



# **ENVIRONMENTAL STATEMENT**

**OF BOKARO COLLIERY OPENCAST PROJECT**

**FOR 2013-14**

**CENTRAL COALFIELDS LIMITED**

**ENVIRONMENT DIVISION**

**CCL,RANCHI**

## EXECUTIVE SUMMARY

- E-1.** This Annual Environmental Statement has been prepared as per the Gazette Notification No.G.S.R. 329(E) dated 13<sup>th</sup> March,the Ministry of Environment & Forests,Government of India.
- E-2** **Bokaro Opencast Project** of Central Coalfields Limited is located in the East-Bokaro Coalfields of Bokaro Distt.of Jharkhand state.The mine block is situated on the north of Damodar river after railway line.The total area of the block is about 7 sq.Km.The project location and other surface features are given in the plan annexed as **ANNEXURE**.
- E-3** The annual target of production for the year 2013-14 is 50000 Tes.The project has achieved the production during 2013-14 is 53878 Tes.
- E-4** The Environmental Monitoring was carried out quarterly as per the guide lines of Ministry of Environment & Forest(MOEF).The Environmental Monitoring results for four quarters of 2013-14 are appended as **ANNEXURE**.
- E-5** Ambient air quality is monitored to study the level of air pollution.The main air pollutant is suspended particulate matter(SPM).It is difficult to quantify the amount of air pollutants generated due to opencast mining.
- E-6** Water is not directly used during mining for coal production. It percolates into working area during mining operation. However ,water is consumed for other purposes ,mainly for dust suppression.
- E-7** The noise levels recorded are generally below permissible limits prescribed by the Ministry of Environment & Forest s(MoEF).There is no continuous high level sound frequency of impulsive nature.
- E-8** Raw material used in coal mining activities are explosive and POL for machines and automobiles. The consumption is detailed in Part-B of Statement Form.
- E-9** Hazardous wastes is not being produced either from mining operation or from any pollution control facilities.Solid waste produced from the mining activities is overburden(OB) material.
- E-10** Regular measures are being taken to control air,water and noise pollutions discussed in detail in part G,H & I of Environmental Statement Form.

## **CHAPTER-1**

### **PROJECT DESCRIPTION**

#### **1.1 INTRODUCTION:**

The Bokaro colliery of Central Coalfields Limited is located in East –Bokaro Coalfield of Jharkhand, designed for a rated capacity of 0.7 million tones of coal per annum .The mine block is situated to the North of river Damodar after railway line. Godo nallah flowing across the Western section of this colliery joins with Damodar river. On the Eastern side of the quarry surface is Baidkaro nallah. Lease hold area of the project is 607.80 Ha.

The O.B generated is presently being dumped nearby the quarry OB dumps can be seen in the around the quarry. At present situation/area is not making external OB dumping, internal OB dumping during 2013-14 is 0.091 MM<sup>3</sup> . All the dumps are located within 0.5 Km distance from the working quarry. Characteristics of the overburden is sand stone and shale band mostly, OB dumps can be seen in the surface plan enclosed. some of the OB dumps will be disturbed again for mining of lower Bermo seam. Half of the abundant quarry has been filled by OB and massive plantation was carried out. Massive plantation is proposed in next year. Slope of the reclaimed dumps is 1 in 1 . Working collieries surrounding this project are Bermo mine, Kargali colliery etc. Coal mining is the prime, industry of the region. These developments have influenced various environmental attributes e.g. air and water quality, noise level, Socio-economic profile, land use pattern etc.

#### **1.2 LOCATION:**

The project comes under Bokaro & Kargali area of Central Coalfields Ltd. Total area of the block is about 7 Sq. Km. The colliery is connected by Fair Weather Road with Bermo Hazaribagh road. The nearest railway station is Bermo on Gomoh-Barkakana loop line of Eastern Railway.

#### **1.3 MINING METHOD:**

Considering the geo-mining condition of the deposit namely

- (i) Moderate gradient (7-9),
- (ii) Volume of Ob during 2013-14 is 0.091 MM<sup>3</sup>
- (iii) Short life of the project: The shovel-dumper system of mining is applied. Drilling blasting operation for loosening of coal and overburden is necessary before excavation by shovel.

#### **1.4 Drainage pattern:**

There are control sumps in the pit. This acts as sedimentation lagoon for the sump water. A major portion of suspended solids are separated here before it is pumped out to natural drains, Godonallah flows on the western part of the quarry and Baidkaro nallah flows on the eastern part of the quarry. Sumps water is used for domestic purpose & partly used for dust suppression.

#### **ENVIRONMENT MONITORING RESULTS:-**

To assess the present status in respect of air, water, noise of the region on Environmental quality monitoring work was undertaken by CMPDI under request from CCL. The relevant parameter of air-water-noise pollutions were studied by CMPDI.

- i. Ambient air quality parameters are within prescribed limits.
- ii. Mine water quality parameters were within the limits prescribed under MOEF.
- iii. Noise level readings (LEQ) were also within the limit.



However the following materials are being consumed for O.B removal & Coal production

S.No.	name of raw material	Name of product	Consumption of raw material (Per unit of output)	
			During financial yr 2012-13	During financial yr 13-14
1	Explosive	Coal	0.62Kg/te	0.25Kg/te
2.	POL		0.18 Kg/te	0.16 Kg/te
3	HSD		1.76 lit/te	2.43 lit/te

**PART-C**

**POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT**

**(PARAMETERS/SPECIFIED IN THE CONSENT ISSUED)**

POLLUTION	Quantity of pollution generated	Percentage variation from prescribed standards with reasons
Water	The analysis results are given in Annexure	The analysis results reveal that most of the parameters are below permissible limits prescribed by MoEF as General Standards for Class 'A' effluent (Effluent discharged into land surface water.)
Air	It is difficult to quantify the amount of air pollutants. The main air pollutant is suspended particulate matter (SPM). The air quality results are appended in Annexure.	Ambient air quality results show that values were within prescribed limits.
Noise	The high noise in mining areas owes its origin in and around excavation and material handling sites. There is no continuous sound frequency of impulsive nature. Ambient Noise Quality reports are appended as Annexure.	Noise quality reports show the results are within permissible limits.

**PART-D**

**HAZARDOUS WASTES**

( As specified under Hazardous Waste Management and handling Rules 1989)

Hazardous Waste	Total Quantity	
	During financial year 2013-14	During financial year 2012-13
(a)From mining process	KL	0.58 Kl
(b)From materials handling system lities	12 V Battery,14 nos	12 Battery,10 nos

**PART-E**

**SOLID WASTES**

	Total quantity in million cubic metre	
	During financial 2013-14	During financial year 12-13
(a)From process	0.091 MM3	0.116 Mm3
(b)From pollution control facilities	Nil	Nil
©Quantity recycled of reutilised	During both financial year, the entire volume of Ob has been used for refilling the decoaled area of the quarry.	

**PART-F**

**PLEASE SPECIFY THE CHARACTERISTICS(IN TERMS OF CONCENTRATION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE THE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES.**

**HAZARDOUS WASTES**

1. Hazardous wastes is not being produced either from mining operation or from any pollution control facilities.
2. **SOLID WASTES.**
3. During opencast mining, overburden produced as soild wastes temporarily as these materials are used for reclamation. During the year 2013-14, 0.091 Million cubic meter of overburden was generated. The overburden material are more or less homogeneous comprising mainly shale, sand, silt and clay & gravel.
4. **DISPOSAL PRACTICE**
5. Presently the O.B material is being filled in de-coaled area of qually.

## **PART-G**

### **IMPACT OF POLLUTION CONTROL MEASURES ON CONSERVATION OF NATURAL RESOURCES AND CONSEQUENTLY ON COST OF PRODUCTION.**

In order to carry out mining in an eco-friendly manner, following pollution control measures have been Implemented.

#### **1.0 AIR POLLUTION CONTROL MEASURE.**

The following measures have been taken to control air pollution.

- (i) Regular sprinkling of water on haul road and other road.
- (ii) Water sprinkling on coal stock.
- (iii) Plantation along the vacant space.
- (iv) All necessary precautions will be taken during drilling ,blasting, loading & transporting operations.

#### **2.0 WATER POLLUTION CONTROL MEASURES.**

(I) The mine water is allowed to settle in sump before pumping to natural drains. Sump water is being utilized for water spraying on haul roads for dust suppression and for domestic purpose.

(ii)The catch drains have been constructed around the foot of the OB dumps in order to collect surface run off water from the dumps and convey them to the settling ponds.

(iii) A oil grease trap and settling ponds are proposed in the workshop to prevent water pollution.

(iv)Colony and other service building are provided with septic tanks and soak pits.

(v)A garland drain is provided around the quarry to collect the surface run off .This also prevent storm water to enter into the quarry area.

#### **3.0 NOISE POLLUTION CONTROL MEASURE.**

(i)Blasting operation is carried out between 1.00 PM to 3.00 P.M

(ii) Regulars maintenance of HEMMs and other equipment.

(iii)Use of HEMMs with sound proof cabin.

(v) Providing green belt around noise generating centers.

#### **4.0 MEASURES FOR RECLAMATION OF LAND**

At present OB generated during mining is being used as refilling material in de coaled area of quarry. As soon as the dumps reaches to its final stage, it is proposal to start technical and biological

Reclamation of the dumps .At the end of mining operations, some de coaled area will remain empty, which would be used for storing rain water. The presence of such a water body will help in increasing the moisture content of soil of adjacent area and ultimately it would promote the growth of vegetation.

## **IMPACT OF POLLUTION CONTROL MEASURES ON COST OF PRODUCTION OF ENVIRONMENTAL MANAGEMENT.**

Consent fee, watercess etc. are regularly deposited. Expenditure in incurred on monitoring and other pollution control measures.

### **PART-H**

#### **ADDITIONAL INVESTMENT PROPOSAL FOR ENVIRONMENTAL/MENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION**

Additional investment proposal has not been finalized yet.However,it is proposed to construct an effluent treatment plant for workshop effluent and plantation in vacant spaces.Other investment proposals are:

- (i) The environmental monitoring of the project will be continued quarterly as per the guidelines of Ministry of Environment & Forests(MoEF).
- (ii) Environmental statement report will be prepared or each financial year ending 31<sup>st</sup> march.
- (iii) The air & water consent will be taken from Jharkhand State Pollution Control Board,Ranchi each year.

### **Part-I**

#### **ANY OTHER PARTICULARS IN RESPECT OF ENVIRONMENTAL PROTECTION AND ABATEMENT OF POLLUTION.**

The major problem of environmental control of Bokaro OCP.

- Management of solid wastes in form of O.B dumps.
- Treatment and disposal of mine effluents including dump lechates
- Control of mine fire.
- Creation of green cover of OB dumps,fire control area and around residential area .
- Treatment of workshop effluent



## TEST REPORT

Job No. : 094313025 Date of Issue: 15/07/13  
 Name of the Customer : CCL  
 Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13  
 Sample Description : Air  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 01/07/13 Date of performance of Test: 01/07/13 to 15/07/13

### TEST RESULT

The sample has been tested with the following results:-

**Area** : *B&K* **Year** 2013  
**Project** : *Bokaro OCP* **Quarter Ending June** '2013

**Name of the Sampling Station** *Hind Strip Colony*

Date of Sampling	SPM	RPM	SO2	NOx	Remarks
24/06/2013 - 25/06/2013	297	99	11	38	

**Name of the Sampling Station** *Rest House*

Date of Sampling	SPM	RPM	SO2	NOx	Remarks
24/06/2013 - 25/06/2013	226	126	10	39	

**Name of the Sampling Station** *Gandhinagar Colony*

Date of Sampling	SPM	RPM	SO2	NOx	Remarks
24/06/2013 - 25/06/2013	271	124	11	43	

**Analysed By**

**Checked By**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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- Note:
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## TEST REPORT

Job No. : 094313025 Date of Issue: 01/07/13  
 Name of the Customer : CCL  
 Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13  
 Sample Description : Noise  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 01/07/13 Date of performance of Test: -

### TEST RESULT

The sample has been tested with the following results:-

Area : **B&K** Year 2013  
 Project : **Bokaro OCP** Quarter Ending June '2013

**Sampling Stations**  
 1 Hindstrip Colony  
 2 Rest House

Station Name	Date of Sampling	Noise Level
Hindstrip Colony	24/06/2013	50.6
Rest House	24/06/2013	48.3

Permissible Limit of Noise Level vide Gazette Notification G.S.R. 742(E) Dt. 25th Sep '2K

Noise Level	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM
	Leq 75 dB(A)	Leq 70 dB(A)

Checked By

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025 Date of Issue: 15/07/13  
 Name of the Customer : CCL

Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13  
 Sample Description : Effluent Water  
 Product Specification (BIS) : MoEF Sch VI Class 'a' std.  
 Test Required : 26 items as per MoEF Sch VI Class 'a' std.  
 Date of receipt of sample : 01/07/13 Date of performance of Test: 01/07/13 to 15/07/13

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** 2013  
**Project** : **Bokaro OCP** **Quarter Ending June** '2013

**Sampling Stations** 1 Lagoon Discharge 26-June-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

SI.No.	Parameter	Sampling Stations			Below Detection Limit	MOEF -SCH-VI STANDARDS	Remarks
		1	2	3			
1	Colour & Odour	Acceptable			-	Acceptable	
2	Total Suspended Solids	32			5.00	100.0	
3	pH value	8.14			0.01	5.5 to 9.0	
4	Temperature (°C)	25.9			-	Shall not exceed 5 C above the receiving temp.	
5	Oil & Grease	BDL			1.00	10.0	
6	Total Residual Chlorine	BDL			0.04	1.0	
7	Ammonical Nitrogen	0.20			0.02	50.0	
8	Total Kjeldahl Nitrogen	2.40			0.02	100.0	
9	Free Ammonia	BDL			0.02	5.0	
10	B.O.D (3 days 27°C)	1.00			1.00	30.0	
11	COD	40			5.00	250.0	
12	Arsenic	BDL			0.01	0.2	
13	Lead	BDL			0.05	0.1	
14	Hexavalent Chromium	BDL			0.01	0.1	
15	Total Chromium	0.13			0.10	2.0	
16	Copper	0.04			0.02	3.0	
17	Zinc	0.02			0.02	5.0	
18	Selenium	BDL			0.01	0.05	
19	Nickel	BDL			0.10	3.0	
20	Fluoride	0.35			0.05	2.0	
21	Dissolved Phosphate	0.18			0.01	5.0	
22	Sulphide	0.03			0.01	2.0	
23	Phenolic Compounds	BDL			0.001	1.0	
24	Manganese	BDL			0.05	2.0	
25	Iron	BDL			0.05	3.0	
26	Nitrate Nitrogen	2.2			0.01	10.0	

**Analysed By**

**Checked By**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025  
 Name of the Customer : CCL

Date of Issue: 15/07/13

Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13

Sample Description : Surface Water

Product Specification (BIS) : IS: 2296 Inland Surface Water Class 'C'

Test Required : 18 items as per IS: 2296

Date of receipt of sample : 01/07/13

Date of performance of Test: 01/07/13 to 15/07/13

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** 2013  
**Project** : **Bokaro OCP** **Quarter Ending June** '2013

**Sampling Stations** 1 Goda Nala before Damodar 26-June-13  
 2 Damodar before Goda Nala 26-June-13  
 3 Damodar after Goda Nala 26-June-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

Sl.No.	Parameter	Sampling Stations			Below Detection Limit	IS : 2296 INLAND SURFACE WATER [1982] Class 'C'	Remarks
		1	2	3			
1	Colour, Hazen unit,Max	16	18	24	1.00	300	
2	Total Suspended Solids	88	114	184	5.00	\$	
3	Disolved Oxygen	4.70	5.10	4.90	0.10	4	
4	pH value	8.12	8.22	8.35	0.01	6.5-8.5	
5	Iron	0.06	BDL	BDL	0.05	5	
6	Chlorides	24	24	30	0.25	600	
7	BOD (3 days 27°C)	2.80	2.70	2.90	1.00	3	
8	Total Dissolved Solids	182	194	232	1.00	1500	
9	Copper	0.04	0.04	0.04	0.02	1.5	
10	Sulphate	48	46	48	1.00	400	
11	Nitrate	5.75	10.18	10.63	0.01	50	
12	Fluoride	0.43	0.35	0.38	0.05	1.5	
13	Selenium	BDL	BDL	BDL	0.01	0.05	
14	Arsenic	BDL	BDL	BDL	0.01	0.2	
15	Lead	BDL	BDL	BDL	0.05	0.1	
16	Zinc	0.10	0.08	0.03	0.02	15	
17	Hexavalent Chromium	BDL	BDL	BDL	0.01	0.05	
18	Phenolics	BDL	BDL	BDL	0.001	0.005	

*Class-C: Tolerance Limit for surface water used for drinking water source with conventional treatment followed by disinfection*

*\$ represents limits not specified*

**Analysed By**

**Checked By**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025 Date of Issue: 07/10/13  
 Name of the Customer : CCL  
 Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13  
 Sample Description : Air  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 23/09/13 Date of performance of Test: 23/09/13 to 07/10/13

### TEST RESULT

The sample has been tested with the following results:-

Area : **B&K** Year 2013  
 Project : **Bokaro OCP** Quarter Ending Sept. '2013

**Name of the Sampling Station** *Hind Strip Colony*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
13/09/2013 - 14/09/2013	100	62	<25	20	

**Name of the Sampling Station** *Rest House*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
16/09/2013 - 17/09/2013	115	94	<25	19	

**Name of the Sampling Station** *Gandhinagar Colony*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
16/09/2013 - 17/09/2013	87	47	<25	20	

Analysed By

Checked By

G.M (Chemist)  
 Env. Lab, CMPDI(HQ)  
 (Authorized Signatory)

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## TEST REPORT

Job No. : 094313025 Date of Issue: 23/09/13  
 Name of the Customer : CCL

Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13  
 Sample Description : Noise  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 23/09/13 Date of performance of Test: -

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** 2013  
**Project** : **Bokaro OCP** **Quarter Ending Sept.** '2013

**Sampling Stations**

- 1 Hindstrip Colony
- 2 Rest House

Station Name	Date of Sampling	Noise Level
Hindstrip Colony	13/09/2013	49.2
Rest House	16/09/2013	47.9

*Permissible Limit of Noise Level vide Gazette Notification G.S.R. 742(E) Dt. 25th Sep '2K*

	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM
Noise Level	Leq 75 dB(A)	Leq 70 dB(A)

**Checked By**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025  
 Name of the Customer : CCL

Date of Issue: 04/10/13

Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13

Sample Description : Effluent Water

Product Specification (BIS) : MoEF Sch VI Class 'a' std.

Test Required : 27 items as per MoEF Sch VI Class 'a' std.

Date of receipt of sample : 23/09/13 Date of performance of Test: 23/09/13 to 04/10/13

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K**  
**Project** : **Bokaro OCP**

**Year** : 2013  
**Quarter Ending Sept.** : '2013

Sampling Stations 1 Lagoon Discharge

19-Sept-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

Sl.No.	Parameter	Sampling Stations			Below Detection Limit	MOEF -SCH-VI STANDARDS	Remarks
		1	2	3			
1	Colour & Odour	Acceptable			5.0 Cannot be quantified	Acceptable	
2	Total Suspended Solids	64			25.00	100.0	
3	pH value	7.94			0.01	5.5 to 9.0	
4	Temperature (°C)	25.3			-	Shall not exceed 5 C above the receiving temp.	
5	Oil & Grease	2.00			2.00	10.0	
6	Total Residual Chlorine	BDL			0.02	1.0	
7	Ammonical Nitrogen	0.24			0.01	50.0	
8	Total Kjeldahl Nitrogen	2.50			1.00	100.0	
9	Free Ammonia	BDL			0.01	5.0	
10	B.O.D (3 days 27°C)	2.00			2.00	30.0	
11	COD	70			4.00	250.0	
12	Arsenic	BDL			0.005	0.2	
13	Lead	BDL			0.005	0.1	
14	Cadmium	BDL			0.0005	2.0	
15	Hexavalent Chromium	BDL			0.01	0.1	
16	Total Chromium	BDL			0.06	2.0	
17	Copper	BDL			0.03	3.0	
18	Zinc	BDL			0.01	5.0	
19	Selenium	BDL			0.005	0.05	
20	Nickel	BDL			0.10	3.0	
21	Fluoride	0.42			0.02	2.0	
22	Dissolved Phosphate	BDL			0.30	5.0	
23	Sulphide	0.005			0.005	2.0	
24	Phenolic Compounds	BDL			0.002	1.0	
25	Manganese	BDL			0.02	2.0	
26	Iron	BDL			0.06	3.0	
27	Nitrate Nitrogen	1.5			0.50	10.0	

Analysed By

Checked By

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025  
 Name of the Customer : CCL

Date of Issue: 04/10/13

Customer Letter Ref. No. (if any): CCL/Env-Monitoring/13-14/ 2013/823-828 dt. 16/05/13

Sample Description : Surface Water

Product Specification (BIS) : IS: 2296 Inland Surface Water Class 'C'

Test Required : 19 items as per IS: 2296

Date of receipt of sample : 23/09/13

Date of performance of Test: 23/09/13 to 04/10/13

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K**  
**Project** : **Bokaro OCP**

**Year** : 2013  
**Quarter Ending Sept.** : '2013

**Sampling Stations** 1 Goda Nala before Damodar  
 2 Damodar before Goda Nala  
 3 Damodar after Goda Nala

19-Sept-13

19-Sept-13

19-Sept-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

SI.No.	Parameter	Sampling Stations			Below Detection Limit	IS : 2296 INLAND SURFACE WATER [1982] Class 'C'	Remarks
		1	2	3			
1	Colour, Hazen unit,Max	20	18	24	5.0	300	
2	Total Suspended Solids	38	58	76	25.00	\$	
3	Disolved Oxygen	4.80	5.20	4.80	0.10	4	
4	pH value	8.12	8.05	8.24	0.01	6.5-8.5	
5	Iron	BDL	BDL	BDL	0.06	5	
6	Chlorides	26	28	20	2.00	600	
7	BOD (3 days 27°C)	3.00	2.40	2.80	2.00	3	
8	Total Dissolved Solids	198	236	174	25.00	1500	
9	Copper	BDL	BDL	BDL	0.03	1.5	
10	Sulphate	42	44	32	2.00	400	
11	Nitrate	9.30	9.74	8.86	0.50	50	
12	Fluoride	0.37	0.40	0.45	0.02	1.5	
13	Cadmium	BDL	BDL	BDL	0.0005	0.01	
14	Selenium	BDL	BDL	BDL	0.005	0.05	
15	Arsenic	BDL	BDL	BDL	0.005	0.2	
16	Lead	BDL	BDL	BDL	5.00	0.1	
17	Zinc	BDL	BDL	BDL	0.01	15	
18	Hexavalent Chromium	BDL	BDL	BDL	0.01	0.05	
19	Phenolics	BDL	BDL	BDL	0.002	0.005	

*Class-C: Tolerance Limit for surface water used for drinking water source with conventional treatment followed by disinfection  
 \$ represents limits not specified*

**Analysed By**

**Checked By**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

B&k - 12

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**TEST REPORT**

Job No. : 094313025 Date of Issue: 17/01/14  
 Name of the Customer : CCL  
 Customer Letter Ref. No. (if any): CCL/DGM-HOD(E&F)/2013/1570 Dt. 22/11/13  
 Sample Description : Air  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 02/01/14 Date of performance of Test: 02/01/14 to 17/01/14

**TEST RESULT**

The sample has been tested with the following results:-

Area : **B&K** Year 2013  
 Project : **Bokaro OCP** Quarter Ending Dec. '2013

All parameters are in  $\mu\text{g}/\text{m}^3$

**Name of the Sampling Station** *Hind Strip Colony*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
26/12/2013 - 27/12/2013	271	212	<25	23	

**Name of the Sampling Station** *Rest House*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
26/12/2013 - 27/12/2013	419	129	<25	22	

**Name of the Sampling Station** *Gandhinagar Colony*

Date of Sampling	SPM	RPM	SO <sub>2</sub>	NO <sub>x</sub>	Remarks
26/12/2013 - 27/12/2013	234	162	<25	23	

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G.M (Chemist)  
 Env. Lab, CMPDI(HQ)  
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## TEST REPORT

Job No. : 094313025 Date of Issue: 02/01/14  
 Name of the Customer : CCL

Customer Letter Ref. No. (if any): CCL/DGM-HOD(E&F)/2013/1570 Dt. 22/11/13  
 Sample Description : Noise  
 Product Specification (BIS) : Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Test Required : As per Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept.'2000  
 Date of receipt of sample : 02/01/14 Date of performance of Test: -

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** 2013  
**Project** : **Bokaro OCP** **Quarter Ending Dec.** '2013

**Sampling Stations**

- 1 Hindstrip Colony
- 2 Rest House

Station Name	Date of Sampling	Noise Level
Hindstrip Colony	26/12/2013	49.3
Rest House	27/12/2013	47.6

*Permissible Limit of Noise Level vide Gazette Notification G.S.R. 742(E) Dt. 25th Sep '2K*

	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM
Noise Level	Leq 75 dB(A)	Leq 70 dB(A)

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**B&K - 10**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025 Date of Issue: 10/01/14  
 Name of the Customer : CCL

Customer Letter Ref. No. (if any): CCL/DGM-HOD(E&F)/2013/1570 Dt. 22/11/13  
 Sample Description : Effluent Water  
 Product Specification (BIS) : MoEF Sch VI Class 'a' std.  
 Test Required : 27 items as per MoEF Sch VI Class 'a' std.  
 Date of receipt of sample : 02/01/14 Date of performance of Test: 02/01/14 to 10/01/14

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** : 2013  
**Project** : **Bokaro OCP** **Quarter Ending Dec.** : '2013

**Sampling Stations** 1 Lagoon Discharge 30-Dec-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

Sl.No.	Parameter	Sampling Stations			Below Detection Limit	MOEF -SCH-VI STANDARDS	BIS Standard	Method
		1	2	3				
1	Colour & Odour	Acceptable			5.0 Cannot be quantified	Acceptable	APHA, 22 <sup>nd</sup> Edition IS 3025 /05:1983	Pt.Cobalt Physical, Qualitative
2	Total Suspended Solids	58			25.00	100.0	IS-3025/17:1984	Gravimetric
3	pH value	8.08			0.01	5.5 to 9.0	IS-3025/11:1983	Electrometric
4	Temperature (°C)	18.9			5.0	Shall not exceed 5 C above the receiving temp.	IS-3025/09:1984	Thermometric
5	Oil & Grease	BDL			2.00	10.0	IS-3025/39:1991	Partition Gravimetric
6	Total Residual Chlorine	BDL			0.02	1.0	APHA, 22 <sup>nd</sup> Edition	DPD
7	Ammonical Nitrogen	0.22			0.01	50.0	IS:3025/34:1988	Nessler's
8	Total Kjeldahl Nitrogen	2.30			1.00	100.0	IS:3025/34:1988	Nessler's
9	Free Ammonia	BDL			0.01	5.0	IS:3025/34:1988	Nessler's
10	B.O.D (3 days 27°C)	2.00			2.00	30.0	IS-3025/44:1993	3 day incubation at 27°C
11	COD	60			4.00	250.0	IS-3025/58:2006	Titration
12	Arsenic	BDL			0.005	0.2	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
13	Lead	BDL			0.005	0.1	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
14	Cadmium	BDL			0.0005	2.0	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
15	Hexavalent Chromium	BDL			0.01	0.1	APHA, 22 <sup>nd</sup> Edition	Diphenylcarbohydrazide
16	Total Chromium	BDL			0.06	2.0	IS-3025/52:2003	AAS-Flame
17	Copper	BDL			0.03	3.0	IS-3025/42:1992	AAS-Flame
18	Zinc	BDL			0.01	5.0	IS-3025/49:1994	AAS-Flame
19	Selenium	BDL			0.005	0.05	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
20	Nickel	BDL			0.10	3.0	IS-3025/54:2003	AAS-Flame
21	Fluoride	0.38			0.02	2.0	APHA, 22 <sup>nd</sup> Edition	SPADNS
22	Dissolved Phosphate	BDL			0.30	5.0	APHA, 22 <sup>nd</sup> Edition	Molybdovanadate
23	Sulphide	0.006			0.005	2.0	APHA, 22 <sup>nd</sup> Edition	Methylene Blue
24	Phenolic Compounds	BDL			0.002	1.0	APHA, 22 <sup>nd</sup> Edition	4-Amino Antipyrine
25	Manganese	BDL			0.02	2.0	APHA, 22 <sup>nd</sup> Edition	AAS-Flame
26	Iron	BDL			0.06	3.0	IS-3025/53:2003	AAS-Flame
27	Nitrate Nitrogen	2.0			0.50	10.0	APHA, 22 <sup>nd</sup> Edition	UV Spectrophotometric

**Analysed By**

**Checked By**

**B&K – 11**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

Job No. : 094313025 Date of Issue: 10/01/14  
 Name of the Customer : CCL

Customer Letter Ref. No. (if any): CCL/DGM-HOD(E&F)/2013/1570 Dt. 22/11/13  
 Sample Description : Surface Water  
 Product Specification (BIS) : IS: 2296 Inland Surface Water Class 'C'  
 Test Required : 19 items as per IS: 2296  
 Date of receipt of sample : 02/01/14 Date of performance of Test: 02/01/14 to 10/01/14

### TEST RESULT

The sample has been tested with the following results:-

**Area** : **B&K** **Year** : 2013  
**Project** : **Bokaro OCP** **Quarter Ending Dec.** : '2013

**Sampling Stations** 1 Goda Nala before Damodar 30-Dec-13  
 2 Damodar before Goda Nala 30-Dec-13  
 3 Damodar after Goda Nala 30-Dec-13

*All parameter are in mg/l unless specified*

*BDL - Below Detectable Limit*

Sl.No.	Parameter	Sampling Stations			Below Detection Limit	IS : 2296 INLAND SURFACE WATER [1982] Class 'C'	BIS Standard	Method
		1	2	3				
1	Colour, Hazen unit,Max	18	14	18	5.0	300	APHA, 22 <sup>nd</sup> Edition	Platinum Cobalt
2	Total Suspended Solids	40	54	68	25.00	\$	IS-3025/17:1984	Gravimetric
3	Disolved Oxygen	4.60	5.10	4.90	0.10	4	IS-3025/38:1989	Winkler Azide
4	pH value	8.02	7.98	8.10	0.01	6.5-8.5	IS-3025/11:1983	Electrometric
5	Iron	BDL	BDL	BDL	0.06	5	IS-3025/53:2003	AAS-Flame
6	Chlorides	24	28	30	2.00	600	IS-3025/32:1988	Argentometric
7	BOD (3 days 27°C)	3.00	2.40	2.80	2.00	3	IS-3025/44:1993	3 day incubation at 27°C
8	Total Dissolved Solids	194	232	178	25.00	1500	IS-3025/16:1984	Gravimetric
9	Copper	BDL	BDL	BDL	0.03	1.5	IS-3025/42:1992	AAS-Flame
10	Sulphate	26	22	24	2.00	400	APHA, 22 <sup>nd</sup> Edition	Turbidity
11	Nitrate	5.75	6.20	6.64	0.50	50	IS-3025/34:1988	Nessler's
12	Fluoride	0.33	0.38	0.42	0.02	1.5	APHA, 22 <sup>nd</sup> Edition	SPADNS
13	Cadmium	BDL	BDL	BDL	0.0005	0.01	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
14	Selenium	BDL	BDL	BDL	0.005	0.05	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
15	Arsenic	BDL	BDL	BDL	0.005	0.2	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
16	Lead	BDL	BDL	BDL	0.005	0.1	APHA, 22 <sup>nd</sup> Edition	AAS-GTA
17	Zinc	BDL	BDL	BDL	0.01	15	IS-3025/49:1994	AAS-Flame
18	Hexavalent Chromium	BDL	BDL	BDL	0.01	0.05	APHA, 22 <sup>nd</sup> Edition,	Diphenylcarboh ydrazide
19	Phenolics	BDL	BDL	BDL	0.002	0.005	APHA, 22 <sup>nd</sup> Edition	4-Amino Antipyrine

*Class-C: Tolerance Limit for surface water used for drinking water source with conventional treatment followed by disinfection  
 \$ represents limits not specified*

**Analysed By**

**Checked By**

**B&K – 12**

**G.M (Chemist)  
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## TEST REPORT

Lab No. T-2187	Job No. 094313025	Year	2013-14
Type of Sample:	Ambient Air	Quarter Ending	March '14
Customer / W. O. no. & Date:	CCL/DGM-HOD (E&F)/2013/ 1570 Dt. 22/11/13	Date of Receipt of Sample:	03.04.14
Mode of Receipt of Sample:	Jointly sampling with customer	Date of Analysis:	03.04.14-17.04.14
Sampling Protocol:	IS 5182 (part 14): 2000 ,R -2010, Methods for Measurement of Air Pollution	Date of Reporting:	17.04.14
Testing Protocol:	Gazette Notification no. G.S.R 742(E) dt.25 <sup>th</sup> Sept. '2000		
Remarks & Observation:	All samplers placed 1.5 m above ground level		

### TEST RESULT

The sample has been tested with the following results:-

**Area :** **B&K** **Project:** **Bokaro OCP**

**Stations:**

1. Hind Strip Colony	<b>Date of Sampling:</b> 26-27/03/2014
2. Rest House	26-27/03/2014
3. Gandhinagar Colony	27-27/03/2014
4.	

S.No	Test Parameters	Units	Test Method	TEST RESULT			
				1	2	3	4
Stations:							
1	Total Particulate Matter (PM <sub>10+</sub> >PM <sub>10</sub> )	µg/m <sup>3</sup>	Lab.SOP 4 based on – IS: 5182/23, 2006	278	463	577	
2	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	IS: 5182/23 2006	144	331	291	
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	IS: 5182 /02 2001 R-2006	<25	<25	<25	
4	Nitrogen Oxides (as NO <sub>x</sub> )	µg/m <sup>3</sup>	IS: 5182 /02 1975 R-1998	22	21	20	

**Note:** Gazette Notification no. G.S.R 742(E) dt.25<sup>th</sup> Sept. '2000 is enclosed along for reference

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**B&K - 9**

**G.M (Chemist)  
Env. Lab, CMPDI(HQ)  
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## TEST REPORT

<b>Lab No. T-2187</b>	<b>Job No. 094313025</b>	<b>Year</b>	<b>2013-14</b>
Type of Sample:	Noise	Quarter Ending	March '14
Customer / W. O. no. & Date:	CCL/DGM-HOD(E&F)/2013/ 1570 Dt. 22/11/13	Date of Receipt of Sample:	03.04.14
Mode of Receipt of Sample:	Jointly sampling with customer	Date of Analysis:	-
Testing Protocol:	Gazette Notification no. G.S.R 742(E) dt.25 <sup>th</sup> Sept.'2000	Date of Reporting:	-
Remarks:			

### TEST RESULT

The sample has been tested with the following results:-

**Area :** **B&K** **Project:** **Bokaro OCP**

**Stations:**

1. Hindstrip Colony
2. Rest House
- 3.
- 4.

Station Name	Date of Sampling	Noise Level
Hindstrip Colony	26/03/2014	48.4
Rest House	26/03/2014	47.5

*Permissible Limit of Noise Level vide Gazette Notification G.S.R. 742(E) Dt. 25th Sep '2K*

Noise Level	6.00 AM to 10.00 PM	10.00 PM to 6.00 AM
	Leq 75 dB(A)	Leq 70 dB(A)

**Checked By**

**B&K - 10**

**G.M (Chemist)**  
**Env. Lab, CMPDI(HQ)**  
**(Authorized Signatory)**

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## TEST REPORT

<b>Lab No. T-2187</b>	<b>Job No. 094313025</b>	<b>Year - 2013-14</b>	<b>2013-14</b>
Type of Sample:	<b>Effluent Water</b>	Quarter Ending	<b>March '14</b>
Customer / W. O. no. & Date:	CCL/DGM-HOD(E&F)/2013/ 1570 Dt. 22/11/13	Date of Receipt of Sample:	03.04.14
Mode of Receipt of Sample:	Picked up sample by laboratory	Date of Analysis:	03.04.14-14.04.14
Testing Protocol:	<b>MOEF -SCH-VI STANDARDS, Class 'A'</b>	Date of Reporting:	14.04.14
Remarks & Observation:	Samples received in 2 ltr plastic Jerri cane, Colour as observed is transparent		

### TEST RESULT

The sample has been tested with the following results:-

**Area :** **B&K** **Project:** **Bokaro OCP**  
**Stations:** **Date of Sampling:** 29/03/2014  
 1. Lagoon Discharge  
 2.  
 3.

Sl.No.	Parameter	Sampling Stations			Desirable Limits	MOEF -SCH-VI STANDARDS Class 'A'	BIS Standard & Method
		1	2	3			
1	Total Suspended Solids, mg/l, Max	48			25.00	100.0	IS 3025/17:1984, R :1996, Gravimetric
2	pH value	8.12			0.01	5.5 to 9.0	IS-3025/11:1983, R-1996, Electrometric
3	Temperature (°C)	25.0			5.0	Shall not exceed 5 C above the receiving temp.	IS-3025/09:1984, Thermometric
4	Oil & Grease, mg/l, Max	<2.00			2.00	10.0	IS 3025/39:1991, R : 2003, Partition Gravimetric
5	Total Residual Chlorine, mg/l, Max	<0.02			0.02	1.0	APHA, 22 <sup>nd</sup> Edition, DPD
6	Ammonical Nitrogen, mg/l, Max	0.12			0.01	50.0	IS 3025/34:1988, R : 2009, Nessler's
7	Total Kjeldahl Nitrogen, mg/l, Max	<1.00			1.00	100.0	IS:3025/34:1988, Nessler's
8	Free Ammonia, mg/l, Max	<0.01			0.01	5.0	IS:3025/34:1988, Nessler's
9	B.O.D (3 days 27°C), mg/l, Max	<2.00			2.00	30.0	IS 3025 /44:1993,R:2003 3 day incubation at 27°C
10	COD, mg/l, Max	56			4.00	250.0	APHA, 22 <sup>nd</sup> Edition, Closed Reflux, Titrimetric
11	Arsenic, mg/l, Max	<0.005			0.005	0.2	IS 3025/37:1988 R : 2003, AAS-VGA
12	Lead, mg/l, Max	0.03			0.005	0.1	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
13	Cadmium, mg/l, Max	0.001			0.0005	2.0	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
14	Hexavalent Chromium, mg/l, Max	<0.01			0.01	0.1	APHA, 22 <sup>nd</sup> Edition, Diphenylcarbohydrazide
15	Total Chromium, mg/l, Max	<0.06			0.06	2.0	IS-3025/52:2003, AAS-Flame
16	Copper, mg/l, Max	<0.03			0.03	3.0	IS 3025/42: 1992 R : 2009, AAS-Flame
17	Zinc, mg/l, Max	<0.01			0.01	5.0	IS 3025 /49 : 1994, R : 2009, AAS-Flame
18	Selenium, mg/l, Max	<0.005			0.005	0.05	APHA, 22 <sup>nd</sup> Edition, AAS-GTA
19	Nickel, mg/l, Max	<0.10			0.10	3.0	IS-3025/54:2003, AAS-Flame
20	Fluoride, mg/l, Max	0.72			0.02	2.0	APHA, 22 <sup>nd</sup> Edition, SPADNS
21	Dissolved Phosphate, mg/l, Max	<0.30			0.30	5.0	APHA, 22 <sup>nd</sup> Edition Molybdovanadate
22	Sulphide, mg/l, Max	<0.005			0.005	2.0	APHA, 22 <sup>nd</sup> Edition, Methylene Blue
23	Phenolic Compounds, mg/l, Max	<0.002			0.002	1.0	APHA, 22 <sup>nd</sup> Edition 4-Amino Antipyrine
24	Manganese, mg/l, Max	<0.02			0.02	2.0	IS-3025/59:2006, AAS-Flame
25	Iron, mg/l, Max	<0.06			0.06	3.0	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
26	Nitrate Nitrogen, mg/l, Max	2.2			0.50	10.0	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric

**Analysed By**

**Checked By**

**B&K – 11**

**G.M (Chemist)  
Env. Lab, CMPDI(HQ)  
(Authorized Signatory)**

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## TEST REPORT

<b>Lab No. T-2187</b>	<b>Job No. 094313025</b>	<b>Year - 2013-14</b>	<b>2013-14</b>
Type of Sample:	<b>Surface Water</b>	Quarter Ending	March '14
Customer / W. O. no. & Date:	CCL/DGM-HOD(E&F)/2013/ 1570 Dt. 22/11/13	Date of Receipt of Sample:	03.04.14
Mode of Receipt of Sample:	Picked up sample by laboratory	Date of Analysis:	03.04.14-14.04.14
Testing Protocol:	-	Date of Reporting:	14.04.14
Remarks & Observation:	Samples received in 2 ltr plastic Jerri cane, Colour as observed is transparent		

### TEST RESULT

The sample has been tested with the following results:-

<b>Area :</b>	<b>B&amp;K</b>	<b>Project:</b>	<b>Bokaro OCP</b>
<b>Stations:</b>	1. Goda Nala before Damodar 2. Damodar before Goda Nala 3. Damodar after Goda Nala 4.		<b>Date of Sampling:</b> 29/03/2014 29/03/2014 29/03/2014

Sl. No	Parameter	Sampling Stations				Desirable Limits	BIS Standard & Method
		1	2	3	4		
1	Total Suspended Solids, mg/l, Max	44	42	48		25.00	IS 3025 /17:1984, R :1996, Gravimetric
2	Disolved Oxygen, min.	4.80	6.40	5.80		0.10	IS 3025/381989, R : 2003, Winkler Azide
3	pH value	8.18	8.10	8.15		0.01	IS-3025/11:1983, R-1996, Electrometric
4	Iron, mg/l, Max	<0.06	<0.06	<0.06		0.06	IS 3025 /53 : 2003, R : 2009 , AAS-Flame
5	Chlorides, mg/l, Max	24	26	22		2.00	IS-3025/32:1988, R-2007, Argentometric
6	BOD (3 days 27°C), mg/l, Max	2.80	2.40	2.60		2.00	IS 3025 /44: 1993, R : 2003 3 day incubation at 27°C
7	Dissolved Solids, mg/l, Max	204	224	164		25.00	IS 3025 /16:1984 R : 2006, Gravimetric
8	Copper, mg/l, Max	<0.03	<0.03	<0.03		0.03	IS 3025 /42 : 1992 R : 2009, AAS-Flame
9	Sulphate, mg/l, Max	28	30	24		2.00	APHA, 22 <sup>nd</sup> Edition Turbidity
10	Nitrate , mg/l, Max	8.41	7.53	7.97		0.50	APHA, 22 <sup>nd</sup> Edition, UV-Spectrophotometric
11	Fluoride, mg/l, Max	0.44	0.48	0.55		0.02	APHA, 22 <sup>nd</sup> Edition SPADNS
12	Cadmium, mg/l, Max	<0.0005	0.001	<0.0005		0.0005	APHA, 22 <sup>nd</sup> Edition AAS-GTA
13	Selenium, mg/l, Max	<0.005	<0.005	<0.005		0.005	APHA, 22 <sup>nd</sup> Edition AAS-GTA
14	Arsenic, mg/l, Max	<0.005	<0.005	<0.005		0.005	IS 3025/37:1988 R : 2003, AAS-VGA
15	Lead, mg/l, Max	0.03	0.01	0.03		0.005	APHA, 22 <sup>nd</sup> Edition AAS-GTA
16	Zinc, mg/l, Max	<0.01	<0.01	<0.01		0.01	IS 3025 /49 : 1994, R : 2009, AAS-Flame
17	Hexavalent Chromium, mg/l, Max	<0.01	<0.01	<0.01		0.01	APHA, 22 <sup>nd</sup> Edition, 1,5 - Diphenylcarbohydrazide
18	Phenolics, mg/l, Max	<0.002	<0.002	<0.002		0.002	APHA, 22 <sup>nd</sup> Edition 4-Amino Antipyrine

**Analysed By**

**Checked By**

**B&K – 12**

**G.M (Chemist)  
Env. Lab, CMPDI(HQ)  
(Authorized Signatory)**

- Note: 1) This Report refers to the values obtained at the time of testing and results related to the items tested  
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 3) Liability for return of samples ceases as samples cannot be retained for retests.