



Ref No: HIL/LHD/JP (M)/MoEF/ 0440

Date: 26.11.2015

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 Amtipani Bauxite Mining project of M/s Hindalco Industries Limited located in Dist- Gumla, Jharkhand for the period April'15 to Sep'15.**

Ref: **Environmental Clearance letter no J-11015/241/2005-IA II (M) dated 14<sup>th</sup> August 2006**

Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Amtipani Bauxite Mining project** of M/s Hindalco located in Gumla, Jharkhand for the period **April'15 to Sep'15.**

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: Regional Office, MoEF, Ranchi

**HINDALCO INDUSTRIES LIMITED**

Mines Division, Court Road  
PO & Distt. Lohardaga (Jharkhand)  
PIN - 835 302, India  
Tel. +91 6526 224112/224015/223113  
Fax +91 6526 224118

**Regd. Office**

Century Bhawan, 3rd Floor  
Dr. Annie Besant Road, Worli, Mumbai, 400 030, India  
Tel +91 22 66626666

**Website** : www.hindalco.com

**Email** hindalco@adityabirla.com

**Corporate Identity No.** L27020MH1958PLC011238

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

**AMTIPANI BAUXITE MINES (190.95 Ha)**

**Period: April'15-September'15**

**MoEF Environment Clearance ref : No J - 11015/241/2005-IA.II(M) dated 14 Aug'06**

Sl No	Conditions	Compliance Status
<b>Specific Conditions</b>		
1	All the conditions stipulated by the State Pollution Control Board in their NOC should be effectively implemented.	Implementations of the stipulated conditions are fulfilled.
2	The mining operations shall not intersect groundwater table. Prior approval of the MoEF and CGWA shall be obtained for mining below water table.	The mining operation is confined within shallow depth (20m max) and as per the previous study conducted by authorized agency [Center for Ground Water Studies, Kolkata (WB)] the ground water level is in the range of 80-100m from ground level.
3	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.	This provision has been taken care of during land acquisition with permission of competent authority i.e. concerned Deputy Commissioner (D.C.) and consent of Raiyat (Land Owner) for 20 years period and will return the land so acquired as per the norms set by D.C. in land purchased agreement. <b>(Documents already submitted)</b>
4	Top soil shall be stacked properly with proper slope with adequate measures and should be used for reclamation and rehabilitation of mined out areas.	Top soil is being stacked separately & used for reclamation and rehabilitation at appropriate time.
5	The waste generated in the initial period shall be dumped temporarily and backfilled in the mined out area. There shall be no permanent external OB dump in the project area. Concurrent backfilling should start from the fifth year onwards. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on six monthly basis.	Concurrent backfilling of the waste in worked out quarry is being practiced. Also, the Wastes generated previously & stacked separately are being used for backfilling.

③



6	<p>Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil and mineral dump. 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. 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 settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</p>	<p>Commensurate with the progress of mining activities over the period of time. Garland drains, settling ponds and toe walls are constructed as per suitability.</p>
7	<p>Plantation shall be raised in an area of 79.3 ha including a green belt of adequate width by planting the native species around the ML area, roads, etc. in consultation with the local DFO/Agriculture Department. The density of the trees should be around 1500 plants per ha.</p>	<p>During 2015-16 around 2500 plantation carried out. Green belt development programme will keep place with progress of mining activities.</p>
8	<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>Study on Water resource evaluation and their development potential has been carried out by Center for Ground Water Studies, Kolkata during Nov-Dec '06. We are in the process to finalize the issue of implementation of suitable conservation measure in consultation with CGWB. A water harvesting plan submitted at Ground water Board, Ranchi for approval.</p>
9	<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>This is being monitored in all season. Report enclosed.</p>
10	<p>Prior permission from the competent authority should be obtained for drawl of water from the surface water bodies.</p>	<p>Rainwater harvested during rainy season is being used for sprinkling on haul roads and raising plantation. As per the terms</p>



		and conditions in Mining lease deed, we have the liberty to use water.
11	The project proponent shall monitor the spring discharge on long term basis (at lease one major spring) both in terms of quantity and quality of water and records maintained. Six monthly report should be submitted to the Ministry of Environment and Forests and its Regional Office located at Bhubneshwar.	Is being monitored.
12	Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be overloaded.	Regular maintenance of vehicles are undertaken to minimize vehicular emission. All measures are being taken to control vehicular emission.
13	Drills should either be operated with dust extractors or should be equipped with water injection system	Wet drilling is done in the drill holes intermittently for dust suppression by pumping water.
14	Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented	Blasting time is fixed for Lunch Time i.e. 12.00 Noon -1.00 PM All efforts are being taken to mitigate impact of blasting.
15	Consent to operate should be obtained from SPCB prior to start of production of mine	Consent to operate has been obtained prior to start of production.
16	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 has not been installed. The sewage water from domestic uses is being collected through individual septic tanks & soak pits. Sullage is collected to an integrated soak pit.
17	Land ouster and land loser/affected people should be compensated and rehabilitated as per the National Policy on Resettlement and Rehabilitation of project Affected Families (NPRR), 2003	Land ouster and land loser/affected people are being compensated and rehabilitated as per the statute.
18	The higher benches of the excavated void to be converted into water reservoir shall be terraced and afforested to stabilize the slopes. Peripheral fencing shall be done along the excavated area.	Implementation process is in progress.
19	A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	Progressive mine Closure Plan along with mining scheme has been prepared and submitted to IBM timely for approval.

## 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 & Forests.	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 mining plan/scheme and obtained EC capacity. Quantum of mineral and OB excavated during the FY2015-16 is annexed.
3	Conservation measures for protection of flora and fauna in the core & buffer zone should be drawn up in consultation with the local forest and wildlife departments.	A plan has been prepared and being implemented for conservation of flora and fauna.
4	Four ambient air quality-monitoring stations 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 meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	Ambient air monitoring stations established and monitoring is being undertaken in consultation with State Pollution Control Board. Monitoring report annexed.
5	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 Bhopal and the State Pollution Control Board / Central Pollution Control Board once in six months.	Monitoring report annexed.
6	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Mobile water tanker with sprinkling facility has been provided along haul roads, loading, unloading & at transfer points to arrest dust emission.
7	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	Complied. PPEs are provided to workers.
8	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st 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 effluent discharge from Mine.

(B)



9	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.	PPE's provided. Periodic training on safety & occupational health is being imparted to workers and health checks up conducted.
10	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	A separate environmental management cell with suitable qualified personnel already formed and informed. <b>(Annexed)</b>
11	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.	Progressive mine Closure Plan along with mining scheme has been approved by IBM, Ranchi. Opening notice had been submitted to concern authorities.
12	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubneshwar.	Separate budget is being prepared for the purpose and expenditure is being reported to the Ministry. <b>(Annexed)</b>
13	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.	Vide Point no. 11 above.
14	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.
15	A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom and suggestion / representation has been received while processing the proposal.	Complied
16	State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.	Displayed.
17	The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days 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	Complied. <b>(Documents already submitted).</b>

<p>Pollution Control Board and also at web site of the Ministry of Environment and Forests at <b>http://envfor.nic.in</b> and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubneshwar.</p>	
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P. Jha



**GEMS PROJECTS PVT.LTD.**

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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**M/S HINDALCO INDUSTRIES LIMITED**  
MINES DIVISION, DIST.-LOHARDAGA, JHARKHAND

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**REPORT**  
**OF**  
**ENVIRONMENTAL MONITORING DATA**  
**OF NETARHAT PLATEAU**  
**FOR**  
**(JULY TO SEPTEMBER QUARTER-2015)**





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

## CONTENT

	<b>LOCATION</b>
<b>AMBIENT AIR QUALITY</b>	
1	Haralangda Pit of Gurdari Mine 584.19 ha., Netarhat Plateau
2	Near Workshop in Amtipani Mine 190.95 ha., Netarhat Plateau
3	Near Working Pit of Kujam-II Mine 157.38 ha., Netarhat Plateau
4	Near Working Pit - Kujam Mines-I, Netarhat Plateau
<b>NOISE LEVEL</b>	
1	Gurudari Pit (584.19 ha. ) Natarhat Plateau
2	Amtipani Pit (190.95 ha. ) Natarhat Plateau
3	Kujam-I (80.87 ha. ) Natarhat Plateau
4	Kujam-II (157.38 ha. ) Natarhat Plateau
<b>SPOT NOISE LEVEL</b>	
1	Poclain at Haralagda Pit
2	Dumper at Working Pit
3	Compressor Near Quarry 4 at Kujam-I
4	Drill Rig at Working Pit Kujam-I
<b>DRINKING WATER</b>	
1	Drinking Water of Netarhat Site Office
2	Drinking Water of Gurdari Mine Office
<b>SURFACE WATER QUALITY</b>	
1	Gurdari Mines(584.19 ha.) Rain Water harvesting Pond
2	Amitipani Mines (190.95 ha.) Rain Water harvesting pond
3	Kujam-I Mines (80.87 ha.) Rain Water harvesting pond
4	Kujam-II Mines (157.38 ha. ) Rain Water harvesting pond
<b>SOIL QUALITY</b>	
1	Topsoil Gurdari Mine (584.19 ha.)
2	Topsoil Amitipani Mine (190.95 ha.)
3	Topsoil Kujam-I Mine (80.87 ha.)
4	Topsoil Kujam-II Mine (157.38 ha.)





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16		Date: 3 <sup>rd</sup> October 2015			
Sample described by customer: <b>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>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Haralangda Pit of Gurdari Mine 584.19 ha., Netarhat Plateau</b>					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: : <b>Haralangda Pit of Gurdari Mine 584.19 ha., Netarhat Plateau</b>					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	32.00
Nitrogen Dioxide	NO <sub>x</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-6): 1975(Reaff:2004)	42.70
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part-23)	78.5
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR (40) Appendix-L	46.6
Carbon Monoxide	CO	µg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.13







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Report No: SEPT002/2015-16		Date: 3 <sup>rd</sup> October 2015			
Sample described by customer: <b>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>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Near Workshop in Amtipani Mine 190.95 ha., Netarhat Plateau</b>					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: <b>Near Workshop in Amtipani Mine 190.95 ha., Netarhat Plateau</b>					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	34.70
Nitrogen Dioxide	NO <sub>x</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-6): 1975(Reaff:2004)	48.90
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part-23)	73.8
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR (40) Appendix-L	48.7
Carbon Monoxide	CO	µg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.18





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Sample described by customer: <b>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>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Near Working Pit of Kujam-II Mine 157.38 ha, .Netarhat Plateau</b>					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
<b>LOCATION/IDENTIFICATION: Near Working Pit of Kujam-II Mine 157.38 ha, .Netarhat Plateau</b>					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	25.50
Nitrogen Dioxide	NO <sub>x</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-6): 1975(Reaff:2004)	32.00
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part-23)	74.7
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR (40) Appendix-L	49.6
Carbon Monoxide	CO	µg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.19







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Sample described by customer: <b>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>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Near Working Pit - Kujam Mines-I, Nerarhat Plateau</b>					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: <b>Near Working Pit - Kujam Mines-I, Nerarhat Plateau t</b>					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	35.00
Nitrogen Dioxide	NO <sub>x</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-6): 1975(Reaff:2004)	42.70
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part-23)	72.80
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR (40) Appendix-L	31.79
Carbon Monoxide	CO	µg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.40





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Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Noise</b>	
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	
Test Start: 23.09.2015	
End Date: 24.09.2015	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result)	Dates
Month			Average of 16 continuous hours in Sep-15		Average of 8 continuous hours in Sep-15	
Gurudari Pit (584.19 ha. ) Natarhat Plateau	dB (A) $L_{eq}$	75	64.9	70	55.9	24/09/2015







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Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Noise</b>	
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	
Test Start: 23.09.2015	
End Date: 24.09.2015	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result)	Dates
Month			Average of 16 continuous hours in Sep-15		Average of 8 continuous hours in Sep-15	
Amtipani Pit (190.95 ha. ) Natarhat Plateau	dB (A) L <sub>eq</sub>	75	69.6	70	59.7	24/09/2015





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Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Noise</b>	
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	
Test Start: 23.09.2015	
End Date: 24.09.2015	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result)	Dates
Month			Average of 16 continuous hours in Sep-15		Average of 8 continuous hours in Sep-15	
Kujam-I (80.87 ha.) Natarhat Plateau	dB (A) L <sub>eq</sub>	75	65.8	70	58.3	24/09/2015







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Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Noise</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: <b>Jharkhand</b>	
Country: India	
Sample Description: <b>Measurement of Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Test Start: 23.09.2015	
End Date: 24.09.2015	

Location/Identification	Unit	Limit (day)	Result	Limit (night)	Result)	Dates
Month			Average of 16 continuous hours in Sep-15		Average of 8 continuous hours in Sep-15	
Kujam-II (157.38 ha. ) Natarhat Plateau	dB (A) L <sub>eq</sub>	75	62.9	70	55.8	24/09/2015





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(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Spot Noise</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: <b>Measurement of Spot Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
<b>Gurudari Mine (584.19 ha.)</b>				
Poclain at Haralagda Pit	dB (A) $L_{eq}$	75	70.7	23/09/2015







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In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
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Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Spot Noise</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: <b>Measurement of Spot Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
<b>Amtipani Mine (190.95 ha.)</b>				
Dumper at Working Pit	dB (A) $L_{eq}$	75	71.8	23/09/2015





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Spot Noise</b>	
Client Name: Hindalco Industries Limited	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: <b>Measurement of Spot Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
<b>Kujam-I Mine (80.87 ha.)</b>				
Compressor at Quarry No.4	dB (A) L <sub>eq</sub>	75	74.3	23/09/2015







# GEMS PROJECTS PVT.LTD

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16	Date: 3 <sup>rd</sup> October 2015
Sample described by customer: <b>Measurement of Spot Noise</b>	
Client Name: <b>Hindalco Industries Limited</b>	
Client Address: Lohardaga	
Postal Code: 835203	
State: Jharkhand	
Country: India	
Sample Description: <b>Measurement of Spot Noise</b>	
Sampling Method: Instrumental, using Sound level Metter	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
<b>Kujam-I Mine (80.87 ha.)</b>				
Drill rig at Working Pit	dB (A) $L_{eq}$	75	74.8	23/09/2015



# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3 <sup>rd</sup> October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Drinking Water of Netrahat Site Office					
Sample collected on: 24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD.					
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	0.4	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	7.5	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	110	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	73	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	10.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO <sub>4</sub> )	mg/l	9.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO <sub>3</sub> )	mg/l	1.30	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.15	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







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	20.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.5	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.10	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	0.015	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	0.09	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as Hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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	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					

Note: Water tested and found to suitable for drinking purpose





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16				Date: 3 <sup>rd</sup> October 2015	
Sample described by customer : <b>DRINKING WATER</b>					
Client Name: <b>Hindalco Industries Limited</b>					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: <b>DRINKING WATER</b>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Drinking Water of Gurdari Mine Office</b>					
Sample collected on: 24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: <b>M/S GEMS PROJECT PVT LTD.</b>					
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	0.5	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	7.8	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	120	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO <sub>3</sub> )	mg/l	64	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
11	Alkalinity Total (as CaCO <sub>3</sub> )	mg/l	72	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	12.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO <sub>4</sub> )	mg/l	6.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO <sub>3</sub> )	mg/l	1.10	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.25	1 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.10	0.5 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	18.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.0	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.12	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	0.01	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	0.05	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as Hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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	0.0005max	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







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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	ε- 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					

Note: Water tested and found to suitable for drinking purpose





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16		Date: 3 <sup>rd</sup> October 2015			
Sample described by customer : <b>SURFACE WATER</b>					
Client Name: <b>Hindalco Industries Limited</b>					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: <b>SURFACE WATER</b>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Gurdari Mines. . Rain Water harvesting Pond (584.19 ha.)					
Sample collected on: 24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: <b>M/S GEMS PROJECT PVT LTD.</b>					
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	0.50	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	7.1	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	105	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO <sub>3</sub> )	mg/l	63	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
11	Alkalinity Total (as CaCO <sub>3</sub> )	mg/l	72	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	14.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO <sub>4</sub> )	mg/l	8.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO <sub>3</sub> )	mg/l	1.40	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.25	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	23.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
18	Magnesium (as Mg)	mg/l	3.4	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.06	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	0.05	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	0.06	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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	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					





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3 <sup>rd</sup> October 2015		
Sample described by customer : <b>SURFACE WATER</b>					
Client Name: <b>Hindalco Industries Limited</b>					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: <b>SURFACE WATER</b>					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: <b>Amitipani Mines 190.95 ha. Rain Water harvesting pond</b>					
Sample collected on: 24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: <b>M/S GEMS PROJECT PVT LTD.</b>					
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	0.4	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	6.8	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	104	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO <sub>3</sub> )	mg/l	49	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
11	Alkalinity Total (as CaCO <sub>3</sub> )	mg/l	64	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	8.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO <sub>4</sub> )	mg/l	4.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO <sub>3</sub> )	mg/l	1.20	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.24	1 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.18	0.5 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	17.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	4.2	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.08	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	0.05	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	0.08	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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	0.0005max	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







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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 (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	β-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					





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16				Date: 3 <sup>rd</sup> October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location:Kujam-I Mines (80.87 ha.) .Rain Water harvesting pond					
Sample collected on:24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD.					
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	0.4	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	7.6	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	105	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 CaCO3)	mg/l	70	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO3)	mg/l	85	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	13.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO4)	mg/l	10.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO3)	mg/l	1.40	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.30	1 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.34	0.5 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

17	Calcium (as Ca)	mg/l	34.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	5.0	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	0.08	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	0.05	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	0.08	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as Hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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, 4500-52-C 4- 175 & F 4-178





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

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	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					







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3 <sup>rd</sup> October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location:Kujam-II Mines (157.38 ha.) Rain Water harvesting pond					
Sample collected on:24.09.2015					
Quantity: 5 L X 2 No. PVC Can					
Test Start/End Date: 24.09.2015/28.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD.					
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	0.5	1 Max	APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13
5	pH	--	7.7	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	100	500 max	IS 3025 (Part 16): 1984, Reaffirmed 2006
8	Monochloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO3)	mg/l	75	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69
11	Alkalinity Total (as CaCO3)	mg/l	80	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	14.0	250 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO4)	mg/l	10.0	200 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO3)	mg/l	1.50	45 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.20	1 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.30	0.5 max	APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25



# GEMS PROJECTS PVT.LTD.

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17	Calcium (as Ca)	mg/l	35.0	75 max	APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	6.0	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.06	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	0.03	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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







# GEMS PROJECTS PVT.LTD.

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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	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					





# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3rd October 2015		
Sample described by customer : SOIL					
Client Name: Hindalco Industries Limited					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: SOIL					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Topsoil Gurdari Mine (584.19 ha.)					
Sample collected on: 24.09.2015					
Quantity: 2KGS					
Test Start/End Date: 24.09.2015/25.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD					
Sl. No.	Analysis		Method	Result	Unit
1	Colour	--	--	Gray	
2	Texture	--	F.A.U.N (2007)	Loamy Sand	
3	Bulk density	--	By Bulk density Apparatus	1.09	gm/cm <sup>3</sup>
4	Water Holding Capacity	--	F.A.U.N (2007)	33.0	%
5	pH	--	F.A.U.N (2007)	6.80	--
6	Electrical Conductivity	--	F.A.U.N (2007)	210.0	µs/cm
7	Organic Carbon	--		0.70	%
8	Organic matter	--	Black & White Wet Digestion method	1.10	%
9	Available Nitrogen	--		120.0	mg/kg
10	Available Phosphorus	--		15.0	mg/kg
11	Available Potassium	--		330	mg/kg
12	Exchangeable calcium			25.00	meq/100gm
13	Exchangeable Magnesium			1.40	meq/100gm
14	Exchangeable Sodium			2.60	meq/100gm
15	Exchangeable Potassium			1.70	meq/100gm
16	Total Exchangeable bases		USEPA 3052	35.00	meq/100gm
17	Manganese		USEPA 3052	0.60	mg/kg
18	Arsenic		USEPA 3052	2.5	mg/kg
19	Silica		USEPA 3052	65.0	%
20	Aluminum		USEPA 3052	10.0	%
21	Iron		USEPA 3052	8.00	%
22	Calcium		USEPA 3052	10.00	%
23	Magnesium		USEPA 3052	2.80	%
24	Sodium		USEPA 3052	0.40	%
25	Potassium		USEPA 3052	0.15	%
26	Sulphate		USEPA 3052	0.70	%







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16 Date: 3rd October 2015  
Sample described by customer : SOIL  
Client Name: Hindalco Industries Limited  
Client Address: Lohardaga  
Postal Code: 835203  
State: Jharkhand

Country: India  
Sample Type: SOIL  
Received: 24.09.2015  
Registered: 24.09.2015  
Marks on Sample: Location: Topsoil Amitipani Mine (190.95 ha.)  
Sample collected on: 24.09.2015  
Quantity: 2KGS  
Test Start/End Date: 24.09.2015/25.09.2015  
Sample collected by: M/S GEMS PROJECT PVT LTD

Sl. No.	Analysis	Method	Result	Unit
1	Colour	--	Gray	
2	Texture	F.A.U.N (2007)	Loamy Sand	
3	Bulk density	By Bulk density Apparatus	1.15	gm/cm <sup>3</sup>
4	Water Holding Capacity	F.A.U.N (2007)	33.0	%
5	pH	F.A.U.N (2007)	6.60	--
6	Electrical Conductivity	F.A.U.N (2007)	205.0	µs/cm
7	Organic Carbon	--	0.70	%
8	Organic matter	Black & White Wet Digestion method	1.20	%
9	Available Nitrogen	--	115.0	mg/kg
10	Available Phosphorus	--	25.0	mg/kg
11	Available Potassium	--	350	mg/kg
12	Exchangeable calcium		35.00	meq/100gm
13	Exchangeable Magnesium		1.70	meq/100gm
14	Exchangeable Sodium		2.50	meq/100gm
15	Exchangeable Potassium		1.65	meq/100gm
16	Total Exchangeable bases	USEPA 3052	45.00	meq/100gm
17	Manganese	USEPA 3052	0.70	mg/kg
18	Arsenic	USEPA 3052	2.8	mg/kg
19	Silica	USEPA 3052	60.0	%
20	Aluminum	USEPA 3052	14.0	%
21	Iron	USEPA 3052	6.50	%
22	Calcium	USEPA 3052	9.00	%
23	Magnesium	USEPA 3052	2.60	%
24	Sodium	USEPA 3052	0.50	%
25	Potassium	USEPA 3052	0.30	%
26	Sulphate	USEPA 3052	0.80	%





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In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3rd <sup>1</sup> October 2015		
Sample described by customer : SOIL					
Client Name: Hindalco Industries Limited					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: SOIL					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Topsoil Kujam-I Mine (80.87 ha.)					
Sample collected on: 24.09.2015					
Quantity: 2KGS					
Test Start/End Date: 24.09.2015/25.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD					
Sl. No.	Analysis		Method	Result	Unit
1	Colour	--	--	Gray	
2	Texture	--	F.A.U.N (2007)	Loamy Sand	
3	Bulk density	--	By Bulk density Apparatus	1.10	gm/cm <sup>3</sup>
4	Water Holding Capacity	--	F.A.U.N (2007)	35.0	%
5	pH	--	F.A.U.N (2007)	6.50	--
6	Electrical Conductivity	--	F.A.U.N (2007)	206.0	µs/cm
7	Organic Carbon	--		0.70	%
8	Organic matter	--	Black & White Wet Digestion method	1.20	%
9	Available Nitrogen	--		110.0	mg/kg
10	Available Phosphorus	--		20.0	mg/kg
11	Available Potassium	--		330	mg/kg
12	Exchangeable calcium			30.00	meq/100gm
13	Exchangeable Magnesium			1.40	meq/100gm
14	Exchangeable Sodium			2.30	meq/100gm
15	Exchangeable Potassium			1.65	meq/100gm
16	Total Exchangeable bases		USEPA 3052	40.00	meq/100gm
17	Manganese		USEPA 3052	0.40	mg/kg
18	Arsenic		USEPA 3052	2.5	mg/kg
19	Silica		USEPA 3052	75.0	%
20	Aluminum		USEPA 3052	10.0	%
21	Iron		USEPA 3052	2.50	%
22	Calcium		USEPA 3052	10.00	%
23	Magnesium		USEPA 3052	2.50	%
24	Sodium		USEPA 3052	0.40	%
25	Potassium		USEPA 3052	0.20	%
26	Sulphate		USEPA 3052	0.50	%







# GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur  
(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16			Date: 3rd October 2015		
Sample described by customer : SOIL					
Client Name: Hindalco Industries Limited					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample Type: SOIL					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Topsoil Kujam-II Mine (157.38 ha.)					
Sample collected on: 24.09.2015					
Quantity: 2KGS					
Test Start/End Date: 24.09.2015/25.09.2015					
Sample collected by: M/S GEMS PROJECT PVT LTD					
Sl. No.	Analysis		Method	Result	Unit
1	Colour	--	--	Gray	
2	Texture	--	F.A.U.N (2007)	Loamy Sand	
3	Bulk density	--	By Bulk density Apparatus	1.15	gm/cm <sup>3</sup>
4	Water Holding Capacity	--	F.A.U.N (2007)	33.0	%
5	pH	--	F.A.U.N (2007)	6.20	--
6	Electrical Conductivity	--	F.A.U.N (2007)	200.0	µs/cm
7	Organic Carbon	--		0.50	%
8	Organic matter	--	Black & White Wet Digestion method	1.10	%
9	Available Nitrogen	--		100.0	mg/kg
10	Available Phosphorus	--		25.0	mg/kg
11	Available Potassium	--		300	mg/kg
12	Exchangeable calcium			33.00	meq/100gm
13	Exchangeable Magnesium			1.50	meq/100gm
14	Exchangeable Sodium			2.10	meq/100gm
15	Exchangeable Potassium			1.50	meq/100gm
16	Total Exchangeable bases		USEPA 3052	42.00	meq/100gm
17	Manganese		USEPA 3052	0.50	mg/kg
18	Arsenic		USEPA 3052	2.0	mg/kg
19	Silica		USEPA 3052	70.0	%
20	Aluminum		USEPA 3052	15.0	%
21	Iron		USEPA 3052	2.00	%
22	Calcium		USEPA 3052	15.00	%
23	Magnesium		USEPA 3052	2.00	%
24	Sodium		USEPA 3052	0.50	%
25	Potassium		USEPA 3052	0.30	%
26	Sulphate		USEPA 3052	0.40	%





# *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](mailto:ecoventures.mumbai@gmail.com) / [ecoventures@eco-ventures.in](mailto:ecoventures@eco-ventures.in)

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

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

### **NETARHAT PLATEAU- ENVIRONMENTAL MONITORING REPORT**

**JUNE 2015**

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: [mahabalranchi@gmail.com](mailto:mahabalranchi@gmail.com)

**Hindalco Industries: Environmental Monitoring report**

**June 2015**

Report no: JUNE029/2015-16	Date: 24 <sup>th</sup> June, 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: Netarhat Plateau- Gurdari Pit Hara Langra Quari	
Sample collected on: 27.05.2015	
Received: 28.05.2015	
Registered: 28.05.2015	
Test Start/End Date: 18.06.2015/20.06.2015	

LOCATION / IDENTIFICATION: Netarhat Plateau- Gurdari Pit Hara Langra Quari					
PARAMETERS		UNIT	LIMIT	METHOD	27/05/2015
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	32.6
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	44.3
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	87.9
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	42.1
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.31

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Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail: [mahabalranchi@gmail.com](mailto:mahabalranchi@gmail.com)

Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE030/2015-16	Date: 24 <sup>th</sup> June, 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: Netarhat Plateau- Amtipani Workshop	
Sample collected on: 27.05.2015	
Received: 28.05.2015	
Registered: 28.05.2015	
Test Start/End Date: 18.06.2015/20.06.2015	

### LOCATION / IDENTIFICATION: Netarhat Plateau- Amtipani Workshop

PARAMETERS	UNIT	LIMIT	METHOD	27/05/2015
Sulphur Dioxide	SO <sub>2</sub> µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	65.7
Nitrogen Dioxide	NO <sub>2</sub> µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	59.4
Particulate Matter (size less than 10 µm)	PM <sub>10</sub> µg/m <sup>3</sup>	100	IS:5182 (Part 23)	81.9
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub> µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	47.4
Carbon Monoxide	CO mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.42

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](mailto:thane@mahabal.com)





# 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: mahabalranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE031/2015-16	Date: 24 <sup>th</sup> June, 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: Netarhat Plateau- Kujam II Weight Bridge	
Sample collected on: 24.05.2015	
Received: 28.05.2015	
Registered: 28.05.2015	
Test Start/End Date: 18.06.2015/20.06.2015	

LOCATION / IDENTIFICATION: Netarhat Plateau- Kujam II Weight Bridge					
PARAMETERS	UNIT	LIMIT	METHOD	24/05/2015	
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	28.2
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	30.5
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	77.4
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	29.4
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.56

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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](mailto:mahabalranchi@gmail.com)

Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE032/2015-16	Date: 24 <sup>th</sup> June, 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: Netarhat Plateau- Kujam I	
Sample collected on: 24.05.2015	
Received: 28.05.2015	
Registered: 28.05.2015	
Test Start/End Date: 18.06.2015/20.06.2015	

LOCATION / IDENTIFICATION: Netarhat Plateau- Kujam I					
PARAMETERS		UNIT	LIMIT	METHOD	24/05/2015
Sulphur Dioxide	SO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182 (Part-2):2001 (Reaff:2006)	29.4
Nitrogen Dioxide	NO <sub>2</sub>	µg/m <sup>3</sup>	80	IS:5182(Part-6):1975 (Reaff:2004)	35.6
Particulate Matter (size less than 10 µm)	PM <sub>10</sub>	µg/m <sup>3</sup>	100	IS:5182 (Part 23)	79.4
Particulate Matter (size less than 2.5 µm)	PM <sub>2.5</sub>	µg/m <sup>3</sup>	60	USEPA CFR(40) Appendix-L	45.7
Carbon Monoxide	CO	mg/m <sup>3</sup>	2	EPA 600/P-99/001F	0.49

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](mailto:thane@mahabal.com)





# 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:mahabalanranchi@gmail.com

Hindalco Industries:Environmental Monitoring report

June 2015

Report no: : JUNE033/2015-16				Date: 24 <sup>th</sup> June, 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: Netarhat Plateau Near Gurdari Pit					
Sample collected on: 27.05.2015					
Quantity: 2 kgs					
Sample collected by: Mahabal Enviro Engineers Pvt Limited					
Received:28.05.2015					
Registered: 28.05.2015					
Test Start/End Date: 18.06.2015/20.06.2015					
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	1.9	gm/cm <sup>3</sup>
4.	Water Holding Capacity	--	F.A.U.N (2007)	24.1	%
5.	pH	--	F.A.U.N (2007)	7.2	-
6.	Electrical Conductivity	--	F.A.U.N (2007)	212	µs/cm
7.	Organic Carbon	--		0.60	%
8.	Organic Matter	--	Black & White Wet Digestion Method	0.90	%
9.	Available Nitrogen	--	Soil & Water Book by P.K Gupta	113.0	mg/kg
10.	Available Phosphorus	--	Soil & Water Book by P.K Gupta	14.2	mg/kg
11.	Available Potassium	--	Soil & Water Book by P.K Gupta	375	mg/kg
12.	Exchangeable Calcium	Ca	Soil & Water Book by P.K Gupta	24.5	meq/100gm
13.	Exchangeable Magnesium	Mg	Soil & Water Book by P.K Gupta	1.21	meq/100gm
14.	Exchangeable Sodium	Na	Soil & Water Book by P.K Gupta	2.26	meq/100gm
15.	Exchangeable Potassium	K	Soil & Water Book by P.K Gupta	1.50	meq/100gm
16.	Total Exchangeable Bases		Soil & Water Book by P.K Gupta	30.4	meq/100gm
17.	Manganese	Mn	USEPA 3052	0.55	mg/kg
18.	Arsenic	As	USEPA 3052	2.00	mg/kg
19.	Silica	SiO <sub>2</sub>	USEPA 3052	52.5	%
20.	Aluminum	Al <sub>2</sub> O <sub>3</sub>	USEPA 3052	7.2	%
21.	Iron	Fe <sub>2</sub> O <sub>3</sub>	USEPA 3052	5.0	%
22.	Calcium	CaO	USEPA 3052	8.4	%
23.	Magnesium	MgO	USEPA 3052	1.95	%
24.	Sodium	Na <sub>2</sub> O	USEPA 3052	0.30	%
25.	Potassium	K <sub>2</sub> O	USEPA 3052	0.28	%
26.	Sulphate	SO <sub>4</sub>	USEPA 3052	0.79	%

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Hindalco Industries: Environmental Monitoring report

June 2015

Report no : JUNE034/2015-16		Date: 24 <sup>th</sup> June, 2015			
<b>Sample described by customer: SOIL</b>					
Client Name: Hindalco Industries Limited					
Client Address: Lohardaga					
Postal Code: 835203					
State: Jharkhand					
Country: India					
Sample type: SOIL					
Marks on Sample: Location: Netarhat Plateau – Kujam & Amtipani					
Sample collected on: 24.05.2015					
Quantity: 2 kgs					
Sample collected by: Mahabal Enviro Engineers Pvt Limited					
Received: 28.05.2015					
Registered: 28.05.2015					
Test Start/End Date: 17.06.2015/19.06.2015					
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	1.9	gm/cm <sup>3</sup>
4.	Water Holding Capacity	--	F.A.U.N (2007)	24.1	%
5.	pH	--	F.A.U.N (2007)	7.2	-
6.	Electrical Conductivity	--	F.A.U.N (2007)	216	µs/cm
7.	Organic Carbon	--		0.60	%
8.	Organic Matter	--	Black & White Wet Digestion Method	0.90	%
9.	Available Nitrogen	--	Soil & Water Book by P.K Gupta	115.0	mg/kg
10.	Available Phosphorus	--	Soil & Water Book by P.K Gupta	14.2	mg/kg
11.	Available Potassium	--	Soil & Water Book by P.K Gupta	372	mg/kg
12.	Exchangeable Calcium	Ca	Soil & Water Book by P.K Gupta	24.6	meq/100gm
13.	Exchangeable Magnesium	Mg	Soil & Water Book by P.K Gupta	1.21	meq/100gm
14.	Exchangeable Sodium	Na	Soil & Water Book by P.K Gupta	2.26	meq/100gm
15.	Exchangeable Potassium	K	Soil & Water Book by P.K Gupta	1.50	meq/100gm
16.	Total Exchangeable Bases		Soil & Water Book by P.K Gupta	30.5	meq/100gm
17.	Manganese	Mn	USEPA 3052	0.54	mg/kg
18.	Arsenic	As	USEPA 3052	2.00	mg/kg
19.	Silica	SiO <sub>2</sub>	USEPA 3052	52.4	%
20.	Aluminum	Al <sub>2</sub> O <sub>3</sub>	USEPA 3052	7.24	%
21.	Iron	Fe <sub>2</sub> O <sub>3</sub>	USEPA 3052	5.0	%
22.	Calcium	CaO	USEPA 3052	8.5	%
23.	Magnesium	MgO	USEPA 3052	1.94	%
24.	Sodium	Na <sub>2</sub> O	USEPA 3052	0.30	%
25.	Potassium	K <sub>2</sub> O	USEPA 3052	0.28	%
26.	Sulphate	SO <sub>4</sub>	USEPA 3052	0.80	%

Vijay Pandey  
SENIOR EXECUTIVE





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**Hindalco Industries: Environmental Monitoring report**

**June 2015**

Report no: : JUNE035/2015-16	Date: 24 <sup>th</sup> June, 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: Amtipani Mine – Water Harvesting Pond	
Sample collected on: 24.05.2015	
Quantity: 5 L X 2 No. PVC Can	
Sample collected by: Mahabal EnviroEngineers Pvt Limited	
Received: 28.05.2015	
Registered: 28.05.2015	
Test Start/End Date: 17.06.2015/19.06.2015	

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	-	6.9	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	97	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 <sub>3</sub> )	mg/l	47	200 Max	APHA 22nd Ed. 2012, 2340-C, 2-44,45
11.	Alkalinity Total (as CaCO <sub>3</sub> )	mg/l	61.4	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 <sub>4</sub> )	mg/l	3.8	200 Max	APHA 22nd Ed. 2012, 4500-SO4-E, 4-196



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Hindalco Industries: Environmental Monitoring report

June 2015

## Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14.	Nitrate (as NO <sub>3</sub> )	mg/l	1.1	45 Max	APHA 22nd Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125
15.	Fluoride (as F)	mg/l	0.22	1 Max	APHA 22nd Ed. 2012, 4500-FB&D, 4-84, 4-87
16.	Boron (as B)	mg/l	0.19	0.5 Max	APHA 22nd Ed. 2012, 4500-BB, 4-25
17.	Calcium (as Ca)	mg/l	15.3	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 <sub>3</sub> -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, 3-18
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, 3114-C, 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 <sub>6</sub> H <sub>5</sub> 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

June 2015

## Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
<b>Microbiological Analysis</b>					
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
<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 (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
<b>Remarks: N.D- Not Detected</b>					

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

Vijay Pandey  
SENIOR EXECUTIVE



Date:26.11.2015

### OFFICE ORDER

In connection with the earlier office order dated 10.11.2014 the re constituted team of Environment management cell to ensure compliance of various environmental Acts, regulations & rules at Mines Division, Hindalco, Lohardaga as follows:

The Environment Management Cell will consist of:


1. B. K. Mahapatra, DGM (Quality & Environment), Convenor.

Members:

2. Ajay Kumar Pandey, Manager (Bagru Mines)
3. A Anbarasu, Mines Manager (Serengdag Mines)
4. S P Jha, Mines Manager (Pakhar Mines)
5. Kiran Sankar Singh, Mines Manager (Gurdari)
6. Vidya Sagar Singh, Mines Manager (Kujam)
7. Amar Bharati, Mines Manager (Amtipani)
8. Rajesh Ambastha, Mines Manager (Chiro Kukud & Orsa)
9. Ananda Sahu, Mines Manager (Bimarla Bauxite Mines)
10. Biplab Mukherjee (Asst. Manager- Geology)

By order

  
Bijesh Kumar Jha

 Joint President (Mines)

Cc to: - All Mines Manager  
All Department head  
Notice Board.

**HINDALCO INDUSTRIES LIMITED**

Mines Division, Court Road  
PO & Distt. Lohardaga (Jharkhand)  
PIN - 835 302, India  
Tel. +91 6526 224112/224015/223113  
Fax +91 6526 224118

**Regd. Office**

Century Bhawan, 3rd Floor  
Dr. Annie Besant Road, Worli, Mumbai, 400 030, India  
Tel +91 22 66626666

Website: [www.hindalco.com](http://www.hindalco.com)

Email [hindalco@adityabirla.com](mailto:hindalco@adityabirla.com)

Corporate Identity No. L27020MH1958PLC011238



**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 to Sep'2015)
1	Pollution Control & Environment monitoring	15,40,000/-	2,62,293/-
2	Reclamation/ Back filing & Rehabilitation	3,89,90,000/-	1,45,51,281/-
3	Green belt & Plantation	60,00,000/-	28,68,213/-
4	Rural Development	1,64,71,000/-	1,04,36,128/-

\*\*Part of OB removed cost.

  
Convener  
Environment Management Cell  
Hindalco Industries Limited

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

NAME OF THE MINES	MINING LEASE AREA (IN HA)	MINED OUT AREA (HA)	BACK FILLED AREA (HA)	PRODUCTIO N (In MT)	OVERBURDEN (In Cu.M)
Shrengdag Bauxite Mines	155.81	4.04	3.50	140103.00	428240.00
Gurdari Bauxite Mines	584.19	5.66	4.92	175340.00	273881.00
Jalim & Sanai	12.14	0.50	0.05	23569.00	16500.00
Serangdag	140.06	0.00	0.00	0.00	0.00
Pakhar Buxite Mines	115.13	1.43	1.90	104145.00	143361.70
Pakhar Buxite Mines	8.09	0.00	0.00	0.00	0.00
Kujam-I	80.87	1.54	0.47	84970.00	82735.79
Kujam-II	157.38	3.46	1.26	77365.00	215398.22
Amtipani	190.95	2.27	1.53	89045.00	121267.01
Chiro-Kukud	152.57	1.28	2.97	51890.00	80377.18
Orsa Bauxite Mines	196.36	0.00	0.00	0.00	0.00
Hisri New	14.55	0.00	0.00	0.00	0.00
Bhusar	65.31	0.00	0.00	0.00	0.00
Bagru	75.41	0.00	0.00	0.00	0.00
<b>Minerals &amp; Minerals Limited</b>					
Pakhar Buxite Mines	109.51	1.40	1.62	157280.00	137012.31
Pakhar Buxite Mines	15.58	0.00	0.00	0.00	0.00
Bimarla Bauxite Mines	134.53	0.00	0.00	0.00	0.00

  
**Convener**

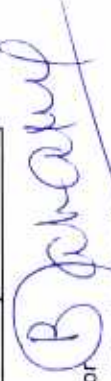
Environment Management Cell  
 Hindalco Industries Limited



**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	905	Open Well		21.74		24.13				
	910	Open Well		24.32		24.55				
	915	Open Well		29.41		28.43				
	903	Open Well		22.83		33.11				
	909	Open Well		17.54		28.74				
Pakhar	1000	Open Well		24.95		22.69				
	1083	Hand Pump	35.36		31.63					
	1027	Open Well		25.84		28.36				
Sherengdag	1094	Hand Pump	41.74		39.55					
	1081	Hand Pump	39.65		31.30					
	1055	Hand Pump	33.07		27.53					
	1066	Hand Pump	27.76		26.27					
Gurdari	1045	Hand Pump	29.32		27.85					
	1061	Hand Pump	28.36		24.93					
	1059	Hand Pump	38.11		36.20					
	1075	Hand Pump	27.98		26.82					
	1075	Hand Pump	28.37		29.33					
Kujam	1040	Open Well		33.97		21.88				
	1041	Open Well		33.66		24.85				
	1064	Hand Pump	31.55		28.68					
Chiro Kukud	1052	Hand Pump	22.39			21.12				
	1148	Hand Pump	33.40		28.39					
	1151	Hand Pump	37.62		31.85					
	1084	Hand Pump	34.25		33.11					

  
 Convenor  
 (Quality & Environment)