



Ref No: HIL/LHD/JP (M)/MoEF/

Date: 28.05.2016

To,  
The Additional Principal Chief Conservator of Forest (C)  
Ministry of Environment, Forests and Climate Changes  
Regional Office (ECZ), Ranchi-834002.

**Sub: Compliance Report of EC conditions for Chiro-Kukud (152.57 ha) Bauxite Mining project of M/s Hindalco Industries Limited located in Gumla, Jharkhand for the period Oct'15 to March'16.**

**Ref: Environmental Clearance letter no J-11015/240/2006-IA II(M) dated 17<sup>th</sup> May 2007**

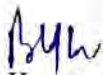
Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Chiro-Kukud (152.57 ha) Bauxite Mining project** of M/s Hindalco located in Gumla, Jharkhand for the period **Oct'15 to March'16**.

Hope you will find the same in order.

Thanking You

Yours Sincerely  
FOR HINDALCO INDUSTRIES LIMITED

  
(Bijesh Kumar Jha)  
Joint President (Mines)

Enclosure: - As Above

Copy to: Member Secretary, JSPCB, Ranchi  
RO, JSPCB, Ranchi  
<mef@ori.nic.in>, <mef@nic.in>, <mef.or@nic.in>, mef.or@nic.in

**Compliance of conditions laid down in Environmental Clearance**

**CHIRO KUKUD BAUXITE MINES**

**Period: Oct'15-March'16**

**J-11015/240/2006-IA.II (M) Dated 17.5.2007**

<b>Sl No</b>	<b>Conditions</b>	<b>Compliance Status</b>
<b>Specific Conditions</b>		
1	Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa foundation Vs Union of India in writ petition (civil) no 460 of 2004, as may be applicable to this project	It will be complied with as per the final decision of Hon'ble Supreme Court.
2.	Environmental Clearance is subject to obtaining clearance from Wildlife (Protection) Act '1972 from the competent authority.	Wildlife Management plan has been accepted by Chief Wildlife Warden, Jharkhand vide letter no 75(vivid)/ 940 dated 22.10.2008.
3.	All the conditions stipulated by SPCB in their NOC shall be effectively implemented.	Implementation of the stipulated conditions are fulfilled.
4	The environmental clearance is subject to approval of the state land use Department, Government of Jharkhand for diversion of agricultural land for non-agricultural use.	Mining Lease is granted/ renewed by the State Govt. after due consideration and Cabinet approval on recommendation of DC who is the competent authority to give permission for using the agricultural land for non-agricultural purpose.
5	Mining shall not intersect groundwater. The mine working shall be restricted to above ground water table. Prior approval of the Ministry of Environment & Forests and Central Ground Water Authority shall be obtained for mining below water table.	As the mining plan, mining is being carried out at shallow depth, at no point of time mining activities will intersect the ground water table.
6	The project proponent shall ensure that the mining shall be carried out in small blocks and at a given point of time active mining shall not be more than 2.0 ha.	Mining is being carried out in small blocks only.
7.	The project proponent shall ensure that no natural water course shall be obstructed due to any mining operations.	No natural water course is being obstructed due to any mining operations.
8	Top soil, if any, shall be stacked properly with proper slope with adequate measures and should be used for reclamation and rehabilitation of mined out areas.	Sequential backfilling and reclamation of the mined out area is being practiced during mining operation.

9.	The overburden generated during the initial year shall be kept as temporary dump. Concurrent backfilling starts from the 2 <sup>nd</sup> year onwards and there shall be no external dump at the end of the mine life.	The overburdens generated during the initial year are kept as temporary dump. Concurrent backfilling starts from the 2 <sup>nd</sup> year onwards and there will be no external dump at the end of the mine life. Data enclosed.
10.	The entire excavated area of 86 ha shall be reclaimed, out of which 66 ha land shall be returned to rayats for agricultural purpose and in 20 ha plantation shall be raised. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forest on six month basis.	Will be complied with the progress of mining work.
11	<p>Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine working. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted particularly after monsoon and maintained properly.</p> <p>Garland drain (size, gradient and length) shall be constructed for mine pit and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper setting of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</p>	<p>Catch drains and siltation ponds of appropriate size have been constructed to arrest silt and sediment flows from mine working. The water so collected are being utilized for watering the mine area, roads, green belt development etc. The drains are regularly desilted particularly after monsoon and maintained properly.</p> <p>Garland drains of appropriate size are provided.</p>
12	Dimension of the retaining wall at the OB benches within the mine to check run-off and siltation should be based on rainfall data.	The dimension of the retaining wall of OB dumps is based on the average rainfall.
13	Plantation shall be raised in an area of 20.0 ha including a green belt of adequate width by planting the native species around the ML area, roads, reclaimed area etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be around 1500 plants per ha.	Will be carried out with progress of mining activity. Around 2500 saplings have been planted during the FY 2015-16.

14	The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.	Suitable measures have been adopted to augment ground water resources in the area.
15	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground water Authority and Regional Director Central Ground Water Board.	Regular monitoring of ground water level and quality are being carried out by recognized agency.
16	Prior permission from the competent authority should be obtained for drawl of water from the surface water bodies.	As per the terms and conditions in Mining lease deed, we have the liberty to use water. Water cess is being paid to JSPCB on regular basis.
17	Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be overloaded.	Vehicle engaged in mining operation are regularly checked and maintenance of vehicles is being done. The vehicles are being covered with tarpaulin.
18	Drills should either be operated with dust extractors or should be equipped with water injection system.	Wet drilling is being done in the holes for dust suppression, for jack hammer type drilling.
19	Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibration and to arrest fly rocks and boulders should be implemented.	Blasting at Mines - fixed blasting period of 12.00 Noon to 1.00 Pm on working days. All the precautionary and mitigative measures to control ground vibration and to arrest generation of fly rocks are being implemented.
20	Consent to operate should be obtained from SPCB prior to start of enhanced production from the mine.	There is no proposal for production enhancement.
21	Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated from mining operations.	There is no effluent discharge from Mine, hence ETP is not required to install. The sewage water from domestic uses is treated through septic tanks and soaks pits.
22	The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna such as Leopard, Indian Wolf, Indian elephant, Indian small civet, Indian Python, etc.	Wildlife Management plan has been accepted by Chief Wildlife Warden, Jharkhand vide letter no 75(vivid)/ 940 dated 22.10.2008.

	Spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. Copy of action plan may be submitted to the Ministry and its Regional Office within 3 months.	
23	A Final Mine Closure plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forest 5 years in advance of final mine closure for approval.	Final mine closure plan (part) has been approved by IBM. FMCP for entire lease will be prepared in appropriate time.

### **GENERAL CONDITIONS**

<b>Sl No</b>	<b>Conditions</b>	<b>Compliance Status</b>
1	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forest	Being adhered to.
2	No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made.	Excavation of OB and Bauxite is being done as per the approved plan, Details of excavation, quantum of mineral; OB etc have been furnished for the financial year 2015-16. Detail Annexed.
3	Four ambient air quality-monitoring station should be established in the core zone as well as in the buffer zone for RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> monitoring. Location of the stations should be decided based on the metrological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	Monitoring locations have been fixed and regular monitoring is being done. Monitoring Reports of AAQ data is attached as <b>Annexure</b> .
4	Data on ambient air quality (RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> ) should be regularly submitted to the Ministry including its Regional office located at Bhubneshwar and the State Pollution Control Board / Central pollution Control Board once in six months.	Monitoring Reports is attached as <b>Annexure</b> .

5	Fugitive dust emission from all the sources should be controlled regularly. Water spraying arrangements on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Water tankers with sprinkling facility have been provided for haul roads, loading unloading & at transfer points.
6	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operation of HEMM, etc. should be provided with ear plug / muffs.	Complied. PPE provided to all operators within the work zone.
7	Industrial waste water (workshops and waste water 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. Oil and grease trap should be installed before discharge of workshop effluents.	Presently, there is no generation of waste water from the mine.
8	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 program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	Complied. PPE provided to workers. Training is being provided through VT centre.  Health survey will be done with progress of mining.
9	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 Organization.	Complied. A suitable environmental management cell has been developed with qualified personal. Copy enclosed.
10	The project authorities should inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	Final mine closure plan has been submitted at IBM for approval. Mining is being carried out as per IBM approved Scheme of Mining.
11	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 the Ministry and its Regional Office located at Bhubneshwar.	The funds earmarked for environmental protection measures are kept in separate account. Cost of environmental protection measures Annexed.

12	The Regional Office of this Ministry located at Bhubneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.	Agreed.
13	The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests its Regional Office, Bhubneshwar CPCB and State Pollution Control Board.	Duly submitted.
14	A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.	Complied
15	State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Center and Collector's office / Tehsildar's Office for 30 days.	Displayed.
16	The project authorities should advertise at least in two local newspapers widely circulated, one of which locality concerned, within 7days of the issue 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 also at web site of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubneshwar.	Already done and copies submitted with earlier six monthly compliance report.



# *Eco Ventures Pvt. Ltd.*

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## **Mahabal Enviro Engineers Pvt. Ltd.**

At Booty, Near PHED Colony, Behind Pump House, PO – RMCC,  
District – Ranchi 834009

### **ORSA & CHIRO PLATEAU- ENVIRONMENTAL MONITORING REPORT**

**January to March 2016**

**For Mahabal Enviro Engineers Pvt. Ltd.**

Vijay Pandey  
**SENIOR EXECUTIVE**







# Mahabal Enviro Engineers Pvt. Ltd.

## Branch Office:

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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

## CONTENT

	LOCATION
	<b>AMBIENT AIR QUALITY</b>
1	Working Pit Near Chiro Kukad Mine 152.57 ha.
2	Weigh Bridge Near Chiro Kukad Mine 152.57 ha.
3	Near ORSA School
4	Saridih Hospital
	<b>NOISE LEVEL</b>
1	Chiro Kukad Mining Area
	<b>SPOT NOISE LEVEL</b>
1	Near Poclain at Chiro Kukad Mine (152.57 ha.)
	<b>DRINKING WATER</b>
1	Chiro Kukad Mines Drinking Water (Hand Pump)





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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 193/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
<b>Sample described by customer: AMBIENT AIR QUALITY MONITORING</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>	
Marks on Sample: Location: <b>Working Pit Near Chiro Kukad Mines 152.57 ha.</b>	
Sample collected on: 17.02.2016	
Received: 18.02.2016	
Registered: 18.02.2016	
Test Start/End Date: 19.02.2016/20.02.2016	

LOCATION/IDENTIFICATION: : Working Pit Near Chiro Kukad Mines 152.57 ha.					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	12.5
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	21.0
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	74.1
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	45.1
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.3

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE



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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 194/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
<b>Sample described by customer: AMBIENT AIR QUALITY MONITORING</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>	
Marks on Sample: Location: <b>Weigh Bridge Near Chiro Kukad Mines 152.57 ha.</b>	
Sample collected on: 17.02.2016	
Received: 18.02.2016	
Registered: 18.02.2016	
Test Start/End Date: 19.02.2016/20.02.2016	

LOCATION/IDENTIFICATION: Weigh Bridge Near Chiro Kukad Mines 152.57 ha.					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	<b>14.5</b>
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	<b>31.0</b>
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	<b>61.0</b>
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	<b>41.2</b>
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	<b>0.42</b>

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries:Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 195/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
<b>Sample described by customer: AMBIENT AIR QUALITY MONITORING</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>	
Marks on Sample: Location: <b>Near ORSA School</b>	
Sample collected on:17.02.2016	
Received: 18.02.2016	
Registered: 18.02.2016	
Test Start/End Date: 19.02.2016/20.02.2016	

LOCATION/IDENTIFICATION: Near ORSA School					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	15.2
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	24.5
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	70.2
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	44.5
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.21

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries:Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 196/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
Sample described by customer: Measurement of Noise	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>	
Marks on Sample: Location: <b>Saridih Hospital</b>	
Sample collected on:17.02.2016	
Received: 18.02.2016	
Registered: 18.02.2016	
Test Start/End Date: 19.02.2016/20.02.2016	

LOCATION/IDENTIFICATION: Saridih Hospital					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	14.3
Nitrogen Dioxide	NO <sub>x</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-6): 1975(Reaff:2004)	23.1
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part-23)	78.2
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR (40) Appendix-L	49.5
Carbon Monoxide	CO	µg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.12

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 197/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
Sample described by customer: Measurement of Noise	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: <b>Measurement of Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: <b>17.02.2016</b>	
Analyse Date: <b>17.02.2016</b>	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Chiro Kukad Mining Area	dB (A) $L_{eq}$	75	58.2	70	52.1	17/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 198/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
<b>Sample described by customer: Measurement of Spot Noise</b>	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Spot Noise	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: <b>17.02.2016</b>	
Analyse Date: <b>17.02.2016</b>	

Location/Identification	Unit	Limit (day)	Result	Dates
<b>Chiro Kukad Mines (152.57 ha.)</b> Near Poclairn	dB (A) $L_{eq}$	75	62.1	17/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey

SENIOR EXECUTIVE



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Hindalco Industries: Environmental Monitoring report

Jan-March 2016

<b>Report No: MEEPL/MAR 199/2015-16</b>	<b>Date: 31<sup>st</sup> March 2016</b>
Sample described by customer : <b>DRINKING WATER-POTABILITY</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: <b>DRINKING WATER-POTABILITY</b>	
Marks on Sample: Location: <b>Chiro Kukad Mines Drinking Water (Hand Pump)</b>	
Sample collected on: 17.02.2016	
Quantity: 5 L X 2 No. PVC Can	
Received: 18.02.2016	
Registered: 18.02.2016	
Test Start/End Date: 19.02.2016/23.02.2016	

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
1	Colour	Hazen	<1	5 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2120-B, 2-6
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part 7): 1983, Reaffirmed 2006
3	Taste	--	Agreeable	Agreeable	IS 3025 (Part 7): 1983, Reaffirmed 2006
4	Turbidity	NTU	0.3	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	6.3	6.5-8.5	APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+-B, 4-92
6	Free Chlorides (Residual)	mg/l	<0.05	0.2 min	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
7	Total Dissolved Solids	mg/l	85	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69
10	Total hardness (as CaCO <sub>3</sub> )	mg/l	60	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO <sub>3</sub> )	mg/l	62	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	9.2	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO <sub>4</sub> )	mg/l	6.2	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190



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## Branch Office:

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Hindalco Industries:Environmental Monitoring report

Jan-March 2016

## Continuation Sheet

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14	Nitrate (as NO <sub>3</sub> )	mg/l	1.20	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125
15	Fluoride (as F)	mg/l	0.2	1 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.13	0.5 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25
17	Calcium (as Ca)	mg/l	21.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.1	30 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Mg-B, 3-84
19	Ammonical Nitrogen/Total Ammonia	mg/l	<0.1	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NH <sub>3</sub> -F, 4-115
20	Iron (as Fe)	mg/l	0.15	0.3 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
21	Manganese (as Mn)	mg/l	N.D	0.1 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
22	Aluminium (as Al)	mg/l	0.08	0.03 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Al-B, 3-61
23	Cadmium (as Cd)	mg/l	N.D	0.003 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
24	Chromium Total (as Cr)	mg/l	N.D	0.05 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
25	Copper (as Cu)	mg/l	N.D	0.05 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
26	Lead (as Pb)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
27	Zinc (as Zn)	mg/l	0.07	5 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
28	Arsenic (as As)	mg/l	<0.01	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-23
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38
31	Nickel (as Ni)	mg/l	<0.06	0.02 max	APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18
32	Mineral Oil	mg/l	N.D	0.5 max	IS 3025 (Part 39): 1991, Reaffirmed 2003: ed. 2.1
33	Cyanide (as CN)	mg/l	N.D	0.05 max	APHA 22 <sup>nd</sup> ED. 2012, 4500-CN.C & 4-39 & 4-44
34	Anionic detergents as MBAS	mg/l	<0.1	0.2 max	APHA 22 <sup>nd</sup> ED. 2012, 5540-C.C & 5-53
35	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> ED. 2012, 5530-B & C 5-4753
36	Polynuclear aromatic hydrocarbons (PAH)	mg/l	N.D	0.0001 max	APHA 22 <sup>nd</sup> ED. 2012, 6440, 6-93
37	Polychlorinated Biphenyls (PCBs)	mg/l	N.D	0.0005 max	USEPA Method 8082
38	Sulphide (as S)	mg/l	N.D	0.05 max	APHA 22 <sup>nd</sup> ED. 2012, 4500-S2-C 4-175 & F 4-178



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Hindalco Industries:Environmental Monitoring report

Jan-March 2016

## Continuation Sheet

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
<b>Microbiological Analysis</b>					
1	Total Colliforms	MPN/100mL	<1.1	N.D	APHA 22 <sup>nd</sup> Ed. 2012, 9221-B & C, 9-66, 9-69 and 9-67
2	E-Coli	MPN/100mL	Absent	N.D	APHA 22 <sup>nd</sup> Ed. 2012, 9221-B & C, 9-66, 9-69 and 9-76
<b>Pesticides Residues</b>					
3	p.p DDT	µg/L	N.D	1	US EPA 508-1995
4	o.p DDT	µg/L	N.D	1	US EPA 508-1995
5	p.p DDE	µg/L	N.D	1	US EPA 508-1995
6	o.p DDE	µg/L	N.D	1	US EPA 508-1995
7	p.p DDD	µg/L	N.D	1	US EPA 508-1995
8	o.p DDD	µg/L	N.D	1	US EPA 508-1995
9	γ-HCH (Lindance)	µg/L	<0.01	2	US EPA 508-1995
10	α -HCH	µg/L	<0.01	0.01	US EPA 508-1995
11	β-HCH	µg/L	N.D	0.04	US EPA 508-1995
12	δ-HCH	µg/L	N.D	0.04	US EPA 508-1995
13	Butachlor	µg/L	N.D	125	US EPA 508-1995
14	Alachlor	µg/L	N.D	20	US EPA 508-1995
15	Atrazine	µg/L	N.D	2	US EPA 508-1995
16	α Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
17	β Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
18	Endosulfan Sulphate	µg/L	N.D	0.4	US EPA 508-1995
19	Ethion	µg/L	N.D	3	US EPA 8141A-1994
20	Malathion	µg/L	N.D	190	US EPA 8141A-1994
21	Methoysl Parathion	µg/L	N.D	0.3	US EPA 8141A-1994
22	Monocrotophos	µg/L	N.D	1	US EPA 8141A-1994
23	Phorate	µg/L	N.D	2	US EPA 8141A-1994
24	Chlorpyrifos	µg/L	N.D	30	US EPA 8141A-1994
25	Aldrin	µg/L	N.D	0.03	US EPA 508-1995
26	Dieldrin	µg/L	N.D	0.03	US EPA 508-1995
Remarks: N.D- Not Detected					

**Conclusion:** The Physical & Chemical Analysis report indicates that the water is not contaminated and potable.

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE



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## Mahabal Enviro Engineers Pvt. Ltd.

At Booty, Near PHED Colony, Behind Pump House, PO - RMCC,  
District - Ranchi 834009

### ORSA & CHIRO - ENVIRONMENTAL MONITORING REPORT

October - December 2015

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE





# Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: MEEPL/DEC020/2015-16	Date: 12 <sup>th</sup> December, 2015
Sample described by customer: AMBIENT AIR QUALITY MONITORING	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample type: AMBIENT AIR QUALITY MONITORING	
Marks on Sample: Location: Working Pit Near Chiro Kukud Mines 152.57 ha.	
Sample collected on: 17.11.2015	
Received: 18.11.2015	
Registered: 18.11.2015	
Test Start/End Date: 18.11.2015/21.11.2015	

### LOCATION / IDENTIFICATION: Working Pit Near Chiro Kukud Mines 152.57 ha.

PARAMETERS	UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub> µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	16.8
Nitrogen Dioxide	NO <sub>2</sub> µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	21.2
Particulate Matter (size less than 10 µm)	PM <sub>10</sub> µg/m <sup>3</sup>	100	IS:5182 (Part 23)	78.6
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub> µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	46.9
Carbon Monoxide	CO mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.31

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE



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Hindalco Industries:Environmental Monitoring report

December 2015

Report no: : MEEPL/DEC021/2015-16	Date: 12 <sup>th</sup> December, 2015
Sample described by customer: AMBIENT AIR QUALITY MONITORING	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample type: AMBIENT AIR QUALITY MONITORING	
Marks on Sample: Location: Weigh Bridge Near Chiro Kukud Mines 152.57 ha.	
Sample collected on: 17.11.2015	
Received:18.11.2015	
Registered: 18.11.2015	
Test Start/End Date: 18.11.2015/21.11.2015	

LOCATION / IDENTIFICATION: Weigh Bridge Near Chiro Kukud Mines 152.57 ha.					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	19.7
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	32.8
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	72.3
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	47.7
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.49

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

<b>Report no. :</b> MEEPL/DEC022/2015-16	<b>Date:</b> 12 <sup>th</sup> December, 2015
<b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING	
<b>Client Name:</b> Hindalco Industries Limited	
<b>Client Address:</b> Lohardaga	
<b>Postal Code:</b> 835203	
<b>State:</b> Jharkhand	
<b>Country:</b> India	
<b>Sample type:</b> AMBIENT AIR QUALITY MONITORING	
<b>Marks on Sample:</b> Location: Near ORSA School	
<b>Sample collected on:</b> 17.11.2015	
<b>Received:</b> 18.11.2015	
<b>Registered:</b> 18.11.2015	
<b>Test Start/End Date:</b> 18.11.2015/21.11.2015	

LOCATION / IDENTIFICATION: Near ORSA School					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	17.6
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	28.9
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	77.5
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	47.2
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.25

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Hindalco Industries:Environmental Monitoring report

December 2015

Report no: : MEEPL/DEC023/2015-16	Date: 12 <sup>th</sup> December, 2015
Sample described by customer: AMBIENT AIR QUALITY MONITORING	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample type: AMBIENT AIR QUALITY MONITORING	
Marks on Sample: Location: Sharidhi Hospital	
Sample collected on: 17.11.2015	
Received:18.11.2015	
Registered: 18.11.2015	
Test Start/End Date: 18.11.2015/21.11.2015	

LOCATION / IDENTIFICATION: Sharidhi Hospital					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	16.7
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	26.8
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	81.5
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix- L	521
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.29

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: : MEEPL/DEC024/2015-16			Date: 12 <sup>th</sup> December, 2015		
Sample described by customer: SOIL					
Client Name: Hindalco Industries Limited					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample type: SOIL					
Marks on Sample: Location: CHIRO KUKUD MINES					
Sample collected on: 18.11.2015					
Quantity: 2 kgs					
Sample collected by: Mahabal Enviro Engineers Pvt Limited					
Received: 18.11.2015					
Registered: 18.11.2015					
Test Start/End Date: 18.11.2015/26.11.2015					
S.No	Analysis		Method	Result	Unit
1.	Colour	--	--	Gray	-
2.	Texture	--	F.A.U.N (2007)	Loamy Sand	-
3.	Bulk Density	--	By Bulk density Apparatus	1.00	gm/cm <sup>3</sup>
4.	Water Holding Capacity	--	F.A.U.N (2007)	31	%
5.	pH	--	F.A.U.N (2007)	6.7	-
6.	Electrical Conductivity	--	F.A.U.N (2007)	2120	µs/cm
7.	Organic Carbon	--		0.57	%
8.	Organic Matter	--	Black & White Wet Digestion Method	0.78	%
9.	Available Nitrogen	--	Soil & Water Book by P.K Gupta	112.8	mg/kg
10.	Available Phosphorus	--	Soil & Water Book by P.K Gupta	16.6	mg/kg
11.	Available Potassium	--	Soil & Water Book by P.K Gupta	382	mg/kg
12.	Exchangeable Calcium	Ca	Soil & Water Book by P.K Gupta	27.25	meq/100gm
13.	Exchangeable Magnesium	Mg	Soil & Water Book by P.K Gupta	1.38	meq/100gm
14.	Exchangeable Sodium	Na	Soil & Water Book by P.K Gupta	2.20	meq/100gm
15.	Exchangeable Potassium	K	Soil & Water Book by P.K Gupta	1.40	meq/100gm
16.	Total Exchangeable Bases		Soil & Water Book by P.K Gupta	31.53	meq/100gm
17.	Manganese	Mn	USEPA 3052	0.40	mg/kg
18.	Arsenic	As	USEPA 3052	2.0	mg/kg
19.	Silica	SiO <sub>2</sub>	USEPA 3052	54.6	%
20.	Aluminum	Al <sub>2</sub> O <sub>3</sub>	USEPA 3052	6.5	%
21.	Iron	Fe <sub>2</sub> O <sub>3</sub>	USEPA 3052	5.00	%
22.	Calcium	CaO	USEPA 3052	8.90	%
23.	Magnesium	MgO	USEPA 3052	1.83	%
24.	Sodium	Na <sub>2</sub> O	USEPA 3052	0.270	%
25.	Potassium	K <sub>2</sub> O	USEPA 3052	0.230	%
26.	Sulphate	SO <sub>4</sub>	USEPA 3052	0.69	%

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: MEEPL/DEC025/2015-16	Date: 12 <sup>th</sup> December, 2015
<b>Sample Description: Measurement of Noise</b>	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Noise Level.	
Sampling Method: Instrumental, Using Sound level Meter	
Sampling Done by: Mahabal Enviro Engineers Pvt. Ltd.	
Sample Collected on: 18.11.2015	

Location / Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Chiro Kukud Mines Area	dB(A) $L_{eq}$	75	64.9	70	62.3	18.11.2015

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: MEEPL/DEC026/2015-16	Date: 12 <sup>th</sup> December, 2015
Sample Description: Measurement of Noise	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Spot Noise.	
Sampling Method: Instrumental, Using Sound level Meter	
Sampling Done by: Mahabal Enviro Engineers Pvt. Ltd.	
Sample Collected on: 18.11.2015	

Location / Identification Spot Noise	Unit	Limit (day)	Result	Dates
Near Poclairn at Chiro Kukud Mines (152.57 ha.)	dB(A) L <sub>eq</sub>	75	71.1	18.11.2015

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE



Head Office: Plot No. F-7, Road No. 21, Wagle Estate, Thane West - 400604, Maharashtra, India  
(600 m from Hotel Rukhmini Palace Turn Opp Toyota Show Room. Near J B Sawant Bus Stop)  
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29.04.2016

**Office Order**

Environmental Cell has been re-constituted at Chiro Kukud Bauxite Mines (Area 152.57 Ha) comprising below mentioned team members. The team will ensure compliance of Environment Act, Regulation & Rule in respect of the said mines of Hindalco Industries Limited.

1. Mr. Rajesh Ambastha (Coordinator)
2. Mr. Tapas Gachhayat (Member)
3. Mr. Satyendra Sharma –Foreman (Member)
4. Mr. Narendra Singh –Mining Mate (Member)



(B.K. Mahapatra)  
Convenor (Quality & Environment)



28.05.2016

**BREAK UP THE COST OF ENVIRONMENTAL MEASURES DURING THE YEAR 2015-16**

The composite cost during the year 2015-16 for environmental protection & pollution control by Jharkhand Mines division of M/s Hindalco Industries Ltd & M/s Minerals & Minerals Ltd for implementation of the suggested measures in EC at our all the operating mines in the state of Jharkhand-namely Pakhar (115.13 Ha), Pakhar (15.58 Ha), Pakhar (109.507 Ha), Pakhar (8.09 Ha), Pakhar (35.12 Ha), Serengdag (140.06 Ha), Serengdag (155.81 Ha), Jalim & Sanai (12.14 Ha), Gurdari (584.19 Ha), Amtipani (190.95 Ha), Kujam I (80.97 Ha) Kujam II (157.38 Ha) and Bagru (75.41 Ha), Hisri New (14.55 Ha), Chiro kukud, Orsa pat(196.36 Ha), Bhusar (65.31 Ha)& Bimarla Bauxite Mines (134.52 Ha).

SI No	Description	Budget (in Rupees) FY 2015-16	Actual (in Rupees) FY 2015-16 (from April'15 to Sep'2015)	Actual (in Rupees) FY 2015-16 (from April'15 to March'2016)
1	Pollution Control & Environment monitoring	15,40,000.00	2,62,293.00	5,53,564.00
2	Reclamation/ Back filing & Rehabilitation**	3,89,90,000.00	1,45,51,281.00	2,67,43,576.00
3	Green belt, Plantation & Water spraying arrangement	60,00,000.00	28,68,213.00	1,08,03,917.00
4	Rural Development	2,33,00,000.00	1,04,36,128.00	2,19,06,062.00

\*\*Part of OB removed cost.

(B.K. Mahapatra)  
Convenor (Quality & Environment)

**PRODUCTION, MINED OUT, BACKFILLED, PRODUCTION AND OVERBURDEN REMOVAL FROM APR-15 TO MAR-16**

Name of Mines	Mining lease area (Ha)	Mined Out area (in Ha)	Backfilled area (in Ha)	Production (in MT)	Overburden Removal (in Cub.M.)
Shrengdag Bauxite Mines	155.81	6.20	10.40	259113	542332
Gurdari Bauxite Mines	584.19	13.40	10.60	324590	360223
Jalim & Sanai	12.14	0.85	0.52	45589	45147
Serangdag	140.06	0.00	0.00	0.00	0.00
Pakhar Buxite Mines	115.13	3.14	4.03	297265	447110
Pakhar Buxite Mines	8.09	0.00	0.00	0.00	0.00
Pakhar Buxite Mines	38.95	0.00	0.00	0.00	0.00
Kujam-I	80.87	3.78	2.17	149590	215034
Kujam-II	157.38	6.79	4.54	223025	500720
Amtipani	190.95	4.63	3.53	149880	361325
Chiro-Kukud	152.57	2.32	4.63	94290	120248
Orsa Bauxite Mines	196.36	0.00	0.00	0.00	0.00
Hisri New	14.55	0.29	0.00	64488	14237
Bagru	75.41	0.00	0.00	0.00	0.00
Bhusar	65.31	0.00	0.00	0.00	0.00
<b>Minerals &amp; Minerals Limited</b>					
Pakhar Buxite Mines	109.507	3.02	3.57	277350	394970
Pakhar Buxite Mines	15.58	0.00	0.00	0.00	0.00
Bimarla	134.37	2.38	1.29	43455	95056

*B. Prasad*

**Monitored water level (FY 2015-16)**

Fig: in meter

Location (Mines)	Elevation (Mtr)	Well type	Monsoon (July-Sep)		Post Monsoon (November)		Winter (January)		Pre Monsoon (April-May)	
			Inside ML	Outside ML	Inside ML	Outside ML	Inside ML	Outside ML	Inside ML	Outside ML
Bagru Plateau (Hisri new, Bagru & Bhusar )	905	Open Well		21.74		24.13		27.35		29.15
	910	Open Well		24.32		24.55		26.50		27.40
	915	Open Well		29.41		28.43		29.95		31.30
Pakhar Gr. Of Mines (115.13,109.507,15.58,8.)	903	Open Well		22.83		33.11		35.10		35.70
	909	Open Well		17.54		28.74		30.15		30.20
	1000	Open Well		24.95		22.69		25.16		25.80
Sherengdag Plateau (Serangdag 155.81 ha, Sherengdag 140.06 Ha, Jalim & Sanai)	1083	Hand Pump	35.36		31.63		34.25		35.40	
	1027	Open Well		25.84		28.36		30.15		31.35
	1094	Hand Pump	41.74		39.55		42.65		42.80	
	1081	Hand Pump	39.65		31.30		41.12		42.10	
	1055	Hand Pump	33.07		27.53		35.55		35.60	
	1066	Hand Pump	27.76		26.27		30.15		30.10	
	1045	Hand Pump	29.32		27.85		29.95		29.90	
Gurdari	1061	Hand Pump	28.36		24.93		25.25		25.90	
	1059	Hand Pump	38.11		36.20		35.15		36.25	
	1075	Hand Pump	27.98		26.82		28.4		29.65	
	1075	Hand Pump	28.37		29.33		30.25		30.15	
	1040	Open Well		33.97		21.88		35.15		36.70
Kujam I, Kujam II & Amtipani Mines	1041	Open Well		33.66		24.85		36.25		39.40
	1064	Hand Pump	31.55		28.68		36.15		42.05	
	1052	Hand Pump	22.39			21.12		24.55		23.60
Chiro Kukud	1148	Hand Pump	33.40		28.39		34.25		37.40	
	1151	Hand Pump	37.62		31.85		36.25		36.05	
	1084	Hand Pump	34.25		33.11		35.65		39.40	



(B.K. Mahapatra) -  
Convenor (Quality & Environment)