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

(FOR THE MONTH JULY, 2024)

E. C. no. J-11015/307/2010-IA.II (M) dated 01.03.2018



CMPDI

ISO 9001 Company
Regional Institute-II
Dhanbad, Jharkhand

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EXECUTIVE SUMMARY

1.0 Introduction

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

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

2.0 Sampling location and rationale

2.1 Ambient air sampling locations

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

2.2 Water sampling stations

The Water sampling stations were selected for mine sump water.

2.3 Noise level monitoring locations

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

3.0 Methodology of sampling and analysis

3.1 Ambient air quality

Parameters chosen for assessment of ambient air quality were Particulate Matter (PM₁₀), Fine Particulate Matter (PM_{2.5}), Sulphur Di-oxide (SO₂) and Nitrogen Oxides (NO_x). Respirable Dust Samplers (RDS) and Fine Dust

Sampler (PM_{2.5} sampler) were used for sampling of PM₁₀, SO₂, & NO_x and Fine Dust Sampler (PM_{2.5} sampler) were used for sampling of PM_{2.5} at 24 hours interval once in a fortnight and the same for the gaseous pollutants. The samples were analysed in Environmental Laboratory of CMPDI, RI-II, Dhanbad.

3.2 Water quality

Water samples were collected as per standard practice. The Mine effluent samples were collected and 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 PM₁₀, PM_{2.5}, SO₂ and NO_x are mostly within the permissible limits in all sampling locations as per MoEF&CC Gazette Notification No. GSR 742(E) dt 25.09.2000 Standards for Coal Mines and National Ambient Air Quality Standard -2009. Sometimes the concentration of PM₁₀& PM_{2.5} exceeds the limits due to heavy public traffic, poor road condition, coke oven plants, burning of coal by surrounding habitants, brick making, municipal waste dumps and industries like Steel Plant, thermal Plants including their fly ash etc.

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

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

4.2 Water quality

The test results indicate that the major parameters compared with MoEF&CC Gazette Notification No. GSR 742(E) dt.25.09.2000 Standards for Coal Mines were 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-IX is in the Eastern part of the Jharia coalfield. It includes a group of 6 Mines (viz. Lodna UG, Bagdigi UG, Joyrampur UG, Bararee UG, Jealgora UG, NT/ST Expan. OCP. The Cluster – IX is situated about 25 - 30 kms from Dhanbad Railway Station. The mines of this Cluster – IX are operating since pre nationalization period (prior to 1972-73). It is connected by both Railway and Road. The drainage pattern of the area is governed by Kashi Jore.
- 1.2 The Cluster-IX is designed to produce 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal.

The Project has Environmental Clearance from Ministry of Environment, Forest and Climate Change (MoEF&CC) for a rated capacity 6.548 MTPA (normative) and 8.512 MTPA (peak) capacity of coal production vide letter no. J-11015/307/2010-IA.II (M) dated 1st March, 2018.

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

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

AMBIENT AIR QUALITY MONITORING

2.1 Location of sampling station and their rationale:

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

2.1.1 Ambient Air Quality Sampling Locations

I. CORE ZONE Monitoring Location

i) Jeenagora (A13) : Industrial Area

The location of the sampling station is 23° 42' 31.00" N & 86° 25' 48.00" E. The sampler was placed at a height of 1.5 m from the ground level at the Safety Office.

II. BUFFER ZONE Monitoring Location

i) Kusmatand Village (A12): Industrial Area

The location of the sampling station is 23°45' 4.65" N & 86° 26' 42.10" E. The sampler was placed at a height of 1.5 m from the ground level of the village.

ii) Bhowrah North (A14) : Industrial Area

The location of the sampling station is 23°41' 37.00" N & 86°23' 54.00"E. The sampler was placed at 1.5 m above the ground level of Project Office.

lii) Hurriladih UGP (A28) : Industrial Area

The location of the sampling station is 23°44' 4.18" N & 86° 24' 6.21" E. The sampler was placed at a height of 1.5 m from the ground level of the mine office.

AMBIENT AIR QUALITY DATA



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Ambient Air Quality Test Report

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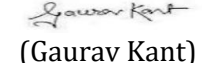
Test Report for Ambient Air Samples

Month & Year		07/2024	Cluster	Cluster IX			ULR No.	TC1012224000001050F
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024
Project		Jeenagora		Sample Ref. No.	REM/BCCL/2024/07	Sampling Method		CMPDI/RI-II/LPM 11 , (IS 5182)
Date of Sampling		04.07.2024		16.07.2024	Period of Analysis	04.07.2024 to 20.09.2024		Zone of Station: Core Zone
Sl. No.	Parameter	Method Analysis of	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009
			1st FN	2nd FN				
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	134	97	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100
2	PM _{2.5}	IS -5182(Part 24):2019	67	58	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	<10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	25	24	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80

* LDL indicates Lower Detection Limit,

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


ANALYSED BY


(Gaurav Kant)
REVIEWED BY


(Amit Raj Mishra)
Authorised Signatory

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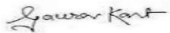
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Ambient Air Quality Test Report

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Test Report for Ambient Air Samples											
Month & Year		07/2024		Cluster				ULR No.		TC1012224000001050F	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue		23.09.2024	
Project		Kusmatand Village		Sample Ref. No.		REM/BCCL/2024/07		Sampling Method		CMPDI/RI-II/LPM 11 , (IS 5182)	
Date of Sampling		04.07.2024		16.07.2024		Period of Analysis		04.07.2024 to 20.09.2024		Zone of Station: Bufer Zone	
Sl. No.	Parameter	Method of Analysis	Observed Values (in $\mu\text{g}/\text{m}^3$)		Range Of .Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009			
			1st FN	2nd FN							
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	81	86	10 $\mu\text{g}/\text{m}^3$ - 1000 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	300	100			
2	PM _{2.5}	IS -5182(Part 24):2019	34	39	10 $\mu\text{g}/\text{m}^3$ - 400 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	Not Specified	60			
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	<10	10 $\mu\text{g}/\text{m}^3$ - 1050 $\mu\text{g}/\text{m}^3$	10 $\mu\text{g}/\text{m}^3$	120	80			
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	21	20	06 $\mu\text{g}/\text{m}^3$ - 420 $\mu\text{g}/\text{m}^3$	06 $\mu\text{g}/\text{m}^3$	120	80			
* LDL indicates Lower Detection Limit,											
**All units are in $\mu\text{g}/\text{m}^3$, 24 hourly Average,											
 ANALYSED BY			 REVIEWED BY (Gaurav Kant)			 Authorised Signatory (Amit Raj Mishra)					
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Test Report for Ambient Air Samples

Month & Year		07/2024	Cluster	Cluster X			ULR No.	TC1012224000001050F	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project		Bhowrah North		Sample Ref. No.	REM/BCCL/2024/07	Sampling Method	CMPDI/RI-II/LPM 11 , (IS 5182)		
Date of Sampling		09.07.2024		29.07.2024	Period of Analysis	09.07.2024 to 20.09.2024		Zone of Station:	Bufer Zone
Sl. No.	Parameter	Method of Analysis	Observed Values (in µg/m³)		Range Of Testing	LDL	MoEF Standards Notification dated 25th September,2000 (GSR 742 E)	NAAQS, 2009	
			1st FN	2nd FN					
1	PM ₁₀	IS -5182(Part 23):2006, R-2017	97	78	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	52	44	10 µg/m³ - 400 µg/m³	10 µg/m³	Not Specified	60	
3	SO ₂	IS-5182(Part-2): 2001 , R-2017	<10	10	10 µg/m³ - 1050 µg/m³	10 µg/m³	120	80	
4	NO ₂	IS-5182 (Part-6): 2006 , R-2017	28	27	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

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

ANALYSED BY

(Gaurav Kant)
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(Amit Raj Mishra)
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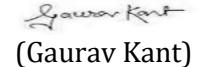
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Test Report for Ambient Air Samples

Month & Year		07/2024	Cluster	Cluster IX			ULR No.	TC1012224000001050F	
Customer		Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project		Huririladih UGP		Sample Ref. No.	REM/BCCL/2024/07	Sampling Method	CMPDI/RI-II/LPM 11 , (IS 5182)		
Date of Sampling		11.07.2024		24.07.2024	Period of Analysis	11.07.2024 to 20.09.2024		Zone of Station:	Bufer Zone
Sl. No.	Parameter	Method 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	113	88	10 µg/m³ - 1000 µg/m³	10 µg/m³	300	100	
2	PM _{2.5}	IS -5182(Part 24):2019	69	52	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	25	06 µg/m³ - 420 µg/m³	06 µg/m³	120	80	

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


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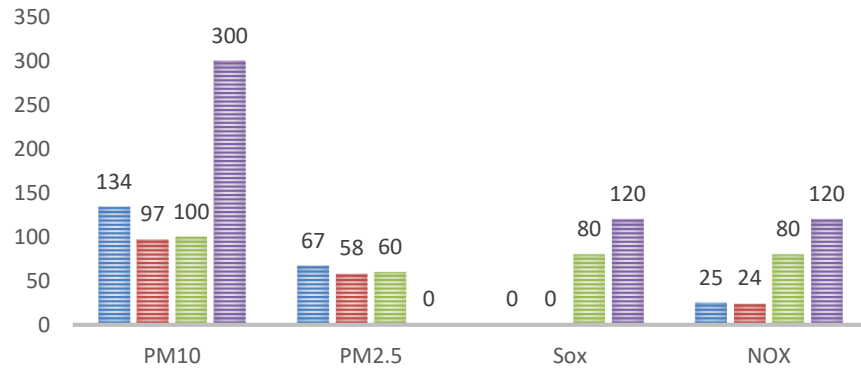
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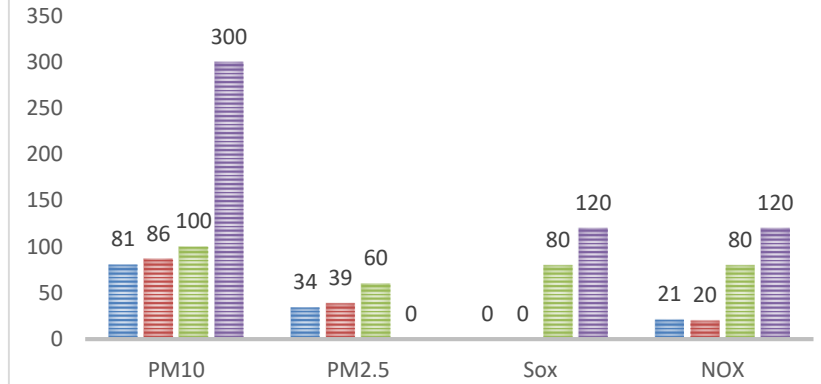
AMBIENT AIR QUALITY AT JEENAGORA

04.07.2024 16.07.2024 NAAQS GSR Standards



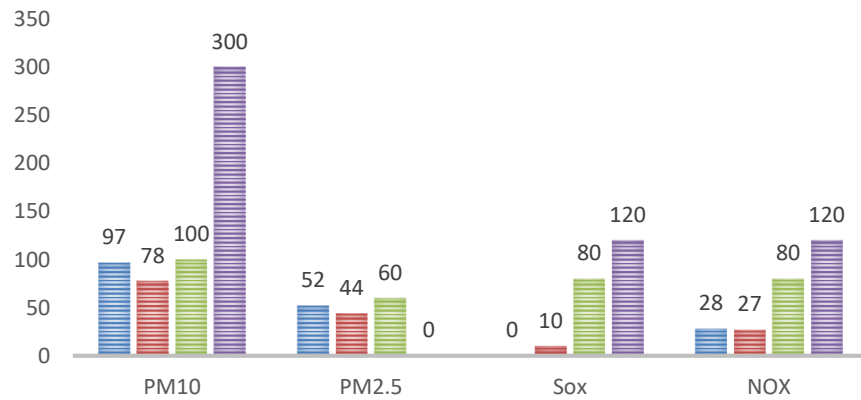
AMBIENT AIR QUALITY AT KUSMATAND VILLAGE

04.07.2024 16.07.2024 NAAQS GSR Standards



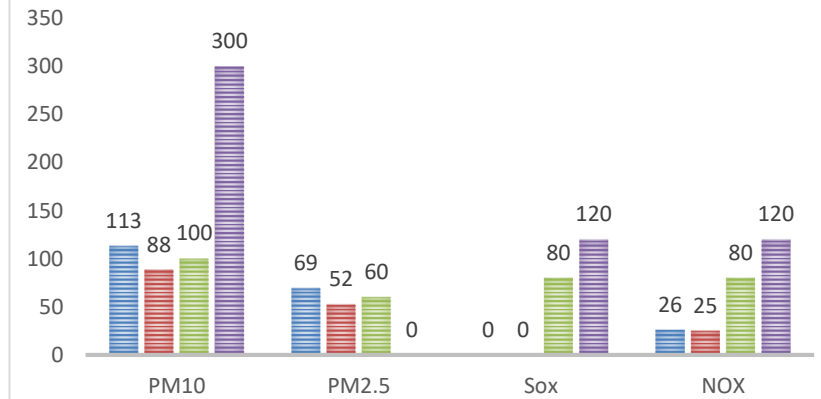
AMBIENT AIR QUALITY AT BHOWRAH NORTH

09.07.2024 29.07.2024 NAAQS GSR Standards



AMBIENT AIR QUALITY AT HURRILADIH UGP

11.07.2024 24.07.2024 NAAQS GSR Standards



WATER QUALITY MONITORING

3.1 Location of sampling sites

(Refer Plate No. – II)

- i) **Mine Discharge of Jeenagora (MW9)**
- ii) **Mine Discharge of LODNA (MW18)**
- iii) **Mine Discharge of JOY RAMPUR (MW19)**
- iv) **Mine Discharge of NT ST (MW20)**
- v) **Mine Discharge of BARAREE (MW21)**
- vi) **Mine Discharge of JEALGORA (MW22)**

3.2 Methodology of sampling and analysis

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

3.3 Results & Interpretations

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



CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED
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MINE EFFLUENT TEST REPORT

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Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.		TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project		Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method	IS 3025 (Part-1) CMPDI/RI-II/LPM 13		
Sampling Stations	(i)	Jeenagora	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent					
			Date of Sampling		08.07.2024	22.07.2024	PERIOD OF ANALYSIS 08.07.2024 to 06.08.2024	
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	33	34	100 (Max)		10	
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.81	7.8	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	36	40	250 (Max)		4	

*LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,

**All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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Environment Laboratory, Regional Institute-II
MINE EFFLUENT TEST REPORT

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Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.	TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024
Project	LODNA	Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method	IS 3025 (Part-1) CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Mine Discharge of LODNA	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent			Period of Analysis	08.07.2024 to 06.08.2024
			Date of Sampling		08.07.2024	22.07.2024	
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	36	41	100 (Max)	10	
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.55	7.48	5.5 - 9.0	0.2	
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)	2	
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	40	44	250 (Max)	4	

**LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,*

***All units in mg/L unless specified otherwise. **Grab sampling carried out for water samples.*

ANALYSED BY

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REVIEWED BY

(Amit Raj Mishra)

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MINE EFFLUENT TEST REPORT

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Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.	TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024
Project	JOYRAMPUR	Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method	IS 3025 (Part-1) CMPDI/RI-II/LPM 13	
Sampling Stations	(i)	Mine Discharge of JOYRAMPUR	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent			Period of Analysis	
			Date of Sampling		08.07.2024	22.07.2024	08.07.2024 to 06.08.2024
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	44	45	100 (Max)	10	
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.61	7.6	5.5 - 9.0	0.2	
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)	2	
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	40	44	250 (Max)	4	

*LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,

**All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.

ANALYSED BY

(Kumar Vaibhav)

REVIEWED BY

(Amit Raj Mishra)

Authorised Signatory

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

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

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 email: rdri2cmpdi@coalindia.in

Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.		TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project	NTST	Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method	IS 3025 (Part-1) CMPDI/RI-II/LPM 13		
Sampling Stations	(i)	Mine Discharge of NTST	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent			Period of Analysis	08.07.2024 to 06.08.2024	
			Date of Sampling		08.07.2024	22.07.2024		
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	49	100 (Max)	10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.48	7.46	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	36	36	250 (Max)	4		

*LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,

**All units in mg/L unless specified otherwise **Grab sampling carried out for water samples.

ANALYSED BY

(Kumar Vaibhav)

REVIEWED BY

(Amit Raj Mishra)

Authorised Signatory

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Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.		TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project	BARAREE	Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13
Sampling Stations	(i)	Mine Discharge of BARAREE	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent			Period of Analysis	08.07.2024 to 06.08.2024	
			Date of Sampling		08.07.2024			
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	41	100 (Max)	10		
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.72	7.68	5.5 - 9.0	0.2		
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)	2		
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	40	44	250 (Max)	4		

*LDL indicates Lower Detection Limit & BDL indicates Below Detection Limit,

**All units in mg/L unless specified otherwise. **Grab sampling carried out for water samples.

ANALYSED BY

(Kumar Vaibhav)
REVIEWED BY

(Amit Raj Mishra)
Authorised Signatory

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Environment Laboratory, Regional Institute-II
MINE EFFLUENT TEST REPORT

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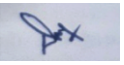
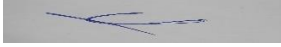
Test Report for Mine Effluent samples

Month & Year	07/2024	Cluster	Cluster IX		ULR No.		TC1012224000001068F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)					Date of Issue	23.09.2024	
Project	JEALGORA	Sampling Ref. No.	REM/BCCL/2024/07		Sampling Method		IS 3025 (Part-1)	CMPDI/RI-II/LPM 13
Sampling Stations	(i)	Mine Discharge of JEALGORA	Sample Collected in 2.5 Ltr Jerricane , Color as observed is transparent				Period of Analysis 08.07.2024 to 06.08.2024	
			Date of Sampling		08.07.2024	22.07.2024		
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	44	46	100 (Max)		10	
2	pH	IS-3025/11:1983, R-2017, Electrometric	7.54	7.51	5.5 - 9.0		0.2	
3	Oil & Grease	IS 3025/39:1991, R : 2019, Partition Gravimetric	<2.0	<2.0	10 (Max)		2	
4	COD	APHA 23rd Edition 5220 C Titrimetric Method	48	44	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
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NOISE LEVEL QUALITY MONITORING

4.1 Location of sampling sites

- 1. Jeenagora (N13)**
- 2. Kusmatand Village (N12)**
- 3. Bhowrah North (N14)**
- 4. Hurriladih UGP (N28)**

4.2 Methodology 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

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Month & Year	07/2024	Cluster	Cluster IX				ULR No.	TC1012224000001084F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	23.09.2024
Project		Sample Ref. No.	REM/BCCL/2024/07			Sampling Method		CMPDI/RI-II/LPM 22	
Sampling Stations	i	Jeenagora		Date of Sampling	04.07.2024	16.07.2024	Zone Category of Station:		Core Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	58.3	56.7	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	69.2	57.1					
3		08:00 - 09:00	69.6	67.5					
4		09:00 - 10:00	72.3	64.9					
5		10:00 - 11:00	69	68.3					
6		11:00 - 12:00	68.5	66.9					
7		12:00 - 13:00	75.1	73.9					
8		13:00 - 14:00	67.3	65.7					
9		14:00 - 15:00	59.5	62.5					
10		15:00 - 16:00	51.5	51.1					
11		16:00 - 17:00	68.5	66.6					
12		17:00 - 18:00	59.5	58.4					
13		18:00 - 19:00	55.1	54.3					
14		19:00 - 20:00	51.7	51.9					
15		20:00 - 21:00	46.7	46.6					
16		21:00 - 22:00	47.3	47.9					
		Leq DAY	67.8	65.5					
1	Noise Level dB(A)Leq -Night	22:00-23:00	41.7	42.7	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	36.9	38.1					
3		00:00- 01:00	36.3	37.9					
4		01:00-02:00	36.2	37.1					
5		02:00-03:00	36.2	36.9					
6		03:00-04:00	42.1	40.3					
7		04:00-05:00	42.3	43.2					
8		05:00-06:00	42.2	42					
		Leq Night	38.9	39.1					

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

Sampling Assistants ANALYSED BY	 (Gaurav Kant) REVIEWED BY				 (Amit Raj Mishra) Authorised Signatory
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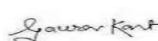
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Ambient Noise Level Test Report

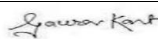
CMPDI, RI-II
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Month & Year	07/2024	Cluster	CLUSTER IX				ULR No.	TC101222400000108F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	23.09.2024	
Project		Sample Ref. No.	REM/BCCL/2024/07			Sampling Method	CMPDI/RI-II/LPM 22		
Sampling Stations	i	Kusmatand Village		Date of Sampling	04.07.2024	16.07.2024	Zone Category of Station:	Bufer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	47.5	46.4	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	50.1	43.9					
3		08:00 - 09:00	52.5	52.4					
4		09:00 - 10:00	58.3	55.1					
5		10:00 - 11:00	56.9	57.2					
6		11:00 - 12:00	55.5	55.8					
7		12:00 - 13:00	56.5	58.7					
8		13:00 - 14:00	58.7	59.8					
9		14:00 - 15:00	56.2	55.1					
10		15:00 - 16:00	53	53					
11		16:00 - 17:00	51.6	51					
12		17:00 - 18:00	50.7	50					
13		18:00 - 19:00	49.2	49.9					
14		19:00 - 20:00	48.9	48.9					
15		20:00 - 21:00	48.7	49.2					
16		21:00 - 22:00	46.7	47.7					
		Leq DAY	54.2	54.2					
1	Noise Level dB(A)Leq - Night	22:00-23:00	41.4	41.8	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	37.1	37.4					
3		00:00- 01:00	36.9	36.9					
4		01:00-02:00	36.7	36.3					
5		02:00-03:00	36.2	36.2					
6		03:00-04:00	39.2	40.2					
7		04:00-05:00	38.8	40.2					
8		05:00-06:00	39.5	40.3					
		Leq Night	36.9	37.6					
**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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Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

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Month & Year	07/2024	Cluster	Cluster IX				ULR No.	TC1012224000001084F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)						Date of Issue	23.09.2024	
Project			Sample Ref. No.	REM/BCCL/2024/07		Sampling Method		CMPDI/RI-II/LPM 22	
Sampling Stations	i	Bhowrah North		Date of Sampling	09.07.2024	29.07.2024	Zone Category of Station:		Bufur Zone
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	55.8	55.1	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	58.9	47.8					
3		08:00 - 09:00	61.6	59.1					
4		09:00 - 10:00	65	66.3					
5		10:00 - 11:00	66	65.4					
6		11:00 - 12:00	66.8	66.6					
7		12:00 - 13:00	69.6	68.7					
8		13:00 - 14:00	62.7	59.6					
9		14:00 - 15:00	59.3	58.3					
10		15:00 - 16:00	49.8	64.9					
11		16:00 - 17:00	49.9	64.4					
12		17:00 - 18:00	48.3	63.6					
13		18:00 - 19:00	46.8	55.4					
14		19:00 - 20:00	47.1	46.1					
15		20:00 - 21:00	47.2	47.7					
16		21:00 - 22:00	46.6	47.6					
		Leq DAY	62.2	62.9					
1	Noise Level dB(A)Leq -Night	22:00-23:00	42	42.3	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	37.7	37.5					
3		00:00- 01:00	37.5	37.2					
4		01:00-02:00	37.2	37.4					
5		02:00-03:00	37.1	37.5					
6		03:00-04:00	42.3	42.4					
7		04:00-05:00	42.4	42.8					
8		05:00-06:00	42.8	43.1					
		Leq Night	39.4	39.6					
**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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Environment Laboratory, Regional Institute-II
Ambient Noise Level Test Report

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Month & Year	07/2024	Cluster	Cluster IX				ULR No.	TC1012224000001084F	
Customer	Environment Department, Bharat Coking Coal Limited (BCCL), Koyla Bhawan, Dhanbad (E-mail: gmenv.bccl@coalindia.in)							Date of Issue	23.09.2024
Project		Sample Ref. No.	REM/BCCL/2024/07			Sampling Method		CMPDI/RI-II/LPM 22	
Sampling Stations	i	Hurriladih UGP		Date of Sampling	11.07.2024	24.07.2024	Zone Category of Station:	Buffer Zone	
Sl. No.	Parameter	Hour / Time of day	Observed Values (in Leq dB(A))	Observed Values (in Leq dB(A))	Method of Analysis	Range Of Testing	LDL	NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Standards	
			First Fortnight	Second Fortnight				Zones	Limits in dB
1	Noise Level dB(A)Leq - Day	06:00 - 07:00	49.8	48.6	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	75 65 55 50
2		07:00 - 08:00	53.4	52.2					
3		08:00 - 09:00	55.7	55.7					
4		09:00 - 10:00	61.6	62					
5		10:00 - 11:00	62.9	63.8					
6		11:00 - 12:00	61.7	62					
7		12:00 - 13:00	64.6	63.6					
8		13:00 - 14:00	54.7	55.5					
9		14:00 - 15:00	45.9	46.4					
10		15:00 - 16:00	45.9	45.7					
11		16:00 - 17:00	46.5	46.6					
12		17:00 - 18:00	39.1	40.7					
13		18:00 - 19:00	48.1	47.3					
14		19:00 - 20:00	45.7	45.1					
15		20:00 - 21:00	47.1	48.6					
16		21:00 - 22:00	48.5	48.2					
		Leq DAY	57.5	57.6					
1	Noise Level dB(A)Leq -Night	22:00-23:00	42.6	41.9	CPCB, Protocol for Ambient Level Noise Monitoring - 2015	35 dB-135 dB	35 dB(A)	Industrial Commercial Residential Silence	70 55 45 50
2		23:00- 00:00	38.1	37.8					
3		00:00- 01:00	37.5	37.6					
4		01:00-02:00	37.4	37.9					
5		02:00-03:00	37.7	38.2					
6		03:00-04:00	38.8	41.6					
7		04:00-05:00	38.9	38.1					
8		05:00-06:00	38.5	37.7					
		Leq Night	36.9	37.5					
**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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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 $\mu\text{g}/\text{m}^3$ 700 $\mu\text{g}/\text{m}^3$	- High Volume Sampling (Average flow rate not less than 1.1 m^3/min)
	Respirable Particulate Matter (size less than 10 μm) (RPM)	Annual Average * 24 hours **	250 $\mu\text{g}/\text{m}^3$ 300 $\mu\text{g}/\text{m}^3$	Respirable Particulate Matter sampling and analysis
	Sulphur Dioxide (SO_2)	Annual Average * 24 hours **	80 $\mu\text{g}/\text{m}^3$ 120 $\mu\text{g}/\text{m}^3$	1.Improvedwest and Gaeke method 2.Ultraviolet fluorescene
	Oxide of Nitrogen as NO_2	Annual Average * 24 hours **	80 $\mu\text{g}/\text{m}^3$ 120 $\mu\text{g}/\text{m}^3$	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.

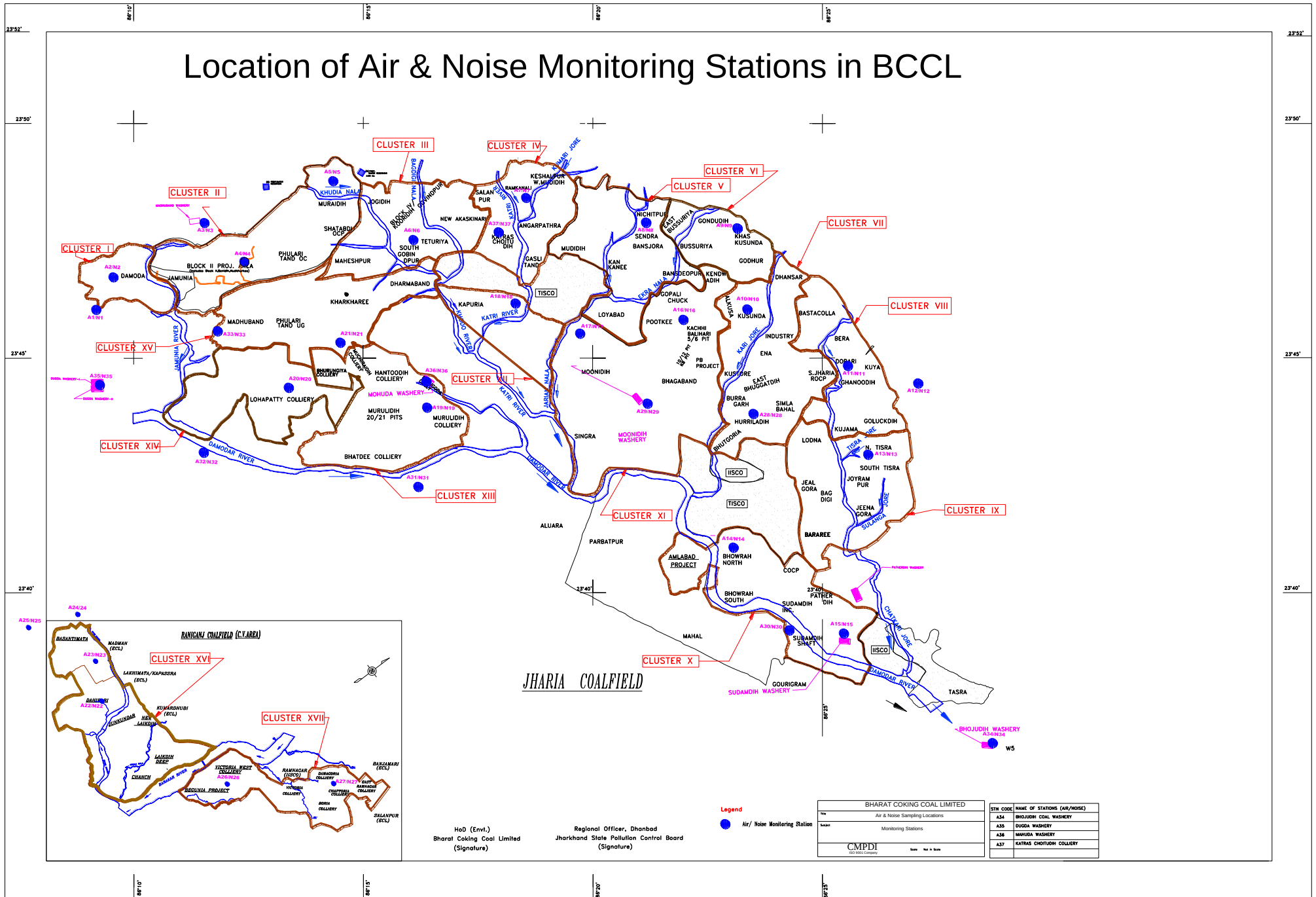
Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO₂), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogen dioxide (NO₂), µg/m³	Annual * 24 Hours **	40 80	30 80	-Jacob & Hochheiser modified (NaOH-NaAsO ₂) Method -Gas Phase Chemiluminescence
Particulate Matter (Size less than 10µm) or PM₁₀, µg/m³	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
Particulate Matter (Size less than 2.5µm) or PM_{2.5}, µg/m³	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
Ozone (O₃) , µg/m³	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
Lead (Pb) , µg/m³	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
Carbon Monoxide (CO), mg/m³	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
Ammonia (NH₃), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C₆H₆), µg/m³	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m³	Annual *	01	01	-Solvent extraction followed by HPLC/GC analysis
Arsenic (As), ng/m³	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m³	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

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

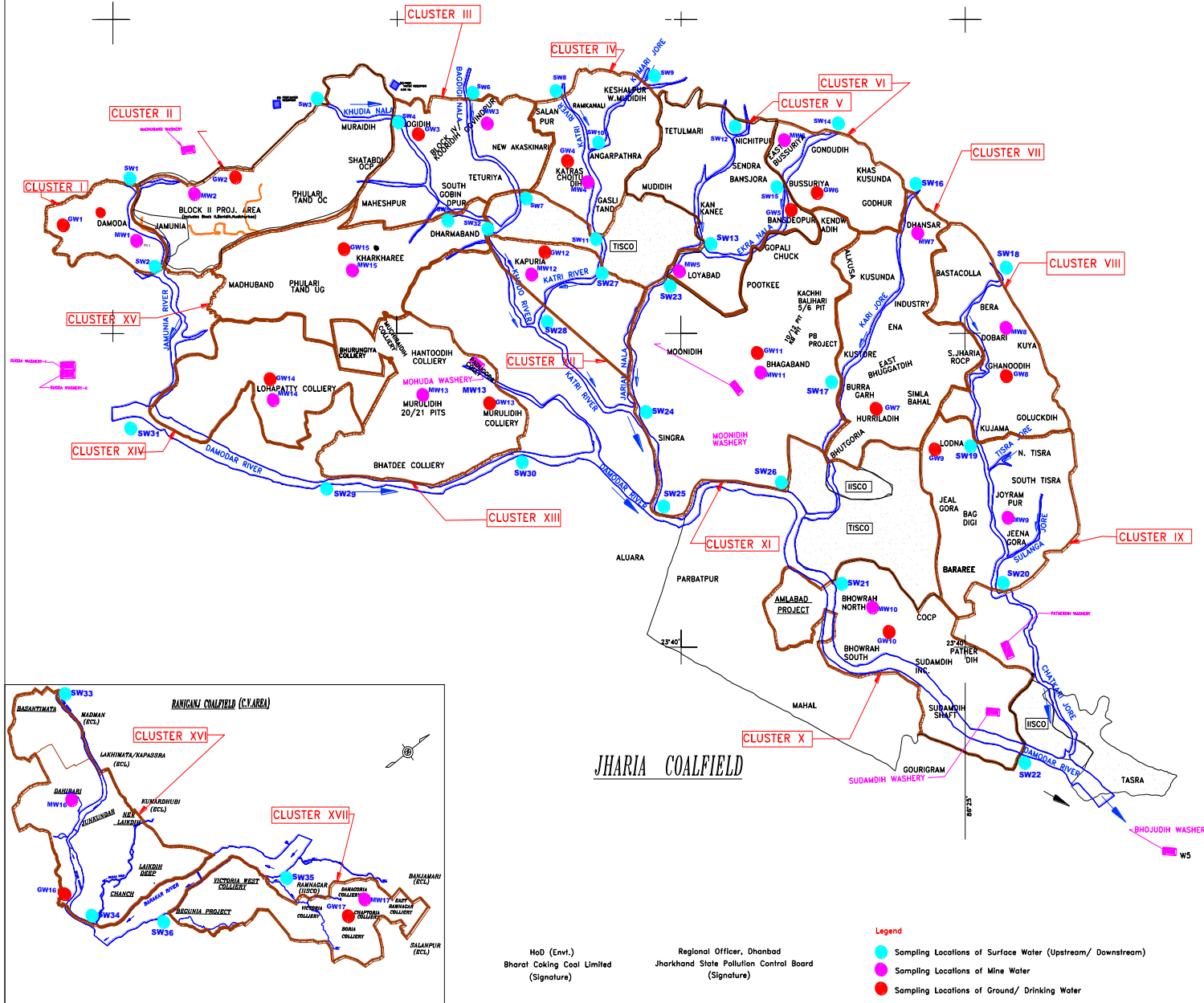
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

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

Location of Air & Noise Monitoring Stations in BCCL



Water Sampling Locations in BCCL



INDEX

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

Legend

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

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

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

Company	BHARAT COKING COAL LIMITED
Title	WATER SAMPLING LOCATIONS
Subject	MONITORING STATIONS
CMPDI	Date: Not to Date