

MINERALS & MINERALS LIMITED

Regd. Office P.O. & Dist. – Lohardaga (Jharkhand) PIN – 835302

Phone: 06526-224016, 224112, FAX: 06526-224118

Ref No: M&M/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 Pakhar (15.58 ha) Bauxite Mining project of M/s Minerals & Minerals Limited located in Lohardaga, Jharkhand for the period Oct'15 to March'16.**

Ref: **Environmental Clearance letter no J-11015/123/2006-IA II (M) dated 24th January 2007**


Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Pakhar (15.58 ha) Bauxite Mining project of M/s Minerals & Minerals Limited**, located in Lohardaga, Jharkhand for the period Oct'15 to March'16.

Hope you will find the same in order.

Thanking You

Yours Sincerely
FOR Minerals & Minerals 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

PAKHAR BAUXITE MINES(15.58 Ha)

MINERALS & MINERALS LTD.

Period: Oct'15-March'16

J-11015/123/2006-IA.II(M) Dated 24.01.2007

Sl No	Conditions	Compliance Status
Specific Conditions		
1	All the conditions stipulated by SPCB in their NOC shall be effectively implemented.	Implementations of the stipulated condition are fulfilled. Mines is discontinued since Sep'14 due to second renewal case as per directive by DMO.
2	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.
3	Mining shall not intersect groundwater. The mine working shall be restricted to ground water table. Prior approval of the Ministry of Environment & Forests and Central Ground Water Authority shall be obtained for mining below water table.	Shallow depth mining is being carried out. Ground water table level is far below. Hence there will be no intersecting of the ground water table due to mining activities.
4	The project proponent shall ensure that no natural watercourse shall be obstructed due to any mining operation.	It is being ensured .No natural water course is obstructed during mining.
5	Top soil 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 are being practiced during mining operation. Whenever backfilling will be done to the mined out area, Top soil is being used for backfilling to reclaim and restore the damage area up to the extent possible.
6	The waste generated shall be concurrently backfilled in the mined out area. There shall be no external OB dump. 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 monthly basis.	Sequential backfilling and reclamation of the mined out area are being exercised during mining operation. Whenever backfilling will be done to the mined out area, subsoil will be used for backfilling to reclaim and restore the damage area up to the extent possible until vegetation come.

7	<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>No runoff is generated from mining activities. However, to collect & manage rain water during monsoon, part of mined out area is used as settling tank for the runoff.</p>
8	<p>Plantation shall be raised in an area of 6.98ha 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.</p>	<p>Being complied.</p>
9	<p>The project proponent shall ensure that there shall be no discharge from the mine.</p>	<p>Being adhered to.</p>
10	<p>The Project proponent shall carry out regular monitoring of spring discharge and its quality near Pakhar village on long term basis.</p>	<p>Monitoring is being carried out by recognized agency.</p>
11	<p>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.</p>	<p>Will be implemented after resume of mining activity.</p>
12	<p>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.</p>	<p>It is being monitored. Report enclosed.</p>

13	Prior permission from the competent authority should be obtained for drawl of water from the surface water bodies.	Agreed. Water cess is being paid on monthly basis to State Pollution Control Board for the Pakhar group of Mines.
14	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.	Will be ensured after resume of Mining activity.
15	Drills should either be operated with dust extractors or should be equipped with water injection system.	Wet drilling is being done in the drill holes intermittently for dust suppression by pumping water active during mining.
16	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.	Mines is discontinued since Sep'14 due to second renewal case as per directive by DMO.
17	Consent to operate should be obtained from SPCB prior to start of enhanced production from the mine.	Mines is discontinued since Sep'14 due to second renewal case as per directive by DMO. All procedure for getting the lease renewal has been done & very shortly mine will be operative.
18	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 from mine; hence ETP has not been installed.
19	The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna such as Indian Python etc. 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.	Action plan for conservation of flora and fauna spotted in the study area was prepared after due consultation with the local DFO and a copy of the same has already been submitted to the DFO for his comments, any suggestion and modification. On receipt of the same after vetting of State Forest Department, the action plan will be submitted to the MoEF. Will be implemented after resume of mining.
20	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.	Progressive Mine closure plan has been dully approved by Indian Bureau of Mines. FMCP related provision will be compiled as per statue.

GENERAL CONDITIONS

Sl No	Conditions	Compliance Status
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 Over Burden and Bauxite is being done as per the approved calendar plan. Mining has been not done during the financial year 2015-16.
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 ₂ , NO _x 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.	Complied. Monitoring Reports is enclosed as Annexure .
4	Data on ambient air quality (RPM, SPM, SO ₂ , NO _x) 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.	Complied. Monitoring Reports is enclosed as Annexure .
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 have been provided for sprinkling of water on haul roads and are generally being engaged at the places where active mining is in progress to arrest fugitive dust emission. Water spraying at dust prone area is also being done.
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.	Noise monitoring is being done at various locations of the work zone area. Workers engaged in operation of HEMMs, etc have also been provided with PPEs such as ear plug and ear muffs.
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 th May, 1993 and 31 st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	There is no effluent discharge from Mine. Workshop has an Oil Catchment Pit to trap oil and grease. It is being ensured to make it operational and effective as and when required.

8	<p>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.</p> <p>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.</p>	<p>Complied. Use of Personal Protective Equipment (PPE) by the individuals is being ensured. All the mine workers are being regularly and periodically sent to our own hospital for health checkup for any contraction of diseases due to exposure in dusty and noisy areas.</p> <p>Training on safety, health and environmental aspects of mining is being regularly imparted through VT centre and also through various other training programmes conducted by the State Government, recognized agencies, etc</p>
9	<p>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.</p>	<p>Separate Environmental Management Cell (EMC) has been constituted and is functioning effectively. Copy enclosed.</p>
10	<p>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.</p>	<p>The mine is running since 1976</p>
11	<p>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.</p>	<p>Statement of budgetary provision and actual expenses for environmental protection measure is enclosed as Annexure .</p> <p>It is once again reiterated that the funds so ear marked shall not be diverted for any other purposes other than it is committed at the beginning of the financial year.</p>
12	<p>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.</p>	<p>Agreed.</p>
13	<p>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.</p>	<p>Complied.</p>
14	<p>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.</p>	<p>Displayed.</p>

15	<p>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 http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubneshwar.</p>	<p>Complied. Copies of the advertisement made in the local newspapers, have already been submitted to the Regional Office.</p>
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Eco Ventures Pvt. Ltd.

Regd. Office: 2/37, Sarvapriya Vihar, Near IIT Gate, New Delhi-110016

Corporate Office: 7/8 Bhaveshwar Bhuvan, Opp Portugese Church, Near Dindayal Upadhyay Garden,
Gokhale Road (North), Dadar (West), Mumbai 400 028. Tel: +91 22 24370520 / 6672.

E: ecoventures.mumbai@gmail.com / ecoventures@eco-ventures.in

Mahabal Enviro Engineers Pvt. Ltd.

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

PAKHAR 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:

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

Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail:mahabalaranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

CONTENT

	LOCATION
	AMBIENT AIR QUALITY
1	Pakhar Plateau- Pakhar Hindalco Colony
2	Pakhar Plateau- Pakhar (115.13 ha.) Quarry No. 4
3	Pakhar Plateau- Pakhar 109.507 ha. (Minerals & Minerals) Working Pit
4	Pakhar Plateau Pakhar Mines(15.58 ha, Minerals & Minerals)
	NOISE LEVEL
1	Pakhar HINDALCO Colony
2	Pakhar Mine (115.13 ha.) Pakhar Plateau
3	Pakhar Mine (109.507 ha. Minerals & Minerals) Pakhar Plateau
4	Pakhar Mine (15.58 ha. Minerals & Minerals) Pakhar Plateau
	SPOT NOISE LEVEL
1	Near Poclain at Pakhar Mine (115.13 ha.)
2	Loading point near Dumper at Pakhar Mines (109.507 ha. Minerals & Minerals)
	DRINKING WATER
1	Canteen Drinking Water of Pakhar Mines





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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail:mahabalaranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 177/2015-16	Date: 31st March 2016
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: Pakhar Plateau- Pakhar Hindalco Colony	
Sample collected on:14.02.2016	
Received: 15.02.2016	
Registered: 15.02.2016	
Test Start/End Date: 16.02.2016/17.02.2016	

LOCATION/IDENTIFICATION: Sherengdag Plateau-Shrengdag Mines 155.81 ha.					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	25.1
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	26.5
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	58.0
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	32.1
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.12

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE





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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 178/2015-16	Date: 31st March 2016
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: Pakhar Plateau- Pakhar (115.13 ha.) Quarry No. 4	
Sample collected on: 14.02.2016	
Received: 15.02.2016	
Registered: 15.02.2016	
Test Start/End Date: 16.02.2016/17.02.2016	

LOCATION/IDENTIFICATION: Pakhar Plateau- Pakhar (115.13 ha.) Quarry No. 4					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	58.2
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	62.5
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	69.8
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	41.2
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.52

For Mahabal Enviro Engineers Pvt. Ltd.

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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabalanranchi@gmail.com

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Jan- Mar 2016

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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: Pakhar Plateau- Pakhar 109.507 ha. (Minerals & Minerals) working Pit	
Sample collected on: 14.02.2016	
Received: 15.02.2016	
Registered: 15.02.2016	
Test Start/End Date: 16.02.2016/17.02.2016	

LOCATION/IDENTIFICATION: Pakhar Plateau- Pakhar 109.507 ha. (Minerals & Minerals) working Pit					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	29.1
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	42.1
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	72.1
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	43.2
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.21

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)
Phone: 2582 0658/ 3139/ 1663/ 3154 Fax: 91-22-25823543 thane@mahabal.com



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At Booty, Near PHED Colony, Behind Pump House, PO – RMCC, District – Ranchi 834009,
Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 180/2015-16	Date: 31st March 2016
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: Pakhar Plateau Pakhar Mines(15.58 ha, Minerals & Minerals)	
Sample collected on: 14.02.2016	
Received: 15.02.2016	
Registered: 15.02.2016	
Test Start/End Date: 16.02.2016/17.02.2016	

LOCATION/IDENTIFICATION: Pakhar Plateau Pakhar Mines(15.58 ha, Minerals & Minerals)					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	11.2
Nitrogen Dioxide	NO _x	µg/m ³	80	IS:5182 (Part-6):1975(Reaff:2004)	20.1
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part-23)	52.5
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR (40) Appendix-L	41.2
Carbon Monoxide	CO	µg/m ³	2	EPA 600/P-99/001F	0.11

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E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 181/2015-16	Date: 31st March 2016
Sample described by customer: Measurement of Noise	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Noise	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Pakhar HINDALCO Colony	dB (A) L_{eq}	75	52.1	70	43	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 182/2015-16	Date: 31st March 2016
Sample described by customer: Measurement of Noise	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Noise	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Pakhar Mines (115.13 ha.)	dB (A) Leq	75	64.0	70	44.5	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

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Sample described by customer: Measurement of Noise	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Noise	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Pakhar Mine (109.507 ha. of Minerals & Minerals)	dB (A) Leq	75	63.0	70	41.5	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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Sample described by customer: Measurement of Noise	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: Measurement of Noise	
Sampling Method: Instrumental, using Sound level Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Pakhar Mine (15.58 ha. of minerals & Minerals)	dB (A) Leq	75	58.0	70	41.2	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE





Mahabal Enviro Engineers Pvt. Ltd.

Branch Office:

At Booty, Near PHED Colony, Behind Pump House, PO – RMCC, District – Ranchi 834009,
Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 185/2015-16	Date: 31st March 2016
Sample described by customer: Measurement of Spot 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 Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Dates
Pakhar Mines (115.13 ha.) Near Poclairn	dB (A) L _{eq}	75	64.0	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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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)
Phone: 2582 0658/ 3139/ 1663/ 3154 Fax: 91-22-25823543 thane@mahabal.com



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Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 186/2015-16	Date: 31st March 2016
Sample described by customer: Measurement of Spot 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 Metter	
Data Collection Date: 14.02.2016	
Analyse Date: 14.02.2016	

Location/Identification	Unit	Limit (day)	Result	Dates
Pakhar Mines (109.507 ha. Of Minerals & Minerals) Loading point near Dumper	dB (A) Leq	75	70.0	14/02/2016

For Mahabal Enviro Engineers Pvt. Ltd.

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E-mail:mahabalanranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

Report No: MEEPL/MAR 187/2015-16	Date: 31st March 2016
Sample described by customer : DRINKING WATER-POTABILITY	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Type: DRINKING WATER-POTABILITY	
Marks on Sample: Location: Canteen Drinking Water of Pakhar Mines	
Sample collected on:14.02.2016	
Quantity: 5 L X 2 No. PVC Can	
Received: 15.02.2016	
Registered: 15.02.2016	
Test Start/End Date: 16.02.2016/20.02.2016	

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
1	Colour	Hazen	<1	5 Max	APHA 22 nd 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	0.2	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	6.2	6.5-8.5	APHA 22 nd Ed. 2012, 4500-H+-B, 4-92
6	Free Chlorides (Residual)	mg/l	<0.05	0.2 min	APHA 22 nd Ed. 2012, 4500-CI-G, 4-69
7	Total Dissolved Solids	mg/l	72	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
10	Total hardness (as CaCO ₃)	mg/l	60	200 max	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO ₃)	mg/l	68	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	15	250 max	APHA 22 nd Ed. 2012, 4500-CI-b, 4-72
13	Sulphate (as SO ₄)	mg/l	7	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190



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Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

Continuation Sheet

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14	Nitrate (as NO ₃)	mg/l	1.5	45 max	APHA 22 nd Ed. 2012, 4500-NO ₃ -E, 4-125
15	Fluoride (as F)	mg/l	0.23	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.15	0.5 max	APHA 22 nd Ed. 2012, 4500-BB, 4-25
Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	24.2	75 max	APHA 22 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.9	30 max	APHA 22 nd Ed. 2012, 3500-Mg-B, 3-84
19	Ammonical Nitrogen/Total Ammonia	mg/l	<0.1	--	APHA 22 nd Ed. 2012, 4500-NH ₃ -F, 4-115
20	Iron (as Fe)	mg/l	0.10	0.3 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
21	Manganese (as Mn)	mg/l	N.D	0.1 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
22	Aluminium (as Al)	mg/l	0.02	0.03 max	APHA 22 nd Ed. 2012, 3500-Al-B, 3-61
23	Cadmium (as Cd)	mg/l	N.D	0.003 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
24	Chromium Total (as Cr)	mg/l	N.D	0.05 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
25	Copper (as Cu)	mg/l	N.D	0.05 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
26	Lead (as Pb)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
27	Zinc (as Zn)	mg/l	0.03	5 max	APHA 22 nd Ed. 2012, 3111-B, 3-18
28	Arsenic (as As)	mg/l	<0.01	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-38
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-23
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-38
31	Nickel (as Ni)	mg/l	<0.06	0.02 max	APHA 22 nd 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 nd Ed. 2012, 4500-CN.C & 4-39 & 4-44
34	Anionic detergents as MBAS	mg/l	<0.1	0.2 max	APHA 22 nd Ed. 2012, 5540-C.C & 5-53
35	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 5530-B & C 5-4753
36	Polynuclear aromatic hydrocarbons (PAH)	mg/l	N.D	0.0001 max	APHA 22 nd Ed. 2012, 6440, 6-93
37	Polychlorinated Biphenyls (PCBs)	mg/l	N.D	0.0005max	USEPA Method 8082
38	Sulphide (as S)	mg/l	N.D	0.05 max	APHA 22 nd Ed. 2012, 4500-S2-C 4-175 & F 4-178





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Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail:mahabalanranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

Jan- Mar 2016

Continuation Sheet

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
Microbiological Analysis					
1	Total Colliforms	MPN/100mL	<1.1	N.D	APHA 22 nd Ed. 2012, 9221-B & C, 9-66, 9-69 and 9-67
2	E-Coli	MPN/100mL	Absent	N.D	APHA 22 nd Ed. 2012, 9221-B & C, 9-66, 9-69 and 9-76
Pesticides Residues					
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 (Lindane)	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	Σ-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	Methoyl 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





Eco Ventures Pvt. Ltd.

Regd. Office: 2/37, Sarvapriya Vihar, Near IIT Gate, New Delhi-110016

Corporate Office: 7/8 Bhaveshwar Bhuvan, Opp Portugese Church, Near Dindayal Upadhyay Garden,
Gokhale Road (North), Dadar (West), Mumbai 400 028. Tel: +91 22 24370520 / 6672.

E: ecoventures.mumbai@gmail.com / ecoventures@eco-ventures.in

Mahabal Enviro Engineers Pvt. Ltd.

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

PAKHAR PLATEAU- ENVIRONMENTAL MONITORING REPORT

OCTOBER - DECEMBER 2015

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE





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Branch Office:

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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail:mahabalaranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

December 2015

Report no: : MEEPL/DEC019/2015-16	Date: 12 th 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: Pakhar Plateau- Pakhar Hindalco Colony Near Weigh Bridge	
Sample collected on: 24.11.2015	
Received:24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/28.11.2015	

LOCATION / IDENTIFICATION: Pakhar Plateau- Pakhar Hindalco Colony, Near Weigh Bridge

PARAMETERS	UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂ µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	28.6
Nitrogen Dioxide	NO ₂ µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	34.1
Particulate Matter (size less than 10 µm)	PM ₁₀ µg/m ³	100	IS:5182 (Part 23)	63.7
Particulate Matter (size less than 2.5 µm)	PM _{2.5} µg/m ³	60	USEPA CFR(40) Appendix-L	38.2
Carbon Monoxide	CO mg/m ³	2	EPA 600/P-99/001F	0.16

For Mahabal Enviro Engineers Pvt. Ltd.

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SENIOR EXECUTIVE



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Phone: 2582 0658 / 3139 / 1663 / 3154 Fax: 91-22-25823543 thane@mahabal.com



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

Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

Report no. : MEEPL/DEC034/2015-16	Date: 12 th 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: Pakhar Plateau- Pakhar (115.13 ha.) Quarry No. 3	
Sample collected on: 24.11.2015	
Received: 24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/28.11.2015	

LOCATION / IDENTIFICATION: Pakhar Plateau- Pakhar (115.13 ha.) Quarry No. 3					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	60.7
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	65.9
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	71.2
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	39.8
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.51

For Mahabal Enviro Engineers Pvt. Ltd.

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SENIOR EXECUTIVE



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(600 m from Hotel Rukhmini Palace Turn Opp Toyota Show Room. Near J B Sawant Bus Stop)
Phone: 2582 0658/ 3139/ 1663/ 3154 **Fax:** 91-22-25823543 **thane@mahabal.com**



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

Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail: mahabalranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

Report no. : MEEPL/DEC035/2015-16	Date: 12 th 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: Pakhar Plateau- Pakhar 109.507 ha. Working Pit	
Sample collected on: 24.11.2015	
Received: 24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/28.11.2015	

LOCATION / IDENTIFICATION: Pakhar Plateau- Pakhar 109.507 ha. Working Pit					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	32.8
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	46.7
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	77.2
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	46.9
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.26

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Hindalco Industries:Environmental Monitoring report

December 2015

Report no. : MEEPL/DEC036/2015-16	Date: 12 th 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: Pakhar Plateau- Pakhar Mines (15.58 ha.)	
Sample collected on: 24.11.2015	
Received: 24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/28.11.2015	

LOCATION / IDENTIFICATION: Pakhar Plateau- Pakhar Mines (15.58 ha.)					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	18.2
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	29.7
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	68.6
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	42.6
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.22

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Mobile No: +91 9431.102.102 / +91 9955.358.262,
E-mail: mahabairanchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

Report no : MEEPL/DEC037/2015-16	Date: 12 th December, 2015
Sample described by customer : DRINKING WATER	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample type: DRINKING WATER	
Marks on Sample: Location: PAKHAR MINES OFFICE	
Sample collected on: 24.11.2015	
Quantity: 5 L X 2 No. PVC Can	
Sample collected by: Mahabal Enviro Engineers Pvt. Limited	
Received: 24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/02.12.2015	

S.No	Parameters	Unit	Result	Acceptable Limit (IS10500:2012)	Method Reference
1.	Colour	Hazen	< 1	5 Max	APHA 22nd Ed. 2012, 2120-B, 2-6
2.	Odour	-	Agreeable	Agreeable	IS 3025 (Part 5):1983, Reaffirmed 2006
3.	Taste	-	Agreeable	Agreeable	IS 3025 (Part 7):1984, Reaffirmed 2006
4.	Turbidity	NTU	0.3	1 Max	APHA 22nd Ed. 2012, 2130-B, 2-13
5.	pH	-	6.6	6.5-8.5	APHA 22nd Ed. 2012, 4500-H+-B, 4-92
6.	Free Chlorides(Residual)	mg/l	<0.05	0.2 min	APHA 22nd Ed. 2012, 4500-Cl G, 4-69
7.	Total Dissolved Solids	mg/l	120	500 Max	IS 3025 (Part 16):1984 Reaffirmed 2006
8.	Monochloramines	mg/l	<0.05	-	APHA 22nd Ed. 2012, 4500-ClG, 4-69
9.	Dichloramines	mg/l	<0.05	-	APHA 22nd Ed. 2012, 4500-ClG, 4-69
10.	Total Hardness (as CaCO ₃)	mg/l	46	200 Max	APHA 22nd Ed. 2012, 2340-C, 2-44,45
11.	Alkalinity Total (as CaCO ₃)	mg/l	61	200 Max	IS 3025 (Part 23):1986 Reaffirmed 2009
12.	Chloride (as Cl)	mg/l	6.9	250 Max	APHA 22nd Ed. 2012, 4500-Cl-B, 4-72
13.	Sulphate (as SO ₄)	mg/l	3.8	200 Max	APHA 22nd Ed. 2012, 4500-SO4-E, 4-190



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Hindalco Industries:Environmental Monitoring report

December 2015

Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14.	Nitrate (as NO ₃)	mg/l	1.2	45 Max	APHA 22nd Ed. 2012, 4500-NO ₃ -E, 4-125
15.	Fluoride (as F)	mg/l	0.24	1 Max	APHA 22nd Ed. 2012, 4500-FB& D, 4-84, 4-87
16.	Boron (as B)	mg/l	0.17	0.5 Max	APHA 22nd Ed. 2012, 4500-BB, 4-25
17.	Calcium(as Ca)	mg/l	15.2	75 Max	APHA 22nd Ed. 2012, 3500-Ca-B, 3-67
18.	Magnesium (as Mg)	mg/l	3.9	30 Max	APHA 22nd Ed. 2012, 3500- Mg- B, 3-84
19.	Ammonical Nitrogen/ Total Ammonia	mg/l	<0.1	-	APHA 22nd Ed. 2012, 4500 NH ₃ -F, 4-115
20.	Iron (as Fe)	mg/l	0.09	0.3 Max	APHA 22nd Ed. 2012, 3111-B,3-18
21.	Manganese (as Mn)	mg/l	N.D	0.1 Max	APHA 22nd Ed. 2012, 3111-B, 318
22.	Aluminium (as Al)	mg/l	0.06	0.03 Max	APHA 22nd Ed. 2012, 3500- Al-B, 3-61
23.	Cadmium (as Cd)	mg/l	N.D	0.003 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
24.	Chromium Total (as Cr)	mg/l	N.D	0.05 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
25.	Copper (as Cu)	mg/l	N.D	0.05 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
26.	Lead (as Pb)	mg/l	N.D	0.01 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
27.	Zinc (as Zn)	mg/l	0.10	5 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
28.	Arsenic (as As)	mg/l	<0.01	0.01 Max.	APHA 22nd Ed. 2012, 3114-C,3-38
29.	Mercury (as Hg)	mg/l	N.D.	0.001 Max.	APHA 22nd Ed. 2012, 3112-B,3-23
30.	Selenium (as Se)	mg/l	N.D.	0.01 Max.	APHA 22nd Ed. 2012, 3114-C, 3-38
31.	Nickel (as Ni)	mg/l	<0.06	0.02 Max.	APHA 22nd 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 22nd Ed. 2012, 4500-CN, C & E, 4-39 & 4-44
34.	Anionic detergents as MBAS	mg/l	<0.1	0.2 Max.	APHA 22nd Ed. 2012, 5540-C, 5-53
35.	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	N.D	0.001 Max.	APHA 22nd Ed. 2012, 5530- B & C, 5-47
36.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	N.D	0.0001 mg/L Max.	APHA 22nd Ed. 2012, 6440, 6-93
37.	Polychlorinated Biphenyls (PCBs)	µg/L	N.D	0.0005 mg/l Max.	USEPA Method 8082
38.	Sulphide (as S)	mg/l	N.D	-	APHA 22nd Ed. 2012, 4500- S2-C 4-175 & F 4-178



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Hindalco Industries:Environmental Monitoring report

December 2015

Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
Microbiological Analysis					
1.	Total Coliforms	MPN/100 mL	<1.1	N.D	APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69
2.	E-Coli	MPN/100 mL	Absent	N.D	APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9-76
Pesticides Residues					
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 (Lindane)	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 532-2000
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.	Methyl 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 water is safe for drinking.

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

Report no : MEEPL/DEC038/2015-16			Date: 12 th 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: Pakhar Mines (115.13 ha.)					
Sample collected on: 24.11.2015					
Quantity: 2 kgs					
Sample collected by: Mahabal Enviro Engineers Pvt Limited					
Received: 24.11.2015					
Registered: 24.11.2015					
Test Start/End Date: 24.11.2015/02.12.2015					
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	1.0	gm/cm ³
4.	Water Holding Capacity	--	F.A.U.N (2007)	23.7	%
5.	pH	--	F.A.U.N (2007)	7.1	-
6.	Electrical Conductivity	--	F.A.U.N (2007)	206	µs/cm
7.	Organic Carbon	--		0.54	%
8.	Organic Matter	--	Black & White Wet Digestion Method	0.67	%
9.	Available Nitrogen	--	Soil & Water Book by P.K Gupta	110.0	mg/kg
10.	Available Phosphorus	--	Soil & Water Book by P.K Gupta	14.8	mg/kg
11.	Available Potassium	--	Soil & Water Book by P.K Gupta	380	mg/kg
12.	Exchangeable Calcium	Ca	Soil & Water Book by P.K Gupta	22.5	meq/100gm
13.	Exchangeable Magnesium	Mg	Soil & Water Book by P.K Gupta	1.89	meq/100gm
14.	Exchangeable Sodium	Na	Soil & Water Book by P.K Gupta	2.23	meq/100gm
15.	Exchangeable Potassium	K	Soil & Water Book by P.K Gupta	1.48	meq/100gm
16.	Total Exchangeable Bases		Soil & Water Book by P.K Gupta	30.5	meq/100gm
17.	Manganese	Mn	USEPA 3052	0.51	mg/kg
18.	Arsenic	As	USEPA 3052	2.30	mg/kg
19.	Silica	SiO ₂	USEPA 3052	60.0	%
20.	Aluminum	Al ₂ O ₃	USEPA 3052	6.9	%
21.	Iron	Fe ₂ O ₃	USEPA 3052	5.0	%
22.	Calcium	CaO	USEPA 3052	8.94	%
23.	Magnesium	MgO	USEPA 3052	1.90	%
24.	Sodium	Na ₂ O	USEPA 3052	0.39	%
25.	Potassium	K ₂ O	USEPA 3052	0.22	%
26.	Sulphate	SO ₄	USEPA 3052	0.84	%

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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E-mail: mahabalaranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

Report no : MEEPL/DEC039/2015-16	Date: 12 th December, 2015
Sample described by customer: SURFACE WATER	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample type: SURFACE WATER	
Marks on Sample: Location: Water Harvesting Pond (Pakhar Mines 115.13 ha.)	
Sample collected on: 24.11.2015	
Quantity: 5 L X 2 No. PVC Can	
Sample collected by: Mahabal EnviroEngineers Pvt Limited	
Received: 24.11.2015	
Registered: 24.11.2015	
Test Start/End Date: 24.11.2015/30.11.2015	

S.No	Parameters	Unit	Result	Acceptable Limit (IS10500:2012)	Method Reference
1.	Colour	Hazen	< 1	5 Max	APHA 22nd Ed. 2012, 2120-B, 2-6
2.	Odour	-	Agreeable	Agreeable	IS 3025 (Part 5):1983, Reaffirmed 2006
3.	Taste	-	Agreeable	Agreeable	IS 3025 (Part 7):1984, Reaffirmed 2006
4.	Turbidity	NTU	0.3	1 Max	APHA 22nd Ed. 2012, 2130-B, 2-13
5.	pH	-	7.0	6.5-8.5	APHA 22nd Ed. 2012, 4500-H+-B, 4-92
6.	Free Chlorides(Residual)	mg/l	<0.05	0.2 min	APHA 22nd Ed. 2012, 4500-Cl G, 4-69
7.	Total Dissolved Solids	mg/l	99	500 Max	IS 3025 (Part 16):1984 Reaffirmed 2006
8.	Monochloramines	mg/l	<0.05	-	APHA 22nd Ed. 2012, 4500-ClG, 4-69
9.	Dichloramines	mg/l	<0.05	-	APHA 22nd Ed. 2012, 4500-ClG, 4-69
10.	Total Hardness (as CaCO ₃)	mg/l	45	200 Max	APHA 22nd Ed. 2012, 2340-C, 2-44,45
11.	Alkalinity Total (as CaCO ₃)	mg/l	63	200 Max	IS 3025 (Part 23):1986 Reaffirmed 2009
12.	Chloride (as Cl)	mg/l	7.1	250 Max	APHA 22nd Ed. 2012, 4500-Cl-B, 4-72
13.	Sulphate (as SO ₄)	mg/l	4.0	200 Max	APHA 22nd Ed. 2012, 4500-SO4-E, 4-190



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Hindalco Industries:Environmental Monitoring report

December 2015

Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14.	Nitrate (as NO ₃)	mg/l	1.2	45 Max	APHA 22nd Ed. 2012, 4500-NO ₃ -E, 4-125
15.	Fluoride (as F)	mg/l	0.23	1 Max	APHA 22nd Ed. 2012, 4500-FB&D, 4-84, 4-87
16.	Boron (as B)	mg/l	0.18	0.5 Max	APHA 22nd Ed. 2012, 4500-BB, 4-25
17.	Calcium(as Ca)	mg/l	15.2	75 Max	APHA 22nd Ed. 2012, 3500-Ca-B, 3-67
18.	Magnesium (as Mg)	mg/l	3.9	30 Max	APHA 22nd Ed. 2012, 3500- Mg- B, 3-84
19.	Ammonical Nitrogen/ Total Ammonia	mg/l	<0.1	-	APHA 22nd Ed. 2012, 4500 NH ₃ -F, 4-115
20.	Iron (as Fe)	mg/l	0.09	0.3 Max	APHA 22nd Ed. 2012, 3111-B,3-18
21.	Manganese (as Mn)	mg/l	N.D	0.1 Max	APHA 22nd Ed. 2012, 3111-B, 318
22.	Aluminium (as Al)	mg/l	0.06	0.03 Max	APHA 22nd Ed. 2012, 3500- Al-B, 3-61
23.	Cadmium (as Cd)	mg/l	N.D	0.003 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
24.	Chromium Total (as Cr)	mg/l	N.D	0.05 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
25.	Copper (as Cu)	mg/l	N.D	0.05 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
26.	Lead (as Pb)	mg/l	N.D	0.01 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
27.	Zinc (as Zn)	mg/l	0.10	5 Max.	APHA 22nd Ed. 2012, 3111-B,3-18
28.	Arsenic (as As)	mg/l	<0.01	0.01 Max.	APHA 22nd Ed. 2012, 3114-C,3-38
29.	Mercury (as Hg)	mg/l	N.D.	0.001 Max.	APHA 22nd Ed. 2012, 3112-B,3-23
30.	Selenium (as Se)	mg/l	N.D.	0.01 Max.	APHA 22nd Ed. 2012, 3114-C, 3-38
31.	Nickel (as Ni)	mg/l	<0.06	0.02 Max.	APHA 22nd 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 22nd Ed. 2012, 4500-CN, C & E, 4-39 & 4-44
34.	Anionic detergents as MBAS	mg/l	<0.1	0.2 Max.	APHA 22nd Ed. 2012, 5540-C, 5-53
35.	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	N.D	0.001 Max.	APHA 22nd Ed. 2012, 5530- B & C, 5-47
36.	Polynuclear aromatic hydrocarbons (PAH)	µg/L	N.D	0.0001 mg/L Max.	APHA 22nd Ed. 2012, 6440, 6-93
37.	Polychlorinated Biphenyls (PCBs)	µg/L	N.D	0.0005 mg/l Max.	USEPA Method 8082
38.	Sulphide (as S)	mg/l	N.D	-	APHA 22nd Ed. 2012, 4500- S2-C 4-175 & F 4-178



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Hindalco Industries: Environmental Monitoring report

December 2015

Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
Microbiological Analysis					
1.	Total Coliforms	MPN/100 mL	<1.1	N.D	APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69
2.	E-Coli	MPN/100 mL	Absent	N.D	APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9-76
Pesticides Residues					
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 (Lindane)	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 532-2000
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.	Methyl 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 water is not contaminated.

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: MEEPL/DEC040/2015-16	Date: 12 th 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 Noise Level.	
Sampling Method: Instrumental, Using Sound level Meter	
Sampling Done by: Mahabal Enviro Engineers Pvt. Ltd.	
Sample Collected on: 24.11.2015	

Location / Identification	Unit	Limit (day)	Result	Limit (night)	Result	Dates
Pakhar Mines 115.13 ha. Working Pit	dB(A) L_{eq}	75	70.2	70	61.3	24.11.2015

For Mahabal Enviro Engineers Pvt. Ltd.

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SENIOR EXECUTIVE



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Hindalco Industries: Environmental Monitoring report

December 2015

Report no: MEEPL/DEC041/2015-16	Date: 12 th 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: 21.11.2015	

Location / Identification Spot Noise	Unit	Limit (day)	Result	Dates
Near Poclairn at at Pakhar Mines 115.13 ha.	dB(A) L _{eq}	75	72.7	24.11.2015

For Mahabal Enviro Engineers Pvt. Ltd.

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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 (35.12Ha), 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
Minerals & Minerals Limited					
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



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	
Gurdari	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	
	1061	Hand Pump	28.36		24.93		25.25		25.90	
	1059	Hand Pump	38.11		36.20		35.15		36.25	
Kujam I, Kujam II & Amtipani Mines	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
	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	

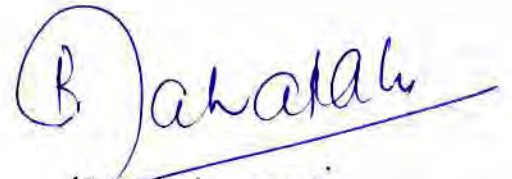


(B.K. Mahapatra) -
Convenor (Quality & Environment)

Office Order

Environmental Cell has been re-constituted at Pakhar Bauxite Mines (Area 15.58 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. Pradeep Kumar Bhaleker- Manager (Coordinator)
2. Mr. Akhilesh Singh (Mine Surveyor)-Member
3. Mr. Ramnath Bhagat (Mining Mate)-Member



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