



Dated: 23rd Nov, 2015

To  
The Additional PCCF,  
Ministry of Environment, Forest and Climate Change,  
Regional Office (ECZ),  
Bungalow No – A-2, Shyamali Colony,  
Ranchi – 834002,  
Tel- 0651-2410007, 2410002  
E-mail: [ro.ranchi-mef@gov.in](mailto:ro.ranchi-mef@gov.in)

**Sub: Submission of Half yearly Compliance Report of Environmental Clearance from MoEFCC vide letter Ref. No: J-11015/61/2006-IA-11(M) dated 19<sup>th</sup> June, 2006 and Environment Monitoring Report of Pre-monsoon and Monsoon (April, 2015 to Sept, 2015) for Kathautia Opencast Coal Mine (KOCCM), Hindalco Industries Ltd.**

- Ref:**
1. Environmental Clearance vide letter no J-11015/61/2006-IA.II(M) dated 19<sup>th</sup> June, 2006
  2. Transfer of EC in the name of Hindalco Industries Ltd from Prior Allotte (M/s UML) vide letter no- J-11015/61/2006-IA-II(M) dated 16<sup>th</sup> April, 2015

Dear Sir,

Please find enclosed herewith Half yearly Compliance Report of Environmental Clearance as well as Environment Monitoring Report of Pre-monsoon and Monsoon period (April, 2015 to Sept, 2015) as per condition stipulated in EC for Kathautia Opencast Coal Mine (KOCCM) of Hindalco Industries Ltd.

It is to mention that Kathautia Open cast coal mine is yet to <sup>commence</sup> operation.

Thanking You,

Yours' Sincerely,

*Pradeep Samanta*  
23.11.15  
(Pradeep Samanta),

Mines Manager, KOCCM



Encl:

1. Environment Monitoring Report (Annexure-I)
2. Compliance Report of EC (Annexure-II)
3. Transfer of EC in the name of Hindalco Industries Ltd (Annexure-III)
4. Copy of Environmental Clearance (Annexure-IV)

CC:

1. Dr. Rita Khanna,  
Director, Monitoring Cell,  
Ministry Of Environment, Forest & Climate Change,  
Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj,  
New Delhi- 110003
2. ✓ The Regional Officer,  
JSPCB, Qtr. No- E-1, C.T.I Colony,  
HEC, Sector-III, Durwa,  
Ranchi-834004
3. ✓ The Member Secretary, JSPCB,  
T.A. Building, Ground Floor,  
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Ranchi  
27-11-15

क्षेत्रीय कार्यालय  
डा. रा. प्र. नि. पर्वत  
टी.टी.आई. कलोनी, ब्ला. नं.-ई-1  
च.ई.सी., धुर्वा, राँची-834004

***Environmental Study of Kathautia Open  
Cast Coal Mines, Daltonganj, Palamau  
district, Jhrkhand***

**(PRE-MONSOON & MONSOON SEASON)  
(APRIL-SEPTEMBER, 2015)**

*Prepared  
for*

**HINDALCO INDUSTRIES LIMITED  
*Daltonganj, Palamau District  
Jharkhand***



*Prepared  
by*

**ENVIRONMENTAL MANAGEMENT GROUP  
CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH  
BARWA ROAD, DHANBAD - 826 015**

**(OCTOBER-2015)**

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**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH,  
DHANBAD**

**Report**

On

***Environmental Study of Kathautia Open Cast  
Coal Mines, Daltonganj, Palamau District,  
Jharkhand***

(Pre-monsoon & Monsoon Season)  
(April -September, 2015)

**Sponsored By**

***M/s Hindalco Industries Ltd.  
Daltonganj, Palamau District  
Jharkhand***

**October, 2015**

1. This report is meant for the internal use of your organisation only and it should not be published in full or part by your organisation or staff. It should not be communicated/circulated to outside parties except the concerned government department.
2. Central Institute of Mining and Fuel Research, Dhanbad reserves the right to publish the results of research for the benefit of the industry.

*KBSH  
29/10/15*  
**(K. B. Singh)  
(Head)  
Environmental Management Group**

*[Signature]*  
**(Gautam Chandra Mondal)  
(Project Leader)**

## **PROJECT PERSONNEL**

### **Project Co-coordinator**

Dr. K. B. Singh

### **Project Leader**

Dr. Gautam Chandra Mondal

### **Key Team Members**

Dr. T. B. Singh

Dr. Abhay Kr. Singh

Dr. Siddharth Singh

### **Team Members**

Mr. K. K. Singh

Mr. Digamber Kumar

Mr. A. S. Kumar

## **1.0 INTRODUCTION**

Mining is a site specific and ecologically sensitive industry. For sustaining national development, mining of coal and minerals is of paramount importance for developed as well as developing countries. To meet the energy requirements of the country, increased coal production has been possible due to large-scale surface mining activities. Surface mining causes environmental disturbance in the form of land degradation, removal of OB material stress on air and water regime and finally interferes in the balance of the ecosystem. To meet these problems, sound environmental management system for pre-mining, active mining and post mining stages in the form of Environmental Impact Assessment, Environmental Management Practice for concurrent mining and Environmental Audit has been made necessary by the regulating state and central authorities. Regular monitoring of the different components of environment is made necessary for evaluating the requirements of environmental management system and its impact in the society. This report presents such study conducted by CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for **Kathautia Open Cast Coal Mine** belonging to **M/S Hindalco Industries Ltd.**

### **i) LOCATION**

The lease area of KOCCM covers land in villages: Kathautia, Kajari, Garikhas, Palhekhurd, Sakhui, Sikka and Batsara in Patan CD Block of district Palamau (Jharkhand). Kathautia Open Cast Coal Mines (KOCCM), is located in southern boundary of the block is about 10 KM from Daltonganj. The project area is situated between the latitude  $24^{\circ} 07' 02''$  N and  $24^{\circ} 08' 52''$  N and longitude  $84^{\circ} 03' 42''$  E &  $84^{\circ} 06' 52''$  E. The site is well connected by road and 15 km away from Daltonganj. The project came into operation in the year 2008.

M/S Hindalco Industries Ltd; approached CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for doing the following work for one year i.e. 2015-2016.

- Environmental monitoring of Air, Water, Soil, Noise, Flora & fauna of the core and buffer zone.
- The Environmental monitoring will be conducted on seasonal basis.
- Preparation of Environmental Statement as stipulated in consent to operate of JSPCB.

The detailed studies with respect to air, water and noise will be carried on four times in the year 2015-16 while soil and dump samples, for the adjoining mining area, will be collected once in a year and analyzed in the CSIR-CIMFR laboratory.

## **2.0 (i) MINING SCENARIO**

At KOCCM, Pandwa Top & Rajhara B seams are being worked out by opencast mining with shovel and dumper combinations. Shovels of different capacities such as 3.0 cubic meters, 2.7 cubic meters and 2.1 cubic meters are used along with 25 T Volvo Dumpers.

The coal seams in this OCP are as follows:

- |       |                 |    |                       |
|-------|-----------------|----|-----------------------|
| (i)   | Rajhara A seam  | -> | 0.4 – 2.67 mts thick  |
| (ii)  | Rajhara B seam  | -> | 0.42 – 2.60 mts thick |
| (iii) | Pandwa Top seam | -> | 0.25 – 3.11 mts thick |

The average grade of coal is 'B' & 'D'. The open cast mine is worked by Shovel-Dumper combination with an average stripping ratio 1:9.66. OB is dumped outside the quarry during initial years. Till the bottom most seams are worked out and quarry benches advance sufficiently, backfilling will be allowed.

The working area by opencast method is having the seams Pandwa Top, Rajhara B & Rajhara A. The grades of coal of the seams are mostly found as B & D. The total Block area of this block is approximately 938.27 ha out of which, 687.93 ha is granted for Mining Lease.

## (ii) REGIONAL GEOLOGY

The Daltonganj coalfield occupies an elongated area of 250 sq km along a narrow east west trend north of Daltonganj ( $24^{\circ} 02' 00''$ ;  $84^{\circ} 04' 00''$ ) and falls between latitude  $24^{\circ} 00' 00''$  and  $24^{\circ} 12' 00''$  N and longitudes  $83^{\circ} 59' 00''$  and  $84^{\circ} 15' 00''$  E. However, the lower Gondwana coal seams underlie only 95 sq km, the Talchir Formation occupying the entire remaining area. Sequence of Karharbari seam is given below:-

### SEQUENCE OF KARHARBARI COAL SEAMS, DALTONGANJ COALFIELD

S. N.	Particulars	Thickness range (meters)
1	<i>Major coal seams</i>	
	a) Top cover over Rajhara A seam	10.25 – 44.75
	Rajhara A seam	0.4 – 2.67
	b) Parting cover over Rajhara B seam	4.20 – 15.30
	Rajhara B seam	0.42 – 2.60
	(c) Parting cover over Pandwa Top seam	4.70 – 13.87
	Pandwa Top seam	0.25 – 3.11
2	<i>Gradient of strata (degree)</i>	1 in 22.16 ( $2^{\circ} 35' 1.67''$ )
3	Category of excavation :	
	(a) Weathered rock (cat)	
	(b) Overburden rock (cat)	
	(c) Coal (cat)	



### 3.0 ENVIRONMENTAL SCENARIO IN THE MINING AREA

#### 3.1 AIR ENVIRONMENT

##### 3.1.1 SOURCES OF AIR POLLUTION

Coal transportation, OB removal, drilling, blasting, haul road and movements of mining equipments are the major sources of air pollution in the area. Generally, dust generation is of major concern. NO<sub>2</sub> is liberated in the time of blasting and during the movement of mining machineries. This coal contains very less sulphur and as such the concentration of SO<sub>2</sub>. In Indian coal, it is low, except Assam where sulphur content is high.

##### 3.1.2 METHODOLOGY & INSTRUMENTS USED:

The methodology and instruments used for air monitoring and analysis are given below:

**Table 1: Methodology and Instrument Used for Air Quality Analysis**

Parameters	Method	Instrument
PM <sub>2.5</sub>	IS-5182 (Part 23):2006 Gravimetric Method Beta attenuation Method	Fine Particulate Sampler
PM <sub>10</sub>	IS-5182 (Part 23):2006 Gravimetric Method Beta attenuation Method	Respirable Dust Sampler (RDS)
SO <sub>2</sub>	IS-5182 (Part 2):2001 (Improved West & Gaeke method)	RDS with gaseous attachment
NO <sub>x</sub>	IS-5182 (Part 6):2006 (Jacob & Hochheiser modified method)	RDS with gaseous attachment

##### 3.1.3 AIR QUALITY

Air quality monitoring in core and buffer zone of the Kathautia Open Cast mine has been carried out in Pre-monsoon season and Monsoon season for the year 2015 to assess the impact of mining activities on the ambient air quality. During the study, two sampling locations for ambient air quality had been fixed in buffer zone and three in core zone area. Details of sampling stations along with the source of air pollution are given in **Table 2**. The air quality at these locations is presented from **Table 3 and Table 6**. The

results show that the ambient air quality of the villages, in and around the mining site, is least affected as the mine is not in operation during the study period.

**Table 2: Details of Sampling Locations**

Stn. Code	Location	Source of Air Pollution
<b>CORE ZONE</b>		
CA <sub>1</sub>	Near Mine Site Office	Mining area, Kachha road, vehicular movement.
CA <sub>2</sub>	Near Haul Road	Mining area and vehicular movement.
CA <sub>3</sub>	Near Stockyard	Mining area and vehicular movement.
<b>BUFFER ZONE</b>		
BA <sub>1</sub>	Kajari Village	Household coal burning and vehicular movement, etc.
BA <sub>2</sub>	Batsara Village	Household coal burning and vehicular movement, etc.

**Table 3: Ambient Air Quality Report for Core Zone**

Sampling Code	Sampling Location	Date of Sampling	Parameters ( $\mu\text{g}/\text{m}^3$ )				Remarks
			PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>	
CA <sub>1</sub>	Near Mine Site Office	25-06-2015	59.1	76.2	14.6	23.9	
CA <sub>2</sub>	Near Haul Road	28-06-2015	34.1	60.4	12.7	20.9	
CA <sub>3</sub>	Near Stockyard	29-06-2015	37.4	68.2	13.2	20.5	
<b>Standards as per NAAQS-2009</b>			<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	

**Table 4: Ambient Air Quality Report for Buffer Zone**

Sampling Code	Sampling Location	Date of Sampling	Parameters ( $\mu\text{g}/\text{m}^3$ )				Remarks
			PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>	
BA <sub>1</sub>	Kajari Village	27-06-2015	34.8	61.5	16.2	21.5	
BA <sub>2</sub>	Batsara Village	26-06-2015	48.3	67.4	16.7	22.1	
<b>Standards as per NAAQS-2009</b>			<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	

**Table 5: Ambient Air Quality Report for Core Zone**

Sampling Code	Sampling Location	Date of Sampling	Parameters ( $\mu\text{g}/\text{m}^3$ )				Remarks
			PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>	
CA <sub>1</sub>	Near Mine Site Office	18-08-2015	52.1	65.2	15.2	28.9	
CA <sub>2</sub>	Near Haul Road	19-08-2015	31.1	58.4	12.7	25.9	
CA <sub>3</sub>	Near Stockyard	20-08-2015	32.4	61.2	13.2	26.5	
Standards as per NAAQS-2009			60	100	80	80	

**Table 6: Ambient Air Quality Report for Buffer Zone**

Sampling Code	Sampling Location	Date of Sampling	Parameters ( $\mu\text{g}/\text{m}^3$ )				Remarks
			PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>	
BA <sub>1</sub>	Kajari Village	20-08-2015	30.8	57.5	19.2	25.6	
BA <sub>2</sub>	Batsara Village	19-08-2015	44.3	61.4	16.7	27.4	
Standards as per NAAQS-2009			60	100	80	80	

### 3.1.4 RESULTS AND DISCUSSIONS

During pre-monsoon season (June, 2015), PM<sub>2.5</sub> concentration level at Near Mine Office in core zone is found 59.1  $\mu\text{g}/\text{m}^3$  and PM<sub>10</sub> is 76.2  $\mu\text{g}/\text{m}^3$ . At Haul Road concentration level of PM<sub>2.5</sub> and PM<sub>10</sub> are found 34.1  $\mu\text{g}/\text{m}^3$  and 60.4  $\mu\text{g}/\text{m}^3$  respectively. Near Stockyard concentration level of PM<sub>2.5</sub> is 37.4  $\mu\text{g}/\text{m}^3$  while PM<sub>10</sub> concentration level is 68.2  $\mu\text{g}/\text{m}^3$ . In the core zone the PM<sub>2.5</sub> values are within the threshold value i.e. 60  $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> as per the guideline of NAAQS around all the sampling sites during the monitoring period. The PM<sub>10</sub> values are within the threshold value i.e. 100  $\mu\text{g}/\text{m}^3$  for PM<sub>10</sub> as per the guideline of NAAQS around the entire sampling site also. Concentration of SO<sub>2</sub> and NO<sub>2</sub> are also found well within the limit of 80  $\mu\text{g}/\text{m}^3$  as per the guideline of

NAAQS in all the sampling sites of core zone of the mine. The PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> in the working zone of the mine are in lower in concentration. However, the mine is closed now.

During Pre-monsoon season (June, 2015), the PM<sub>2.5</sub> concentration at Kajari Village in buffer zone is observed 34.8 µg/m<sup>3</sup> and the concentration of PM<sub>10</sub> is 61.5 µg/m<sup>3</sup>. The PM<sub>2.5</sub> concentration at Batsara Village is found 48.3 µg/m<sup>3</sup> while the concentration of PM<sub>10</sub> is 67.4. In the buffer zone both the values are within the threshold value i.e. 60 µg/m<sup>3</sup> for PM<sub>2.5</sub> & 100 µg/m<sup>3</sup> for PM<sub>10</sub> as per the guideline of NAAQS. Concentration of SO<sub>2</sub> and NO<sub>2</sub> are also found within the limit 80 µg/m<sup>3</sup> as per the guideline of NAAQS in all the sampling sites of buffer zone of the mine.

During monsoon season (August, 2015), PM<sub>2.5</sub> concentration level at Near Mine Office in core zone is found 52.1 µg/m<sup>3</sup> and PM<sub>10</sub> is 65.2 µg/m<sup>3</sup>. At Haul Road concentration level of PM<sub>2.5</sub> and PM<sub>10</sub> are found 35.1 µg/m<sup>3</sup> and 58.4 µg/m<sup>3</sup> respectively. Near Stockyard concentration level of PM<sub>2.5</sub> is 38.4 µg/m<sup>3</sup> while PM<sub>10</sub> concentration level is 61.2 µg/m<sup>3</sup>. In the core zone the PM<sub>2.5</sub> values are within the threshold value i.e. 60 µg/m<sup>3</sup> for PM<sub>2.5</sub> as per the guideline of NAAQS around all the sampling sites during the monitoring period. The PM<sub>10</sub> values are within the threshold value i.e. 100 µg/m<sup>3</sup> for PM<sub>10</sub> as per the guideline of NAAQS around the entire sampling site also. Concentration of SO<sub>2</sub> and NO<sub>2</sub> are also found well within the limit of 80 µg/m<sup>3</sup> as per the guideline of NAAQS in all the sampling sites of core zone of the mine. The PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> in the working zone of the mine are in lower in concentration. However, the mine is closed now.

During monsoon season (August, 2015), the PM<sub>2.5</sub> concentration at Kajari Village in buffer zone is observed 30.8 µg/m<sup>3</sup> and the concentration of PM<sub>10</sub> is 57.5 µg/m<sup>3</sup>. The PM<sub>2.5</sub> concentration at Batsara Village is found 44.3 µg/m<sup>3</sup> while the concentration of PM<sub>10</sub> is 61.4 µg/m<sup>3</sup>. In the buffer zone both the values are within the threshold value i.e. 60 µg/m<sup>3</sup> for PM<sub>2.5</sub> & 100 µg/m<sup>3</sup> for PM<sub>10</sub> as per the guideline of NAAQS. Concentration of SO<sub>2</sub> and NO<sub>2</sub> are also found within the limit 80 µg/m<sup>3</sup> as per the guideline of NAAQS in all the sampling sites of buffer zone of the mine

## **3.2 WATER ENVIRONMENT**

### **3.2.1. SOURCES OF WATER POLLUTION**

#### **Mine Water**

No adverse impact on surface water is anticipated as the main surface water regime is not proposed to be disturbed except for the drainage having their catchment within the ML area. The mine water, which is mainly rain water & ground water seepage, is used for industrial purposes after settling in the settling pond and the balance released into Durgawati Nalla by which the downstream consumers are benefited. Since, the water is of good quality after settling, there are no any possibility of water pollution in the area.

#### **Domestic Effluents/Sewage**

There are minimum housing facilities within the ML area for essential services comprising about 100 inhabitants. The domestic wastes from these houses are led to septic tanks. As the domestic waste water is minimum, the possibility of pollution is remote/insignificant. However, proper care has been taken up in the shelters area of inhabitants for sewage discharge.

### **3.2.2 INSTRUMENTS USED**

- a) pH and Conductivity meter
- b) Ion Meter,
- c) COD Analyser,
- d) BOD Analyser,
- e) Water Analysis Kit, (Hach, DR - 2000)
- f) UV-VIS Spectrophotometer (Simazdo)
- g) Atomic Absorption Spectrophotometer (Varian)
- h) Ion Chromatograph (Dionex)
- i) ICP-MS (Perkin Elmer)

### **3.2.3 WATER QUALITY OF THE AREA**

To assess the water quality of the area mine water, ground water and surface water were collected and analysed. During the lean periods, mine water is used for water spraying on haul roads, plantation and other mining activities. To assess the water quality of the area water samples from eight locations (mine pit water, Effluent water from Settling, tube well near mine office, Tube Well Water near Shelter, tube well water of Kajari village, tube well water of Batsara village and upstream as well as downstream of Koyal river water to the mine site) were collected during pre-monsoon and monsoon season. The analysis was carried out in the field as well as CSIR-CIMFR Laboratory and results are presented from **Table 7 to 12.**

Water quality of nearby well and tube well show that there is no significant impact of mining on water quality of region. TSS, TDS, Oil & Grease, COD, trace metals and other parameters are found within their respective threshold limits. Mine water quality also does not show any high value as it remains within the pit, where the contaminants settle before the mine water discharge. As far as river water is concerned, its quality shows its acceptability as is not affected by Kathautia mine effluents. The level of TSS, TDS and DO in the river water were found within threshold limit.

**Table 7: Mine Discharge Water Quality Data**

<b>Area: Core Zone</b>	<b>Season: Pre-monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 29.06.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>1</sub>- Mine Pit Water</b>	<b>W<sub>2</sub>- Effluent water from Settling Pond No.-2;</b>

Sl. No.	Parameters	Station Code		MoEF Sch.-VI Standard
		W <sub>1</sub>	W <sub>2</sub>	
1	Colour, Hazen units, Max	<5	<5	5
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable
3	Total suspended solids, mg/l, Max	42	39	100
4	pH	7.89	8.14	6.5-8.5
5	Temperature (°C)	27.1	27.4	§
6	Oil & Grease, mg/l, Max	1.4	0.7	10
7	Total Residual Chlorine, mg/l, Max	<0.1	<0.1	1.0
8	Ammonical Nitrogen, (as N) mg/l, Max	1.112	1.042	50
9	Total Kjeldahl Nitrogen, (as NH <sub>3</sub> ) mg/l, Max	1.021	1.041	100
10	Free Ammonia (as NH <sub>3</sub> ) mg/l, Max	0.102	0.112	5.0
11	BOD (3days at 27°C), mg/l, Max	1.2	5.8	30
12	COD, mg/l, Max	40.2	34.9	250
13	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001	<0.001	1.0
14	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.2
15	Lead (as Pb), mg/l, Max	<0.001	<0.001	0.1
16	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	2.0
17	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.003	0.002	0.1
18	Total Chromium (as Cr), mg/l, Max	0.004	0.004	2.0
19	Copper (as Cu), mg/l, Max	0.004	0.005	3.0
20	Zinc (as Zn), mg/l, Max	0.009	0.012	5.0
21	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.05
22	Nickel (as Ni), mg/l, Max	0.003	0.004	3.0
23	Fluorides (as F), mg/l, Max	0.62	1.11	2.0
24	Dissolved Phosphate (as P), mg/l, Max	<0.1	<0.1	5.0
25	Sulphide (as S), mg/l, Max	0.28	0.35	2.0
26	Manganese (as Mn), mg/l, Max	0.006	0.004	2.0
27	Iron (as Fe), mg/l, Max	0.22	0.14	3.0
28	Nitrate (as N), mg/l, Max	<0.01	<0.01	10

§: Temperature shall not exceed 5°C above the receiving water temp.

**Table 8: Ground Water Quality Data**

<b>Area: Core Zone/Buffer Zone</b>	<b>Season: Pre-monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 27.06.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>3</sub>- Tube Well Water Mine office;</b>	<b>W<sub>4</sub>- Tube Well Water near Shelter;</b>
<b>W<sub>5</sub>- Tube Well Water Kajari Village;</b>	<b>W<sub>6</sub>- Tube Well Water Batsara Village;</b>

Sl. No.	Parameters	Station Code				IS: 10500 (Desirable Limit)
		W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	
1	Colour, Hazen units, Max	<5	<5	<5	<5	5
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity, NTU, Max	1.26	1.48	1.89	1.28	5.0
5	pH	7.12	7.07	7.27	7.13	6.5-8.5
6	Total Hardness (as CaCO <sub>3</sub> )	267	222	179	68	300
7	Iron (as Fe), mg/l, Max	0.095	0.178	0.135	0.141	0.3
8	Chloride (as Cl <sup>-</sup> ), mg/l, Max	22.4	2.3	4.5	3.4	250
9	Total Dissolved Solid, mg/l, Max	549	368	325	212	500
10	Calcium (as Ca), mg/l, Max	64.9	64.1	50.6	18.7	75
11	Magnesium (as Mg), mg/l, Max	25.5	15.1	12.8	5.2	30
12	Manganese (as Mn), mg/l, Max	0.011	0.012	0.010	0.005	0.10
13	Sulphates (as SO <sub>4</sub> <sup>2-</sup> ), mg/l, Max	17.5	0.1	4.3	5.2	150
14	Nitrate (as NO <sub>3</sub> ), mg/l, Max	2.74	<0.01	6.21	17.56	45
15	Fluorides (as F), mg/l, Max	0.67	0.22	0.39	1.1	0.06-1.2
16	Boron (as B), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.5
17	Arsenic (as AS), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.05
18	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.01
19	Lead (as Pb), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.1
20	Copper (as Cu), mg/l, Max	<0.001	0.001	<0.001	<0.001	0.05
21	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.006	0.010	0.014	0.011	0.05
22	Selenium (as Se), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.01
23	Silver (as Ag), mg/l, Max	<0.001	<0.001	<0.001	<0.001	-
24	Zinc (as Zn), mg/l, Max	0.105	0.124	0.127	0.215	5
25	Alkalinity, mg/l, Max	302	201	212	134	200
26	Mineral Oil, mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.001
27	Coliform Organism (MPN/100ml)	Absent	Absent	Absent	Absent	Absent



**Table 9: Surface Water Quality Data**

<b>Area: Buffer Zone</b>	<b>Season: Pre-monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 27.06.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>7</sub>- Koyal River, U/S of Mine;</b>	<b>W<sub>8</sub>- Koyal River, D/S of Mine;</b>

Sl. No.	Parameters	Station Code		(IS: 2296)# Surface Waters Class "C" Tolerance Limits
		W <sub>7</sub>	W <sub>8</sub>	
1	Colour, Hazen units, Max	<5	<5	300
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable
3	Dissolved Oxygen, mg/l, Min.	6.3	5.8	4
4	pH	7.17	7.77	6.5-8.5
5	BOD (3days at 27°C), mg/l, Max	2.6	3.4	3
6	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001	<0.001	0.005
7	Total Hardness (as CaCO <sub>3</sub> ), mg/l, Max	63	76	NS
8	Iron (as Fe), mg/l, Max	0.24	0.29	50
9	Chloride (as Cl <sup>-</sup> ), mg/l, Max	3.75	7.76	600
10	Total Dissolved Solid, mg/l, Max	129	172	1500
11	Calcium (as Ca), mg/l, Max	16.3	19.2	NS
12	Magnesium (as Mg), mg/l, Max	5.5	6.8	NS
13	Manganese (as Mn), mg/l, Max	0.011	0.015	NS
14	Sulphates (as SO <sub>4</sub> <sup>-</sup> ), mg/l, Max	5.68	8.85	400
15	Nitrate (as NO <sub>3</sub> <sup>-</sup> ), mg/l, Max	3.43	0.17	50
16	Fluorides (as F), mg/l, Max	0.62	0.72	1.5
17	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.2
18	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.01
19	Lead (as Pb), mg/l, Max	0.006	0.012	0.1
20	Copper (as Cu), mg/l, Max	0.011	0.015	1.5
21	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.015	0.019	0.05
22	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.05
23	Zinc (as Zn), mg/l, Max	0.45	0.48	15
24	Coliform Organism (MPN/100ml)	22	26	5000

# : Class "C"- Drinking water source with conventional treatment followed by disinfection.  
NS: Not Specified

**Table 10: Mine Discharge Water Quality Data**

<b>Area: Core Zone</b>	<b>Season: Monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 20.08.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>1</sub>- Mine Pit Water</b>	<b>W<sub>2</sub>- Effluent water from Settling Pond No.-2;</b>

Sl. No.	Parameters	Station Code		MoEF Sch.-VI Standard
		W <sub>1</sub>	W <sub>2</sub>	
1	Colour, Hazen units, Max	<5	Sample not available	5
2	Odour	Unobjectionable		Unobjectionable
3	Total suspended solids, mg/l, Max	47		100
4	pH	8.17		6.5-8.5
5	Temperature (°C)	26.2		§
6	Oil & Grease, mg/l, Max	1.8		10
7	Total Residual Chlorine, mg/l, Max	<0.1		1.0
8	Ammonical Nitrogen, (as N) mg/l, Max	1.137		50
9	Total Kjeldahl Nitrogen, (as NH <sub>3</sub> ) mg/l, Max	1.052		100
10	Free Ammonia (as NH <sub>3</sub> ) mg/l, Max	0.098		5.0
11	BOD (3days at 27°C), mg/l, Max	1.8		30
12	COD, mg/l, Max	42.5		250
13	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001		1.0
14	Arsenic (as AS), mg/l, Max	<0.001		0.2
15	Lead (as Pb), mg/l, Max	<0.001		0.1
16	Cadmium (as Cd), mg/l, Max	<0.001		2.0
17	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.003		0.1
18	Total Chromium (as Cr), mg/l, Max	0.005		2.0
19	Copper (as Cu), mg/l, Max	0.005		3.0
20	Zinc (as Zn), mg/l, Max	0.012		5.0
21	Selenium (as Se), mg/l, Max	<0.001		0.05
22	Nickel (as Ni), mg/l, Max	0.004		3.0
23	Fluorides (as F), mg/l, Max	0.93		2.0
24	Dissolved Phosphate (as P), mg/l, Max	<0.1		5.0
25	Sulphide (as S), mg/l, Max	0.37		2.0
26	Manganese (as Mn), mg/l, Max	0.004		2.0
27	Iron (as Fe), mg/l, Max	0.20		3.0
28	Nitrate (as N), mg/l, Max	<0.01		10

§: Temperature shall not exceed 5°C above the receiving water temp.

**Table 11: Ground Water Quality Data**

<b>Area: Core Zone/Buffer Zone</b>	<b>Season: Monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 21.08.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>3</sub>- Tube Well Water Mine office;</b>	<b>W<sub>4</sub>- Tube Well Water near Shelter;</b>
<b>W<sub>5</sub>- Tube Well Water Kajari Village;</b>	<b>W<sub>6</sub>- Tube Well Water Batsara Village;</b>

Sl. No.	Parameters	Station Code				IS: 10500 (Desirable Limit)
		W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	
1	Colour, Hazen units, Max	<5	<5	<5	<5	5
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity, NTU, Max	1.42	1.65	1.92	1.40	5.0
5	pH	7.17	6.89	7.04	7.01	6.5-8.5
6	Total Hardness (as CaCO <sub>3</sub> )	247	220	160	202	300
7	Iron (as Fe), mg/l, Max	0.087	0.172	0.112	0.141	0.3
8	Chloride (as Cl <sup>-</sup> ), mg/l, Max	15.95	2.32	3.35	6.05	250
9	Total Dissolved Solid, mg/l, Max	497	409	326	384	500
10	Calcium (as Ca), mg/l, Max	61.8	63.1	46.5	55.0	75
11	Magnesium (as Mg), mg/l, Max	24.2	15.8	10.8	15.8	30
12	Manganese (as Mn), mg/l, Max	0.013	0.014	0.009	0.009	0.10
13	Sulphates (as SO <sub>4</sub> <sup>2-</sup> ), mg/l, Max	12.8	0.83	3.24	3.55	150
14	Nitrate (as NO <sub>3</sub> ), mg/l, Max	4.03	<0.01	4.21	10.26	45
15	Fluorides (as F), mg/l, Max	1.12	0.12	0.54	0.90	0.06-1.2
16	Boron (as B), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.5
17	Arsenic (as AS), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.05
18	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.01
19	Lead (as Pb), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.1
20	Copper (as Cu), mg/l, Max	<0.001	0.001	<0.001	<0.001	0.05
21	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.005	0.009	0.010	0.012	0.05
22	Selenium (as Se), mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.01
23	Silver (as Ag), mg/l, Max	<0.001	<0.001	<0.001	<0.001	-
24	Zinc (as Zn), mg/l, Max	0.097	0.104	0.112	0.225	5
25	Alkalinity, mg/l, Max	188	141	110	140	200
26	Mineral Oil, mg/l, Max	<0.001	<0.001	<0.001	<0.001	0.001
27	Coliform Organism (MPN/100ml)	Absent	Absent	Absent	Absent	Absent

**Table12: Surface Water Quality Data**

<b>Area: Buffer Zone</b>	<b>Season: Monsoon</b>
<b>Project: Kathautia OC Mine</b>	<b>Date of Sampling: 21.08.2015</b>
<b>Name of the Sampling Station:</b>	
<b>W<sub>7</sub> - Koyal River, U/S of Mine;</b>	<b>W<sub>8</sub> - Koyal River, D/S of Mine;</b>

Sl. No.	Parameters	Station Code		(IS: 2296)# Surface Waters Class "C" Tolerance Limits
		W <sub>7</sub>	W <sub>8</sub>	
1	Colour, Hazen units, Max	<5	<5	300
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable
3	Dissolved Oxygen, mg/l, Min.	6.2	5.6	4
4	pH	7.47	8.02	6.5-8.5
5	BOD (3days at 27°C), mg/l, Max	2.8	3.5	3
6	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), mg/l, Max	<0.001	<0.001	0.005
7	Total Hardness (as CaCO <sub>3</sub> ), mg/l, Max	35.9	59.3	NS
8	Iron (as Fe), mg/l, Max	0.20	0.29	50
9	Chloride (as Cl <sup>-</sup> ), mg/l, Max	2.88	5.99	600
10	Total Dissolved Solid, mg/l, Max	86	160	1500
11	Calcium (as Ca), mg/l, Max	9.3	14.9	NS
12	Magnesium (as Mg), mg/l, Max	3.1	5.4	NS
13	Manganese (as Mn), mg/l, Max	0.009	0.012	NS
14	Sulphates (as SO <sub>4</sub> <sup>2-</sup> ), mg/l, Max	2.78	6.64	400
15	Nitrate (as NO <sub>3</sub> ), mg/l, Max	1.13	1.37	50
16	Fluorides (as F), mg/l, Max	0.62	0.73	1.5
17	Arsenic (as AS), mg/l, Max	<0.001	<0.001	0.2
18	Cadmium (as Cd), mg/l, Max	<0.001	<0.001	0.01
19	Lead (as Pb), mg/l, Max	0.004	0.009	0.1
20	Copper (as Cu), mg/l, Max	0.010	0.012	1.5
21	Hexavalent Chromium (as Cr <sup>6+</sup> ), mg/l, Max	0.011	0.014	0.05
22	Selenium (as Se), mg/l, Max	<0.001	<0.001	0.05
23	Zinc (as Zn), mg/l, Max	0.40	0.45	15
24	Coliform Organism (MPN/100ml)	32	53	5000

# : Class "C"- Drinking water source with conventional treatment followed by disinfection.

### 4.3 NOISE ENVIRONMENT

Noise is undesirable and unpleasant sound produced by the vibration of bodies or molecules of the medium and propagates as a pressure perturbation. It disturbs man's work, sleep and communication. It damages hearing and evokes other physiological reactions. Mining is the third largest industry in terms of employment and the recent trends of mechanization has changed the working environment to noisy environment leading to higher sound levels.

#### 4.3.1 SOURCES OF NOISE

Noise produced at different levels by different equipments in the open cast mine are summarized in the **Table 13**.

**Table 13: Noise Generating Mining Equipments**

S. N.	Equipment / Operation	Noise level dB(A)
1	Feeder breaker	82-100
2	Dumpers	100-115
3	Shovels	80-107
4	Dozers	84-107
5	Front End loader	83-101
6	Electric motors, gear drivers, hoppers, drilling & main pump	85-95
7	Belt conveyer	90-92
8	Drill	110-115

Noise level study at Kathautia Open Cast Coal Mine was carried out in buffer as well as core zone. Five noise level monitoring locations in core zone and two noise level monitoring locations in buffer zone were fixed-up and get representative values during Pre-monsoon and monsoon seasons.

#### 4.3.2 INSTRUMENTS USED

Sound level study is carried by using Mip-oy Integrated Sound Level Meter Meeting IEC-179A measuring average peak and Low values in Day and Night time.

### 4.3.3 RESULTS & DISCUSSION

Results are shown from **Table 14 & Table 17** for ambient noise levels of core and buffer zones during pre-monsoon and monsoon seasons. The average peak values at the nearby villages are found well below the standard values of 55 & 45 dB (A) for day & Night. In core zone maximum noise levels and average noise levels are also well within the prescribed limit of 75 & 70 dB (A) for Day & Night respectively.

**Table 14: Noise Level in Core Zone of the Study Area during Pre-monsoon Season (June, 2015)**

Date of Sampling:		Noise level dB(A) average					
25.06.2015		Day Time			Night Time		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N <sub>1</sub>	Near Mine Office	41.9	64.5	53.4	36.4	55.2	45.1
N <sub>2</sub>	Coal Face	40.2	60.3	51.2	32.5	45.6	42.2
N <sub>3</sub>	Near OB dump	38.5	59.0	52.1	31.2	44.7	41.2
N <sub>4</sub>	Stockyard	37.2	64.0	50.4	32.5	45.2	41.4
N <sub>5</sub>	Haul Road	39.3	65.0	52.0	34.4	47.6	42.8
Standards as per CPCB		75			70		

**Table 15: Noise Level in Buffer Zone of the Study Area during Pre-monsoon Season (June, 2015)**

Date of Sampling:		Noise level dB(A) average					
26.06.2014		Day Time			Night Time		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N <sub>6</sub>	Kajari Village	36.6	60.5	52.1	31.2	44.5	41.8
N <sub>7</sub>	Batsara Village	42.8	62.8	53.4	30.6	45.7	42.5
Standards as per CPCB		55			45		

**Table 16: Noise Level in Core Zone of the Study Area during monsoon Season (August, 2015)**

Date of Sampling:		Noise level dB(A) average					
20.08.2015		Day Time			Night Time		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N <sub>1</sub>	Near Mine Office	40.5	62.5	51.5	32.5	53.6	43.5
N <sub>2</sub>	Coal Face	38.2	59.0	48.6	30.0	44.6	37.3
N <sub>3</sub>	Near OB dump	38.5	59.0	52.1	31.2	44.7	41.2
N <sub>4</sub>	Stockyard	36.0	62.0	49.4	32.5	45.2	41.4
N <sub>5</sub>	Haul Road	39.5	63.5	51.5	34.4	47.6	42.8
Standards as per CPCB		75			70		

**Table 17: Noise Level in Buffer Zone of the Study Area during monsoon Season (August, 2015)**

Date of Sampling:		Noise level dB(A) average					
21.08.2015		Day Time			Night Time		
Stn. Code	Location	Min.	Max.	Average	Min.	Max.	Average
N <sub>6</sub>	Kajari Village	36.0	60.1	48.05	31.2	40.0	35.6
N <sub>7</sub>	Batsara Village	42.8	60.8	51.8	30.6	41.6	36.1
Standards as per CPCB		55			45		

#### 4.0 CONCLUSION

On the basis of the data generated it has been found that the environmental scenario in and around mining area of Kathautia Open Cast Mine with respect to air, water and noise are well within the permissible limits.

#### 5.0 RECOMMENDATIONS & FOLLOW-UP ACTION

The study indicates that air quality around the Kathautia Open Cast Coal Mine is found to be within the threshold limit as per the guideline of NAAQS, 2009. However,

the mine is not in working during the monitoring period. Water quality of the surrounding water resources are also not found polluted by mine effluent. For the best practice of coal mining in future, Environmental Management System should always be considered with following measures:

- ✓ Frequency of spraying of water on the haul roads for controlling the dust to its minimum level may be increased.
- ✓ Regular maintenance of the heavy earth moving machines.
- ✓ Mine water collection in settling tank before its discharge.
- ✓ Garland drainage should be made around the dumps.
- ✓ Reclamation and revegetation of overburden dumps should be done to control soil erosion, denudation of agricultural land and nearby riverine system, wetlands and to improve the aesthetics of the area.
- ✓ Dumps brought under biological reclamation should not be made active.
- ✓ The mine management has been implementing, these measures to make mining operation eco-friendly in this coal mine of Hindalco Industries Ltd.



**CONDITIONS TO BE COMPLIED AS PER ENVIRONMENTAL CLEARANCE APPROVAL  
KATHAUTIA OPEN CAST COAL MINE, DALTONGANJ**

EC . No. J-11015 /61//2006-IA.II(M) dated 19<sup>th</sup> June, 2006

**A. SPECIFIC CONDITIONS**

Sl. No.	Condition	Compliance
01	All the conditions stipulated by SPCB shall be effectively implemented	Will be complied as applicable
02	The bund/embankment shall be designed taking into account the highest flood level, based on past data, of the drainage of the water bodies in the buffer zone which impact the mining operations so as to guard against mine inundation	Will be complied as applicable
03	Topsoil should be stacked properly with proper slope at earmarked site(s) and should not be kept active and shall be used for reclamation and development of green belt.	Topsoil will be stacked properly with proper slope at earmarked site(s) only. It will be used for reclamation and development of green belt
04	OB should be stacked at earmarked external OB dumpsite (s) within ML area and shall be a maximum height of 60 m only and consist of benches of 10 m each. The ultimate slope of the dump shall not exceed 28°. Backfilling shall begin at the end of 3 <sup>rd</sup> year in the decoaled area. Monitoring and management of existing reclaimed dumpsites should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on yearly basis.	Will be complied as applicable.

05	<p>Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development, etc. The drains should be regularly desilted and maintained properly.</p> <p>Garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.</p>	Will be complied as applicable.
06	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.	Will be complied as applicable
07	No ancillary operations shall as crushing , screening and washing of coal shall be done within the lease	Will be complied as applicable
08	Crushers at the CHP should be operated with high efficiency bag filters, water sprinkling system should be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points	Will be complied as applicable
09	Drills should be wet operated only.	Drills will be wet operated only when the mining will be in operation
10	Surface Miners shall be used for coal and OB extraction. Controlled Blasting should be limited to hard strata only and practiced only during daytime with use of delay detonators. The mitigative measures for control of ground vibration and to arrest the fly rocks and boulders should be implemented.	Coal and OB will be extracted by drilling & Blasting with shovel dumper combination
11	Area brought under afforestation shall cover a total area of 802.03 ha and includes reclaimed external OB dump (73.97 ha), reclaimed topsoil dump (4 Ha), backfilled area (683.97 ha), 18.65 ha along excavated area, along ML boundary, along roads (14.80 ha) 6.64 ha along thr river and in undisturbed area 1.14 ha) within the lease by planting native species in consultation with the local DFO/Agriculture department. The density of the trees should be around 2500 plants per ha.	Afforestation programme will be undertaken in defined areas and species will be selected in consultation with DFO/ Agriculture department.

12	A progressive closure Plan shall be implemented by reclamation of quarry area of 683.97 ha shall be backfilled and afforested by planting native plant species in consultation with the local DFO / Agriculture Department. The density of the trees should be around 2500 plants per ha. The balance 3.96 ha of decoaled area shall be converted into a water reservoir, the upper benches of which shall be gently sloped and stabilised and reclaimed with plantation.	Will be complied as applicable
13	Conservation Plan for endangered species, found in and around the project area shall be formulated, if required, in consultation with the State Forest and Wildlife Departments.	Will be complied as applicable.
14	The company shall obtain prior approval of CGWA/CGWB Regional Office for use of groundwater if any, for mining operations.	Will be complied as applicable.
15	Regular monitoring of groundwater level and quality should be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.	Will be complied as applicable
16	The company shall put up artificial groundwater recharge measures for augmentation of groundwater resource. The project authorities should meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.	Will be complied as applicable.
17	ETP should also be provided for workshop and CHP waste water	Will be complied as applicable.
18	R & R shall not be less than the norms laid down by the State Government and National R & R Policy and shall be completed within a specified time-frame.	R& R will be as per Government policy.

19	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests for approval 5 years in advance of final mine closure for approval.	Will be complied as required.
20	Consent to operate shall be obtained before starting mining operations	Will be complied as required.

#### B. GENERAL CONDITIONS

Sl. No.	Condition	Compliance
01	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.	Will be complied as applicable
02	No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.	Will be complied as applicable
03	Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone, for SPM, RPM, SO <sub>2</sub> and NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.	Will be complied. Monitoring stations have been established.
04	Fugitive dust emissions (SPM and RPM) from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points should be provided and properly maintained.	Will be complied as advised.
05	Data on ambient air quality (SPM, RPM, SO <sub>2</sub> and NO <sub>x</sub> ) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and to the Central Pollution Control Board once in six months.	Will be complied as applicable
06	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc should be provided with ear plugs/muffs.	Will be complied as applicable

07	Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May 1993 and 31 <sup>st</sup> December 1993 or as amended from time to time before discharge. Oil and grease trap should be installed before discharge of workshop effluents.	Will be complied as applicable
08	Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.	Will be complied as applicable
09	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	Will be complied as applicable
10	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.	Will be complied
11	A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the company.	Will be complied as applicable
12	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to this Ministry and its Regional Office at Bhubaneswar.	Will be complied as applicable
13	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.	Agreed Full cooperation will be extended. The Regional office has been shifted from Bhubaneswar to Ranchi
14	A copy of the will be marked to concerned Panchayat/Local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.	Will be complied as applicable
15	State Pollution Control board should display a copy of the clearance letter at the regional Office, District Industry Centre and Collector's Office / Tehsildar's Office for 30 days.	Will be complied as applicable

16	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a>	Will be complied as applicable
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Government of India  
Ministry of Environment, Forest & Climate Change

Indira Paryavaran Bhawan  
Aliganj, Jor Bagh Road,  
New Delhi-110003

No. J-11015/61/2006-IA-II.(M)

Dated : 16<sup>th</sup> April, 2015

To,

Asst. Vice-President -Corporate-Affairs  
M/s Hindalco Industries Limited  
Aditya Birla Centre,  
3<sup>rd</sup> Floor, B wing, S.K. Ahire Marg,  
Worli, Mumbai-400030  
Maharashtra

E-mail: corporateaffairs@adityabirla.com

**Subject: Transfer of Environmental Clearance of Kathautia Opencast Coalmine Project (0.80 MTPA) in an ML area of 938.27 ha in villages Kathautia, Kajri, Garikhas, Palhekhurd, Sika, Sakhui and Batsara, Tehsil Daltonganj district Palamau, Jharkhand from M/s Usha Martin Limited to M/s Hindalco Industries Limited, Mumbai, Maharashtra - reg.**

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2006 and subsequent amendment thereto had accorded Environmental Clearance (EC) to M/s Usha Martin Limited for Kathautia Opencast Coalmine Project (0.80 MTPA) in an ML area of 938.27 ha in villages Kathautia, Kajri, Garikhas, Palhekhurd, Sika, Sakhui and Batsara, Tehsil Daltonganj district Palamau, Jharkhand subject to compliance of terms and conditions stipulated in the EC letter No. J-11015/61/2006-IA.II (M) dated June 19<sup>th</sup>, 2006.

WHEREAS the Supreme Court of India vide judgment dated 25<sup>th</sup> August, 2014 read with its order dated 24<sup>th</sup> September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.



WHEREAS in pursuance of the judgment and order of the Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules 2014 conducted the auction of the mines.

WHEREAS Ministry of Coal (MOC) vide its O.M. letter no. 43020/20/2014-CPAM dated 16<sup>th</sup> March, 2015 has informed MoEFCC that MOC has recently approved 23 coal blocks (15 coal blocks from Schedule II and 8 coal blocks from Schedule III of the Ordinance) through bidding to different successful bidders/ companies. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the new successful bidders before 31.03.2015.

WHEREAS Ministry of Coal vide Vesting Order under clause (b) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order no. 104/3/2015/NA dated 23<sup>rd</sup> March, 2015 has allocated the Kathautia Opencast Coalmine Project (0.80 MTPA) in an ML area of 938.27 ha in villages Kathautia, Kajri, Garikhas, Palhekhurd, Sika, Sakhui and Batsara, Tehsil Daltonganj district Palamau, Jharkhand, to M/s Hindalco Industries Limited, Registered Office at Century Bhavan, 3<sup>rd</sup> Floor, Dr. Annie Besant Road, Worli, Mumbai-400 030 Maharashtra as the successful bidder.

WHEREAS vide Gazette Notification S.O. 811 (E) Notification dated 23.03.2015, MOEFCC has made amendments to paragraph 11 in the Gazette Notification S.O.1533 (E) dated 14<sup>th</sup> September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of "no objection" from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

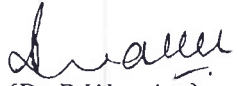
WHEREAS pursuant to the MOC vesting Order no. 104/3/2015/NA dated 23<sup>rd</sup> March, 2015 and MoEFCC Gazette Notification S.O. 811(E) dated 23.03.2015, the EC granted vide letter





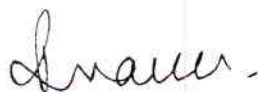
no. J-11015/61/2006-IA.II (M) dated 19<sup>th</sup> June, 2006 to M/s Usha Martin Limited for Kathautia Opencast Coalmine Project (0.80 MTPA) in an ML area of 938.27 ha in villages Kathautia, Kajri, Garikhas, Palhekhurd, Sika, Sakhui and Batsara, Tehsil Daltonganj district Palamau, Jharkhand is hereby transferred to M/s Hindalco Industries Limited, Registered Office at Century Bhavan, 3<sup>rd</sup> Floor, Dr. Annie Besant Road, Worli, Mumbai-400 030 Maharashtra subject to the following conditions:

- (i) Any change in scope of work will attract the provisions of Environment Protection Act (EPA), 1986 and Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments / circulars.
- (ii) All conditions stipulated in the EC letter No. J-11015/61/2006-IA.II (M) dated 19<sup>th</sup> June, 2006 shall remain unchanged.
- (iii) The successful bidder shall be liable, if any, for any act of violation of the EPA 1986 / EIA Notification 2006 /subsequent amendments and circulars which it has inherited during the transfer.
- (iv) Successful bidder shall be liable for compliance of all court directions, if any.

  
(Dr R Warri)  
Director

**Copy to :**

1. Secretary, Ministry of Coal, New Delhi.
2. Secretary, Department of Environment & Forest, Government of Orissa, Secretariat, Bhubaneswar.
3. PCCF (WL), Govt. of Orissa in regard to implementation of WL Conservation Plan.
4. Chief Conservator of Forest, Regional Office (EZ), Ministry of Environment & Forest, A-Chadrashekarapur, Bhubaneswar -751023
5. Chairman, Orissa State Pollution Control Board, Parivesh Bhawan, A/118, Nilkanthanagar, Unit VIII, Bhubaneswar-751012.
6. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi
7. Member Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3, Kasturba Gandhi Marg, New Delhi.
8. District Collect, **Palamau**, Government of Orissa.
9. Monitoring File 10. Guard File 11. Record File.

  
(Dr R Warri)  
Director

EC + PC

No. J-11015/61/2006-IA.II(M)  
Government of India  
Ministry of Environment & Forests

Paryavaran Bhawan,  
C.G.O. Complex, Lodi Road,  
New Delhi - 110003.

Dated: 10<sup>th</sup> June 2006

To  
M/s Usha Martin Ltd.,  
701, Surya Kiran Building,  
19, Kasturba Gandhi Marg,  
New Delhi - 110001.

Sub: **Kathautia Opencast Coal Mine Project (0.80 MTPA) of M/s Usha Martin Ltd., located in villages Kathautia, Kajri, Garikhas, Palhekurd, Sika, Sakhui and Batsara,, Tehsil Daltonganj, District Palamau, Jharkand - environmental clearance - reg.**

Sir,

This has reference to your letter dated 14.03.2006 submitting your application and subsequent letters dated 12.04.2006, 12.04.2006, 25.04.2006, 02.05.2006 and 02.05.2006 on the above-mentioned subject. The Ministry of Environment & Forests has considered your application. It has been noted that the project is for opening a new **Kathautia Opencast Coal Mine Project for the linked Sponge Iron Plant. The total lease area is 938.27 ha of which 55.98 ha is agricultural land and 882.29 ha is wasteland. Of the total lease area, area for excavation is 687.93 ha, 4 ha is for storage of topsoil dumps, 73.97 ha is for OB dumps, 2ha is for infrastructure, 1 ha is for roads, 40.09 ha is for greenbelt, 3.50 ha is for tailings pond, and 125.51 ha is undisturbed area. There are no National Parks, Wildlife Sanctuary, Biosphere Reserves found in the 10 km buffer zone. The nearest water body (Koel River) flows at a distance of 500m, and River Durgawati adjacent to the northern boundary of the proposed project and Amannat River and Jinjoi Nadi flow at a distance of 4 km and 1 km respectively form the mine site. The project does not involve modification of the natural drainage. An embankment for protection against flood is planned 5m above the HFL of Durgavati Nallah which is controlling the drainage to the core zone. Project involves R&R of 7 villages- Kathautia, Kajri, Garikas, Palhekurd, Sakhui, Sika and Batsara involving 976 land losers and 396 losers of both land and homestead. Mining will be opencast by mechanised method. Surface Miners will be mainly used for both coal and OB extraction and blasting will be done only if hard starta is encountered. The rated capacity of the project is 0.80 million tonnes per annum (MTPA) of coal production. Mineral transportation of 2667 TPD of coal is by road. Ultimate working depth of the mine is 50m below ground level (bgl). Water table is in the range of 3.2 m - 6.98 m bgl in the core zone and 2.9 m - 8.5 m bgl in the buffer zone. Mining will intersect water table. Average water requirement is 345 m<sup>3</sup>/d, which will be met from groundwater (27 m<sup>3</sup>/d) and from mine pit water (318m<sup>3</sup>/d). An estimated 244.46 Mm<sup>3</sup> of OB and 6.879 Mm<sup>3</sup> of topsoil will be generated in life of mine of which about 93% of the OB will be backfilled and the balance will be dumped in four external dumps of 50m max. height. Backfilling will begin from 1<sup>st</sup> year onwards. Public Hearing was held on 18.07.2005. NOC has been obtained on 21.02.2006. Life of the mine at the rated capacity is 33years. The Mining Plan has been approved by Ministry of Coal on 20.05.2005. Capital cost of the project is Rs. 80 crores.**

2. The Ministry of Environment & Forests hereby accords environmental clearance for the above-mentioned Kathautia Opencast Coal Mine Project of M/s Usha Martin Ltd. for production of coal of 0.80 MTPA rated capacity under the provisions of the Environmental Impact Assessment Notification, 1994 and subsequent amendments thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

- (i) All the conditions stipulated by the State Pollution Control Board shall be effectively implemented.
- (ii) The bund/embankment shall be designed taking into account the highest flood level, based on past data, of the drainage of the water bodies in the buffer zone which impact the mining operations so as to guard against mine inundation.
- (iii) Topsoil should be stacked properly with proper slope at earmarked site(s) and should not be kept active and shall be used for reclamation and development of green belt.
- (iv) OB should be stacked at earmarked external OB dumpsite(s) within ML area and shall be a maximum height of 60m only and consist of benches of 10m each. The ultimate slope of the dump shall not exceed 28°. Backfilling shall begin at the end of 3<sup>rd</sup> year in the decoaled area. Monitoring and management of existing reclaimed dumpsites should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Bhubaneswar on yearly basis.
- (v) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development, etc. The drains should be regularly desilted and maintained properly.  
Garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.
- (vi) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.
- (vii) No ancillary operations such as crushing, screening and washing of coal shall be done within the lease.
- (viii) Crushers at the CHP should be operated with high efficiency bag filters, water sprinkling system should be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, and transfer points.
- (ix) Drills should be wet operated.
- (x) Surface Miners shall be used for coal and OB extraction. Controlled blasting should be limited to hard strata only and practiced only during daytime with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.
- (xi) Area brought under afforestation shall cover a total area of 802.03 ha and includes reclaimed external OB dump (73.97 ha), reclaimed topsoil dump (4 ha), backfilled area (683.97 ha), 18.65 ha along excavated area, along ML boundary, along roads

(14.80 ha), 6.64 ha along the river and in undisturbed area (1.14 ha) within the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

- (xii) A Progressive Closure Plan shall be implemented by reclamation of quarry area of 683.97 ha shall be backfilled and afforested by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha. The balance 3.96 ha of decolaed area shall be converted into a water reservoir, the upper benches of which shall be gently sloped and stabilised and reclaimed with plantation.
  - (xiii) Conservation Plan for endangered species found in and around the project area shall be formulated, if required, in consultation with the State Forest and Wildlife Departments.
  - (xiv) The company shall obtain prior approval of CGWA/CGWB Regional Office for use of groundwater if any, for mining operations.
  - (xv) Regular monitoring of groundwater level and quality should be carried out by establishing a network of exiting wells and construction of new peizometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.
  - (xvi) The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource. The project authorities should meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.
  - (xvii) ETP should also be provided for workshop and CHP wastewater.
  - (xviii) R&R shall be not less than the norms laid out by the State Government and of the National R&R Policy and shall be completed within a specified time-frame.
  - (xix) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in-advance of final mine closure for approval.
  - ✓ (xx) Consent to Operate shall be obtained before starting mining operations. — Mr Patodra has applied
- B. General Conditions
- (i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.
  - (ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.
  - (iii) Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for SPM, RPM, SO<sub>2</sub> and NO<sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.


- 4
- (iv) Fugitive dust emissions (SPM and RPM) from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points should be provided and properly maintained.
  - (v) Data on ambient air quality (SPM, RPM, SO<sub>2</sub> and NO<sub>x</sub>) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board and the Central Pollution Control Board once in six months.
  - (vi) Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc should be provided with ear plugs/muffs.
  - (vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May 1993 and 31<sup>st</sup> December 1993 or as amended from time to time before discharge. Oil and grease trap should be installed before discharge of workshop effluents.
  - (viii) Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.
  - (ix) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.
  - (x) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.  
Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.
  - (xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the company.
  - (xii) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to this Ministry and its Regional Office at Bhubaneswar.
  - (xiii) The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.
  - (xiv) A copy of the will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.
  - (xv) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.

(xvi) The Project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at the website of the ministry of Environment & Forests at <http://envfor.nic.in>.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules.

  
(Dr. T. Chandini)  
Additional Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi.
3. Chief Conservator of Forests, Regional office (E7), Ministry of Environment & Forests, A/3 Chandrashekarapur, Bhubaneswar - 751023.
4. Chairman, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi - 110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. District Collector, Palamau, Government of Jharkhand.
8. Monitoring File    9.    Guard File    10.    Record File