflorum*	Tulsi	Tulsi
2	*Catharanthus roseus*	Sadabahar	Sadabahar
3	*Aloe vera*	Aloe vera	Aloe vera
4	*Jatropha curcas*	Ratanjot	Ratanjot
5	*Murraya koenigii*	Kari patta	Kari patta
6	*Sansevieria trifasciata*	Nagdaman	Nagdaman
7	*Euphorbia tithymaloides*	Nagdon	Nagdon
8	*Allium bisceptrum*	Janglee Pyaaj	Janglee Pyaaj

XII. A time schedule for filling of existing and abandoned quarries be done.

Existing & abandoned quarries are being filled as per approved progressive mine closure plan of the colliery. Mining Plan and Mine Closure Plan of Amalgamated Sudamdih- Patherdih and Bhowra (South) mines has been approved in 348th BCCL Board meeting dated 29.01.2019. Time schedule as per approved mine closure plan is attached as Annexure – III.



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BHARAT COKING COAL LIMITED

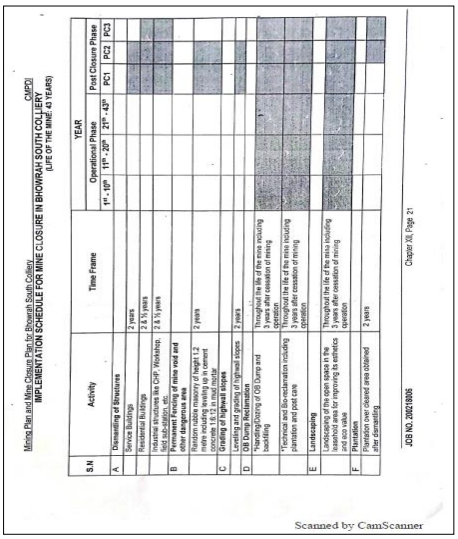
DRAFT

MINING PLAN AND MINE CLOSURE PLAN
FOR
BHOWRAH SOUTH COLLIERY
(UPTO (-) 115m RL HORIZON)

(EASTERN JHARIA AREA)

NOVEMBER – 2018

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



Mining Plan and Mine Closure Plan for Bhowrah South Colliery
IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN BHOWRAH SOUTH COLLIERY
(LIFE OF THE MINE 43 YEARS)

CMPDI

S.N	Activity	Time Frame	YEAR: Operational Phase 1st - 10th	11th - 20th	21th - 43th	Post Closure Phase PC1	PC2	PC3
A	Dismantling of Structures							
	Service Buildings	2 years						
	Residential Buildings	2 & ½ years						
	Industrial structures like CHP, Workshop, Hospital, Building etc.	2 & ½ years						
B	Permanent Fencing of mine void and other dangerous area							
	Protective fencing consisting of height 1.2 metres including leveling up in cement concrete 1:6:12 in mild mortar	2 years						
C	Closure of Adit/Incline/Shaft							
	Leveling and grading of spoil heaps	2 years						
D	OB Dump Reclamation							
	*Handing/Dozing of OB Dump and backfilling	Throughout the life of the mine including 2 years after cessation of mining operation						
	*Technical and Bio-reclamation including plantation and post care	Throughout the life of the mine including 2 years after cessation of mining operation						
E	Landscaping							
	Landscaping of the open space in the industrial area for improving the esthetics and eco value	Throughout the life of the mine including 2 years after cessation of mining operation						
F	Plantation							
	Plantation over closed area obtained after reclaiming	2 years						

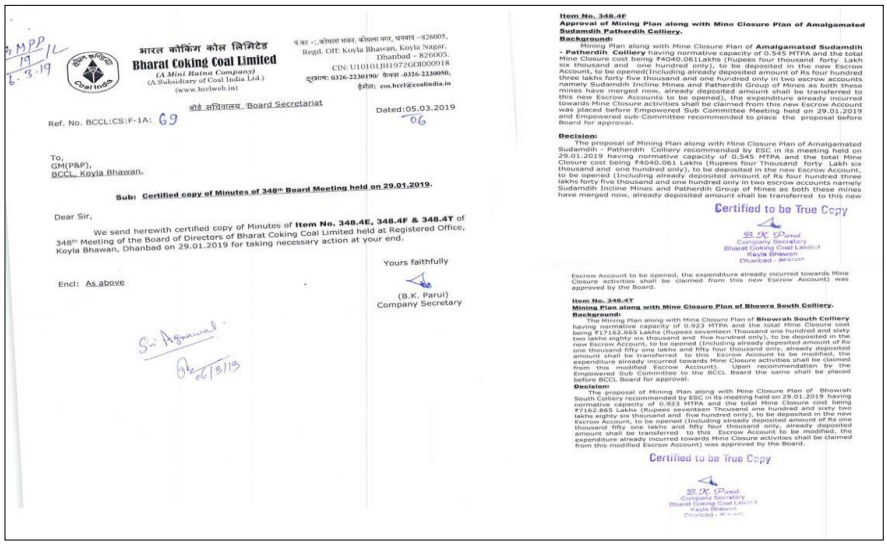
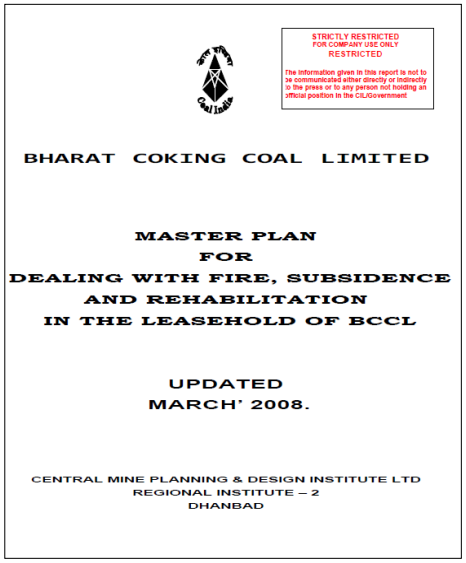
JOB NO. 20021806

Chapter XII, Page 21

Scanned by CamScanner

XIII. Of the total water bodies area of 286.54 ha in the post

This is post mining closure activities and will be done as per approved mining plan & mine closure plan.

	mining land use, consist of 243.97 ha of natural water bodies like Damodar river and no. of water ponds. Only 42.57 ha of mine voids were proposed to be converted to artificial water bodies for catering to domestic use of local villagers. Keeping in view the Damodar river in the vicinity, there should be no additional water bodies are created from mine.	Mining Plan and Mine Closure Plan of Amalgamated Sudamdih-Patherdih (ASP) and Bhowra (South) mines has been approved in 348th BCCL Board meeting dated 29.01.2019.  भारत कोकिंग कोल लिमिटेड Bharat Coking Coal Limited (A Mini Ratna Company) (A Subsidiary of Coal India Ltd.) (www.bcclweb.in) कोयला भवन, कोयला नगर, धनबाद -826005. Regd. Off: Koyla Bhawan, Koyla Nagar, Dhanbad - 826005. CIN: U10101JH1972GOI000918 दूरभाष: 0326-2230190/ फैक्स -0326-2230050, ई-मेल: cos.bccl@coalindia.in बोर्ड सचिवालय Board Secretariat Ref. No. BCCL:CS:F-1A: 69 Dated:05.03.2019 To, GM(P&P), BCCL, Koyla Bhawan. **Sub: Certified copy of Minutes of 348th Board Meeting held on 29.01.2019.** Dear Sir, We send herewith certified copy of Minutes of **Item No. 348.4E, 348.4F & 348.4T** of 348th Meeting of the Board of Directors of Bharat Coking Coal Limited held at Registered Office, Koyla Bhawan, Dhanbad on 29.01.2019 for taking necessary action at your end. Yours faithfully (B.K. Parul) Company Secretary Encl: As above **Item No. 348.4F** **Approval of Mining Plan along with Mine Closure Plan of Amalgamated Sudamdih Patherdih Colliery.** **Background:** Mining Plan along with Mine Closure Plan of **Amalgamated Sudamdih - Patherdih Colliery** having normative capacity of 0.545 MTPA and the total Mine Closure cost being ₹4040.061 Lakhs (Rupees four thousand forty Lakh six thousand and one hundred only), to be deposited in the new Escrow Account, to be opened(Including already deposited amount of Rs four hundred three lakhs forty five thousand and one hundred only in two escrow accounts namely Sudamdih Incline Mines and Patherdih Group of Mines as both these mines have merged now, already deposited amount shall be transferred to this new Escrow Accounts to be opened), the expenditure already incurred towards Mine Closure activities shall be claimed from this new Escrow Account was placed before Empowered Sub Committee Meeting held on 29.01.2019 and Empowered sub-Committee recommended to place the proposal before Board for approval. **Decision:** The proposal of Mining Plan along with Mine Closure Plan of Amalgamated Sudamdih - Patherdih Colliery recommended by ESC in its meeting held on 29.01.2019 having normative capacity of 0.545 MTPA and the total Mine Closure cost being ₹4040.061 Lakhs (Rupees four Thousand forty Lakh six thousand and one hundred only), to be deposited in the new Escrow Account, to be opened (Including already deposited amount of Rs four hundred three lakhs forty five thousand and one hundred only in two escrow accounts namely Sudamdih Incline Mines and Patherdih Group of Mines as both these mines have merged now, already deposited amount shall be transferred to this new Escrow Account to be opened, the expenditure already incurred towards Mine Closure activities shall be claimed from this new Escrow Account) was approved by the Board. Certified to be True Copy **Item No. 348.4T** **Mining Plan along with Mine Closure Plan of Bhowra South Colliery.** **Background:** The Mining Plan along with Mine Closure Plan of **Bhowrah South Colliery** having normative capacity of 0.923 MTPA and the total Mine Closure cost being ₹17162.865 Lakhs (Rupees Seventeen Thousand one hundred and sixty two lakhs eighty six thousand and five hundred only), to be deposited in the new Escrow Account, to be opened (including already deposited amount of Rs one thousand fifty one lakhs and fifty four thousand only, already deposited amount shall be transferred to this Escrow Account to be modified, the expenditure already incurred towards Mine Closure activities shall be claimed from this modified Escrow Account); Upon recommendation by the Empowered Sub Committee to the BCCL Board the same shall be placed before BCCL Board for approval. **Decision:** The proposal of Mining Plan along with Mine Closure Plan of Bhowrah South Colliery recommended by ESC in its meeting held on 29.01.2019 having normative capacity of 0.923 MTPA and the total Mine Closure cost being ₹7162.865 Lakhs (Rupees Seventeen Thousand one hundred and sixty two lakhs eighty six thousand and five hundred only), to be deposited in the new Escrow Account, to be opened (Including already deposited amount of Rs one thousand fifty one lakhs and fifty four thousand only, already deposited amount shall be transferred to this Escrow Account to be modified, the expenditure already incurred towards Mine Closure activities shall be claimed from this modified Escrow Account) was approved by the Board. Certified to be True Copy
XIV.	The measure identified in the environmental plan for cluster X groups of mine and the conditions given in this environmental clearance letter shall be dovetailed to the implementation of the Jharia action plan.	Master plan/ Jharia Action Plan is dovetailed with environmental clearance conditions. Jharia Master Plan is attached as Annexure–IV.  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 MASTER PLAN FOR DEALING WITH FIRE, SUBSIDENCE AND REHABILITATION IN THE LEASEHOLD OF BCCL UPDATED MARCH' 2008. CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD REGIONAL INSTITUTE – 2 DHANBAD
XV.	As there is no fire in cluster X but the measure should be adopted by proponent to control the spread of neighboring fire to the cluster X. The proponent shall prepare time series maps of the Jharia Coalfields through NRSA to monitor and prevent fire problems in the Jharia Coalfield by isothermal mapping/ imaging and monitoring temperatures of the coal seams (whether	The Work Order for "Delineation of Surface Fire and associated land subsidence in Jharia Coal Field using satellite based remote sensing techniques" has been awarded to NRSC under the MoU signed with NRSC. NRSC has submitted the final report, in which Coal Mine fire map has been prepared based on the Satellite data of Landsat-8 and attached as Annexure V. As per NRSC final report, there is a decrease in areal extent of the fire from 2017 to 2020. As compared 2017, when the total fire affected extent of the JCF was about 3.28 km2; in 2020 total fire affected extent is about 1.89 km2 (including TISCO mines).

<table>
<tr>
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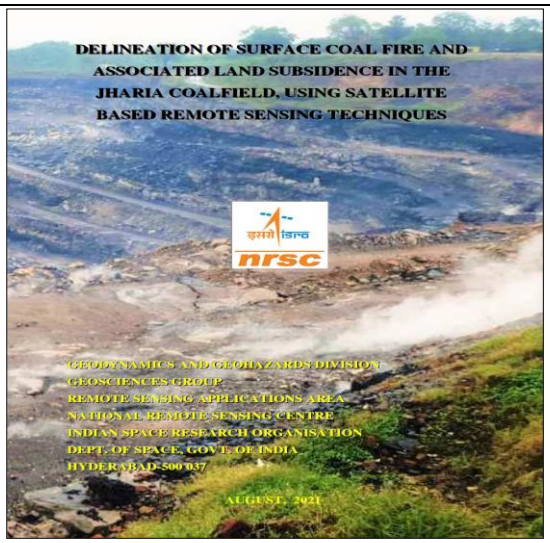
<td>they are close to spontaneous ignition temperatures) and based on which, areas with potential fire problems shall be identified. Measures to prevent ingress of air (ventilation) in such areas, to prevent restart fresh/ spread fires in other areas including in mines of cluster XIV shall be undertaken.</td>
<td> 

Measure to prevent ingress of air (ventilation) is being taken as specified in EMP and as per Jharia Master Plan. Further fire patches are under operation to dig out the fiery coal and combustible materials to save the coal from burning and to stop further spread of the fire. Once the fiery coal is dug-out/excavated there will be no more chance of re-starting of fresh/ spreading of fire into other areas.</td>
</tr>
<tr>
<td>XVI.</td>
<td>Underground mining should be taken up after completion of reclamation of Opencast mine area after 2 years.</td>
<td>All OC Mines are in developing stage and Mining is being done as per the Coal Mines Regulation (CMR) Act.</td>
</tr>
<tr>
<td>XVII.</td>
<td>No mining shall be undertaken where underground fires continue. Measure shall be taken to prevent/check such fire including in old OB dump.</td>
<td>It is being complied.
Action is being taken to control, mine fires including old OB dump areas as specified in Jharia Master Plan and the mining is being done as per the Coal Mines Regulation (CMR) Act.</td>
</tr>
<tr>
<td>XVIII.</td>
<td>A part of cluster X is under River Damodar. It was clarified that although the mine is underground, there is no coal underneath River Damodar, which would be mined. The Committee desired that the data of bore wells near River Damodar require to be monitored for permeability and seepage of water of River Damodar.</td>
<td>CMPDI has prepared a report for design location and construction of 23 nos. of Piezometer covering all the 17 clusters of BCCL. For Drilling for establishment of 23 nos Piezometer wells for cluster of mines of BCCL command area for Ground water monitoring, LOA was issued by Civil Department on 03.12.2021 and work has been completed (Annexure- VI). One Piezometric well system (PZ-10A) has been constructed under Cluster X. E.J. Area, BCCL. Digital Water Level Recorder (DWLR) with telemetry system has been also installed with Piezometric well. Details are given below:
<table>
<tr><th>Cluster</th><th>Location Details</th><th>No. of Wells</th><th>Depth</th><th>Latitude & Longitude</th></tr>
<tr><td>Cluster X</td><td>Bandhponda Village, East side of 17 no. incline of South Bhowra Colliery</td><td>01 (PZ-10A)</td><td>135 m</td><td>E.J. Area
23º40’28.14”N
86º23’34.56” E
RL: 476 ft
Depth: 135 m</td></tr>
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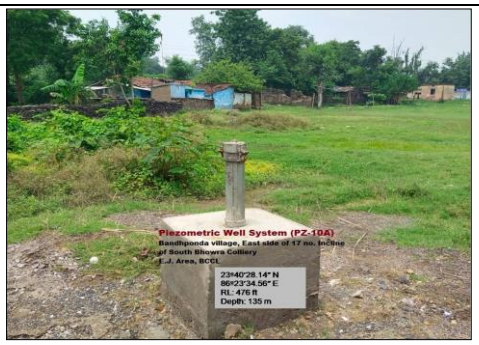
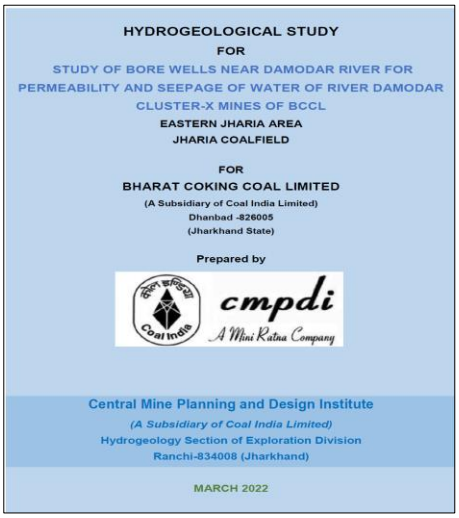


A Study was conducted by CMPDIL entitled “study of Bore wells near Damodar river for Permeability and seepage of water of river Damodar for Cluster- X group of coal mines of BCCL”.(report attached as Annexure- VIA)

HYDROGEOLOGICAL STUDY
FOR
STUDY OF BORE WELLS NEAR DAMODAR RIVER FOR PERMEABILITY AND SEEPAGE OF WATER OF RIVER DAMODAR CLUSTER-X MINES OF BCCL
EASTERN JHARIA AREA
JHARIA COALFIELD
FOR
BHARAT COKING COAL LIMITED
(A Subsidiary of Coal India Limited)
Dhanbad -826005
(Jharkhand State)
Prepared by
cmpdi
A Mini Ratna Company
Central Mine Planning and Design Institute
(A Subsidiary of Coal India Limited)
Hydrogeology Section of Exploration Division
Ranchi-834008 (Jharkhand)
MARCH 2022
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<tr>
<td>XIX.</td>
<td>The rejects of washeries in Cluster –X should be send to FBC based plant.</td>
<td>At present Sudamdih washery is non-operational. Previously, the Rejects generation was very low in operation of Sudamdih Washery as maximum portion was generated as middling. Rejects once significant in quantity will be checked for grade and auctioned to the users.</td>
</tr>
<tr>
<td>XX.</td>
<td>There shall be no external OB dumps. OB produce from the whole cluster will be 29.01 Mm3. OB from One Patch OCP mine shall be backfilled. At the end of the mining there shall be no void and the entire mined out area shall be re-vegetated. Areas where opencast mining was carried out and completed shall be reclaimed immediately thereafter.</td>
<td>Action is being taken as specified in EMP. O.B. removed from mine/ collieries are back filled in old/ abandoned quarry/voids. At the end of the mining, there shall not be voids and area will be re-vegetated and reclaimed with the proper eco-restoration techniques suggested by the experts available in BCCL and in external agencies i.e. FRI Dehradun, CEMDE Delhi.
Year wise data of OB removal & excavated area is given below:
UNIT WISE OB REMOVED (IN M^3) OF CLUSTER X
<table>
<tr><th>Mine Name</th><th>2013-14</th><th>2014-15</th><th>2015-16</th><th>2016-17</th><th>2017-18</th><th>2018-19</th><th>2019-20</th><th>2020-21</th><th>2021-22</th><th>2022-23</th><th>2023-24</th></tr>
<tr><td>Bhowra North</td><td>502538</td><td>1172570</td><td>321554</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Bhowra South</td><td>581650</td><td>318400</td><td>6222675</td><td>4491830</td><td>3488184</td><td>2205725</td><td>3854237</td><td>3993684</td><td>3454029</td><td>5112672</td><td>9915964</td></tr>
<tr><td>ASP Colliery</td><td>260443</td><td>77444</td><td>1364138</td><td>1535176</td><td>1126630</td><td>923629</td><td>585637</td><td>2170162</td><td>2056041</td><td>1846847</td><td>1441116</td></tr>
<tr><td>Sudamdih Shaft</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Amlabad UG</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total (Cluster X)</td><td>1344631</td><td>1568414</td><td>7908367</td><td>6027006</td><td>4614814</td><td>3129354</td><td>4439875</td><td>6163847</td><td>5510070</td><td>6959519</td><td>11357080</td></tr>
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UNIT WISE EXCAVATED AREA (IN Ha) OF CLUSTER X

Mine Name	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Bhowra North – Mix	12.50	10.42	0.00	0.00	0.00	0.00	0	0	0	0	0
Bhowra South – Mix	29.97*					16.44*			22.0	13.0	13.50
ASP Colliery	0.96	0.60	0.58	0.51	0.52	18.90*				1.33	
Sudamdih Shaft	-	-	-	-	-	-	-	-		-	-
Amlabad UG	-	-	-	-	-	-	-	-		-	-

* Data showing cumulative excavated area of Bhowra south (mix) from 2013-14 to 2017-18 & 2018-19 to 2020-21

</td></tr>
<tr><td>XXI.</td><td>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- X shall be drawn up and implemented.</td><td>

Year wise coal production plan for Cluster X is given below:

Year wise Coal Production Plan

Name of Mine		Peak (MTY)	18-19	19-20	20-21	21-22	22-23	23-24	24-25
Bhowra North	UG	0.143	0.025	0.01	0.01	0	0	0	0
	OC	0.546	0	0	0	0	0	0	0.35
Bhowra South	UG	0.377	0.025	0.01	0	0	0	0	0
	OC	1.2	0.825	0.9	0.62	0.65	0.58	0.6	0.9
Amalgamated Sudamidh Patherdih Mine	OC	0.709	0.225	0.38	0.45	0.4	0.48	0.45	0.43
Sudamidh Shaft	UG	0.24	0	0	0	0	0	0	0
Amlabad	UG	0	0	0	0	0	0	0	0
Total		2.289	1.100	1.300	1.080	1.050	1.060	1.050	1.680
Sanctioned Peak Capacity as per Existing EC			**2.289**	**2.289**	**2.289**	**2.289**	**2.289**	**2.289**	**2.289**

Mine closure plan as per the guidelines of Ministry of Coal have been prepared by Central Mine Planning and Design Institute (CMPDI) and it is being implemented.

</td></tr>
<tr><td>XXII.</td><td>The void in 5 ha area shall be converted into a water reservoir of a maximum depth of 15-20 m in post mining stage and shall be gently sloped and the upper benches of the reservoir shall be recognized 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>

This is post mine closure activity.

A part of the void will be converted into the water body as specified in EMP at post mining stage and plantation, sitting arrangement etc. will be provided around the periphery of the reservoir & will be developed as water recreational park.

</td></tr>
<tr><td>XXIII.</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 the nalas/water bodies. The small water bodies in OC shall be protected to the</td><td>

Mining operation is being done as per Coal Mines Regulation Act.

Action for construction of embankment has been taken as specified in EMP. Every year monsoon preparation programme is carried out by colliery / mines before the onset of monsoon for protection of mines from rain water flow and to maintain a safe distance from nalas flowing or small water bodies protection in the lease boundary.

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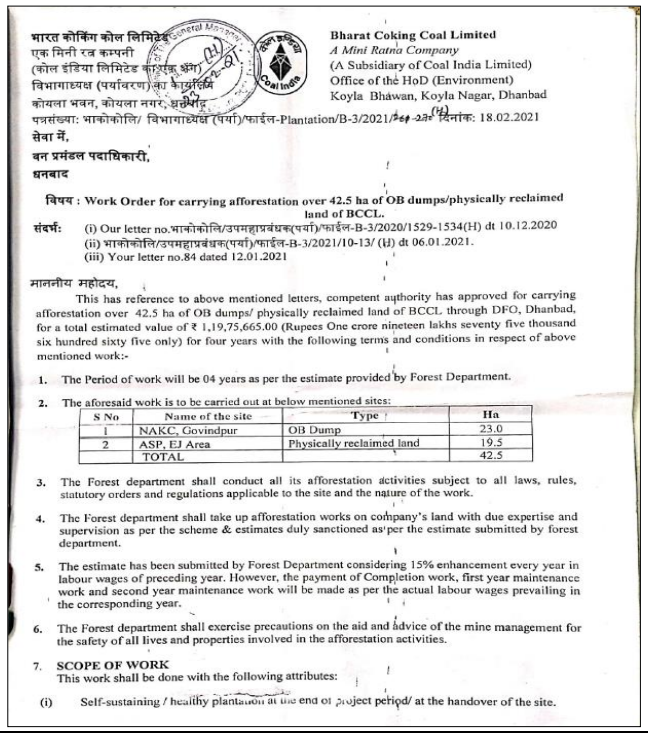
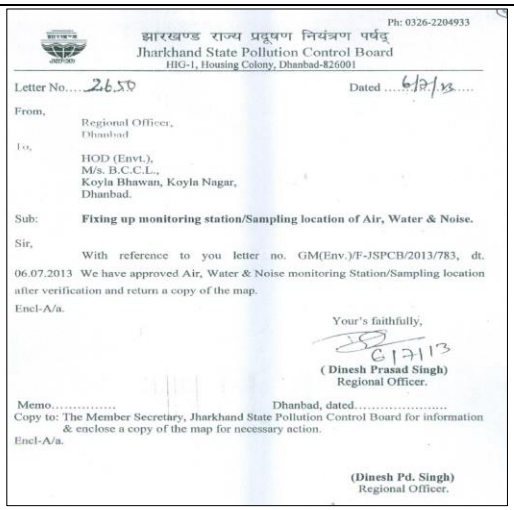
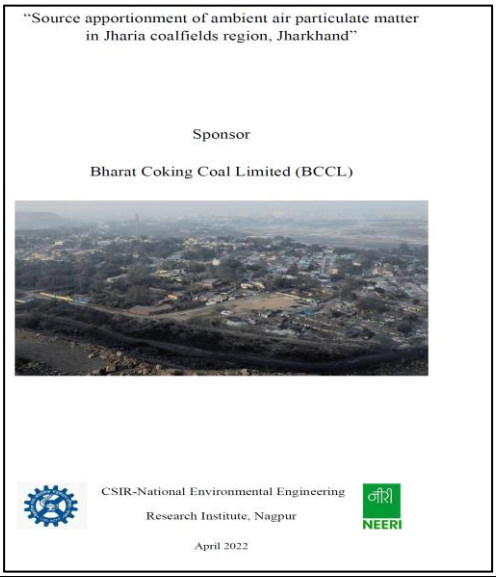
	extent feasible and the embankment proposed along water body shall be strengthened with stone pitching.	
XXIV.	Active OB dumps near water bodies and rivers should be rehandled for backfilling abandoned mine voids. However, those which have been biologically reclaimed need not be disturbed.	No OB is being dumped near water bodies. The OB dumps created earlier already stabilized & further action has been taken for their eco-restoration work as per Road Map prepared by FRI, Dehradun.
XXV.	Thick green belt shall be developed along undisturbed areas, mine boundary and in mine reclamation. During post mining stage, a total of 47.63 ha area would be reclaimed by planting native species in consultation with the local DFO/Agriculture Department/institution with the relevant discipline. The density of the trees shall be around 2500 plants per ha.	Eco-restoration sites covering an area of 58.66 Ha have been developed in consultations with institutes like FRI which was duly visited and appreciated during their visit. In FY 2023-24, Approx. 10400 plants were planted under different programs like Eco-restoration sites, plantation by DFO, Env. Day Celebration, Mission LiFE program, Swachh Bharat Abhiyan etc. Green belt is developed at available places and after the remaining area is decoaled, plantation will speed up in a time bound manner as per the EC conditions. Details of plantation in EJ Area is shown in specific condition no. III.

XXVI.	The road should be provided with avenue plantation on both side as trees act as sink of carbon and other pollutant.	Avenue plantation has been made along the permanent road near permanent structures to minimize the pollution. Approx 2500 plants have been planted as Avenue Plantation from Panchait dam to Ambona Jamkudur and in BIT Campus by DFO, Dhanbad. In 2023-24, approx 200 plants were planted in different colonies, schools, office premises and free saplings were distributed to local residents for awareness towards environment and plantation. Avenue Plantation in ASP Colliery

		DFO was requested through a letter regarding need based survey for plantation (Block plantation / gabion/ avenue plantation) under the leasehold area of Cluster X. A Team from DFO, Dhanbad had been visited the Cluster X and identified the area of 22.10 Ha. (19.5 Ha + 2.6 Ha) near Damodar river in joint field visit and work orders were issued for plantation under Riverside plantation scheme near Damodar River. Plantation work is in progress in area of 19.5 Ha. through DFO, Dhnabad. Copy of the work order is enclosed Annexure – VII.  भारत कोकिंग कोल लिमिटेड एक मिनी रत्न कम्पनी (कोल इंडिया लिमिटेड का एक अंग) विभागाध्यक्ष (पर्यावरण) का कार्यालय कोयला भवन, कोयला नगर, धनबाद Bharat Coking Coal Limited *A Mini Ratna Company* (A Subsidiary of Coal India Limited) Office of the HoD (Environment) Koyla Bhawan, Koyla Nagar, Dhanbad पत्रसंख्या: भाकोकोलि/ विभागाध्यक्ष (पर्या)/फाईल-Plantation/B-3/2021/ 23 दिनांक: 18.02.2021 सेवा में, वन प्रमंडल पदाधिकारी, धनबाद विषय : Work Order for carrying afforestation over 42.5 ha of OB dumps/physically reclaimed land of BCCL. संदर्भ: (i) Our letter no.भाकोकोलि/उपमहाप्रबंधक(पर्या)/फाईल-B-3/2020/1529-1534(H) dt 10.12.2020 (ii) भाकोकोलि/उपमहाप्रबंधक(पर्या)/फाईल-B-3/2021/10-13/ (H) dt 06.01.2021. (iii) Your letter no.84 dated 12.01.2021 माननीय महोदय, This has reference to above mentioned letters, competent authority has approved for carrying afforestation over 42.5 ha of OB dumps/ physically reclaimed land of BCCL through DFO, Dhanbad, for a total estimated value of ₹ 1,19,75,665.00 (Rupees One crore nineteen lakhs seventy five thousand six hundred sixty five only) for four years with the following terms and conditions in respect of above mentioned work:- 1. The Period of work will be 04 years as per the estimate provided by Forest Department. 2. The aforesaid work is to be carried out at below mentioned sites: S No | Name of the site | Type | Ha 1 | NAKC, Govindpur | OB Dump | 23.0 2 | ASP, EJ Area | Physically reclaimed land | 19.5 TOTAL | 42.5 3. The Forest department shall conduct all its afforestation activities subject to all laws, rules, statutory orders and regulations applicable to the site and the nature of the work. 4. The Forest department shall take up afforestation works on company's land with due expertise and supervision as per the scheme & estimates duly sanctioned as per the estimate submitted by forest department. 5. The estimate has been submitted by Forest Department considering 15% enhancement every year in labour wages of preceding year. However, the payment of Completion work, first year maintenance work and second year maintenance work will be made as per the actual labour wages prevailing in the corresponding year. 6. The Forest department shall exercise precautions on the aid and advice of the mine management for the safety of all lives and properties involved in the afforestation activities. 7. SCOPE OF WORK This work shall be done with the following attributes: (i) Self-sustaining / healthy plantation at the end of project period/ at the handover of the site.
XXVII.	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 –XIV shall be implemented.	A meeting was called by Chairman, Jharkhand Pollution control Board on 11.06.2019 and JSPCB directed to prepare an Environmental Action Plan which will be implemented by BCCL. Action Plan has been prepared in consultation with Jharkhand Pollution Control Board for entire BCCL and approved by Competent Authority of BCCL. It is being implemented comprehensively for all the mines of BCCL. Some of the salient steps of this action plan are as under: 1. Covered Transportation 2. Permanent Pucca Transportation Road 3. Fixed & Overhead Sprinklers and Mobile Sprinklers 4. AAQ & CQAAQMS Monitoring 5. Online PM10 Analyzer 6. Source Apportionment Study.
XXVIII.	The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board. The Committee stated that smoke/dust emission vary from source to source (fuel	The locations of monitoring stations had been finalized in consultation with JSPCB. The monitoring work of ambient environment quality is being carried out by Central Mine Planning & Design Institute Limited (CMPDIL) which is having CSIR laboratory recognized under the EP Rules. Report of Regular Environmental Monitoring is enclosed as Annexure – VIII.

	wood, coal, fly ash from TPPs, silica from natural dust, etc) and a Source Apportionment Study should be got carried out for the entire Jharia Coalfields. Mineralogical composition study should be undertaken on the composition of the suspended particulate matter (PM10 and PM2.5) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.	 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. BCCL had awarded the work order for the Project "Source Apportionment of ambient air particulate matter in Jharia coalfields region, Jharkhand" to CSIR-NEERI, Nagpur vide Ref no. भाकोकोलि/उप महाप्रबंधक/पर्या/ SOURCE APPORTIONMENT (MoU) /NEERI /2018/ dated 12.05.2018. Workshop organized with NEERI, Nagpur on 04.10.2021. Comments/ Clarification submitted to NEERI, Nagpur for its incorporation. Further, comments of JSPCB and BCCL also submitted to NEERI and NEERI, Nagpur had submitted the final report on the source apportionment study and the mineralogical composition study in the Jharia Coalfields (Copy Enclosed as Annexure- IX).  "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 नीरी NEERI April 2022
XXIX.	No groundwater shall be used for the mining activities. Additional water required, if any, shall be met from mine water or by recycling/reuse of the water from the existing activities and from rainwater harvesting measures.	No groundwater is drawn for mining activities however cutting of aquifer is integral part of mining. Mine water is being used for the industrial purpose like water sprinkling to suppress dust generation, etc. Further Mine water is also utilized for the community purposes. Following action has been taken by the company: • Installation of Pressure filters for utilization of mine water. In cluster X, there is three nos. of Rapid Gravity Pressure Filter plant of total 1.72 MGD capacity, which is used for supply of water in nearby colonies, houses, quarters.

<table>
<tr>
<td></td>
<td>The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry to dewatering of mine.</td>
<td>
<table>
<tr><th colspan="6">Detail of Water Treatment Plant/ Filter Plant in E.J. Area</th></tr>
<tr><th rowspan="2">S. No.</th><th rowspan="2">Location of source of water</th><th rowspan="2">Treatment method</th><th>Capacity</th><th>In use</th><th rowspan="2">Supply of water</th></tr>
<tr><th>(MGD)</th><th>(MGD)</th></tr>
<tr><td>1</td><td>Sudamdih</td><td>Rapid gravity filter</td><td>0.8</td><td>0.47</td><td>Sudamdih colony, Patherdih colony, Patherdih Basti, Patherdih Basti, Supkar Basti, Hattala basti, etc</td></tr>
<tr><td>2</td><td>Bhowra</td><td>Rapid gravity filter</td><td>0.66</td><td>0.39</td><td>Gaurkhuti, 12 no. basti, 13 no.basti, 35 no. basti; 6 no. dhowra, Manjhi Basti, Gandhi Nagar, 19 no. Basti upar, 19 no. Basti niche, etc.</td></tr>
<tr><td>3</td><td>Amlabad</td><td>Rapid gravity filter</td><td>0.26</td><td>0.02</td><td>Amlabad colony and nearby basti</td></tr>
</table>

Report on Rain water harvesting and artificial recharge system in cluster X prepared by CMPDIL and attached as Annexure – X. Ponds & old quarries are being used for rain water harvesting & artificial recharge system in the area.
A proposal has been moved for construction of two (2) nos. Rooftop Rain Water Harvesting Structures in EJ Area under “Jal Shakti Abhiyan” program, which is in approval stage.
</td>
</tr>
<tr>
<td>XXX.</td>
<td>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 &</td>
<td>
Regular monitoring of Ground water quality is being carried out by CMPDIL. The Ground water Level and Quality report for Clusters of mines of BCCL (including Cluster X), have been submitted by CMPDIL & attached as Annexure II.
CMPDI had prepared a report for design location and construction of 23 nos. of Piezometer covering all the 17 clusters of BCCL. For Drilling for establishment of 23 nos Piezometer wells for cluster of mines of BCCL command area for Ground water monitoring, LOA has been issued by Civil Department on 03.12.2021 and work has been completed. One Piezometric well system (PZ-10A) has been constructed under Cluster X. E.J. Area, BCCL.
Digital Water Level Recorder (DWLR) with telemetry system has been also installed with Piezometric well.
Details of Piezometric well system of Cluster X is given below:
<table>
<tr><th>Cluster</th><th>Location Details</th><th>No. of Wells</th><th>Depth</th><th>Latitude & Longitude</th></tr>
<tr><td>Cluster X</td><td>Bandhponda Village, East side of 17 no. incline of South Bhowra</td><td>01 (PZ-10A)</td><td>135 m</td><td>E.J. Area
23º40’28.14”N
86º23’34.56” E
RL: 476 ft</td></tr>
</table>
</td>
</tr>
</table>

	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.	Colliery — Depth: 135 m
XXXI.	Mine discharge water shall be treated to meet standards prescribed standards before discharge into natural water courses/agriculture. The quality of the water discharged shall be monitored at the outlet points and proper records maintained thereof and uploaded regularly on the company website.	Mine discharge water is being allowed to settle down in the mine sumps before disposal into storage reservoirs. The monitoring of mine water quality parameters is being done by CMPDIL and parameters are well within the prescribed limit provided by CPCB.
XXXII.	ETP shall also be provided for workshop, and CHP, if any. Effluents shall be treated to confirm to prescribe standards in case discharge into the natural water course.	There is no CHP in Cluster X. Work has been started for construction of Oil & Grease trap system at workshop under EJ Area.
XXXIII.	Regular monitoring of subsidence movement on the surface over and around	As per CMR, 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

cmpdi
A Miniratna Company

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:0326-225-850
email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	03/2024	Cluster	Cluster X	ULR No.	TC101222400000658F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)				Date of Issue 14.05.2024
Project		Sampling Ref. No.	REM/BCCL/2024/03	Sampling Method	IS 3025 (Part-1) CMPDI/RI-II/LPM 13
Sampling Stations	(i)	Bhowrah North	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent		Period of analysis 04.03.2024 to 30.03.2024
			Date of Sampling	04.03.2024 / 18.03.2024	

Sl. No.	Parameter	Method of Analysis	Observed Values: First Fortnight	Observed Values: Second Fortnight	STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)	LDL
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	7.78	7.81	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39-1991, R : 2019, Partition Gravimetric	<2.0	<2.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	32	36	*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*

---- End of Report ----
Page 1 of 1

भारत कोकिंग कोल लिमिटेड
(कोल इंडिया लिमिटेड का एक अंग)
BHARAT COKING COAL LIMITED
(A Subsidiary of Coal India Limited)
Corporate Identity No. (CIN): U10101JH1972GOI000918
Office of the General Manager EJ Area, Dhanbad- 828302 (JH)
GSTIN: 20AACB7934MFZB (JH), 19AAACB7934M2Z7 (WB)

Ref. No.GM/EJA/ACE/WO/2024-25/215 Date 02 /04 /2024

WORK ORDER

To,
Smt. Anuradha Shahi,
At. 9 Near Panchayat Bhawan,
Nunudhib,
P.O.:- Patherdih
Dhanbad, 828119 (Jharkhand)
Email:- anuradhashahi1212@gmail.com

Sub – Award of the work "Construction of Oil and Grease Trap (OGT) at Auto garage Workshop, Of Bhowra under E.J. Area".

Ref: 1. NIT Ref. No. : BCCL/CIVIL/EJA/2023-24/eNIT/36/210 dt.07.03.2024
2. LOA No. : GM/EJA/ACE/LOA/2023-24/265 dt.01.04.2024
3. P.O. No. : 5500008701

Dear Sir,
With reference to the above subject work, the work is hereby awarded to you with the approval of competent authority for a total value **Rs.9,20,103.25 (Rupees Nine Lakh Twenty Thousand One Hundred Three and paise Twenty Five) which includes Quoted Amount Rs.9,20,103.25 and GST Amount (@18%) Rs.NIL**, at an overall 22.86% **(Twenty Two point Eight Six percent) below the estimated cost** based on terms and conditions contained in the NIT & Tender Document.

1. The date of commencement of the work will be counted from 29.04.2024
2. Time of completion of the work will 90 (Ninety) days.
3. The defect liability period for the work will be 6 (Six) months or expiry of one full monsoon period after completion of the work, whichever is later.
4. You are hereby requested to make necessary preliminary arrangement to start the work in consultation with concerned overseer.
5. **You have deposited Rs.17,600.00 (Rupees Seventeen thousand Six hundred) only online as earnest money vide Ref.no.3155791040346 and Rs.28,500.00 (Rupees Twenty Eight Thousand Five Hundred) only through Demand Draft vide Ref.**

Page 1 of 2

No.000358 dt.08.04.2024 issued by HDFC Bank, Digwadih Branch, Dhanbad against balance amount of P.S.D (Rs.46,005.16).
6. **Balance security money is 5% i.e. Rs.46,010.00 shall be recovered from A/C bills.** The full security deposit shall be remain at the disposal of the Company as security for the satisfactory execution of work in accordance with the provision of the/contract.
7. You are requested to contact Engg.Asstt. (Civil), Bhowra EJ Area before starting the work.
8. Payment authority will be AFM, EJ, Area.
9. All others terms and conditions as appeared in NIT and Tender documents are applicable in this contract.
10. You are requested to acknowledge receipt of this work order within 10 days from date of receipt of the same in writing to the under signed.

Yours faithfully
Area Civil Engineer
EJ, Area

Encl. : BOQ
Copy to:-

1. CVO, BCCL, Koyla Bhawan
2. GM, EJ Area.
3. AGM, EJ Area.
4. Project Officer, Bhowra, E.J Area.
5. AFM, EJ, Area.
6. Engg.Asstt. (Civil), Bhowra, E.J Area.
7. LEO (C), Jharia & Dhanbad.
8. ALC (C)- III, Dhanbad.
9. Nodal Officer, CLMC, EJ Area
10. Concerned file.

Page 2 of 2

	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.	surroundings is done. Currently there is no depillaring operation going on in underground mines of cluster X.
XXXIV.	Sufficient coal pillars shall be left unextracted around the air shaft (within the subsidence influence area) to protect from any damage from subsidence, if any.	Sufficient coal pillars have been left around air shafts as per the statutes and DGMS guidelines.
XXXV.	High root density tree species shall be selected and planted over areas likely to be affected by subsidence.	A list of high root density Plant species certified by FRI and its plantation in subsidence prone area will be taken-up at the time of depillaring operations. Nursery of high root density is also developed under EJ Area. List of high root density plant species is given below. **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. *Gmelina 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* — Jangali 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. *Syzizium cuminii* — Jamun 23. *Azadirachta indica* — Neem 24. *Holoptelea integrifolia* — Indian elm 25. *Butea monosperma* — Palash /dhak Scientist Forest Ecology & Climate Change Division Forest Research Institute, Dehradun-248006
XXXVI.	Depression due to subsidence resulting in water accumulating within the low lying areas shall be filled up or drained out by cutting drains.	It shall be complied, where ever applicable. However, regular monitoring is being done through pit safety meeting and bipartite & tripartite safety meeting at area and HQ level.

XXXVII.	Solid barriers shall be left below the roads falling within the blocks to avoid any damage to the roads.	It is being followed. Sufficient barriers are left for saving the surface installation and infra structures as per the CMR guidelines.
XXXVIII.	No depillaring operation shall be carried out below the township/colony.	It is being followed.
XXXIX.	The Transportation Plan for conveyor-cum–rail for Cluster- X should be dovetailed with Jharia Action Plan. Road transportation of coal during Phase–I should be by mechanically covered trucks, which should be introduced at the earliest. The Plan for conveyor-cum–rail for Cluster-XIV should be dovetailed with Jharia Action Plan. The road transpiration of coal during phase–I should be by mechanically covered trucks.	Vehicles engaged in transportation are duly checked at Security Check-Post (CISF Check-Post) where security personnel also ensure proper covering of Trucks. No OEM is providing mechanically covered trucks. A communication in this regard has been made to Coal India Ltd for taking up with OEM. In absence of availability of approved OEM of mechanically covered trucks, BCCL is ensuring trucks are covered with tarpaulin through mandatory clause of covering in transportation contracts. The transport Plan for conveyor-cum-rail for Cluster X is to be implemented in the Phase II of the Jharia Master Plan. At present, Phase -1 is under implementation and after completion of Pre-implementation (1st & 2nd Yr.) and Phase 1 (3rd to 7th year) and Phase 2 (8th to 12th year). The plan shall be prepared after the completion of the above said phases to have conveyor-cum-rail transportation as informed by CMPDIL to whom the said work of preparation of Rail-cum-conveyor plan has been awarded (Annexure XI). During Phase- 1 & 2, covering of trucks by tarpaulin covers is being ensured as can be seen in Picture attached.
XL.	A study should be initiated to analyze extent of reduction in pollution load	CMPDI had carried out the study to analyze extent of reduction in pollution load every year by reducing road transport. Pollution load study report for Cluster X is attached in annexure XII.

<table>
<tr><td></td><td>every year by reducing road transport.</td><td>
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 X GROUP OF MINES

Bhowrah North (UG),Bhowrah North (OC),Bhowrah South (UG), 3 Pit OCP,Chandan OCP(Bhowrah),Patherdih (UG),Chandan OCP (Patherdih),Sudamdih Incline (UG),Sudamdih Shaft (UG),Amlabad (UG) Closed,Sudamdih Coal Washery(Within the lease hold of Sudamdih Shaft Mine)

Normative Production : 1.762 MTPA
Peak Production : 2.289MTPA
Lease Hold Area : 2057.47Ha

Bharat Coking Coal Limited
(July,2019)
Prepared by

Environment Division
Central Mine Planning & Design Institute Limited
CMPDI (HQ)
Gondwana Place
Kanke Road, Ranchi-834008
</td></tr>
<tr><td>XLI.</td><td>R&R of 1670 nos of PAF's involved. They should be rehabilitated at cost of Rs 7087.75 Lakhs as per the approved Jharia Action Plan.</td><td>Implementation of master plan has already been started through Jharkhand Rehabilitation and Development Authority (JRDA), Dhanbad to a well-established Jharia Vihar Township located at Belgoria. The rehabilitation data for EJ area is as follows:
<table>
<tr><td colspan="2">No. of Households</td><td>Shifted</td></tr>
<tr><td>Non LTH</td><td>LTH</td><td>Non LTH + LTH</td></tr>
<tr><td>3125</td><td>528</td><td>89</td></tr>
</table>
</td></tr>
<tr><td>XLII.</td><td>Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet for and submitted to Ministry.</td><td>A separate booklet comprising of CSR activities has been prepared and attached as annexure XIII (A) – Detail of CSR activity of Cluster X.</td></tr>
<tr><td>XLIII.</td><td>A detailed CSR Action Plan shall be prepared for Cluster X group of mines. Specific activities shall be identified for CSR of Rs 20.25/annum @ of Rs 5/ton of coal production. As recurring expenditure. The 47.63 ha of area within Cluster XIV ML existing as waste land and not being acquired shall be put to productive use under CSR and developed with fruit bearing and other useful species for the local communities. Third party evaluation shall be got</td><td>It being complied. CSR action plan of BCCL is centralized and BCCL is implementing CSR Activities. CSR action plan of BCCL including CSR budget and expenditure is enclosed as Annexure XIII (B).
A separate CSR committee has been formed at Area level for cluster-X, who will look after the works being executed under CSR. A booklet comprising of CSR activities conducted by E.J. area has been prepared and attached as annexure XIII (A) – Detail of CSR activity of Cluster X.</td></tr>
</table>

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<tr>
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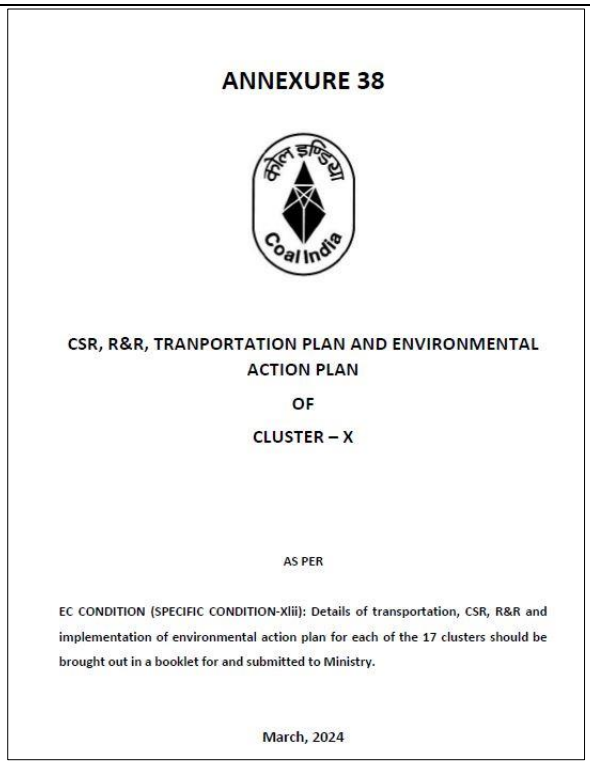
<td>carried out regularly for the proper implementation of activities undertaken in the project area under CSR. Issue raised in the Public Hearing shall also be integrated with activities being taken up under CSR. The details of CSR undertaken along with budgetary provisions for the village-wise various activities and expenditure thereon shall be uploaded on the company website every year. The company must give priority to capacity building both within the company and to the local youth, who are motivated to carry out the work in future.</td>
<td>

ANNEXURE 38
CSR, R&R, TRANPORTATION PLAN AND ENVIRONMENTAL ACTION PLAN
OF
CLUSTER – X
AS PER
EC CONDITION (SPECIFIC CONDITION-Xlii): Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet for and submitted to Ministry.
March, 2024
</td>
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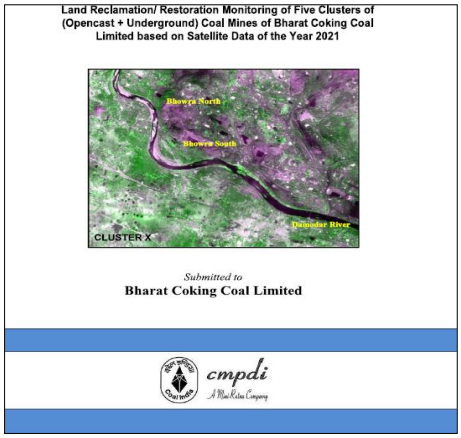
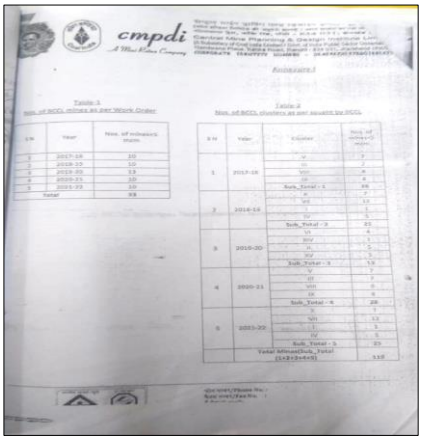
<tr>
<td>XLIV.</td>
<td>For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhubaneswar.</td>
<td>
Presently a time series map of vegetation cover in the Jharia Coal Field has been carried out through CMPDI, Ranchi using satellite imagery for every 3 years.




Time series of land use maps based on satellite imagery of the core zone and buffer zone is attached as Annexure – XIV. Details of vegetation cover under Cluster X is given below, as per the time series map of vegetation cover report:
<table>
<tr><th>Land use / Reclamation status</th><th>Area (in Ha)</th><th>%</th></tr>
<tr><td>a.) Plantation on OB dump</td><td>66.09</td><td>3.21</td></tr>
<tr><td>b.) Plantation on Backfill area (Biological Reclamation)</td><td>29.16</td><td>1.42</td></tr>
<tr><td>c.) Social Forestry / Avenue Plantation</td><td>140.75</td><td>6.84</td></tr>
<tr><td>d.) Shrubs</td><td>645.77</td><td>31.39</td></tr>
<tr><td>e.) Other Plantation area</td><td>64.34</td><td>3.13</td></tr>
<tr><td>Total area under Vegetation</td><td>946.11</td><td>45.98</td></tr>
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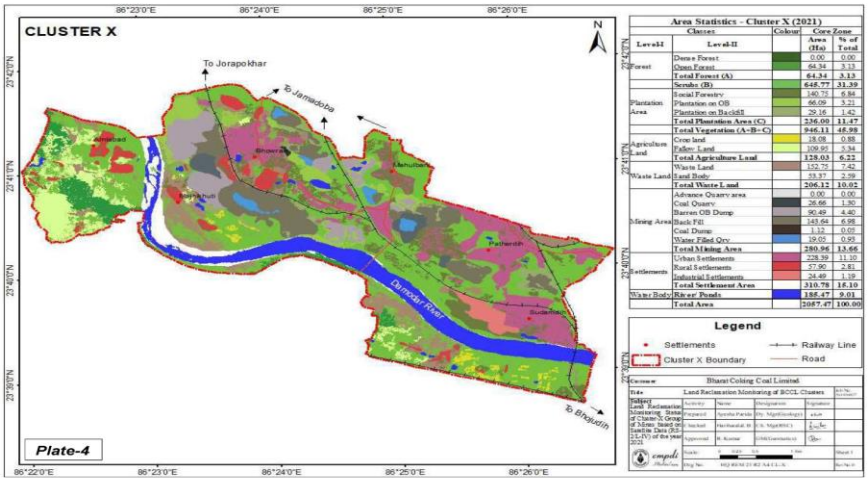
<td>


</td>
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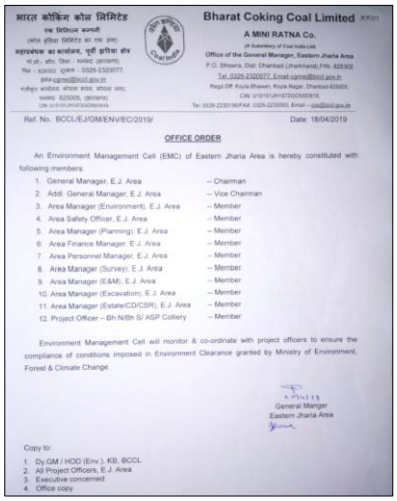
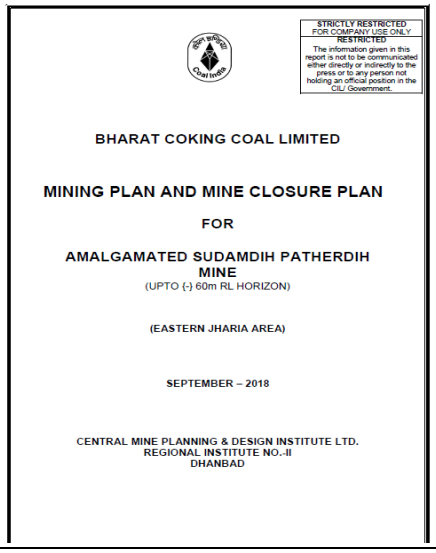
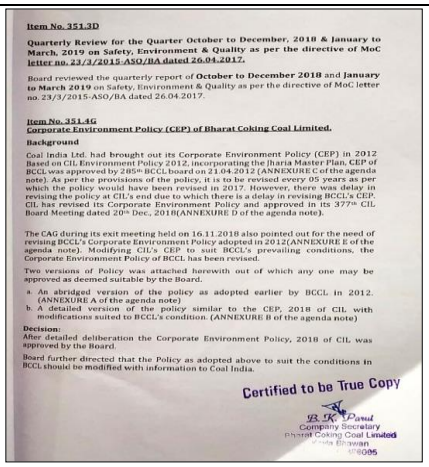
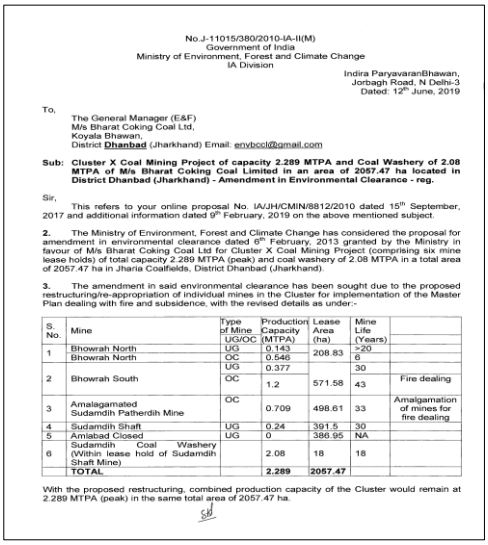
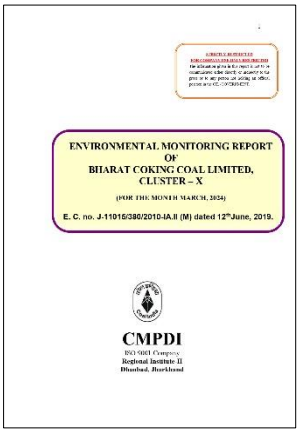
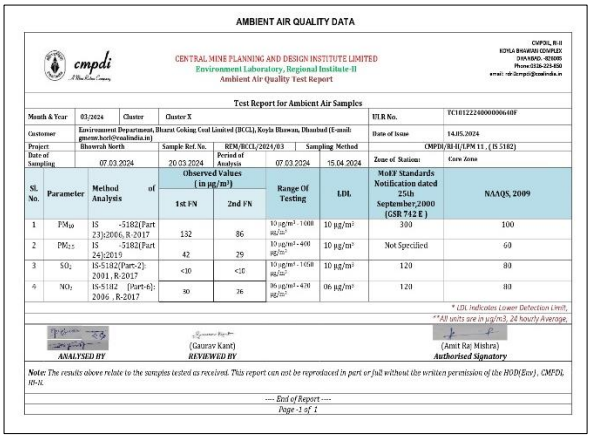
<tr>
<td>XLV.</td>
<td>A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests five year before mine closure for approval. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem, which were conserved in-situ and ex-situ in an identified area within the lease for reintroduction in the mine during mine reclamation and at the post mining stage for habitat restoration.</td>
<td>Mining Plan and Mine Closure Plan of Amalgamated Sudamdih Patherdih and Bhowra (South) mines has been approved in 348th BCCL Board meeting dated 29.01.2019. Approval copy is attached in Specific condition no. XIII.
Mine Closure Cost of different mine have been deposited every year in the Escrow account and Cluster X of BCCL had deposited the amount of Rs. 4949.46 lakh (including interest) to the escrow account till 31st March 2024. Details of the fund deposited till 31.03.2024 in the escrow account is given below:

<u>STATEMENT SHOWING MINE CLOSURE COST (ESCROW ACCOUNT) DETAILS</u>
<table>
<tr><th rowspan="2">S. No.</th><th rowspan="2">Name of Mine</th><th rowspan="2">Escrow account</th><th colspan="2">Amount deposited in Escrow account till 31st March 2024 (in Rs. Lakh)</th><th>Total Amount in Escrow Fund</th></tr>
<tr><th>Deposited in Escrow account from 2013-14 to 2023-24</th><th>Interest incurred from 2013-14 to 2023-24</th><th>Principal & Interest upto 31.03.2024</th></tr>
<tr><td>1</td><td>Bhowra (N) Grp of Mines (UG+OC)</td><td>150100008868</td><td>554.78</td><td>284.24</td><td>839.02</td></tr>
<tr><td>2</td><td>Bhowra (S) Grp of Mines (UG+OC)</td><td>150100008830</td><td>1968.92</td><td>850.07</td><td>2818.99</td></tr>
<tr><td>3</td><td>Sudamdih Incline Mine</td><td>150100008868</td><td>93.74</td><td>76.05</td><td>169.79</td></tr>
<tr><td>4</td><td>Patherdih Grp of Mines</td><td>150100008872</td><td>389.22</td><td>201.59</td><td>590.81</td></tr>
<tr><td>5</td><td>Amalgamated Sudamdih- Paherdih Colliery</td><td>150100011524</td><td>290.31</td><td>21.88</td><td>312.19</td></tr>
<tr><td>6</td><td>Sudamidh Shaft Mine</td><td>150100011673</td><td>174.22</td><td>44.44</td><td>218.66</td></tr>
<tr><td colspan="3">Total Eastern Jharia Area (Cluster X)</td><td>3471.19</td><td>1478.27</td><td>4949.46</td></tr>
</table>
</td>
</tr>
<tr>
<td>XLVI.</td>
<td>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 socioeconomic issues and the capacity building required in this regard.</td>
<td>A full-fledged Environment Department, headed by a HoD (Environment) along with a suitable qualified multidisciplinary team of executives which includes Environment, Mining, Excavation, Civil executives and technicians has been established in Headquarters. They are also trained in ecological restoration, sustainable development, rainwater harvesting methods etc.
The team is multidisciplinary and very much motivated under the guidance of company’s Director (Technical) and CMD. Further capacity building at both corporate and operating level is being done.
At the project level, two Executives in each area have been appointed as Environment Officer and are also entrusted with the responsibility of compliance and observance of the environmental acts/ laws including environment protection measures. The activities are monitored on regular basis at Area and at Head quarter levels. HoD (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.</td>
</tr>
</table>

		Environment Management Cell at area level has been constituted for the management of Environment and monitoring of compliance of EC conditions.  भारत कोकिंग कोल लिमिटेड Bharat Coking Coal Limited A MINI RATNA Co. Office of the General Manager, Eastern Jharia Area Ref. No.: BCCL/EJ/GM/ENV/EC/2019/ Date: 18/04/2019 OFFICE ORDER An Environment Management Cell (EMC) of Eastern Jharia Area is hereby constituted with following members: 1. General Manager, E.J. Area -- Chairman 2. Addl. General Manager, E.J. Area -- Vice Chairman 3. Area Manager (Environment), E.J. Area -- Member 4. Area Safety Officer, E.J. Area -- Member 5. Area Manager (Planning), E.J. Area -- Member 6. Area Finance Manager, E.J. Area -- Member 7. Area Personnel Manager, E.J. Area -- Member 8. Area Manager (Survey), E.J. Area -- Member 9. Area Manager (E&M), E.J. Area -- Member 10. Area Manager (Excavation), E.J. Area -- Member 11. Area Manager (Estate/CD/CSR), E.J. Area -- Member 12. Project Officer – Bh.N/Bh S/ ASP Colliery -- 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 General Manger Eastern Jharia Area Copy to: 1. Dy GM / HOD (Env.), KB, BCCL 2. All Project Officers, E.J. Area 3. Executive concerned 4. Office copy
XLVII.	Implementation of final mine closure plan for Cluster X, subject to obtaining prior approval of the DGMS in regard to mine safety issues	Final Mine Closure Plan has been prepared for each Mine in this cluster. Mining Plan and Mine Closure Plan of ASP Colliery is attached as Annexure – XV. Before implementation of final mine closure plan, prior permission from DGMS has been taken in regard to mine safety issues. Safety Management Plan (SMP) for each colliery has been prepared as per Coal Mines Regulation Act for the Safety of the mine and mining operations.  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 SUDAMDIH PATHERDIH MINE (UPTO (-) 60m RL HORIZON) (EASTERN JHARIA AREA) SEPTEMBER – 2018 CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD. REGIONAL INSTITUTE NO.-II DHANBAD BHARAT COKING COAL LIMITED (A Subsidiary of Coal India Limited) EASTERN JHARIA AREA BHOWRA (N) U/G MINES SAFETY MANAGEMENT PLAN BY SMP TEAM BHOWRA (N) U/G MINES E. J. AREA, BHOWRA BCCL, DHANBAD Safety Officer Bhowra (N) U/G Mines Colliery Engineer Bhowra (N) U/G Mines ACM (In-charge) Bhowra (N) U/G Mines Project Officer Bhowra (N) U/G Mines Manager Bhowra (N) U/G Mines
XLVIII.	Corporate Environment Responsibility: A. The Company shall have a well laid down Environment Policy approved by the Board of Directors. B. The Environment Policy shall prescribe for standard operating process/	A revised Corporate Environment Policy 351.4(G) has already been laid down and approved in 377th Board meeting by the Board of Directors. This is also posted on BCCL website link- http://www.bcclweb.in/environment/CEP_04.11.2019.pdf Complied. And attached as Annexure - XVI

	procedures to bring into focus any infringements/ deviation/ violation of the environmental or forest norms/conditions. C. The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished. D. To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.	 **Item No. 351.3D** **Quarterly Review for the Quarter October to December, 2018 & January to March, 2019 on Safety, Environment & Quality as per the directive of MoC letter no. 23/3/2015-ASO/BA dated 26.04.2017.** Board reviewed the quarterly report of **October to December 2018** and **January to March 2019** on Safety, Environment & Quality as per the directive of MoC letter no. 23/3/2015-ASO/BA dated 26.04.2017. **Item No. 351.4G** **Corporate Environment Policy (CEP) of Bharat Coking Coal Limited.** **Background** Coal India Ltd. had brought out its Corporate Environment Policy (CEP) in 2012 Based on CIL Environment Policy 2012, incorporating the Jharia Master Plan, CEP of BCCL was approved by 285th BCCL board on 21.04.2012 (ANNEXURE C of the agenda note). As per the provisions of the policy, it is to be revised every 05 years as per which the policy would have been revised in 2017. However, there was delay in revising the policy at CIL's end due to which there is a delay in revising BCCL's CEP. CIL has revised its Corporate Environment Policy and approved in its 377th CIL Board Meeting dated 20th Dec., 2018(ANNEXURE D of the agenda note). The CAG during its exit meeting held on 16.11.2018 also pointed out for the need of revising BCCL's Corporate Environment Policy adopted in 2012(ANNEXURE E of the agenda note). Modifying CIL's CEP to suit BCCL's prevailing conditions, the Corporate Environment Policy of BCCL has been revised. Two versions of Policy was attached herewith out of which any one may be approved as deemed suitable by the Board. a. An abridged version of the policy as adopted earlier by BCCL in 2012. (ANNEXURE A of the agenda note) b. A detailed version of the policy similar to the CEP, 2018 of CIL with modifications suited to BCCL's condition. (ANNEXURE B of the agenda note) **Decision:** After detailed deliberation the Corporate Environment Policy, 2018 of CIL was approved by the Board. Board further directed that the Policy as adopted above to suit the conditions in BCCL should be modified with information to Coal India. Certified to be True Copy B.K. Parul Company Secretary Bharat Coking Coal Limited Koyla Bhawan 826005 A hierarchical system of the company to deal with environmental issues from corporate level to mine level already exists. Being complied. There is apex Committee constituted at Ministry of Coal & CIL level and an Environment Advisory Committee has been also formulated at BCCL level comprising of the HODs of different disciplinary, chaired by DT(P&P), for implementation and monitoring of compliances of EC Conditions of all the areas of BCCL.
B.	**General Conditions by MOEF:**	
I.	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.	For change in scope of working of cluster X, amended EC has been obtained vide letter no.J-11015/380/2010-IA-II(M) dated 12th June 2019. Copy of amended EC is attached as Annexure XVII.  No.J-11015/380/2010-IA-II(M) Government of India Ministry of Environment, Forest and Climate Change IA Division Indira ParyavaranBhawan, Jorbagh Road, N Delhi-3 Dated: 12th June, 2019 To, The General Manager (E&F) M/s Bharat Coking Coal Ltd, Koyala Bhawan, District **Dhanbad** (Jharkhand) Email: envbccl@gmail.com **Sub: Cluster X Coal Mining Project of capacity 2.289 MTPA and Coal Washery of 2.08 MTPA of M/s Bharat Coking Coal Limited in an area of 2057.47 ha located in District Dhanbad (Jharkhand) - Amendment in Environmental Clearance - reg.** Sir, This refers to your online proposal No. IA/JH/CMIN/8812/2010 dated 15th September, 2017 and additional information dated 9th February, 2019 on the above mentioned subject. 2. The Ministry of Environment, Forest and Climate Change has considered the proposal for amendment in environmental clearance dated 8th February, 2013 granted by the Ministry in favour of M/s Bharat Coking Coal Ltd for Cluster X Coal Mining Project (comprising six mine lease holds) of total capacity 2.289 MTPA (peak) and coal washery of 2.08 MTPA in a total area of 2057.47 ha in Jharia Coalfields, District Dhanbad (Jharkhand). 3. The amendment in said environmental clearance has been sought due to the proposed restructuring/re-appropriation of individual mines in the Cluster for implementation of the Master Plan dealing with fire and subsidence, with the revised details as under:- S. No. | Mine | Type of Mine UG/OC | Production Capacity (MTPA) | Lease Area (ha) | Mine Life (Years) | 1 | Bhowrah North | UG | 0.143 | 208.83 | >20 | Bhowrah North | OC | 0.546 | | 6 2 | Bhowrah South | UG | 0.377 | 571.58 | 30 | | OC | 1.2 | | 43 | Fire dealing 3 | Amalagamated Sudamdih Patherdih Mine | OC | 0.709 | 498.61 | 33 | Amalgamation of mines for fire dealing 4 | Sudamdih Shaft | UG | 0.24 | 391.5 | 30 5 | Amlabad Closed | UG | 0 | 386.95 | NA 6 | Sudamdih Coal Washery (Within lease hold of Sudamdih Shaft Mine) | | 2.08 | 18 | 18 | **TOTAL** | | **2.289** | **2057.47** | With the proposed restructuring, combined production capacity of the Cluster would remain at 2.289 MTPA (peak) in the same total area of 2057.47 ha.
II.	No change in the calendar plan of production for quantum of mineral coal shall be made	Being followed. Production is being done well within production capacity of this cluster as per EC.

III.	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM2.5, SO2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.	The optimum location of monitoring stations in Jharia Coal Field finalized in consultation with the Jharkhand State Pollution Control Board. Ambient air quality is being regularly monitored by CMPDIL. Report is enclosed as Annexure VIII – Environmental Monitoring Report for cluster X. Water Sprinkling in Mine Premises has been regularly done to reduce PM10 and PM2.5 level. Picture showing water sprinkling is attached.
IV.	Data on ambient air quality (PM10, PM 2.5, SO2 and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.	Ambient air quality data (PM10, PM2.5, SO2 and NOx) and heavy metals & other monitoring data have been regularly monitored and analyzed by CMPDIL and submitted the report, which is attached as Annexure VIII. Also, Continuous monitoring of PM10 level is monitored through Online PM10 Analyser machines installed at Bhowra Gr. of Colliery and ASP Colliery of EJ area. The concentration of heavy metals in ambient air is well within the permissible limit  ENVIRONMENTAL MONITORING REPORT OF BHARAT COKING COAL LIMITED, CLUSTER – X (FOR THE MONTH MARCH, 2024) E. C. no. J-11015/380/2010-IA.II (M) dated 12th June, 2019. CMPDI ISO 9001 Company Regional Institute-II Dhanbad, Jharkhand  AMBIENT AIR QUALITY DATA cmpdi CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED Environment Laboratory, Regional Institute-II Ambient Air Quality Test Report CMPDIL, RI-II KOYLA BHAWAN COMPLEX DHANBAD - 828005 Phone:0326-225-850 email: ridcmpdi@coalindia.in Test Report for Ambient Air Samples Month & Year: 03/2024 | Cluster: Cluster X | ULR No.: TC101222400000064IF Customer: Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenvironment@coalindia.in) | Date of Issue: 14.05.2024 Project: Bhowrah North | Sample Ref. No.: REM/BCCL/2024/03 | Sampling Method: CMPDI/RI-II/LPM 11 , (IS 5182) Date of Sampling: 07.03.2024 | 20.03.2024 | Period of Analysis: 07.03.2024 | 15.04.2024 | Zone of Station: Core Zone Sl. No. | Parameter | Method of Analysis | Observed Values (in µg/m³) 1st F/N | 2nd F/N | 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 | 132 | 86 | 10 µg/m³ - 1000 µg/m³ | 10 µg/m³ | 300 | 100 2 | $PM_{2.5}$ | IS -5182(Part 24):2019 | 42 | 29 | 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 | 26 | 06 µg/m³ - 470 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 | (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 ---- Page -1 of 1

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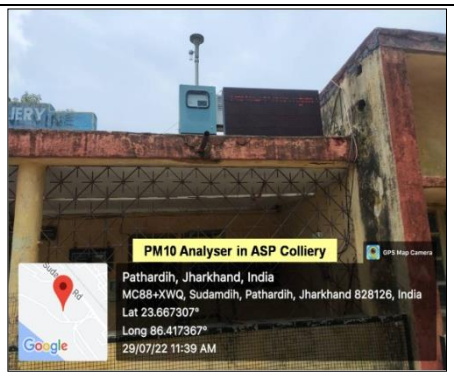

Heavy Metal Analysis report of Ambient Air Quality

SAMPLE	Date	Hg (µg/m³)	Cr(µg/m³)	As (ng/m³)	Pb (µg/m³)	Ni (ng/m³)	Cd (µg/m³)
Jeenagora (A13)	22.06.2023	<0.001	<0.01	<1	0.024	16	0.01
Bhowrah North (A14)	29.06.2023	<0.001	0.01	<1	0.026	18	<0.001
Sudamdih Washery (A15)	27.06.2023	<0.001	0.01	<1	0.026	17	0.01
Sitanala (A30):	27.06.2023	<0.001	0.01	<1	0.027	<2	<0.001
Sudamdih Mine shaft (A41):	28.06.2023	<0.001	<0.01	<1	0.015	<2	<0.001

Analysed By
JSA/SA/SSA

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

Approved By
HOD(In-charge) Environment
RI-2, CMPDI, Dhanbad
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<td>V.</td>
<td>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.</td>
<td>It is being complied in mines and also the Noise levels are below the Ambient Noise Standard (Day time 75 dB & Night Time (70 dB for Industrial Area). However, ear muffs / ear plugs are provided to the workers engaged in blasting and drilling operations, HEMM operations etc.

cmpdi
A Miniratna Company

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

CMPDIL, RI-II
KOYLA BHAWAN CORPLEX
DHANBAD - 826005
Phone:0326 223 850
email: ri2rcmpdi@coalindia.in

Month & Year	03/2024	Cluster	Cluster X					ULR No.	TC101222400000674F
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	14.05.2024
Project			Sample Ref. No.	REM/BCCL/2024/03			Sampling Method	CMPDI/RI-II/LPM 22	
Sampling Stations	i	Bhowrah North		Date of Sampling	07.03.2024	20.03.2024	Zone Category of Station:	Core Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards: Zones	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards: Limits in dB
1	Noise Level dB(A)Leq - Day	06.00 - 07.00	55.1	54.4	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07.00 - 08.00	58.1	57.9					
3		08.00 - 09.00	60.9	60.9					
4		09.00 - 10.00	64.2	65.5					
5		10.00 - 11.00	65.2	64.6					
6		11.00 - 12.00	66	65.8					
7		12.00 - 13.00	68.7	67.9					
8		13.00 - 14.00	61.9	59.8					
9		14.00 - 15.00	58.6	57.6					
10		15.00 - 16.00	49.2	64.1					
11		16.00 - 17.00	49.3	63.6					
12		17.00 - 18.00	47.7	62.9					
13		18.00 - 19.00	46.2	54.7					
14		19.00 - 20.00	46.5	45.5					
15		20.00 - 21.00	46.6	47.2					
16		21.00 - 22.00	46	47.1					
		Leq DAY	61.4	62.8					
1	Noise Level dB(A)Leq - Night	22.00-23.00	43.9	44.2	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23.00-00.00	43.8	43.6					
3		00.00-01.00	43.6	43.3					
4		01.00-02.00	43.3	43.5					
5		02.00-03.00	43.2	43.6					
6		03.00-04.00	44.2	44.3					
7		04.00-05.00	44.3	44.7					
8		05.00-06.00	44.7	45					
		Leq NIGHT	43.9	44.1					

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

(Gaurav Kant)
ANALYSED BY
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.

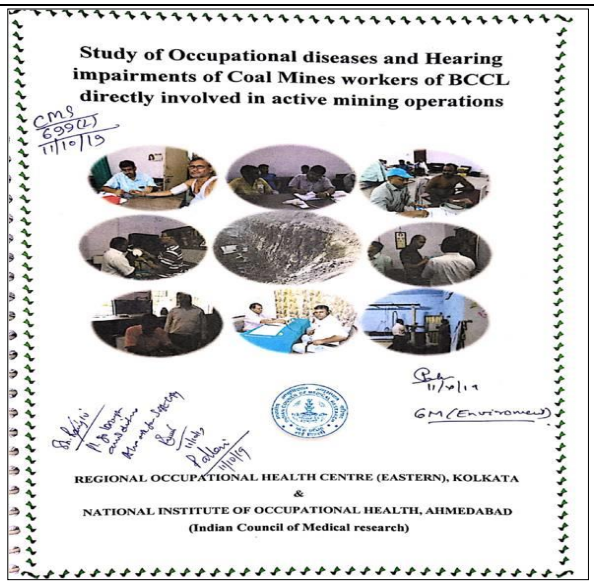
End of Report
Page 1 of 1
</td>
</tr>
<tr>
<td>VI.</td>
<td>Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as</td>
<td>The optimum location of monitoring stations in Jharia Coal Field finalized in consultation with the Jharkhand State Pollution Control Board. Mine water & ground water quality is being regularly monitored by CMPDIL.
Physico-Chemical characteristics of effluents are well within the prescribed limit. Work has been started for construction of Oil & Grease trap system at workshop under EJ Area.</td>
</tr>
</table>

<table>
<tr><td></td><td>amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.</td><td></td></tr>
<tr><td>VII.</td><td>Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.</td><td>Vehicular emissions are being under control and the Pollution under control certificate has been attached as Annexure – XVIII. All the vehicles used for coal transportation are covered with tarpaulins.</td></tr>
<tr><td>VIII.</td><td>Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analyzed through a laboratory recognized under EPA Rules, 1986.</td><td>Monitoring of Environmental quality parameters have been regularly done by CMPDIL with proper analysis equipment.</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>It is being complied. All Personnel working in mines are provided with respiratory masks and safety eyeglass to protect the dust ingestion. Year wise details of protective respiratory devices / dust mask issued is given below:

<u>DETAILS OF PROTECTIVE RESPIRATORY DEVICES / DUST MASK ISSUED</u>

<table>
<tr><td>Mine Name</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td><td>2020</td><td>2021</td><td>2022</td><td>2023</td></tr>
<tr><td>Bhowra North</td><td>200</td><td>180</td><td>70</td><td>220</td><td>Nil</td><td>Nil</td><td>-</td><td>-</td></tr>
<tr><td>Bhowra South</td><td>38</td><td>119</td><td>80</td><td>110</td><td>320</td><td>280</td><td>-</td><td>-</td></tr>
<tr><td>ASP Colliery</td><td>65</td><td>68</td><td>72</td><td>50</td><td>220</td><td>190</td><td>-</td><td>-</td></tr>
</table>

National Institute of Occupational Health (NIOH) has conducted a study on Occupational disease and Hearing impairments of Coal Mines workers of BCCL directly involved in active mining operations and submitted their final report which has already been scrutinized by Medical Department, BCCL. NIOH report is enclosed as Annexure - XIX.</td></tr>
</table>



Study of Occupational diseases and Hearing impairments of Coal Mines workers of BCCL directly involved in active mining operations

REGIONAL OCCUPATIONAL HEALTH CENTRE (EASTERN), KOLKATA
&
NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH, AHMEDABAD
(Indian Council of Medical research)

A separate full-fledged Human Resource Development (HRD) Department is conducting regular training programs on safety and health issues. Apart from this, Vocational Training Center (VTC) exist in E.J. area (cluster X), which provides periodical training on the safety and occupational health issue to workers working in the mines.

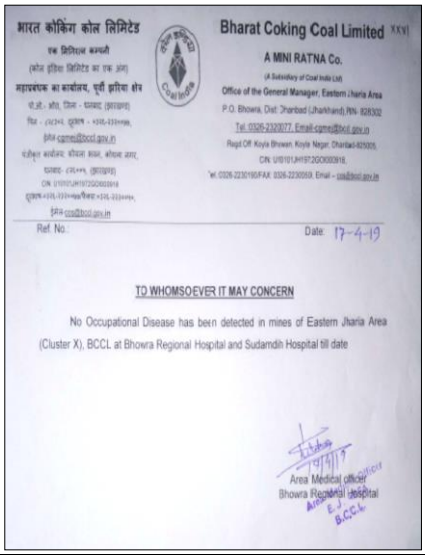
X. Occupational health surveillance programs of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.

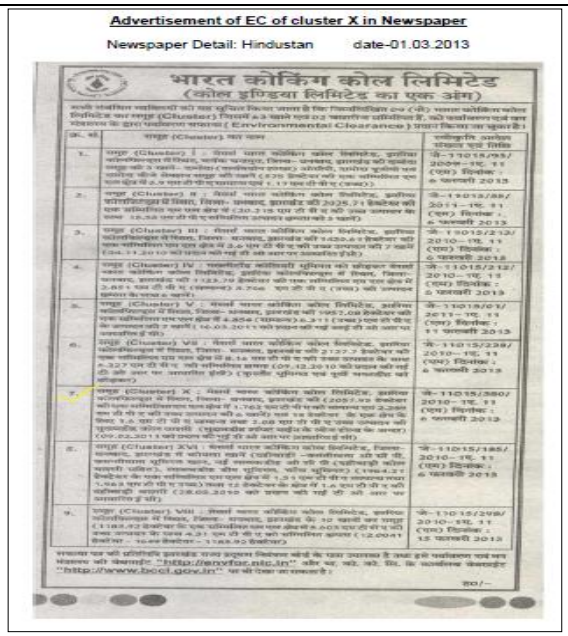
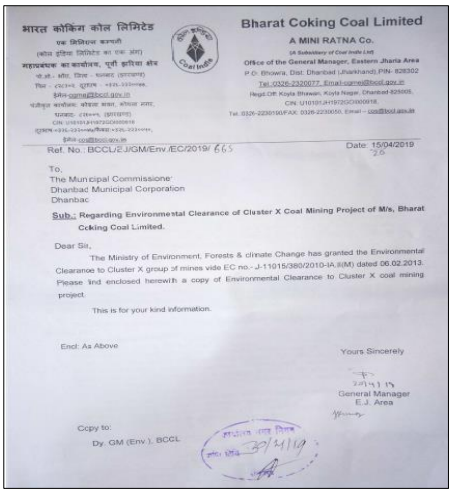
Initial Medical Examination (IME) and Periodical Medical Examination (PME) of all the personnel are carried out as per the Statutes and Director General of Mines Safety (DGMS) guideline.

IME, PME and VTC details are given below:

	Year	Target	Actual
PME	2016	951	993
	2017	891	927
	2018	385	464
	2019	1073	896
	2020	1221	1036
	2021	569	629
	2022	608	603
	2023	106	107
VTC	2016-17	472	488
	2017-18	338	392
	2018-19	343	386
	2019-20	414	455
	2020-21	461	557
	2021-22	360	325
	2022-23	360	343
	2023-24	317	276

Contractual Workers:	Training	IME	
2014-15	15	2014-15	15
2015-16	78	2015-16	74
2016-17	78	2016-17	62
2017-18	163	2017-18	124
2018-19	111	2018-19	111
2019-20		2019-20	Nil
2020-21		2020-21	Nil
2021-22		2021-22	96
2022-23	196	2022-23	203
2023-24	32	2023-24	Nil

		Certificate of the area medical officer showing no occupational disease has been detected in the Cluster X group of mines is attached.  भारत कोकिंग कोल लिमिटेड एक मिनिरत्न कम्पनी (कोल इंडिया लिमिटेड का एक अंग) महाप्रबंधक का कार्यालय, पूर्वी झरिया क्षेत्र Bharat Coking Coal Limited XXVI A MINI RATNA Co. (A Subsidiary of Coal India Ltd) Office of the General Manager, Eastern Jharia Area P.O. Bhowra, Dist: Dhanbad (Jharkhand) PIN- 828302 Tel: 0326-2320077, Email-cgmej@bccl.gov.in Regd.Off: Koyla Bhawan, Koyla Nagar, Dhanbad-826005, CIN: U10101JH1972GOI000918, Tel: 0326-2230160 FAX: 0326-2230059, Email – ceo@bccl.gov.in Ref. No.: Date: 17-4-19 TO WHOMSOEVER IT MAY CONCERN No Occupational Disease has been detected in mines of Eastern Jharia Area (Cluster X), BCCL at Bhowra Regional Hospital and Sudamdih Hospital till date Area Medical Officer Bhowra Regional Hospital B.C.C.L.
XI.	A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.	Environment Management Cell at area level has been constituted for the management of Environment and monitoring of compliance of EC conditions.
XII.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhubaneswar.	Year wise and item wise expenditure made on environment protection measures is enclosed as Annexure – XX.
XIII.	The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance	It has been complied. Advertisement in local newspaper has also been done.

	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.	 Advertisement of EC of cluster X in Newspaper Newspaper Detail: Hindustan date-01.03.2013 भारत कोकिंग कोल लिमिटेड (कोल इण्डिया लिमिटेड का एक अंग)
XIV.	A copy of the environmental clearance letter shall be marked to concern Panchayat/Zila Parishad, Municipal corporation or Urban local body and local NGO, if any, from whom any suggestion /representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.	Copy of EC letter of cluster X has been displayed on BCCL website. Link- http://www.bcclweb.in/Environment%20Clearance/ECX.pdf Amended Environment clearance (New) letter link- http://www.bcclweb.in/Environment%20Clearance/ClusterX%20amendment.pdf A copy of EC letter sent to Municipal corporation / panchyat is attached.  भारत कोकिंग कोल लिमिटेड Bharat Coking Coal Limited A MINI RATNA Co. Ref. No.: BCCL/EJ/GM/Env./EC/2019/ 665 Date: 15/04/2019 To, The Municipal Commissioner Dhanbad Municipal Corporation Dhanbad Sub.: Regarding Environmetal Clearance of Cluster X Coal Mining Project of M/s. Bharat Coking Coal Limited. Dear Sir, The Ministry of Environment, Forests & climate Change has granted the Environmental Clearance to Cluster X group of mines vide EC no.- J-11015/380/2010-IA.II(M) dated 06.02.2013. Please find enclosed herewith a copy of Environmental Clearance to Cluster X coal mining project. This is for your kind information. Encl: As Above Yours Sincerely General Manager E.J. Area Ccpy to: Dy. GM (Env.), BCCL
XV.	A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.	Complied. Copy of EC letter and amended Environment clearance (New) letter of cluster X has been displayed on BCCL website.

XVI.	The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM10, PM2.5, SO2 and NOx (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.	Complied. The clearance letter has been uploaded on the BCCL website. Link- http://www.bcclweb.in/Environment%20Clearance/ECX.pdf Amended Environment clearance (New) letter link- http://www.bcclweb.in/Environment%20Clearance/ClusterX%20amendment.pdf The compliance status of the stipulated environmental clearance conditions has been uploaded on BCCL website, link- https://www.bcclweb.in/?page_id=4731&lang=en
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 compliance report of Cluster X has been regularly submitted to the MoEFCC portal Parivesh https://parivesh.nic.in/ and also a copy of the report is being submitted to CPCB & Jharkhand SPCB office.
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.	Project authority is ready to extend its full cooperation for any kind of visit and inspection conducted by Regional Office in connection with EC Conditions Compliance.
XIX.	The Environmental statement for each financial	Environmental Statement (Form-V) has been regularly submitted for each financial year to Jharkhand State Pollution Control Board.

	year ending 31 March in Form –V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEF by E-mail.	Annexure XXI – Environmental statement (Form-V) of projects/ collieries of E.J. Area attached.
C.	**Other Conditions by MOEF:**	
i.	The Ministry or any other Competent Authority may stipulate any further condition(s) for environmental protection.	Agreed.
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	It is being complied.

	water, and occupational and other diseases due to the mining operations.	
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.	There is a status quo to be maintained by both the parties issued by Hon'ble High Court in the WPC no. 4944 of 2011 by order dated 18.1.2012. The case is still not disposed off and the status quo continues.

27/05/24
Area Manager (Envt.)
EJ Area

27.5.24
Project Officer
ASP Colliery,
EJ Area

27/5/24
Project Officer
Bhowra (S) Colliery,
EJ Area

27/5/24
Project Officer
Bhowra (N) Colliery,
EJ Area

27/05/24.
Addl. General Manager
EJ Area, BCCL
Cluster X

General Manager
EJ Area, BCCL
Cluster X

LIST OF ANNEXURE

Annexure	Description
I	Water Quality Report of Cluster X
II	Groundwater level & Quality report by CMPDIL
III	Time schedule / Mine closure Plan of Bhowra South
IV	Jharia Master Plan for dealing with fire, subsidence and Rehabilitation in the leasehold of BCCL
V	Delineation of surface coal fire and Land subsidence in the Jharia coalfield, Dhanbad, Jharkhand from remote Sensing data by NRSC, Hyderabad
VI	Work completion certificate of Drilling and installation of 23 nos of piezometric wells in the command area of BCCL & Permeability and seepage study report
VII	Work order copy for work of plantation through DFO
VIII	Regular Environment Monitoring Report for Cluster X
IX	Source apportionment of ambient air particulate matter in Jharia coalfields region, Jharkhand study conducted by CSIR – NEERI, Nagpur
X	Rain Water Harvesting & Artificial Recharge system in Cluster X
XI	Transportation Plan RCR
XII	Study to Analyze the Extent of Reduction of Pollution Load Every Year by reducing Coal Transportation by Road prepared by CMPDIL
XIII	A.) CSR Activity plan of Cluster X B.) CSR Action Plan BCCL
XIV	Land Restoration / Reclamation Monitoring of Clusters of (Opencast + Underground) Coal Mines of Bharat Coking Coal Limited based on Satellite Data by CMPDIL
XV	Mining plan and mine closure plan for ASP Colliery
XVI	Corporate Environment Policy (CEP) of BCCL
XVII	Copy of Amendment in Environment clearance of Cluster X
XVIII	PUC Certificate
XIX	Study of occupation disease and hearing impairments of coal mines workers of BCCL directly involved in active mining operations by NIOH, Ahmedabad
XX	Yearwise Environmental expenditure made for Cluster X
XXI	Environmental Statement / Form V copy

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WATER QUALITY REPORT OF BHARAT COKING COAL LIMITED, CLUSTER – X

(FOR THE Q.E. DEC 2023)

E. C. no. J-11015/380/2010-IA.II (M) dated 12th June, 2019.

CMPDI

ISO 9001 Company

Regional Institute-II

Dhanbad, Jharkhand

CLUSTER - X

(FOR THE Q.E. DEC 2023)

CONTENTS

SL. NO.	CHAPTER	PARTICULARS
1.		EXECUTIVE SUMMARY
2.	CHAPTER - I	INTRODUCTION
3.	CHAPTER-II	WATER SAMPLING & ANALYSIS
4.	**Plates:** Plate NO. - I	SURFACE PLAN SHOWING WATER MONITORING LOCATIONS

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WATER QUALITY REPORT
OF
BHARAT COKING COAL LIMITED
CLUSTER – X

(FOR THE Q.E. DEC 2023)

E. C. no. J-11015/380/2010-IA.II (M) dated 12th June, 2019.

CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

EXECUTIVE SUMMARY

1.0 Introduction

The purpose of environmental monitoring is to assess the quality of various attributes that affects the 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 Water sampling stations

The Water sampling stations were selected for mine effluent water, Ground water supply, well/ Hand pump water & also surface water samples.

3.0 Methodology of sampling and analysis

3.1 Water quality

Water samples were collected as per standard practice. Effluent samples were analyzed for 25 parameters on quarterly basis & for 27 parameters on half yearly basis. The Ground and Surface water samples were collected and analyzed for 25 and 17 parameters respectively, on quarterly basis. Thereafter the samples were preserved and analyzed at the Environmental Laboratory at CMPDI RI-II, Dhanbad

4.0 Results and interpretations

4.1 Water quality

The test results indicate that the major parameters compared with MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines, IS.10500/2012 (Ground water) and IS: 2296 (Surface water), are with in permissible limits.

CHAPTER - I

INTRODUCTION

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

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.

1.1 The Cluster-X is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Amlabad UG, Bhowra north UG/OC, Bhowra South UG/OC , Amalgamated Sudamdih Patherdih Mine, Sudamdih Shaft, Sudamdih Coal Washery The Cluster–X is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster–X are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Damodar River.

1.2 The Cluster-X is designed to produce 1.762 MTPA (normative) and 2.289 MTPA (peak) capacity of coal and coal washery of 2.08 MTPA.

The Project has Environmental Clearance from Ministry of Environment, Forests and Climate Change (MoEF&CC) for a rated capacity 1.762 MTPA (normative) and 2.289 MTPA (peak) capacity of coal production vide letter no. J-11015/380/2010-IA.II (M) dated 12thJune, 2019.

.

In compliance of these conditions the Environmental Monitoring has been carried out & report prepared for submission to MoEF&CC & SPCB and other statutory authorities.

CHAPTER – II

WATER QUALITY MONITORING

2.1 Location of sampling sites

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

i) Ground Water quality at **Bhowrah North (GW10)**

ii) Surface Water quality at **U/S of Damodar River (SW21)**

iii) Surface Water quality at **D/S of Damodar River (SW22)**

iv) Mine Water Quality at Bhowrah North **(MW10)**

2.2 Methodology of sampling and analysis

Water samples were collected as per standard practice. Effluent samples were analyzed for 25 parameters on quarterly basis & for 27 parameters on half yearly basis. The Ground and Surface water samples were collected and analyzed for 25 and 17 parameters respectively, on quarterly basis. Thereafter the samples were preserved and analyzed at the Environmental Laboratory at CMPDI RI-II, Dhanbad

2.3 Results & Interpretations

The results are given in tabular form along with the applicable standards. Results show that most of the parameters are within the permissible limits.

CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
GROUND WATER ANALYSIS TEST REPORT

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

Month & Year	**QUARTER ENDING Dec 2023**	**Cluster**	**CLUSTERX**	**ULR No.**	**TC1013223000000452P**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**11.03.2024**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/23-24/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**
Sampling Stations	**Bhowrah North**	**Date of Sampling**	**27.11.2023**	**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**	
			Period of Analysis	**27.11.2023 to 09.01.2024**	

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**			**IS 10500: 2012**	
			GW10 G0085	**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	3	1-500.0	1	5	15
2	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	40	2.0-800.0	2	75	200
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	35	2.0-1500.0	5	250	1000
4	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method,2023	0.67	0.2-2.00	0.2	1	1.5
5	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	0.29	0.2-10	0.2	1	No relaxation
6	Magnesium	APHA 24th Edition, 3500-Mg B: Calculation Method,2023	58	6.0-700	6	30	100
7	Nitrate , mg/l	APHA, 24th Edition, UV-Spectrophotometric Method,2023	14.52	0.5-45.0	0.5	45	No relaxation
8	Odour	APHA, 24th Edition, , 2150-C,2023	Agreeable	Qualitative	Qualitative	Agreeable	Agreeable
9	pH value	IS 3025, Part 11 : 1983 R 2023 Electrometric(pH Meter) Method	8.03	1-14	0.1	6.5-8.5	No relaxation
10	Sulphate, mg/l	APHA –24th Edition, 4500 S , Turbidity Method,2023	203	10.0-400.0	10	200	400
11	Taste	APHA,24th Edition, 2160-C , 2023	Acceptable	Qualitative	Qualitative	Acceptable	Agreeable
12	Total Alkalinity (c_aco_3), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	272	4.0-2000.0	4	200	600
13	Total Dissolved Solids, mg/l	IS 3025, Part 16: 1984 R 2023 Gravimetric method	823	25.0-5000.0	25	500	2000
14	Total Hardness, mg/l	IS 3025, (Part 21): 2019 EDTA Method	342	4.0-2000.0	4	200	600
15	Turbidity, NTU	IS 3025, (Part 10):1984, R-2023 Nephelometric/Turbiditimetric Method	2.2	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,*

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 ----

CMPDIL, RI-II
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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

Environment Laboratory, Regional Institute-II

GROUND WATER ANALYSIS TEST REPORT

Month & Year	**QUARTER ENDING Dec 2023**	**Cluster**	**CLUSTER X**	**Report No.**	**RI-2/GW/23-24/QE/03**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**11.03.2024**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/23-24/GW**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**
Sampling Stations	**Bhowrah North**	**Date of Sampling**	**27.11.2023**	**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**	
			Period of Analysis	**27.11.2023 to 09.01.2024**	

Sl. No.	Parameter	Method of Analysis	Observed Values			IS 10500: 2012	
			GW10 G0085	Range Of Testing	LDL	Acceptable Limit (Max)*	Permissible Limit in the Absence of Alternate Source (Max)
1	Boron (as B), mg/l, Max	APHA, 24th d Edition ,Carmine,2023	<0.2	0.2-10	0.2	0.5	1
2	Copper (as Cu), mg/l, Max	IS 3025 Part 42 : 1992 R : 2019, AAS-Flame APHA, 24th edition, AAS-GTA	<0.01	0.20-10.0	0.01	0.05	1.5
3	Free Residual Chlorine, mg/l, Min	APHA, 24th Edition, , 4500-Cl-B. (Iodometric Method-I),2023	<0.04	0.04-5	0.04	0.2	1
4	Lead (as Pb), mg/l, Max	IS:3025(Part 47):1994 (Reaffirmed 2019) APHA, 24th edition, AAS-GTA	<0.005	0.005-10	0.005	0.01	No relaxation
5	Phenolic compounds (as C6H5OH), mg/l, Max	APHA, 24th Edition,4-Amino Autipyrine	<0.001	0.001-10	0.001	0.002	0.002
6	Selenium, mg/l, Max	APHA 24th Edition IS-3025,part 56:2003, R-2019/, AAS-VGA,2023	<0.007	0.007-10	0.007	0.01	No relaxation
7	Total Arsenic (as As), mg/l, Max	IS-3025,part 37:1988, R-2019/ APHA 24th edition AAS-VGA	<0.006	0.006-10	0.006	0.01	0.05
8	Total Chromium (as Cr), mg/l, Max	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA, 24th Edition, AAS-GTA,2023	<0.01	0.10-10.0	0.01	0.05	No relaxation
9	Nickel as Ni, mg/l Max	IS 3025 Part 54 : 2003,R : 2019, AAS-Flame APHA, 24th Edition, AAS-GTA,2023	<0.005	0.10-10	0.005	0.02	No relaxation
10	Manganese as Mn, mg/l, Max	IS 3025(Part 59) : 2006,R:2019, AAS-Flame Method	0.12	0.10-10.0	0.02	0.1	0.3

****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,*

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
AUTHORISED SIGNATORY

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
Environment Laboratory, Regional Institute-II
SURFACE WATER ANALYSIS TEST REPORT

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Month & Year	Quarter Ending Dec 2023	Cluster	X	ULR No.	TC1016023000000480P TC1016123000000481P
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			Date of Issue	11.03.2024
Project	Sample Ref. No.		REM/BCCL/23-24/SW /	Sampling Method	(IS 3025 , Part-1) CMPDI/RI-II/LPM 13
Sampling Stations	(i)	Upstream of Damodar River(SW21)	Date of Sampling	04.12.23	Period of Analysis
	(ii)	Downstream of Damodar River(SW22)	Date of Sampling	04.12.23	04.12.2023 to 09.01.2024

Sl. No.	Parameter	Method of Analysis	Observed Values		IS : 2296 INLAND SURFACE WATER [1982] Class 'C	Range of Testing	LDL
			S0023	S0021			
1	BOD (3 days 27°C), mg/l	IS 3025 (Part 44) : 1993, R-2019 , 3 day incubation at 27°C	<2.0	<2.0	3	2.00-100.00	2
2	Colour,Hazen Units	APHA 24th Edition , 2120-B-:2023	2	1	10	1-500.0	1
3	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 Argentometric Method	29	45	600	2.0-1500.0	5
4	Copper, mg/l	IS 3025 (Part 42) : 1992 R : 2019, AAS-Flame Method	<0.2	<0.2	1.5	0.2-10.0	0.2
5	Dissolved Oxygen, mg/L	IS 3025 (Part 38) : 1989, R:2003 Winkler Azide Method	6.9	7.0	4	1.0-10.0	0.1
6	Fluoride, mg/l	APHA, 24th Edition, SPADNS Method,2023	0.60	0.64	1.5	0.2-2.00	0.2
7	Hexavalent Chromium, mg/l	APHA 24th Edition, 1,5-Diphenylcarbohydrazide Method IS 3025 (Part 52) : 2003,R-2023	<0.01	<0.01	0.05	0.01-1.4	0.01
8	Iron, mg/l	IS 3025 (Part 53):2003,R:2019, AAS-Flame Method	<0.2	<0.2	50	0.2-10	0.2
9	Nitrate , mg/l	APHA, 24th Edition, UV-Spectrophotometric Method,2023	8.81	9.16	50	0.5-45.0	0.5
10	pH value	IS 3025, (Part 11) : 1983 R-2023 Electrometric (Ph Meter) method	8.20	8.19	6.5-8.5	1.0-14.0	2
11	Sulphate, mg/l	APHA –24th Edition,4500- S, Turbidity Method,2023	33	38	400	10.0-400.0	10
12	Total Dissolved Solids, mg/l	IS 3025, (Part 16): 1984 R-2023 Gravimetric method	489	521	1500	25.0-10000.0	25
13	Zinc, mg/l	IS 3025(Part 49) : 1994, R : 2019, AAS-Flame Method	<0.1	<0.1	15	0.10 – 10.0	0.1

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit*

****All units in mg/L unless specified otherwise Sample Collected in 5 Ltr Jerricane , Color as observed is transparent*

	(Kumar Vaibhav)	(Amit Raj Mishra)
Analysed by	*REVIEWED BY*	*AUTHORISED SIGNATORY*

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

Environment Laboratory, Regional Institute-II

SURFACE WATER ANALYSIS TEST REPORT

Month & Year	QUARTER Ending Dec 2023	Cluster	X	Report No.	RI-2/SW/23-24/QE/03
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)			Date of Issue	11.03.2024
Project	Sample Ref. No.	REM/BCCL/23-24/SW /	Sampling Method	(IS 3025 , Part-1) CMPDI/RI-II/LPM 13	
Sampling Stations	(i) Upstream of Damodar River(SW21)	Date of Sampling	04.12.2023	Period of Analysis	
	(ii) Downstream of Damodar River(SW22)	Date of Sampling	04.12.2023	04.12.2023 to 09.01.2024	

Sl. No.	Parameter	Method of Analysis	Observed Values S0023	Observed Values S0021	IS : 2296 INLAND SURFACE WATER [1982] Class 'C	Range of Testing	LDL
1	Arsenic (as As), mg/l, Max	IS-3025,Part 37:1988, R-2019/ APHA 24th Edition AAS-VGA	<0.006	<0.006	0.2	0.006-10	0.006
2	Lead (as Pb), mg/l, Max	APHA, 24th Edition, AAS-GTA	<0.005	<0.005	0.1	0.005-10	0.005
3	Phenolic compounds (as C6H5OH), mg/l, Max	APHA, 24th Edition 4-Amino Antipyrine	<0.002	<0.002	0.005	0.002-10	0.002
4	Selenium, mg/l, Max	IS-3025 ,Part 56:2003, R-2019/ APHA 24th Edition, AAS-VGA	<0.007	<0.007	0.05	0.007-10	0.007

***Grab sampling carried out for water samples. *LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit*

****All units in mg/L unless specified otherwise Sample Collected in 5 Ltr Jerricane , Color as observed is transparent*

	(Kumar Vaibhav)	(Amit Raj Mishra)
Analysed by	*REVIEWED BY*	*AUTHORISED SIGNATORY*

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MINE EFFLUENT ANALYSIS TEST REPORT

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Month & Year	**QUARTER ENDING Dec 2023**	**Cluster VI**	**CLUSTER X**	**ULR No.**	**TC1019123000000511P**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**11.03.2024**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/23-24/MW/**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**
Sampling Stations	**MW10**	**Date of Sampling**	**16.12.2023**	**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**	
				Period of Analysis	**16.12.2023 to 29.01.2024**

Sl. No.	Parameter	Method of Analysis	MW10 M0683	Range Of Testing	LDL	MOEF -SCH-VI STANDARDS Class 'A'
1	B.O.D (3 days 27°C), mg/l, Max	IS 3025 /44:1993,R:20033 day incubation at 27°C	<2.0	2-1000.0	2	30
2	Colour	APHA,24th Edition ,2120-B-:2023	3	1.0-500.0	1	-
3	COD, mg/l, Max	APHA 24th Edition 5220 C Titrimetric Method,2023	24	4.0-800.0	4	250
4	Copper (as Cu), mg/l, *Max*	IS 3025(Part42): 1992 R : 2019, AAS-Flame	<0.2	0.2-10.0	0.2	3
5	Dissolved Phosphate (as P), mg/l, Max	IS 3025/ 31, 1988 R 2019	<0.1	0.1-5	0.1	5
6	Fluoride (as F) mg/l, *Max*	APHA, 24th Edition, Page 4-90 to , 4500 –F- D (SPADNS Method),2023	0.5	0.2-2	0.2	2
7	Hexavalent Chromium, mg/l, Max	IS 3025 (Part 52) : 2003,Reaffirmed 2019	<0.01	0.01-1.4	0.01	0.1
8	Iron (as Fe), mg/l, *Max*	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame	<0.2	0.2-10	0.2	3
9	Manganese(as Mn), mg/l, Max	APHA, 24th Edition, AAS-GTA	<0.1	0.1-10	0.005	0.1
10	Nickel (as Ni), mg/l, *Max*	IS-3025(Part 54):2003, R:2019 AAS-Flame	<0.1	0.1-10.0	0.1	3
11	Nitrate Nitrogen, mg/l, *Max*	APHA, 24th Edition,UV-Spectrphotometric	1.18	0.5-45	0.5	10
12	Oil & Grease, mg/l, Max	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	2.0-1000	2	10
13	pH value	IS-3025/11:1983, R-2023, Electrometric	7.92	1 -14	0.1	5.5 to 9.0
14	Temperature (°C)	IS-3025/09:1984, Thermometeric	24.5	1-100		Shall not exceed 5° C above the receiving temp
15	Total Chromium (as Cr), mg/l, *Max*	IS-3025(Part 52):2003, R:2019 AAS-Flame	<0.1	0.1-8	0.1	2
16	Total Suspended Solids, mg/l, Max	IS 3025/17:1984, R :2023, Gravimetric	37	10-5000	10	100
17	Zinc (as Zn), mg/l, *Max*	IS 3025 /49 : 1994, R : 2019, AAS-Flame	<0.1	0.1-2.0	0.1	5
18	Odour	APHA, 24th Edition, , 2150-C	Agreeable	Qualitative	Qualitative	Qualitative

****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,*

ANALYSED BY	(Kumar Vaibhav) ***REVIEWED BY***	(Amit Raj Mishra) ***AUTHORISED SIGNATORY***

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

Environment Laboratory, Regional Institute-II

MINE EFFLUENT ANALYSIS TEST REPORT

CMPDIL, RI-II
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Month & Year	**QUARTER ENDING Dec 2023**	**Cluster**	**CLUSTER X**	**Report No.**	**RI-2/MW/23-24/QE/03**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**11.03.2024**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/23-24/MW/**	**Sampling Method**	**CMPDI/RI-II/LPM 13,(IS 3025:Part -1)**
Sampling Stations	**MW10**	**Date of Sampling**	**16.12.2023**	**Sample Collected in 5 Ltr Jerricane , Color as observed is transparent**	
				Period of Analysis	**16.12.2023 to 29.01.2024**

Sl. No.	Parameter	Method of Analysis	MW10 M0683	Range Of Testing	LDL	MOEF -SCH-VI STANDARDS Class 'A'
1	Ammonical Nitrogen, mg/l, Max	IS 3025/34:1988,R : 2009, Nessler's	<0.02	0.02-100	0.02	50
2	Arsenic (as As), mg/l, Max	IS-3025,part 37:1988, R-2019/ APHA 2nd Edition AAS-VGA,2023	<0.006	0.006-5	0.006	0.2
3	Free Ammonia, mg/l, Max	IS:3025/34:1988, Nesseler's	<0.01	0.01-10	0.01	5
4	Lead (as Pb), mg/l, *Max*	IS-3025(Part 59):2006, R 2023 AAS-Flame /APHA, 24th Edition, 3111B, AAS-Flame	<0.005	0.2-10	0.005	2
5	Phenolic compounds	APHA, 24th Edition4-Amino Antipyrine,2023	<0.002	0.002-5	0.002	1
6	Selenium, mg/l, Max	IS-3025,part 56:2003, R-2019/ APHA 24th Edition, AAS-VGA,2023	<0.007	0.007-5	0.007	0.05
7	Sulphide (as S^{2-}) mg/l Max.	APHA 24th Edition Methylene Blue Method,2023	0.005	0.005-5	0.005	2
8	Total Kjeldahl Nitrogen, mg/l, Max	IS:3025/34:1988, Nesseler's	<1	1-200	1	100
9	Total Residual Chlorine, mg/l, Max	APHA, 24th Edition, , 4500-Cl B. (Iodometric Method-I),2023	<0.04	0.04-5.00	0.04	1

****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,*

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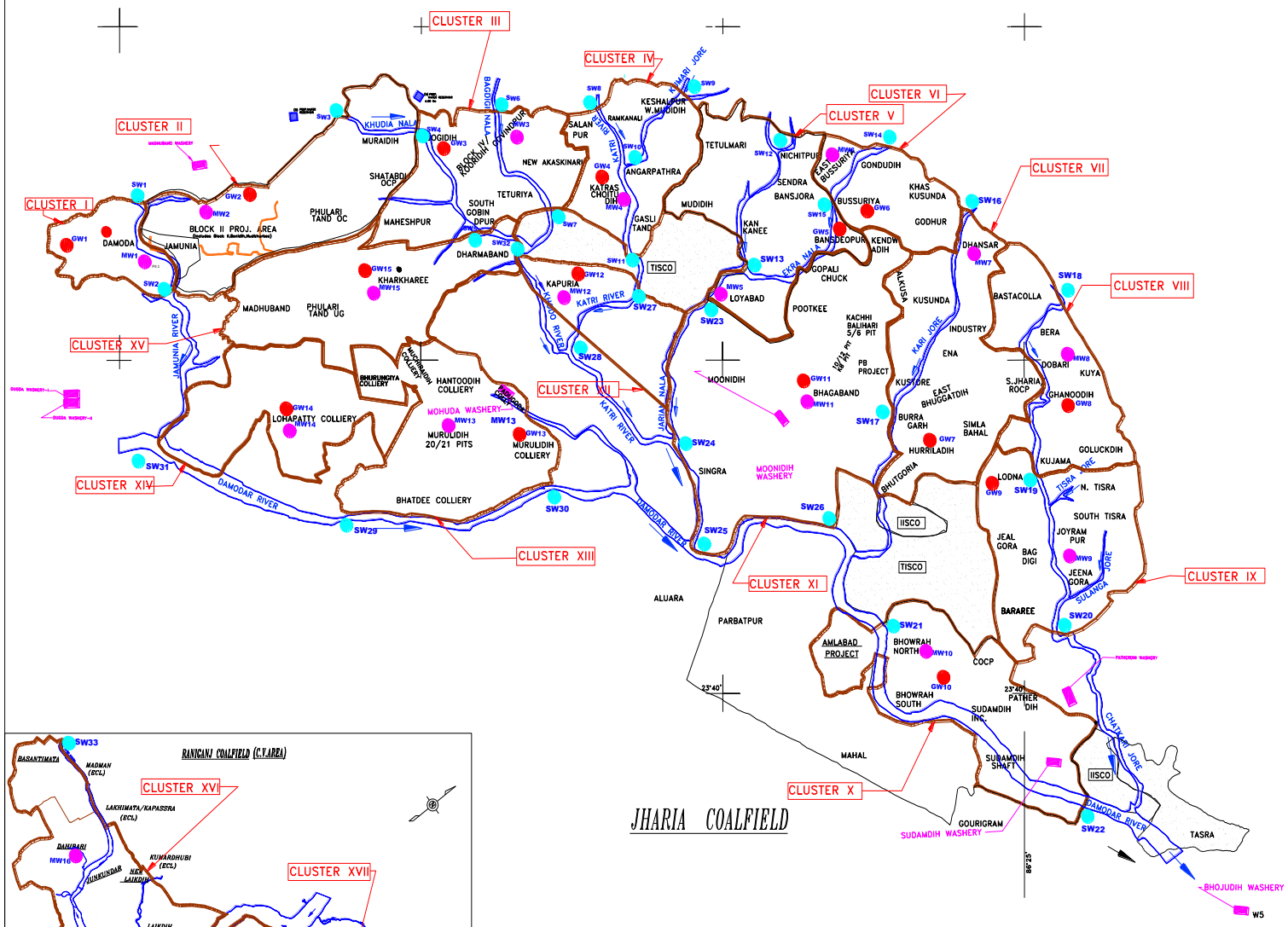
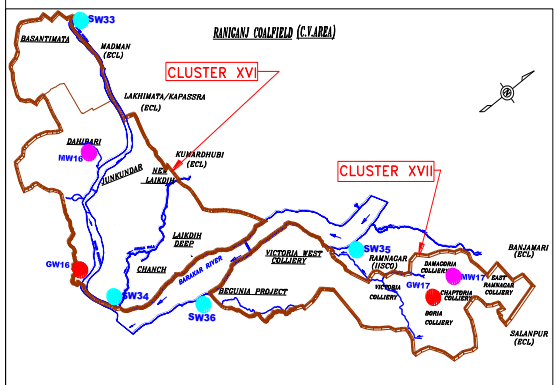
Water Sampling Locations in BCCL





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

HoD (Envt.)
Bharat Coking Coal Limited
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Regional Officer, Dhanbad
Jharkhand State Pollution Control Board
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Legend
- Sampling Locations of Surface Water (Upstream/ Downstream)
- Sampling Locations of Mine Water
- Sampling Locations of Effluent Water

Customer: BHARAT COKING COAL LIMITED
Title: WATER SAMPLING LOCATIONS
Subject: MONITORING STATIONS

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GROUNDWATER LEVEL & QUALITY REPORT

FOR CLUSTERS OF MINES, BCCL

(Assessment year – 2023-24)

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

JHARIA COALFIELD AND RANIGANJ COALFIELD (PART)

For

(BHARAT COKING COAL LIMITED)

(A Subsidiary of Coal India Limited)

KOYLA BHAWAN (DHANBAD)

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MARCH – 2024

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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: 1264.10 mm Rainfall data given in **Annexure-IV**.
5	Geological Formations	Gondwana Formation (Talchir Formation, Barakar Formation, Barren Measure Formation & Raniganj Formation)
6	Aquifer System	Unconfined/Phreatic Aquifer – thickness 25 m (Avg.) Semi-confined to confined Aquifer – thickness from 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 140 nos. of monitoring stations 48 nos located within core mining area and rest comes within Buffers zone. 44 Nos. of Groundwater monitoring well (Dug Wells) network established by CMPDI to record groundwater level data in and around the Core Zone of JCF and 4 Nos. of Groundwater monitoring well (Dug Wells) in RCF (CV Area).
9	Groundwater Levels Below Ground Level (bgl)	JCF area: Pre-monsoon – 1.70 to 11.38 m (Avg. 6.33 m bgl) in '2023-24 Post-monsoon – 0.60 to 8.03 m (Avg. 3.77 m bgl) in '2023-24 RCF area (part): Pre-monsoon – 2.10 to 9.50 m (Avg. 5.22 m bgl) in '2023-24 Post-monsoon – 1.50 to 5.18 m (Avg. 3.06 m bgl) in '2023-24
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 (GWRA-2022)

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 15 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 May including Arsenic and Fluoride.
iii) To evaluate the status of ground water level condition in the area.
iv) To study the ground water flow direction in the mining areas.
v) To study the depth to ground water level condition in the mining areas.
vi) To study the ground water quality data and interpretation in the mining areas.

J. GROUND WATER LEVEL OF CLUSTER-X

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

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

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

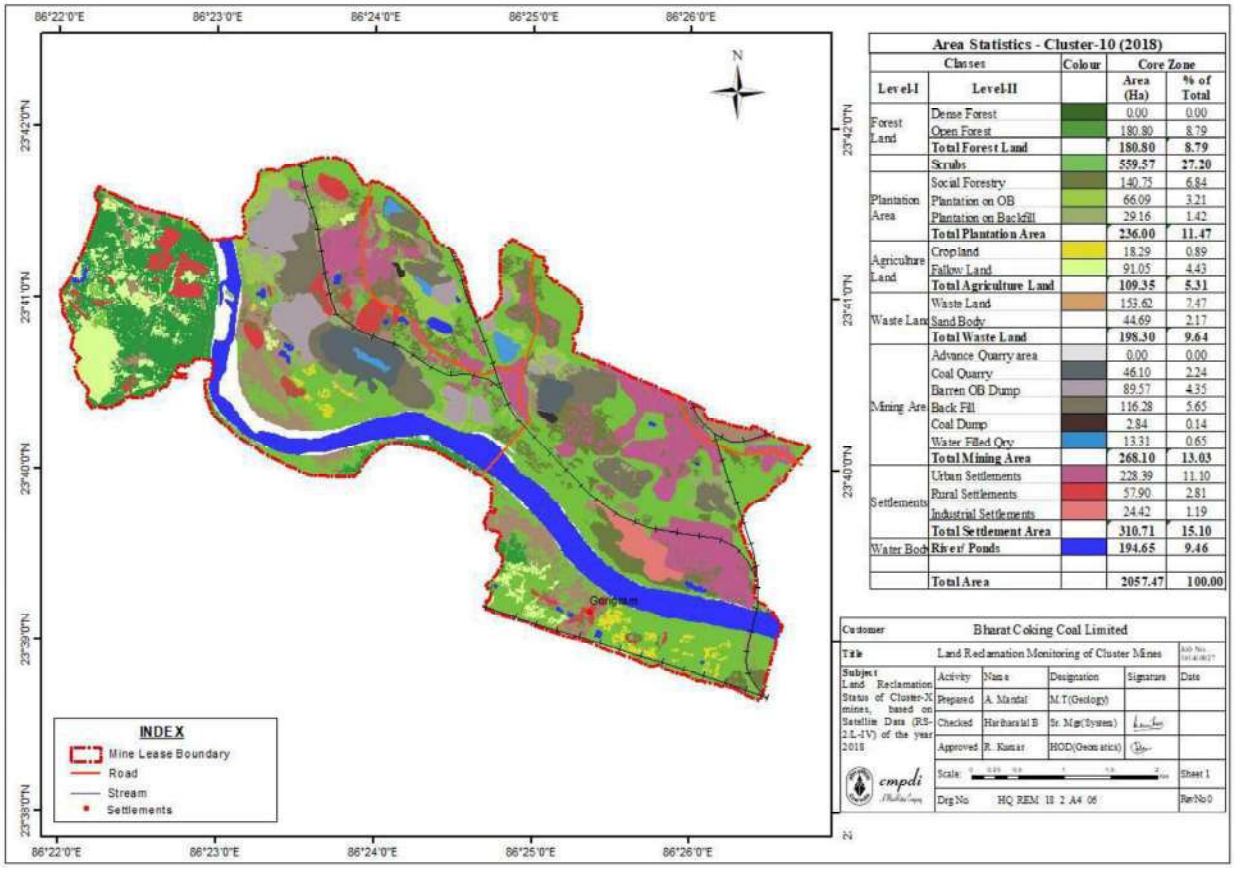
Monitoring stations (**A019, D035, D036 and D077**) are located in the core zone of the mine area. Water level monitoring in these monitoring stations has been done in the months of May'23, August'23, and Nov'23 and January'24, the Ground water level data is presented in the table below:

Sl No.	Well No.	Location	Water level (bgl in meters)											
			2023-24				2022-23				2021-22			
			May	Aug	Nov	Jan	May	Aug	Nov	Jan	May	Aug	Nov	Jan
1	A019	Bhowrah	2.90	2.10	2.60	2.73	4.10	1.82	2.54	1.79	3.30	1.95	1.90	2.20
2	D035	Patherdih	5.23	3.45	3.90	4.10	6.10	3.70	4.68	5.50	6.60	2.70	2.90	4.30
3	D036	Sudamdih	1.85	0.50	0.60	1.00	3.25	0.15	0.60	1.44	2.02	0.45	0.55	0.55
4	D077	Amlabad	5.98	3.90	3.93	5.07	6.50	3.40	4.70	6.00	5.98	2.60	4.69	5.60
Average WL (bgl)			3.99	2.49	2.76	3.23	4.99	2.27	3.13	3.68	4.48	1.93	2.51	3.16

LAST THREE-YEAR ASSESSMENT:

Pre-monsoon GW Level (m): Min – 1.85 m Max – 6.60 m
Post-monsoon GW Level (m): Min – 0.55 m Max – 4.70 m

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



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

4.0 GROUND WATER LEVEL SCENARIO

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

Table –7: Groundwater level data (Cluster-wise)

Sl. No.	Cluster of BCCL	No. of Monitoring Wells	Water level Below ground level (May, Aug, Nov'23 & Jan'24)	Avg. Fluctuation (in meters) during 2023	Geological Formation
1	I	3 nos.	0.80 to 5.20 m	1.48 m	Barakar
2	II	4 nos.	0.50 to 10.73 m	2.16 m	Barakar
3	III	4 nos.	1.09 to 10.73 m	2.06m	Barakar
4	IV	3 nos.	1.95 to 8.45 m	3.59 m	Barakar
5	V	2 nos.	0.55 to 5.55 m	1.07 m	Barakar
6	VI	3 nos.	1.80 to 4.40 m	1.39 m	Barakar
7	VII	4 nos.	1.22 to 4.75 m	1.48 m	Barakar
8	VIII	2 nos.	2.52 to 8.52 m	4.06 m	Barakar
9	IX	4 nos.	1.88 to 9.03 m	3.49 m	Barakar
10	X	4 nos.	0.50 to 5.98 m	1.23 m	Barakar
11	XI	3 nos.	0.95 to 8.02 m	2.09 m	Barakar & Barren Measure
12	XIII	3 nos.	2.98 to 9.00 m	2.30 m	Raniganj
13	XIV	2 nos.	3.13 to 8.05 m	2.06 m	Raniganj
14	XV	3 nos.	2.35 to 5.42 m	1.64 m	Barakar & Barren Measure
15	XVI	4 nos.	2.07 to 8.25 m	2.50 m	Barakar

Depth to water level (in bgl) values describe that water level goes down to maximum 10.73 m during summer season and minimum up to 0.50 m during monsoon season of 2023. Un-confined aquifer is affected around 20 m to 30 m of maximum radius close to active opencast mining areas, showing steep gradient towards mine void. Other than that, there is no mining effect in the water level within JCF area and RCF area (part). Historical water level data and hydrograph of permanent observation stations from CGWB is shown in **Annexure–VI**. Water Table contour map and Depth to water level map both during pre & post-monsoon season is shown in **Plate-IV (A, B) & V (A, B)**.

Monitoring of groundwater (quantity & quality) to assess the present condition and resource has been done regularly in the coalfield area. Well hydrographs (**Annexure–VI**) are prepared and studied to identify long-term trends. Hydrograph trend analysis of CGWB monitoring wells and observation wells reveals

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

5.0 DETAILS OF PIEZOMETERS

A piezometer network is useful for monitoring the impact of mining activity on groundwater regime. Total 23 nos. of Piezometers were constructed during 2022-23 within JCF and RCF to monitor GW level (**Plate-III**). The depth of piezometers varies from 30m to 300m below ground level.

Water level in the piezometers from May23 to Jan24 are furnished below in **Table-8** and the hydrographs (May22 to Jan24) are given in the Annexure VIB.

Table –8: Groundwater level data in Piezometers (Cluster-wise)

PZ ID	Cluster	Lat.	Long.	Depth (m)	May 23	June23	July23	Aug23	Sept 23	Oct 23	Nov 23	Dec 23	Jan24
PZ1A	I	23.7692	86.1754	40	12.26	13.20	8.80	6.75	6.50	7.50	8.65	9.90	11.98
PZ1B	I	23.7692	86.1753	115	30.20	29.10	24.04	19.00	19.90	21.90	24.05	26.90	30.40
PZ2A	II	23.7672	86.1890	87	30.90	31.60	22.50	17.50	16.50	18.90	22.50	25.50	28.33
PZ2B	II	23.7908	86.2470	77	8.02	7.30	5.10	3.50	3.90	4.30	4.50	4.40	4.6
PZ3A	III	23.8015	86.2824	172	89.5	89.1	83.73	76.50	78.85	81.00	82.64	84.00	86.42
PZ3B	III	23.7798	86.2418	30	24.72	23.72	18.0	14.1	13.2	15.12	18.3	20.4	23.23
PZ3C	III	23.8016	86.2824	124	-	-	-	-	-	-	-	-	-
PZ4A	IV	23.7764	86.3123	70	38.1	37.5	32.2	26.5	27.39	29.5	31.3	33.5	34.9
PZ4B	IV	23.7765	86.3125	240	100.9	98.2	94.6	89.9	90.8	91.3	91.6	92.1	92.7
PZ5A	V	23.7817	86.3569	35	8.5	7.8	5.8	2.5	3.5	4.4	4.8	5	5.31
PZ5B	V	23.7999	86.3619	94	90.94	85.5	80.1	75.08	73.2	78.04	82.0	86.1	90.32
PZ7A	VII	23.7701	86.4110	159	109.9	110.1	105.02	98.5	92.9	96.8	98.1	101.8	104.86
PZ7B	VII	23.7400	86.3997	35	29.36	30.02	21.38	16.63	15.68	17.96	21.38	24.23	26.18
PZ7C	VII	23.7342	86.4433	105	92.27	90.88	85.40	78.03	80.43	82.62	84.29	85.68	85.2

PZ8A	VIII	23.7556	86.4271	140	49.23	49.01	46.05	40.08	38.37	42.55	43.45	44.20	46
PZ9A	IX	23.7305	86.4464	84	43.85	44.55	41.87	38.25	39.43	40.50	41.32	42.00	40.32
PZ9B	IX	23.6962	86.4159	100	72.6	71.05	67.5	57.2	58.9	59.8	61.3	63.35	63.7
PZ10A	X	23.6880	86.4051	134	6.9	6.2	4.01	3.1	3.6	4.05	4.6	5.1	6.35
PZ11A	XI	23.7264	86.3419	300	52.7	47.5	37.2	28.09	34.6	37.1	39.05	40.9	53.15
PZ13A	XII	23.7138	86.2516	80	39.9	36.3	32.1	23.6	25.8	26.5	28.1	30.1	31.81
PZ14A	XIV	23.7415	86.2139	30	12.8	10.1	7.9	4.6	5.5	6.1	7.3	7.9	8.39
PZ14B	XIV	23.7415	86.2139	162	14.6	13.5	9.8	5.05	6.3	7.5	9.1	10.5	12.56
PZ16A	XVI	23.7308	86.7605	90	35.58	35.64	32.49	29.60	28.54	30.40	31.06	32.0	32.24

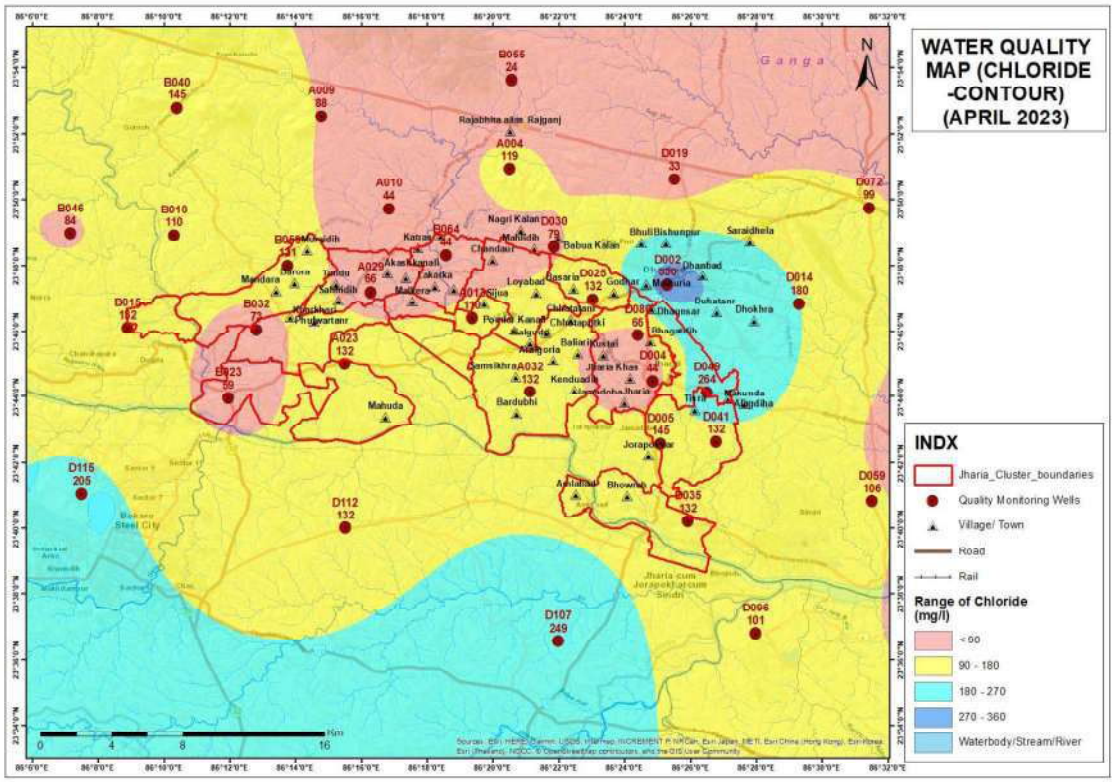
6.0 GROUND WATER QUALITY

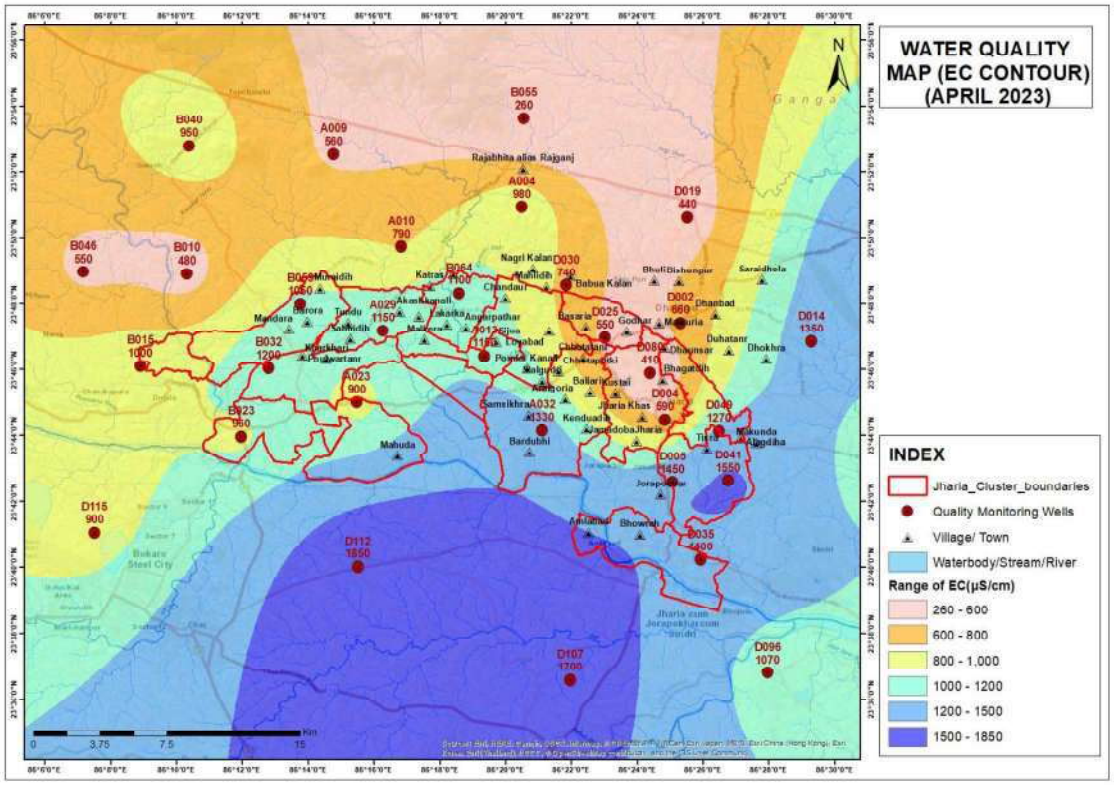
The ground water samples of the study area (15 nos. of Cluster of mines, BCCL) were collected from dug wells and analyzed. Thirty-five ground water samples were analyzed during the month of April and May'2023 at CMPDI, RI-II, Dhanbad. The water sampling details is given in **Annexure–V** and Water sample locations are shown in **Plate-II**. The water quality data is presented in **Annexure–VII.**

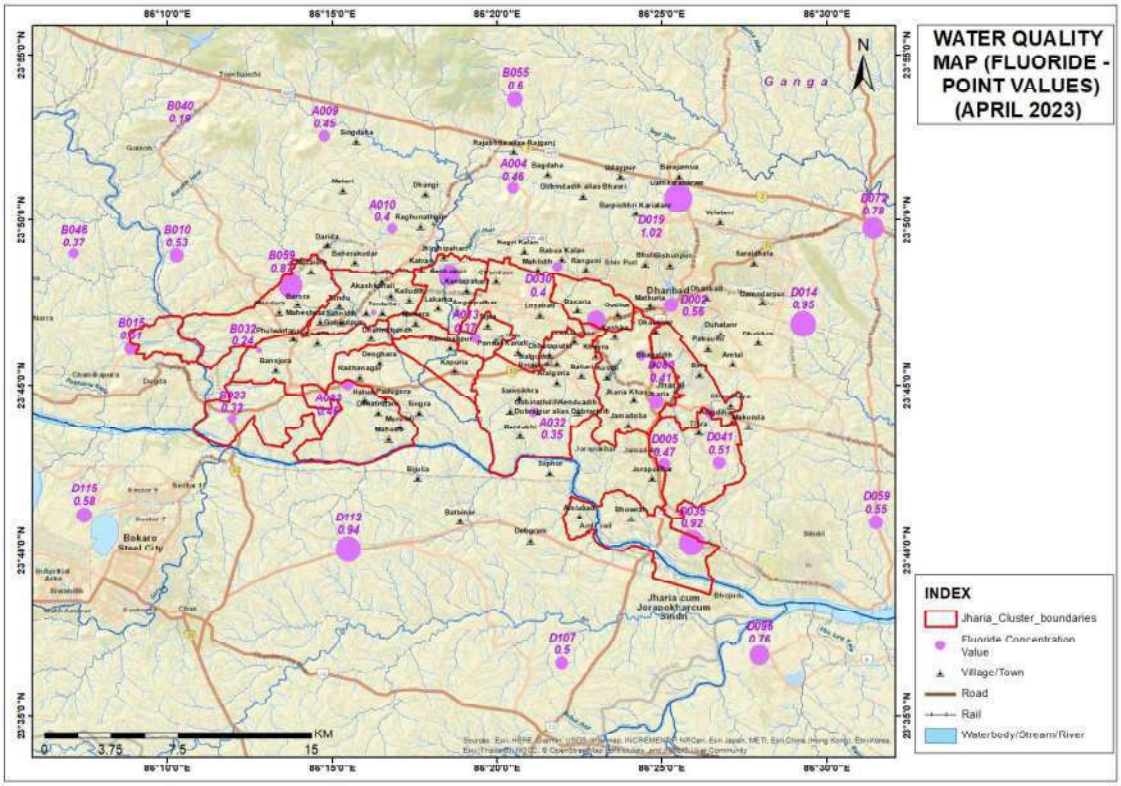
The study of the variations in water quality parameters is described below:

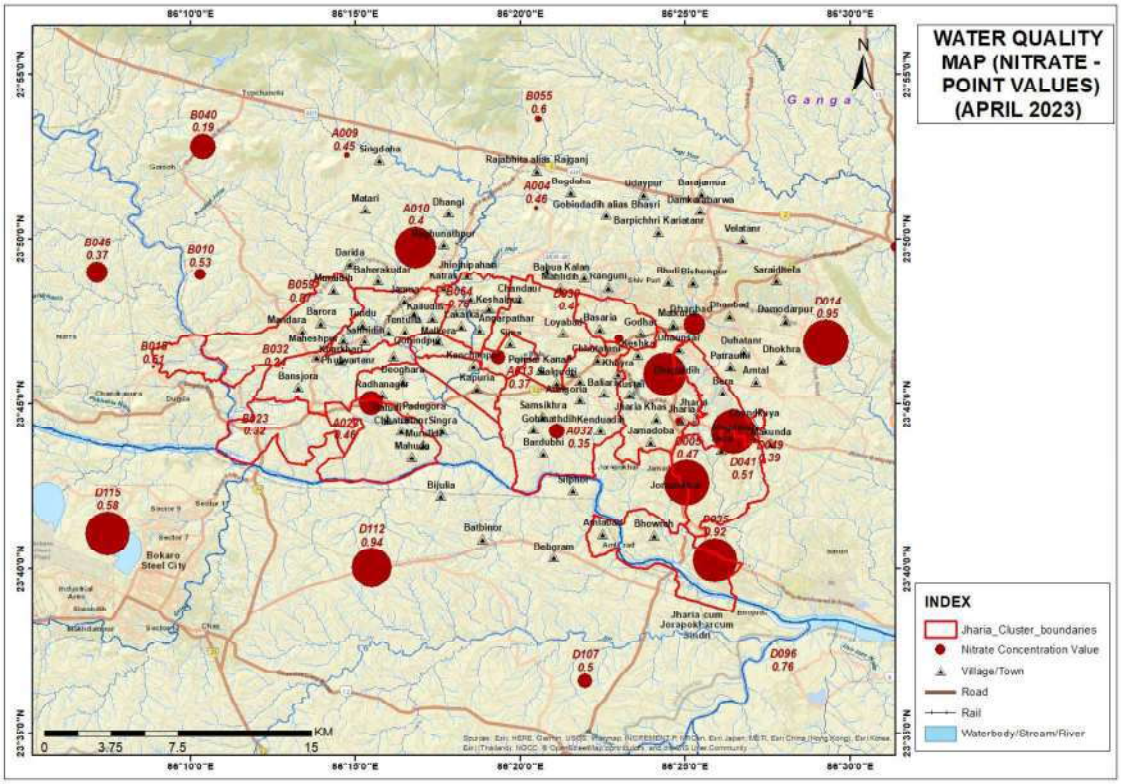
The pH of the groundwater samples varies between 7.63 (D-112) to 8.62 (B-64), the pH is within the IS 10500:2012 limit of drinking water standard.

The concentration of calcium in the water samples varies 21 (B-55) to 190 mg/l (D-107) and is above the permissible limit (75 mg/l) of drinking water standards. The sulphate ranges between 40 (B-55) to 659 mg/l (D-35) and the value of sulphate in water sample are above the permissible limit (200 mg/l). The Iron, Manganese, Zinc and Chromium concentration in the water samples found to be below the upper IS 10500:2012 limits for drinking water.


WATER QUALITY MAP (CHLORIDE -CONTOUR) (APRIL 2023)
INDX
Jharia_Cluster_boundaries
Quality Monitoring Wells
Village/ Town
Road
Rail
Range of Chloride (mg/l)
< 90
90 - 180
180 - 270
270 - 360
Waterbody/Stream/River
N
Ganga
Rajabhita alias Rajganj
Nagri Kalan
Bhuli
Bishunpur
Saraidhela
Dhanbad
Dhaunsar
Dhokhra
Duhatanr
Mahuda
Bardubhi
Jharia Khas
Kenduadih
Bhowrah
Steel City
Km
0
4
8
16


WATER QUALITY MAP (EC CONTOUR) (APRIL 2023)
INDEX
Jharia_Cluster_boundaries
Quality Monitoring Wells
Village/ Town
Waterbody/Stream/River
Range of EC(µS/cm)
260 - 600
600 - 800
800 - 1,000
1000 - 1200
1200 - 1500
1500 - 1850
N
Ganga
Rajabhita alias Rajganj
Nagri Kalan
Bhuli
Bishunpur
Saraidhela
Dhanbad
Dhaunsar
Dhokhra
Duhatanr
Mahuda
Bardubhi
Jharia Khas
Kenduadih
Bhowrah
Steel City
Km
0
3.75
7.5
15


WATER QUALITY MAP (FLUORIDE - POINT VALUES) (APRIL 2023)
INDEX
Jharia_Cluster_boundaries
Fluoride Concentration Value
Village/Town
Road
Rail
Waterbody/Stream/River
Ganga
Bokaro Steel City
Jharia cum Jorapokhar cum Sindri
KM
0 3.75 7.5 15


WATER QUALITY MAP (NITRATE - POINT VALUES) (APRIL 2023)
INDEX
Jharia_Cluster_boundaries
Nitrate Concentration Value
Village/Town
Road
Rail
Waterbody/Stream/River
Ganga
Bokaro Steel City
Jharia cum Jorapokhar cum Sindri
KM
0 3.75 7.5 15

7.0 STAGE OF GROUNDWATER EXTRACTION

The groundwater is mainly utilized for domestic needs and irrigation purposes. The groundwater abstraction is mainly through dug wells and bore wells. The stage of groundwater development in Dhanbad District is 76.30% (as per 2017 GWRA). The highest stage of development is in Jharia Block (127.0%) & Dhanbad Block (107.50%) and lowest stage of development is in Chirkunda Block (35.5%) as per GWRA-2013. The Gondwana sandstones in general, known to constitute good aquifers at many places. However, the yield potential of the area adjoining to active mines in the coal belt is poor. The active mines often act as groundwater "sinks". In contrast, the water-logged abandoned mines and pits act as potential sources of groundwater. As per the assessment by Central Ground Water Board (CGWB), Patna in 2022, Block wise data of Dhanbad District given below:

Table–9A: Block wise Stage of Groundwater development

Sl No.	Administrative Unit		Category (GWRA-2013)	Category (GWRA-2017)	Category (GWRA-2022)
	District	**Block**			
1	Bokaro	Bermo	**Over- exploited**	**Over- exploited**	**Over- exploited**
2	Dhanbad	Baghmara	Critical	Critical	Safe
3	Dhanbad	Baliapur	Semi- Critical	Semi- Critical	**Over- exploited**
4	Dhanbad	Dhanbad	**Over- exploited**	**Over- exploited**	Semi-critical
5	Dhanbad	Jharia / Dhanbad Urban	**Over- exploited**	**Over- exploited**	Critical
6	Dhanbad	Topchachi	Critical	Critical	Critical
7	Dhanbad	Chirkunda	Safe	Safe	Safe

- **Dynamic Groundwater Resource Assessment, CGWB as per 2013, 2017 and 2022.**

8.0 IMPACT OF MINING ON GROUND WATER REGIME

8.1 GENERAL CONSEQUENCES OF COAL MINES ON AMBIENT HYDROGEOLOGICAL REGIME

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

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

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

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

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

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

During mining, the hydraulic gradients generally steep down near mine i.e. within the mine influence area. In the up-dip region, only un-confined aquifer is punctured through the mining process and thus only unconfined aquifer is affected whereas in the down-dip region both un-confined and semi-confined aquifers may be affected. The confined aquifers of lower Barakar Formation in the mining area are not punctured as it lies below the working coal seams and hence normally there is no noticeable effect in the aquifer related to this formation.

8.3 ESTIMATION OF RADIUS OF MINE INFLUENCE ZONE

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

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

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

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

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

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

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

9.0 CONSERVATION MEASURES & FUTURE STRATEGY

- BCCL has installed 25 Pressure Filter Plant of total capacity of 4.16 MGD to meet drinking water requirement in nearby area. At present 63 Water Treatment Plants are operational having

capacity of 16.16 MGD within Jharia Coalfield area. Further, installation of 28 more Pressure Filter Plants having capacity of 5.84 MGD are in progress.

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

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

10.0 EXISTING/PROPOSED RAINWATER HARVESTING STRUCTURES IN BCCL COAL MINES

Fig-3 to 4.

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

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

Fig-5 to 6.

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

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

Fig-7 to 8.

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

RECHARGE POND / ABANDONDED IN THE JCF MINE AREA

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SAMPLES

(Wherever not specified, characteristics are expressed in mg/l, maximum)

Ground Water Sampling at Monitoring Station Code : - D35 , PATHERDIH RAILWAY COLONY

1.

Date of Sampling at Station: 05.04.2023

Sl. No.	Parameter	Method of Analysis	Observed Values	LDL	IS 10500: 2012	
					Acceptable Limit (Max)*	Permissible Limit in the Absence of Alternate Source (Max)
1	pH value	IS 3025, Part 11 : 1983 R 2017 Electrometric(pH Meter) Method	7.86	0.1	6.5-8.5	No relaxation
2	Electric Conductivity	IS 3025 (Part 14) -1984 R 2002	1.4	-	-	-
3	Sodium as Na	IS : 3025, Part 45: 1993 R: 2003 Flame Photometer	47.9	0.5	-	-
4	Potassium as K	IS : 3025, Part 45: 1993 R: 2003 Flame Photometer	0.8	0.5	-	
5	Magnesium	APHA 24th Edition , 3500-Mg B: Calculation Method	46	6	30	100
6	Calcium, mg/l	IS 3025, (Part 40): 1991 R:2019,AAS-Flame Method & EDTA Method	147	2	75	200
7	Carbonate Alkalinity (c_aco_3), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	0	0	-	-
8	Bicarbonate Alkalinity (c_aco_3), mg/l, Max	IS 3025, Part 23: 1986 R 2019 Titration Method	360	0	-	-
9	Sulphate, mg/l	APHA –23rd Edition, 4500-S 2-E. , Turbidimetric Method	659	10	200	400
10	Chlorides, mg/l	IS-3025(Part 32):1988, R-2019 , Argentometric Method	132	5	250	1000
11	Nitrate , mg/l	APHA 24th Edition , UV-Spectrophotometric Method	41.8	0.5	45	No relaxation
12	Fluoride, mg/l	APHA, 23rd Edition, SPADNS Method	0.92	0.2	1	1.5
13	Iron, mg/l	IS 3025 (Part 53) : 2003, R : 2019 , AAS-Flame Method	<0.2	0.2	1	No relaxation
14	Manganese as Mn, mg/l, Max	IS 3025(Part 59) : 2006,R:2019, AAS-Flame Method	0.03	0.02	0.1	0.3
15	Total Arsenic (as As), mg/l, Max	IS-3025,part 37:1988, R-2019/ APHA 24th Edition AAS-VGA	<0.006	0.006	0.01	0.05
16	Total Chromium (as Cr), mg/l, Max	IS-3025 Part 52:2003, R:2019,AAS-Flame APHA 24th Edition , AAS-GTA	<0.1	0.01	0.05	No relaxation
17	Zinc, mg/l	IS 3025(Part 49) : 1994,R:2019, AAS-Flame Method	<0.1	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,*

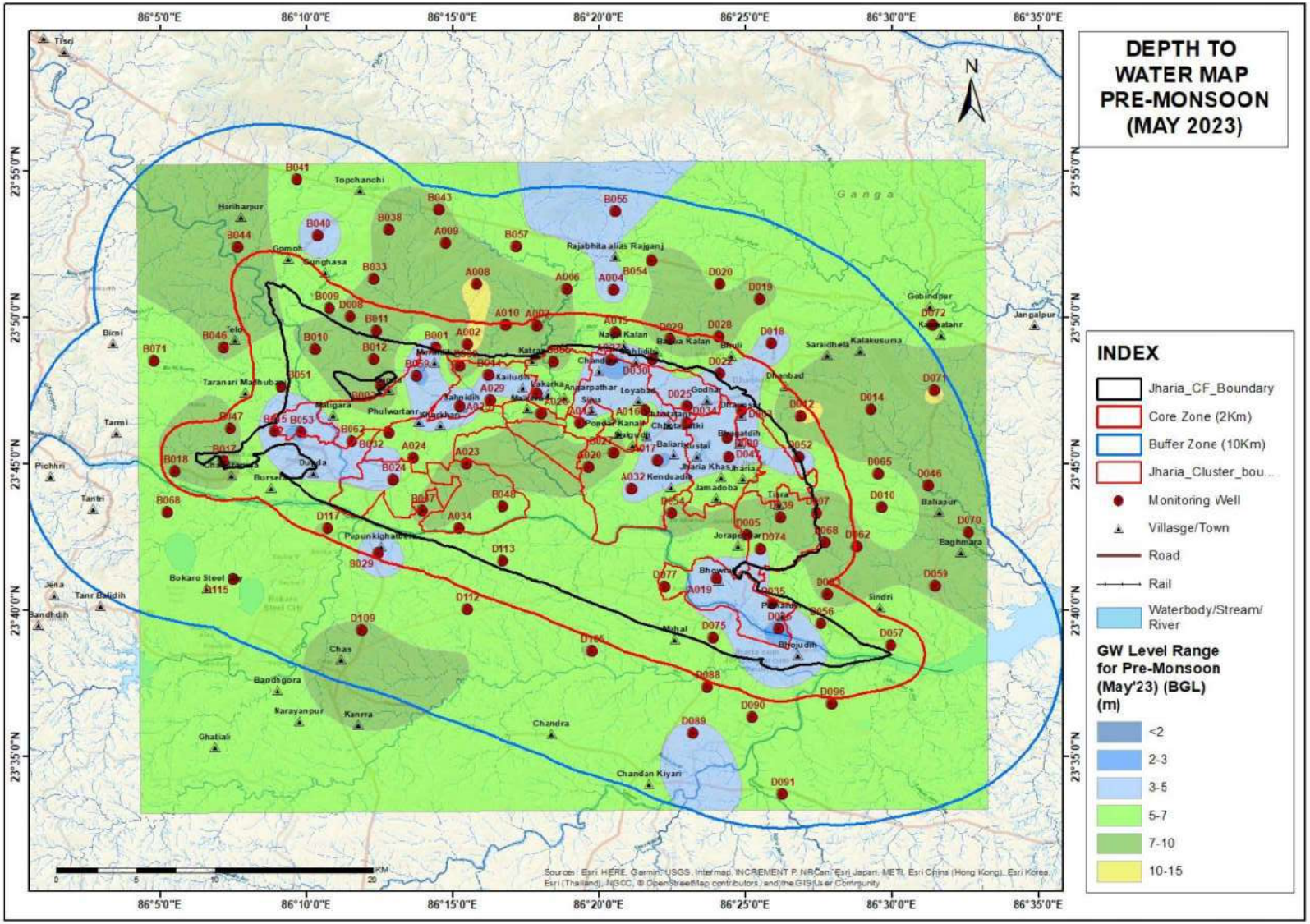


Plate- VA: Depth to Groundwater Level map of JCF, Pre Monsoon (May'23)

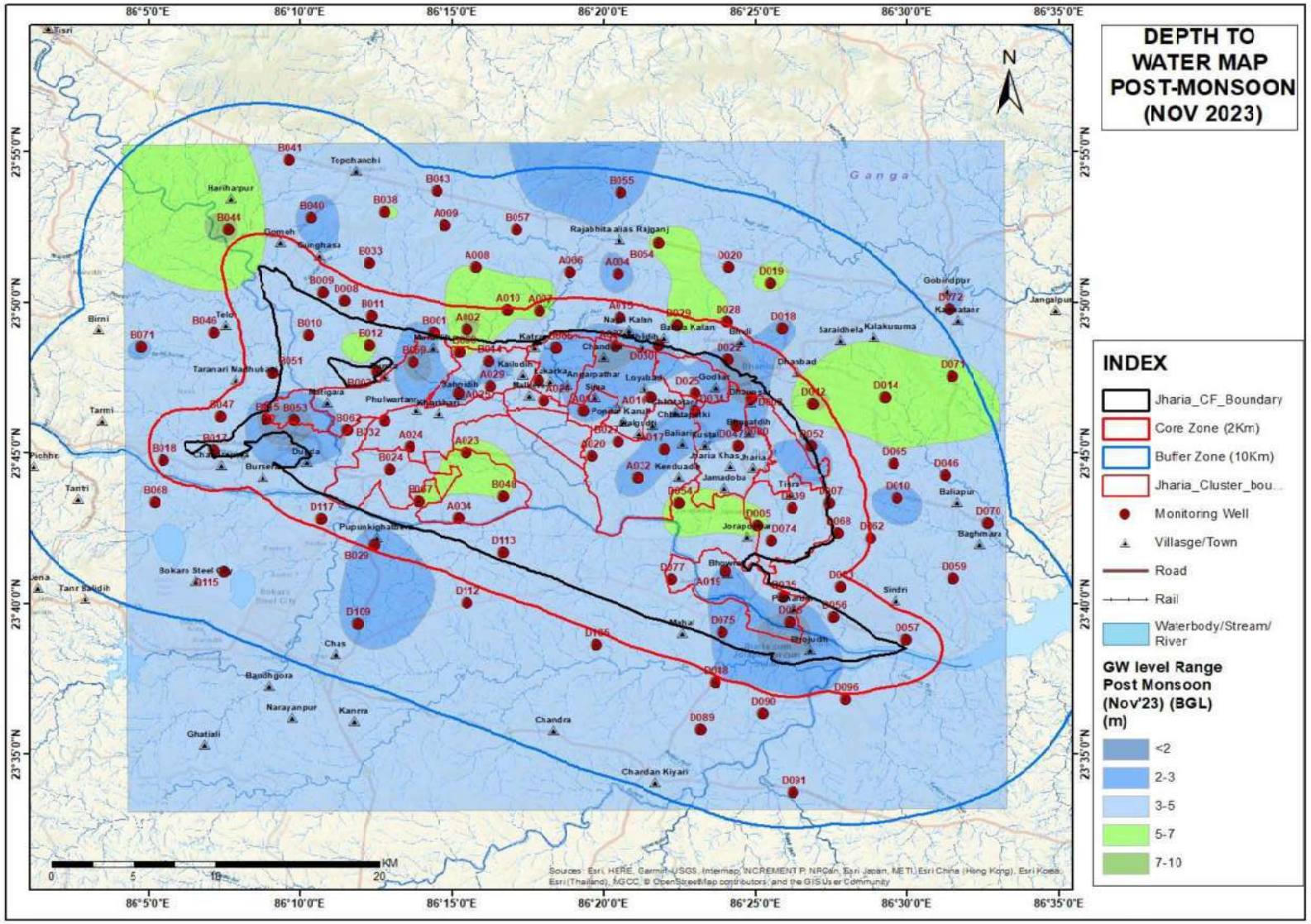


Plate- VB: Depth to Groundwater Level map of JCF, Post Monsoon (Nov'23)

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BHARAT COKING COAL LIMITED

DRAFT

MINING PLAN AND MINE CLOSURE PLAN

FOR

BHOWRAH SOUTH COLLIERY

(UPTO {-} 115m RL HORIZON)

(EASTERN JHARIA AREA)

NOVEMBER – 2018

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

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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. Details can be worked in closure plans envisaged to be prepared.

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.

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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;

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IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN BHOWRAH SOUTH COLLIERY

(LIFE OF THE MINE: 43 YEARS)

S.N	Activity	Time Frame	YEAR					
			Operational Phase			Post Closure Phase		
			1st - 10th	11th - 20th	21th - 43th	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						
	*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						

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S.N	Activity	Time Frame	YEAR					
			Operational Phase			Post Closure Phase		
			1st - 10th	11th - 20th	21th - 43th	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 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.

NOTE: The progressive mine closure will be done as per the provisions made out in the Mining Plan and as per the situation/requirement that may arise in course of execution of the Mining Plan

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BHARAT COKING COAL LIMITED

MASTER PLAN
FOR
DEALING WITH FIRE, SUBSIDENCE AND REHABILITATION IN THE LEASEHOLD OF BCCL

UPDATED
MARCH' 2008.

CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD
REGIONAL INSTITUTE – 2
DHANBAD

I) As the manpower in BCCL is continuously reducing due to super -annuation, only 25000 BCCL houses shall be constructed against 42650 houses as proposed in the Master Plan. Therefore fund for construction of only 25000 houses shall be considered in the Master Plan.

II) The cost estimate of the fire projects should be reduced to the extent possible. Whenever fire is handled by direct removal of coal and OB, the cost shall be set off considering that 50% of coal will be available for selling.

III) A sample survey should be carried out for private (Pucca & Kutcha) for ascertaining suitable fund provision as compensation in the Master Plan.

IV) For the purpose of income generation scheme, it has been decided that head of every displaced house shall be paid wage of 250 days in a year for two years as per minimum wage rate of respective state Govts.

The Master plan, July'2006 has been prepared considering the above decision and was submitted to State Govt. of Jharkhand for their acceptance vide letter no.GM (ENV)/F-rhab/2007/138 dated 6.3.2007. Jharkhand state Govt. has not given acceptance as yet.

Cost up-dation of the Master Plan July'o6 has been done up to Feb'08 considering the increase in WPI and Civil Cost Index.. Increase in WPI was about 7% and Civil cost index was 14.28%

5.O SCOPE OF WORK OF MASTER PLAN '2008

Master Plan now covers only following two aspects:

i) **Dealing with fire**, which includes identification of fire areas, selection of technologies to deal with the fires, prioritization for implementation and assessment of tentative fund requirement.

ii) **Rehabilitation & Resettlement** of the affected people from the areas affected by fire & subsidence including identification of affected sites, identification of resettlement sites and assessment of tentative fund requirement.

Note: "BCCL vide letter no GM(Env)/F- /06 dated 22nd April, 2006 suggested that diversion of railway lines and NH 32 road passing through coal bearing areas of JCF should also be included in the Master Plan'2006.

Diversion of rails and roads passing over the coal bearing areas are affected by fire and subsidence at many places and may further be affected. As the diversion will affect the operation of other coal producing companies like TISCO & SAIL, other industries operating in the coalfield and State Govt. as well as Railway, a joint decision is to be taken involving all the above stakeholders.

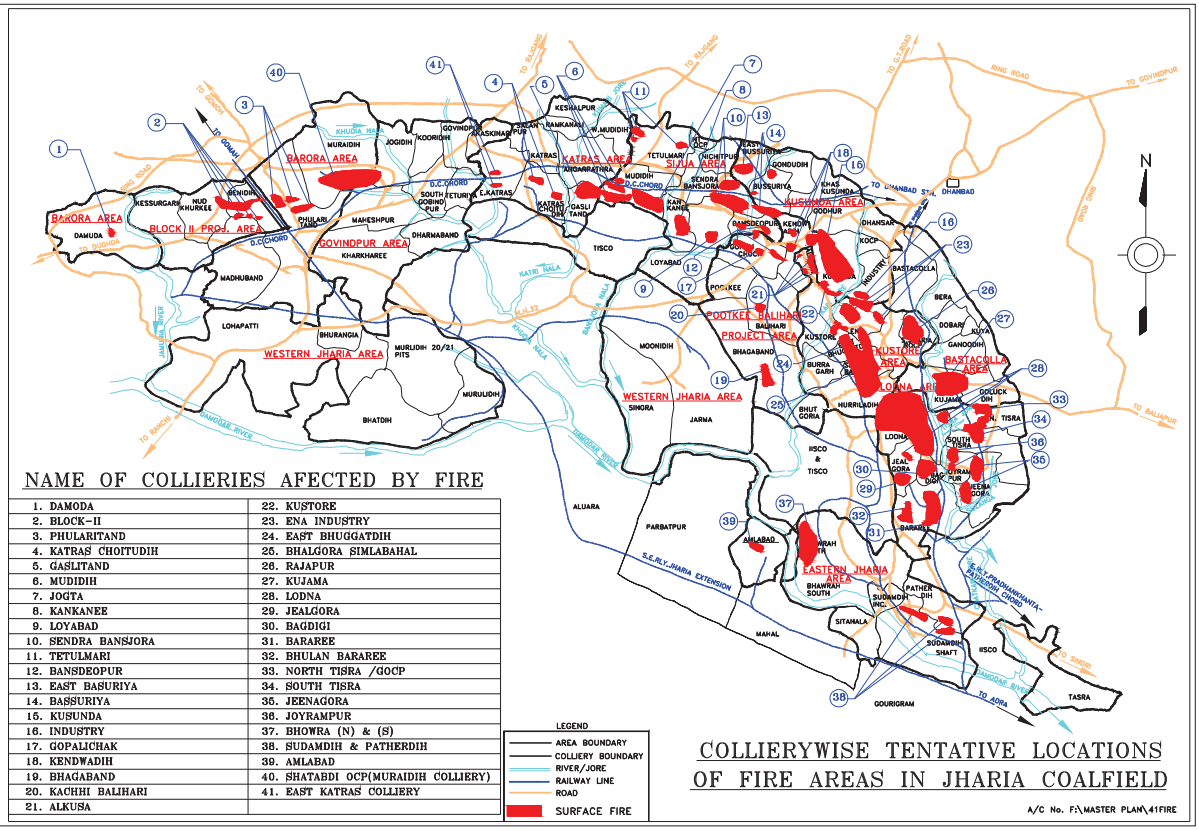
Moreover, the diversion of rail and road requires survey of the alternative routes, detail layout planning by expert agencies like RITES and likely to take about two years time.

Therefore, in this Master Plan, a lump sum provision of Rs.20 Crs has been kept for survey and planning only as an advance action. The detail proposal for diversion may be taken up as a separate Master Plan in future. "

As per the recommendation of the committee constituted by DGMS, all the sites proposed for stabilization in the Master Plan '99, have now been considered for rehabilitation. The time frame for implementation of Revised Master Plan has been considered as 10 years proposed to be implemented in two Phases (Phase – I & II each of 5 years duration), excluding 2 years of pre-implementation period.

Implementation of the Fire control measures and rehabilitation of BCCL houses from the endangered area will be the responsibility of BCCL, where as rehabilitation of Non-BCCL houses/structures from the endangered areas will be the responsibility of State Govt. of Jharkhand and West Bengal. Land acquisition for BCCL employees shall be done in association with State Govt. of Jharkhand.

Rehabilitation sites will be located on non-coal bearing area along the fringe / periphery of Jharia coalfield. The sites will have the basic infrastructural facilities like Water & Electricity, School, Banks, Hospitals, Market Complex, Play Ground, and Community Center etc.



NAME OF COLLIERIES AFECTED BY FIRE

1. DAMODA	22. KUSTORE
2. BLOCK-II	23. ENA INDUSTRY
3. PHULARITAND	24. EAST BHUGGATDIH
4. KATRAS CHOITUDIH	25. BHALGORA SIMLABAHAL
5. GASLITAND	26. RAJAPUR
6. MUDIDIH	27. KUJAMA
7. JOGTA	28. LODNA
8. KANKANEE	29. JEALGORA
9. LOYABAD	30. BAGDIGI
10. SENDRA BANSJORA	31. BARAREE
11. TETULMARI	32. BHULAN BARAREE
12. BANSDEOPUR	33. NORTH TISRA /GOCP
13. EAST BASURIYA	34. SOUTH TISRA
14. BASSURIYA	35. JEENAGORA
15. KUSUNDA	36. JOYRAMPUR
16. INDUSTRY	37. BHOWRA (N) & (S)
17. GOPALICHAK	38. SUDAMDIH & PATHERDIH
18. KENDWADIH	39. AMLABAD
19. BHAGABAND	40. SHATABDI OCP(MURAIDIH COLLIERY)
20. KACHHI BALIHARI	41. EAST KATRAS COLLIERY
21. ALKUSA	

COLLIERYWISE TENTATIVE LOCATIONS OF FIRE AREAS IN JHARIA COALFIELD

A/C No. F:\MASTER PLAN\41FIRE

TABLE -1

LIST OF FIRES IN THE LEASEHOLD OF BCCL

Sl. No.	Name of the fire	Fire Status
1	Ganeshpur X, XI , XII & XIII seam fire	Active
2	Burwabera X seam fire	Active
3	Phularitand X, XI, XII seam fire	Active
4	Angarpathra XII, XI, X, IX Spl. seam fire	Extinguished
5	Gaslitand XVT, XVB seam fire	Active
6	Jogta XV, XIV, XIII, XII, XI seam fire	Active
7	Kankanee XIII & XIV seam fire	Active
8	Ekra XI & XII seam fire	Active
9	Ekra XIII & XIV seam fire	Active
10	Loyabad XV, XIV, XIII seam fire	Active
11	Bassuriya XIV, XIII & XII, XI and X seam fire	Active
12	Sendra Bansjora XIV, XIII, XII, XI seam fire	Active
13	Bansdeopur XIV, XII seam fire	Active
14	Gopalichak XVI, XV, XIV, XIII, XII,XI seam fire	Active
15	Industry XII, XI seam fire	Active
16	Kusunda XII, XI seam fire	Active
17	Alkusa XII, XIV seam fire	Active
18	Kustore XIV, XIII, XII, XI seam fire	Active
19	Ena XII, XI seam fire	Active
20	Pure jharia X seam fire	Active
21	K.P. Dobari X, V/VI/VII/VIII/VIIA seam fire	Active
22	Rajapur X seam fire	Active
23	Kujama XII, XI seam fire	Active
24	Kujama IX, X seam fire	Active
25	Bhalgora XIV seam fire	Dormant
26	Bhalgora XV seam fire	Dormant
27	East Bhuggatdih XV, XIV seam fire	Active
28	Ena XIV seam fire	Active
29	Ena XV seam fire	Active
30	Simlabahal XIV seam fire	Dormant
31	N.S. Lodna XIII, XIIIA, XIV seam fire	Active
32	Bagdigi XIV, XIA, XV seam fire	Active
33	Baniahar XV, XIVA, XIV seam fire	Active
34	Bhaga XV seam fire	Active
35	South Tisra VII, VIII, IX, X seam fire	Active
36	Bhowra XIII, XIV seam fire	Active
37	Bararee XV, XIVA, XIV seam fire	Active
38	Bhulan Bararee XIII, XIV seam fire	Active
39	Bhulan Bararee XVI, XV seam fire	Active
40	Sudamdih IX to XIV seam fire	Active
41	Patherdih IX to XIII seam fire	Active

Sl. No.	Name of the fire	Fire Status
42	Bhowra IX , X seam fire	Active
43	Block –II XII, XI/XII, X Spl. seam fire	Active
44	Katras-Choitudih XIII seam fire	Active
45	Katras-Choitudih XIV, XV seam fire	Active
46	Tetulmari IV seam fire	Active
47	Tetulmari VI/VII seam fire	Active
48	Kendwadih XIII seam fire	Dormant
49	Kendwadih XIV, XIII seam fire	Dormant
50	Pootkee XV seam fire	Extinguished
51	East Bassuriya V/VI seam fire	Active
52	East Bassuriya VIII seam fire	Active
53	Kessurgarh V, VI, VII seam fire	Extinguished
54	Bhagaband XVI seam fire	Dormant
55	Amlabad XIV seam fire	Dormant
56	Sudamdih XV seam fire	Extinguished
57	Moonidih XVIIT seam fire	Extinguished
58	Damoda V, VI, VII seam fire	Dormant
59	Mudidih fire	Dormant
60	Jogidih X seam fire	Extinguished
61	Kooridih X seam fire	Extinguished
62	Nudkhurkee X seam fire	Extinguished
63	West Mudidih IX/X seam fire	Extinguished
64	East Katras XIV seam fire	Extinguished
65	North Tisra VII, VIII, IX seam fire	Active
66	North Tisra X seam fire	Active
67	Jeenagora IX, X, XI seam fire	Active
68	Jeenagora IX, X, XI,XII seam fire	Active
69	Joyrampur XI, XII, XIII seam fire	Active
70	Jealgora XV, XIV, XIIIB, XIIIA seam fire	Dormant
71	Bassuriya IX,I X Spl. seam	Active
72	Industry X seam	Active
73	Kachhi Balihari XV seam	Dormant
74	Kendwadih XI, XII seam	Active
75	Shatabdi V/VI/VII seam	Active
76	Sendra Bansjora X seam	Active
77	East Katras XI,XIII & XIV seam fire	Active

7.0 MASTER PLAN FOR REHABILITATION OF INHABITATED FIRE & SUBSIDENCE PRONE AREAS.

7.1 Introduction:

In the updated Master Plan of April'04, altogether 532 sites (271 in full & 261 in part) were considered for rehabilitation as the houses over these sites were declared unstable & uncontrollable (UU) as ground movement can not be controlled by stowing. Total no. of houses proposed to be evacuated from 532 sites were 65300 which includes

BCCL houses	:	36208
Non-BCCL : Private houses	:	15571
Non- BCCL : Un-authorised houses (Encroacher)	:	12719
Others : (Religious places, schools, Hospitals, Post offices, Police stations etc).	:	802

Apart from these 532 sites, 121 sites were considered unstable but controllable (UC) i.e where ground movement could be controlled by stowing.

In accordance with the directive of Supreme court of India, on 3rd May, 2005, Director General of Mines Safety (DGMS) constituted a Committee to go through the Action Plan and subsequent affidavit/ATR filed by UOI and to verify the same in connection with PIL case filed by Sri Haradhan Roy, Ex MP.

The Committee concluded that as there are no scientific methods available to check long term stability, it might not be possible to certify that the areas thus stabilized. The present stabilization work may restrict the effect of subsidence and allow some time. The final and permanent solution is evacuation of the affected area and rehabilitation.

In view of the above, 121 sites which were proposed for stabilization have now been considered for rehabilitation.

7.2 Total no. of houses in the endangered areas

Over the period of time from original Master Plan of March'1999 to date, 24 Nos. of sites have been demolished and shifted to other places by BCCL management. These sites have been deleted from this Master Plan.

Where fire dealing has been proposed by excavation method some stable parts are necessarily to be evacuated for digging out the fire. Such stable parts have now been

10 The community facilities like primary schools, community centre, small dispensary and shopping centre will also be included in the town planning. These common facilities will be constructed as per the plan under the proposed compensation package. However, the running cost of all the facilities, i.e. water supply, power supply, schools, dispensary etc. shall not be the part of compensation package and will have to be looked after by the Panchayat and other bodies of the State Government.

11 Common structures such as religious places etc. shall be built at resettlement site on mutual agreement basis from Rehabilitation fund of Master Plan.

12 The proposed location of resettlement site is guided by the following considerations:-

a) Preferably the proposed resettlement site should be either land owned by BCCL or vested to the state Government.

b) In case such land are not available, then the required land may be purchased from private owner by State Govt.

13. No employment shall be offered for any rehabilitation under the Master Plan

7.4.2 BCCL Houses:

BCCL houses from the endangered areas are proposed to be rehabilitated in four Satellite Township in non-coal bearing areas along the periphery of JCF. The houses over endangered houses will be rehabilitated with equivalent type of house in satellite township in triple storied building having all basic infrastructural facilities. As soon as an employee residing in the identified endangered area retires, the house shall be demolished.

It is proposed that Rehabilitation/resettlement work of BCCL houses shall be the responsibility of BCCL whereas the same for Non BCCL houses including encroachers shall be the responsibility of concerned state Govt. However acquisition of land for rehabilitation of BCCL employees shall be done in association with State Govts of Jharkhand/West Bengal.

7.5 Amenities & Infrastructures:

The resettlement sites of the affected population for BCCL & Non-BCCL has been identified exclusively on non coal bearing areas sufficiently away from the impact of future mining. For this purpose, it is proposed that satellite township should be constructed along the fringe of Jharia Coal Field. The size of township should be large enough to accommodate at least 12500 Non-BCCL families and 6000 BCCL families. In each locality, there will be separate town ship for BCCL houses and Non-BCCL (both private & encroachers) adjacent to each other. In each township the following amenities will be provided as per BPE norm.

40	E. Jharia	Sudamdih Inc.	Main Colony Miners house/05	19200
41	E. Jharia	Sudamdih Inc.	Main Colony/ O3	16000
42	E. Jharia	Sudamdih Inc.	Old Incline Colony/06	4800
43	E. Jharia	Sudamdih S.M.	New Miners colony/02	33600
44	E. Jharia	Sudamdih S.M.	River side colony/01	30400
45	**Gobindpur**	Akashkinaree	Akashkinare Colony/ O6	3837
46	Gobindpur	Akashkinaree	Labour Qtrs. Along PWD Road/ O2	19139
47	Gobindpur	Akashkinaree	Part of Bhatmurna Bastee/O3	6996
48	Gobindpur	Akashkinaree	Qtrs. Along office compound/O4	37973
49	Gobindpur	Akashkinaree	Qtrs.on South side of Akashkinaree/O5	32070
50	Gobindpur	Block-IV / Kooridih	Kooridih 3 seam Area Hutment/ O4	1870
51	Gobindpur	Block-IV / Kooridih	LCH Dhowrah Govindpur/18	720
52	Gobindpur	Block-IV / Kooridih	Near Block-IV Office/15	26846
53	Gobindpur	Block-IV / Kooridih	Near Gobindpur Hospital/14	24280
54	Gobindpur	Block-IV / Kooridih	NHS Qrts/12	1400
55	Gobindpur	Block-IV / Kooridih	South Gobindpur Bastee/16	7040
56	Gobindpur	Block-IV / Kooridih	South Gobindpur Dhowra/17	1562
57	Gobindpur	Gobindpur	Agardih Labour Qtrs/O7	17580
58	Gobindpur	Gobindpur	Darpan Bastee/O5	132
59	Gobindpur	Gobindpur	Imli Dhowrah/O3	31145
60	Gobindpur	Gobindpur	IV Seam Colony/O1	57408
61	Gobindpur	Gobindpur	Labour Qrts./O6	1174
62	Gobindpur	Gobindpur	Mehtadih Colony & Bunglow/O4	31145
63	Gobindpur	Jogidih	Baihardih Colony 'B'/ 1B	8365
64	Gobindpur	Jogidih	Baihardih Village/1A	5118
65	Gobindpur	Kharkharee	Nawagarh More & Phularitand Village/ O3	14400
66	Gobindpur	Kharkharee	Part of Phularitand Village/ 3A	24000
67	Gobindpur	Maheshpur	Maheshpur Bastee/O1	33309
68	Gobindpur	Maheshpur	NHS Qtrs. & House North of DB Road/11	43823
69	Gobindpur	Maheshpur	Premnagar Colony Bastee etc./ 14	13418
70	Gobindpur	Maheshpur	Staff Qtrs. & Hutment/O4	2806
71	Gobindpur	S.Gobindpur	Bilbera - C/13	8000
72	Gobindpur	S.Gobindpur	Bilbera 'A'/ O7	1600
73	Gobindpur	S.Gobindpur	Kali Nagar Bilbera/12	8000
74	Gobindpur	S.Gobindpur	South Govindpur 'B/O6	2400
75	Gobindpur	S.Gobindpur	Tandabari-A/O1	18400
76	Gobindpur	Teturia	Colliery Office Area/O3	22400
77	Gobindpur	Teturia	NHS Qtrs.& Hutment/O1	43600
78	Gobindpur	Teturia	No.2 Locality/O2	32800
79	**Katras**	Angarpathra	AP Section-2 /O2	16800
80	Katras	Angarpathra	JK Khas/O4	2200
81	Katras	Angarpathra	JK Section/O3	62400
82	Katras	Angarpathra	National Angarpathra-2/O6	6500
83	Katras	East Katras	Akashkinaree 04/06	2800
84	Katras	East Katras	Akashkinaree -2/O2	400
85	Katras	East Katras	Akashkinaree 3/O4	3840
86	Katras	East Katras	Akashkinaree 5/O7	1000
87	Katras	East Katras	Akashkinaree-6/O8	4350
88	Katras	East Katras	Bhandardih 2 /11	2500
89	Katras	East Katras	Koiludih 01/03	3900
90	Katras	East Katras	Koiludih 3/10	40180
91	Katras	East Katras	Koiludih 4/15	65752

DELINEATION OF SURFACE COAL FIRE AND ASSOCIATED LAND SUBSIDENCE IN THE JHARIA COALFIELD, USING SATELLITE BASED REMOTE SENSING TECHNIQUES

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

AUGUST, 2021

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 identification is 4 subsidence areas, within the BCCL mine boundary. Of these, the major area where considerable ground subsidence is occurring is the Moonidih UG project. Long term underground mining has resulted in continuous subsidence in the area. Apart from this, the other three areas are south of South Govindpur, Bagdigi and Bhagaband mines, however, the field evidences of the same are not conclusive. No quantitative estimates of the subsidence have been carried out in the study.

7.2 Conclusions

The following conclusions can be made:

1. As of the date of study in the year 2020 and in comparison with the previous study done in 2017, there has been a change in areal extent and disposition of the fire affected areas. On the other hand, persistent subsidence is seen in the Moonidih area due to underground mining activities.
2. Compared to 2012, the eastern flanks (Lodna, Tisra, Bhulanbarai areas) show considerable decrease in fire disposition and the western flank (Shatabdi and Block II area) show diminished fire presence.
3. The fires are continuation of existing fire affected areas as seen in the 2017 study.
4. The mines in Kusunda remain to be the worst affected with maximum presence of active fires.
5. There is a decrease in areal extent of the fire from 2017 to 2020. As compared 2017, when the total fire affected extent of the JCF was about 3.28 km^2; in 2020 total fire affected extent is about 1.89 km^2 (including TISCO mines). Within the mining lease of BCCL (excluding TISCO) in comparison 2017, when the total fire affected extent of the JCF was about 3.27 km^2; in 2020 total fire affected extent is about 1.86 km^2.

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.) both in 2017 and in the present 2020 study are pixel based. 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 disposition of fire. Hence, they should not be quoted as fire area on the ground.*

Ref. no: BCCL/GEO/GM (Geology)/2023/01 Date: 02.01.2023

To whomsoever it may concern

Certified that **M/s R.K. Drilling Services.**, Infront of Kheda petrol pump, Itarsi- 461111, Madhya Pradesh, has successfully completed the work of **"Drilling and installation of 23 nos. Of Peizometric wells in the command area of BCCL"** vide:

1. Work Order No.: BCCL/GEO/GM(GEOLOGY)/WO/2021-22/07, Dated: 03.02.2022
2. Agreement No. : No. 01 of 2021-22
3. Awarded value of work : Rs. 1,51,96,000.00
4. Date of commencement of work : 05.02.2022
5. Date of completion as per agreement : 29.07.2022
6. Date of actual completion : 29.07.2022
7. Provisional time extension granted up to : Nil
8. Revised Estimate value : Rs. 1,37,00,900.00
9. Status of work : Completed

This is being issued on the request of the agency vide their letter received on mail dated: 20.12.2022.

2/1/2023

General Manager (Geology),
Geology Department,
Bharat Coking Coal Limited

Copy to;

1. All Area GMs
2. GM (Civil)
3. GM (Finance)
4. HOD (Environment)
5. M/s R.K. Drilling Services
6. Office Copy

ISO : 9001-2015 Certifed Company
DRILLING
SINCE 1972

R.K. DRILLING SERVICES

7777807567
rkdrillingservices@gmail.com
www.rkdrillingservices.com
NH 69, Opp. Bharat Petrol Pump,
Kheda, ITARSI-461111(M.P.)

Date: 20.12.2022

To,
The General Manager,
Geology,
BCCL.

Sub: Request for Issue of NO DUES/ WORK COPLETION CERTIFICATES

NIT Ref. No.: BCCL/CED/TC/eNIT-12/2021-22/225; Date:05.07.2021

WORK ORDER NO: BCCL/GEO/GM(Geology)/WO/2021-22/07 Dt: 03.02.2022

For the work of "Drillingand installation of 23 nos of piezometricwells in the commandarea of BCCL"

Respected Sir,

We were awarded the contract for above sited work. Work has been successfully completed by us. I request you to issue No Dues certificate & Work completion certificate.

Regards
M Asif
Partner
R K Drilling Services

R.K. DRILLING SERVICES ITARSI

भारत कोकिंग कोल लिमिटेड
एक मिनी रत्न कम्पनी
(कोल इंडिया लिमिटेड का एक अंग)
विभागाध्यक्ष (पर्यावरण) का कार्यालय
कोयला भवन, कोयला नगर, धनबाद

Bharat Coking Coal Limited
A Mini Ratna Company
(A Subsidiary of Coal India Limited)
Office of the HoD (Environment)
Koyla Bhawan, Koyla Nagar, Dhanbad

पत्रसंख्या: भाकोकोलि/ विभागाध्यक्ष (पर्या)/फाईल-Plantation/B-3/2021/260-270(H) दिनांक: 18.02.2021

सेवा में,

वन प्रमंडल पदाधिकारी,

धनबाद

विषय : Work Order for carrying afforestation over 42.5 ha of OB dumps/physically reclaimed land of BCCL.

संदर्भ: (i) Our letter no.भाकोकोलि/उपमहाप्रबंधक(पर्या)/फाईल-B-3/2020/1529-1534(H) dt 10.12.2020
(ii) भाकोकोलि/उपमहाप्रबंधक(पर्या)/फाईल-B-3/2021/10-13/ (H) dt 06.01.2021.
(iii) Your letter no.84 dated 12.01.2021

माननीय महोदय,

This has reference to above mentioned letters, competent authority has approved for carrying afforestation over 42.5 ha of OB dumps/ physically reclaimed land of BCCL through DFO, Dhanbad, for a total estimated value of ₹ 1,19,75,665.00 (Rupees One crore nineteen lakhs seventy five thousand six hundred sixty five only) for four years with the following terms and conditions in respect of above mentioned work:-

1. The Period of work will be 04 years as per the estimate provided by Forest Department.

2. The aforesaid work is to be carried out at below mentioned sites:

S No	Name of the site	Type	Ha
1	NAKC, Govindpur	OB Dump	23.0
2	ASP, EJ Area	Physically reclaimed land	19.5
	TOTAL		42.5

3. The Forest department shall conduct all its afforestation activities subject to all laws, rules, statutory orders and regulations applicable to the site and the nature of the work.

4. The Forest department shall take up afforestation works on company's land with due expertise and supervision as per the scheme & estimates duly sanctioned as per the estimate submitted by forest department.

5. The estimate has been submitted by Forest Department considering 15% enhancement every year in labour wages of preceding year. However, the payment of Completion work, first year maintenance work and second year maintenance work will be made as per the actual labour wages prevailing in the corresponding year.

6. The Forest department shall exercise precautions on the aid and advice of the mine management for the safety of all lives and properties involved in the afforestation activities.

7. **SCOPE OF WORK**
This work shall be done with the following attributes:

(i) Self-sustaining / healthy plantation at the end of project period/ at the handover of the site.

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15. TERMS OF PAYMENT

Total project cost is ₹ 1,19,75,665.00 (Rupees One crore nineteen lakhs seventy five thousand six hundred sixty five only) as per the estimate submitted by Forest Department. The payment schedule will be as follows: -

S. No	Financial Year	Details of the work	Amount (Rs.)	Remarks
1.	2020-21	Advance Work	44,41,205.00	Wages @ ₹ 295.80 per MD
2.	2021-22	Completion work	46,85,034.00	Wages @ ₹ 340.17 per MD
3.	2022-23	Maintenance work-1	17,03,227.00	Wages @ ₹ 391.19 per MD
4.	2023-24	Maintenance work-2	11,46,199.00	Wages @ ₹ 449.87 per MD
	Total		11975665.00	

16. The estimate for the Completion work, Maintenance work-1 and Maintenance work-2 is based on the tentative increase in the labour wages @ 15% of preceding year's wages as submitted in the estimate by the Forest Department. Therefore, the forest department shall certify the rate of labour wages for the corresponding year and demand letter/ bill based on the actual rates of labour wages to that corresponding year.

17. **Paying Authority:** HOD (Pay), Pay Office, BCCL HQ, Koyla Bhawan, Dhanbad.

18. All the payment will be made by ELECTRONIC MODE through bank in the account of DFO, Dhanbad. You are required to fill the format of Electronic Fund Transfer (EFT) in triplicate which is enclosed as annexure-A.

19. For release of the payment, you have to submit
    a) The letter of acceptance of the work order along with the Demand letter/Bill for the Advance work.

    And for further payments regarding this work order
    a) Utilization certificate of the preceding payment made to you in respect of this work order
    b) Joint inspection report of preceding year's work.
    c) Demand letter/Bill based on the actual rates of labour wages to that corresponding year for payment.

    The utilization certificates along with joint inspection report shall be accepted by the accepting authority i.e. HOD (Env), BCCL.

20. BCCL shall not have any liability in case of any accident etc. towards Forest Department's personnel/ staffs /workers during the execution of the work.

21. Child labour is prohibited under Mines Act, therefore, child labour shall not be deployed in the aforesaid work.

22. All other conditions stipulated in aforementioned reference letters shall be complied.

23. Matter relating to any dispute or difference arising out of this work order shall be subject to the jurisdiction of Dhanbad court only.

18/2/21

विभागाध्यक्ष (पर्यावरण)

Copy to:-

1. TS to D (T) OP/ D(T) PP, BCCL..... for kind information please.
2. GM (Vigilance), BCCL..... .....for kind information please.
3. GM, Govindpur/ EJ Area ....for kind information please
4. Project Officer, NAK Colliery, Govindpur/ ASP Colliery, EJ Area
5. HOD, (Pay)/ In-charge Pay Office, BCCL HQ, Koyla Bhawan, Dhanbad.
6. Master File/Office Copy

18/2/21

विभागाध्यक्ष (पर्यावरण)

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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 – X

(FOR THE MONTH MARCH, 2024)

E. C. no. J-11015/380/2010-IA.II (M) dated 12th June, 2019.

CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

2.3 Noise level monitoring locations

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

3.0 Methodology of sampling and analysis

3.1 Ambient air quality

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

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

3.2 Water quality

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

3.3 Noise level monitoring

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

4.0 Results and interpretations

4.1 Air quality

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

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

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

4.2 Water quality

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

4.3 Noise Level

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

INTRODUCTION

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

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

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

1.1 The Cluster-X is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Amlabad UG, Bhowra north UG/OC, Bhowra South UG/OC , Amalgamated Sudamdih Patherdih Mine, Sudamdih Shaft, Sudamdih Coal Washery The Cluster–X is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster–X are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage of the area is governed by Damodar River.

1.2 The Cluster-X is designed to produce 1.762 MTPA (normative) and 2.289 MTPA (peak) capacity of coal and coal washery of 2.08 MTPA.

The Project has Environmental Clearance from Ministry of Environment, Forests and Climate Change (MoEF&CC) for a rated capacity 1.762 MTPA (normative) and 2.289 MTPA (peak) capacity of coal production vide letter no. J-11015/380/2010-IA.II (M) dated 12thJune, 2019.

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) 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 an elevated platform of around 1.5m height from ground level at Guest House of EJ Area.

ii) Sudamdih Washery (A15): Industrial Area

The location of the sampling station is 23°39'31.00"N 86°25'48.00"E. The sampler was placed at elevated platform of around 1.5m height from ground level at Coal lab near washery.

iii) Sudamdih Mine shaft (A41): Industrial Area

The location of the sampling station is 23°39'37"N 86°25'39"E.The sampler was placed at elevated platform of around 1.5m height from ground level at electric substation of sudamdih shaft mine.

II. BUFFER ZONE Monitoring Location

i) Jeenagora (A13): Industrial Area

The location of the sampling station is 23°42'31.00"N 86°26'38.00"E. The sampler was placed elevated platform of around 1.5m height from ground level at Safety Office.

ii) Sitanala (A30): Industrial Area

This location of the sampling station is 23°41'15.00"N 86°22'39.00"E, at the Amlabad Project office which is currently in-operational. It has been selected to study the impact of Air pollution in the buffer zone on the Cluster.

AMBIENT AIR QUALITY DATA

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

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

Test Report for Ambient Air Samples

Month & Year	**03/2024**	**Cluster**	**Cluster X**			**ULR No.**	**TC1012224000000640F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**14.05.2024**
Project	**Bhowrah North**	**Sample Ref. No.**	**REM/BCCL/2024/03**		**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	07.03.2024	20.03.2024	**Period of Analysis**	07.03.2024	15.04.2024	**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**
			1st FN	**2nd FN**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	132	86	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	42	29	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	26	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***	(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

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	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**	**TC1012224000000640F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project	**Sudamdih Washery**	**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	05.03.2024	19.03.2024	**Period of Analysis** 05.03.2024	15.04.2024	**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**
			1st FN	**2nd FN**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	75	88	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	28	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	26	28	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***	(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 ----

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	**03/2024**	**Cluster**	**CLUSTER X**	**ULR No.**	**TC1012224000000640F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project	**Sudamdih Mine Shaft**	**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**
Date of Sampling	06.03.2024	22.03.2024	**Period of Analysis**	06.03.2024 – 15.04.2024	**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**
			1st FN	**2nd FN**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	82	75	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	41	36	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	<10	<10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	21	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***	(Amit Raj Mishra) ***Authorised Signatory***

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

CMPDIL, RI-II
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Test Report for Ambient Air Samples

Month & Year	**03/2024**	**Cluster**	**Cluster X**			**ULR No.**	**TC1012224000000640F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**14.05.2024**
Project	**Jeenagora**	**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**		**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	01.03.2024	16.03.2024	**Period of Analysis**	01.03.2024	15.04.2024	**Zone of Station:**	**Buffer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)**		**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
			1st FN	**2nd FN**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	132	90	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	41	43	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	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***	(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.*

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

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Test Report for Ambient Air Samples

Month & Year	**03/2024**	**Cluster**	**CLUSTER X**			**ULR No.**	**TC1012224000000640F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**14.05.2024**
Project	**Sitanala**	**Sample Ref. No.**	**REM/BCCL/2024/03**		**Sampling Method**	**CMPDI/RI-II/LPM 11 , (IS 5182)**	
Date of Sampling	05.03.2024	19.03.2024	**Period of Analysis**	05.03.2024	15.04.2024	**Zone of Station:**	**Buffer Zone**

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values (in µg/m³)**		**Range Of Testing**	**LDL**	**MoEF Standards Notification dated 25th September,2000 (GSR 742 E)**	**NAAQS, 2009**
			1st FN	**2nd FN**				
1	PM_{10}	IS -5182(Part 23):2006, R-2017	61	81	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	$PM_{2.5}$	IS -5182(Part 24):2019	33	36	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO_2	IS-5182(Part-2): 2001 , R-2017	<10	<10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO_2	IS-5182 (Part-6): 2006 , R-2017	19	22	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***	(Amit Raj Mishra) ***Authorised Signatory***

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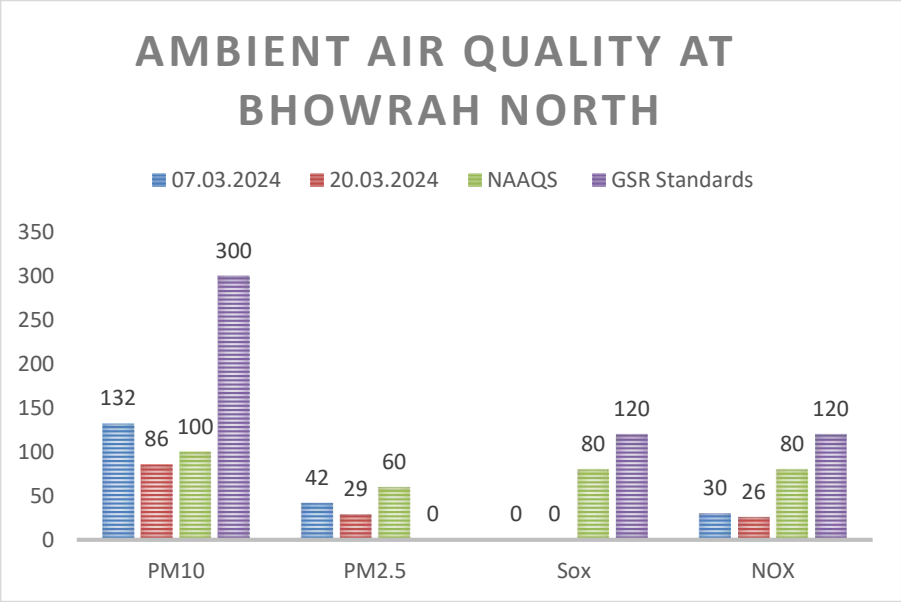
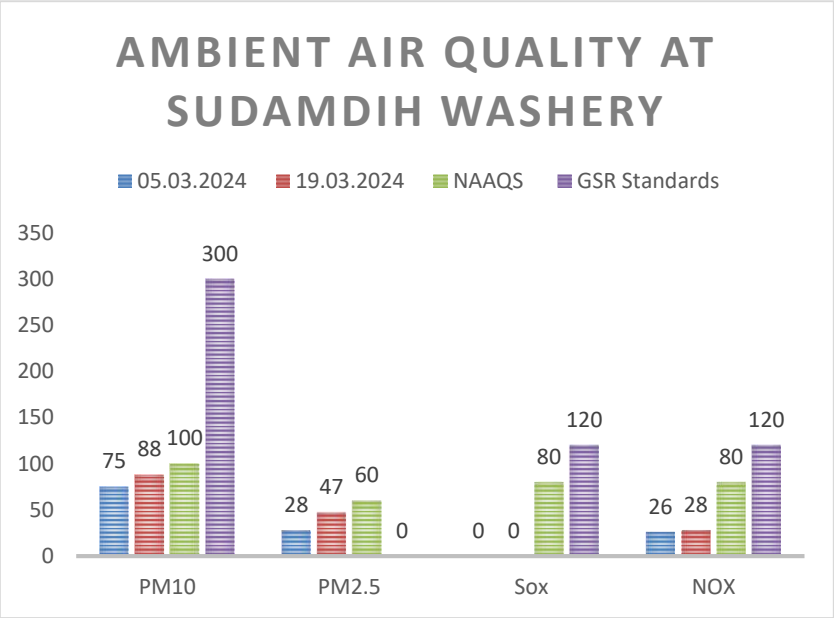

AMBIENT AIR QUALITY AT BHOWRAH NORTH
07.03.2024
20.03.2024
NAAQS
GSR Standards
350
300
250
200
150
100
50
0
132
86
100
300
42
29
60
0
0
0
80
120
30
26
80
120
PM10
PM2.5
Sox
NOX


AMBIENT AIR QUALITY AT SUDAMDIH WASHERY
05.03.2024
19.03.2024
NAAQS
GSR Standards
350
300
250
200
150
100
50
0
75
88
100
300
28
47
60
0
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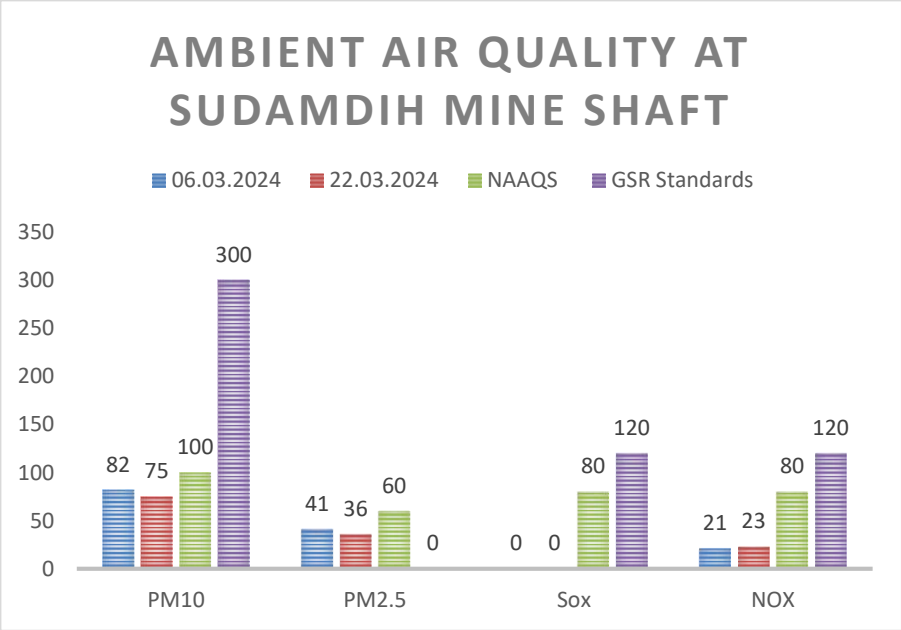
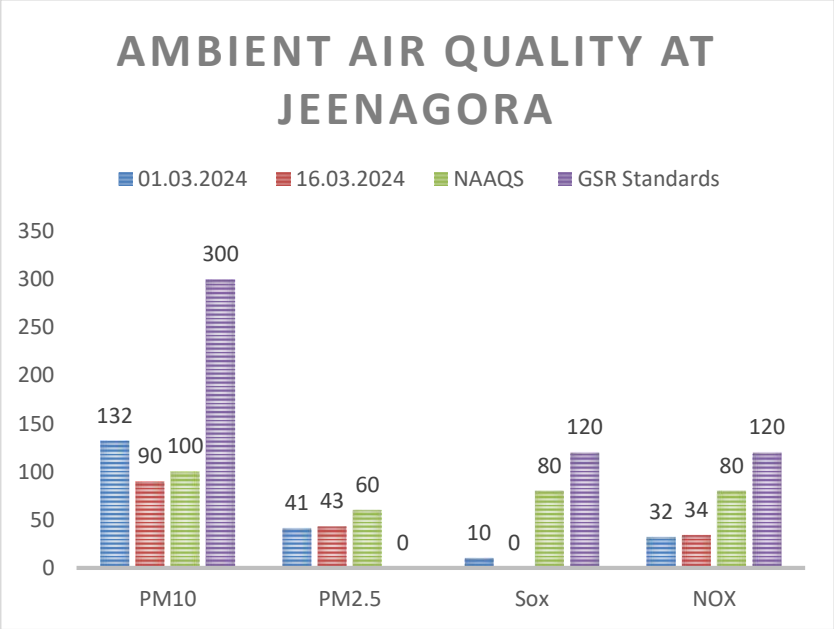
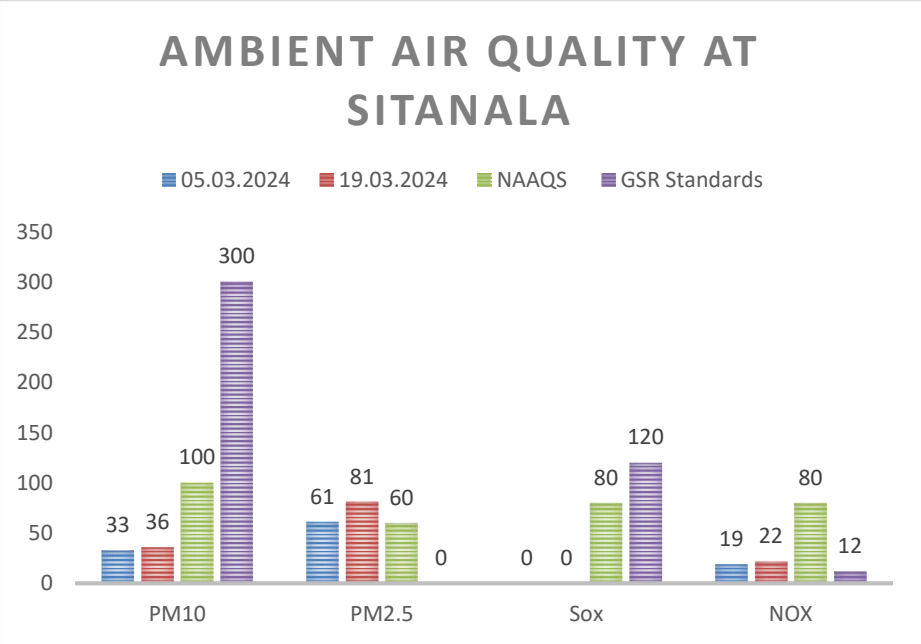
0
80
120
26
28
80
120
PM10
PM2.5
Sox
NOX


AMBIENT AIR QUALITY AT SUDAMDIH MINE SHAFT
06.03.2024
22.03.2024
NAAQS
GSR Standards
350
300
250
200
150
100
50
0
82
75
100
300
41
36
60
0
0
0
80
120
21
23
80
120
PM10
PM2.5
Sox
NOX


AMBIENT AIR QUALITY AT JEENAGORA
01.03.2024
16.03.2024
NAAQS
GSR Standards
350
300
250
200
150
100
50
0
132
90
100
300
41
43
60
0
10
0
80
120
32
34
80
120
PM10
PM2.5
Sox
NOX


AMBIENT AIR QUALITY AT SITANALA
05.03.2024
19.03.2024
NAAQS
GSR Standards
350
300
250
200
150
100
50
0
33
36
100
300
61
81
60
0
0
0
80
120
19
22
80
12
PM10
PM2.5
Sox
NOX

WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer **Plate No. – II**)

i) Mine Discharge of Bhowrah North (MW10)

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

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

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Test Report for Mine Effluent samples

Month & Year	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**		**TC1012224000000658F**	
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**14.05.2024**
Project		**Sampling Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**IS 3025 (Part-1)**	**CMPDI/RI-II/LPM 13**	
Sampling Stations	**(i)**	**Bhowrah North**	**Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent**				
			Date of Sampling	04.03.2024	18.03.2024	**Period of analysis 04.03.2024 to 30.03.2024**	

Sl. No.	**Parameter**	**Method of Analysis**	**Observed Values**		**STANDARDS FOR COAL MINES (Stipulated by Ministry of Environment and Forests (MoEF), Vide Notification No. GSR 742(E), Dt: 25.09.2000)**	**LDL**
			First Fortnight	**Second Fortnight**		
1	Total Suspended Solids	IS 3025/17:1984, R :2017, Gravimetric	42	46	*100 (Max)*	10
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.78	7.81	*5.5 - 9.0*	0.2
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	*10 (Max)*	2
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	32	36	*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***

---- End of Report ----

NOISE LEVEL QUALITY MONITORING

4.1Location of sampling sites

1. **Bhowrah North (N14)**
2. **SudamdihWashery (N15)**
3. **Jeenagora (N13)**
4. **Sitanala (N30)**
5. **Sudamdih Mine shaft (N41)**

4.2Methodology of sampling and analysis

Noise level measurements in form of 'L_{EQ}' were taken using Integrated Data Logging Sound Level Meter during day time & night time. Noise levels were measured for the complete day & night time, the Intergration time taken was one hour or 3600 seconds. Noise levels were measured in Decibels, 'A' weighted average, i.e. dB (A).

4.3 Results & Interpretations

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

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

CMPDIL, RI-II
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Month & Year	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**	**TC1012224000000674F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project		**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 22**
Sampling Stations	**i**	**Bhowrah North**	**Date of Sampling**	07.03.2024 – 20.03.2024	**Zone Category of Station:** **Core Zone**

Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	55.1	54.4	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	58.1	57.9					
3		08:00 - 09:00	60.9	60.9					
4		09:00 – 10:00	64.2	65.5					
5		10:00 - 11:00	65.2	64.6					
6		11:00 - 12:00	66	65.8					
7		12:00 - 13:00	68.7	67.9					
8		13:00 - 14:00	61.9	59.8					
9		14:00 - 15:00	58.6	57.6					
10		15:00 - 16:00	49.2	64.1					
11		16:00 - 17:00	49.3	63.6					
12		17:00 - 18:00	47.7	62.9					
13		18:00 - 19:00	46.2	54.7					
14		19:00 - 20:00	46.5	45.5					
15		20:00 - 21:00	46.6	47.2					
16		21:00 - 22:00	46	47.1					
		Leq DAY	61.4	62.3					
1	Noise Level dB(A)Leq -Night	22:00-23:00	43.9	44.2	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	43.8	43.6					
3		00:00- 01:00	43.6	43.3					
4		01.00-02.00	43.3	43.5					
5		02.00-03.00	43.2	43.6					
6		03.00-04.00	44.2	44.3					
7		04.00-05.00	44.3	44.7					
8		05:00-06:00	44.7	45					
		Leq NIGHT	43.9	44.1					

**LDL indicates Lower Detection Limit*

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

			(Gaurav Kant)				(Amit Raj Mishra)
	ANALYSED BY		***REVIEWED BY***				***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.

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Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

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email: rdri2cmpdi@coalindia.in

Month & Year	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**	**TC1012224000000674F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project		**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 22**
Sampling Stations	**i**	**Sudamdih Washery**	**Date of Sampling** 05.03.2024 – 19.03.2024	**Zone Category of Station:**	**Core Zone**

Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards: Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	54.4	53.4	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	57.2	56.2					
3		08:00 - 09:00	56.4	55.4					
4		09:00 – 10:00	54.4	53.6					
5		10:00 - 11:00	53.6	52.3					
6		11:00 - 12:00	55.4	54.1					
7		12:00 - 13:00	54	53.2					
8		13:00 - 14:00	60.6	58.1					
9		14:00 - 15:00	62.2	64.2					
10		15:00 - 16:00	64.6	59.2					
11		16:00 - 17:00	59.6	60.8					
12		17:00 - 18:00	60	59.6					
13		18:00 - 19:00	60.4	60					
14		19:00 - 20:00	59.5	59.7					
15		20:00 - 21:00	58.1	57.4					
16		21:00 - 22:00	58.3	56.7					
		Leq DAY	59.2	58.4					
1	Noise Level dB(A)Leq -Night	22:00-23:00	55.2	52.7	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	51.3	51					
3		00:00- 01:00	51	49.9					
4		01.00-02.00	48.9	49.1					
5		02.00-03.00	47.6	48.2					
6		03.00-04.00	47.3	47.6					
7		04.00-05.00	46.6	46					
8		05:00-06:00	47.3	47					
		Leq NIGHT	50.4	49.4					

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

Sampling Assistants	(Gaurav Kant)			(Amit Raj Mishra)
ANALYSED BY	***REVIEWED BY***			***Authorised Signatory***

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A Mini Ratna Company

CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

Environment Laboratory, Regional Institute-II

Ambient Noise Level Test Report

Month & Year	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**	**TC1012224000000674F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project		**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 22**

Sampling Stations	**i**	**Jeenagora**	**Date of Sampling**	01.03.2024	16.03.2024	**Zone Category of Station:**	**Buffer Zone**

Sl. No.	**Parameter**	**Hour / Time of day**	**Observed Values (in Leq dB(A))** First Fortnight	**Observed Values (in Leq dB(A))** Second Fortnight	**Method of Analysis**	**Range Of Testing**	**LDL**	**NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards** Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	59.6	56.1	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	68.4	62.9					
3		08:00 - 09:00	69.8	66.7					
4		09:00 – 10:00	71.4	64.1					
5		10:00 - 11:00	69.1	67.5					
6		11:00 - 12:00	67.7	66.1					
7		12:00 - 13:00	74.1	73					
8		13:00 - 14:00	66.5	64.9					
9		14:00 - 15:00	59.7	61.7					
10		15:00 - 16:00	50.8	50.5					
11		16:00 - 17:00	67.7	65.8					
12		17:00 - 18:00	58.8	57.7					
13		18:00 - 19:00	54.4	53.6					
14		19:00 - 20:00	51	51.2					
15		20:00 - 21:00	46.1	46					
16		21:00 - 22:00	46.7	47.3					
		Leq DAY	67.2	64.8					
1	Noise Level dB(A)Leq -Night	22:00-23:00	43.6	44.6	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	43	44.3					
3		00:00- 01:00	42.2	44.1					
4		01.00-02.00	42.1	43.2					
5		02.00-03.00	42.1	42.9					
6		03.00-04.00	44	42.1					
7		04.00-05.00	44.2	45.2					
8		05:00-06:00	46.2	46					
		Leq NIGHT	43.6	44.2					

**LDL indicates Lower Detection Limit*

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

Sampling Assistants	(Gaurav Kant)			(Amit Raj Mishra)
ANALYSED BY	***REVIEWED BY***			***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.

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CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED

Environment Laboratory, Regional Institute-II

Ambient Noise Level Test Report

Month & Year	**03/2024**	**Cluster**	**Cluster X**			**ULR No.**	**TC1012224000000674F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**					**Date of Issue**	**14.05.2024**
Project		**Sample Ref. No.**	**REM/BCCL/2024/03**		**Sampling Method**	**CMPDI/RI-II/LPM 22**	
Sampling Stations	**i**	**Sitanala**	**Date of Sampling**	05.03.2024	19.03.2024	**Zone Category of Station:**	**Buffer Zone**

Sl. No.	**Parameter**	**Hour / Time of day**	**Observed Values (in Leq dB(A))** First Fortnight	**Observed Values (in Leq dB(A))** Second Fortnight	**Method of Analysis**	**Range Of Testing**	**LDL**	**NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards** Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	48.6	48.5	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	53.8	53.3					
3		08:00 - 09:00	55.7	54.4					
4		09:00 – 10:00	56.5	56.9					
5		10:00 - 11:00	55.4	56.8					
6		11:00 - 12:00	63.5	64.4					
7		12:00 - 13:00	58.6	60.9					
8		13:00 - 14:00	59.8	62.2					
9		14:00 - 15:00	56.4	57.6					
10		15:00 - 16:00	54.4	55.7					
11		16:00 - 17:00	54.4	54.4					
12		17:00 - 18:00	49.6	50.3					
13		18:00 - 19:00	48.9	48.3					
14		19:00 - 20:00	48.3	48.1					
15		20:00 - 21:00	48	47.8					
16		21:00 - 22:00	47.8	47.4					
		Leq DAY	56.2	57.4					
1	Noise Level dB(A)Leq -Night	22:00-23:00	44.8	44.2	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	44.6	44.1					
3		00:00- 01:00	44.3	44.7					
4		01.00-02.00	44	43.6					
5		02.00-03.00	43.5	43.5					
6		03.00-04.00	42.6	43.2					
7		04.00-05.00	42.5	43					
8		05:00-06:00	44	43.3					
		Leq NIGHT	43.9	43.7					

**LDL indicates Lower Detection Limit*

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

Sampling Assistants	(Gaurav Kant)			(Amit Raj Mishra)
ANALYSED BY	***REVIEWED BY***			***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 ----

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

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

Month & Year	**03/2024**	**Cluster**	**Cluster X**	**ULR No.**	**TC1012224000000674F**
Customer	**Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)**			**Date of Issue**	**14.05.2024**
Project		**Sample Ref. No.**	**REM/BCCL/2024/03**	**Sampling Method**	**CMPDI/RI-II/LPM 22**
Sampling Stations	**i**	**Sudamdih Mine Shaft**	**Date of Sampling** 06.03.2024	22.03.2024	**Zone Category of Station:** **Core Zone**

Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A)) First Fortnight	Observed Values (in Leq dB(A)) Second Fortnight	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	48.6	48.8	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	48.5	48.9					
3		08:00 - 09:00	50.6	51.1					
4		09:00 – 10:00	48.2	47.8					
5		10:00 - 11:00	50.6	51.1					
6		11:00 - 12:00	53.6	54					
7		12:00 - 13:00	54.7	54.7					
8		13:00 - 14:00	55.1	54.5					
9		14:00 - 15:00	54.3	55.5					
10		15:00 - 16:00	54	53.3					
11		16:00 - 17:00	51	52.9					
12		17:00 - 18:00	50.3	52.7					
13		18:00 - 19:00	48.5	50.6					
14		19:00 - 20:00	48.2	49.7					
15		20:00 - 21:00	48.1	49.4					
16		21:00 - 22:00	48.3	48.2					
		Leq DAY	51.6	52.1					
1	Noise Level dB(A)Leq -Night	22:00-23:00	46.3	46.1	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	46.2	46.1					
3		00:00- 01:00	45.9	46					
4		01.00-02.00	45.8	45.8					
5		02.00-03.00	45.3	45.7					
6		03.00-04.00	45.7	45.5					
7		04.00-05.00	45.2	45.3					
8		05:00-06:00	45.7	45.4					
		LeqNIGHT	45.8	45.7					

**LDL indicates Lower Detection Limit*

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

Sampling Assistants	(Gaurav Kant)		(Amit Raj Mishra)
ANALYSED BY	***REVIEWED BY***		***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 ----

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

Category	Pollutant	Time weighted average	Concentration in Ambient Air	Method of Measurement
1	**2**	**3**	**4**	**5**
III Coal mines located in the coal fields of • Jharia • Raniganj • Bokaro	Suspended Particulate Matter (SPM)	Annual Average * 24 hours **	500 µg/m^3 700 µg/m^3	- High Volume Sampling (Average flow rate not less than 1.1
	Respirable Particulate Matter (size less than 10 µm) (RPM)	Annual Average * 24 hours **	250 µg/m^3 300 µg/m^3	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1.Improvedwest and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 µg/m^3 120 µg/m^3	1. Jacob & Hochheiser Modified (Na-Arsenic) Method 2. Gas phase Chemilumine-scence

Note:

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

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

NATIONAL AMBIENT AIR QUALITY STANDARDS

New Delhi the 18th November 2009

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

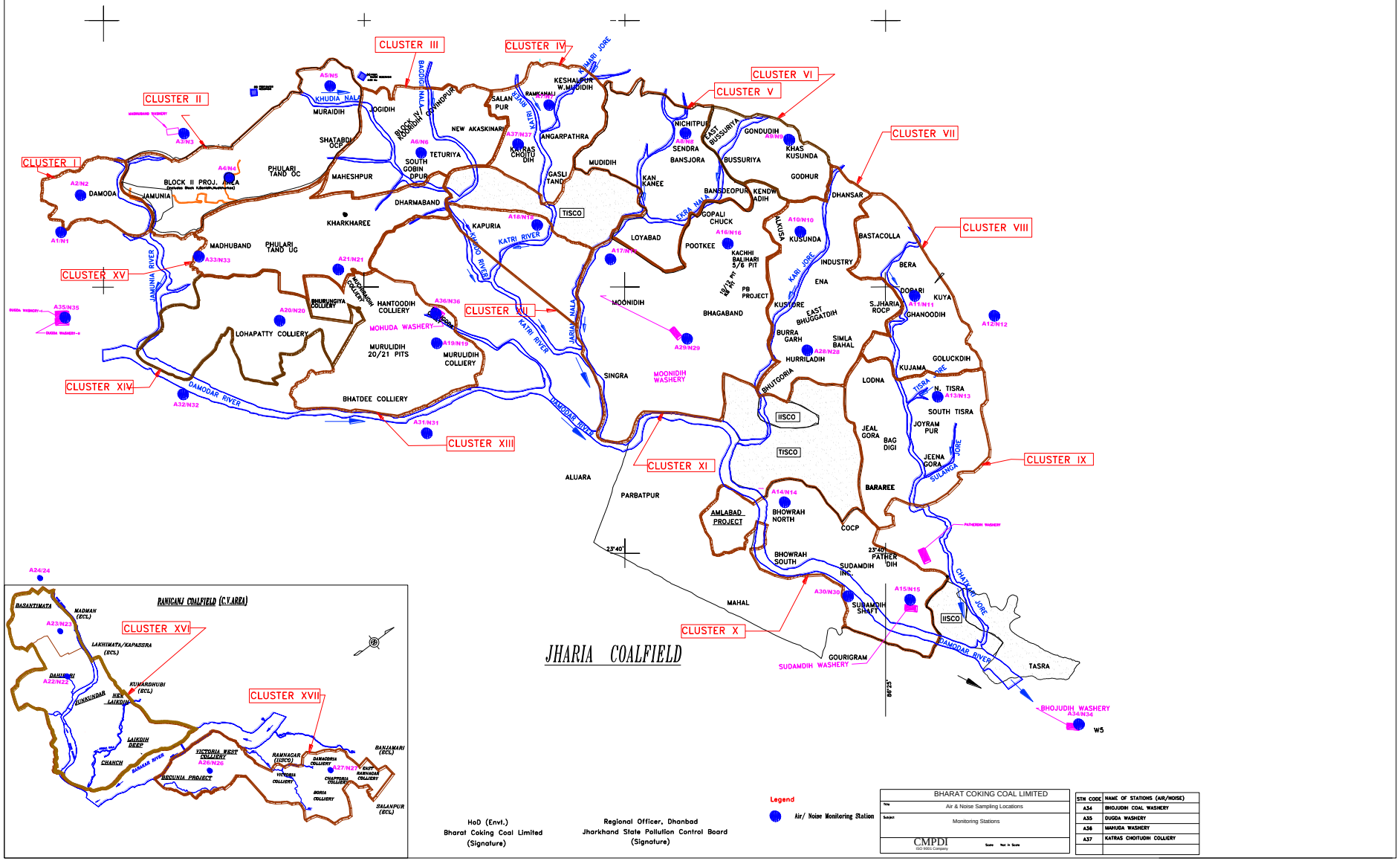
Pollutant	**Time Weighted Average**	**Concentration in Ambient Air**		**Methods of Measurement**
		Industrial, Residential, Rural and other Areas	**Ecologically Sensitive Area (Notified by Central Government)**	
Sulphur Dioxide (SO_2), µg/m^3	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogendioxide (NO_2), µg/m^3	Annual * 24 Hours **	40 80	30 80	-Jacob &Hochheiser modified ($NaOH$-$NaAsO_2$) Method -Gas Phase Chemiluminescence
Particulate Matter (Size less than 10µm) or PM_{10}, µg/m^3	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
Particulate Matter (Size less than 2.5µm) or $PM_{2.5}$, µg/m^3	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
Ozone (O_3) , µg/m^3	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
Lead (Pb) , µg/m^3	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
Carbon Monoxide (CO), mg/m^3	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
Ammonia (NH_3), µg/m^3	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C_6H_6), µg/m^3	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m^3	Annual *	01	01	-Solvent extraction followed byHPLC/GC analysis
Arsenic (As), ng/m^3	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m^3	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

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

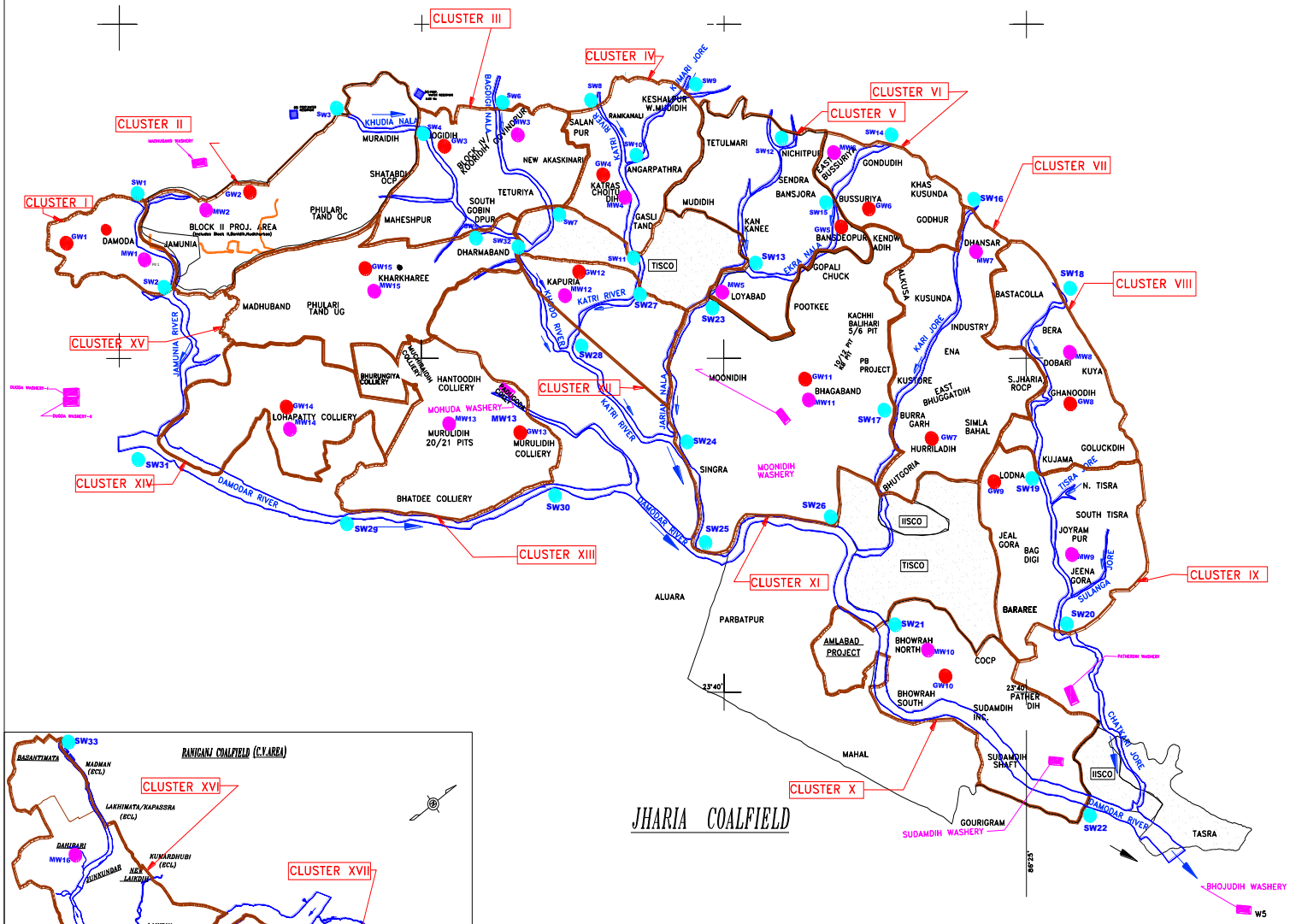
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

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

Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL



INDEX

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

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

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

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

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

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AMBIENT AIR QUALITY REPORT OF BHARAT COKING COAL LIMITED, CLUSTER – X

(FOR THE Q.E. JUNE 2023)

E. C. no. J-11015/380/2010-IA.II (M) dated 12thJune, 2019.

CMPDI
ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

EXECUTIVE SUMMARY

1.0 Introduction

The purpose of environmental monitoring is to assess the quality of various attributes that affects the 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 – II

AMBIENT AIR QUALITY MONITORING

2.1 Location of sampling station and their rationale:

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

2.2 Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Bhowrah North (A14): Industrial Area

The location of the sampling station is 23°41'37.00"N - 86°23'54.00"E.

ii) Sudamdih Washery (A15): Industrial Area

The location of the sampling station is 23°39'31.00"N - 86°25'48.00"E.

iii) Sudamdih Mine shaft (A41): Industrial Area

The location of the sampling station is 23°39'37"N 86°25'39"E.The sampler was placed at elevated platform of around 1.5m height from ground level at electric substation of sudamdih shaft mine.

II. BUFFER ZONE Monitoring Location

i) Jeenagora (A13): Industrial Area

The location of the sampling station is 23°42'31.00"N - 86°26'38.00"E.

ii) Sitanala (A30): Industrial Area

This location of the sampling station is 23°41'15.00"N - 86°22'39.00"E, at the Amlabad Project office which is currently in-operational.

2.3 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.

AMBIENT AIR QUALITY DATA

Name of the Company: **Bharat Coking Coal Limited** Year : **2023-24.**

Name of the Cluster : **Cluster - X** PERIOD: **Q. E. JUNE 2023.**

Heavy Metal Analysis report of Ambient Air Quality

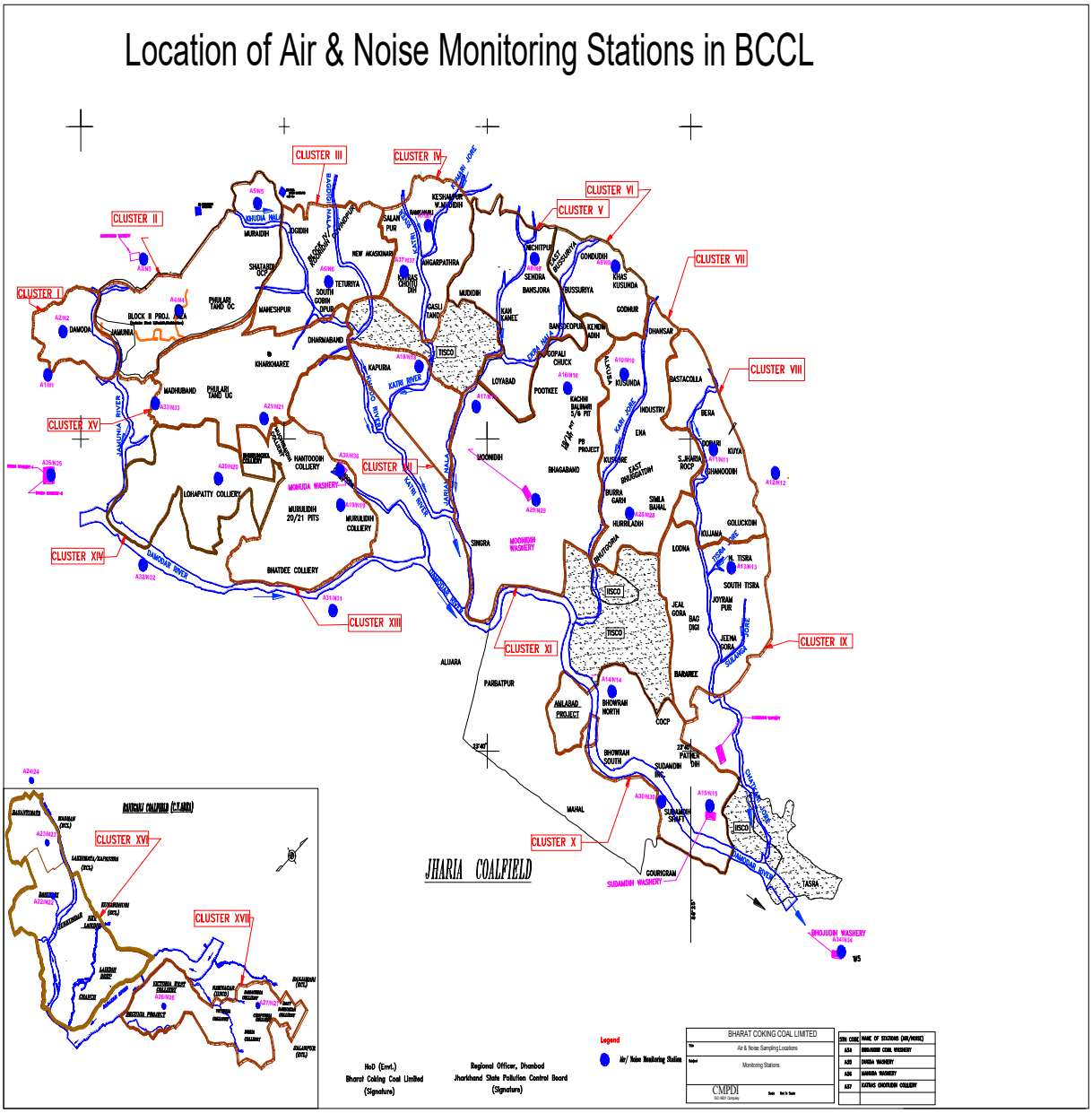
SAMPLE	Date	Hg (µg/m^3)	Cr(µg/m^3)	As (ng/m^3)	Pb (µg/m^3)	Ni (ng/m^3)	Cd (µg/m^3)
Jeenagora (A13)	22.06.2023	<0.001	<0.01	<1	0.024	16	0.01
Bhowrah North (A14)	29.06.2023	<0.001	0.01	<1	0.026	18	<0.001
Sudamdih Washery (A15)	27.06.2023	<0.001	0.01	<1	0.026	17	0.01
Sitanala (A30):	27.06.2023	<0.001	0.01	<1	0.027	<2	<0.001
Sudamdih Mine shaft (A41):	28.06.2023	<0.001	<0.01	<1	0.015	<2	<0.001

Analysed By
JSA/SA/SSA

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

Approved By
HOD(In-charge) Environment
RI-2, CMPDI, Dhanbad

Location of Air & Noise Monitoring Stations in BCCL



Legend

Air/ Noise Monitoring Station

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

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

BHARAT COKING COAL LIMITED	
Title	Air & Noise Sampling Locations
Subject	Monitoring Stations
CMPDI (ISO 9001 Company)	Date Not to Scale

STN CODE	NAME OF STATIONS (AIR/NOISE)
A24	BINGANDIH COAL WASHERY
A25	DHADHA WASHERY
A26	MAHUDA WASHERY
A27	KATRAS CHOUDHURI COLLIERY

ACTION PLAN FOR IMPLEMENTATION OF POLLUTION CONTROL MEASURES IN BCCL COMMAND AREA

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
1	**Air Pollution Control measures**	***Covered Transportation*** A) Responsibility of CISF personnel appointed at weigh-bridge will be to maintain a Register for tarpaulin covering of coal loaded trucks. B) GMs of respective areas will insure the implementation of the above within 15 days of order/Action Plan released.	✓ ***3 Months*** *Ensuring proper mechanism of inspection and implementation of Covered truck is in Place* **Continuing**	-	-	• Area Environment Engineer • Area GM • HOD(Env), HQ BCCL	NA
2		***Permanent Pucca Transportation Road*** ***A)*** Roads under BCCL will be Paved/Black topped in Non-Coal Bearing Area ***B)*** *Cost Estimate*: Area Civil Engineer (**4 Months**) ***C)*** *Capital Indent*: Area Civil Engineer (3 Months) ***D)*** *Approvals/Tender/ Work start and completion*: Area Civil Deptt. & CED, HQ (**12 Months**)	-	-	✓	• Area Civil Engineer • Area GM BCCL	Capital Budget Respective Areas 3 crores
3		***Drilling with Dust extractor/wet drilling*** ***A)*** All Existing drills are equipped with dust containment or water injection system. All new procurements of drills shall be with dust containment system. ***B)*** *Cost Estimate*:Excavation Deptt. ***C)*** *Capital Indent*: Excavation Deptt.		✓ At present no drills procurement is in-line.		• GM Excavation • Area GM BCCL	- Capital Budget will be reapportioned as required

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
		D) *Approvals/Tender/ Work start and completion*: E&M Deptt.					
4		***Fixed Sprinkling arrangements at Siding (preferably at height)*** ***A)*** Sprinklers shall be installed ***B)*** *Cost Estimate*: Siding in-charge & Area E&M Manager, E&M In-charge washery (3 **Months**) ***C)*** *Capital Indent*: Colliery Manager &Area E&M Manager, Area Env Engineer (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: Area E&M Deptt. & MM deptt, HQ (7 **Months**)	-	✓	-	• Area GM • GM WCD, CCWO • HOD(Env) BCCL	Capital Budget Environment Head: 2.5 Crores. Othr Heads : 6.5 Lakhs
5		***Overhead sprinklers at Loading site*** ***A)*** At loading points overhead water showering arrangement shall be provided. ***B)*** *Cost Estimate*: Colliery Engineer& Area E&M Manager (**2 Months**) ***C)*** *Capital Indent*: Colliery Manager &Area E&M Manager (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: Area E&M Deptt.& Project officer (**7 Months**)	-	✓	-	• Project Officer • Area GM • HOD(Env) BCCL	Capital Budget Environment Head: 2.5 Crores.
6		***Mobile sprinklers/ Mist Sprinkler*** ***A)*** Mobile sprinklers trips will be increased and Mist sprinklers procurement will be done	-	✓	-	• GM E&M • HOD (Env)	Capital Budget Environment Head: 2.5 Crores

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
		B) *Cost Estimate*: E&M Deptt., HQ(**3 Months**) ***C)*** *Capital Indent*: Area E&M Manager (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: MM deptt, HQ (**6 Months**)					
7		***Wheel washing ditches after weigh-bridge for tire cleansing*** ***A)*** Wheel washing arrangement shall be provided at Weigh- Bridge site ***B)*** *Cost Estimate*: Colliery Manager & Area Civil Engineer (**2 Months**) ***C)*** *Capital Indent*: Colliery Manager, Project officer&Area Civil Engineer (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: Area E&M Deptt. & MM deptt, HQ (**6 Months**)	-	✓	-	• Project Officer, BCCL • Area GMBCCL • Project Officer, Washery, BCCL	Capital Budget New commitment
8		***Enclosure of CHP/covered crushing*** ***A)*** CHP/Crushers shall be covered ***B)*** *Cost Estimate*: Area Manager Transport & Area E&M Manager (**2 Months**) ***C)*** *Capital Indent*: Colliery Manager & Project officer (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: Area E&M Deptt. & MM deptt, HQ (**6 Months**)	-	✓	-	• Area Manager transport • Area Manager Sales BCCL	Capital Budget New Commitment
9		***Grass covering over inactive OB dumps.*** ***A)*** Inactive OB dumps shall be identified and will be covered with	-	✓ Continuing	✓	• HOD (Env) • SRM (Min), Eco-Restoration Team	Revenue Budget Rs 5 crores

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
		grass ***B)*** *Cost Estimate*: Area Environment Engineer (**2 Months**) ***C)*** *Proposal*: HQ Env Deptt. (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: HQ, Env Deptt. (**6 Months**)				• Area Env Manager	
10		***Building boundaries around railway siding made of coconut choirs or GI sheets.*** ***A)*** Railway sidings will be surrounded with boundaries of GI Sheets/Coconut coir/Jute Cloths B) *Cost Estimate*: Siding in-charge & Area Civil Manager (**2 Months**) C) *Capital Indent*: Colliery Manager & Project officer (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: Area E&M Deptt. & MM deptt, HQ (**6 Months**)	-	✓	-	• Area GM • HOD(Env) BCCL	Capital Budget New Commitment
11		***Introducing Bioswale as Pilot Project*** A) Cost Estimate: GM Civil, CED, HQ B) Capital Indent: GM Civil, CED,HQ C) Approval/Tender/Work start and completion: CED, HQ			✓	• Concerned Area GM • GM Civil • HOD(Env)	Capital Budget New Commitment

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
12		***Fiery coal/OB should be dumped in-pit/ wetted completely before transporting*** ***A)*** Fiery coal shall not be transported on elevated OB dumps and shall be dumped in-pit/ transported after complete wetting B) Project officer & Area manager planning to site the location prior to excavating fiery coal/OB. ***C)*** Water Pools to be used for drenching of fire and wetting of fiery coal/OB ***D)*** Strict instructions to be issued from Functional Technical Directors.	✓	-	-	• Area GM • HOD (Env)	-
13		***Pollution under control Certificate to be ensured by Transporter/ BCCL transport in-charge*** A) *CMC Deptt: To be included in contracts of transporter* B) *Area Transport In-Charge shall ensure PUC is issued to all plying vehicles*	✓	-	-	Area Manager Transport HOD(Env)	-
14	**Inspection/ Monitoring measures/ Complaint Redressal**	***AAQ Monitoring*** A) 39 Air and Noise Monitoring Stations in JCF B) Stations established in consultation with JSPCB	✓ ***Ongoing***	-	-	• CMPDIL, RI-II, Dhanbad	Revenue Budget Rs 3.5 crores
15		***COAAQMS,*** A) COAAQMS shall be installed at Jagjeevan Nagar	-	✓	✓	• CMPDIL • HOD(Env) BCCL	Capital Budget Rs 3 crores

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
		B) *Cost Estimate*: CMPDIL, RI-II, Dhanbad (**2 Months**) C) *Capital Indent*: CMPDIL, RI-II, Dhanbad (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: CMPDIL, RI-II, Dhanbad (**6 Months**) ***Online PM10 Analyser*** Online PM10 Analyzer shall be installed at Mines and Railway sidings ***A)*** *Cost Estimate*: Area Environment Manager (**2 Months**) ***B)*** *Capital Indent*: Colliery Manager (**2Months**) ***C)*** *Approvals/Tender/ Work start and completion*: MM Deptt, HQ (**6 Months**)					
16		***Source Apportionment Study*** Work awarded to NEERI, Nagpur on 12.05.2018. Monitoring work started Final report shall be submitted in One year	-	✓	-	HOD(Env)	Revenue Budget Rs 1.41 Crores
17		***HQ Environment Deptt. review and report the status of compliances to FDs and Board*** • Structured meetings with all the areas/washeries • Inspection of Areas by HQ Compliance team	✓ ***Ongoing***	-	-	SRM (Min) HOD (Env)	-

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
18		***All the areas to inspect each other's progress monitored under Environment Department, HQ*** ***A)*** Schedule and teams already formulated for inspections	✓	-	-	Area Inspection Team	-
18		***An Inspecting team to be formed consisting local activist/NGO for regular inspection of above practices*** ***A)*** Area Environment Committee to be formulated for monitoring of Environment Compliances (1 Month)	✓	-	-	Area Environment Committee	-
19	**Water Environment**	***Township wise STP/ETP*** ***A)*** STP will be installed in Koyla Nagar, Jagjeevan Nagar with 2 MLD capacity **DMC will collect septage for whole Jharia and Koyla Nagar, Bhuli Township** B) *Cost Estimate*: CED, HQ (3 **Months**) C) *Capital Indent*: CED, HQ (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: CED,HQ (12 **Months**)			✓	GM (Civil)	Capital Budget: 3.85 crores
20		***Workshop effluents treatment*** ***A)*** Oil & Grease Trap B) *Cost Estimate*: Workshop In-charge (**2 Months**) C) *Capital Indent*: Workshop in-charge & Area Civil Engineer (**2Months**) ***D)*** *Approvals/Tender/ Work start and completion*: CED, HQ (8 **Months**)	-	✓	-	• Area Environment Manager • Workshop Incharge • HOD (Env) BCCL	Capital Budget: Rs 5 crores

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
21		***Garland Drains/Retaining Walls around OB Dumps*** A) *Cost Estimate*: Area Civil Engineer & Area Survey officer (**2 Months**) B) *Capital Indent*: Area Civil Engineer, Area Environment Manager & Area Survey Officer (**2Months**) ***C)*** *Approvals/Tender/ Work start and completion*: CED, HQ (8 **Months**)	-	✓	-	• Area Civil Manager • Area GM BCCL	Capital Budget 2.00 crores
22	**Others**	***Biodiversity*** A) Plantation over OB dumps/Backfilled Areas/ Avenue & Boundary Plantation B) स्नेह स्मृति उपवन shall be developed in all areas.	✓ Eco-restoration with three tier plantation practiced. For 2019-20, plantation of area of 54 Ha will be done by State Forest Department.	✓	✓	• HOD(Env) • Area GM BCCL	Revenue Budget Plantation: 5 crores
23		***Mechanical Sweeper*** Proposal: CSR Deptt. Handed over to Dhanbad Municipal Corporation	-	✓	-	Dhanbad Municipal Corporation	CSR Budget

ACTION PLAN FOR FOREST CLEARANCE COMPLIANCE

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
1	Soil Management	*Mitigative measures to minimize soil erosion* • Contour Trenching • Gully Plugging • Brushwood Checkdam *Cost Estimate: Area Civil Engineer* *Capital Indent: Area Civil Engineer* Rate Consultation: State Forest Department		✓		• Area Environment Engineer • Area GM • HOD(Env), HQ BCCL	**Revenue Budget** 30 Lakhs (Bastacolla Area) **Capital Budget** Bastacolla Area: 10 Lakhs Environment: 5 crores
2		*Plantation of drought hardy plant species* *Cost Estimate: Area Environment Manager* *Rate Consultation: State Forest Department*	✓ Continuing			• Area GM • HOD(Env), HQ BCCL	**Revenue Budget** Plantation: Rs 6 Crores
3		***Construction of check dams, retention/toe walls*** ***Cost Estimate: Area Civil Engineer*** ***Capital Indent: Area Civil Engineer***		✓		• Area GM • HOD(Env), HQ BCCL	**Capital Budget** Bastacolla Area: 10 Lakhs Environment Settling Pond: 5 crores
4	Demarcation	***Boundary of Safety Zone and Mining Lease*** Ensure demarcation exists for safety zone and Mining lease by erection of Concrete Pillars (4 feet high from ground)	✓ Demarcated (Safety Zone already demarcated)	✓ Mining lease will be demarcated.		• Area GM • Area Environment Manager	-

SL No.	Type of Action	Activities and Executing Responsibilities	Timeline			Monitoring and Reporting	Budget
			Short term (3 to 6 Months)	Medium Term (12 Months)	Long term (24 Months)		
5	**Others**	***Plantation in Blanks within Lease*** Area Identification: Project Officer, Concerned Colliery Cost Estimate: Area Environment Manager	-	✓	-	• Project Officer • Area GM • HOD(Env) BCCL	**Revenue Budget** Plantation Head: 6 Crores.
6		***De-silting of Village tanks and water bodies located within 5 Kms*** Identification of Site: Project Officer Cost Estimate: Area Civil Engineer	-	✓	-	• Area GMs • Area Environment Manager	**Revenue Budget** Environment Head: 2 Crores

EXISTING STATUS OF VARIOUS POLLUTION CONTROL MEASURES

ANNEXURE-1

Existing Mobile Sprinklers

Sl no.	Unit/area	Mobile Sprinklers (No.)	
		No. of Mobile Tankers	Capacity of Tankers (KL)
1	Barora Area	5	92
2	Block II	5	124
3	Govindpur Area	4	68
4	Katras Area	16	284
5	Sijua Area	11	204
6	Kusunda Area	16	170
7	PB	7	42
8	Bastacolla Area	19	240
9	Lodna Area	9	156
10	E J Area	8	112
11	W J Area	3	20
12	C V Area	6	118
13	WWZ Area	5	35.2
14	EWZ Area	2	20
TOTAL		**116**	**1685.2**

ANNEXURE-2

Existing Fixed Sprinklers:

Unit/area	No. of Fixed Sprinklers
Block II	Working (Nudkhrkhi)
Govindpur Area	Working
Katras	95
Sijua Area	10
Kusunda Area	Working (Godhur)
Lodan	10
W J Area	34
WWZ Area	143
EWZ Area	7
Total	**299**

ANNEXURE-3

Status Garland Drains

Sl. no.	Total OB dumps (Mine wise)	Dumps to be rehandled /used for backfilling and so do not require wall	Old dumps that require wall/ garland drain in Mtrs.	Work Completed as on date in Mtrs.
1	Jamunia		480	480
2	Gopalichak	Dump to be rehandled for backfilling	-	-
3	Muralidih		100	100
4	Bhowra(North)		150	150
	Bhowra(South)		150	150
5	Damoda		300	300
6	Block-IV		660	460
7	Muraidih	Dump to be rehandled for backfilling	400	400
8	Mudidih		250	250
9	Akashkinari		700	500
10	West Mudidih		-	-
11	Gaslitand		250	
12	Tetulmari	Dump to be rehandled for backfilling	-	-
13	Nichitpur		175	-
14	SendraBansjora		175	175

ANNEXURE-4

Plantation Status:

S. No.	Area/colonies	Total Plantation area (Ha)	Gabion/ Avenue / Road side Plantation	Total afforestation/ eco-restoration (Nos)
1.	Barora	320.86	1000	854908
2.	Block-II	27	570	67500
3.	Govindpur	74.5	250	184050
4.	Katras	36.78	2285	40695
5.	Sijua	97.1	1320	194230
6.	Kusunda	41.78	500	89457
7.	PB Area	28	1390	67350
8.	Bastacolla	87.2	1600	188000
9.	Lodna	85.8	1848	178655
10.	EJ Area	127.74	2500	185075
11.	WJ Area	269.4		366550
12.	CV Area	94.6	7300	238870
13.	Koyla Nagar	10.5	4450	12600
14.	Jagjivan Nagar	3.4		4080
15.	Washery division	35	125	110250
16.	CCWO Colony	2.6		3120
17.	Bhuli Township	8.9		10680
	Others			13297
Total		1350.66	25138	2809367
Total Plantation by BCCL (including Gabion/ Avenue / Road side & eco-restoration)				2834505

ANNEXURE-5

Oil & Grease Trap in Workshop

Sl no.	Area	Completed	Proposed
1	Barora	**Completed**	
2	PB	**Completed**	
3	Sinidih	**Completed**	
4	Block-II	**Completed**	
5	Sijua	**Completed**	
6	Lodna	**Completed**	
7	Govindpur		**Proposed**
8	Katras	**Completed**	
9	Bastacolla		**Proposed**
10	Kusunda		**Proposed**
11	EJ		**No Workshop**
12	CV		**Proposed**

DrillsDust suppression system status:

Sl. no.	Mine	Total No. of drills	No. of drills with dust containment system
1	Jamunia	2	2
2	Block-II	7	7
3	Damoda	3	3
4	Muraidih	5	5
5	Shatabdi	4	4
6	Akashkinari	1	1
7	Block-IV	4	4
8	AKWMC	6	6
9	Nichitpur	4	4
10	SendraBansjora	2	2
11	East Bassuria	2	2
12	Dhansar	3	3
13	ROCP	3	3
14	Ena	2	2
15	Ghanoodih	3	3
16	KOCP	3	3
17	NT/ST	4	4
18	Jeenagora	3	3
19	COCP-Bhowra	2	2
20	COCP-Patherdih	4	3
21	Dahibari-Basantimata	7	7

“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

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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.

WATER HARVESTING & ARTIFICIAL RECHARGE

Coal mining is the major industrial activity in the area. Ground water pumping is an integral part of mine management for safe and efficient coal extraction. Pumping from both underground and opencast mines may affect groundwater table near the mine area. In coal mining area the impact is observed to be mostly limited to 500 m from the mine boundary. Mining activity also creates high permeability aquifer zones during backfilling activities in opencast mines and depillaring/caving activities in underground mines. Besides this, groundwater utilization is mainly for domestic and irrigation use in the study area.

To minimize the impact of mining on ground water system, the project/mine authority has been adopting all possible measure to increase the ground water recharge potential.

The stage of ground water development in the buffer zone (10 km from the periphery of the core zone) of Cluster-X mines comes to about 40.15%. As per the data collected from the Central Ground Water Board, Ranchi, the stage of ground water development in the Jharia Block in which Cluster-X project and its buffer zone located is 53.62% in year 2004 and 105.63% in year 2008-09. CGWB observation well located at Jharia does not show any declining trend. The area falls within the “Critical” to “Overexploited category but both pre monsoon and post monsoon ground water level do not show any significant long term declining trend. Rather the pre-monsoon water level shows a rising trend. Again, core zone of cluster X is located in the discharge area near Damodar River. Therefore artificial recharge can be done in the buffer zone of the Cluster-X.

Artificial recharge has to be done to check the lowering of water level in the study area using rainwater harvesting and surplus mine water.

Groundwater inflow (11825 m^3/day) and mine influence area (maximum 500 m from the mine edge) have been estimated and the groundwater monitoring would be undertaken as corrective measure to avoid adverse effects. The mine discharge after passing through sedimentation tank is being discharged onto local jore / nala with check dams at suitable locations so that the groundwater gets additional recharge by the return flow.

The impact on ground water level will be minimized by artificial recharge by spreading of pumped out water, creation and filling of ponds with mine water and construction of rainwater harvesting structure.

Rain Water harvesting is a deliberate collection and storage of rain water that runs off on natural and man-made catchment area. The amount of water harvested depends on the frequency and intensity of the rain fall and characteristics of the catchment to allow the precipitate to infiltrate through the sub-soil and percolate down to recharge aquifers.

It is therefore proposed that during mining operation the rain water within the mining area will be accumulated in earthen water pool developed on the surface which will not only be helpful in re-charging the ground water of the area but will fulfil the non-drinking water demand of nearby inhabitants also.
Necessary check dams (Figure No-2) have been/will be made in the nala for recharging ground water aquifer. Roof-top rainwater harvesting (Figure No-3) will be taken up in the project area using the administrative buildings if required. Rainwater harvesting and artificial recharge will also take place through abandoned dug-wells and final voids of old mines for increasing ground water potential and check water level lowering.

Check dams / Nala bunds – Runoff conservation structures like check dams, nala bunds are constructed over the stream / nala bed thereby increasing the contact period of rainwater with the underlying formation. It is commonly

constructed across small streams with gentle slope and there is no submergence beyond stream course. The site selected should have sufficient thickness of permeable bed / weathered formation to facilitate recharge within short span of time. A check dams in Kari jore near Dhansar Colliery (western part) and another one at Nagri jore near Jogta/Nischitpur OC is provided to facilitate groundwater recharge.

Figure No-2: Check Dams / Nala bunds.

Rooftop Runoff Recharge –

- **Recharge through existing Dug/Tube well –** In areas where shallow aquifers have dried up and existing Dug/Tube wells are tapping deeper aquifer, rooftop rainwater harvesting through existing wells can be adopted to recharge the aquifers.
- **Filter Pit –** If the roof area is more, to accommodate excess rainwater a filter pit may be constructed. The shape and size of the filter pit is depending upon available runoff.

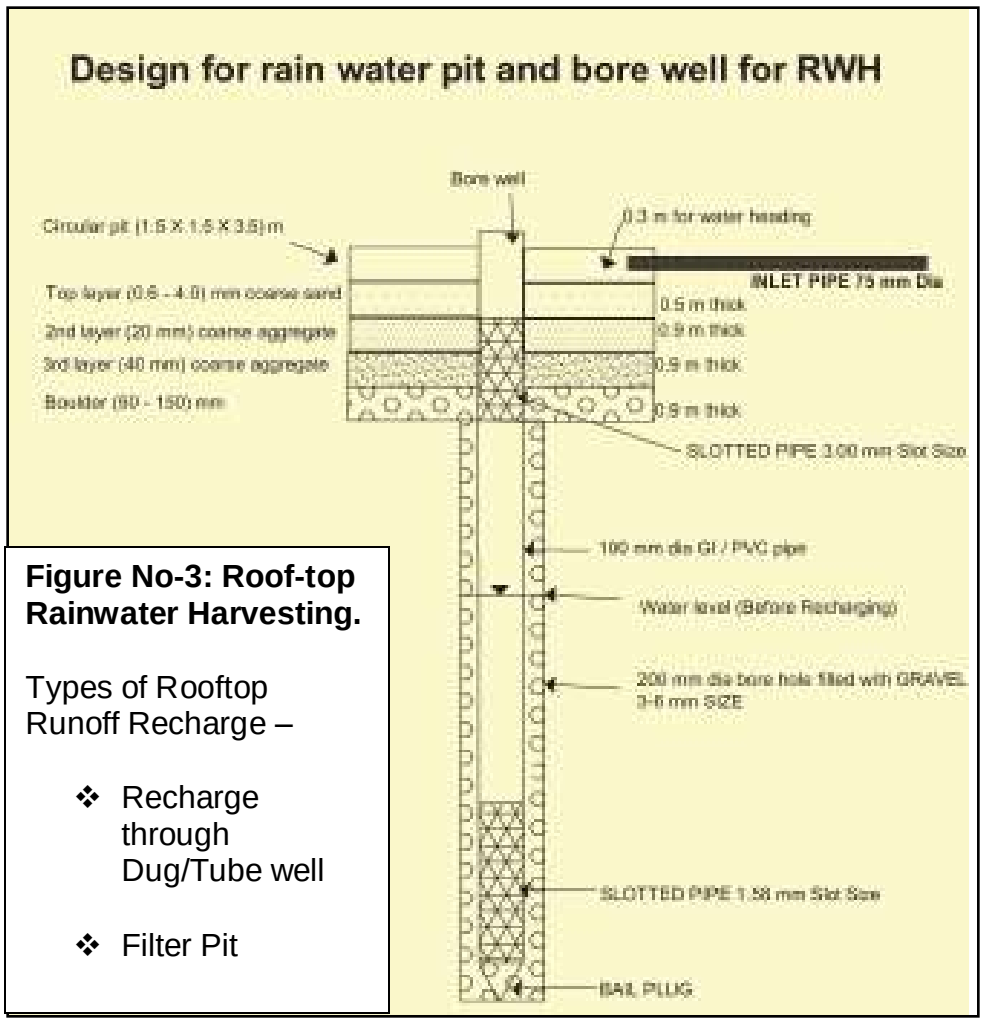

Figure No-3: Roof-top Rainwater Harvesting.

Types of Rooftop Runoff Recharge –

- Recharge through Dug/Tube well
- Filter Pit

Recharge Pit – The abandoned underground mine workings can be used as recharge pit which can act as artificial recharge structure to augment the recharge of deeper aquifers. It behaves as huge ground water reservoirs and contains groundwater runoff (i.e. planned recharge). After mine closure, voids of opencast and underground workings will be waterlogged. This will help in maintaining the water table in the surrounding areas and may become a source of water supply to the community. Out of 115.15 Ha of abandoned quarry in the core zone of Cluster-X, 46.15 Ha has already been backfilled. Remaining area of 69.00 Ha will be act as water body to recharge the groundwater.

Recharge through Dug well – Existing dug wells may also be used as recharge wells, as and when source water become available. In areas where

considerable de-saturation of aquifers have already taken place due to over-exploitation of groundwater resources resulting in the drying up of dug wells and lowering of piezometric head in bore/tube wells. Existing groundwater abstraction structures can be used as cost-effective mechanism for artificial recharge of the phreatic or deeper aquifer zones. Dug well has been made near or within the small streams / nala / jore to augment the groundwater recharge. Water is percolating from flowing stream into groundwater systems through dug wells.

Water harvesting through Settling tank and Percolation tank -These is an artificially created surface water body, submerging in its reservoir a highly permeable land so that surface runoff is made to percolate and recharge the ground water storage. Percolation tank should be located on highly fractured and weathered rock with lateral continuity. The size of the tank should be governed by the percolation capacity of strata in the tank bed.

The surplus mine water will be given to the local people for irrigation. Utilization of mine water for irrigation use will also enhance the ground water recharge potential through artificial recharge in the area.

The pond, tanks, stop dams etc constructed in the rehabilitated and affected villages also augment the groundwater recharge.

Efforts are being made to construct more recharge structures at suitable sites in the nearby villages in consultation with Central Ground Water Board.

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

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बी. सी. सी. एल.
कोयला भवन
धनबाद

विषय: Study of Installation of Rail-cum-Conveyor System in BCCL for transportation of coal.

संदर्भ: पत्र संख्या:
1. सी.एम.पी.डी.आई./पर्यावरण /2016/663, दिनंक: 14.07.2016,
2. BCCL/Dy.GM (Env)/F-EMP/16/1314-15 (M), Dated: 23.06.2016,
3. आर.आई.- 2/पर्यावरन / एम-30/1150, दिनांक : 20.06.2015.
4. E-17719

महोदय,

In reference to your letter no. BCCL/Dy.GM (Env)/F-EMP/16/1314-15 (M), Dated: 23.06.2016, to GM (Env), CMPDI-HQ, it has already been indicated in letter no.आर.आई.-2/पर्यावरन / एम-30/1150, दिनांक : 20.06.2015 that study for installation of Rail-cum-Conveyor System in BCCL for transportation of coal can be started only after the liquidation of coal mine fire, rehabilitation of 595 unstable sites, road realignment and relocation of railway sidings of BCCL and final report of RITES in regard to realignment of railway lines.

This is for your kind information.

भवदीय

(वि.कु. सिन्हा)
क्षेत्रीय निदेशक

Sri Amaitabha Act Mgr(Env), for record.
4.8.16.

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

CLUSTER X GROUP OF MINES

Bhowrah North (UG),Bhowrah North (OC),Bhowrah South (UG), 3 Pit OCP,Chandan OCP(Bhowrah),Patherdih (UG),Chandan OCP (Patherdih),Sudamdih Incline (UG),Sudamdih Shaft (UG),Amlabad (UG) Closed,Sudamdih Coal Washery(Within the lease hold of Sudamdih Shaft Mine)

Normative Production : 1.762 MTPA
Peak Production : 2.289MTPA
Lease Hold Area : 2057.47Ha

Bharat Coking Coal Limited

(July,2019)

Prepared by

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Kanke Road, Ranchi-834008

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Chapter – I

Introduction

1.1 Genesis:

MOEF provided Environmental Clearance to the various mines of the Cluster J-11015/380/2010-IA.II (M) Dated 06.02.2013 As per the Environmental Clearance Conditions given by the Ministry of Environment & Forest "A study should be initiated to analyse extent of reduction in pollution load every year by reducing road transport of coal". Therefore the present study has been carried out to quantify the pollution load due to coal transportation.

1.2 Methodology:

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

1.3 General Information about the Cluster:

1.3.1 Brief Description:

Cluster X mines of BCCL consists of six mines, Bhowrah North (Mixed UG and OC), Bhowrah South (Mixed UG and OC that are 3 Pit OCP Chandan OCP), Patherdih (Mixed UG and OC that is Chandan OCP), Sudamdih Incline (UG), Sudamdih Shaft (UG) are operating mines and one closed Amlabad (UG) mine . There is also one existing Sudamdih coal washery. This cluster is located in the Eastern part of the Jharia coalfield. These mines are taken over by BCCL from private mine owners after nationalization through Coal Mines Nationalization Act, 1972-73.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:

(Mixed UG and OC), Bhowrah South (Mixed UG and OC that are 3 Pit OCP Chandan OCP), Patherdih (Mixed UG and OC that is Chandan OCP), Sudamdih Incline (UG), Sudamdih Shaft (UG) are operating mines . There is one closed Amlabad (UG) mine. There is also one existing Sudamdih coal washery. The cluster falls in Eastern Jharia Area of Jharia Coalfield part of the Bharat Coking Coal Limited in the Dhanbad District of Jharkhand state. 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 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 –X

Sl No	Name of Mines	Production Capacity (MTY)		Lease Hold Area (Ha)
		Normative	Peak	
1	Bhowrah North (UG)	0.11	0.143	208.83
2	Bhowrah North (OC)	0.42	0.546	
3	Bhowrah South (UG)	0.29	0.377	571.58
4	3 Pit OCP	0.235	0.305	
5	Chandan OCP(Bhowrah)	0.158	0.205	
6	Patherdih (UG)	0.054	0.070	244.34
7	Chandan OCP (Patherdih)	0.22	0.286	
8	Sudamdih Incline (UG)	0.09	0.117	254.27
9	Sudamdih Shaft (UG)	0.185	0.240	391.50
10	Amlabad (UG) Closed	0	0	386.95
	Total	1.762	2.289	2057.47
11	Sudamdih Coal Washery (Within the lease hold of Sudamdih Shaft Mine)	1.6	2.08	18

1.3.3 Impact of Fire Control on Ambient Air Quality:

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

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

1.4 Meteorological Data

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

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

The analysis of wind pattern during the season showed that the predominant wind directions were from North-West & West followed by North-East having frequencies 15.71%, 11.45% & 4.67% respectively. The receptors located in the Downwind directions i.e. SE and East from the dust generating sources are likely

to be affected. The dispersion of air borne dust during calm period (45% of time) will be very poor and buildup of pollutant concentration during this period will occur.

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

Table 1.2: SEASONAL WIND DISTRIBUTION

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

Wind Direction	Wind Velocity (m/s) & Duration (%)				
	< 0.5	0.6 -1.5	1.6 -3.5	>3.5	Total
N		1.61	0.78	0.00	2.38
NNE		0.83	0.37	0.00	1.19
NE		3.17	1.47	0.05	4.67
ENE		0.41	0.14	0.00	0.55
E		1.10	0.69	0.00	1.79
ESE		0.50	0.37	0.00	0.87
SE		1.28	0.41	0.05	1.74
SSE		0.64	0.18	0.00	0.82
S		0.41	0.09	0.00	0.50
SSW		0.28	0.05	0.00	0.32
SW		2.29	0.60	0.00	2.88
WSW		1.06	0.41	0.00	1.47
W		8.99	2.48	0.00	11.45
WNW		1.24	1.01	0.00	2.24
NW		11.47	4.22	0.05	15.71
NNW		2.11	3.59	0.00	5.7

Wind Direction	Wind Velocity (m/s) & Duration (%)				
	< 0.5	0.6 -1.5	1.6 -3.5	>3.5	Total
CALM	44.97	-	-	-	44.97
Total	44.97	37.32	17.56	0.15	100

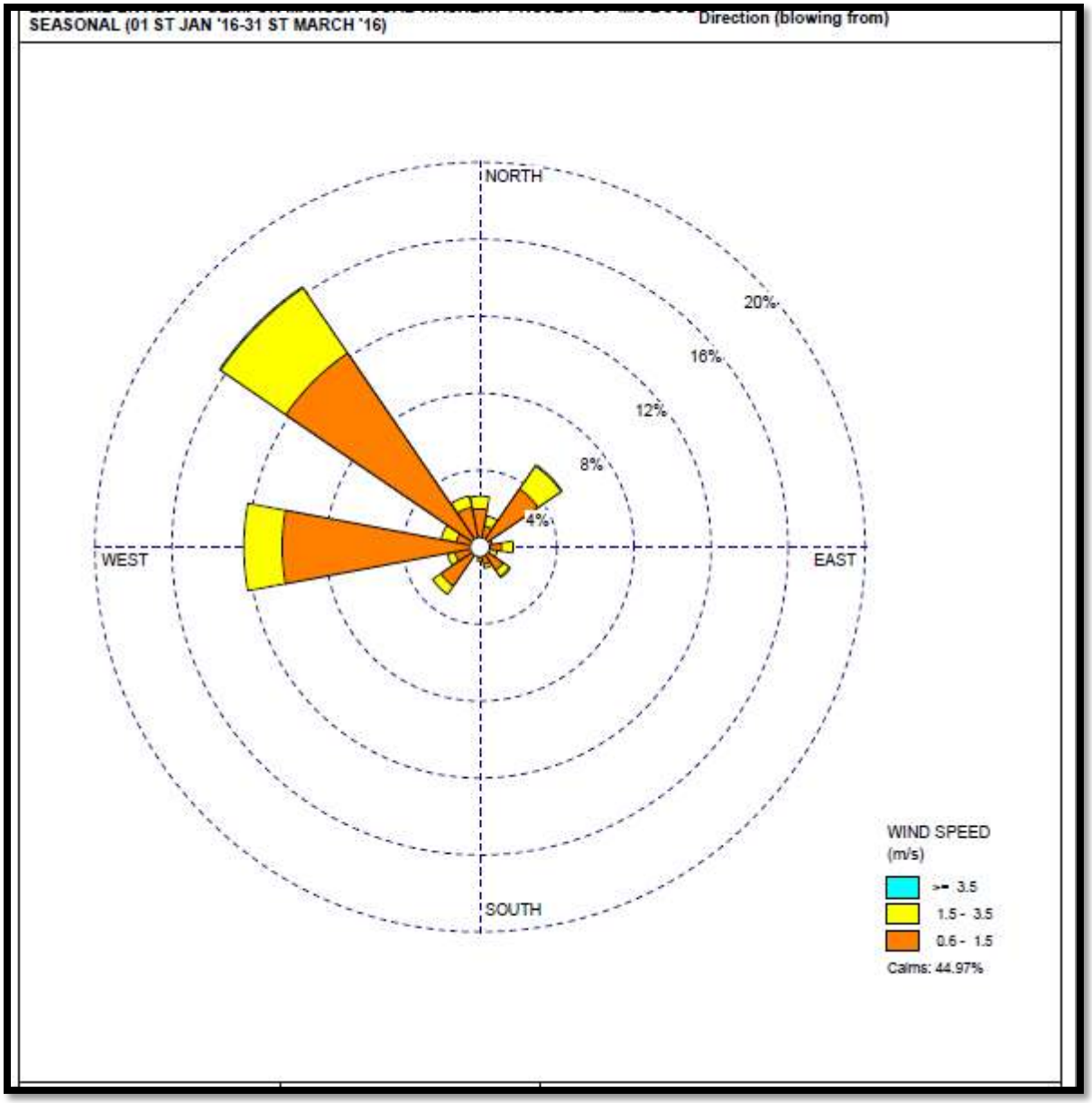

Figure No.-1.1 Wind Rose diagram for the period 1St Jan to 31St March 2016

Chapter – II

Fugitive Dust Generation Due To Movement of Coal

2.1 Introduction

The coal produced moves to the consumers via Road & Rail. Coal from the mine face is brought to the surface dumps and bulk of it goes to the nearby railway 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 for the year 2013-14, 2014-15 and 2015-16.

2.2.1 Cluster X Dust Generation (Kg/day):

Table: 2.1 Dust Generation (Kg/day)

Dust generated per day (Kg/Day)										
Name of the Mine	**Year**	**Location**	**Distance from Face to Siding (Km)**	**Coal Transferred (Te)**	**Daily Coal Production (Te/Day)**	**Capacity of the Dumper**	**Vehicle Kilometer Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
Bhowra South	13-14	Sudmadih washery	6	11888.66	36.00	14	30.86	0.53	16.354	
	13-14	Other Consumers	20	28226.29	86.00	14	245.71	0.53	130.229	
	13-14	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
		Total for 13-14			**122.00**				**146.583**	1.20
	14-15	Sudmadih washery	6	3495.82	11.00	14	9.43	0.53	4.997	
	14-15	Munidih washery	20	2014.34	6.00	14	17.14	0.53	9.086	
	14-15	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
	14-15	Other Consumers	20	26230.52	79.00	14	225.71	0.53	119.629	
		Total for 14-15			**96.00**				**133.711**	1.39
	15-16	Sudmadih washery	6	4232.18	13.00	14	11.14	0.53	5.906	
	15-16	Other Consumers	20	24238.9	73.00	14	208.57	0.53	110.543	

Dust generated per day (Kg/Day)										
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 Kilometer Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
	15-16	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
		Total for 15-16			**86.00**				**116.449**	1.35
Bhowra (North) u/g mines	13-14	Sudmadih washery	6	4232.18	13.00	14	11.14	0.53	5.906	
	13-14	Other Consumers	20	24238.9	73.00	14	208.57	0.53	110.543	
	13-14	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
		Total for 13-14			**13.00**				**116.449**	8.96
	14-15	Sudmadih washery	6	2366.92	7.00	14	6.00	0.53	3.180	
	14-15	Munidih washery	20	1398.73	4.00	14	11.43	0.53	6.057	
	14-15	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
	14-15	Other Consumers	20	26219.77	79.00	14	225.71	0.53	119.629	
		Total for 14-15			**90.00**				**128.866**	1.43
	15-16	Sudmadih washery	6	3092.46	9.00	14	7.71	0.53	4.089	
	15-16	workshop	0.5	120	0.00	14	0.00	0.53	0.000	
	15-16	Other Consumers	20	21299.27	65.00	14	185.71	0.53	98.429	
		Total for 15-16			**74.00**				**102.517**	1.39
Sudam dih incline (ASP)	13-14	Sudmadih washery	3	14806.94	45.00	14	19.29	0.53	10.221	
	13-	workshop	0.5	29	0.00	14	0.00	0.53	0.000	

Dust generated per day (Kg/Day)										
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 Kilometer Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
	14									
		Total for 13-14			**45.00**				10.221	0.23
	14-15	Sudmadih washery	3	27204.78	82.00	14.00	35.14	0.53	18.626	
	14-15	Munidih washery	20	412.66	1.00	20.00	2.00	0.53	1.060	
	14-15	MPL	20	7862.26	24.00	14.00	68.57	0.53	36.343	
		Total for 14-15			**106.00**				56.029	0.53
	15-16	Sudmadih washery	3	14263.52	43.00	15.00	17.20	0.53	9.116	
		Total for 15-16			**43.00**				**9.116**	0.21
Patherdih u/g (ASP)	13-14	Sudmadih washery	3	14090.58	43.00	14.00	18.43	0.53	9.767	
	13-14	workshop	4	120	0.00	14.00	0.00	0.53	0.000	
		Total for 13-14			**43.00**				**9.767**	0.23
	14-15	Sudmadih washery	3	5128.19	16.00	14.00	6.86	0.53	3.634	
	14-15	workshop	4	20	0.00	14.00	0.00	0.53	0.000	
	14-15	Other Consumers	20	3442.17	10.00	14.00	28.57	0.53	15.143	
		Total for 14-15			**26.00**				**18.777**	0.72
COCP Patherdih (ASP)	13-14	Sudmadih washery	3	27899.58	85.00	14.00	36.43	0.53	19.307	
	13-14	MPL	20	88044.23	267.00	14.00	762.86	0.53	404.314	
	13-	By Rail (Durgapur	1	1535.81	5.00	14.00	0.71	0.53	0.379	

Dust generated per day (Kg/Day)										
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 Kilometer Travelled**	**Emission Rate for PM 10 (kg/VKT)**	**Pollution Load * Dust Generated Per Day (Kg/day)**	**Dust generated Kg/per tonne**
	14	steel plant)								
		Total for 13-14			**90.00**				**424.000**	4.71
	14-15	Sudmadih washery	3	11459.74	35.00	14.00	15.00	0.53	7.950	
	14-15	W-III washery	3	24128.06	73.00	14.00	31.29	0.53	16.581	
	14-15	Other Consumers	20	15074	46.00	14.00	131.43	0.53	69.657	
		Total for 14-15			**81.00**				**94.189**	1.16
	15-16	Sudmadih washery	3	50234.35	152.00	14.00	65.14	0.53	34.526	
		Total for 15-16			**152.00**				**34.526**	0.23

* 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 forthe Cluster:

Phase – II (after 15 Years):

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

During 2015-16, the combined daily coal production of the Cluster was 355 tones resulting in 263 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.10 kg/te.

As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of 5131 kg/day for daily coal production of 6936 tonnes (2.289 MTY) during Phase –II.

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

Cluster	Production Capacity (MTY)	Proposed Transport Infrastructure in Phase – II
X	2.289	**Coal transport by Conveyor to Railway Siding**
	6936 tonnes /Day	

2.5 Conclusion:

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

Phase – I :(2013-14 to 2028 -29) :

1. During Phase – I, business as usual(BAU) scenario will prevail and the existing road cum rail transport network system will be used for coal dispatch to the consumers. During 2015-16, the combined daily coal production of the Cluster was 355 tones resulting in 263 kg of daily fugitive dust generation. The dust (PM-10) generation rate at present is 0.10 kg/te.
2. The generation of fugitive dust due to transportation of coal by road can be further reduced by enforcing covering of loaded trucks, periodical removal of loose materials lying on the road surface and black topping of coal transportation roads.
3. Avenue plantation, effective wetting of the road surface and proper maintenance of roads will further result in mitigation of the impact of road generated dust on ambient air quality.
4. Better road condition, by the use of Mechanical Sweeper or vacuum cleaner dust generation may be minimized.

Phase – II :(From 2029-30 Onwards):

As a result of replacement of existing road transportation of coal by Conveyor to railway siding will result in reduction of fugitive dust generation to the extent of 5131 kg/day for daily coal production of 6936 tonnes (2.289 MTY) during Phase –II.

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

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

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

Year	Coal Production (Te/day)	Dust Generation(Kg/Day)
2015-16 (By Road transportation)	355	263
2029-30 (Considering peak production and all the coal transported through Road)	6936	5131
2029-30(By Conveyor Transportation)	6936	0

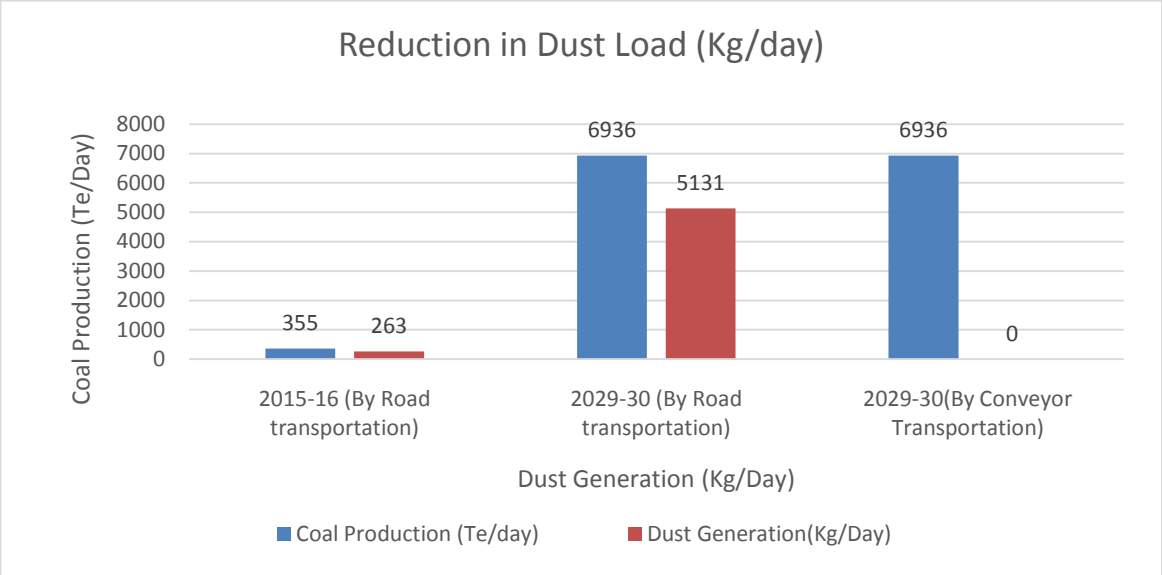

Figure 2.1: Presentation of reduction in dust generation due to replacement of Road transportation by Conveyor system.

ANNEXURE 38

CSR, R&R, TRANPORTATION PLAN AND ENVIRONMENTAL ACTION PLAN

OF

CLUSTER – X

AS PER

EC CONDITION (SPECIFIC CONDITION-Xlii): Details of transportation, CSR, R&R and implementation of environmental action plan for each of the 17 clusters should be brought out in a booklet for and submitted to Ministry.

March, 2024

INTRODUCTION

Coal India has adopted CSR as a strategic tool for sustainable growth. For Coal India in the present context, CSR means not only investment of funds for Social Activity but also Integration of Business processes with Social processes. Even much before the issue of CSR became global concern; Coal India was aware of its Corporate Social Responsibility and was fulfilling the aspiration of the Society through well-defined "Community Development Policy" within the periphery of 8 Kms. of the Project sites. This has resulted into a harmonious relationship between Coal India and the peripheral Communities.

Coal India has identified land oustees, PAP and those staying within the radius of 25 Kms of the Project as primary beneficiaries. Poor and needy section of the society living in different parts of India are second beneficiaries. For carrying out CSR activities, 80% of the budgeted amount are be spent within the radius of 25 Km of the Project Site/Mines/Area HQ/Company HQ and 20% of the budget to be spent within the States in which operating.

SCOPE

As per Schedule VII Section 135 of New Companies Act 2013 the following should be the Scope of Activities under Corporate Social Activities:

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

SOURCE OF FUND

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

CURRENT STATUS

Healthcare: Regular Health checkup camp & Health awareness programme is organized by Bhowra Regional Hospital of E.J. Area/ Cluster X, BCCL. Details of Year wise health checkup programme / camp is given below:

I. Mobile Medical Van (MMV):

S. No.	Year (financial year)	No. of Mobile Medical VanCamp	Beneficiaries	Amount (inRs.)	Remarks
1.	2015-16	229	7012	215927.76	Till Dec. 2016

II. General Medical Camps:

S. No.	Year (financial year)	Name of Medical Camp	Beneficiaries	Date
1.	2015-16	Family Planning Camp	33	03.02.2016
2.		Family Planning Camp	40	16.02.2016

III. Health Camp organized by Bhowra Regional Hospital (BRH), E.J. Area/ Cluster X:

Year: 2019

Date	Programme Organized	No. of Beneficiaries
30.11.2019	Life Style Programme of Female Employees	80
30.12.2019	Awareness Programme of Female Employees	110

Year: 2020

Date	Programme Organized	No. of Beneficiaries
15.02.2020	Diagnostic Camp, BRH	72
20.02.2020	School Camp, Amlabad	140
29.02.2020	Diagnostic camp, Sudamdih Hospital	55
14.03.2020	Health Camp, Bhowra Area	65
21.09.2020	RAT Test (Covid 19), BRH	250
22.09.2020	RAT Test (Covid 19), BRH	122

Year: 2022

Date	Programme Organized	No. of Beneficiaries
12.05.2022	School Camp, Amlabad	72
19.07.2022	Diabetic Camp, Sudamdih Hospital	140
14.11.2022	Children Day Camp, BRH	56

Year: 2023

Date	Programme Organized	No. of Beneficiaries
04.01.2023	Mega Health Awareness Camp, BRH	141
24.11.2023	Health Awareness Camp, Amlabad	212

Highlights of CSR Work under taken during 2015-16 and 2016-17 at Cluster-X

S. No.	Details	No. of units		Total Amount (in Rs.)	Remarks
1.	Construction of toilets in various schools in Saraikela-Kharsawan district of Jharkhand under "Swachh Vidyalaya Abhiyaan"under CSR activities of BCCL.	Girls	Boys	29,548,000	Work was done by state government.
		89	89		
	Total	178		29,548,000	

PROPOSED STATUS:

CSR Work to be under taken during 2017-18 at Cluster-X

S. No.	Details	Remarks
1.	Construction of Marriage/Multipurpose Hall in Mayurdubhi (मयुरदुभी) village in Amai Nagar (आमाई नगर (Panchayat of Block Chandankyari	Proposed activity

BCCL

C.S.R. PERFORMANCE REPORT MONTHWISE
April 2015 to December 2016
BHowrah REGIONAL HOSPITAL. E.J. AREA.

MOBILE MEDICAL VAN.

Date: 29.04.2016

SL.NO.	MONTH	NO.OF.CAMP	NO.OF.BENEFICIARIES	TOTAL EXPENDITURE
1.	April 15	26	1122	₹ 39,171.33
2.	May	25	937	₹ 35,270.12
3.	June	25	941	₹ 32,950.08
4.	July	27	1028	₹ 38,685.08
5.	August	25	1003	₹ 31,288.24
6.	September	26	634	₹ 17,211.73
7.	October	24	443	₹ 7,963.19
8.	November	24	517	₹ 7870.23
9.	December	27	387	₹ 5,517.76
10.	January 16			
11.	February			
12.	March			
	Total —	229	7012	₹ 2,15,927.76

Dy.C.M.O. I/C
Sudamdih R/ Hospital
E.J.Area.

NAME OF VILLAGES COVERED UNDER CSR/MMV PROGRAMME

E.J. AREA - VILLAGES

1. Bhowrah 19 No. Basti.
2. Parghabad Basti
3. Supker Basti
4. Manjhi Basti.
5. Mohubani Basti.
6. Sheobabudih
7. Bhowrah 7No Basti.
8. Bhowrah 4 No Basti.
9. Bhowrah Jahaj Tand.
10. Thana Basti.
11. Manpur Basti.
12. Amlabad Basti.
13. New Riverside Basti.
14. Gourkhutti Basti.
15. Sawardih Basti
16. Hattala Basti.

Dy.C.M.O. I/C
Sudamdih R/Hospital

/5959

FAMILY PLANNING CAMP

E.J.AREA

1. Sudamdih R/ Hospital date - 0 3.02.2016. Beneficiaries- 33
2. Bhowrah R/ Hospital date - 16.02.2016 Beneficiaries –40

Dy.C.M.O

Sudamdih R /Hospital

Pictures showing the Health Checkup Camp & Awareness Programme organized by BRH

भारत कोकिंग कोल लिमिटेड

भारत कोकिंग कोल लिमिटेड

भारत कोकिंग कोल लिमिटेड

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CSR BUDGET AND EXPENDITURE FOR FY 2019-20

Sl No	CSR Projects identified	Sector	Amt. Spent (₹ lakhs)
1	Deepening/renovation including construction of steps/ghats for ponds at Tundi, East Tundi & Baliapur	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 rejuvination of river Ganga	9.53
2	Installation of hand pumps at different locations in Dhanbad district through Dept. of drinking water and Sanitation, Dhanbad via depository mode	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health care and sanitation including contribution to Swach Bharat Kosh set-up by the Central Government for the promotion of sanitation and **making available safe drinking water**	18.02
3	Medical camps under Block II Area	Eradicating hunger, poverty and malnutrition, **promoting health care including preventive health care** and sanitation including contribution to Swach Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	0.42
4	Green Haat project at Barwa village, Govindpur block (under Swachhta Pakhwada)	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health care and **sanitation** including contribution to Swach Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	0.81
5	Sanction of the amount to Municipal Commissioner, Dhanbad for procurement of fogging machine and sprayer for Dhanbad Municipal Corporation towards tackling COVID-19, under CSR initiatives of BCCL	Eradicating hunger, poverty and malnutrition, promoting health care including preventive health care and **sanitation** including contribution to Swach Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water	10
6	Works in Pehla Kadam School- a School for the underprivilaged located at Jagjeevan Nagar	Promoting education, **including special education** & employment enhancing vocation skills especially among children, women, elderly,and the differently abled & livelihood enhancement projects	7.21

7	Works in RBB School, Rajganj	Promoting education,including **special education** & employment enhancing vocation skills especially among children,women,elderly,and the differently abled & livelihood enhancement projects	84.39
8	BCCL Ke LAAL/BCCL Ki Laadli	**Promoting education**, including special education & employment enhancing vocation skills especially among children, women, elderly, and the differently abled & livelihood enhancement projects	4.73
9	Development of smart classes in different high Schools, higher secondary Schools and other Schools in Dhanbad District for a total of 129 schools through District administration via depository mode	**Promoting education**, including special education & employment enhancing vocation skills especially among children, women, elderly, and the differently abled & livelihood enhancement projects	193.5
10	Mining Sirdars training to SC/ST candidates (preference to PAPs)	Promoting education,including special education & employment enhancing **vocation skills** especially among children,women,elderly,and the differently abled & **livelihood enhancement projects**	8.93
11	Construction of PCC road at Topchanchi Block	Rural development projects	2.12
12	Construction of Marriage Hall at Ratanpur Village, Ratanpur Panchayat, Govindpur Block	Rural development projects	33.63
13	Construction of Community Center at Jiramuri Village ,Ratanpur Panchayat, Govindpur Block	Rural development projects	1.25
14	Depository mode transfer to D.C. Dhanbad towards preparatory efforts to tackle COVID-19 situation in Dhanbad", under CSR initiatives of BCCL	Disaster Management	200
15	Depository mode transfer to Chief Minister's Relief Fund, Jharkhand	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	50

16	Miscellaneous: Yoga Diwas, Handloom handing over expense, final bill settlement of constructed marriage mandap	Others	0.12
17	Liability reversed	Others	(23.4)
Total			**601.22**

CSR Works & Expenditure FY 2020-21*

(CSR Budget - ₹ 5.54 Crore)

Sl No	CSR Projects identified	District and State of Project		Amt. spent (₹ lakhs)		Direct or through agency
		District	State	Direct Exp	Overheads	
A	**Promoting education,including special education & employment enhancing vocation skills especially among children,women,elderly,and the differently abled & livelihood enhancement projects**					
1	Works in RBB School, Rajganj	Dhanbad	Jharkhand	27.57	--	Direct
B	**Rural Development Works**					
1	Construction of marriage hall at Ratanpur panchayat, Govindpur Block	Dhanbad	Jharkhand	3.73	--	Direct
2	Other Civil Works	Dhanbad	Jharkhand	1.69	--	Direct
C	**COVID-19 related initiatives**					
1	Procurement of bleaching powder	Dhanbad	Jharkhand	6.4	--	Direct
2	Procurement of face masks	Dhanbad	Jharkhand	0.16	--	Direct
3	Financial assistance to D.C. Dhanbad to combat COVID-19 situation in Dhanbad	Dhanbad	Jharkhand	200	--	Depository mode of work execution through Dhanbad district administration
	Total			**239.55**	--	

**** Figures unaudited for the FY 2020-21***

Modified CSR Annual Action Plan for FY 2021-22 - BCCL

Sl. No.	CSR Projects/Programmes	Item from the list of the activities in schedule VII of the act	Estimated Budget (₹ in Lakhs)*	Manner of execution	Implementation Schedule	Monitoring and reporting mechanism	Details of need and impact assessment **, if any
COVID related proposals							
1	Assistance to Dhanbad District Administration	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	100.00	BCCL	FY 2021-22	By BCCL	NA
2	Assistance to Jharkhand State Administration	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	25.00	BCCL	FY 2021-22	By BCCL	NA
3	Masks & hand sanitizers	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	0.72	BCCL	FY 2021-22	By BCCL	NA
4	Fooding & other miscellaneous heads	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	36.45	BCCL	FY 2021-22	By BCCL	NA
5	Boarding and lodging of frontline health workers	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	22.62	BCCL	FY 2021-22	By BCCL	NA

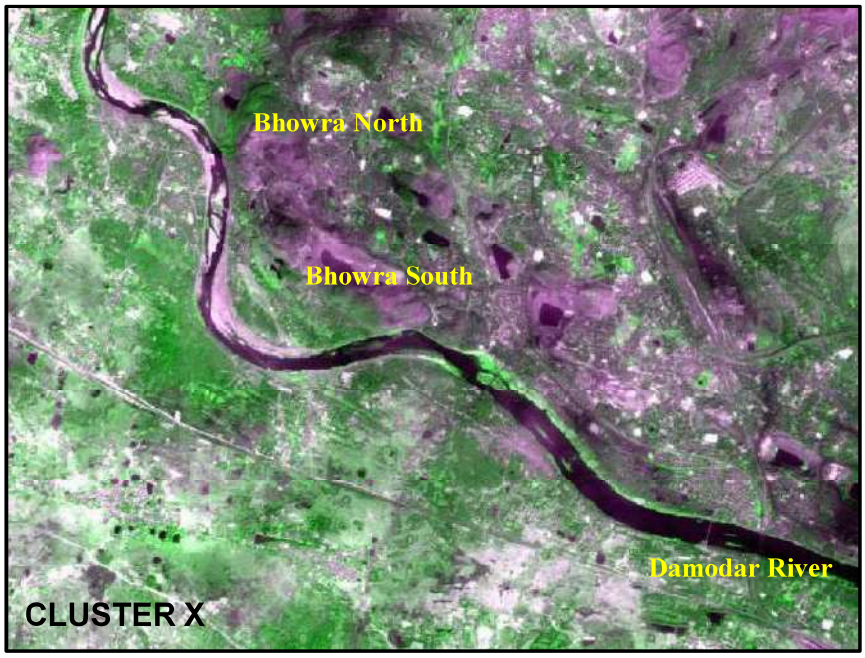
6	Sanitization of temporary quarantine centres	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water. Disaster Management, including relief, rehabilitation and reconstruction activities.	2.15	BCCL	FY 2021-22	By BCCL	NA
Non-COVID related proposals							
7	Training of PAPs at CIPET	Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and differently abled and livelihood enhancement projects.	28.00	BCCL	FY 2021-22 & FY 2022-23	By BCCL	NA
8	Development of Aanganwadis	Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and differently abled and livelihood enhancement projects.	263.50	BCCL	FY 2021-2022 to FY 2023-2024	By BCCL	NA
9	Swachh Vidyalaya Abhiyan Survey	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	6.96	BCCL	FY 2021-22	By BCCL	NA
10	Distribution of blankets	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	3.58	BCCL	FY 2021-22	By BCCL	NA
11	Mining sirdarship training for SC/ST candidates. Project closed in FY 2021-22 on submission of bills.	Promoting education, including special education and employment enhancing vocation skills especially among children, women, elderly, and differently abled and livelihood enhancement projects.	3.26	BCCL	FY 2021-22	By BCCL	NA
12	COVID quarantine centre. Project closed in FY 2021-22 on submission of bills.	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	3.80	BCCL	FY 2021-22	By BCCL	NA
13	Public toilet at Dhanbad	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	3.15	BCCL	FY 2021-22	By BCCL	NA

14	Gymnasium at Ambedkar Academy, Dhanbad. Project closed in FY 2021-22 on submission of bills.	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	2.35	BCCL	FY 2021-22	By BCCL	NA
15	Reversal of Financial Liability of FY 2020-21 for Medical Camps under CSR	Eradicating hunger, poverty and malnutrition, promoting preventive health care and sanitation including contribution to the Swachh Bharat Kosh set-up by the Central Government for the promotion of sanitation and making available safe drinking water.	-8.52	BCCL	FY 2021-22	By BCCL	NA
	Total		**493.02**				**-**

Note * - Modalities of utilisation of fund- Project wise funds shall be utilised as per project wise budget within the Delegation of Power as per rules of the Company

Note ** - As per the Companies (Corporate Social Responsibility Policy) Amendment Rules, 2021, (a) Every company having average CSR obligation of ten crore rupees or more in pursuance of subsection (5) of section 135 of the Act, in the three immediately preceding financial years, shall undertake impact assessment, through an independent agency, of their CSR projects having outlays of one crore rupees or more, and which have been completed not less than one year before undertaking the impact study.

Land Reclamation/ Restoration Monitoring of Five Clusters of (Opencast + Underground) Coal Mines of Bharat Coking Coal Limited based on Satellite Data of the Year 2021



Submitted to

Bharat Coking Coal Limited

cmpdi

A Mini-Ratna Company

Executive Summary

1. Project — Land reclamation/ restoration monitoring of five clusters of (Opencast + Underground) coal mines of Bharat Coking Coal Ltd. (BCCL) based on satellite data on every three-year basis.

2. Objective — Objective of land reclamation/ restoration monitoring is to assess the area of backfilled, plantation, social forestry, active mining area, water bodies, distribution of wasteland, agricultural land and forest in the leasehold area of the project. This will help in assessing the progressive status of mined land reclamation and to take up remedial measures, if any, required for environmental protection.

3. Salient Findings

- Out of 5 Clusters of mines viz. I, IV, VII, X and XI considered for land reclamation monitoring during the year 2021-22; cluster XI group of mines is added during the year 2021-22. These clusters consist of mainly opencast mines.

- Out of the total mine leasehold area of 9411.54 Ha. of the 05 clusters considered for monitoring during the year 2021-22; total excavated area is 1218.18 Ha. out of which 61.92 Ha. area (5.08%) has been planted on backfill (Biological Reclamation) and 712.90 Ha. area (58.52%) is under backfilling (Technical Reclamation) and 443.36 Ha. area (36.40%) is under active mining. Cluster wise details of land reclamation of the above Clusters is given in Table-1.

- Total area under plantation (green cover) covers an area of 968.94 Ha. which is 10.30% of total leasehold area.

- This report and the findings will be considered as basis for further monitoring and reclamation related activities.

Table 1

Land Reclamation Status in five Clusters (Underground + Opencast Mines) of BCCL based on Satellite Data of the Year 2021

(Area in Hectare)

Sl. No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021
1	Cluster I	575.00	575.00	10.11	11.10	7.29	7.29	47.99	45.21	25.53	25.53	28.39	27.61	45.79	46.00	80.81	78.03	17.40	18.39
				22.08%	24.13%	15.92%	15.85%					62.00%	60.02%			14.05%	13.57%	38.00%	39.98%
2	Cluster IV	1123.79	1123.79	147.22	176.03	0.00	0.00	27.11	27.11	165.09	165.09	166.67	152.29	313.89	328.32	192.20	192.20	147.22	176.03
				46.90%	53.62%	0.00%	0.00%					53.10%	46.38%			17.10%	17.10%	46.90%	53.62%
3	Cluster VII	2127.70	2127.70	351.54	351.68	37.47	25.47	15.52	11.43	238.67	238.67	122.23	183.42	511.24	560.57	291.66	275.57	389.01	377.15
				68.76%	62.74%	7.33%	4.54%					23.91%	32.72%			13.71%	12.95%	76.09%	67.28%
4	Cluster X	2057.47	2057.47	116.28	143.64	29.16	29.16	66.09	66.09	140.75	140.75	59.41	45.71	204.85	218.51	236.00	236.00	145.44	172.80
				56.76%	65.74%	14.23%	13.34%					29.00%	20.92%			11.47%	11.47%	71.00%	79.08%
5	Cluster XI	-	3527.58	-	30.45	-	0.00	-	0.00	-	187.14	-	34.33	-	64.78	-	187.14	-	30.45
					47.01%		0.00%						52.99%				5.31%		47.01%
	TOTAL	**5883.96**	**9411.54**	**625.15**	**712.90**	**73.92**	**61.92**	**156.71**	**149.84**	**570.04**	**757.18**	**376.70**	**443.36**	**1075.77**	**1218.18**	**800.67**	**968.94**	**699.07**	**774.82**
				58.11%	**58.52%**	**6.87%**	**5.08%**					**35.02%**	**36.40%**			**13.61%**	**10.30%**	**64.98%**	**63.60%**
																		(% is calculated with respect to Excavated Area as applicable)	

Note: In reference of the above Table, different parameters are classified as follows: (Cluster XI started from current year)

1. Area under Biological Reclamation includes Areas under Plantation done on Backfilled Area Only.

2. Area under Technical Reclamation includes Area under Barren Backfilling only.

3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site and Quarry filled with water etc., if any.

4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the above Table.

5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

Table 2

Cluster wise Area Statistics of Land Use/ Cover classes in five Clusters of (OC+UG) mines of BCCL based on Satellite Data of the year 2021

Status of Land Reclamation in 5 Clusters of (UG+OC) mines of Bharat Coking Coal Ltd. based on Satellite data of the Year 2021

(Area in Hectare)

		CLUSTER I		CLUSTER IV		CLUSTER VII		CLUSTER X		CLUSTER XI		TOTAL	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Open Forest	0.00	0.00	0.00	0.00	0.00	0.00	64.34	3.13	0.00	0.00	64.34	0.68
	Total Forest (A)	0.00	0.00	0.00	0.00	0.00	0.00	64.34	3.13	0.00	0.00	64.34	0.68
SCRUBS	**Scrubs (B)**	230.09	40.02	172.78	15.37	572.72	26.92	645.77	31.39	1177.06	33.37	2798.42	29.73
PLANTATION	Social Forestry/Avenue Plantation	25.53	4.44	165.09	14.69	238.67	11.22	140.75	6.84	187.14	5.31	757.18	8.05
	Plantation on OB Dump	45.21	7.86	27.11	2.41	11.43	0.54	66.09	3.21	0.00	0.00	149.84	1.59
	Plantation on Backfill (Biological Reclamation)	7.29	1.27	0.00	0.00	25.47	1.20	29.16	1.42	0.00	0.00	61.92	0.66
	Total Plantation (C)	78.03	13.57	192.20	17.10	275.57	12.95	236.00	11.47	187.14	5.31	968.94	10.30
	Total Vegetation (A+B+C)	**308.12**	**53.59**	**364.98**	**32.48**	**848.29**	**39.87**	**946.11**	**45.98**	**1364.20**	**38.67**	**3831.70**	**40.71**
	Coal Dump	1.99	0.35	1.94	0.17	8.92	0.42	1.12	0.05	0.73	0.02	14.70	0.16
ACTIVE MINING	Coal Quarry	11.14	1.94	145.67	12.96	177.97	8.36	26.66	1.30	31.66	0.90	393.10	4.18
	Advance Quarry Site	1.73	0.30	0.00	0.00	0.00	0.00	0.00	0.00	2.67	0.08	4.40	0.05
	Quarry Filled With Water	14.74	2.56	6.62	0.59	5.45	0.26	19.05	0.93	0.00	0.00	45.86	0.49
	Total Area under *Active Mining*	**27.61**	**4.80**	**152.29**	**13.55**	**183.42**	**8.62**	**45.71**	**2.22**	**34.33**	**0.97**	**443.36**	**4.71**
	Barren OB Dump	21.18	3.68	110.42	9.83	53.57	2.52	90.49	4.40	22.66	0.64	298.32	3.17
RECLAIMED	Area Under Backfilling (Technical Reclamation)	11.10	1.93	176.03	15.66	351.68	16.53	143.64	6.98	30.45	0.86	712.90	7.57
	Total Area under Mine Operation	**61.88**	**10.76**	**440.68**	**39.21**	**597.59**	**28.09**	**280.96**	**13.66**	**88.17**	**2.50**	**1469.28**	**15.61**
WASTELAND	Waste Lands	65.94	11.47	82.19	7.31	182.23	8.56	152.75	7.42	708.59	20.09	1191.70	12.66
	Fly Ash Pond / Sand Body	15.55	2.70	0.00	0.00	0.00	0.00	53.37	2.59	15.83	0.45	84.75	0.90
	Total Wasteland	**81.49**	**14.17**	**82.19**	**7.31**	**182.23**	**8.56**	**206.12**	**10.02**	**724.42**	**20.54**	**1276.45**	**13.56**
WATERBODIES	Reservoir, Nallah, Ponds	15.38	2.67	12.13	1.08	20.60	0.97	185.47	9.01	63.67	1.80	297.25	3.16
	Total Waterbodies	**15.38**	**2.67**	**12.13**	**1.08**	**20.60**	**0.97**	**185.47**	**9.01**	**63.67**	**1.80**	**297.25**	**3.16**
AGRICULTURE	Crop Lands	3.42	0.59	3.45	0.31	38.23	1.80	18.08	0.88	81.78	2.32	144.96	1.54
	Fallow Lands	80.92	14.07	37.02	3.29	20.12	0.95	109.95	5.34	822.67	23.32	1070.68	11.38
	Total Agriculture	**84.34**	**14.67**	**40.47**	**3.60**	**58.35**	**2.74**	**128.03**	**6.22**	**904.45**	**25.64**	**1215.64**	**12.92**
SETTLEMENTS	Urban Settlement	7.17	1.25	166.29	14.80	390.66	18.36	228.39	11.10	336.58	9.54	1129.09	12.00
	Rural Settlement	14.04	2.44	16.81	1.50	9.41	0.44	57.90	2.81	14.68	0.42	112.84	1.20
	Industrial Settlement	2.58	0.45	0.24	0.02	20.57	0.97	24.49	1.19	31.41	0.89	79.29	0.84
	Total Settlements	**23.79**	**4.14**	**183.34**	**16.31**	**420.64**	**19.77**	**310.78**	**15.10**	**382.67**	**10.85**	**1321.22**	**14.04**
	Grand Total	**575.00**	**100.00**	**1123.79**	**100.00**	**2127.70**	**100.00**	**2057.47**	**100.00**	**3527.58**	**100.00**	**9411.54**	**100.00**

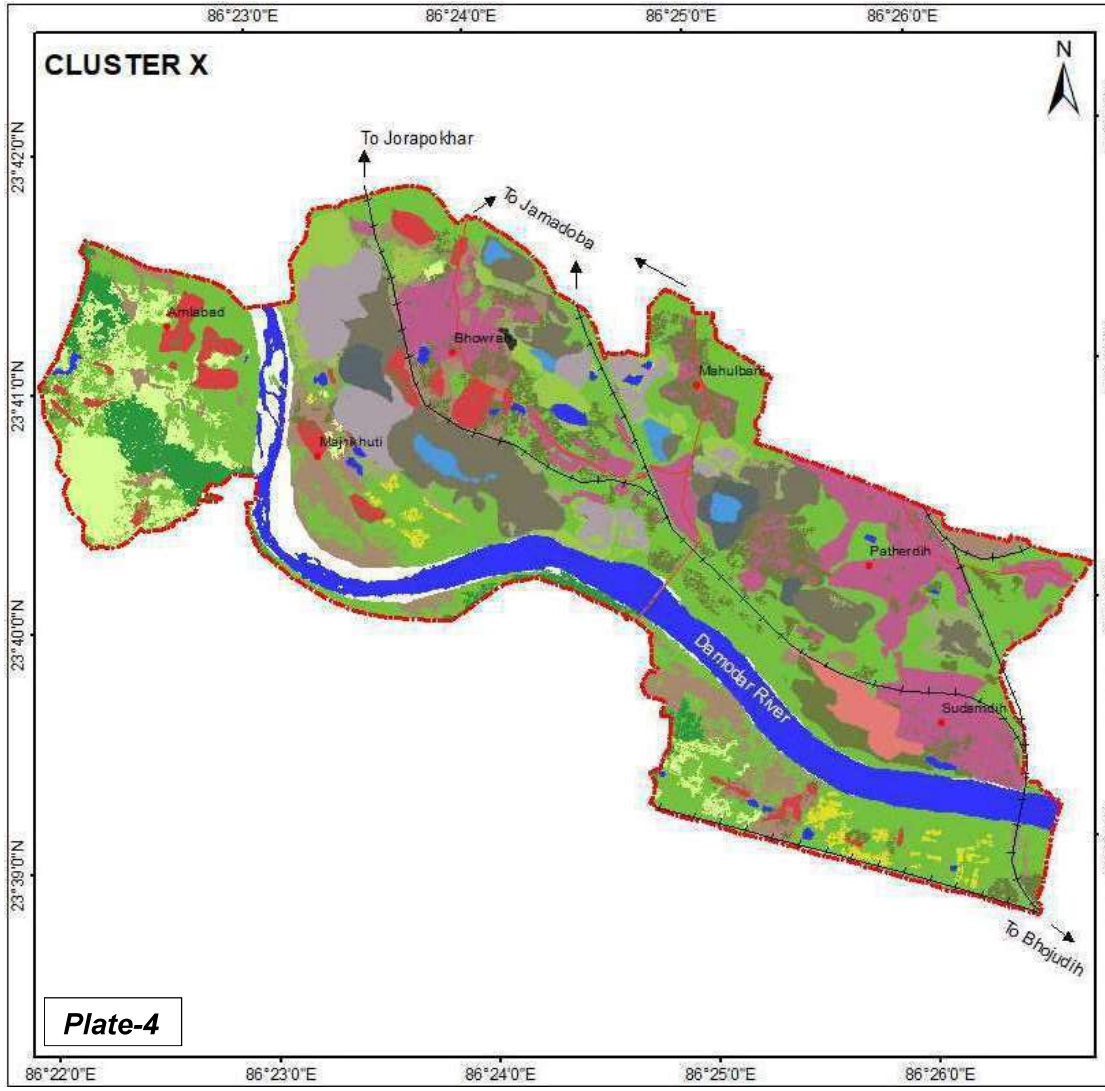


Plate-4

Area Statistics - Cluster X (2021)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (Ha)	% of Total
Forest	Dense Forest		0.00	0.00
	Open Forest		64.34	3.13
	Total Forest (A)		**64.34**	**3.13**
	Scrubs (B)		**645.77**	**31.39**
Plantation Area	Social Forestry		140.75	6.84
	Plantation on OB		66.09	3.21
	Plantation on Backfill		29.16	1.42
	Total Plantation Area (C)		**236.00**	**11.47**
	Total Vegetation (A+B+C)		**946.11**	**45.98**
Agriculture Land	Crop land		18.08	0.88
	Fallow Land		109.95	5.34
	Total Agriculture Land		**128.03**	**6.22**
Waste Land	Waste Land		152.75	7.42
	Sand Body		53.37	2.59
	Total Waste Land		**206.12**	**10.02**
Mining Area	Advance Quarry area		0.00	0.00
	Coal Quarry		26.66	1.30
	Barren OB Dump		90.49	4.40
	Back Fill		143.64	6.98
	Coal Dump		1.12	0.05
	Water Filled Qry		19.05	0.93
	Total Mining Area		**280.96**	**13.66**
Settlements	Urban Settlements		228.39	11.10
	Rural Settlements		57.90	2.81
	Industrial Settlements		24.49	1.19
	Total Settlement Area		**310.78**	**15.10**
Water Body	**River' Ponds**		**185.47**	**9.01**
	Total Area		**2057.47**	**100.00**

Legend

- Settlements
- Cluster X Boundary
- Railway Line
- Road

Customer	Bharat Coking Coal Limited				
Title	Land Reclamation Monitoring of BCCL Clusters				Job No. 561410027
Subject: Land Reclamation Monitoring Status of Cluster-X Group of Mines based on Satellite Data (RS-2/L-IV) of the year 2021	Activity	Name	Designation	Signature	
	Prepared	Ayesha Parida	Dy. Mgr(Geology)		
	Checked	Harihara Lal. H	Ch. Mgr(RSC)		
	Approved	R. Kumar	GM(Geomatics)		
cmpdi	Scale: 0 0.25 0.5 1 Km				Sheet 1
	Drg No. HQ/REM/21/R2/A4/CL-X				Rev No. 0

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BHARAT COKING COAL LIMITED

MINING PLAN AND MINE CLOSURE PLAN

FOR

AMALGAMATED SUDAMDIH PATHERDIH MINE

(UPTO {-} 60m RL HORIZON)

(EASTERN JHARIA AREA)

SEPTEMBER – 2018

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

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;

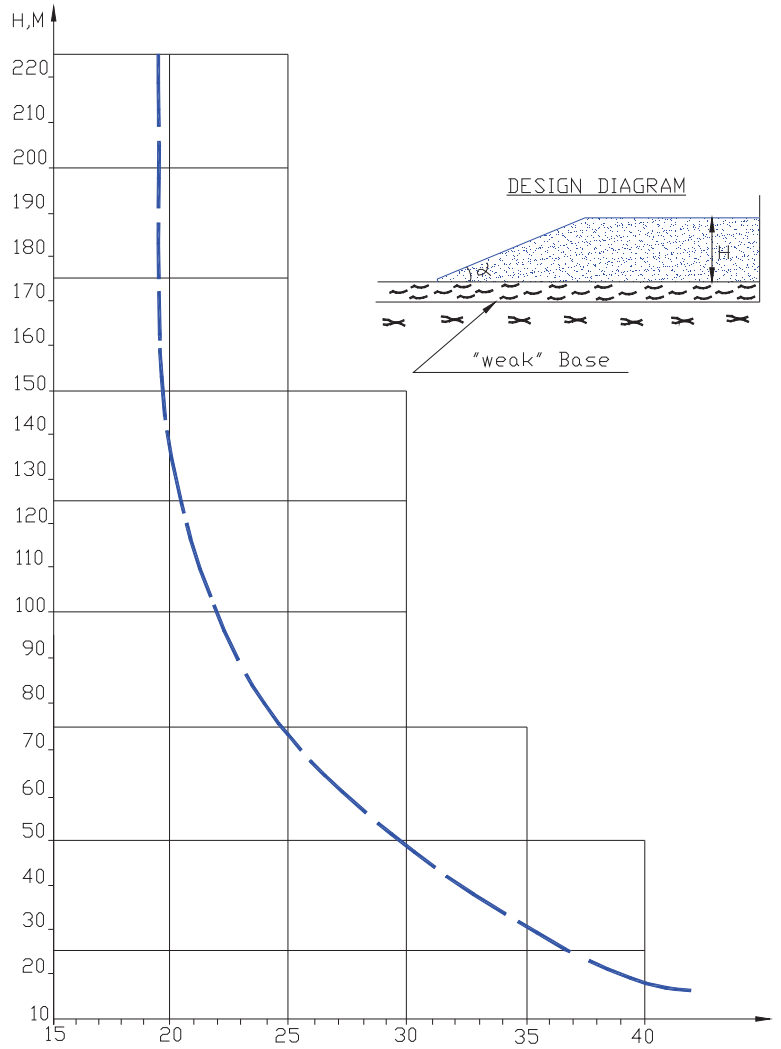
The following technical aspects would be reviewed in the final mine closure planning. Details can be worked in closure plans envisaged to be prepared.

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 30 m 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.



1 5.4. Graph illustrating dependence of stable slope angle (α) on height (H) of ex-site dumps formed on "weak" Base

Backfilling will be started in the OCP and 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 neighboring mines shall be explored.

i) **Closure of entry to the open-cast mine:** 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.

(b) Environmental aspects

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**.

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 are two types of Closure, namely, Progressive Mine Closure (Concurrent) and Final Mine Closure. 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 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.

(e) Maintenance of records pertaining to Progressive Mine Closure

The Mine management shall maintain following 2 Nos. of 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.

Execution of progressive mine closure activities and 5 yearly monitoring

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 to be carried out on yearly basis. The details to be maintained in the said register shall cover inter alia the name of the activity, place, period of execution, executing agency, expenditure incurred, proof of the 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 mine and the area. At the end of each year the said register (along with two plans) shall be placed before HoD (Env)/GM(Env.) of the company for scrutiny and approval.

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.

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, 2007 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 mines 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."*

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 such a situation, it is envisaged that a revised mine closure plan should be prepared as per relevant guidelines and submitted for approval of the competent authority.**

The Mine Closure Plan for Sudamdih Incline Mines and Patherdih Group of Mines was prepared in October, 2013 and was approved by BCCL Board in 301st Board meeting held on 30.10.2013. As per the approved Mine Closure Plan, the closure cost was estimated at approximately Rs.396.316 lakhs for Sudamdih Incline Mine and Rs. 831.155 lakhs for Patherdih Group of Mines under the conditions envisaged in the aforesaid closure plan. The amount already deposited in the escrow account (Account no. 00150100008872 and 00150100008871 at Bank of Baroda, Dhanbad Branch) in the name of Sudamdih Incline Mines and Patherdih Group of Mines is Rs. 403.46 Lakhs upto 31.03.2018.

The earlier mine closure plan was prepared considering Sudamdih Incline Mine and Patherdih Group of Mines as mixed mine i.e. running of both underground & opencast operation. However now it has been decided by BCCL management to discontinue underground mining operation and to extract coal only by opencast mining operation in the Amalgamated Sudamdih Patherdih Colliery. Therefore, given the changes in mining parameters of the mine since the preparation of approved Mine Closure Plan, a new Mine Closure Plan is required for this mine. Accordingly this mining plan and mine closure plan is prepared considering only opencast operation at Amalgamated Sudamdih Patherdih Colliery. However a new escrow account may be opened in the name of Amalgamated Sudamdih Patherdih Colliery and the existing two accounts may be discontinued as per the policy decision of BCCL.

In ASP Colliery, the leasehold area after boundary adjustment is 505.85 Ha, as per the plan supplied by the colliery authority, out of which 284.83 Ha is not considered workable area at present, due to Damodar river (52.23 Ha), coal barriers, DGMS restrictions, non-coal bearing area (Barren Area), Railway acquired land and surface built-up. The remaining area of 221.02 Ha is considered as project area, out of which 135.0 Ha area is considered for opencast mining in the near future and 85.39 for OB dump/Phase-II mining. Thus, 221.02 Ha area is considered for calculation of closure cost as per opencast norms.

The overlapping area (where UG & OC operations have been done in different vertical levels) has been considered for calculation of closure cost as per opencast 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

As per the above guidelines these rates will stand modified based on Whole Sale 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:

12.8.2 As per Mine Closure guidelines, the total expenditure to be incurred at the notified rate of the year (August 2009) may be calculated in following manner:

Particulars	OC Unit	Remarks
Area	221.02	Area X Notified Rate
Notified Rate (Rs.Lakh)	6	
Total Amount (in base year) (Rs. Lakh)	1326.12	

12.8.4 As per the guidelines *"these rates will stand modified based on whole Price Index as notified by Government of India from time to time".*

An escalation factor has been calculated based on WPI of June 2018 (119.1). 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. Converting WPI of June 2018 to that of base year 2004-05, we arrive at figure of 185.9151. Escalation factor vis-a-vis WPI of August '09 (129.6) comes out to be 1.43453

Particulars	OC Unit	Remarks
Total Amount (in base year) (in Rs. Lakh)	1326.12	Total Amount (in base year) X Escalation Factor
Escalation Factor	1.43453	
Escalated Amount (in Rs. Lakh)	1902.359	

12.8.4 As per the earlier approved Mine Closure Plan the total deposited amount in Escrow Account till 31.3.2018 was Rs. 403.46 Lakhs. Out of which 104.25 lakh deposited in OC Unit and 299.21 lakh were deposited in UG unit. The

amount already accrued in the escrow account shall be adjusted against the new closure cost calculated.

Particulars	OC Unit	UG Unit	Remarks
Escalated Amount (Rs. Lakhs)	1902.359	-	
Amount already deposited in escrow account (Rs. Lakhs)	104.25	299.21	
Balance Escalated Amount (Rs. Lakhs)	1498.899		

12.8.5 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 mine.

Particulars	OC Unit	Remarks
Escalated Amount	1498.899	Balance Escalated Amount / Life
Life	33	
Amount per year	45.421	

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:

Break-Up cost of Mine Closure of Amalgamated Sudamdih - Patherdih (ASP) Colliery Year wise

Year	OC Unit	Total
1	45.42	45.42
2	47.69	47.69
3	50.08	50.08

4	52.58	52.58
5	55.21	55.21
6	57.97	57.97
7	60.87	60.87
8	63.91	63.91
9	67.11	67.11
10	70.46	70.46
11	73.99	73.99
12	77.69	77.69
13	81.57	81.57
14	85.65	85.65
15	89.93	89.93
16	94.43	94.43
17	99.15	99.15
18	104.11	104.11
19	109.31	109.31
20	114.78	114.78
21	120.52	120.52
22	126.54	126.54
23	132.87	132.87
24	139.51	139.51
25	146.49	146.49
26	153.81	153.81
27	161.50	161.50
28	169.58	169.58
29	178.06	178.06
30	186.96	186.96
	196.31	196.31
	206.12	206.12
	216.43	216.43
TOTAL	**3636.591**	**3636.591**

The amount calculated above shall be deposited every year by BCCL in the Escrow Account in the name of Amalganated Sudamdih Patherdih Colliery.

Thus, total amount that shall be further deposited for final mine closure activities of Amalgamated Sudamdih Patherdih Colliery during the balance life of 33 years stands out to be Rs. 3636.591 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.

Particulars	Amount (in Rs. lakhs) OC Unit	Amount (in Rs. lakhs) UG Unit	Total
Amount Already Deposited in Escrow Account	104.25	299.21	403.46
Amount to be Deposited in the Escrow Account in the Future	3636.591	-	3636.591
Total Amount available for Mine Closure Activities			4040.051

12.8.6 Based on the existing mine closure planning norms, the above calculated cost at current WPI of June 2018 on mine closure may be tentatively grouped under different heads as given in Tables below as per guidelines of CMPDI(HQ).

Break up Cost of Mine Closure of Amalgamated Sudamdih Patherdih Colliery

Sl. No.	Activity	Mine Closure Cost
A	**Dismantling of Structures**	
	Service Buildings	7.273
	Residential Buildings	97.097
	Industrial Structures like CHP, Workshop, field sub-station, etc.	10.910
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	54.549

Sl. No.	Activity	Mine Closure Cost
C	**Grading of Highwall slopes**	
	Levelling and grading of highwall slopes	64.368
D	***OB Dump Reclamation**	
	Handling/Dozing of external OB Dump into mine void	3224.202
	Bio-Reclamation including soil spreading, plantation and maintenance	14.546
E	***LANDSCAPING**	
	Landscaping of the cleared land for improving its esthetic	10.910
F	***Plantation**	
	Plantation over area obtained after dismantling	18.183
	Plantation around fencing	7.273
	Plantation over the cleared external OB Dump	0.727
G	**Monitoring/Testing of parameters for three years**	
	Air Quality	8.001
	Water Quality	7.273
H	***Enterpreneuship Development(Vocational/skill development training for sustainable income of affected people**	9.455
I	***Miscellaneous and other mitigative measures**	72.732
J	**Manpower Cost for Supervision**	29.093
	TOTAL	**3636.591**

Note: *: To be covered under Progressive Mine Closure activities also.

Thus, total amount that shall be deposited for final mine closure activities of Amalgamated Sudamdih Patherdih Colliery (ASPC) mine during the period of 33 years has been estimated as 3636.591 lakhs for OC Units based on OC norms at WPI of June 2018.

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.

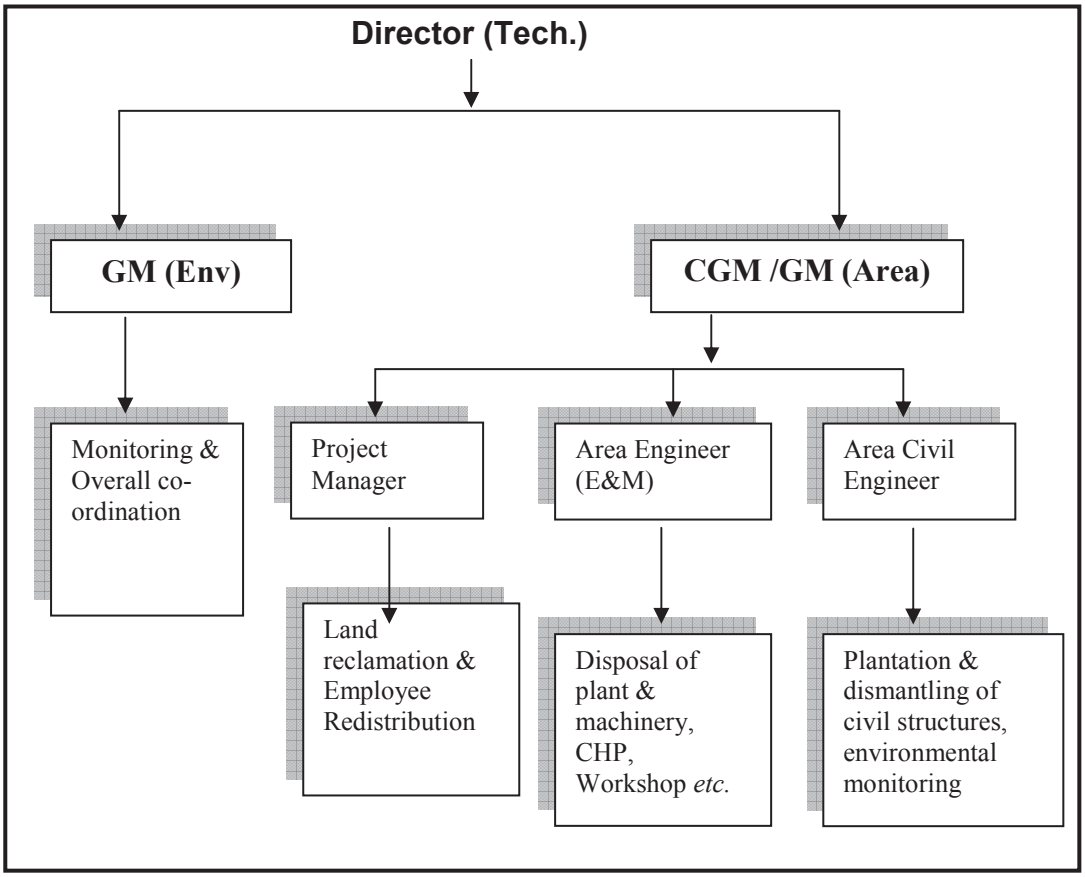
However, the additional amount beyond the escrow account, if any estimated later on, will be provided by the mine operator after estimating the final mine closure cost five years prior to mine closure (as per the mine closure guideline**.**

12.9 IMPLEMENTATION PROTOCOL

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.

Mine closure activities (in opencast section as well as underground section) should be implemented as per implementation schedule given herewith.

For implementing the mine closure activities and monitoring thereof, the following organisational structure at corporate level has been proposed:



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.

When the mine closure activities would take final shape and the entire area 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.

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE IN AMALGAMATED SUDAMDIH PATHERDIH

(LIFE OF THE MINE: 33 YEARS)

S.N	Activity	Time Frame	YEAR					
			Operational Phase			Post Closure Phase		
			1st - 10th	11th - 20th	21th - 33th	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						
	*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						

S.N	Activity	Time Frame	YEAR					
			Operational Phase			Post Closure Phase		
			1st - 10th	11th - 20th	21th - 33th	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 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.

NOTE: The progressive mine closure will be done as per the provisions made out in the Mining Plan and as per the situation/requirement that may arise in course of execution of the Mining Plan

Item No. 351.3D

Quarterly Review for the Quarter October to December, 2018 & January to March, 2019 on Safety, Environment & Quality as per the directive of MoC letter no. 23/3/2015-ASO/BA dated 26.04.2017.

Board reviewed the quarterly report of **October to December 2018** and **January to March 2019** on Safety, Environment & Quality as per the directive of MoC letter no. 23/3/2015-ASO/BA dated 26.04.2017.

Item No. 351.4G
Corporate Environment Policy (CEP) of Bharat Coking Coal Limited.

Background

Coal India Ltd. had brought out its Corporate Environment Policy (CEP) in 2012 Based on CIL Environment Policy 2012, incorporating the Jharia Master Plan, CEP of BCCL was approved by 285th BCCL board on 21.04.2012 (ANNEXURE C of the agenda note). As per the provisions of the policy, it is to be revised every 05 years as per which the policy would have been revised in 2017. However, there was delay in revising the policy at CIL's end due to which there is a delay in revising BCCL's CEP. CIL has revised its Corporate Environment Policy and approved in its 377th CIL Board Meeting dated 20th Dec., 2018(ANNEXURE D of the agenda note).

The CAG during its exit meeting held on 16.11.2018 also pointed out for the need of revising BCCL's Corporate Environment Policy adopted in 2012(ANNEXURE E of the agenda note). Modifying CIL's CEP to suit BCCL's prevailing conditions, the Corporate Environment Policy of BCCL has been revised.

Two versions of Policy was attached herewith out of which any one may be approved as deemed suitable by the Board.

a. An abridged version of the policy as adopted earlier by BCCL in 2012. (ANNEXURE A of the agenda note)
b. A detailed version of the policy similar to the CEP, 2018 of CIL with modifications suited to BCCL's condition. (ANNEXURE B of the agenda note)

Decision:
After detailed deliberation the Corporate Environment Policy, 2018 of CIL was approved by the Board.

Board further directed that the Policy as adopted above to suit the conditions in BCCL should be modified with information to Coal India.

Certified to be True Copy

B.K. Parul
Company Secretary
Bharat Coking Coal Limited
Koyla Bhawan
826005

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ENVIRONMENTAL POLICY STATEMENT:

Bharat Coking Coal Limited (BCCL) is committed 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. It also aims to bringing awareness amongst its stakeholders for continual improvement in environmental performances following best practices.

OBJECTIVES:

Bharat Coking Coal Limited shall endeavour to:
1. Plan & design projects with due consideration to environmental concerns for Sustainable Development.
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 of surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.
4. Implement Environment Management Plans in all our mines /projects/Clusters effectively to mitigate pollution, conservation of natural resources and restoration of ecology & biodiversity.
5. Ensure compliance of all applicable Environmental Clearance& Forestry Clearance conditions and other statutory conditions issued by regulatory agencies.
6. Recycling of wastes on the principle of REDUCE, REUSE and RECYCLE.
7. Put special thrusts on efficient energy utilization / renewable energy as a measure to reduce carbon foot-print.
8. Strive for continual improvement in our environmental performances by setting targets, measuring progress and taking corrective action.
9. Taking measures to render productive post mining land use.
10. Implementation of activities applicable to BCCL arising out of International Conventions.
11. Create environmental awareness among the employees and the local communities through pro-active communication and training

STRATEGIES FOR IMPLEMENTATION OF ENVIRONMENTAL POLICY:

BackGround:

Bharat Coking Coal Limited subscribes to the view of Sustainable Development. Unless theenvironment can sustain all the developmental activities, any pursuit of developmentin isolation can cause irreparable damage to the ecosystem and associatedenvironmental attributes. Keeping this view in mind, Bharat Coking Coal Limited attaches toppriority towards sustainable development and approved its ‘Corporate EnvironmentalPolicy’. Based on CIL Environment Policy2012,incorporating theJharia Master Plan ,CEP of BCCL was approved by 285th BCCL board on 21.04.2012and is complimentary to theNational Environmental Policy, 2006.The Revised BCCL Policy, 2019 is the outcome of the experience gained since2012, keeping in view the modifications / amendments made time to time inenvironmental policies and additional stipulation notified by MoEF&CC (Ministry of Environment, Forest& Climate Change), and other organisations concerning mineclosure, reclamation of degraded land, environmental clearance etc. and also with theobjective of revisiting the corporate policy.The Policy has a vision of Green Mining and mission of 100% compliance of environmental statutes applicable to coal mining industry.This policy is prepared in line with that of CIL’s

policy with incorporation of prevailing local conditions.

STRATEGIES: Bharat Coking Coal Limited adopts the strategies appended below for effective implementation:

1. MINE/ PROJECT PLANNING & DESIGN FOR SUSTAINABLE DEVELOPMENT:

a) Coal being a non-renewal energy source, extraction shall be planned prudently tomeet national requirement in a planned way. The projects shall be designed on theprinciple of Sustainable Development with due consideration to environment, mine closure,safety and aspirations of the stakeholders at the planning& designstage itself with due regard to mine closure plan.

b) While preparing the Mining plan/project reports, the effort shall be to incorporatelatest mining technologies and equipment's with optimal capacity, which are moreenvironment friendly

c) All Mining Plan/ project reports will be provided with detailed provisions for ensuring environmental compliances

2. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) & ENVIRONMENT MANAGEMENT PLAN (EMP)

a. All mine planning and design shall be environmentally acceptable and operationshall be carried out in such a way as to facilitate the compliance of stipulated environmentalstandards.
b. EIA& EMP for all projects/Clusters shall be formulated as per the approved ToR (Termsof Reference) and pubic consultations for obtaining Environmental Clearance (EC) from MoEF&CC. Similarly, in the existing projects needing enhancementof production capacities with or without increase in land, change of technology,renewal of lease and change in land use etc. fresh EC is required to be sought asper norms. The projects shall be operated after obtaining Consent to Establish(CTE)/Consent to Operate (CTO) from State Pollution Control Boards (SPCB).
c. Detailed Mine Closure Plans shall be prepared for all existing and new mines as per the MoC (Ministry of Coal) guidelines.

3. COMPLIANCE OF THE STATUTORY REQUIREMENTS:

The implementation of EMP and fulfilment of all other statutory requirements like conditions of EC, FC and consents to establish & operate, including timely submission of returns to statutory bodies and various agencies, are to be ensured at all levels.

4. MEASURES TO MITIGATE POLLUTION:

a) Air Pollution:

i) Generation of dust is to be controlled at the source to the possible extent with necessary control measures during drilling, blasting, loading, unloading, CHPtransfer points etc
ii)Deployment of eco-friendly mining technologies.
iii) Dust generation is to be minimized along coal / waste transportation routes.
iv)Mechanized transportation of coal to be encouraged.
v) Green belt is to be created around the source of dust

b) Water pollution:

i) The mine water and other effluent shall be treated to ensure the discharge normsas per statute. The treated effluent shall be utilized to the extent possible with aview to achieve

maximum water conservation.
ii) Oil & grease from the effluent shall be removed by Oil & Grease Traps forproper disposal.

c) Noise / ground vibration:

i) All measures to minimize noise pollution will be taken including maintenance of HEMM, equipment and provision of PPE where required.
ii) Suitable blasting techniques shall be followed to reduce ground vibration as well as noise pollution.

d)Land reclamation:

i) Progressive and concurrent reclamation of mined out areas will be carried out as per approved EIA/EMP and Mine Closure Plan (MCP).
ii) Slopes of external dumps are the important area to be suitably graded / terraced for effective reclamation and plantation.
iii) Preservation of top soil is required for future use. Old as well as existing nonactive dumps are to be technically and biologically reclaimed.
iv) Monitoring of reclamation work of all opencast mines will be done through Satellite Surveillance. The outcome shall be put in the websites.

e) Mine closure plans:

Mine Closure Plan (MCP) shall be prepared for each mineon which Mine closure guidelines are applicable. MCP are being delineated in two phases viz. progressive and final mine closure. Appropriate funds are set aside and deposited under a special Escrow fund every year as per MoC guidelines, to be utilized for proper and final mine closure.
For mines closed prior to issuance of MoC guidelines (i.e. 27th August, 2009) suitable action to be taken as per provisions of Mines Act 1952.

f) Mine fire& subsidence

BCCL shall endeavour to reduce occurrence of mine fire and subsidence due to mining activityfor safety and conservation purpose and, shall take steps for prevention and control of coal mine fire. Monthly report shall be submitted to top management of thesubsidiary and CIL and Quarterly to company board. Action Plan for mine fire control shall be implemented. Monitoring will be done through Satellite Surveillance/other suitable technology. Rehabilitation under Master Plan will be expedited to facilitate faster liquidation of fire. During the execution of the Master Plan since 2009, changes have occurred in the fire dealing methodology, the number of affected families and the infrastructure facilities to be provided to them. However, these modifications were executed in cognizance of HPCC committee for JMP.
BCCL is committed for implementation of the GOI approved Master Plan for Dealing with Fire, Subsidence and Rehabilitation in leasehold of BCCL (Jharia Master Plan) which is also required to be dovetailed with the implementation of EC conditions of various clusters of BCCL . Necessary steps shall be taken for implementation of Jharia master plan to deal with the problem of fire and subsidence in JCF along with R&R of affected people.

g) Monitoring:

I. All receptors in and around the mining projects/clusters all be monitored regularly to assess the efficacy of the pollution control / mitigation measures within stipulated standards.
II. Effect of mining on the hydrology of the area will be monitored through measurement of water level and quality of nearby wells and bore holes provided for this purpose. Conservation of water through rainwater harvesting shall be taken up.
III. Area and Unit environmental cells shall have regular interaction with the people in and around the coal mines and other allied units on matters related to environment to take necessary and timely corrective actions.
V. Environmental initiatives and monitoring through self and third party environment audit shall be conducted for generating useful data for taking corrective actions and mitigation measures as per guidelines.

h) Other measures:

I. Special emphasis shall be given to undertake R&D related to various facets of coal mine environmental management in collaboration with Central Mine Planning and Design Institute (CMPDI) and other competent institutions.

II. Besides ensuring statutory compliance, the BCCL desires to set high standards and continual improvement.

III. Mines & establishments shall be ISO 14001certified in phased manner.

IV. CSR and R&R policies of CIL are to be incorporated by BCCL for better planning and implementation of the socio-economic issues of coal mining areas.

V. The coal mining environmental issues are complex and require multidisciplinary approach to address the same. BCCL will endeavour to enter into MoUs with expert agencies of repute to assist in environment issues and also help in capacity building of BCCL executives.

VI. BCCL conduct periodical medical examination (PME) of its work force on routine basis in compliance of the requirement mining rules and regulation,
additional test will be done as and when require.

5. PRESERVATION OF BIO-DIVERSITY:

BCCL has made the ecological restoration a flagship programme for restoration of degraded mined areas and adopting 3- tier plantation consisting of native species grasses, bushes and trees under the technical expertise of Forest research institute, Dehradun, a renowned institute in the field of forests and ecology. Ecological restoration has been widely accepted as one of the most effective means to restore the ecology and biodiversity.

BCCL is committed towards the conservation and restoration of the natural biodiversity of the region on the degraded mined out areas and restore back to forest like areas. BCCL will strive to restore the habitats for the native fauna of the region by restoring the areas through ecological restoration.

BCCL is committed towards the wellbeing and betterment of the living standards for the local community through establishment of the eco-parks in the reclaimed mined areas in the coalfield and promoting the eco-mining tourism in the coalfield areas and exploring the new opportunities to the local communities. This will start from mine planning including technically and biologically reclamation of mined out areas in collaboration with State Forest Departments, Wild Life Divisions, NGOs, FRI Dehradun etc. working in the fields of biodiversity conservation.

6. COAL BENEFICIATION / COALWASHERIES:

a) For beneficiation of Runoff Mines (ROM) coal, washeries are being set up in a phased manner as per requirement and statutes.

b) Slurry Management System (SMS) in all washeries shall be organized to ensure collection of fines, gainful utilization of rejects viz. power generation in Fluidized Bed Combustion (FBC) plants, selling to brick manufacturers or adopting other environmental friendly disposal options as feasible.

c) The reject dumps and tailings shall be suitably handled to avoid any contamination.

d) The effluent from washeries including tailings pond shall be suitably treated and reused to minimize water consumption with zero discharge concept.

7. CONSERVATION AND CLEAN TECHNOLOGY:

a) R&D projects shall be taken up to promote clean coal technology and improve the existing technologies.

b) Energy saved is energy produced. Voluntary energy audit to be done for corrective action to reduce carbon footprint.

c) Clean Development Mechanisms will be explored for reducing emission of Green House Gases by exploration, identification, preparation of projects reports for extraction of methane from Coal Bed, Coal Mine, Abandoned Mine, Ventilation Air, UG Coal Gasification, generation and utilization of renewable energy etc.

8. AWARENESS PROGRAMME:

a) Publicity to generate awareness through exchange & communication of information, newsletters and periodicals on environment, seminars, workshops, celebration of

World Environment Day etc, at BCCL HQ, Areas & units to be undertaken. Regular training programs to be organized at various levels to inculcate awareness among employees.
b) Courses on environmental and forestry laws and Environmental Protection Measures and the Corporate Policy to be organized for project executives for improving knowledge.
c) BCCL will felicitate its workers for best practices in eco-restoration, land reclamation, conservation, compliance of statutes and innovative ways of sustaining environment.

9. WASTE MANAGEMENT:

BCCL will undertake appropriate action for safe handling, storage and disposal of solid waste and hazardous waste generated from its industrial set up and colonies as per relevant rules. The biomedical waste generated from hospitals and dispensaries will be collected and disposed in appropriate facilities created as per statutes. E-waste management and handling of various types of e-waste generatedin its operations will be done as per rule.

10. CORPORATE ENVIRONMENT RESPONSIBILITY:

Corporate Environment Responsibility (CER) is mandatory for issuing environmental clearance for all the Greenfield and Brownfield projects as per directives of MoEFCC with effect from 1st May, 2018 (O.M.No.22-65/2017- IAIII dt. 19.06.2018). Budgetary provisions should be kept for implementation of provisions of CER for all the projects which will be submitted to MoEFCC for grant of environmental clearance.

11. INCORPORATION OF VIEWS OF STAKEHOLDERS:

BCCL will critically examine and incorporate the viewpoints of various stakeholders like PAPs/PAFs, Parliamentary Committees, Standing Sub-Committees, NGOs etc.

12.IMPLEMENTATION OF POLICY:

i) Manpower: BCCL shall have environmental divisions at decision making & operational levels in its structure. The environment department shall be set up and strengthened at:
i)BCCL HQ
ii)Areas / Units / Collieries / Workshops /Washeries

ii) Roles and Responsibilities: The environmental department, set up at company HQs, Areas and Unit levels with appropriate manpower and resources, shall be responsible for implementation of policy, obtaining EC, FC, consent to establish & operate, statutes requirements and undertaking mitigation measures besides preparation of action plan every year and also to intimate the status of implementation to the management regularly.

iii) Annual Environment Budget (Revenue &Capital): The Annual Environment Budget (revenue & capital) shall be prepared based on the action plan including monitoring of various bench marks and the budget utilization. The year wise funds earmarked for environmental protection measures shall be kept in separate accounts with Environmental cost code.

REVIEW OF ENVIRONMENTAL POLICY:

In view of the present fast changing social, economic and environmental scenario, the CIL 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, the CILCorporate Environmental Policy would be reviewed and suitably revised. It will be followed by revision of this policy accordingly.

Place: Dhanbad **Chairman-cum-Managing Director**
Date:

No.J-11015/380/2010-IA-II(M)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division

Indira ParyavaranBhawan,
Jorbagh Road, N Delhi-3
Dated: 12th June, 2019

To,

The General Manager (E&F)
M/s Bharat Coking Coal Ltd,
Koyala Bhawan,
District **Dhanbad** (Jharkhand) Email: envbccl@gmail.com

Sub: Cluster X Coal Mining Project of capacity 2.289 MTPA and Coal Washery of 2.08 MTPA of M/s Bharat Coking Coal Limited in an area of 2057.47 ha located in District Dhanbad (Jharkhand) - Amendment in Environmental Clearance - reg.

Sir,

This refers to your online proposal No. IA/JH/CMIN/8812/2010 dated 15th September, 2017 and additional information dated 9th February, 2019 on the above mentioned subject.

2. The Ministry of Environment, Forest and Climate Change has considered the proposal for amendment in environmental clearance dated 6th February, 2013 granted by the Ministry in favour of M/s Bharat Coking Coal Ltd for Cluster X Coal Mining Project (comprising six mine lease holds) of total capacity 2.289 MTPA (peak) and coal washery of 2.08 MTPA in a total area of 2057.47 ha in Jharia Coalfields, District Dhanbad (Jharkhand).

3. The amendment in said environmental clearance has been sought due to the proposed restructuring/re-appropriation of individual mines in the Cluster for implementation of the Master Plan dealing with fire and subsidence, with the revised details as under:-

S. No.	Mine	Type of Mine UG/OC	Production Capacity (MTPA)	Lease Area (ha)	Mine Life (Years)	
1	Bhowrah North	UG	0.143	208.83	>20	
	Bhowrah North	OC	0.546		6	
2	Bhowrah South	UG	0.377	571.58	30	
		OC	1.2		43	Fire dealing
3	Amalagamated Sudamdih Patherdih Mine	OC	0.709	498.61	33	Amalgamation of mines for fire dealing
4	Sudamdih Shaft	UG	0.24	391.5	30	
5	Amlabad Closed	UG	0	386.95	NA	
6	Sudamdih Coal Washery (Within lease hold of Sudamdih Shaft Mine)		2.08	18	18	
	TOTAL		**2.289**	**2057.47**		

With the proposed restructuring, combined production capacity of the Cluster would remain at 2.289 MTPA (peak) in the same total area of 2057.47 ha.

Revised Mining Plan for the changed capacities of individual mines/lease holds namely, Amalgamated Sudamdih Patherdih OCP and Bhowrah South OCP has been approved by the Board of M/s Bharat Coking Coal Ltd on 29th January, 2019.

4. The proposal was considered by the sectoral Expert Appraisal Committee in its meeting held on 24-25 April, 2019, wherein the Committee recommended the amendments proposed by the project proponent as stated in para 3 above. Based on recommendations of the EAC, Ministry of Environment, Forest and Climate Change hereby accords approval for amendment in environmental clearance dated 6th February, 2013 to effect changes in production capacities of individual mines/lease holds of Cluster X Coal Mining Project of total capacity 2.289 MTPA (peak) and Coal Washery of 2.08 MTPA in an area of 2057.47 ha.

5. All terms and conditions stipulated in the environmental clearance dated 6th February, 2013 shall remain unchanged.

SKS
12/6/2019

(S. K. Srivastava)
Scientist E

Copy to:

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi
2. The Additional Principal Chief Conservator of Forests, Regional office (ECZ), Ministry of Environment & Forests, Bungalow No. A-2, Shyamali Colony, Ranchi - 834002
3. The Member Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
4. The Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi
5. The Advisor, Coal India Limited, SCOPE Minar, Core-I, 4th Floor, Vikas Marg, Laxmi Nagar, N Delhi
6. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32
7. The Member Secretary, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi
8. The District Collector, Dhanbad, Government of Jharkhand
9. Monitoring File 10. Guard File 11. Record File 12. Notice Board

POLLUTION UNDER CONTROL CERTIFICATE

Vehicle Emission Emission Test Certificate

[illegible]

License No: 284/2016

Sl. No:	00000127	Regis Date:	2010	Test Time:	12:14 PM
Vehicle No:	JH01AD 1547	Fuel:	DIESEL	Odometer:	NA
Make:	TML	Engine No:	20722	Owner Name:	
Model:	TIPPER	Chassis No:	13852	Remark:	
Category:	TIPPER	Test Date:	15-3-2019		

FLUSH CYCLE

AVERAGE

RPM Min	RPM Max	Oil Tmp
0630	4250	43

DETAIL

RPM Min	RPM Max	Temp	HSU	K value
630	4250	54	20.75	0.54
610	4290	61	27.86	0.76
630	4250	62	24.62	0.66
MEAN			24.42	0.65
RESULT		PASS		

Result: Pass **Valid Up To:** 14-9-2019

This Vehicle Meets the Emission Standards Prescribed By Rule 115 (2) of Central Motor Vehicle Rule 1989.
This Certificate is Valid for Six Months Only.

Seal of Testing Centre **Test Station Code: 284/2016** **Authorized Signatory**

Lic No. 397/18 See Under Rule 252/01 JH(MVR)

TRANSPORT DEPTT. GOVT. OF JHARKHAND

Veh No. JH10AG 9659

Type of Vehicle TIPPER

TIPPER

POLLUTION UNDER CONTROL

DATE OF ISSUE 05/12/2018

VALID UPTO 03/06/2019

POLLUTION UNDER CONTROL

INDIA GREEN

प्रपत्र पी.यू.सी.

मोटर वाहन नियमावली, 2001 के नियम 115 (2) के अंतर्गत प्रदूषण नियंत्रण के अन्तर्गत प्रमाण-पत्र

प्रदूषण स्तर प्रमाण-पत्र

जाँच केन्द्र का नाम

बालाजी पम्पुल स्टेशन, धुर्वाकोड, धनबाद-

वाहन प्रदूषण जाँच केन्द्र

अनुज्ञप्ति संख्या : 397 / 13 BC-/14555

मोटर वाहन संख्या : JH10AG 9659 R.C.Reg. 11/12/2012

मेक : TML निर्गत की तिथि : 05/12/2018

मॉडल : 2012 वाहन का प्रकार TIPPER

निरन्तरण स्तर की जाँच एवं मिले पठन परिणाम :

पेट्रोल / LPG वाहन

CMVR 1989 के नियम 115 (2) के अन्तर्गत निर्धारित मापदण्ड

CO :- 0.5%-4.5%

HC :- 750-2000

गैस का नाम वास्तविक पठन

CO

HC

डीजल वाहन

नियम 115 (2) गैस का नाम वास्तविक पठन

मापदण्ड 19

H.S.U-66

फुल लोड

फ्री एक्स

नियम के अन्तर्गत निर्धारित मापदण्ड को पूरा करता है/नहीं

03/06/2019

ALL INDIA VALID

प्रमाण पत्र निर्गत की तिथि से छः माह तक वैध है

KOYLANCHAL VAHAN PRADUSHAN JANCH KENDRA
AUTH. BY GOVT. OF JHARKHAND
KARKEND BAZAR, KOBANDA, DHANBAD

koylanchalpuc@gmail.com

परिवहन विभाग

[illegible]

Licence No: 284/2016

Sl. No:	20000127	Regis Date:	2010	Test Time:	12:14 PM
Vehicle No:	JH10R-1438	Fuel:	DIESEL	Odometer:	NA
Make:	TML	Engine No:	20732	Owner Name:	
Model:	TIPPER	Chassis No:	13632	Remark:	
Category:	TIPPER	Test Date:	15-3-2019		

FLUSH CYCLE

AVERAGE

RPM Min	RPM Max	Oil Temp
0610	4250	43

DETAIL

RPM Min	RPM Max	Temp	HSU	K value
630	4250	59	29.75	0.54
610	4250	61	27.88	0.76
630	4250	62	24.62	0.66
MEAN			24.42	0.65
RESULT		PASS		

Result: Pass **Valid Up To:** 14-9-2019

This Vehicle Meets the Emission Standards Prescribed By Rule 115 (2) of Central Motor Vehicle Rule 1989.
This Certificate is Valid for Six Months Only.

VAYAU PRADUSHAN JANCH KENDRA ★ KOYLANCHAL ★ AUTH. BY GOVT. OF JHARKHAND ★ HAREEJ BAZAR, KUSUNDA, DHANBAD

Seal of Testing Centre **Test Station Code: 284/2016** **Authorized Signatory**

POLLUTION UNDER CONTROL CERTIFICATE

COMPUTERIZED EMISSION TEST CERTIFICATE
(Rule 160B(3) of BMV Rules 1992)

Transport Department
Govt. Of JHARKHAND

License: 440/2015

PUCC No.	1141171	Make	TATA Motors Ltd.	Name	GEC PROJECT LTD
Serial No.	1171	Model	TIPPER	Address	NA
Vehicle No.	JH01AC3505	Fuel	Diesel	Date	01/02/2019
Date of Mfg.	NA	Chasis	12160	Time	02:13:25
Category	GVW	Engine	06158		

Photo of Vehicle

Sl No.	Opacity [1/m]	Opacity [%]	RPM (Max)
1	56	46.13	1209
2	0.59	46.16	1214
3	0.57	46.12	1216
4	0.6	46.14	1212
5	0.56	46.15	1218
--	--	--	--
--	--	--	--
Mean	0.58	46.136	1213.8

Grade PASS Valid Upto 31/07/2019

Certified that the vehicle's smoke emission confirms to the standards prescribed under rule 115(2) of central motors vehicle under 1989

Seal of Testing Centre

Test Station Code: 440/2015

Authorised Signatory

Lic No. 397/18 See Under Rule 252/91 JH(MVR)

TRANSPORT DEPTT. GOVT. OF JHARKHAND

Veh No.
JH22A 1658

Type of Vehicle
TIPPER

TIPPER LPT

POLLUTION UNDER CONTROL

DATE OF ISSUE
03/12/2018

VALID UPTO
01/06/2019

प्रपत्र पी.यू.सी.

मोटर यान (प्रदूषण नियंत्रण) नियमावली, 2001 के नियम 252 द 12 I के अधीन प्रदूषण नियंत्रण के अन्तर्गत प्रमाण-पत्र

1658

प्रदूषण स्तर प्रमाण-पत्र
जाँच केन्द्र का नाम
कोयलांचल वाहन प्रदूषण जाँच केन्द्र
बाराही प्रफुल स्टेशन, धनबाद-

अनुक्रमांक संख्या : 307 / 18 BC-/14513
मोटर वाहन संख्या : JH22A 1658 फ्रेम संख्या D.O.Reg. 29/07/2007
मेक : TML निर्गत की तिथि : 03/12/2018
मॉडल : 2007 वाहन का प्रकार : TIPPER LPT 2515

निरसारण स्तर की जाँच एवं निम्न पाये गये —
पेट्रोल / LPG वाहन

CMVR 1989 के नियम 115 [2] के अन्तर्गत निर्धारित मापदण्ड — मेक का नाम — वास्तविक पठन
CO :- 0.5%-3.5%
HC :- 750-2000
HC :-

डीजल वाहन

CMVR 1989 के नियम 115 [2] के अन्तर्गत निर्धारित मापदण्ड — मेक का नाम — वास्तविक पठन
21
I.S.U-55
धुआं सोख —
की प्रमाण

CMVR 1989 के नियम 115 के अन्तर्गत निर्धारित निरसारण मापदण्ड को पूरा करता है / नहीं करता है।

01/06/2019

ALL INDIA VALID

प्राधिकृत हस्ताक्षर

प्रमाण पत्र की निर्गत की तिथि से 06 माह तक वैध है।

KOYLANCHAL VAHAN PRADUSHAN JANCH KENDRA * AUTH. BY GOVT. OF JHARKHAND * KARKEND BAZAR

koylanchalpuc@gmail.com

POLLUTION UNDER CONTROL

INDIA GREEN

POLLUTION UNDER CONTROL

Lic No. 397/18 See Under Rule 252/01 JH(MVR)

TRANSPORT DEPTT. GOVT. OF JHARKHAND

Veh No. JH22A 1658

Type of Vehicle TIPPER

TIPPER LPT

POLLUTION UNDER CONTROL

DATE OF ISSUE 03/12/2018

VALID UPTO 01/06/2019

OUR EARTH OUR HOME

प्रपत्र पी.यू.सी.

झारखंड मोटर यान नियमावली, 2001 के नियम 252 ट (2) के तहत
प्रदूषण नियंत्रण के अन्तर्गत प्रमाण-पत्र

1658

प्रदूषण स्तर प्रमाण-पत्र

जाँच केन्द्र का नाम

वाहन प्रदूषण जाँच केन्द्र
बालाजी फ्यूल स्टेशन, मुईफोड़, धनबाद-

अनुज्ञप्ति संख्या : 397 / 18 क्रम संख्या BC-/14513

मोटर वाहन संख्या : JH22A 1658 D.O.Reg. 29/07/2007

मेक : TML निर्माण की तिथि : 03/12/2018

मोडल : 2007 वाहन का प्रकार : TIPPER LPT 2515

निरसरण स्तर की जाँच एवं निम्न पठन द्वारा —

पेट्रोल / LPG वाहन

CMVR 1989 के नियम 115 (2) के अन्तर्गत निर्धारित मापदण्ड
CO :- 0.5%-4.5%
HC :- 750-2000

गैस का नाम CO - HC - वास्तविक पठन

डीजल वाहन

CMVR के नियम 115 (2) के अन्तर्गत निर्धारित मापदण्ड

गैस का नाम वास्तविक पठन

21

भारतवर्ष सरकार

P.G.U-65
कुल लोड —
की एकल —

के नियम 115 (2) के अन्तर्गत निर्धारित निम्नतम मापदण्ड को पूरा करता है/ नहीं करता है।

01/06/2019

ALL INDIA VALID

प्राधिकृत हस्ताक्षर

केन्द्र की ... प्रमाण पत्र निर्गत की तिथि से छः माह तक वैध है।

AUTH. BY GOVT. OF JHARKHAND

POLLUTION CHAL VAHAN PRADUSHAN JANCH KENDRA KARKEND BAZAR

INDIA GREEN

koylanchalpuc@gmail.com

Study of Occupational diseases and Hearing impairments of Coal Mines workers of BCCL directly involved in active mining operations

CMS
699(L)
11/10/19

11/10/19

GM (Environment)

11/10/19

11/10/19

REGIONAL OCCUPATIONAL HEALTH CENTRE (EASTERN), KOLKATA

&

NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH, AHMEDABAD

(Indian Council of Medical research)

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CONCLUSION

- This study covered 351 subjects from Kustore sector and 140 subjects from Baghmara sector of BCCL Collieries. Mean age of the workers was 45.9 ± 8.36 years. Most of the workers were between 35-54 years age. Mean job experience was 11.72 ± 8.49 years.

- Most common symptoms complained by study subjects were musculoskeletal pain (34%). Other complaints were Cough, difficulty in breathing, chest pain, soreness of mouth etc. Headache, sleep disturbance, weakness, tremor in fingers was also experienced by some subjects.

- About 20% subjects had systolic blood pressure >140 as well as diastolic blood pressure > 90 mm of Mercury. 9% workers had only higher systolic blood pressure and 11% had only higher diastolic blood pressure.

- As far as pulmonary functional status of study subjects in concerned, about 3% subjects had restrictive type of abnormality (FVC/PFVC < 80%) and 0.6 % subjects had combined type of abnormality (FVC/PFVC <80 % and FEV1% <70%). A good number of subjects (36.5%) had FEV1% values between 70% and 80%. Mean FVC values were significantly lower among the subjects of age 45 years or above.

- So far as chest radiographic findings are concerned, 93% subjects had findings within normal limits. 3% subjects showed findings suggestive of opacities in lung and almost 1.5% had other features on chest X-ray (mostly suggestive of Koch's infection of lung). Such findings may be due to pneumoconiotic changes in lung, hence these subjects should be properly followed up and necessary medical, ethical, legal, administrative actions may be initiated as necessary.

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- Haematological and biochemical findings of the subjects were mostly within normal limits. Almost 11% workers had random blood sugar level more than 140 units. As far as ophthalmological findings are concerned, 5% subjects had uncorrected vision and 9% subjects had Cataract in eyes.

- Decline in hearing ability with increasing duration of exposure was observed more at higher frequency; however, this observation is subject to adjustment for age and other probable factors.

- The subjects for this study are selected from workplaces identified by BCCL, Govt. of India, as required for the purpose of this study. The findings of this study may thus be restricted to the concerned workplaces and may not be generalisable.

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EXPENDITURE MADE UNDER VARIOUS HEADS OF ENVIRONMENTAL MANAGEMENT PLAN

Major Environmental measures cost for the year 2013-14

Sl. No.	Activity (2013-14)	Cost Incurred (In Lakhs)
1	Environmental Monitoring (through HQ)	4.80
2	Gabion Plantation through DFO	20.41
3	Biological reclamation	93.98
4	EMP Preparation cost	80.00
Total Cost Incurred (Manpower cost and Diesel cost is included)		199.19

Major Environmental measures cost for the year 2014-15

Sl. No.	Activity (2014-15)	Cost Incurred (In Lakhs)
1	Environmental Monitoring (through HQ)	4.80
2	Gabion Plantation through DFO	15.11
3	Ecological Restoration	279.86
4	FRI Dehradun Monitoring Cost	0.85
5	Environment Statutory Fee	2.25
Total Cost Incurred (Manpower cost and Diesel cost is included)		302.87

Major Environmental measures cost for the year 2015-16

Sl. No.	**Activity (2015-16)**	**Cost Incurred (In Lakhs)**
1	Environmental Monitoring (through HQ)	4.80
2	Gabion Plantation through DFO	11.40
3	Ecological Restoration	308.81
4	Statutory Fee including CTO/CTE	11.25
5	FRI Dehradun Monitoring Cost	2.138
Total Cost Incurred(Manpower cost and Diesel cost is included)		338.40

Major Environmental measures cost for the year 2016-17

Sl. No.	**Major Environment Activity (2016-17)**	**Cost Incurred (In Lakhs)**
1	Environmental Monitoring (through HQ)	4.46
2	Gabion Plantation through DFO	11.16
3	FRI Dehradun Monitoring Cost	0.89
4	Ecological Restoration / Block Plantation	214.43
5	Water Sprinkling	46.20
6	Scientific study for delineation of fire (through HQ)	18.10
Total Cost Incurred (Manpower cost and Diesel cost is included)		295.24

Major Environmental Measure cost for the year 2017-18

Sl. No.	Major Environment Activity	Cost Incurred (In Lakhs)
1	Environmental Monitoring (through HQ)	20.55
2	Source Apportionment Study (through HQ)	141.60
3	Ecological Restoration / Block Plantation	221.53
4	FRI Dehradun Monitoring Cost	0.89
5	Water Sprinkling	34.66
Total Cost Incurred (Manpower cost and Diesel cost is included)		419.23

Major Environmental measures cost for the year 2018-19

Sl. No.	Major Environment Activity	Cost Incurred (In Lakhs)
1	Routine Environmental Monitoring	32.57
2	Water Quarterly Monitoring Report	3.60
3	FRI Dehradun Monitoring Cost	0.89
4	Ecological Restoration/Block Plantation	38.31
5	Water Sprinkling	31.51
6	Construction of water curtain sprinkler	1.50
7	Statutory Fee including CTO/CTE	3.80
8	Ground water Monitoring	CMPDIL (through HQ)
Total Cost Incurred (Manpower cost and Diesel cost is included)		112.18

Major Environmental measures cost for the year 2019-20

Sl. No.	Major Environment Activity	Cost Incurred (In Lakhs)
1	Routine Environmental Monitoring	17.99
2	Water Quarterly Monitoring Report	1.69
3	FRI Dehradun Monitoring Cost	0.85
4	Ecological Restoration/Block Plantation	45.50
5	Water Sprinkling	31.51
6	Statutory Fee including CTO/CTE	3.80
7	Mist water sprinkler (indent) through HQ	45.66
8	Ground water Monitoring	CMPDIL (through HQ)
9	Online PM10 Analyser installation (through HQ)	42.30
Total Cost Incurred (Manpower cost and Diesel cost is included)		189.30

Major Environmental measures cost for the year 2020-21

Sl. No.	Major Environment Activity	Cost Incurred (in Lakhs)
1.	Routine Environmental Monitoring	19.50
2.	Water Quarterly Monitoring Cost	1.69
3.	Ecological Restoration (material cost)	0.50
4.	Compensatory Plantation by DFO	13.98
5.	Block Plantation by DFO	20.42
6.	Water sprinkling (Manpower & Diesel Cost included)	30.00 (approx)
7.	Statutory Fee including CTO/CTE	3.80
8.	Ground water monitoring	CMPDIL (through HQ)
9.	Online PM10 Analyser installation (2 Nos.)	through HQ
10.	Construction of Toe Wall Bhowra South	17.34
11.	Mine Closure Cost (deposited in Escrow account)	247.51
Total Cost Incurred		354.74

Major Environmental measures Cost for the year 2021-22

Sl. No.	Major Environment Activity	Cost Incurred (in Lakhs)
1.	Routine Environmental Monitoring	26.70
2.	Water Quarterly Monitoring Cost	2.22
3.	Ecological Restoration (material cost)	0.50
4.	Plantation by DFO	21.50
5.	Water sprinkling (Manpower & Diesel Cost included)	30.00 (approx)
6.	Statutory Fee including CTO/CTE	3.80
7.	Ground water monitoring	CMPDIL (through HQ)
8.	Construction of Siltation pond	3.42
9.	Environmental Awareness Programme like Env Day Celebration, Amrit Mahotsav, Vriksharopan abhiyan etc	0.60
10.	Mine Closure Cost (deposited in Escrow account)	183.01
Total Cost Incurred		271.75

Major Environmental measures Cost for the year 2022-23

Sl. No.	Major Environment Activity	Cost Incurred (in Lakhs)
1.	Routine Environmental Monitoring	38.86
2.	Water Quarterly Monitoring Cost	3.18
3.	Ecological Restoration (material cost)	0.50
4.	Plantation by DFO	17.50
5.	Water sprinkling (Manpower & Diesel Cost included)	31.00 (approx)
6.	DWLR with telemetry for Ground water level monitoring	0.75
7.	Peizometric well installation 1 no.	7.79
8.	Ground water monitoring	CMPDIL (through HQ)
9.	Construction of Toe Wall in ASP colliery	10.00
10.	Construction of wheel washing arrangement in ASP	9.70
11.	Fog canon 2 no. installed	16.75
12.	Environmental Awareness Programme like Env Day Celebration, Amrit Mahotsav, Vriksharopan abhiyan etc	0.80
13.	Mine Closure Cost (deposited in Escrow account)	196.96
Total Cost Incurred		333.79

Major Environmental measures Cost for the year 2023-24

Sl. No.	Major Environment Activity	Cost Incurred (in Lakhs)
1.	Routine Environmental Monitoring	39.97
2.	Water Quarterly Monitoring Cost	2.91
3.	Ecological Restoration (material cost)	1.00
4.	Plantation by DFO	3.28
5.	Water sprinkling (Manpower & Diesel Cost included)	35.00 (approx)
6.	Ground water monitoring	CMPDIL (through HQ)
7.	Construction of Toe Wall in Bhowra S colliery	19.93
8.	Truck mounted Fog canon	42.77
9.	Installation of Fixed water sprinkler at weighbridge	2.66
10.	Installation of 5KLD ETP at Regional Hospital Bhowra	3.77
11.	Environmental Awareness Programme like Env Day Celebration, Vriksharopan abhiyan etc	0.80
12.	Mine Closure Cost (deposited in Escrow account)	220.96
Total Cost Incurred		373.05

Mine Closure Cost Details from 2013-14 to 2023-24:

S. No.	Name of Mine	Escrow account	Amount deposited in Escrow account till 31st March 2024 (in Rs. Lakh)		Total amount in Escrow Fund
			Deposited in Escrow account from 2013-14 to 2023-24	Interest incurred from 2013-14 to 2023-24	Principal & Interest upto 31.03.2024
1	Bhowra (N) Grp of Mines (UG+OC)	150100008868	554.78	284.24	839.02
2	Bhowra (S) Grp of Mines (UG+OC)	150100008830	1968.92	850.07	2818.99
3	Sudamdih Incline Mine	150100008868	93.74	76.05	169.79
4	Patherdih Grp of Mines	150100008872	389.22	201.59	590.81
5	Amalgamated Sudamdih- Paherdih Colliery	150100011524	290.31	21.88	312.19
6	Sudamidh Shaft Mine	150100011673	174.22	44.44	218.66
Total Eastern Jharia Area (Cluster X)			**3471.19**	**1478.27**	**4949.46**

*Note:- Amount deposited in Escrow account for implementation of progressive mine closure Activity in the mines under cluster X is 49.49 Crores from FY 2013-14 to FY 2023-24.

BHARATCOKING COAL LIMITED
A MINI RATNA COMPANY
A SUBSIDIARY OF COAL INDIA LIMITED
OFFICE OF THE PROJECT OFFICER
ASP COLLIERY (SUDAMDIH)
P.O.- Sudamdih Dist.-Dhanbad
Pin - 828126, Jharkhand

भारत कोकिंग कोल लिमिटेड
(कोल इंडिया लिमिटेड का एक अंग)
परियोजना पदाधिकारी का कार्यालय
ए0 एस0 पी0 कोलियरी(सुदामडीह)
पी0ओ0 – सुदामडीह, जिला-धनबाद
पिन कोड- 828126, झारखंड

Ref. No. EJA/ASP/SMD/23/ 2766

Date: 27/9/23

To,
The Member Secretory,
Jharkhand State Pollution Control Board,
TA. Division Building
HEC, Dhurwa.
RANCHI – 834004.

Sub. :-**Submission of Environmental Statement (From –V) for the year 2022-23.**

Dear Sir,

Please find herewith the Environmental Statement duly filled for the financial year 2022-23 in respect of A.S.P. Colliery, E.J. Area.

This is for your kind information, Sir

Encl. - As Above

Yours faithfully

27-9-23

Project Officer
A.S.P. Colliery

Copy to:
1. Regional Officer, J.S.P.C.B, Dhanbad
2. Area Manager (Env.) E.J. Area.
3. Colliery Manager / Safety Officer, A.S.P. Colliery.
4. Office file.

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"FORM – V"
(See rule 14)

Environmental statement for the financial year ending 31st March'2023

PART – A

Name and address of the owner / Occupier of the industry operation or process	: Sri U. A. Kaole, D.T. (P&P), Koyla Bhawan, Koyla Nagar, BCCL, Dhanbad.
Industry category primary (STD Code)	: Coal Mining Industry (A.S.P. Colliery)
Production capacity	: 0.709 MTPA.
Year of establishment	: 1962
Date of last environmental statement	: Dt. 27.09.2022 (Ref. No. EJA/ASP//22/2103) submitted.

PART – B

Water and Raw Material consumption:

Water Consumption	
1. Process (Dust suppression)	797 KL/ Day
2. Cooling	Nil
3. Domestic	470 KL/ Day

Name of products	Process water consumption per unit of product point	
	During the previous Financial year 2021-22	During the current Financial year 2022-23
N/A	N/A	N/A

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 2021-22	During the current Financial year 2022-23
Diesel	Coal	5.73 Ltrs./Ton.	5.51 Ltrs./Ton
Explosive	Coal	3.028 Kg/Ton	3.213Kg/Ton

Industry may two codes if disclosing details of raw material would violate contractual Obligations otherwise all industries have to name the materials used.

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PART – C

Pollution discharged to Environment / unit of output (Parameter as specified in the consent issued).

Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of Pollution in discharges (mass / volume)	Percentage of variation from prescribed stack with reason.
a) Water	--	Total suspended solid – 42 pH – 7.94 Oil & Grease - <2.0 COD - 28	Within the limit Within the limit Within the limit Within the limit
b) Air	—	PM10 - 83 PM 2.5 - 35 SO_2 - <10 NOx - 24	Within the limit Within the limit Within the limit Within the limit

PART – D

Hazardous wastes (As specified under Hazardous wastes Management and Handling rules 1989.

Hazardous waste	Total Quantity	
	During the previous Financial year 2021-22	During the current Financial year 2022-23
a) From process	Quantity of Burnt Oil –3993Ltrs. Cotton waste 1500 Kg. Oil soaked filters - 1153Nos.	Quantity of Burnt Oil – 3885Ltrs. Cotton waste – 1707 Kg. Oil soaked filters – 1219 Nos.
b) From pollution control facilities	N/A	N/A

PART – E

Solid wastes

Solid wastes	Total Quantity	
	During the previous Financial year 2021-22	During the current Financial year 2022-23
a) From process	Quantity of Overburden generated – 2056041.315M^3	Quantity of Overburden generated – 1846847.170M^3
b) From Pollution control facilities	Oil & Grease trap's bottom sludge - N/A	Oil & Grease trap's bottom sludge – N/A
c) Quantity of recycled or reutilized with unit.	Quantity of O/B used for back filling -1572317.510 M^3	Quantity of O/B used for back filling - Nil

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PART – F

Please specify the characterization (in terms of composition of quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes

Type of rock : Sedimentary

Type of soil : There is no soil. All soil has been removed earlier.

Chemical properties of soil – N/A

Disposal process for solid waste (Back filling practice) – By dumper for back filling of the excavated area.

PART – G

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.

Ecological restoration work is going on.

PART – H

Additional measures / investment proposal for environmental protection including abatement of pollution, prevention of pollution.

(i) There are two water tankers of 20 KL Capacity, which sprinkle 04 trips water daily (except rainy season).
(ii) Fencing of ecological restoration site is being done.
(iii) There is no pressure filters.
(iv) Black toping of roads has not been done.
(v) Monitoring of air quality, water quality and noise levels are being done periodically.
(vi) Coal is being transported by covered trucks.

PART – I

Any other particulars for improving the quality of the environment.

Carbon sequestration studies done at H.Q. Level /source appointment study and reduction in pollution load by reducing road transport study being done at H.Q. level.

Anil
27-9-23

Signature	
Name	Anil Kumar
Designation	Project Officer
Address	A.S.P. Colliery Post: Sudamdih, Dist: Dhanbad Jharkhand - 828126

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Bharat coking coal limited

(A Subsidiary of Coal India Ltd)

Office of the Project Officer, Bhowra (N), Eastern Jharia Area,
P.O. Bhowra, Dist: Dhanbad (Jharkhand),PIN- 828302

Ref. No: - BCCL/EJA/BH (N)/2023/ 452 Date:- 01/12/2023

To,
The Member Secretary,
Jharkhand State Pollution Control Board
T. A. Division Building (Ground Floor)
H. E. C. Dhurva.
Ranchi – 834004

Sub:- Submission of Environmental Statement in From – V

Dear Sir,
Environmental Statement is Form – V is being submitted to you for financial year 2022-23 in respect of Bhowra (N) U/G Mines.

Enclosures:- As above.

EJ340541427IN

भारतीय डाक
India Post

Yours Faithfully

1/12/23

Project Officer
Bhowra (N) U/G Mines

PROJECT OFFICER
BHOWRA (N) U/G MINES

Distribution:-
1. The Regional Office, JSPCB Office, HIG Dhanbad
2. The General Manager (Env.), BCCL, KoylaBhawan.
3. The Area Manager (Env.), E. J. Area, Bhowra.
4. Office File.

FROM 4

[See rules 6(5), 13(8), 16(6) and 20(2)]

FORM FOR FILING ANNUAL RETURNS

[To be submitted to State Pollution control Board by 30th day of June of every yearfor the preceding period April to March]

1. Name and address of facility :Binod Kumar Pandey, Project Officer, Bhowra(N) U/G Mines P.O. Bhowra, Dist: - Dhanbad, Pin: 828302
2. Authorisation No. and Date of issue :Applied online for Authorisation vide application no: 5330817 Dated: - 09/05/2019
3. Name of the authorised person and full : ---------- address with telephone, fax number and e-mail
4. Production during the year (product wise), wherever applicable: - N/A

Part A, To be filled by hazardous waste generators

1.Total quantity of waste generated category wise: Burnt oil – 20Litres

2. Quantity dispatched
   - i. to disposal facility
   - ii. to recycler or co-processor
   - iii. others

   } N/A

3. Quantity utilized in-house, if any :– Burnt oil –145 Litres in lubricating coal tub, Bevel pulley etc.
4. Quantity in storage at the end of the year: – Nil

Part B, To be filled by Treatment, storage and disposal facility operators

1. Total quantity received –
2. Quantity in stock at the beginning of the year –
3. Quantity treated –
4. Quantity disposed in landfills as such and after treatment –
5. Quantity incinerated (if applicable) -
6. Quantity processed other than specified above –
7. Quantity in storage at the end of the day –

} N/A

Part C, To be filled by recyclers or co-processors or other users

1. Quantity of waste received during the year
   - i. domestic sources - 145 litres (burnt oil)
   - ii. imported (if applicable)
2. Quantity in stock at the beginning of the year –Nil
3. Quantity recycled or co-processed or used – 145 litres used in lubrication of pump bearing & coal tubs & bevel pulley
4. Quantity of products dispatched (wherever applicable)– Nil
5. Quantity of waste generated – Nil
6. Quantity of waste disposed – Nil
7. Quantity re-exported (wherever applicable) -Nil
8. Quantity in storage at the end of the year – Nil

4/12/23

Signature of the Occupier or Operator of the disposal facility

PROJECT OFFICER
BHOWRA (N) U/G MINES

Date.....

Place: Bhowra (N) U/G Mines

FORM 3

[See rules 6(5), 13(7), 14(6), and 20(1)]

FORMAT FOR MAINTAINING RECORDS OF HAZARDOUS AND OTHER WASTES

1. Name and address of the facility – Bhowra (N) U/GMine, AT+PO- Bhowra, Dhanbad 828302

2. Date of issuance of authorisation and its reference number –Applied online by application no- 5330817 dated: - 09/05/19

3. Description of hazardous and other wastes handled (Generated or Received)

Date	Type of waste with category as per Schedules I, II and III of these rules	Total quantity (Liter)	Method of Storage	Destined to or received from
--	Used/Burnt oil	145	Sealed Drum	workshop
	Total	20(Fortyliters)		

4. Date wise description of management of hazardous and other wastes including products sent and to whom in case of recyclers or pre-processor or utiliser – N/A

5. Date of environmental monitoring (as per authorisation guidelines of Central Pollution Control Board): - March 2022.

Date ....01/12/23.....

Place. Bhowra (N) U/G Mines

1/12/23

Signature of occupier

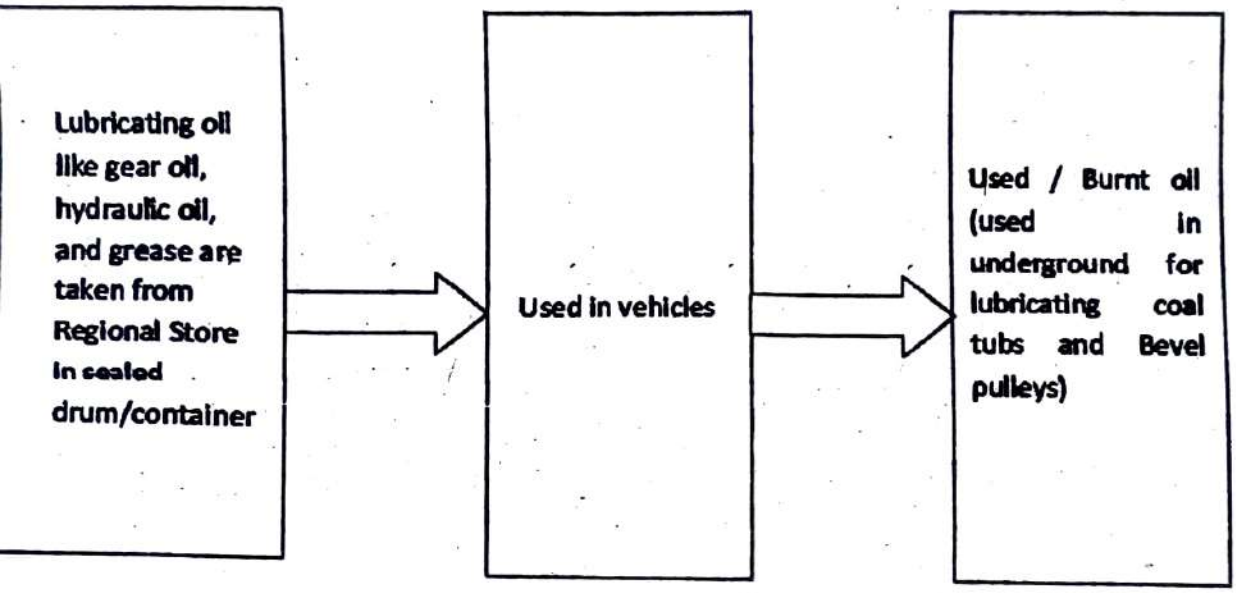
Bharat coking coal limited

(A Subsidiary of Coal India Ltd)

Office of the Project Officer, Bhowra (N), Eastern Jharia Area,
P.O. Bhowra, Dist: Dhanbad (Jharkhand),PIN- 828302

. No. – BCCL/EJA/Bh(N)/2023/454 Date:- 01/12/23

Sub: Process diagram for hazardous waste management.



01/12/23
Manager
owra (N) U/G Mines

MANAGER
RA (N) U/G MINES

01/12/23
Colliery Engineer,
Bhowra (N) U/G Mines
Colliery Engineer
Bhowra (N) Colliery

Bharat coking coal limited

(A Subsidiary of Coal India Ltd)

Office of the Project Officer, Bhowra (S), Eastern Jharia Area,

P.O. Bhowra, Dist: Dhanbad (Jharkhand),PIN- 828302

Ref. No:- BCCL/EJA/BH(S)//2023/1578 Date:-06/12/2023

To,
The Member Secretary,
Jharkhand State Pollution Control Board
T. A. Division Building (Ground Floor)
H. E. C. Dhurva.
Ranchi – 834004

Sub:- Submission of Environmental Statement in From – V

Dear Sir,

Environmental Statement is Form – V is being submitted to you for financial year 2022-23 in respect of Bhowra (S) Colliery.

Enclosures:- As above.

Yours Faithfully

6/12/23

Project Officer
Bhowra (S) Colliery

Distribution:-
1.The Regional Office, JSPCB Office, HIG Dhanbad
2. The General Manager (Env.), BCCL, Koyla Bhawan
3. The Area Manager (Env.), E. J. Area, Bhowra.
4. Office File.

EJ 340541577 IN भारतीय डाक India Post

(Form – V)

(See rule 14)

Environmental Statement for the financial year ending the 31.st March 2023

PART – A

(i)	Name and address of the owner/occupier of the industry operation or process	: Sanjay Kumar Singh, D.T. (P&P) BCCL, Koyla Nagar, Dhanbad
(ii)	Industry category	: Coal Mining Industry
(iii)	Production capacity	: U/G - 0.143 MTY OCP – 0.546 MTY (EC no:- J-11015/380/2010-1A-II(M), dt: 06/02/13) and EC amended dated: 12.06.2019
(iv)	Year of establishment	: Colliery operating since pre nationalization period and vested in BCCL through Coal Mine Nationalisation Act 1972-73
(v)	Date of last environmental Statement submitted	: 25.06.2022, (Ref. No: BCCL/EJA/BH(N)/2020/285)

PART - B

Water and River Material Consumption

Water Consumption	
Process (Dust separation)	2022.5 M^3/day
Cooling	Nil
Domestic	1217.5 M^3/day

Name of Products	Process water consumption per unit of product output	
	During the previous financial year	During the current financial year
COAL	0.3 KL/T	6.64 KL/T

Raw Material Consumption

Name of materials	Name of products	Consumption of raw material per Unit of output	
		During the previous financial year (2021-22)	During the current financial year (2022-23)
Diesel	Coal	4.584 L/Te	0.0195 L/Te
Explosive	Coal	7.13 Kg/ Te	8.70 Kg/ Te
Timber	Coal	NIL	NIL

*S – wooden sleepers, P- wooden props.

PART- C

Pollution discharged to environment/unit of output (parameter as specified in the consent issued)

Pollutants	Quantity of pollutants discharge	Concentrations of pollutants in discharge(mass/volume)	Percentage of variation from prescribed standards with reasons
Water	--	*(MW- 10 , 27.03.23)* TSS - 46 PH - 7.96 Oil & Grease - <2.0 COD - 32	Within Limit
Air	--	*(as on 10.04.23)* PM 10 - 158 PM 2.5 - 72 SO_2 - <10 NO_x - 27	Within Limit

PART – D

Hazardous Wastes

(as specified under Hazardous waste management and handling rules, 1989)

Hazardous Waste	Total Quantity (Kg.)	
	During the previous financial year (2021-22)	During the current financial year (2022-23)
From process	Burnt oil - 590 Litre	Burnt oil - 824 Litre
From pollution control facilities	N/A	N/A

PART – E

Solid Wastes

Solid Wastes		Total Quantity	
		During the previous financial year	During the current financial year
(a) Process		3454029 M^3	4043280 M^3
(b) Pollution control facility		Nil	Nil
(c)	1.Quantity recycled or re-utilized within the unit	3454029 M^3 (Backfilled)	4043280 M^3 (Backfilled)
	2. Sold	Nil	Nil
	3. Disposed	Nil	Nil

PART – F

Please specify the characterizations (in terms of composition of quantum) of hazardous as well as solid waste and indicate disposal practice adopted for both these categories of wastes.

(i)	Type of Rocks	: -	N/A
(ii)	Type of soil	: -	N/A
(iii)	Chemical properties of soil	: -	N/A
(iv)	Disposal process for Solid Waste (backfilling practice)	: -	N/A

PART – G

Impact of pollution abatement measures taken on conservation of nature resources and on the cost of production

(i)	No. of plants planted	: Nil
(ii)	Cost of plants	: Nil
(iii)	Plantation cost incurred	: Nil
(iv)	Backfilling cost	: Nil

PART – H

Additional measures/investment proposal for environmental protection including abatement of pollution, prevention of pollution

(i) Water sprinkling is done in transporting road, coal stock yard, working faces, etc. to reduce dust emission.

(ii) Proper and timely maintenance of tipper, SDL machine, fan, pumps etc. is being done to control noise pollution.

(iii) Monitoring of air quality and water quality is being done periodically.

(iv) Covered coal transportation is being done.

(v) Pucca road prepared for coal transportation.

(vi) Maintenance of plants.

PART – I

Any other particulars for improving the quality of the environment

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6/12/23

Project officer
Bhowra (S) Colliery