

ADITYA BIRLA



Ref No: HIL/LHD/JP (M)/MoEF/439

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 Kujam-II 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-11015/242/2005-IA II(M) dated 14th August 2006**

Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Kujam-II (157.38Ha)** 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. Amie 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
Kujam II Bauxite Mines (157.38 Ha) -Capacity 3.0 LTPA**

Period: April' 15 to Sep'15

MoEF & CC Environment Clearance No...J-11015/297/20114AM (M) dated 21.07.2015

Sl no	Specific Conditions	Compliance
i	Implementation of all the conditions as specified in earlier EC vide no. J-11015/242/2005-1A.11 (M), dated 14.08.2006 and shall be complied by M/s Hindalco Industries Limited.	Implemented. Certified compliance reports duly submitted to MoEF regional office, Ranchi.
ii	Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Jharkhand and any other Court of Law, if any, as may be applicable to this project.	Agreed.
iii	The environmental clearance is valid for 13 years as the life of mine is 13 years.	Agreed, This may extend subject to enhancement of reserve in due course of mining.
iv	Environmental clearance is subject to obtaining clearance, if any, under the Wildlife (Protection) Act, 1972 from the competent authority, as may be applicable to this project.	Not applicable to this project.
v	The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Jharkhand and effectively implement all the conditions stipulated therein.	Consent to Operate will be obtained for enhanced of production capacity. Applied online as per statutory of JSPCB.
vi	No mining activities will be allowed in forest area for which the Forest Clearance is not available.	There is no forest area involved within the lease.
vii	Project Proponent has to conduct a study from an Institution of Repute on the impact of Bauxite dust on Crop Productivity for agricultural land located around mines and mitigation measures to be implemented by Project Proponent to reduce the impact.	Agreed.

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viii	Project Proponent has to implement the Recommendation by the Institute for Crops most suited in this environment and training to the farmers to switch over to new cropping system which will sustain nutrient loading.	Agreed.
ix	Implementation of the Recommendations of National Institute of Miners Health for ensuring good occupational environment for mine workers.	Occupational health study is being done as per the recommendation of the 10 th safety committee proposal.
x	Use of mechanical devices with total mechanization and reducing use of explosives.	Being explored.
xi	Concurrent reclamation of mined out areas.	Concurrent back filling/ reclamation is being carried out in mined out areas.
xii	Use of effective sprinkler system to suppress fugitive dust on haul road and other transport road and comprehensive study for slope stabilization of mine benches and OB dumps in one year.	Effective water sprinkling is being done to suppress fugitive dust on haul road by mobile water tanker during dry season.
xiii	Implementation of Action Plan on the issues raised during the Public Hearing. The proponent shall complete all the tasks as per the action plan submitted with the budgetary provisions during the public hearing held on 11.07.2013. The issues raised during Public Hearing were discussed during the Meeting, which inter-alia, included, local employment, regular water spraying to prevent pollution and socio economic development i.e. water facilities, medical and education etc. As per the villager's requirements, it was informed by the Proponent that they would prefer to take care of local employment, assistance in medical, drinking water and education facilities etc. These have been incorporated in the action plan with budgetary provisions.	Being implemented as per the issues raised during the Public Hearing dated 11.07.2013.
xiv	Implementation of Recommendation of Compliance Report by Regional Office of Ministry of Environment, Forest and Climate Change.	Is being complied.



xv	Washing of all transport vehicles should be done inside the mining lease.	Agreed.
xvi	A comprehensive ore evacuation plan for all existing mines of the Project Proponent in the area may be made by streamlining transport of ore based on proper study.	Agreed. Already evacuation plan has been prepared and transport has been streamlined.
xvii	Regular and periodical medical examination of the workers engaged in the project shall be carried out and records maintained; also, Occupational health check-ups for workers having some ailments like BP, diabetes, habitual smokers, etc. shall be undertaken once in six months and necessary remedial/preventive measures taken accordingly.	Regular and periodical medical examination of the workers engaged in the project is being carried out and records maintained.
xviii	Implementation of Environment Management Policy of the Company w.r.t, judicious use of Mineral resources for growth & development synchronizing mining & environment with prosperity.	Environment Management Policy of the Company w.r.t, judicious use of Mineral resources for growth & development synchronizing mining & environment with prosperity is being implemented.
xix	Specific programmes be initiated especially covering education, health care, livelihood generation, infrastructure development & promotion of sports & culture for SC/ST population; Regular monitoring of ground water table to be carried out, as also the depth of water available in the network of existing wells, by constructing new piezometers as required.	All these aspects are cover under CSR activities being carried out in and around the area. Regular monitoring of water table is being done at the points and report submitted to JSPCB and MoEF & CC.
xx	Effective safeguard measures, such as regular water sprinkling, shall be carried out in critical areas prone to air pollution and having high levels of PM10 and PM2.5 such as haul roads, loading and unloading points and transfer points. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.	Regular water sprinkling is being carried out in critical areas such as haul roads, loading and unloading points and transfer points. Ambient Air Quality parameters are found within the norms prescribed by the Central Pollution Control Board in this regard.



xxi	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly. Occupational health and safety measures for workers who are having some ailments like BP, diabetes, or are habitual smokers, should have health check-up once in six months.	Pre-placement medical examination and periodical medical examination of the workers engaged in the project is being carried out and records maintained as per statute.
xxii	Stratified layer system of plantation to be adopted in consultation with the State Govt., which would effectively mitigate the additional dust, sound and vibration.	Layer system of plantation will be adopted in consultation with the Forest Dept, which would effectively mitigate the additional dust, sound and vibration.
xxiii	The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and ground water for the project.	Rainwater harvested during rainy season is being used for sprinkling on haul roads and raising plantation. Spring water is drawn from the down the hill pockets ponds for drinking purposes. Hence, as per the terms and conditions in Mining lease deed, we have permission from the Deputy Commissioner for drawl of water from the surface water bodies. Water cess is being paid regularly to Jharkhand State Pollution Control Board.
xxiv	The mining operations shall be restricted to above ground water table and it should not intersect groundwater table. In case of working below ground water table, prior approval of the Ministry of Environment, Forest and Climate Change and Central Ground Water Authority shall be obtained, for which a detailed hydro-geological study shall be carried out.	The mining operations will be restricted to above ground water table only.
xxv	The pollution due to transportation load on the environment will be effectively controlled & water sprinkling will also be done regularly. Vehicles with PUC only will be allowed to ply. The mineral transportation shall be carried out through covered trucks only and	Mobile water tanker with sprinkling facility has been provided along haul roads, loading, unloading & at transfer points to arrest dust emission.

	the vehicles carrying the mineral shall not be overloaded. Project should obtain 'PUC' certificate from all the vehicles from authorized pollution testing centre.	Regular maintenance of vehicles are undertaken to minimize vehicular emission. All measures are being taken to control vehicular emission. Vehicles with PUC only are allowed to ply for transportation of Bauxite.
xxvi	There shall be planning, developing and implementing facility of rainwater harvesting measures on long term basis in consultation with Regional Director, Central Groundwater Board and implementation of conservation measures to augment ground water resources in the area in consultation with Central Ground Water Board.	A detail rain water harvesting plan to augment ground water has been prepared and submitted to Ground water Board.
xxvii	Regular monitoring of ground water table to be carried out at the upstream and depth of water available in the dug well is to be measured. Monitoring to be done by establishing a network of existing wells and constructing new piezometers.	Monitoring of ground water table is being carried out regularly and reported along with six monthly compliance report.
xxviii	Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.	Monitoring of Ambient Air Quality is being done as per statute.
xxix	The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any mining operations.	No natural watercourse and/or water resources will be obstructed due to any mining operations.
xxx	The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be maintained to 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for	Top soil is being stacked separately & used for reclamation and rehabilitation at appropriate time.

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	<p>stabilization of the dump. The entire excavated area shall be backfilled and afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office located at Ranchi on six monthly basis.</p>	
xxxii	<p>Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies 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 sit material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.</p>	<p>Catch drains and siltation ponds of appropriate size is being constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies. Harvested water is being used for watering the mine area, roads, green belt development etc.</p>
xxxiii	<p>Dimension of the retaining wall at the toe of over burden dumps and OB benches within the mine to check run-off and siltation shall be based on the rain fall data.</p>	<p>Retaining wall at the toe of over burden dumps and OB benches within the mine to check run-off is being provided as per necessity.</p>
xxxiiii	<p>Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM10 and PM2.5 such as haul road, loading and unloading point and transfer points. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Regular monitoring of the flow rate of the springs and perennial</p>	<p>Regular water sprinkling is being carried out in critical areas prone to air pollution and having high levels of PM10 and PM2.5 such as haul road, loading and unloading point and transfer points. Ambient Air Quality parameters found within the norms prescribed by the Central</p>

	nallahs flowing in and around the mine lease shall be carried out and records maintained.	Pollution Control Board in this regard.
xxxiv	Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented. Drills shall either be operated with dust extractors or equipped with water injection system.	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.
xxxv	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, Mobile toilets, mobile SIP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Agreed.
xxxvi	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change. 5 years in advance of final mine closure for approval.	A Final Mine Closure Plan along with details of Corpus Fund will be submitted to the Ministry of Environment, Forest and Climate Change in appropriate time for approval.

Sl no	Specific Conditions	Compliance
i	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.	No change in mining technology and scope of working will be made without prior approval of the Ministry of Environment, Forest and Climate Change.
ii	No change in the calendar plan including excavation, quantum of bauxite ore and waste should be made.	Being adhered to.
iii	The critical parameters such as PM10 (size less than 10 micro meter), PM2.5 (size less than 2.5 micro meter), NO in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored	Monitoring of AAQ and water quality is being done as per statute and the monitored data is being uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain.

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	<p>periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS))]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change, which is available on the website of the Ministry www.envfor.nic.in shall also be referred in this regard for its compliance.</p>	
iv	<p>Four ambient air quality-monitoring stations should be established in the core zone as well as buffer zone for PM10, PM2.5, SO2 & NOx monitoring. Location of the stations should be decided based on the ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board. Data on ambient air quality should be regularly submitted to the Ministry including its Regional Office located at Ranchi and the State Pollution Control Board/Central Pollution Control Board once in six month.</p>	<p>Ambient air monitoring stations established and monitoring is being undertaken in consultation with State Pollution Control Board. Monitoring report annexed.</p>
v	<p>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.</p>	<p>Mobile water tanker with sprinkling facility has been provided along the haul roads, loading, unloading & at transfer points to arrest dust emission.</p>
vi	<p>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.</p>	<p>Necessary measures are being implemented to control of noise levels below 85 dBA. PPEs are provided to workers.</p>
vii	<p>Regular monitoring of water quality</p>	<p>Regular monitoring of water quality</p>

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	upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change, its Regional Office, Ranchi, Central Groundwater Authority, Regional Director, Central Ground water Board, State Pollution Control Board and Central Pollution Board.	upstream and downstream of water bodies is being carried out and record of monitoring data maintained and submitted to the Ministry of Environment, Forest and Climate Change, its Regional Office, Ranchi, State Pollution Control Board and Central Pollution Board.
viii	Regular monitoring of ground water level and quality shall be carried out in constructing new piezometers during the mining operation. The monitoring shall 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 Ministry of Environment, Forest and Climate Change and its Regional Office, Ranchi, Central Ground Water Authority and Regional Director, Central Ground Water Board.	Regular monitoring of ground water level and quality is being carried out and reported.
ix	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 19m May, 1993 and 31' 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.
x	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	As it is operating mines -PPE's provided. Periodic training on safety & occupational health is being imparted to workers and health checks up conducted.
xi	A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	A separate environmental management cell has been established under the control of a Senior Executive. (Copy enclosed)

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xii	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Ranchi.	The fund earmarked for environmental protection measures is being kept in separate account. Year wise expenditure is being reported to the Ministry and its Regional Office located at Ranchi.
xiii	The project authorities should inform to the Regional Office located at Ranchi regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	Date of financial closures and final approval of the project will be implemented in due time. Mines is operative since 18.03.2009.
xiv	The Regional Office of this Ministry located at Ranchi 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.
xv	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Ranchi, Central Pollution Control Board and State Pollution Control Board.	Six monthly report on the status of the earlier EC is being duly and timely submitted. The same will followed for this EC (expanded capacity).
xvi	The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Ranchi, Central Pollution Control Board and State Pollution Control Board.	Six monthly report on the status of the earlier EC is being duly and timely submitted. The same will followed for this EC (expanded capacity).
xvii	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.	Copy of Clearance letter submitted to concern Panchayat.



xviii	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.	Agreed
xix	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 Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located Ranch'.	Published in two newspapers widely circulated (Hindustan and Dainik Jagran) on 27.07.2015. Paper cutting enclosed.

B. Bahadur



JHARKHAND MINES, LOHARDAGA

P & A DEPARTMENT

DATE:

NEWS PAPER:

हिन्दुस्तान

रांची • सोमवार • 27 जुलाई 2015

ADITYA BHILA

NOTICE

This is to inform that Kujam-II Bauxite Mines (Lease area 157.38 Ha.) project of M/s Hindalco Industries Limited located in Village Kujam and Chirodih, Thana Bishunpur, District Gumla, Jharkhand has been accorded Environment Clearance for Expanded capacity by Government of India, Ministry of Environment and Forest. A copy of the clearance letter is available with the Jharkhand State Pollution Control Board and also at website of the Ministry of Environment and Forest at <http://envfor.nic.in>

**Joint President - Mines
Hindalco Industries Limited
Lohardaga-Jharkhand**

Ref: HILP&A/Advertisement/8-25.07.15



JHARKHAND MINES, LOHARDAGA

P & A DEPARTMENT

DATE:

NEWS PAPER:

दैनिक जागरण

रांची, 27 जुलाई 2015



हिण्डालको इंडस्ट्रीज लिमिटेड

लोहखण्ड - झारखण्ड

सूचना

यह सूचित किया जाता है कि हिण्डालको इंडस्ट्रीज लिमिटेड के कुजाम-II बॉक्सईट माइन्स (पट्टा क्षेत्र 157.38 हे.) के अन्तर्गत कुजाम एवं चिरोडीह गांव, थाना बिशुनपुर, जिला गुमला, झारखण्ड को भारत सरकार के वन एवं पर्यावरण मंत्रालय द्वारा क्षमता विस्तार हेतु पर्यावरण स्वीकृति प्रदान किया गया है। इस स्वीकृति का प्रपत्र झारखण्ड राज्य प्रदूषण नियंत्रण बोर्ड के पास उपलब्ध है, एवं पर्यावरण मंत्रालय के वेबसाइट <http://envfor.nic.in> में उपलब्ध है।

संयुक्त अध्यक्ष-ज्ञान
हिण्डालको इंडस्ट्रीज लिमिटेड
लोहखण्ड-झारखण्ड

Ref : HIL/P&A/Advertisement/25.07.2015



GEMS PROJECTS PVT.LTD.

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

M/S HINDALCO INDUSTRIES LIMITED

MINES DIVISION, DIST.-LOHARDAGA, JHARKHAND

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

	LOCATION
AMBIENT AIR QUALITY	
1	Haralangda Pit of Gurdari Mine 584.19 ha., Natarhat Plateau
2	Near Workshop in Amtipani Mine 190.95 ha., Natarhat Plateau
3	Near Working Pit of Kujam-II Mine 157.38 ha., Natarhat Plateau
4	Near Working Pit - Kujam Mines-I, Natarhat Plateau
NOISE LEVEL	
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
SPOT NOISE LEVEL	
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
DRINKING WATER	
1	Drinking Water of Natarhat Site Office
2	Drinking Water of Gurdari Mine Office
SURFACE WATER QUALITY	
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
SOIL QUALITY	
1	Topsoil Gurdari Mine (584.19 ha.)
2	Topsoil Amtipani 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 rd October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Haralangda Pit of Gurdari Mine 584.19 ha., Netarhat Plateau					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: : Haralangda Pit of Gurdari Mine 584.19 ha., Netarhat Plateau					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	32.00
Nitrogen Dioxide	NO _x	µg/m ³	80	IS:5182 (Part-6): 1975(Reaff:2004)	42.70
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part-23)	78.5
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR (40) Appendix-L	46.6
Carbon Monoxide	CO	µg/m ³	2	EPA 600/P-99/001F	0.13





GEMS PROJECTS PVT.LTD.

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

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State: Jharkhand					
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Sample Type: AMBIENT AIR QUALITY MONITORING					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Near Workshop in Amtipani Mine 190.95 ha., Netarhat Plateau					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: Near Workshop in Amtipani Mine 190.95 ha., Netarhat Plateau					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	34.70
Nitrogen Dioxide	NO _x	µg/m ³	80	IS:5182 (Part-6): 1975(Reaff:2004)	48.90
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part-23)	73.8
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR (40) Appendix-L	48.7
Carbon Monoxide	CO	µg/m ³	2	EPA 600/P-99/001F	0.18





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16		Date: 3 rd October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Near Working Pit of Kujam-II Mine 157.38 ha, .Netarhat Plateau					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: Near Working Pit of Kujam-II Mine 157.38 ha, .Netarhat Plateau					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	25.50
Nitrogen Dioxide	NO _x	µg/m ³	80	IS:5182 (Part-6): 1975(Reaff:2004)	32.00
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part-23)	74.7
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR (40) Appendix-L	49.6
Carbon Monoxide	CO	µg/m ³	2	EPA 600/P-99/001F	0.19





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16		Date: 3 rd October 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					
Received: 24.09.2015					
Registered: 24.09.2015					
Marks on Sample: Location: Near Working Pit - Kujam Mines-I, Nerarhat Plateau					
Sample collected on: 24.09.2015					
Test Start/End Date: 24.09.2015/25.09.2015					
LOCATION/IDENTIFICATION: Near Working Pit - Kujam Mines-I, Nerarhat Plateau t					
PARAMETERS		UNIT	LIMIT	METHOD	Concentration
Sulphur Dioxide	SO ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	35.00
Nitrogen Dioxide	NO _x	µg/m ³	80	IS:5182 (Part-6): 1975(Reaff:2004)	42.70
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part-23)	72.80
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR (40) Appendix-L	31.79
Carbon Monoxide	CO	µg/m ³	2	EPA 600/P-99/001F	0.40





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
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





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
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 _{eq}	75	69.6	70	59.7	24/09/2015





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(NABL ACCREDITED LABORATORY)

Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
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 _{eq}	75	65.8	70	58.3	24/09/2015





GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur
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Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
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_{eq}	75	62.9	70	55.8	24/09/2015





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
Gurudarl Mine (584.19 ha.)				
Poclain at Haralagda Pit	dB (A) L_{eq}	75	70.7	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 rd October 2015
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	
Test Start: 23.09.2015	
End Date: 23.09.2015	

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





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Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
Test Start: 23.09.2015	
End Date: 23.09.2015	

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





GEMS PROJECTS PVT.LTD

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Report No: SEPT002/2015-16	Date: 3 rd October 2015
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	
Test Start: 23.09.2015	
End Date: 23.09.2015	

Location/Identification	Unit	Limit (day)	Result	Dates
Kujam-I Mine (80.87 ha.)				
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 rd 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 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	0.4	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	7.5	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-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 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	73	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	10.0	250 max	APHA 22 nd Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO ₄)	mg/l	9.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO ₃)	mg/l	1.30	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.15	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.13	0.5 max	APHA 22 nd Ed. 2012, 4500-BB, 4-25





GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur
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Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	20.0	75 max	APHA 22 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.5	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-NH3-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	0.015	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	0.09	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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	0.0005 max	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.





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
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 (Lindance)	µg/L	<0.01	2	US EPA 508-1995
10	α-HCH	µg/L	<0.01	0.01	US EPA 508-1995
11	β-HCH	µg/L	N.D	0.04	US EPA 508-1995
12	δ-HCH	µg/L	N.D	0.04	US EPA 508-1995
13	Butachlor	µg/L	N.D	125	US EPA 508-1995
14	Alachlor	µg/L	N.D	20	US EPA 508-1995
15	Atrazine	µg/L	N.D	2	US EPA 508-1995
16	α Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
17	β Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
18	Endosulfan Sulphate	µg/L	N.D	0.4	US EPA 508-1995
19	Ethion	µg/L	N.D	3	US EPA 8141A-1994
20	Malathion	µg/L	N.D	190	US EPA 8141A-1994
21	Methoysl Parathion	µg/L	N.D	0.3	US EPA 8141A-1994
22	Monocrotophos	µg/L	N.D	1	US EPA 8141A-1994
23	Phorate	µg/L	N.D	2	US EPA 8141A-1994
24	Chlorpyrifos	µg/L	N.D	30	US EPA 8141A-1994
25	Aldrin	µg/L	N.D	0.03	US EPA 508-1995
26	Dieldrin	µg/L	N.D	0.03	US EPA 508-1995
Remarks: N.D- Not Detected					

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 rd 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 Gurdari Mine 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 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	0.5	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	7.8	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-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 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	64	200 max	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO ₃)	mg/l	72	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	12.0	250 max	APHA 22 nd Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO ₄)	mg/l	6.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO ₃)	mg/l	1.10	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.25	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.10	0.5 max	APHA 22 nd Ed. 2012, 4500-BB, 4-25



GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur
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Sl. No.	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method reference
17	Calcium (as Ca)	mg/l	18.0	75 max	APHA 22 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	3.0	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.12	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	0.01	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	0.05	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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





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
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 (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: 3rd 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: 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: 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 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	0.50	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	7.1	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-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 nd Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 nd Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO ₃)	mg/l	63	200 max	APHA 22 nd Ed. 2012, 4500-Cl-G, 4-69
11	Alkalinity Total (as CaCO ₃)	mg/l	72	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	14.0	250 max	APHA 22 nd Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO ₄)	mg/l	8.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO ₃)	mg/l	1.40	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.25	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.13	0.5 max	APHA 22 nd Ed. 2012, 4500-BB, 4-25
17	Calcium (as Ca)	mg/l	23.0	75 max	APHA 22 nd 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 nd Ed. 2012, 3500-Mg-B, 3-84
19	Ammonical Nitrogen/Total Ammonia	mg/l	<0.1	--	APHA 22 nd Ed. 2012, 4500-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.06	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	0.05	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	0.06	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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	0.0005 max	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





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
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 (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 rd 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: Amitipani Mines 190.95 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 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	0.4	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	6.8	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	104	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	49	200 max	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO ₃)	mg/l	64	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	8.0	250 max	APHA 22 nd Ed. 2012, 4500-CI-b, 4-72
13	Sulphate (as SO ₄)	mg/l	4.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO ₃)	mg/l	1.20	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.24	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.18	0.5 max	APHA 22 nd 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 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	4.2	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.08	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	Aluminum (as Al)	mg/l	0.05	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	0.08	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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





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
Microbiological Analysis					
1	Total Coliforms	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 (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 rd 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 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	0.4	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	7.6	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-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 nd Ed. 2012, 4500-Cl-G, 4-69
9	Dichloramines	mg/l	<0.05	--	APHA 22 nd Ed. 2012, 4500-Cl-G, 4-69
10	Total hardness (as CaCO3)	mg/l	70	200 max	APHA 22 nd Ed. 2012, 4500-Cl-G, 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 nd Ed. 2012, 4500-Cl-b, 4-72
13	Sulphate (as SO4)	mg/l	10.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO3)	mg/l	1.40	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.30	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.34	0.5 max	APHA 22 nd 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 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	5.0	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.08	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	0.05	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	0.08	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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 C6H5OH)	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	0.0005 max	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





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
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-Coll	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	δ-HCH	µg/L	N.D	0.04	US EPA 508-1995
13	Butachlor	µg/L	N.D	125	US EPA 508-1995
14	Alachlor	µg/L	N.D	20	US EPA 508-1995
15	Atrazine	µg/L	N.D	2	US EPA 508-1995
16	α Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
17	β Endosulfan	µg/L	N.D	0.4	US EPA 508-1995
18	Endosulfan Sulphate	µg/L	N.D	0.4	US EPA 508-1995
19	Ethion	µg/L	N.D	3	US EPA 8141A-1994
20	Malathion	µg/L	N.D	190	US EPA 8141A-1994
21	Methoysl Parathion	µg/L	N.D	0.3	US EPA 8141A-1994
22	Monocrotophos	µg/L	N.D	1	US EPA 8141A-1994
23	Phorate	µg/L	N.D	2	US EPA 8141A-1994
24	Chlorpyrifos	µg/L	N.D	30	US EPA 8141A-1994
25	Aldrin	µg/L	N.D	0.03	US EPA 508-1995
26	Dieldrin	µg/L	N.D	0.03	US EPA 508-1995
Remarks: N.D- Not Detected					





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16			Date: 3 rd 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 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	0.5	1 Max	APHA 22 nd Ed. 2012, 2130-B, 2-13
5	pH	--	7.7	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	100	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	75	200 max	APHA 22 nd Ed. 2012, 4500-CIG, 4-69
11	Alkalinity Total (as CaCO ₃)	mg/l	80	200 max	IS 3025 (Part 237): 1986, Reaffirmed 2009
12	Chloride (as Cl)	mg/l	14.0	250 max	APHA 22 nd Ed. 2012, 4500-CI-b, 4-72
13	Sulphate (as SO ₄)	mg/l	10.0	200 max	APHA 22 nd Ed. 2012, 4500-so4-e, 4-190
14	Nitrate (as NO ₃)	mg/l	1.50	45 max	APHA 22 nd Ed. 2012, 4500-NO3-E, 4-125
15	Fluoride (as F)	mg/l	0.20	1 max	APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87
16	Boron (as B)	mg/l	0.30	0.5 max	APHA 22 nd 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	35.0	75 max	APHA 22 nd Ed. 2012, 3500-Ca-B, 3-67
18	Magnesium (as Mg)	mg/l	6.0	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-NH3-F, 4-115
20	Iron (as Fe)	mg/l	0.06	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	0.03	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	0.07	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, 3-18
29	Selenium (as Se)	mg/l	N.D	0.001 max	APHA 22 nd Ed. 2012, 3112-B, 3-18
30	Mercury (as hg)	mg/l	N.D	0.01 max	APHA 22 nd Ed. 2012, 3114-B, 3-18
31	Nickel (as Ni)	mg/l	<0.05	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	0.0005 max	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





GEMS PROJECTS PVT.LTD.

In Association with M/s MAHARASTRA ENVIRO POWER LTD, Nagpur
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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 (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 rd 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 ³
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 rd 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 ³
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	%





GEMS PROJECTS PVT.LTD.

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

Report No: SEPT002/2015-16			Date: 3rd ¹ 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: Topsoll 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 ³
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 ³
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.

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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.

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Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE029/2015-16	Date: 24 th 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 ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	32.6
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	44.3
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	87.9
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	42.1
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.31

Vijay Pandey
SENIOR EXECUTIVE



Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE030/2015-16	Date: 24 th 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 ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	65.7
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	59.4
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 2.3)	81.9
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	47.4
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.42

Vijay Pandey

SENIOR EXECUTIVE

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Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE031/2015-16	Date: 24 th 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 ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	28.2
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	30.5
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	77.4
Particulate Matter [size less than 2.5 µm]	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	29.4
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.56

Vijay Pandey
SENIOR EXECUTIVE



Mahabal Enviro Engineers Pvt. Ltd.

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E-mail: mahabalranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

June 2015

Report no : JUNE032/2015-16	Date: 24 th 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 ₂	µg/m ³	80	IS:5182 (Part-2):2001 (Reaff:2006)	29.4
Nitrogen Dioxide	NO ₂	µg/m ³	80	IS:5182(Part-6):1975 (Reaff:2004)	35.6
Particulate Matter (size less than 10 µm)	PM ₁₀	µg/m ³	100	IS:5182 (Part 23)	79.4
Particulate Matter (size less than 2.5 µm)	PM _{2.5}	µg/m ³	60	USEPA CFR(40) Appendix-L	45.7
Carbon Monoxide	CO	mg/m ³	2	EPA 600/P-99/001F	0.49

Vijay Pandey

SENIOR EXECUTIVE

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Mahabal Enviro Engineers Pvt. Ltd.

Branch Office:

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

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E-mail: mahabalanranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE033/2015-16					Date: 24 th 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 ³	
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 ₂	USEPA 3052	52.5	%	
20.	Aluminum	Al ₂ O ₃	USEPA 3052	7.2	%	
21.	Iron	Fe ₂ O ₃	USEPA 3052	5.0	%	
22.	Calcium	CaO	USEPA 3052	8.4	%	
23.	Magnesium	MgO	USEPA 3052	1.95	%	
24.	Sodium	Na ₂ O	USEPA 3052	0.30	%	
25.	Potassium	K ₂ O	USEPA 3052	0.28	%	
26.	Sulphate	SO ₄	USEPA 3052	0.79	%	


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Hindalco Industries: Environmental Monitoring report

June 2015

Report no: : JUNE034/2015-16			Date: 24 th 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 – 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 ³
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 ₂	USEPA 3052	52.4	%
20.	Aluminum	Al ₂ O ₃	USEPA 3052	7.24	%
21.	Iron	Fe ₂ O ₃	USEPA 3052	5.0	%
22.	Calcium	CaO	USEPA 3052	8.5	%
23.	Magnesium	MgO	USEPA 3052	1.94	%
24.	Sodium	Na ₂ O	USEPA 3052	0.30	%
25.	Potassium	K ₂ O	USEPA 3052	0.28	%
26.	Sulphate	SO ₄	USEPA 3052	0.80	%

Vijay Pandey
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Hindalco Industries: Environmental Monitoring report

June 2015

Report no : JUNE035/2015-16	Date: 24 th 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 ₃)	mg/l	47	200 Max	APHA 22nd Ed. 2012, 2340-C, 2-44,45
11.	Alkalinity Total (as CaCO ₃)	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 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

June 2015

Continuation Sheet

S.No	Parameters	Unit	Result	Acceptable Limit (IS 10500:2012)	Method Reference
14.	Nitrate (as NO ₃)	mg/l	1.1	45 Max	APHA 22nd Ed. 2012, 4500-NO ₃ -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 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

June 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.

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)

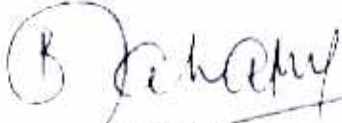
Cc to: - All Mines Manager
All Department head
Notice Board.

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

The composite cost during the year 2014-15 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
Bagru	75.41	0.00	0.00	0.00	0.00
Minerals & Minerals Limited					
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

B. Khanif

Monitored water level (FY 2015-16)

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					

Fig in meter


 Convenor
 (Quality & Environment)