

**QUATERLY COMPLIANCE REPORT
(MARCH-2020 TO MAY-2020)**

**ON
ENVIRONMENTAL MONITORING**

AT

**BANDHAMANDI GRAPHITE
MINES & BENEFICIATION
PLANT**

**(M/s PRADHAN INDUSTRY)
Village-Bandhamandi
RAYAGADA**

Prepared by:-



VISIONTEK CONSULTANCY SERVICES PVT. LTD.

(An Enviro Engineering Consulting Cell)

Plot No.-M22&M23, Chandaka Industrial Estate, Patia-751024, Bhubaneswar,

Tel. : 7752017905

E-mail : vigiontek@gmail.com, vigiontek@vcspl.org,

Visit us at: www.vcspl.org



ISO 14001:2004

ISO 9001:2008

OHSAS 18001:2007

CONTENTS

Sl. No.	Description	Page No.
1.0	Introduction	1
2.0	Study Period	1
3.0	Methodology	1
4.0	Selection of Monitoring Locations	1
4.1	Ambient Air Quality	1-2
4.1.1	Ambient Air Quality Sampling Stations(Core Zone)	2
4.1.2	Ambient Air Quality Sampling Stations(Buffer Zone)	3
4.2	Water Quality	3
4.2.1	Ground Water Sampling Locations	4
4.2.2	Surface Water Sampling Locations	4
4.3	Ground Water Level	5
4.3.1	Ground Water Level Sample Sampling Locations	5
4.4	Noise Level Sample	5
4.4.4	Noise Sample Sampling Locations	5
4.5	Silica Sample	5
4.5.1	Silica Sample Sampling Locations	6

ANNEXURE

Annexure No.	Description	Page No.
1	Ambient Air Quality Monitoring Report (Core Zone)	7-11
2	Ambient Air Quality Monitoring Report (Buffer Zone)	12-16
3	Ground Water Quality Report	17-21
4	Surface Water Quality Report	22-26
5	Ground Water Level Report	27-28
6	Noise Quality Report	29-30
7	Silica Analysis in AAQ Report	31-32



METHODOLOGY OF ENVIRONMENTAL MONITORING STUDY

1.0 INTRODUCTION :

M/s Visiontek Consultancy Services Pvt. Ltd. carried out the environmental monitoring for the M/s Bandhamadi Graphite Mines & Beneficiation Plant, Rayagada.

Environmental monitoring was carried out at various locations inside the plant site. The Monitoring was carried out with respect to the qualities of Ambient Air, Ground & Surface Water, Ground Water Level & Noise.

2.0 STUDY PERIOD:

The study was conducted during month of from March 2020 to May 2020

3.0 METHODOLOGY:

The environmental monitoring was carried out as per the standard methodology of Bureau of Indian Standard (IS: 11255), American Public Health Association (APHA), & Central Pollution Control Board (CPCB).

4.0 SELECTION OF MONITORING LOCATIONS:

The location for Ambient Air, Ground & Surface Water, Ground Water Level & Noise Level Survey has been selected by Bandhamadi Graphite representative.

4.2 AMBIENT AIR QUALITY:

The ambient air quality (AAQ) of the study region was monitored at four locations selected within the premises. Ambient air quality (AAQ) in respect of Particulate Matter (size less than 10 μm or PM₁₀), Particulate matter (size less than 2.5 μm or PM_{2.5}), Sulphur di-oxide (SO₂), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO), Ozone (O₃), Ammonia (NH₃), Nickel (Ni), Lead (Pb), Arsenic (As), Benzene (C₆H₆) and Benzo(a) Pyrene (BaP). Respirable Dust Sampler (APM 460BL) of ENVIROTECH make, FPS (APM) of ENVIROTECH make, Organic Vapour Sampler,



ENVIROTECH make, model APM 850 were used for monitoring of ambient air quality at all the identified locations. The sampling method was carried out as per the guidelines for planning IS: 5182 (part 14): 2000. And the analysis methods are outlined in the table as shown below:

AMBIENT AIR QUALITY ANALYSIS METHOD

SL. NO.	PARAMETER	ANALYSIS METHOD
1.	Particulate Matter (size less than 10 μm or PM_{10}), $\mu\text{g}/\text{m}^3$	Gravimetric method
2.	Particulate matter (size less than 2.5 μm or $\text{PM}_{2.5}$), $\mu\text{g}/\text{m}^3$	Gravimetric method
3.	Sulphur di-oxide (SO_2), $\mu\text{g}/\text{m}^3$	Improved west & Geake method
4.	Oxides of Nitrogen (NO_x), $\mu\text{g}/\text{m}^3$	Jacob and Hochheiser Modified method
5.	Carbon Monoxide (CO), mg/m^3	NDIR Spectroscopy method
6.	Ozone (O_3), $\mu\text{g}/\text{m}^3$	Chemical Method
7.	Ammonia (NH_3), $\mu\text{g}/\text{m}^3$	Indophenol Blue Method
8.	Benzene (C_6H_6), $\mu\text{g}/\text{m}^3$	Absorption & Desorption followed by GC analysis
9.	Benzo(a) Pyrene (BaP), ng/m^3	Solvent extraction followed by GC analysis.
10.	Nickel (Ni), ng/m^3	AAS method after sampling
11.	Lead (Pb), $\mu\text{g}/\text{m}^3$	AAS method after sampling
12.	Arsenic(As), ng/m^3	AAS method after sampling

4.2.1 AMBIENT AIR QUALITY SAMPLING STATIONS (CORE ZONE):

Details of the sampling locations are given below.

Field ID	Station
AAQ-1	At Mine Office
AAQ-2	At Mine Face
AAQ-3	At Dump Site
AAQ-4	At Plant Site

The detailed Ambient Air Quality report (Core Zone) is given in the Annexure-2.



4.2.2 AMBIENT AIR QUALITY SAMPLING STATIONS (BUFFER ZONE):

Details of the sampling locations are given below.

Field ID	Station
AAQ-1	Bandhamadi Village
AAQ-2	Kachama Village
AAQ-3	Podeng Village
AAQ-4	Bartibali Village

The detailed Ambient Air Quality report (Buffer Zone) is given in the **Annexure-3**.

4.3 WATER QUALITY:

Water quality monitoring was carried out at fourteen waste water locations. Samples were collected manually during study period. Considering several possibilities of interference the poly tetrafluoroethylene (PTFE) sample bottles were used. These bottles were sterilized properly before being used for water sample collection.

The methodology for sample collection, preservation and analysis was as per Standard methods for the Examination of Water and Wastewater, 23rd Edition, 2017 APHA.

WATER QUALITY ANALYSIS METHOD

SL.NO.	PARAMETER	TESTING METHOD
1	Colour	APHA 2120 B, C
2	Odour	APHA 2150 B
3	Taste	APHA 2160 C
4	Turbidity	APHA 2130 B
5	pH	APHA 4500H ⁺ B
6	Total Hardness (as CaCO ₃)	APHA 2340 C
7	Iron (as Fe)	APHA 3500Fe, B
8	Chloride (as Cl)	APHA 4500Cl B
9	Residual Free Chlorine	APHA 4500Cl, B
10	Total Dissolved Solids	APHA 2540 C
11	Calcium as Ca	APHA 3500Ca B
12	Magnesium as Mg	APHA 3500Mg B
13	Copper as Cu	APHA 3111 B,C
14	Manganese as Mn	APHA 3500Mn B
15	Sulphate as SO ₄ ²⁻	APHA 4500 SO ₄ ²⁻ E
16	Nitrate as NO ₃ ⁻	APHA 4500 NO ₃ ⁻ E
17	Fluoride as F	APHA 4500F C
18	Phenolic Compounds as C ₆ H ₅ OH	APHA 5530 B,D
19	Mercury as Hg	APHA 3500 Hg



20	Cadmium as Cd	APHA 3111 B,C
21	Selenium as Se	APHA 3114 B
22	Arsenic as As	APHA 3114 B
23	Cyanide as CN	APHA 4500 CN C,D
24	Lead as Pb	APHA 3111 B,C
25	Zinc as Zn	APHA 3111 B,C
26	Anionic Detergents as MBAS	APHA 5540 C
27	Chromium as Cr ⁺⁶	APHA 3500Cr B
28	Mineral Oil	APHA 5220 B
29	Alkalinity	APHA 2320 B
30	Aluminium as Al	APHA 3500Al B
31	Boron	APHA 4500B, B
32	Poly Aromatic Hydrocarbon as PAH	APHA 6440 B
33	Pesticides	APHA 6630 B,C

4.3.1 GROUND WATER SAMPLING LOCATIONS :

Detail of the sampling location is given below:

Field ID	Location
GW-1	Bore well Near Project Site
GW-2	Open Well at Bandhamadi Village
GW-3	Open Well at Kachama Village
GW-4	Open Well at Podeng Village
GW-5	Open Well at Baligurha Village

The detailed Ground water analysis report is mentioned in Annexure-3.

4.3.2 SURFACE WATER SAMPLING LOCATIONS :

Detail of the sampling location is given below:

Field ID	Location
SW-1	Dalakona Nallah Near Panasagurha Upstream
SW-2	Dalakona Nallah Near Panasagurha Downstream
SW-3	Settling Pond
SW-4	Uagarh Nadi Near Bandhamadi Upstream

The detailed Surface water analysis report is mentioned in Annexure-4.



4.4 GROUND WATER LEVEL:

Ground water level was measured by pizeometer.

4.4.1 GROUND WATER LEVEL SAMPLING LOCATIONS :

Detail of the sampling location is given below:

Field ID	Location
GWL-1	Openwell at Bandhamadi
GWL-2	Openwell at Bhitardarba
GWL-3	Openwell at Panasagurha
GWL-4	Openwell at Birda
GWL-5	Open well at Baligurha

The detailed Ground water Level analysis report is mentioned in Annexure-5

4.5 NOISE LEVEL MONITORING:

Noise Levels were recorded by Digital Sound Level Meter of LUTRON make at two locations within the plant premises. Monitoring was carried out once in a month at each location during the study period for day time and night time. According to CPCB (Noise Pollution (Regulation & Control) rules, 2000 day time is considered from 6.00 am to 10.00 pm and night time is considered from 10.00 pm to 6.00 am.

Locations of Noise level monitoring stations are as follows:

4.5.1 NOISE LEVEL SAMPLING STATIONS:

Field ID	Location ID
N-1	Mining Quarry
N-2	Dump Site
N-3	Residential Area

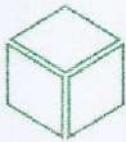
The detailed noise measurement data is given in Annexure-6.



Annexure-1

AMBIENT AIR QUALITY ANALYSIS REPORT





Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2015

OHSAS 45001 : 2018

Ref:

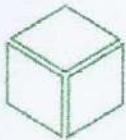
Date:

AMBIENT AIR QUALITY MONITORING REPORT(CORE ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 1 (Mine Office)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

PARAMETERS												
Date	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
10.03.2020	52.8	31.68	6.1	12.4	10.2	0.28	24.2	BDL	BDL	BDL	BDL	BDL
11.03.2020	53.2	31.92	6.2	12.8	10.6	0.32	24.8	BDL	BDL	BDL	BDL	BDL
08.04.2020	53.6	32.16	6.4	13.2	11.2	0.34	22.6	BDL	BDL	BDL	BDL	BDL
09.04.2020	52.6	31.56	6.8	13.6	11.6	0.36	21.8	BDL	BDL	BDL	BDL	BDL
13.05.2020	51.8	31.08	6.2	13.8	10.8	0.31	23.2	BDL	BDL	BDL	BDL	BDL
14.05.2020	50.6	30.36	6.4	14.2	10.4	0.32	23.6	BDL	BDL	BDL	BDL	BDL
Monthly Average	52.43	31.46	6.35	13.33	10.80	0.32	23.37	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	100	4	400	1	20	6	5	1	
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA CFR-40 (pt.50) Appendix-I	Modified West & Grasek Method IS 5182 (Part-2) R.A.2006	Chemical Method IS 5182 (Part-9) R.A.2006	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182 (Part-22);2004	AAS Method USEPA/ IO3.2	Gas Chromatography IS 5182 (Part-11);2006	Solvent Extraction IS 5182 (Part-12);2004			

For Visiontek Consultancy Services Pvt.Ltd



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008
ISO 14001: 2015
OHSAS 45001: 2018

Ref:

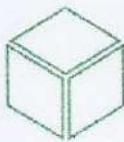
Date:

AMBIENT AIR QUALITY MONITORING REPORT(CORE ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 3 (Dump Site)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

Date	PARAMETERS											
	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
10.03.2020	51.2	30.72	6.1	14.8	12.6	0.32	25.8	BDL	BDL	BDL	BDL	BDL
11.03.2020	51.6	30.96	6.4	14.4	13.2	0.34	25.2	BDL	BDL	BDL	BDL	BDL
08.04.2020	50.8	30.48	6.2	13.8	13.8	0.38	25.6	BDL	BDL	BDL	BDL	BDL
09.04.2020	51.4	30.84	6.8	13.6	14.2	0.32	25.4	BDL	BDL	BDL	BDL	BDL
13.05.2020	52.2	31.32	7.1	14.1	14.6	0.36	25.2	BDL	BDL	BDL	BDL	BDL
14.05.2020	51.8	31.08	6.2	14	12.8	0.33	25.4	BDL	BDL	BDL	BDL	BDL
Monthly Average	51.50	30.90	6.47	14.12	13.53	0.34	25.43	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
Testing Method	Gravimetric IS 5182; Part 23	Improved West & Grake Method IS 5182 (Part-2) Appendix-1 R.A.2006	Modified Jacob & Hochheiser Method IS 5182 (Part-4) R.A.2006	Chemical Method IS 5182 (Part-9) R.A.2006	Non Dispersive Infrared Method IS 5182 (Part-10) 1999 (Method-401)	Indo Phenol Blue Method Air Sampling ,3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182 (Part -22);2004	AAS Method USEPA/ 103.2	AAS Method USEPA/ 103.2	Gas Chromatography IS 5182 (Part-11);2006	Solvent Extraction IS 5182 (Part-12);2004	

For Visiontek Consultancy Services Pvt.Ltd



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001: 2008

ISO 14001: 2015

OHSAS 45001: 2018

Ref:

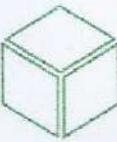
Date:

AMBIENT AIR QUALITY MONITORING REPORT (CORE ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 4 (Plant Site)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

Date	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NOx ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	PARAMETERS						
						CO (mg/m^3)	NH ₃ (mg/m^3)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
10.03.2020	48.2	28.92	6.8	13.2	11.6	0.32	23.2	BDL	BDL	BDL	BDL	BDL
11.03.2020	50.6	30.36	6.2	13.4	12.1	0.31	23.6	BDL	BDL	BDL	BDL	BDL
08.04.2020	51.2	30.72	7.1	13.8	12.4	0.32	23.8	BDL	BDL	BDL	BDL	BDL
09.04.2020	51.8	31.08	7.2	14.2	12.6	0.33	23.6	BDL	BDL	BDL	BDL	BDL
13.05.2020	52.2	31.32	6.4	14.1	12.8	0.33	23.4	BDL	BDL	BDL	BDL	BDL
14.05.2020	52.8	31.68	6.2	13.6	12.2	0.32	23.8	BDL	BDL	BDL	BDL	BDL
Monthly Average	51.13	30.68	6.65	13.72	12.28	0.32	23.57	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	100	4	400	1	20	6	5	1	
Testing Method	Gravimetric IS 5182: Part 23	Improved West & Gerke Method (pt 50) Appendix-1	Chemical Method IS 5182 (Part-6) RA:2006	Non Dispersive Infrared Method IS 5182 (Part-9) RA:2006	AAS Method IS 5182 Part -23;2004 James P. Lodge (Method-401)	US EPA/ 103.2	AAS Method US EPA/ 103.2	Gas Chromatogr aphy IS 5182 (Part-11);2006	Solvent Extraction IS 5182 (Part-12);2004			

For Visiontek Consultancy Services Pvt.Ltd



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001: 2015

OHSAS 45001: 2018

Ref:

Date:

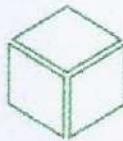
AMBIENT AIR QUALITY MONITORING REPORT(BUFFER ZONE)- MAR 20 TO MAY 20

- 1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
- 2. Sampling Location : Monitoring Station No.- AAQ 1 (Bandhamandi Village)
- 3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
- 4. Sample Collected By : VCSPL representative in presence of Client's representative

Date	PARAMETERS										BaP (ng/m ³)
	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	
11.03.2020	40.8	24.48	6.2	12.4	9.4	0.28	20.8	BDL	BDL	BDL	BDL
09.04.2020	43.6	26.16	6.6	13.2	9.6	0.31	23.6	BDL	BDL	BDL	BDL
14.05.2020	44.8	26.88	6.8	13.8	9.8	0.32	24.2	BDL	BDL	BDL	BDL
Monthly	43.07	25.84	6.53	13.13	9.60	0.30	22.87	BDL	BDL	BDL	BDL
Averages											
CPBC, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5
Testing Method	Gravimetric IS 5182: Part 23	Improved West & Gelske Method IS 5182 (Part-6) RA2006 RA2016	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2006	Chemical Method IS 5182 (Part-9) RA2006	Non Dispersive Infrared Method IS 5182 (Part-10); 1999	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5162 (Part-22); 2004	AAS Method USEPA / 103.2	AAS Method USEPA / 103.2	Gas Chromatography IS 5182 (Part-11); 2004	Solvent Extraction IS 5182 (Part-12); 2004

For

Visiontek Consultancy Services Pvt. Ltd



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001: 2015

OHSAS 45001: 2018

Ref:

Date:

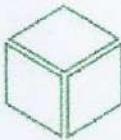
AMBIENT AIR QUALITY MONITORING REPORT(BUFFER ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 2 (Kachama Village)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

Date	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	PARAMETERS						
						CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
11.03.2020	40.6	24.36	5.6	12.2	9.2	0.24	19.2	BDL	BDL	BDL	BDL	BDL
09.04.2020	41.8	25.08	5.8	13.8	9.6	0.32	20.2	BDL	BDL	BDL	BDL	BDL
14.05.2020	42.6	25.56	6.4	13.6	10.2	0.36	21.8	BDL	BDL	BDL	BDL	BDL
Monthly Averages	41.67	25.00	5.93	13.20	9.67	0.31	20.40	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA CFR-40 (pt 50) Appendix-I	Improved West & Grake Method IS 5182 (Part-2) RA 2006	Modified Jacob & Hochhauser Method IS 5182 (Part-6) RA 2006	Chemical Method IS 5182 (Part-9) RA 2006	Non Dispersive Infrared Method IS 5182 (Part-10) RA 2006	AAS Method IS 5182 (Part-22); 2004	AAS Method USEPA / TO3.2 (Method-401)	AAS Method USEPA / TO3.2 (Method-401)	Gas Chromatography IS 5182 (Part-11); 2006	Solvent Extraction IS 5182 (Part-12); 2004	

For Visiontek Consultancy Services Pvt.Ltd.





Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001: 2008

ISO 14001: 2015

OHSAS 45001: 2018

Ref:

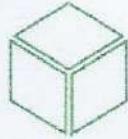
Date:

AMBIENT AIR QUALITY MONITORING REPORT (BUFFER ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant,Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 3 (Podeng Village)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

Date	PARAMETERS							BaP (ng/m ³)				
	PM_{10} ($\mu\text{g}/\text{m}^3$)	$\text{PM}_{2.5}$ ($\mu\text{g}/\text{m}^3$)	SO_2 ($\mu\text{g}/\text{m}^3$)	NO_x ($\mu\text{g}/\text{m}^3$)	O_3 ($\mu\text{g}/\text{m}^3$)	CO (mg/m ³)	NH_3 ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m ³)	As (ng/m ³)	C_6H_6 ($\mu\text{g}/\text{m}^3$)	
11.03.2020	35.12	21.67	5.1	11.8	10.2	0.28	28.8	BDL	BDL	BDL	BDL	BDL
09.04.2020	37.89	22.13	5.4	12.2	10.8	0.36	29.6	BDL	BDL	BDL	BDL	BDL
14.05.2020	34.54	20.56	5.6	12.6	11.4	0.34	30.4	BDL	BDL	BDL	BDL	BDL
Monthly Averages	35.85	21.45	5.37	12.20	10.80	0.33	29.60	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
Testing Method	Gravimetric IS 5182; Part 23	Gravimetric EPA CFR-40 (pt 50) Appendix-I	Improved West & Geake Method IS 5152 (Part-2) RA2006	Modified Jacobs & Hochheiser Method IS 5182 (Part-6) RA2006	Chemical Method IS 51.82 (Part-9) RA2006	Non Dispersive Infrared Method IS 5182 (Part-10) 1999	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182 (Parr-22) 2004	AAS Method USEPA/ IO3.2	USEPA/ IO3.2	Gas Chromatography IS 5182 (Part-10) 2006	Solvent Extraction IS 5182 (Part-12); 2004

For Visiontek Consultancy Services Pvt. Ltd.



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001: 2015

OHSAS 45001: 2018

Ref:

Date:

AMBIENT AIR QUALITY MONITORING REPORT(BUFFER ZONE)- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : Monitoring Station No.- AAQ 4 (Bartibali Village)
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer.
4. Sample Collected By : VCSPL representative in presence of Client's representative

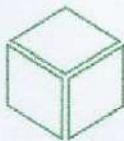
Date	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NOx ($\mu\text{g}/\text{m}^3$)	PARAMETERS							
					O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)
11.03.2020	43.8	26.28	5.6	12.8	11.6	0.28	25.6	BDL	BDL	BDL	BDL	BDL
09.04.2020	42.6	25.56	6.4	13.6	10.8	0.32	28.8	BDL	BDL	BDL	BDL	BDL
14.05.2020	42.8	25.68	6.8	14.4	10.6	0.34	30.2	BDL	BDL	BDL	BDL	BDL
Monthly Averages	43.07	25.84	6.27	13.60	11.00	0.31	28.20	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
Testing Method	Gravimetric IS 5182; Part 23	Gravimetric EPA CFR 40 (Pt.50) Appendix-I	Improved West & Geake Method IS 5182 (Part-6) RA 2006	Modified Jacob & Hochbeiser Method IS 5182 (Part-9) RA 2006	Chemical Method IS 5182 (Part-9) RA 2006	Non Dispersive Infrared Method IS 5182 (Part-2) RA 2006	AAS Method IS 5182 (Part-22); 2004	AAS Method USEPA /I03.2	AAS Method USEPA /I03.2	Gas Chromatography IS 5182 (Part-11); 2006	Gas Chromatography IS 5182 (Part-12); 2006	Solvent Extraction IS 5182 (Part-12); 2004

For Visiontek Consultancy Services Pvt.Ltd.

Annexure-2

GROUND WATER QUALITY REPORT





Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2007

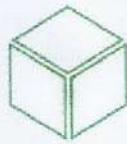
Ref.:

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 2020 TO MAY 2020

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-1: Bore well at Near Bhitardarha
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Standard as per IS:10500:2012		Analysis Results		
				Desired Limit	Permissible Limit	MARCH-20	APRIL-20	MAY-20
<i>Essential Characteristics</i>								
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2.120 B.C	5	15	CL	CL	CL
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1	5	<1	<1	<1
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 4500H ⁺ B	6.5-8.5	No Relaxation	7.26	7.34	7.38
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	50.6	48.0	50.2
7.	Iron (as Fe)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.24	0.28	0.32
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500Cl ⁻ B	250	1000	14.8	15.1	15.1
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl ₂ B	0.2	1	ND	ND	ND
<i>Desirable Characteristics</i>								
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	96.0	94.0	106.0
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	31.2	26.4	27.8
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	10.8	11.6	12.4
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL	BDL
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL	BDL
15.	Sulphate as SO ₄	mg/l	Turbidimetric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200	400	5.6	5.4	5.8
16.	Nitrate as NO ₃	mg/l	By UV-Screen Method APHA 23 RD Ed.2017 : 4500 NO ₃ ⁻ E	45	No Relaxation	0.26	0.28	0.34
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017 : 4500F C	1.0	1.5	ND	ND	ND

Date:
Averages



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2007

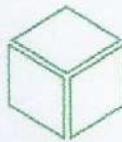
Ref.:

			Chloroform extraction by Colorimetric Method APHA 23 RD Ed.2017: 5530 B,D	0.001	0.002	BDL	BDL	BDL
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	AAS Method APHA 23 RD Ed.2017: 3112 B	0.001	No Relaxation	BDL	BDL	BDL
19.	Mercury as Hg	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 B	0.003	No Relaxation	BDL	BDL	BDL
20.	Cadmium as Cd	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 B	0.01	No Relaxation	BDL	BDL	BDL
21.	Selenium as Se	mg/l	By AAS Method APHA 23 RD Ed.2017: 3500 Se C	0.01	No Relaxation	BDL	BDL	BDL
22.	Arsenic as As	mg/l	By AAS Method APHA 23 RD Ed.2017: 3114 B	0.01	No Relaxation	BDL	BDL	BDL
23.	Cyanide as CN	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017: 4500 CN C,D	0.05	No Relaxation	ND	ND	ND
24.	Lead as Pb	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	0.01	No Relaxation	BDL	BDL	BDL
25.	Zinc as Zn	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	5	15	BDL	BDL	BDL
26.	Chromium as Cr ⁶⁺	mg/l	Diphenyl Carbazide Method APHA 23 RD Ed.2017: 3500Cr B	—	—	BDL	BDL	BDL
27.	Mineral Oil	mg/l	Partition-Gravimetric Method APHA 23 RD Ed.2017: 5520 B	0.5	No Relaxation	BDL	BDL	BDL
28.	Alkalinity	mg/l	Titration Method APHA 23 RD Ed.2017: 2320 B	200	600	54.0	58.0	62.0
29.	Aluminium as Al	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 D	0.03	0.2	BDL	BDL	BDL
30.	Boron	mg/l	Circumum Method APHA 23 RD Ed.2017: 4500B, B	0.5	2.4	BDL	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	APHA 5540 C	0.2	—	ND	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	GC Analysis Method APHA 23 RD Ed.2017: 6440 B	0.0001	—	BDL	BDL	BDL
33.	Pesticides	µg/l	GC Analysis Method APHA 23 RD Ed.2017: 6630 B,C	Absent	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable, BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, F<0.1 mg/l, Cd<0.01 mg/l, Se<0.001 mg/l, Zn<0.03 mg/l, Pb<0.002 mg/l, Cr⁶⁺<0.004 mg/l, As<0.004 mg/l, Hg<0.05 mg/l, Pb<0.01 mg/l, Pb<0.01 mg/l, CR<0.01 mg/l, ND: Not Detected, B<0.01 mg/l, PAH<0.0001 mg/l.

For Visiontek Consultancy Services Pvt. Ltd.

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 20 TO MAY 20



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

Ref.:

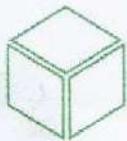
1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-2; Open Well at Bandhamandi Village
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Analysis Results				
				Standard as per IS:10500:2012 Amended on 2015 & 2018		MARCH-20 Desired Limit	MARCH-20 Permissible Limit	MAY-20 18.03.20
<i>Essential Characteristics</i>								
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C	5	15	CL	CL	CL
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017:2150 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017:2130 B	1	5	<1	<1	<1
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 4500HF B	6.5-8.5	No Relaxation	7.28	7.22	7.3
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	52.2	58.0	56.0
7.	Iron (as Fe)	mg/l	BY AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.24	0.26	0.22
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500CFB	250	1000	18.8	19.6	20.2
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl, B	0.2	1	ND	ND	ND
<i>Desirable Characteristics</i>								
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	96.0	104.0	108.0
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	38.0	42.0	44.0
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	13.4	14.6	15.2
13.	Copper as Cu	mg/l	BY AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL	BDL
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL	BDL
15.	Sulphate as SO ₄	mg/l	Turbid metric Method APHA 23 RD Ed.2017:4500 SO ₄ ²⁻ E	200	400	5.2	5.6	5.8
16.	Nitrate as NO ₃	mg/l	By UV-Screen Method APHA 23 RD Ed.2017:4500 NO ₃ E	45	No Relaxation	0.98	0.94	0.92
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method	1.0	1.5	0.014	0.018	0.021
								0.02

Date:



ISO 14001 : 2015
OHSAS 18001 : 2007



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008
ISO 14001 : 2015
OHSAS 18001 : 2007

Ref.:

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 20 TO MAY 20

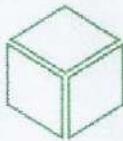
1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-2: Open Well at Bandhamandi Village
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Analysis Results						
				MARCH-20	APRIL-20	MAY-20	Averages			
Standard as per IS:10500:2012 Amended on 2015 & 2018				Desired Limit	Permissible Limit	18.03.20	28.04.2020			
<i>Essential Characteristics</i>										
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C	5	15	CL	CL			
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	Agreeable	Agreeable	Agreeable	Agreeable			
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable			
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1	5	<1	<1			
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 4500H ⁺ B	6.5-8.5	No Relaxation	7.28	7.22			
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	52.2	58.0			
7.	Iron (as Fe)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.24	0.26			
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500Cl ⁻ B	250	1000	18.8	19.6			
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl ₂ B	0.2	1	ND	ND			
<i>Desirable Characteristics</i>										
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	96.0	104.0			
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	38.0	42.0			
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	13.4	14.6			
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL			
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL			
15.	Sulphate as SO ₄	mg/l	Turbidometric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200	400	5.2	5.6			
16.	Nitrate as NO ₃	mg/l	By UV-Screen Method APHA 23 RD Ed.2017 : 4500 NO ₃ ⁻ E	45	No Relaxation	0.98	0.94			
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method	1.0	1.5	0.014	0.018			
						0.021	0.02			

Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel.: 7752017905

E-mail : visiontek@vcspl.org, visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at: www.vcspl.org

Committed For Better Environment



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



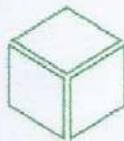
ISO 9001 : 2008
ISO 14001 : 2015
OHSAS 18001 : 2007

								Ref.:
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	APHA 23 RD Ed.2017: 4500F-C Chloroform extraction by Colorimric Method	0.001	0.002	BDL	BDL	BDL
19.	Mercury as Hg	mg/l	APHA 23 RD Ed.2017: 5530 B,D AAS Method	0.001	No Relaxation	BDL	BDL	BDL
20.	Cadmium as Cd	mg/l	APHA 23 RD Ed.2017: 3111 B AAS Method	0.003	No Relaxation	BDL	BDL	BDL
21.	Selenium as Se	mg/l	APHA 23 RD Ed.2017: 3500 Se C By AAS Method	0.01	No Relaxation	BDL	BDL	BDL
22.	Arsenic as As	mg/l	APHA 23 RD Ed.2017: 3114 B By AAS Method	0.01	No Relaxation	BDL	BDL	BDL
23.	Cyanide as CN	mg/l	APHA 23 RD Ed.2017: 4500 CN Distillation followed by Spectrophotometric Method	0.05	No Relaxation	ND	ND	ND
24.	Lead as Pb	mg/l	APHA 23 RD Ed.2017: 3111 B By AAS Method	0.01	No Relaxation	BDL	BDL	BDL
25.	Zinc as Zn	mg/l	APHA 23 RD Ed.2017: 3111 B By AAS Method	5	15	BDL	BDL	BDL
26.	Chromium as Cr ⁶⁺	mg/l	APHA 23 RD Ed.2017: 3500Cr B Diphenyl Carbazide Method	--	--	BDL	BDL	BDL
27.	Mineral Oil	mg/l	APHA 23 RD Ed.2017: 5520 B Partition-Gravimetric Method	0.5	No Relaxation	BDL	BDL	BDL
28.	Alkalinity	mg/l	APHA 23 RD Ed.2017: 2320 B Titration Method	200	600	44.0	46	48.0
29.	Aluminium as Al	mg/l	APHA 23 RD Ed.2017: 3111 D AAS Method	0.03	0.2	BDL	BDL	BDL
30.	Boron	mg/l	APHA 23 RD Ed.2017: 4500B, B Curcumin Method	0.5	2.4	BDL	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	APHA 23 RD Ed.2017: 5540 C Anionic Surfactants	0.2	ND	ND	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	APHA 23 RD Ed.2017: 6440 B GC Analysis Method	0.0001	--	BDL	BDL	BDL
33.	Pesticides	µg/l	APHA 23 RD Ed.2017 6630 B,C GC Analysis Method	Absent	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable,
BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, F<0.1 mg/l, Cd<0.002 mg/l, Hg<0.004 mg/l, As<0.001 mg/l, Pb<0.01 mg/l, Zn<0.03 mg/l, Cr⁶⁺<0.01 mg/l,
Al<1 mg/l, B<0.01 mg/l, PAH<0.0001 mg/l.

For Visiontek Consultancy Services Pvt. Ltd

Date: *28/01/2018*



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2007

Ref.:

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 20 TO MAY 20

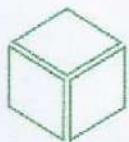
1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-3; Open Well at Panasgurha Village
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Analysis Results			
				Standard as per IS:10500:2012 Amended on 2015 & 2018	Desired Limit	Permissible Limit	Averages
Essential Characteristics				MARCH-20	APRIL-20	MAY-20	22.05.2020
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	5 Agreeable	5 Agreeable	5 Agreeable	CL Agreeable
2.	Odour	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	5 Agreeable	5 Agreeable	5 Agreeable	CL Agreeable
3.	Taste	--	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1 1	5 No Relaxation	<1.0 7.41	<1.0 7.32
4.	Turbidity	NTU	pH Meter APHA 23 RD Ed.2017 : 4500H ⁺ B	6.5-8.5 EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	600 1.0 No Relaxation	108.0 0.24	112.0 0.26
5.	pH	--	By AAS Method APHA 23 RD Ed.2017 : 3111, B	200 1.0	600 No Relaxation	116.0 0.24	113.5 0.28
6.	Total Hardness (as CaCO ₃)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500ClB	250 1.000	1000 20.2	20.8 20.8	20.2 20.2
7.	Iron (as Fe)	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500ClB	0.2 1	ND ND	ND ND	ND ND
8.	Chloride (as Cl)	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500 2000	182.0 21.0	176.0 20.2	180 20.8
9.	Residual Free Chlorine	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75 30	200 100	21.0 18.2	21.0 19.2
Desirable Characteristics				Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	0.05 0.1	1.5 0.3	BDL BDL
10.	Total Dissolved Solids as TDS	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05 0.1	1.5 0.3	BDL BDL	BDL BDL
11.	Calcium as Ca	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1 0.05	0.3 1.5	BDL BDL	BDL BDL
12.	Magnesium as Mg	mg/l	Turbidometric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200 400	6.2 6.2	6.8 7.2	6.95 7.2
13.	Copper as Cu	mg/l	By UV-Screen Method APHA 23 RD Ed.2017 : 4500 NO ₃ -E	45 1.0	No Relaxation 0.018	3.2 0.020	3.05 0.024
14.	Manganese as Mn	mg/l	Distillation followed by Spectrophotometric Method	1.0 1.5	ND ND	ND ND	ND ND
15.	Sulphate as SO ₄	mg/l					
16.	Nitrate as NO ₃	mg/l					
17.	Fluoride as F	mg/l					

Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel.: 7752017905

E-mail : visiontek@vcspl.org, visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at: www.vcspl.org

Committed For Better Environment



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

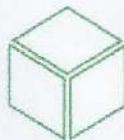


Ref:	Parameter	Method	Unit	CL	AL	BL	BDL	BBL
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	mg/l	0.001	0.002	BDL	BDL	BDL
19.	Mercury as Hg	mg/l	mg/l	APHA 23 RD Ed.2017: 4500F C Chloroformic Method APHA 23 RD Ed.2017: 5530 B,D	0.001	No Relaxation	BDL	BDL
20.	Cadmium as Cd	mg/l	mg/l	APHA 23 RD Ed.2017: 3112 B AAS Method APHA 23 RD Ed.2017: 3111 B	0.003	No Relaxation	BDL	BDL
21.	Selenium as Se	mg/l	mg/l	APHA 23 RD Ed.2017: 3500 Se C By AAS Method	0.01	No Relaxation	BDL	BDL
22.	Arsenic as As	mg/l	mg/l	APHA 23 RD Ed.2017: 3114 B Distillation followed by Spectrophotometric Method	0.01	No Relaxation	BDL	BDL
23.	Cyanide as CN	mg/l	mg/l	APHA 23 RD Ed.2017: 4500 CN C,D By AAS Method	0.05	No Relaxation	ND	ND
24.	Lead as Pb	mg/l	mg/l	APHA 23 RD Ed.2017: 3111 B By AAS Method	0.01	No Relaxation	BDL	BDL
25.	Zinc as Zn	mg/l	mg/l	APHA 23 RD Ed.2017: 3111 B Diphenyl Carbazide Method	5	15	BDL	BDL
26.	Chromium as Cr ⁺⁶	mg/l	mg/l	APHA 23 RD Ed.2017: 3500Cr B Partition-Gravimetric Method	-	--	BDL	BDL
27.	Mineral Oil	mg/l	mg/l	APHA 23 RD Ed.2017: 5520 B Titration Method	0.5	No Relaxation	BDL	BDL
28.	Alkalinity	mg/l	mg/l	APHA 23 RD Ed.2017: 2320 B AAS Method	200	600	60.8	62.0
29.	Aluminium as Al	mg/l	mg/l	APHA 23 RD Ed.2017: 3111 D Cureumin Method	0.03	0.2	BDL	BDL
30.	Boron	mg/l	mg/l	APHA 23 RD Ed.2017: 4500B, B Anionic Surfactants	0.5	2.4	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	mg/l	APHA 23 RD Ed.2017: 5540 C GC Analysis Method	0.2	—	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	mg/l	APHA 23 RD Ed.2017: 6440 B GC Analysis Method	0.0001	—	BDL	BDL
33.	Pesticides	µg/l	µg/l	APHA 23 RD Ed.2017 6650 B,C	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable,

BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, Fe<0.1 mg/l, Cd<0.002 mg/l, Hg<0.002 mg/l, Zn<0.03 mg/l, Pb<0.01 mg/l, As<0.004 mg/l, Se<0.001 mg/l, Cr⁺⁶<0.01 mg/l, Al<1 mg/l, Cr<1 mg/l, B<0.01 mg/l,
PAH<0.0001 mg/l

For Visiontek Consultancy Services Pvt. Ltd
Date:



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008
OHSAS 18001 : 2007

ISO 14001 : 2015
OHSAS 18001 : 2007

Ref.:

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada

2. Sampling Location : GW-4: Open Well at Birda

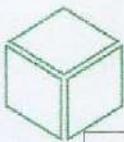
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Standard as per IS:10500:2012		Analysis Results		
				Amended on 2015 & 2018	Desired Permissible Limit	MARCH-20	APRIL-20	MAY-20
<i>Essential Characteristics</i>								
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C	5	15	CL	CL	CL
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017:2150 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017:2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017:2130 B	1	5	<1.0	<1.0	<1.0
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 4500HT B	6.5-8.5	No Relaxation	7.22	7.28	7.26
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	106.0	112.0	116.0
7.	Iron (as Fe)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.26	0.28	0.22
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500CI' B	250	1000	40.0	42.0	44.0
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl, B	0.2	1	ND	ND	ND
<i>Desirable Characteristics</i>								
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	182.0	180.0	186.0
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	40.0	36.0	38.0
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	20.2	20.6	21.4
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	0.05	1.5	BDL	BDL	BDL
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017: 3500Mn B	0.1	0.3	BDL	BDL	BDL
15.	Sulphate as SO ₄	mg/l	Turbidometric Method APHA 23 RD Ed.2017:4500 SO ₄ ²⁻ E	200	400	4.2	4.4	5.2
16.	Nitrate as NO ₃	mg/l	UV-Screen Method APHA 23 RD Ed.2017:4500 NO ₃ , E	45	No Relaxation	2.6	2.4	2.5
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017: 4500F C	1.0	1.5	0.026	0.028	0.022

Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel.: 7752017905

E-mail : visiontek@vcspl.org, visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at: www.vcspl.org

Committed For Better Environment



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



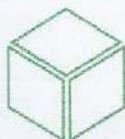
ISO 14001 : 2015
OHSAS 18001 : 2007

Ref.	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18. Phenolic Compounds as C ₆ H ₅ OH	mg/l	Chloroform extraction by Colorimetric Method APHA 23 rd Ed,2017: 5550 B,D	0.001	0.002					
19. Mercury as Hg	mg/l	AAS Method APHA 23 rd Ed,2017: 3112 B	0.001	No Relaxation	BDL	BDL	BDL	BDL	BDL
20. Cadmium as Cd	mg/l	AAS Method APHA 23 rd Ed,2017: 3111 B	0.003	No Relaxation	BDL	BDL	BDL	BDL	BDL
21. Selenium as Se	mg/l	By AAS Method APHA 23 rd Ed,2017: 3500 Se C	0.01	No Relaxation	BDL	BDL	BDL	BDL	BDL
22. Arsenic as As	mg/l	By AAS Method APHA 23 rd Ed,2017: 3114 B	0.01	No Relaxation	BDL	BDL	BDL	BDL	BDL
23. Cyanide as CN	mg/l	Distillation followed by Spectrophotometric Method APHA 23 rd Ed,2017: 4500 CN- C,D	0.05	No Relaxation	ND	ND	ND	ND	ND
24. Lead as Pb	mg/l	By AAS Method APHA 23 rd Ed,2017: 3111 B	0.01	No Relaxation	BDL	BDL	BDL	BDL	BDL
25. Zinc as Zn	mg/l	By AAS Method APHA 23 rd Ed,2017: 3111 B	5	15	BDL	BDL	BDL	BDL	BDL
26. Chromium as Cr ^{VI}	mg/l	Diphenyl Carbazide Method APHA 23 rd Ed,2017: 3500Cr B	--	--	BDL	BDL	BDL	BDL	BDL
27. Mineral Oil	mg/l	Partition Gravimetric Method APHA 23 rd Ed,2017: 5520 B	0.5	No Relaxation	BDL	BDL	BDL	BDL	BDL
28. Alkalinity	mg/l	Titration Method APHA 23 rd Ed,2017: 2320 B	200	600	50.0	52.0	54.0	51.8	
29. Aluminum as Al	mg/l	AAS Method APHA 23 rd Ed,2017: 3111 D	0.03	0.2	BDL	BDL	BDL	BDL	BDL
30. Boron	mg/l	Cureumin Method APHA 23 rd Ed,2017: 4500B, B	0.5	2.4	BDL	BDL	BDL	BDL	BDL
31. Anionic Detergents as MBAS	mg/l	Anionic Surfactants APHA 23 rd Ed,2017: 5540 C	0.2		ND	ND	ND	ND	
32. Poly Aromatic Hydrocarbon as PAH	mg/l	GC Analysis Method APHA 23 rd Ed,2017: 6440 B	0.0001	--	BDL	BDL	BDL	BDL	BDL
33. Pesticides	µg/l	GC Analysis Method APHA 23 rd Ed,2017: 6630 B,C	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable,
BDL: (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, F<0.1 mg/l, Cd<0.002 mg/l, Hg<0.002 mg/l, Cd<0.01 mg/l, Se<0.001 mg/l, Cr^{VI}<0.01 mg/l, Al<1 mg/l, Pb<0.01 mg/l, As<0.004 mg/l, Zn<0.03 mg/l, Cr^{VI}<0.01 mg/l, Al<1 mg/l, Cd<0.001 mg/l.

For Visiontek Consultancy Services Pvt. Ltd.

Date:

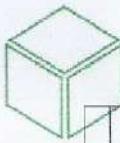


Ref.:

GROUND WATER QUALITY ANALYSIS REPORT- MARCH 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-5: Open Well at Baligurha
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Analysis Results					
				Standard as per IS:10500:2012 Amended on 2015 & 2018	Desired Limit	Permissible Limit	MARCH-20 18.03.20	APRIL-20 28.04.2020	MAY-20 22.05.2020
<i>Essential Characteristics</i>									
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C	5	15	CL	CL	CL	CL
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1	5	2.4	2.6	2.0	2.225
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 45001H ⁺ B	6.5-8.5	No Relaxation	7.26	7.31	7.34	7.30
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	106.0	112.0	114.0	110.5
7.	Iron (as Fe)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	1.0	No Relaxation	0.24	0.28	0.30	0.285
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500Cl ⁻ B	250	1000	34.0	38.0	40.0	38.5
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl ₂ B	0.2	1	ND	ND	ND	ND
<i>Desirable Characteristics</i>									
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	182.0	184.0	190.0	188
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	38.0	40.0	42.0	41
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	21.2	22.6	23.2	22.95
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL	BDL	BDL
14.	Manganese as Mn	mg/l	Per sulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL	BDL	BDL
15.	Sulphate as SO ₄ ²⁻	mg/l	Turbid metric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200	400	4.8	4.6	5.2	5
16.	Nitrate as NO ₃ ⁻	mg/l	By UV-Screen Method APHA 23 RD Ed.2017 : 4500 NO ₃ ⁻ E	45	No Relaxation	2.8	3.2	3.4	Date: 3.12.25
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method	1.0	1.5	0.014	0.018	0.021	0.019



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2015
OHSAS 18001 : 2007

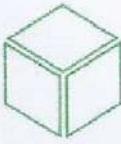
Ref.:

18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	Chloroform Extraction by Colorimetric Method APHA 23 rd Ed.2017: 5530 B,D	0.001	0.002	BDL	BDL	BDL	BDL
19.	Mercury as Hg _g	mg/l	AAS Method API/A 23 rd Ed.2017: 31112 B	0.001	No Relaxation	BDL	BDL	BDL	BDL
20.	Cadmium as Cd	mg/l	AAS Method APHA 23 rd Ed.2017: 3111 B	0.003	No Relaxation	BDL	BDL	BDL	BDL
21.	Selenium as Se	mg/l	By AAS Method APHA 23 rd Ed.2017: 3500 Se C	0.01	No Relaxation	BDL	BDL	BDL	BDL
22.	Arsenic as As	mg/l	By AAS Method APHA 23 rd Ed.2017: 3114 B	0.01	No Relaxation	BDL	BDL	BDL	BDL
23.	Cyanide as CN	mg/l	Distillation followed by Spectrophotometric Method APHA 23 rd Ed.2017: 4500 CN- C,D	0.05	No Relaxation	ND	ND	ND	ND
24.	Lead as Pb	mg/l	By AAS Method APHA 23 rd Ed.2017: 3111 B	0.01	No Relaxation	BDL	BDL	BDL	BDL
25.	Zinc as Zn	mg/l	By AAS Method APHA 23 rd Ed.2017: 3111 B	5	15	BDL	BDL	BDL	BDL
26.	Chromium as Cr ⁺⁶	mg/l	Diphenyl Carbazide Method APHA 23 rd Ed.2017: 3500Cr-B	--	--	ND	ND	ND	ND
27.	Mineral Oil	mg/l	Partition Gravimetric Method APHA 23 rd Ed.2017: 5520 B	0.5	No Relaxation	BDL	BDL	BDL	BDL
28.	Alkalinity	mg/l	Titration Method APHA 23 rd Ed.2017: 2320 B	200	600	54.0	60.0	62.0	60.0
29.	Aluminum as Al	mg/l	AAS Method APHA 23 rd Ed.2017: 3111 D	0.03	0.2	BDL	BDL	BDL	BDL
30.	Boron	mg/l	Curcumin Method APHA 23 rd Ed.2017: 4500B, B	0.5	2.4	BDL	BDL	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	Anionic Surfactants APHA 23 rd Ed.2017: 5540 C	0.2	--	ND	ND	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	GC Analysis Method APHA 23 rd Ed.2017: 6440 B	0.0001	--	BDL	BDL	BDL	BDL
33.	Pesticides	µg/l	GC Analysis Method APHA 23 rd Ed.2017: 6630 B,C	Absent	Absent	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable,
BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, F<0.1 mg/l, Cd<0.002 mg/l, Hg<0.002 mg/l, Cd<0.01 mg/l, Se<0.001 mg/l, Cd<0.001 mg/l, Pb<0.004 mg/l, As<0.001 mg/l, Zn<0.03 mg/l, Cr⁺⁶<0.01 mg/l, Al<1 mg/l, Pb<0.01 mg/l, Cd<0.001 mg/l, Cu<0.01 mg/l, Mn<0.01 mg/l, Cd<0.001 mg/l, Pb<0.001 mg/l.

For Visiontek Consultancy Services Pvt. Ltd

Date:



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2015

OHSAS 18001 : 2007

Ref.:

GROUND WATER QUALITY ANALYSIS REPORT-MARCH 20 TO MAY 2020

1. Name of Industry
2. Sampling Location
3. Sample Collected By

: M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada

: GW-6: Bore Well Near Project Site

: VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Analysis Results			
				Standard as per IS:10500:2012 Amended on 2015 & 2018		MARCH-20	APRIL-20
				Desired Limit	Permissible Limit	18.03.20	28.04.2020
<i>Essential Characteristics</i>							
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C	5	15	CL	CL
2.	Odour	--	Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	--	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1	5	2.0	1.7
5.	pH	--	pH Meter APHA 23 RD Ed.2017 : 4500H ⁺ B	6.5-8.5	No Relaxation	7.22	7.3
6.	Total Hardness (as CaCO ₃)	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	96.0	102.0
7.	Iron (as Fe)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.16	0.21
8.	Chloride (as Cl)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500Cl ⁻ B	250	1000	44.0	46.0
9.	Residual Free Chlorine	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl ₂ , B	0.2	1	ND	ND
<i>Desirable Characteristics</i>							
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	190.0	196.0
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	40.0	44.0
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	19.2	21.4
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL
15.	Sulphate as SO ₄ ²⁻	mg/l	Turbidometric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200	400	5.2	4.6
16.	Nitrate as NO ₃ ⁻	mg/l	By UV-Screen Method	45	No Relaxation	3.6	4.2

Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel.: 7752017905

E-mail : visiontek@vcspl.org, visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at: www.vcspl.org

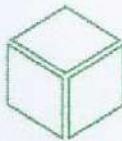
Committed For Better Environment

Date:
BDL

Date:
BDL

Date:
BDL

Date:
BDL



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2015

OHSAS 18001 : 2007

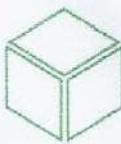
Ref.:

			APHA 23 RD Ed.2017: 4500 NO ₃ ⁻ E					
17.	Fluoride as F	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017: 4500F-C	1.0	1.5	0.018	0.024	0.026
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	Chloroform extraction by Colorimetric Method APHA 23 RD Ed.2017: 5530 B,D	0.001	0.002	BDL	BDL	BDL
19.	Mercury as Hg	mg/l	AAS Method APHA 23 RD Ed.2017: 3112 B	0.001	No Relaxation	BDL	BDL	BDL
20.	Cadmium as Cd	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 B	0.003	No Relaxation	BDL	BDL	BDL
21.	Selenium as Se	mg/l	By AAS Method APHA 23 RD Ed.2017: 3500 Se C	0.01	No Relaxation	BDL	BDL	BDL
22.	Arsenic as As	mg/l	By AAS Method APHA 23 RD Ed.2017: 3114 B	0.01	No Relaxation	BDL	BDL	BDL
23.	Cyanide as CN	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017: 4500 CN C,D	0.05	No Relaxation	ND	ND	ND
24.	Lead as Pb	mg/l	By AAS Method APHA 23 RD Ed.2017 3111 B	0.01	No Relaxation	BDL	BDL	BDL
25.	Zinc as Zn	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	5	15	BDL	BDL	BDL
26.	Chromium as Cr ⁶⁺	mg/l	Diphenyl Carbazide Method APHA 23 RD Ed.2017: 3500Cr B.	---	---	BDL	BDL	BDL
27.	Mineral Oil	mg/l	Partition-Gravimetric Method APHA 23 RD Ed.2017: 5520 B	0.5	No Relaxation	BDL	BDL	BDL
28.	Alkalinity	mg/l	Titration Method APHA 23 RD Ed.2017:2320 B	200	600	68.0	72.0	74.0
29.	Aluminum as Al	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 D	0.03	0.2	BDL	BDL	BDL
30.	Boron	mg/l	Curcumin Method APHA 23 RD Ed.2017: 4500B, B	0.5	2.4	BDL	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	Anionic Surfactants APHA 23 RD Ed.2017:5540 C	0.2	ND	ND	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	GC Analysis Method APHA 23 RD Ed.2017: 6440 B	0.0001	--	BDL	BDL	BDL
33.	Pesticides	µg/l	GC Analysis Method APHA 23 RD Ed.2017 6630 B,C	Absent	Absent	Absent	Absent	Absent

Note: CL: Colourless, AL: Agreeable,
BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, Fe<0.1 mg/l, Hg<0.002 mg/l, Cd<0.01 mg/l, Ni<0.001 mg/l, Pb<0.004 mg/l, As<0.001 mg/l, Cr⁶⁺<0.01 mg/l, Zn<0.03 mg/l, At<1 mg/l,
B<0.01 mg/l, PAH<0.0001 mg/l

For Visiontek Consultancy Services Pvt. Ltd
Signature:

Date:



Ref:

GROUND WATER QUALITY ANALYSIS REPORT-MARCH 2020 TO MAY 2020

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : GW-7: Bore Well Project Site (Core Zone)
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Unit	Testing Methods	Standard as per IS:10500:2012 Amended on 2015 & 2018			Analysis Results		
				Desired Limit	Permissible Limit	MARCH-20 18.03.20	APRIL-20 28.04.2020	MAY-20 22.05.2020	Averages
				Essential Characteristics					
1.	Colour	Hazen	Visual Comparison Method APHA 23 RD Ed.2017 : 2120 B, C Threshold Odour Test APHA 23 RD Ed.2017 : 2150 B	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
2.	Odour	—	Flavor Threshold Test APHA 23 RD Ed.2017 : 2160 C	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3.	Taste	—	Nephelometric Method APHA 23 RD Ed.2017 : 2130 B	1	5	1.9	1.8	1.6	1.875
4.	Turbidity	NTU	pH Meter APHA 23 RD Ed.2017 : 4500H ⁺ B	6.5-8.5	No Relaxation	7.28	7.32	7.31	7.318
5.	pH	—	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 2340 C	200	600	96.0	102.0	108.0	105.2
6.	Total Hardness (as CaCO ₃)	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111, B	1.0	No Relaxation	0.14	0.16	0.18	0.176
7.	Iron (as Fe)	mg/l	Argentometric Method APHA 23 RD Ed.2017 : 4500CT ⁺ B	250	1000	42.0	44.0	40.0	42.8
8.	Chloride (as Cl)	mg/l	Iodometric Method APHA 23 RD Ed.2017 : 4500Cl, B	0.2	1	ND	ND	ND	ND
Desirable Characteristics									
10.	Total Dissolved Solids as TDS	mg/l	Gravimetric Method APHA 23 RD Ed.2017 : 2540 C	500	2000	186.0	196.0	204.0	199
11.	Calcium as Ca	mg/l	EDTA Titrimetric Method APHA 23 RD Ed.2017 : 3500Ca B	75	200	38.0	44.0	36.0	40
12.	Magnesium as Mg	mg/l	Calculation Method APHA 23 RD Ed.2017 : 3500Mg B	30	100	19.2	20.6	21.2	20.8
13.	Copper as Cu	mg/l	By AAS Method APHA 23 RD Ed.2017 : 3111 B	0.05	1.5	BDL	BDL	BDL	BDL
14.	Manganese as Mn	mg/l	Persulfate Method APHA 23 RD Ed.2017 : 3500Mn B	0.1	0.3	BDL	BDL	BDL	BDL
15.	Sulphate as SO ₄	mg/l	Turbidometric Method APHA 23 RD Ed.2017 : 4500 SO ₄ ²⁻ E	200	400	5.2	4.6	4.8	4.8
16.	Nitrate as NO ₃	mg/l	By UV-Screen Method APHA 23 RD Ed.2017 : 4500 NO ₃ E	45	No Relaxation	3.6	4.2	3.6	3.8



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2007

Ref.:

17.	Fluoride as F	mg/l	Spectrophotometric Method APHA 23 RD Ed.2017: 4500F-C	1.0	1.5	0.018	0.016	0.021	0.020
18.	Phenolic Compounds as C ₆ H ₅ OH	mg/l	Chloroform extraction by Colorimetric Method APHA 23 RD Ed.2017: 5530 B,D	0.001	0.002	BDL	BDL	BDL	BDL
19.	Mercury as Hg	mg/l	AAS Method APHA 23 RD Ed.2017: 3112 B	0.001	No Relaxation	BDL	BDL	BDL	BDL
20.	Cadmium as Cd	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 B	0.003	No Relaxation	BDL	BDL	BDL	BDL
21.	Selenium as Se	mg/l	By AAS Method APHA 23 RD Ed.2017: 3500 Se C	0.01	No Relaxation	BDL	BDL	BDL	BDL
22.	Arsenic as As	mg/l	By AAS Method APHA 23 RD Ed.2017: 3114 B	0.01	No Relaxation	BDL	BDL	BDL	BDL
23.	Cyanide as CN	mg/l	Distillation followed by Spectrophotometric Method APHA 23 RD Ed.2017: 4500 CN C,D	0.05	No Relaxation	ND	ND	ND	ND
24.	Lead as Pb	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	0.01	No Relaxation	BDL	BDL	BDL	BDL
25.	Zinc as Zn	mg/l	By AAS Method APHA 23 RD Ed.2017: 3111 B	5	15	BDL	BDL	BDL	BDL
26.	Chromium as Cr ⁶⁺	mg/l	Diphenyl Carbazide Method APHA 23 RD Ed.2017: 3500Cr B	---	---	BDL	BDL	BDL	BDL
27.	Mineral Oil	mg/l	Partition-Gravimetric Method APIPA 23 RD Ed.2017: 5520 B	0.5	No Relaxation	BDL	BDL	BDL	BDL
28.	Alkalinity	mg/l	Titration Method APHA 23 RD Ed.2017: 2320 B	200	600	65.0	65.8	66.7	66.375
29.	Aluminium as Al	mg/l	AAS Method APHA 23 RD Ed.2017: 3111 D	0.03	0.2	BDL	BDL	BDL	BDL
30.	Boron	mg/l	Curcumin Method APHA 23 RD Ed.2017: 4500B, B	0.5	2.4	BDL	BDL	BDL	BDL
31.	Anionic Detergents as MBAS	mg/l	Anionic Surfactants APHA 23 RD Ed.2017: 5540 C	0.2	--	ND	ND	ND	ND
32.	Poly Aromatic Hydrocarbon as PAH	mg/l	GC Analysis Method APHA 23 RD Ed.2017: 6440 B	0.0001	--	BDL	BDL	BDL	BDL
33.	Pesticides	µg/l	GC Analysis Method APHA 23 RD Ed.2017: 6630 B,C	Absent	Absent	Absent	Absent	Absent	199

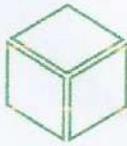
Note: CL: Colourless, AL: Agreeable,
BDL (Below Detection Limit) Values: Cu<0.02 mg/l, Mn<0.05 mg/l, F<0.1 mg/l, Cd<0.01 mg/l, Hg<0.05 mg/l, Cd<0.004 mg/l, As<0.001 mg/l, Se<0.001 mg/l, Cr⁶⁺<0.03 mg/l, Zn<0.01 mg/l, Pb<0.01 mg/l, As<0.001 mg/l, Cd<0.001 mg/l, Cu<0.02 mg/l, Mn<0.05 mg/l, Cd<0.01 mg/l, Hg<0.02 mg/l, Cd<0.004 mg/l, As<0.001 mg/l, Se<0.001 mg/l, Cr⁶⁺<0.01 mg/l, Al<1 mg/l, B<0.01 mg/l, PAH<0.0001 mg/l

For Visiontek Consultancy Services Pvt. Ltd.

Annexure-3

SURFACE WATER QUALITY REPORT





Ref:

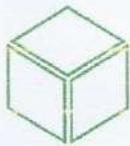
Date:

SURFACE WATER QUALITY ANALYSIS REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : SW-1: Dalakona Nalla Near Panasagurha (Upstream)
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Testing Methods	Unit	Standards as per IS-2296:1992 Class 'C'	Analysis Results		
					Mar-20	Apr-20	May-20
1.	pH Value	APHA 23 rd Edition 2017: 4500H B	—	6.0-9.0	7.44	7.42	7.44
2.	Dissolved Oxygen (minimum)	APHA 23 rd Edition 2017: 4500 O' C	mg/l	4.0	5.6	5.8	5.2
3.	Total Dissolved Solids as TDS	APHA 23 rd Edition 2017: 2540 C	mg/l	1500	88.0	92.0	94.0
4.	Total Suspended Solids as TSS	APHA 23 rd Edition 2017: 2540 D	mg/l	—	28.0	32.0	32.0
							Average 30.67

[Signature]
For Visiontek Consultancy Services Pvt. Ltd.



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2018

Ref.:

Date:

SURFACE WATER QUALITY ANALYSIS REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : SW-2: Dalakona Nulla Near Panasgurha (Downstream)
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl No.	Parameter	Testing Methods	Unit	Standards as per IS-2296:1992 Class -'C'	Analysis Results			
					Mar-20	Apr-20	May-20	Averages
1.	pH Value	APHA 23 rd Edition 2017: 4500H' B	--	6.0-9.0	7.32	7.41	7.46	7.40
2.	Dissolved Oxygen (Minimum)	APIA 23 rd Edition 2017: 4500 O C	mg/l	4.0	5.8	6.6	6.8	6.40
3.	Total Dissolved Solids as TDS	APHA 23 rd Edition 2017: 2540 C	mg/l	1500	128.0	132.0	138.0	132.67
4.	Total Suspended Solids as TSS	APHA 23 rd Edition 2017: 2540 D	mg/l	--	32.0	28.0	34.0	31.33

For Visiontek Consultancy Services Pvt. Ltd.



Ref:

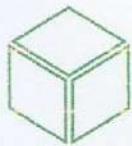
Date:

SURFACE WATER QUALITY ANALYSIS REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : SW-3: Water from Settling Pond
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No.	Parameter	Testing Methods	Unit	Standards as per IS-2296:1992 Class -'C'	Analysis Results			Averages
					Mar-20	Apr-20	May-20	
1.	pH Value	APHA 23 rd Edition 2017: 4500H B	--	6.0-9.0	7.46	7.48	7.52	7.49
2.	Dissolved Oxygen (Minimum)	APIHA 23 rd Edition 2017: 4500 O C	mg/l	4.0	7.1	6.8	7.4	7.10
3.	Total Dissolved Solids as TDS	APIHA 23 rd Edition 2017: 2540 C	mg/l	1500	118.0	116.0	124.0	119.33
4.	Total Suspended Solids as TSS	APIHA 23 rd Edition 2017: 2540 D	mg/l	--	40.0	36.0	36.0	37.33

[Signature]
For Visiontek Consultancy Services Pvt. Ltd.



Ref.:

Date:

SURFACE WATER QUALITY ANALYSIS REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sampling Location : SW-4: Uagarhi Nadi Near Bandhamandi Upstream
3. Sample Collected By : VCSPL Representative in presence of Client's Representative

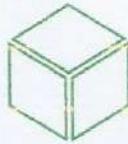
Sl. No.	Parameter	Testing Methods	Unit	Standards as per IS-2396:1992 Class 'C'	Analysis Results			Averages
					Mar-20	Apr-20	May-20	
1.	pH Value	APHA 23 rd Edition 2017: 45001 F B	--	6.0-9.0	7.46	7.52	7.51	7.50
2.	Dissolved Oxygen (minimum)	APHA 23 rd Edition 2017: 4500 O C	mg/l	4.0	5.8	5.4	5.6	5.60
3.	Total Dissolved Solids as TDS	APHA 23 rd Edition 2017: 2540 C	mg/l	1500	134.0	128.0	138.0	133.33
4.	Total Suspended Solids as TSS	APHA 23 rd Edition 2017: 2540 D	mg/l	--	30.0	36.0	32.8	32.93

For Visiontek Consultancy Services Pvt. Ltd.

Annexure-4

GROUND WATER LEVEL ANALYSIS REPORT





Ref.:

Date:

GROUND WATER LEVEL ANALYSIS REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada

2. Sampling Locations :

GWL1 : Open Well at Bhitarbarha

GWL2 : Open Well at Bandhamandi Village

GWL3 : Open Well at Panastagarha Village

GWL4 : Open Well at Birda

GWL5 : Open Well at Baligurha Village

GWL6 : Bore Well Near Project Site

GWL7 : Bore Well at Project Site (Core Zone)

3. Sample Collected By : VCSPL Representative in presence of Client's Representative

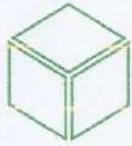
Location Id	Date of Sampling	Unit	Analysis Result
GWL1	14.03.2020		6.1
GWL2	14.03.2020		6.4
GWL3	14.03.2020		6.2
GWL4	18.04.2020	mt/bgl	5.8
GWL5	18.04.2020		6.0
GWL6	18.04.2020		6.2
GWL7	14.05.2020		6.0
GWL8	14.05.2020		6.1

For Visiontek Consultancy Services Pvt. Ltd.

Annexure-5

NOISE MONITORING REPORT





Ref.:

Date:

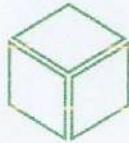
NOISE MONITORING REPORT- MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada

2. Sample Collected By : VCSPL Representative in presence of Client's Representative

Location ID	Monitoring Station Location	Day time Equivalent (Noise Level in dB(A) leq)				Night time Equivalent (Noise Level in dB(A) leq)			
		Mar-20	Apr-20	May-20	Mar-20	Apr-20	May-20	Mar-20	May-20
		14.03.2020	18.04.2020	14.05.2020	14.03.2020	18.04.2020	14.05.2020	18.04.2020	14.05.2020
N-1	Mining Quarry	68.8	63.6	64.4	49.6	50.6	50.4		
N-2	Dump Site	63.4	64.1	63.8	49.2	51.2	50.8		
N-3	Residential Area	62.6	64.6	62.9	48.8	51.6	51.2		
	Standard as per CPCB		75			70			

For Visiontek Consultancy Services Pvt. Ltd.



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 14001 : 2015
OHSAS 18001 : 2018

Ref:

Date:

SILICA ANALYSIS REPORT – MAR 20 TO MAY 20

1. Name of Industry : M/s Bandhamandi Graphite Mines & Beneficiation Plant, Rayagada
2. Sample Collected By : VCSPL Representative in presence of Client's Representative

Location Id	Date of Sampling	Unit	Analysis Result	
			%	Silica as SiO ₂
AAQ1: Mines Office				0.019
AAQ2: Mines Face				0.012
AAQ3: Dump Site	14.03.2020	%		0.014
AAQ4: Plant Site				0.010

For Visiontek Consultancy Services Pvt. Ltd.



Visiontek Consultancy Services Pvt. Ltd

(An Enviro Engineering Consulting Cell)

Plot No.-M22&M23,Chandaka Industrial Estate, Patia-751024 Tel.: 7752017905,
E-mail : visiontekin@gmail.com, visiontekin@yahoo.co.in, Visit us at : www.vcspl.org

Committed For Better Environment



ISO 14001:2004
ISO 9001: 2008
OHSAS 18001:2007