



Ref No: HIL/LHD/JP (M)/MoEF/ 1238

Date: 23.11.2016

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

**Sub: Compliance Report of EC conditions for Hisri New (14.55 ha) Bauxite Mining project of M/s Hindalco Industries Limited located in Lohardaga District of Jharkhand for the period April'16-Sep'16.**

Ref: Environmental Clearance letter no J-11015/531/2007-IA II (M) dated 17<sup>th</sup> June 2011

Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Hisri New (14.55 ha) Bauxite Mining project of M/s Hindalco Industries Limited**, located in Lohardaga District of Jharkhand for the period **April'16-Sep'16**.

Hope you will find the same in order.

Thanking You

Yours Sincerely  
FOR M/s Hindalco Industries Limited,

  
(Bijesh Kumar Jha)  
Agent of Mines

Enclosure: - As Above

Copy to: Member Secretary, JSPCB, Ranchi  
RO, JSPCB, Ranchi  
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**Compliance of conditions laid down in Environmental Clearance**

**HISRI (NEW) BAUXITE MINES(14.55 Ha)**

**Period: April'16-Sep'16**

**Environmental Clearance letter no J-11015/531/2007-IA II (M) dated 17<sup>th</sup> June 2011**

| <b>Sl No</b>        | <b>Conditions</b>   | <b>Compliance Status</b>  |
|---------------------|---|---|
| Specific Conditions |   |   |
| 1                   | The project proponent shall obtain Consent to Establish and Consent to Operate from the Jharkhand State Pollution Control Board and effectively implement all the conditions stipulated therein.  | Consent to Establish and consent to operate has been obtained prior to start of Mining. Implementations of stipulated conditions are fulfilled.   |
| 2                   | The environmental clearance is subject to forestry clearance.   | Forest clearance is obtained.   |
| 3                   | The environmental clearance is subject to approval of the state land use Department, Government of Jharkhand for diversion of agricultural land for non-agricultural use.   | Mining Lease is granted by the State Govt. after due consideration and Cabinet approval on recommendation of DC who is the competent authority to give permission for using the agricultural land for non-agricultural purpose.   |
| 4                   | The mining operation shall be restricted to above ground water table and it should not intersect the ground water table. In case of working below ground water table, prior approval of the Ministry of Environment & Forests and Central Ground Water Authority shall be obtained, for which a detailed hydro – geological study shall be carried out. | Present depth of mining is 12- 15mtr bgl (maximum). Ground water table level is 40-50 mtr bgl. Thus there is no chance to intersect ground water table during mining operation. Working zone will be restricted to above ground water table.  |
| 5                   | The Project proponent shall ensure that no natural watercourse shall be obstructed due to any mining operations. The first order streams and the seasonal nallahs originating from the mining lease area shall be protected.  | It is being ensured. No natural water course has been obstructed.   |
| 6                   | 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.   | Sequential backfilling and reclamation of the mined out area are being exercised. Topsoil is being spread on backfilled area for reclamation of the area.<br><br>The top soil being temporarily stored at earmarked site (s) as and when required for its further use for reclamation over backfilled area. |

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| 7  | <p>The solid waste generated during the mining operation shall be backfilled and there shall be no external overburden dump left at the end of the mine life. The entire excavated area of 12.19 ha. shall be backfilled and reclaimed by plantation. The backfilling should be carried out in such a manner that it is restored to the normal ground level. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment &amp; Forest on six month basis.</p>   | <p>Overburden and waste rock are being used for back filling. Data pertaining to backfilling is enclosed as Annexure.</p> <p>Backfilling is continuous process and is being done in commensurate with the progress of mining.</p> <p>Monitoring and management of rehabilitated areas continuing through supervision.</p>   |
| 8  | <p>Catch drains and siltation ponds of appropriate size should be constructed around the working pit, sub-grade dump, soil and mineral dumps to arrest flow of silt and sediment directly into the agricultural fields, the Kisco Nadi, the Sukri Nadi, the Chungahat nallah, the Barki nallah and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted, particularly after monsoon and maintained properly.</p> <p>Garland drain, settling tanks and check dams of appropriate size, gradient and length shall be constructed for both around the minepit and sub grade dump to prevent run off of water and flow sediments directly into the agricultural fields, the Kisco Nadi, the Sukri Nadi, the Chungahat nallah, the Barki nallah 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 setting of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</p> | <p>No run off is being generated from mining activities. However, to collect and manage rainwater during monsoon drains, Pit sumps are made, part of mined out area is used as settling tank. Settled water is being used for sprinkling of quarry, roads, green belt development, etc.</p> <p>Catch drains , siltation ponds , garland drain ,settling tank , check dams etc being constructed as and when required and is being maintained with the progress of mining.</p> |
| 9  | <p>Dimension of the retaining wall at the toe of the sub-grade, dump and OB benches within the mine to check run-off and siltation should be based on the rain fall data.</p>   | <p>The dimensions of the retaining wall OB dumps are based on the average rainfall.</p>   |
| 10 | <p>Plantation shall be raised in an area of 12.7 ha including a 7.5 m. wide green belt in the safety zone around the mining lease by planting the native species around ML area, backfilled and reclaimed</p>   | <p>Plantation is carried out progressively with the progress of mining in and around the Mine lease area.</p>   |

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|    | area, around water body, roads etc. in consultation with the local DFO / Agriculture Department. At least 1500 trees per year shall be planted with a tree density of 1000 trees per hectare. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.   | During FY 2016-17 –around 7000 saplings planted within the Bagru plateau including this mine.   |
| 11 | Effective safe guard measures, such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels to particulate matter such as around loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.   | Effective safe guard measures, such as regular water sprinkling are being carried out in critical areas prone to air pollution. Regular Ambient Air Quality monitoring are being carried out.<br><br>AAQ quality result are attached carried out by authorized agency.<br><br>The parameters are found within prescribed limit. |
| 12 | The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.   | System is already in place. Suitable conservation measures to augment ground water resources in the area is being taken viz contour bunds, gullies etc in the mining lease area.  |
| 13 | Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The periodic monitoring [(at least four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) once in each season)] shall be carried out in consultation with the State Ground Water Board/ Central Ground water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional office Bhubneshwar, The Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the ground water table is getting depleted due to the mining activity, necessary corrective measures shall be carried out. | It is being monitored. Report is attached   |
| 14 | Monitoring to the springs shall be carried out for the quality and quantity of water regularly so as to ensure that there is no adverse impact on the same due to the project. Records in this regards shall be maintained.   | Monitoring is being done, water quality report enclosed.  |

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| 15. | It shall be ensured that there is no change in the hydrology of the area due to the project.   | Being adhered to.  |
| 16. | The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) required for the project.   | Water is collected from rain water harvesting pond of Bagru plateau. Water cess is being paid to State Pollution Control Board regularly.<br><br>We are using water harvested only for mining purposes. No ground water or water from natural surface water bodies is being used for mining purposes.  |
| 17. | Suitable rain water harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.  | Suitable rain water harvesting measures on long term basis have been planned and will be implemented. Viz. rain water harvesting pond.   |
| 18. | Appropriate mitigative measures shall be taken to prevent pollution of the Kisco Nadi, the Sukri Nadi and other rivers in the buffer zone of the mine, in consultation with the State Pollution Control Board.   | Appropriate mitigative measures have been taken to prevent pollution of the Kisco Nadi, the Sukri Nadi and other rivers in the buffer zone of the mine. Viz- check dams, contour bunds, gullies in the mining lease area is so designed that all the rain water within the lease are collected in to the pit, No water allowed to flow out of the lease. |
| 19  | Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and transportation of mineral from mine face to the Beneficiation plant.. The vehicles should be covered with a tarpaulin and shall not be overloaded. | Regular maintenance of vehicles are undertaken to minimize vehicular emission. Care is taken on regular basis to arrest spillage/fugitive dust emission. Bauxite is being transported by ropeway.  |
| 20  | Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibration and to arrest fly rocks and boulders should be implemented.   | Blasting operation is being carried out only daytime. Controlled blasting is in practice. The mitigative measures for control of ground vibration and to arrest fly rocks and boulders are being implemented.  |
| 21  | Drills shall either be operated with dust extractors or equipped with water injection system.  | Wet drilling is done in the drill holes intermittently for dust suppression by pumping water.  |
| 22  | Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.                                  | Water sprinkling is being carried out regularly at mineral handling area ,loading and unloading areas to control the dust.   |

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| 23  | Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated from mining operations.  | There is no likely hood of effluent from mine, hence ETP is not required. The sewage water for working population is planned to be collected through Septic Tank/Soak Pit and treated in Sewage Treatment Plant already existing in adjoining Bagru ML. |
| 24  | The project authorities should undertake sample survey to generate data on pre-project community health status within a radius of 1 Km. from proposed mine.   | Agreed. Being getting done through medical camp.  |
| 25  | 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.  | System is already in place  |
| 26. | 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 STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of the temporary structures to be removed after the completion of the project.   | System is already in place.   |
| 27  | The critical parameters such as RSPM (Particulate matter with size less than 10 µm (i.e. PM <sub>10</sub> , PM <sub>2.5</sub> ) and NO <sub>x</sub> in the ambient air within the impact zone, peak particle velocity at 300 m. distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharge 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 and Forests, which is available on the website of the Ministry <a href="http://www.envfor.nic.in">www.envfor.nic.in</a> shall also be referred in this regard for its compliance. | Being carried out. Monitoring report enclosed.  |
| 28  | A Final Mine Closure plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forest 5 years in advance of final mine closure for approval.  | Progressive Mine Closure Plan duly approved by Indian Bureau of Mines is with us. FMCP (part) is approved by BM. FMCP for entire lease will be prepared in due time.  |

## GENERAL CONDITIONS

| Sl No | Conditions  | Compliance Status  |
|-------|---|--|
| 1     | No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.   | Being adhered to.  |
| 2     | No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made.   | Mining of ore and OB is being done as per approved calendar plan.  |
| 3     | Conservation measures for protection of flora and fauna in the core & buffer zone should be drawn up in consultation with the local forest and wildlife department.   | Conservation measures for protection of flora and fauna in the core & buffer zone has been drawn up in consultation with the local forest and wildlife department. |
| 4     | Four ambient air quality-monitoring station should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10 $\mu\text{m}$ (i.e. $\text{PM}_{10}$ ) $\text{PM}_{2.5}$ ) & $\text{NO}_x$ monitoring. Location of the stations should be decided based on the metrological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board. | Being carried out. Enclosed as Annexure.   |
| 5     | Data on ambient air quality RSPM (Particulate matter with size less than 10 $\mu\text{m}$ i.e. $\text{PM}_{10}$ ) & $\text{NO}_x$ should be regularly submitted to the Ministry including its Regional office located at Bhubneshwar and the State Pollution Control Board / Central pollution Control Board once in six months.  | Being carried out. Enclosed as Annexure.   |
| 6     | Fugitive dust emission from all the sources should be controlled regularly. Water spraying arrangements on haul roads, loading and unloading and at transfer points should be provided and properly maintained.   | Water spraying arrangements on haul roads, loading and unloading and at transfer points have been provided and properly maintained.                                |
| 7     | Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operation of HEMM, etc.   | Measures are being taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operation  |

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|    | should be provided with ear plug / muffs.  | of HEMM, etc. has been provided with ear plug / muffs.   |
| 8  | Industrial waste water (workshops and waste water from the mine) Should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.              | Is being done as applicable.   |
| 9  | Personnel working in dusty areas should wear protective respiratory devices and they should also provided with adequate training and information on safety and health aspects.<br>Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. | Complied. Use of Personal Protective Equipment (PPE) by the individuals is being ensured. All the mine workers are being regularly and periodically sent to our own hospital for health checkup for any contraction of diseases due to exposure in dusty and noisy areas.<br><br>Training on safety, health and environmental aspects of mining is being regularly imparted through VT centre and also through various other training programmes conducted by the State Government, recognized agencies, etc |
| 10 | A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.   | Separate Environmental Management Cell (EMC) has been constituted and is functioning effectively. Copy enclosed as Annexure.   |
| 11 | The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubneshwar.  | The 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.   |
| 12 | The project authorities should inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.  | This is an operating Mine and provision related to financial closure is not applicable.  |
| 13 | The Regional Office of this Ministry located at Bhubneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring  | Agreed.  |



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|    | reports.   |                 |
| 14 | The project proponent shall submit six monthly report on the status of the compliance of the stipulated environmental Clearance conditions including results of monitoring data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Officer, Bhubaneshwar, the respective Zonal office of Central Pollution Control Board the State Pollution Control Board. The proponent shall upload the status of compliance of the Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Bhubneshwar, the respective Zonal Office of Central Pollution Control Board and State Pollution Control Board. | Duly submitted. |
| 15 | A copy of clearance letter shall be sent by the proponent to concerned Panchyat, Zila Parisad/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.  | Duly submitted. |
| 16 | State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Center and Collector's office / Tehsildar's Office for 30 days.  | Displayed.      |
| 17 | The environmental statement for each financial year ending 31 <sup>st</sup> March in Form – V as is mandated to be submitted by the project proponent to the concerned Stated pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of the compliance of environmental clearance conditions and shall also be sent to the Regional Office of the Ministry of Environment and Forests, Bhubneshwar by e-mail.  | Submitted.      |

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| 18. | The Company shall submit within 3 month their policy towards Corporate Environment Responsibility which should inter-alia address (i) Standard operating process/ procedure to bring into focus any infringements/ deviation/ violation of environmental or forest norms/ conditions, (ii) Hierarchical system or Administrative order of the Company to deal with environmental issues and ensuring compliance with environmental issues and ensuring compliance with Environment Clearance conditions and (iii) System of reporting of non compliance / violation of environmental norms to the Board of Directors of the Company and / or stakeholders or shareholders. | Already Submitted.     |
| 19  | The project authorities should advertise at least in two local newspapers widely circulated, one of which locality concerned, within 7days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubneshwar.  | Complied and informed. |



# 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

### BAGRU PLATEAU- ENVIRONMENTAL MONITORING REPORT

APRIL TO JUNE 2016

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE





# Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

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| <b>AMBIENT AIR QUALITY</b>                    |                                      |
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| 2   | Hisri Pit Bagru Plateau              |
| 3   | Bhusar Mines Pit Bagru Plateau       |
| 4   | Entrance Gate Bagru Mines            |
| 5   | Bagru Hisri Pit II                   |
| <b>NOISE LEVEL</b>                            |                                      |
| 1   | Bagru Plateau                        |
| 2   | Bagru Crushing Site                  |
| <b>SPOT NOISE</b>                             |                                      |
| 1   | Bagru Crusher site                   |
| <b>DRINKING WATER</b>                         |                                      |
| 1   | Tap Water-Bagru Plateau near office. |
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| 1   | Hisri Pit                            |
| <b>STACK MONITORING OF DG SETS (FLUE GAS)</b> |                                      |
| 1   | Bagru Mines Office-Bagru Plateau     |



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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|  |                                   |
|--|-----------------------------------|
| Report no: : MEEPL/ JULY050/2016-17                            | Date: 18 <sup>th</sup> July, 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING   |                                   |
| Client Name: Hindalco Industries Limited                       |                                   |
| Client Address: Lohardaga                                      |                                   |
| Postal Code: 835203  |                                   |
| State: Jharkhand   |                                   |
| Country: India   |                                   |
| Sample type: AMBIENT AIR QUALITY MONITORING                    |                                   |
| Marks on Sample: Location: Bagru Plateau- Office (Near Colony) |                                   |
| Sample collected on: 11.06.2016                                |                                   |
| Received: 14.06.2016   |                                   |
| Registered: 14.06.2016   |                                   |
| Test Start/End Date: 14.06.2016/18.06.2016                     |                                   |

| LOCATION / IDENTIFICATION: Bagru Plateau- Office (Near Colony) |  |                   |                |               |
|--|--|-------------------|----------------|---------------|
| Sl. No.  | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.  | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 51.2          |
| 02.  | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 32.5          |
| 03.  | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 24.5          |
| 04.  | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 35.2          |
| 05.  | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 16.5          |
| 06.  | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 19.5          |
| 07.  | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.70          |
| 08.  | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.05          |
| 09.  | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 10.2          |
| 10.  | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.92          |
| 11.  | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 3.1           |
| 12.  | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.3           |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE



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# Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

|  |                                   |
|--|-----------------------------------|
| Report no: : MEEPL/ JULY051/2016-17                          | Date: 18 <sup>th</sup> July, 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING |                                   |
| Client Name: Hindalco Industries Limited                     |                                   |
| Client Address: Lohardaga                                    |                                   |
| Postal Code: 835203  |                                   |
| State: Jharkhand   |                                   |
| Country: India   |                                   |
| Sample type: AMBIENT AIR QUALITY MONITORING                  |                                   |
| Marks on Sample: Location: Hisri Mines Bagru Plateau         |                                   |
| Sample collected on: 19.06.2016                              |                                   |
| Received: 23.06.2016   |                                   |
| Registered: 23.06.2016                                       |                                   |
| Test Start/End Date: 23.06.2016/23.06.2016                   |                                   |

| LOCATION / IDENTIFICATION: Hisri Mines Bagru Plateau |  |                          |                |               |
|--|--|--------------------------|----------------|---------------|
| Sl. No.  | PARAMETERS   | UNIT                     | Standard Limit | Concentration |
| 01.  | Particulate Matter (size less than 10 $\mu\text{m}$ ) PM <sub>10</sub>   | $\mu\text{g}/\text{m}^3$ | 100            | 50.2          |
| 02.  | Particulate Matter (size less than 2.5 $\mu\text{m}$ ) PM <sub>2.5</sub> | $\mu\text{g}/\text{m}^3$ | 60             | 31.5          |
| 03.  | Sulphur Dioxide (SO <sub>2</sub> )                                       | $\mu\text{g}/\text{m}^3$ | 80             | 22.5          |
| 04.  | Nitrogen Dioxide (NO <sub>2</sub> )                                      | $\mu\text{g}/\text{m}^3$ | 80             | 32.8          |
| 05.  | Ammonia (NH <sub>3</sub> )   | $\mu\text{g}/\text{m}^3$ | 400            | 18.9          |
| 06.  | Ozone (O <sub>3</sub> )  | $\mu\text{g}/\text{m}^3$ | 180            | 13.5          |
| 07.  | Carbon Monoxide (CO)   | $\text{mg}/\text{m}^3$   | 02             | 0.62          |
| 08.  | Lead (Pb)  | $\mu\text{g}/\text{m}^3$ | 1.0            | 0.04          |
| 09.  | Nickel (Ni)  | $\text{ng}/\text{m}^3$   | 20             | 9.4           |
| 10.  | Arsenic (As)   | $\text{ng}/\text{m}^3$   | 06             | 2.91          |
| 11.  | Benzene (C <sub>6</sub> H <sub>6</sub> )                                 | $\mu\text{g}/\text{m}^3$ | 05             | 3.12          |
| 12.  | Benzo (a) Pyrene   | $\mu\text{g}/\text{m}^3$ | 01             | 0.40          |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE





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Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

|   |  |
|---|--|
| <b>Report no. :</b> MEEPL/ JULY052/2016-17                          | <b>Date:</b> 18 <sup>th</sup> July, 2016 |
| <b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING |  |
| Client Name: <b>Hindalco Industries Limited</b>                     |  |
| Client Address: Lohardaga   |  |
| Postal Code: 835203   |  |
| State: Jharkhand  |  |
| Country: India  |  |
| Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>                  |  |
| Marks on Sample: Location: <b>Bhusar Mines Pit Bagru Plateau</b>    |  |
| <b>Sample collected on:</b> 12.06.2016                              |  |
| <b>Received:</b> 16.06.2016   |  |
| <b>Registered:</b> 16.06.2016                                       |  |
| <b>Test Start/End Date:</b> 16.06.2016/21.06.2016                   |  |

| LOCATION / IDENTIFICATION: Bhusar Mines Pit Bagru Plateau |  |                   |                |               |
|---|--|-------------------|----------------|---------------|
| Sl. No.   | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.   | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 52.5          |
| 02.   | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 34.1          |
| 03.   | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 23.5          |
| 04.   | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 31.2          |
| 05.   | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 17.5          |
| 06.   | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 13.5          |
| 07.   | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.63          |
| 08.   | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.03          |
| 09.   | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 9.3           |
| 10.   | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.91          |
| 11.   | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 2.9           |
| 12.   | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.45          |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|   |  |
|---|--|
| <b>Report no. :</b> MEEPL/ JULY053/2016-17                          | <b>Date:</b> 18 <sup>th</sup> July, 2016 |
| <b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING |  |
| Client Name: <b>Hindalco Industries Limited</b>                     |  |
| Client Address: <b>Lohardaga</b>                                    |  |
| Postal Code: <b>835203</b>  |  |
| State: <b>Jharkhand</b>   |  |
| Country: <b>India</b>   |  |
| Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>                  |  |
| Marks on Sample Location: <b>Entrance Gate Bagru Mines</b>          |  |
| <b>Sample collected on:</b> 12.06.2016                              |  |
| <b>Received:</b> 16.06.2016   |  |
| <b>Registered:</b> 16.06.2016                                       |  |
| <b>Test Start/End Date:</b> 16.06.2016/21.06.2016                   |  |

| LOCATION / IDENTIFICATION: Entrance Gate Bagru Mines |  |                   |                |               |
|--|--|-------------------|----------------|---------------|
| Sl. No.  | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.  | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 48.2          |
| 02.  | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 33.5          |
| 03.  | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 24.2          |
| 04.  | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 31.2          |
| 05.  | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 14.2          |
| 06.  | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 13.5          |
| 07.  | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.42          |
| 08.  | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.05          |
| 09.  | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 9.5           |
| 10.  | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.89          |
| 11.  | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 3.2           |
| 12.  | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.34          |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|   |  |
|---|--|
| <b>Report no. :</b> MEEPL/ JULY054/2016-17                          | <b>Date:</b> 18 <sup>th</sup> July, 2016 |
| <b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING |  |
| Client Name: <b>Hindalco Industries Limited</b>                     |  |
| Client Address: <b>Lohardaga</b>                                    |  |
| Postal Code: <b>835203</b>  |  |
| State: <b>Jharkhand</b>   |  |
| Country: <b>India</b>   |  |
| Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>                  |  |
| Marks on Sample Location: <b>Hisri Pit II</b>                       |  |
| <b>Sample collected on:</b> 13.06.2016                              |  |
| <b>Received:</b> 15.06.2016   |  |
| <b>Registered:</b> 15.06.2016                                       |  |
| <b>Test Start/End Date:</b> 15.06.2016/18.06.2016                   |  |

| LOCATION / IDENTIFICATION: Kukad Village |  |                   |                |               |
|--|--|-------------------|----------------|---------------|
| Sl. No.                                  | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.                                      | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 45.2          |
| 02.                                      | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 35.2          |
| 03.                                      | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 21.2          |
| 04.                                      | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 32.2          |
| 05.                                      | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 16.5          |
| 06.                                      | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 10.2          |
| 07.                                      | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.50          |
| 08.                                      | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.04          |
| 09.                                      | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 8.9           |
| 10.                                      | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.90          |
| 11.                                      | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 3.2           |
| 12.                                      | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.35          |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|   |   |
|---|---|
| <b>Report no. : MEEPL/ JULY055/2016-17</b>                    | <b>Date: 18<sup>th</sup> July, 2016</b> |
| <b>Sample described by customer: Measurement of Noise</b>     |   |
| Client Name: <b>Hindalco Industries Limited</b>               |   |
| Client Address: <b>Lohardaga</b>                              |   |
| Postal Code: <b>835203</b>                                    |   |
| State: <b>Jharkhand</b>                                       |   |
| Country: <b>India</b>   |   |
| Sample Description: <b>Measurement of Noise</b>               |   |
| Sampling Method: <b>Instrumental, using Sound level Meter</b> |   |
| Data Collection Date: <b>12.06.2016</b>                       |   |
| Analyse Date: <b>12.06.2016</b>                               |   |

| Location/Identification | Unit                   | Limit (day) | Result | Limit (night) | Result | Dates      |
|-------------------------|------------------------|-------------|--------|---------------|--------|------------|
| Bagru Plateau           | dB (A) L <sub>eq</sub> | 75          | 49.9   | 70            | 38.1   | 12.06.2016 |

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

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|   |   |
|---|---|
| <b>Report no. : MEEPL/ JULY056/2016-17</b>              | <b>Date: 18<sup>th</sup> July, 2016</b> |
| Sample described by customer: Measurement of Noise      |   |
| Client Name: <b>Hindalco Industries Limited</b>         |   |
| Client Address: <b>Lohardaga</b>                        |   |
| Postal Code: 835203                                     |   |
| State: Jharkhand  |   |
| Country: India  |   |
| Sample Description: <b>Measurement of Noise</b>         |   |
| Sampling Method: Instrumental, using Sound level Metter |   |
| Data Collection Date: 12.06.2016                        |   |
| Analyse Date: 12.06.2016                                |   |

| Location/Identification             | Unit            | Limit (day) | Result | Limit (night) | Result) | Dates      |
|-------------------------------------|-----------------|-------------|--------|---------------|---------|------------|
| Bagru Plateau Bagru<br>Crusher site | dB (A) $L_{eq}$ | 75          | 71.8   | 70            | 43.6    | 12.06.2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

|   |   |
|---|---|
| <b>Report no: : MEEPL/ JULY057/2016-17</b>              | <b>Date: 18<sup>th</sup> July, 2016</b> |
| Sample described by customer: Measurement of Noise      |   |
| Client Name: <b>Hindalco Industries Limited</b>         |   |
| Client Address: <b>Lohardaga</b>                        |   |
| Postal Code: 835203                                     |   |
| State: Jharkhand  |   |
| Country: India  |   |
| Sample Description: <b>Measurement of Spot Noise</b>    |   |
| Sampling Method: Instrumental, using Sound level Metter |   |
| Data Collection Date: 12.06.2016                        |   |
| Analyse Date: 12.06.2016                                |   |

| Location/Identification          | Unit       | Limit (day) | Result | Dates      |
|----------------------------------|------------|-------------|--------|------------|
| Bagru Plateau Bagru Crusher site | dB (A) Leq | 75          | 72.1   | 12.06.2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

Report no : MEEPL/ JULY058/2016-17

Date: 18<sup>th</sup> July, 2016

Sample described by customer : DRINKING WATER-POTABILITY

Client Name: Hindalco Industries Limited

Client Address: Lohardaga

Postal Code: 835203

State: Jharkhand

Country: India

Sample Type: DRINKING WATER-POTABILITY

Marks on Sample: Location: Bagru Plateau near office.

Quantity: 5 L X 2 No. PVC Can

Sample collected on: 12.06.2016

Received: 13.06.2016

Registered: 13.06.2016

Test Start/End Date: 13.06.2016/16.06.2016.

| Sl. No. | Parameters                               | Unit  | Result    | Acceptable Limit (IS10500:2012) | Method reference                                  |
|---------|--|-------|-----------|---------------------------------|---|
| 1       | Colour                                   | Hazen | <1        | 5 Max                           | APHA 22 <sup>nd</sup> Ed. 2012, 2120-B, 2-6       |
| 2       | Odour                                    | --    | Agreeable | Agreeable                       | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 3       | Taste                                    | --    | Agreeable | Agreeable                       | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 4       | Turbidity                                | NTU   | 0.2       | 1 Max                           | APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13      |
| 5       | pH                                       | --    | 6.9       | 6.5-8.5                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+-B, 4-92   |
| 6       | Free Chlorides (Residual)                | mg/l  | <0.05     | 0.2 min                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 7       | Total Dissolved Solids                   | mg/l  | 72.1      | 500 max                         | IS 3025 (Part 16): 1984, Reaffirmed 2006          |
| 8       | Monochloramines                          | mg/l  | <0.05     | --                              | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 9       | Dichloramines                            | mg/l  | <0.05     | --                              | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 10      | Total hardness (as CaCO <sub>3</sub> )   | mg/l  | 48.5      | 200 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 11      | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 59.2      | 200 max                         | IS 3025 (Part 237): 1986, Reaffirmed 2009         |
| 12      | Chloride (as Cl)                         | mg/l  | 7.1       | 250 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72   |
| 13      | Sulphate (as SO <sub>4</sub> )           | mg/l  | 4.8       | 200 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190 |



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Hindalco Industries : Environmental Monitoring report

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## Continuation Sheet

| Report no: : MEEPL/ JULY058/2016-17 |  |      |        | Date: 18 <sup>th</sup> July, 2016 |  |
|-------------------------------------|--|------|--------|-----------------------------------|--|
| Sl. No.                             | Parameters   | Unit | Result | Acceptable Limit (IS10500:2012)   | Method reference   |
| 14                                  | Nitrate (as NO <sub>3</sub> )                            | mg/l | 1.2    | 45 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125 |
| 15                                  | Fluoride (as F)  | mg/l | 0.23   | 1 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87        |
| 16                                  | Boron (as B)   | mg/l | 0.16   | 0.5 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25                  |
| 17                                  | Calcium (as Ca)  | mg/l | 29     | 75 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67                |
| 18                                  | Magnesium (as Mg)  | mg/l | 4.0    | 30 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Mg-B, 3-84                |
| 19                                  | Ammonical Nitrogen/Total Ammonia                         | mg/l | <0.1   | --                                | APHA 22 <sup>nd</sup> Ed. 2012, 4500-NH <sub>3</sub> -F, 4-115 |
| 20                                  | Iron (as Fe)   | mg/l | 0.13   | 0.3 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 21                                  | Manganese (as Mn)  | mg/l | N.D    | 0.1 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 22                                  | Aluminium (as Al)  | mg/l | 0.009  | 0.03 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Al-B, 3-61                |
| 23                                  | Cadmium (as Cd)  | mg/l | N.D    | 0.003 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 24                                  | Chromium Total (as Cr)                                   | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 25                                  | Copper (as Cu)   | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 26                                  | Lead (as Pb)   | mg/l | N.D    | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 27                                  | Zinc (as Zn)   | mg/l | 0.04   | 5 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 28                                  | Arsenic (as As)  | mg/l | <0.01  | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18                   |
| 29                                  | Selenium (as Se)   | mg/l | N.D    | 0.001 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18                   |
| 30                                  | Mercury (as hg)  | mg/l | N.D    | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18                   |
| 31                                  | Nickel (as Ni)   | mg/l | <0.06  | 0.02 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 32                                  | Mineral Oil  | mg/l | N.D    | 0.5 max                           | IS 3025 (Part 39): 1991, Reaffirmed 2003: ed. 2.1              |
| 33                                  | Cyanide (as CN)  | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> ED. 2012, 4500-CN.C & 4-39 & 4-44        |
| 34                                  | Anionic detergents as MBAS                               | mg/l | <0.1   | 0.2 max                           | APHA 22 <sup>nd</sup> ED. 2012, 5540-C.C & 5-53                |
| 35                                  | Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) | mg/l | N.D    | 0.001 max                         | APHA 22 <sup>nd</sup> ED. 2012, 5530-B & C 5-4753              |
| 36                                  | Polynuclear aromatic hydrocarbons (PAH)                  | mg/l | N.D    | 0.0001 max                        | APHA 22 <sup>nd</sup> ED. 2012, 6440, 6-93                     |
| 37                                  | Polychlorinated Biphenyls (PCBs)                         | mg/l | N.D    | 0.0005 max                        | USEPA Method 8082  |
| 38                                  | Sulphide (as S)  | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> ED. 2012, 4500-S2-C 4-175 & F 4-178      |

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# Mahabal Enviro Engineers Pvt. Ltd.

## Branch Office:

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E-mail: mahabalanranchi@gmail.com

Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

## Continuation Sheet

| Report no: : MEEPL/ JULY058/2016-17 |                     |                |        | Date: 18 <sup>th</sup> July, 2016  |   |
|-------------------------------------|---------------------|----------------|--------|------------------------------------|---|
| S.No                                | Parameters          | Unit           | Result | Acceptable Limit<br>(IS10500:2012) | Method Reference  |
| <b>Microbiological Analysis</b>     |                     |                |        |                                    |   |
| 1.                                  | Total Colliforms    | MPN/<br>100 mL | N.D    | <1.1                               | APHA 22nd Ed. 2012, 9221-B<br>& C, 9-66, 9-69               |
| 2.                                  | E-Coli              | MPN/<br>100 mL | N.D    | Absent                             | APHA 22nd Ed. 2012, 9221-<br>B, C & G, 9-66, 9-69 and 9- 76 |
| <b>Pesticides Residues</b>          |                     |                |        |                                    |   |
| 3.                                  | p,p DDT             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 4.                                  | o,p DDT             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 5.                                  | p,p DDE             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 6.                                  | o,p DDE             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 7.                                  | p,p DDD             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 8.                                  | o,p DDD             | µg/L           | N.D    | 1                                  | US EPA 508-1995   |
| 9.                                  | γ-HCH (Lindane)     | µg/L           | <0.01  | 2                                  | US EPA 508-1995   |
| 10.                                 | α-HCH               | µg/L           | <0.01  | 0.02                               | US EPA 508-1995   |
| 11.                                 | β-HCH               | µg/L           | N.D    | 0.03                               | US EPA 508-1995   |
| 12.                                 | δ - HCH             | µg/L           | N.D    | 0.03                               | US EPA 508-1995   |
| 13.                                 | Butachlor           | µg/L           | N.D    | 120                                | US EPA 508-1995   |
| 14.                                 | Alachlor            | µg/L           | N.D    | 20                                 | US EPA 508-1995   |
| 15.                                 | Atrazine            | µg/L           | N.D    | 2.1                                | 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    | 0.3                                | US EPA 508-1995   |
| 19.                                 | Ethion              | µg/L           | N.D    | 3                                  | US EPA 8141A-1994   |
| 20.                                 | Malathion           | µg/L           | N.D    | 185                                | US EPA 8141A -1994  |
| 21.                                 | Methyl Parathion    | µg/L           | N.D    | 0.4                                | 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    | 26                                 | US EPA 8141A -1994  |
| 25.                                 | Aldrin              | µg/L           | N.D    | 0.03                               | US EPA 508-1995   |
| 26.                                 | Dieldrin            | µg/L           | N.D    | 0.03                               | US EPA 508-1995   |
| Remarks: N.D- Not Detected          |                     |                |        |                                    |   |

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

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE





# Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

| <b>Report no. : MEEPL/ JULY059/2016-17</b>                    |                         |  |        | <b>Date: 18<sup>th</sup> July, 2016</b> |   |
|---|-------------------------|--|--------|---|---|
| Sample described by customer: <b>STP Outlet (Bagru Mines)</b> |                         |  |        |   |   |
| Client Name: <b>Hindalco Industries Limited</b>               |                         |  |        |   |   |
| Client Address: Lohardaga                                     |                         |  |        |   |   |
| Postal Code: 835203   |                         |  |        |   |   |
| State: Jharkhand  |                         |  |        |   |   |
| Country: India  |                         |  |        |   |   |
| Sample Type: <b>Effluent Water</b>                            |                         |  |        |   |   |
| Marks on Sample: Location: <b>STP Outlet (Bagru Mines)</b>    |                         |  |        |   |   |
| Sample collected on: 13.06.2016                               |                         |  |        |   |   |
| Quantity: 4 liters  |                         |  |        |   |   |
| Received: 14.06.2016  |                         |  |        |   |   |
| Registered: 14.06.2016  |                         |  |        |   |   |
| Test Start/End Date: 14.06.2016/18.06.2016                    |                         |  |        |   |   |
| Sl. No.   | Analysis                | Method   | Result | Unit                                    | Limits  |
| 1   | pH                      | APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+-B,4-92 | 7.2    | mg/l                                    | 5.5-9.0   |
| 2   | Total Suspended Solids  | APHA 22 <sup>nd</sup> EDN: 2012-2540           | 20.1   | mg/l                                    | 100   |
| 3   | BOD @ 27 <sup>o</sup> C | IS 3025 (Part 44): 1993, RA2003, Amd.1         | 10.2   | mg/l                                    | 30  |
| 4   | COD                     | IS 3025 (Part 58): 1993, RA2006, Amd.1         | 30.2   | mg/l                                    | 250   |
| 5   | Oil & Grease            | IS 3025(PART 39): 1991 RA 2003,Ed 2.1          | <5.0   | mg/l                                    | 10  |
| 6   | Total Dissolved Solids  | APHA 22 <sup>ND</sup> EDN 2012-2540            | 81.2   | mg/l                                    | 2100  |
| 7   | Aluminum (as Al)        | APHA 22 <sup>nd</sup> EDN 2012-3120B           | 1.2    | mg/l                                    | 3   |
| 8   | Calcium (as Ca)         | APHA 22 <sup>nd</sup> EDN 2012-3120B           | 7.01   | mg/l                                    | 75  |
| 9   | Iron (as Fe)            | APHA 22 <sup>nd</sup> EDN 2012-3120B           | 2.1    | mg/l                                    | 3   |
| 10  | Temperature             |  | 23.5   | <sup>o</sup> C                          | Shall not exceed 5 <sup>o</sup> C above the receiving water temperature |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

|  |                                   |
|--|-----------------------------------|
| Report no: : MEEPL/ JULY060/2016-17                      | Date: 18 <sup>th</sup> July, 2016 |
| Sample described by customer : DRINKING WATER-POTABILITY |                                   |
| Client Name: Hindalco Industries Limited                 |                                   |
| Client Address: Lohardaga                                |                                   |
| Postal Code: 835203                                      |                                   |
| State: Jharkhand   |                                   |
| Country: India   |                                   |
| Sample Type: SURFACE WATER                               |                                   |
| Marks on Sample: Location: Bagru Plateau near office.    |                                   |
| Quantity: 5 L X 2 No. PVC Can                            |                                   |
| Sample collected on: 13.06.2016                          |                                   |
| Received: 14.06.2016                                     |                                   |
| Registered: 14.06.2016                                   |                                   |
| Test Start/End Date: 14.06.2016/18.06.2016.              |                                   |

| Sl. No. | Parameters                               | Unit  | Result    | Acceptable Limit (IS 10500:2012) | Method Reference                                  |
|---------|--|-------|-----------|----------------------------------|---|
| 1       | Colour                                   | Hazen | <2        | 5 Max                            | APHA 22 <sup>nd</sup> Ed. 2012, 2120-B, 2-6       |
| 2       | Odour                                    | --    | Agreeable | Agreeable                        | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 3       | Taste                                    | --    | Agreeable | Agreeable                        | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 4       | Turbidity                                | NTU   | 0.20      | 1 Max                            | APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13      |
| 5       | pH                                       | --    | 8.0       | 6.5-8.5                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+B, 4-92    |
| 6       | Free Chlorides (Residual)                | mg/l  | <0.05     | 0.2 min                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CI-G, 4-69   |
| 7       | Total Dissolved Solids                   | mg/l  | 410       | 500 max                          | IS 3025 (Part 16): 1984, Reaffirmed 2006          |
| 8       | Total hardness (as CaCO <sub>3</sub> )   | mg/l  | 39        | 200 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69    |
| 9       | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 42        | 200 max                          | IS 3025 (Part 237): 1986, Reaffirmed 2009         |
| 10      | Chloride (as Cl)                         | mg/l  | 45        | 250 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CI-b, 4-72   |
| 11      | Sulphate (as SO <sub>4</sub> )           | mg/l  | 32.5      | 200 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190 |
| 12      | Boron (as B)                             | mg/l  | 0.20      | 0.5 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25     |
| 13      | Magnesium (as Mg)                        | mg/l  | 5.7       | 30 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Mg-B, 3-84   |



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Hindalco Industries : Environmental Monitoring report

APRIL-JUNE 2016

## Continuation Sheet

| Report no. : MEEPL/ JULY060/2016-17 |                        |      |        | Date: 18 <sup>th</sup> July, 2016 |   |
|-------------------------------------|------------------------|------|--------|-----------------------------------|---|
| Sl. No.                             | Parameters             | Unit | Result | Acceptable Limit (IS 10500:2012)  | Method Reference  |
| 14                                  | Fluoride (as F)        | mg/l | 0.23   | 1 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87 |
| 15                                  | Calcium (as Ca)        | mg/l | 17.5   | 75 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67         |
| 16                                  | Iron (as Fe)           | mg/l | 0.23   | 0.3 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 17                                  | Cadmium (as Cd)        | mg/l | N.D    | 0.003 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 18                                  | Chromium Total (as Cr) | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 19                                  | Copper (as Cu)         | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 20                                  | Lead (as Pb)           | mg/l | N.D    | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 21                                  | Zinc (as Zn)           | mg/l | 0.03   | 5 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 22                                  | Arsenic (as As)        | mg/l | <0.01  | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38            |
| 23                                  | Selenium (as Se)       | mg/l | N.D    | 0.001 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-23            |
| 24                                  | Mercury (as hg)        | mg/l | N.D    | 0.01 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38            |
| 25                                  | Cyanide (as CN)        | mg/l | N.D    | 0.05 max                          | APHA 22 <sup>nd</sup> ED. 2012, 4500-CN.C & 4-39 & 4-44 |
| 26                                  | Manganese (as Mn)      | mg/l | N.D    | 0.1 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 27                                  | Dissolved Oxygen       | mg/l | 7.0    | 7-8                               | APHA 20 <sup>th</sup> ED. Method 4500-o g.              |

For Mahabal Enviro Engineers Pvt. Ltd.

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SENIOR EXECUTIVE





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**Hindalco Industries : Environmental Monitoring report**

**APRIL-JUNE 2016**

| <b>Report no. : MEEPL/ JULY061/2016-17</b>   |  | <b>Date: 18<sup>th</sup> July, 2016</b> |         |                                 |
|--|--|---|---------|---------------------------------|
| Sample described as: <b>FLUE GAS</b>   |  |   |         |                                 |
| Name of the Industry: <b>M/S HINDALCO INDUSTRIES LIMITED</b>   |  |   |         |                                 |
| Address: Mines Division, Lohardaga, Jharkhand, Pin-835302  |  |   |         |                                 |
| Date & time of Sampling: 12.06.2016(13.00-13.30 Hrs)   |  |   |         |                                 |
| Sampling Site: <b>Bagru Mines Office-Bagru Plateau</b>   |  |   |         |                                 |
| A. General Information about Stack <ul style="list-style-type: none"> <li>Stack connected to: DG-Set (250 KVA)</li> <li>Emission due to Burning of H.S.D</li> <li>Material OF construction: M.S</li> <li>Shape of Stack: Circular</li> <li>Whether stack is provided with permanent platform &amp; ladder: Yes</li> <li>Capacity: 250 KVA</li> </ul> |  |   |         |                                 |
| B. Physical characteristics of stack <ul style="list-style-type: none"> <li>Height of the stack (a) from ground level: 7.0</li> <li>Diameter of the Stack at Sampling point: 0.2030</li> <li>Height of the sampling point from GL: 6.25</li> </ul>   |  |   |         |                                 |
| C. Analysis/Characteristic of Stock <ul style="list-style-type: none"> <li>Fuel used: H.S.D</li> <li>Fuel Consumption: 30 lt/hr</li> </ul>   |  |   |         |                                 |
| D. Analysis Report   |  |   |         |                                 |
| Sl. No.  | PARAMETERS   | PROTOCOL                                | RESULTS | Limits as per MoEF G.S.R.448(E) |
| 1  | Temperature of Emission (°C)                           | IS 11255 Part: 3 1985 (Realf 2008)      | 310     | ---                             |
| 2  | Barometric pressure (mm of Hg)                         | IS 11255 Part: 3 1985 (Realf 2008)      | 620     | ---                             |
| 3  | Velocity of Gas (m/Sec)                                | IS 11255 Part: 3 1985 (Realf 2008)      | 8.4     | ---                             |
| 4  | Quantity of Gas flow (Nm <sup>3</sup> /hr)             | IS 11255 Part: 3 1985 (Realf 2008)      | 563     | ---                             |
| 5  | Concentration of CO <sub>2</sub> (% v/v)               | IS 11255 Part: 3 1985 (Realf 2008)      | 4.0     | 5.0                             |
| 6  | Concentration of CO (gm/kw-h)                          | IS 11255 Part: 3 1985 (Realf 2008)      | 0.29    | --                              |
| 7  | Concentration of SO <sub>2</sub> (mg/Nm <sup>3</sup> ) | USEPA-6C                                | 55.2    | --                              |
| 8  | Concentration of NO <sub>2</sub> (gm/kw-h)             | USEPA-7E                                | 0.75    | 9.2                             |
| 9  | Concentration of Particulate Matters (gm/kw-h)         | IS 11255 Part: 3 1985 (Realf 2003)      | 0.17    | 0.3                             |
| E. Pollution Control Device<br>Details of pollution control devices attached with the stack: Nil   |  |   |         |                                 |
| F. Remarks: Nil  |  |   |         |                                 |

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

Vijay Pandey  
**SENIOR EXECUTIVE**





# *Eco Ventures Pvt. Ltd.*

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

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

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

### **BAGRU PLATEAU- ENVIRONMENTAL MONITORING REPORT**

**JULY TO SEPTEMBER 2016**

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

Vijay Pandey  
SENIOR EXECUTIVE





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**Hindalco Industries : Environmental Monitoring Report**

**July – September 2016**

## CONTENT

|   |                                      |
|---|--------------------------------------|
| <b>LOCATION</b>                               |                                      |
| <b>AMBIENT AIR QUALITY</b>                    |                                      |
| 1   | Bagru Plateau- Office (Near Colony)  |
| 2   | Hisri Mines Pit Bagru Plateau        |
| 3   | Bhusar Mines Pit Bagru Plateau       |
| 4   | Entrance Gate Bagru Mines            |
| 5   | Bagru Hisri Mines Pit II             |
| <b>NOISE LEVEL</b>                            |                                      |
| 1   | Bagru Plateau – Near Office          |
| 2   | Bagru Plateau – Near Workshop        |
| <b>SPOT NOISE</b>                             |                                      |
| 1   | Bagru Crusher site                   |
| <b>DRINKING WATER</b>                         |                                      |
| 1   | Tap Water-Bagru Plateau near office. |
| <b>EFFLUENT WATER ANALYSIS</b>                |                                      |
| 1   | STP Outlet (Bagru Mines)             |
| <b>SURFACE WATER</b>                          |                                      |
| 1   | Hisri Pit                            |
| <b>STACK MONITORING OF DG SETS (FLUE GAS)</b> |                                      |
| 1   | Bagru Mines Office-Bagru Plateau     |



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Hindalco Industries : Environmental Monitoring Report

July – September 2016

|  |                                      |
|--|--------------------------------------|
| Report no: : MEEPL/ OCT0125/2016-17                            | Date: 31 <sup>st</sup> October, 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING   |                                      |
| Client Name: Hindalco Industries Limited                       |                                      |
| Client Address: Lohardaga                                      |                                      |
| Postal Code: 835203  |                                      |
| State: Jharkhand   |                                      |
| Country: India   |                                      |
| Sample type: AMBIENT AIR QUALITY MONITORING                    |                                      |
| Marks on Sample: Location: Bagru Plateau- Office (Near Colony) |                                      |
| Sample collected on: 21.09.2016                                |                                      |
| Received: 22.09.2016   |                                      |
| Registered: 22.09.2016   |                                      |
| Test Start/End Date: 22.09.2016/24.09.2016                     |                                      |

| LOCATION / IDENTIFICATION: Bagru Plateau- Office (Near Colony) |  |                          |                |               |
|--|--|--------------------------|----------------|---------------|
| Sl. No.  | PARAMETERS   | UNIT                     | Standard Limit | Concentration |
| 01.  | Particulate Matter (size less than 10 $\mu\text{m}$ ) $\text{PM}_{10}$   | $\mu\text{g}/\text{m}^3$ | 100            | 43.7          |
| 02.  | Particulate Matter (size less than 2.5 $\mu\text{m}$ ) $\text{PM}_{2.5}$ | $\mu\text{g}/\text{m}^3$ | 60             | 28.3          |
| 03.  | Sulphur Dioxide ( $\text{SO}_2$ )  | $\mu\text{g}/\text{m}^3$ | 80             | 20.5          |
| 04.  | Nitrogen Dioxide ( $\text{NO}_2$ )                                       | $\mu\text{g}/\text{m}^3$ | 80             | 32.1          |
| 05.  | Ammonia ( $\text{NH}_3$ )  | $\mu\text{g}/\text{m}^3$ | 400            | 13.9          |
| 06.  | Ozone ( $\text{O}_3$ )   | $\mu\text{g}/\text{m}^3$ | 180            | 20.1          |
| 07.  | Carbon Monoxide (CO)   | $\text{mg}/\text{m}^3$   | 02             | 0.62          |
| 08.  | Lead (Pb)  | $\mu\text{g}/\text{m}^3$ | 1.0            | 0.03          |
| 09.  | Nickel (Ni)  | $\text{ng}/\text{m}^3$   | 20             | 8.5           |
| 10.  | Arsenic (As)   | $\text{ng}/\text{m}^3$   | 06             | 2.87          |
| 11.  | Benzene ( $\text{C}_6\text{H}_6$ )                                       | $\mu\text{g}/\text{m}^3$ | 05             | 2.9           |
| 12.  | Benzo (a) Pyrene   | $\mu\text{g}/\text{m}^3$ | 01             | 0.3           |

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Hindalco Industries : Environmental Monitoring Report

July – September 2016

|  |                                      |
|--|--------------------------------------|
| Report no: : MEEPL/ OCT0126/2016-17                          | Date: 31 <sup>st</sup> October, 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING |                                      |
| Client Name: Hindalco Industries Limited                     |                                      |
| Client Address: Lohardaga                                    |                                      |
| Postal Code: 835203  |                                      |
| State: Jharkhand   |                                      |
| Country: India   |                                      |
| Sample type: AMBIENT AIR QUALITY MONITORING                  |                                      |
| Marks on Sample: Location: Hisri Mines Pit Bagru Plateau     |                                      |
| Sample collected on: 21.09.2016                              |                                      |
| Received: 22.09.2016   |                                      |
| Registered: 22.09.2016                                       |                                      |
| Test Start/End Date: 22.09.2016/24.09.2016                   |                                      |

| LOCATION / IDENTIFICATION: Hisri Mines Pit Bagru Plateau |  |                   |                |               |
|--|--|-------------------|----------------|---------------|
| Sl. No.  | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.  | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 53.1          |
| 02.  | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 36.5          |
| 03.  | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 23.9          |
| 04.  | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 35.1          |
| 05.  | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 18.5          |
| 06.  | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 15.4          |
| 07.  | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.58          |
| 08.  | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.03          |
| 09.  | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 8.1           |
| 10.  | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.73          |
| 11.  | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 3.01          |
| 12.  | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.33          |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE





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Hindalco Industries : Environmental Monitoring Report

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|   |   |
|---|---|
| <b>Report no. :</b> MEEPL/ OCT0127/2016-17                          | <b>Date:</b> 31 <sup>st</sup> October, 2016 |
| <b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING |   |
| Client Name: <b>Hindalco Industries Limited</b>                     |   |
| Client Address: Lohardaga   |   |
| Postal Code: 835203   |   |
| State: Jharkhand  |   |
| Country: India  |   |
| Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>                  |   |
| Marks on Sample: Location: <b>Bhusar Mines Pit Bagru Plateau</b>    |   |
| Sample collected on: 21.09.2016                                     |   |
| Received: 22.09.2016  |   |
| Registered: 22.09.2016  |   |
| Test Start/End Date: 22.09.2016/24.09.2016                          |   |

| LOCATION / IDENTIFICATION: Bhusar Mines Pit Bagru Plateau |  |                   |                |               |
|---|--|-------------------|----------------|---------------|
| Sl. No.   | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.   | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 59.3          |
| 02.   | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 38.0          |
| 03.   | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 21.1          |
| 04.   | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 35.9          |
| 05.   | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 15.4          |
| 06.   | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 19.2          |
| 07.   | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.55          |
| 08.   | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.027         |
| 09.   | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 7.5           |
| 10.   | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.77          |
| 11.   | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 2.8           |
| 12.   | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.41          |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring Report

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|  |                                      |
|--|--------------------------------------|
| Report no: : MEEPL/ OCT0128/2016-17                          | Date: 31 <sup>st</sup> October, 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING |                                      |
| Client Name: Hindalco Industries Limited                     |                                      |
| Client Address: Lohardaga                                    |                                      |
| Postal Code: 835203  |                                      |
| State: Jharkhand   |                                      |
| Country: India   |                                      |
| Sample Type: AMBIENT AIR QUALITY MONITORING                  |                                      |
| Marks on Sample Location: Entrance Gate Bagru Mines          |                                      |
| Sample collected on: 21.09.2016                              |                                      |
| Received: 22.09.2016   |                                      |
| Registered: 22.09.2016                                       |                                      |
| Test Start/End Date: 22.09.2016/24.09.2016                   |                                      |

### LOCATION / IDENTIFICATION: Entrance Gate Bagru Mines

| Sl. No. | PARAMETERS   | UNIT              | Standard Limit | Concentration |
|---------|--|-------------------|----------------|---------------|
| 01.     | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 55.7          |
| 02.     | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 38.1          |
| 03.     | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 20.2          |
| 04.     | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 31.8          |
| 05.     | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 18.1          |
| 06.     | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 15.4          |
| 07.     | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.45          |
| 08.     | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.03          |
| 09.     | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 8.1           |
| 10.     | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.75          |
| 11.     | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 2.9           |
| 12.     | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.30          |

For Mahabal Enviro Engineers Pvt. Ltd.

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SENIOR EXECUTIVE



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**Hindalco Industries : Environmental Monitoring Report**

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|   |   |
|---|---|
| <b>Report no. :</b> MEEPL/ OCT0129/2016-17                          | <b>Date:</b> 31 <sup>st</sup> October, 2016 |
| <b>Sample described by customer:</b> AMBIENT AIR QUALITY MONITORING |   |
| Client Name: <b>Hindalco Industries Limited</b>                     |   |
| Client Address: <b>Lohardaga</b>                                    |   |
| Postal Code: <b>835203</b>  |   |
| State: <b>Jharkhand</b>   |   |
| Country: <b>India</b>   |   |
| Sample Type: <b>AMBIENT AIR QUALITY MONITORING</b>                  |   |
| Marks on Sample Location: <b>Hisri Mines Pit II</b>                 |   |
| <b>Sample collected on:</b> 21.09.2016                              |   |
| <b>Received:</b> 22.09.2016   |   |
| <b>Registered:</b> 22.09.2016                                       |   |
| <b>Test Start/End Date:</b> 22.09.2016/24.09.2016                   |   |

| LOCATION / IDENTIFICATION: Hisri Mines Pit - II |  |                   |                |               |
|---|--|-------------------|----------------|---------------|
| Sl. No.   | PARAMETERS   | UNIT              | Standard Limit | Concentration |
| 01.   | Particulate Matter (size less than 10 µm) PM <sub>10</sub>   | µg/m <sup>3</sup> | 100            | 52.1          |
| 02.   | Particulate Matter (size less than 2.5 µm) PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60             | 30.5          |
| 03.   | Sulphur Dioxide (SO <sub>2</sub> )                           | µg/m <sup>3</sup> | 80             | 16.9          |
| 04.   | Nitrogen Dioxide (NO <sub>2</sub> )                          | µg/m <sup>3</sup> | 80             | 28.7          |
| 05.   | Ammonia (NH <sub>3</sub> )                                   | µg/m <sup>3</sup> | 400            | 16.5          |
| 06.   | Ozone (O <sub>3</sub> )                                      | µg/m <sup>3</sup> | 180            | 12.1          |
| 07.   | Carbon Monoxide (CO)   | mg/m <sup>3</sup> | 02             | 0.48          |
| 08.   | Lead (Pb)  | µg/m <sup>3</sup> | 1.0            | 0.02          |
| 09.   | Nickel (Ni)  | ng/m <sup>3</sup> | 20             | 5.1           |
| 10.   | Arsenic (As)   | ng/m <sup>3</sup> | 06             | 2.5           |
| 11.   | Benzene (C <sub>6</sub> H <sub>6</sub> )                     | µg/m <sup>3</sup> | 05             | 3.2           |
| 12.   | Benzo (a) Pyrene   | µg/m <sup>3</sup> | 01             | 0.30          |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring Report**

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|   |   |
|---|---|
| <b>Report no. :</b> MEEPL/ OCT0130/2016-17                | <b>Date:</b> 31 <sup>st</sup> October, 2016 |
| <b>Sample described by customer:</b> 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 Meter    |   |
| Data Collection Date: 21.09.2016                          |   |
| Analyse Date: 22.09.2016                                  |   |

| Location/Identification   | Unit       | Limit (day) | Result | Limit (night) | Result | Dates      |
|---------------------------|------------|-------------|--------|---------------|--------|------------|
| Bagru Plateau Near Office | dB (A) Leq | 75          | 48.4   | 70            | 35.0   | 21.09.2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring Report**

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|   |  |
|---|--|
| <b>Report no. : MEEPL/ OCT0131/2016-17</b>              | <b>Date: 31<sup>st</sup> October, 2016</b> |
| Sample described by customer: Measurement of Noise      |  |
| Client Name: <b>Hindalco Industries Limited</b>         |  |
| Client Address: <b>Lohardaga</b>                        |  |
| Postal Code: 835203                                     |  |
| State: Jharkhand  |  |
| Country: India  |  |
| Sample Description: <b>Measurement of Noise</b>         |  |
| Sampling Method: Instrumental, using Sound level Metter |  |
| Data Collection Date: 21.09.2016                        |  |
| Analyse Date: 22.09.2016                                |  |

| Location/Identification       | Unit                   | Limit (day) | Result | Limit (night) | Result | Dates      |
|-------------------------------|------------------------|-------------|--------|---------------|--------|------------|
| Bagru Plateau – Near Workshop | dB (A) L <sub>eq</sub> | 75          | 43.9   | 70            | 36.7   | 21.09.2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring Report**

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|   |  |
|---|--|
| <b>Report no. : MEEPL/ OCT0132/2016-17</b>              | <b>Date: 31<sup>st</sup> October, 2016</b> |
| Sample described by customer: Measurement of Spot Noise |  |
| Client Name: <b>Hindalco Industries Limited</b>         |  |
| Client Address: <b>Lohardaga</b>                        |  |
| Postal Code: 835203                                     |  |
| State: Jharkhand  |  |
| Country: India  |  |
| Sample Description: <b>Measurement of Spot Noise</b>    |  |
| Sampling Method: Instrumental, using Sound level Metter |  |
| Data Collection Date: 21.09.2016                        |  |
| Analyse Date: 22.09.2016                                |  |

| Location/Identification          | Unit            | Limit (day) | Result | Dates      |
|----------------------------------|-----------------|-------------|--------|------------|
| Bagru Plateau Bagru Crusher site | dB (A) $L_{eq}$ | 75          | 68.6   | 21.09.2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring Report

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|  |                                      |
|--|--------------------------------------|
| Report no: : MEEPL/ OCT0133/2016-17                      | Date: 31 <sup>st</sup> October, 2016 |
| Sample described by customer : DRINKING WATER-POTABILITY |                                      |
| Client Name: Hindalco Industries Limited                 |                                      |
| Client Address: Lohardaga                                |                                      |
| Postal Code: 835203                                      |                                      |
| State: Jharkhand   |                                      |
| Country: India   |                                      |
| Sample Type: DRINKING WATER-POTABILITY                   |                                      |
| Marks on Sample: Location: Bagru Plateau near office.    |                                      |
| Quantity: 5 L X 2 No. PVC Can                            |                                      |
| Sample collected on: 21.09.2016                          |                                      |
| Received: 21.09.2016                                     |                                      |
| Registered: 22.09.2016                                   |                                      |
| Test Start/End Date: 22.09.2016/25.09.2016.              |                                      |

| Sl. No. | Parameters                               | Unit  | Result    | Acceptable Limit (IS10500:2012) | Method reference                                  |
|---------|--|-------|-----------|---------------------------------|---|
| 1       | Colour                                   | Hazen | <1        | 5 Max                           | APHA 22 <sup>nd</sup> Ed. 2012, 2120-B, 2-6       |
| 2       | Odour                                    | --    | Agreeable | Agreeable                       | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 3       | Taste                                    | --    | Agreeable | Agreeable                       | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 4       | Turbidity                                | NTU   | 0.2       | 1 Max                           | APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13      |
| 5       | pH                                       | --    | 7.0       | 6.5-8.5                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+-B, 4-92   |
| 6       | Free Chlorides (Residual)                | mg/l  | <0.05     | 0.2 min                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 7       | Total Dissolved Solids                   | mg/l  | 85.9      | 500 max                         | IS 3025 (Part 16): 1984, Reaffirmed 2006          |
| 8       | Monochloramines                          | mg/l  | <0.05     | --                              | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69    |
| 9       | Dichloramines                            | mg/l  | <0.05     | --                              | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69    |
| 10      | Total hardness (as CaCO <sub>3</sub> )   | mg/l  | 55.1      | 200 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69    |
| 11      | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 68.9      | 200 max                         | IS 3025 (Part 237): 1986, Reaffirmed 2009         |
| 12      | Chloride (as Cl)                         | mg/l  | 8.4       | 250 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72   |
| 13      | Sulphate (as SO <sub>4</sub> )           | mg/l  | 5.9       | 200 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190 |



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**Hindalco Industries : Environmental Monitoring Report**

**July – September 2016**

## Continuation Sheet

| Report no: : MEEPL/ OCT0133/2016-17 |  |      |        | Date: 31 <sup>st</sup> October, 2016 |  |
|-------------------------------------|--|------|--------|--------------------------------------|--|
| Sl. No.                             | Parameters   | Unit | Result | Acceptable Limit (IS10500:2012)      | Method reference   |
| 14                                  | Nitrate (as NO <sub>3</sub> )                            | mg/l | 1.1    | 45 max                               | APHA 22 <sup>nd</sup> Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125 |
| 15                                  | Fluoride (as F)  | mg/l | 0.18   | 1 max                                | APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87        |
| 16                                  | Boron (as B)   | mg/l | 0.12   | 0.5 max                              | APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25                  |
| 17                                  | Calcium (as Ca)  | mg/l | 34     | 75 max                               | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67                |
| 18                                  | Magnesium (as Mg)  | mg/l | 4.3    | 30 max                               | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Mg-B, 3-84                |
| 19                                  | Ammonical Nitrogen/Total Ammonia                         | mg/l | <0.1   | --                                   | APHA 22 <sup>nd</sup> Ed. 2012, 4500-NH <sub>3</sub> -F, 4-115 |
| 20                                  | Iron (as Fe)   | mg/l | 0.13   | 0.3 max                              | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 21                                  | Manganese (as Mn)  | mg/l | N.D    | 0.1 max                              | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 22                                  | Aluminium (as Al)  | mg/l | 0.009  | 0.03 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Al-B, 3-61                |
| 23                                  | Cadmium (as Cd)  | mg/l | N.D    | 0.003 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 24                                  | Chromium Total (as Cr)                                   | mg/l | N.D    | 0.05 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 25                                  | Copper (as Cu)   | mg/l | N.D    | 0.05 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 26                                  | Lead (as Pb)   | mg/l | N.D    | 0.01 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 27                                  | Zinc (as Zn)   | mg/l | 0.02   | 5 max                                | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 28                                  | Arsenic (as As)  | mg/l | <0.01  | 0.01 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18                   |
| 29                                  | Selenium (as Se)   | mg/l | N.D    | 0.001 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-18                   |
| 30                                  | Mercury (as hg)  | mg/l | N.D    | 0.01 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-18                   |
| 31                                  | Nickel (as Ni)   | mg/l | <0.02  | 0.02 max                             | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18                   |
| 32                                  | Mineral Oil  | mg/l | N.D    | 0.5 max                              | IS 3025 (Part 39): 1991, Reaffirmed 2003: ed. 2.1              |
| 33                                  | Cyanide (as CN)  | mg/l | N.D    | 0.05 max                             | APHA 22 <sup>nd</sup> ED. 2012, 4500-CN.C & 4-39 & 4-44        |
| 34                                  | Anionic detergents as MBAS                               | mg/l | <0.1   | 0.2 max                              | APHA 22 <sup>nd</sup> ED. 2012, 5540-C.C & 5-53                |
| 35                                  | Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) | mg/l | N.D    | 0.001 max                            | APHA 22 <sup>nd</sup> ED. 2012, 5530-B & C 5-4753              |
| 36                                  | Polynuclear aromatic hydrocarbons (PAH)                  | mg/l | N.D    | 0.0001 max                           | APHA 22 <sup>nd</sup> ED. 2012, 6440, 6-93                     |
| 37                                  | Polychlorinated Biphenyls (PCBs)                         | mg/l | N.D    | 0.0005 max                           | USEPA Method 8082  |
| 38                                  | Sulphide (as S)  | mg/l | N.D    | 0.05 max                             | APHA 22 <sup>nd</sup> ED. 2012, 4500-S2-C 4-175 & F 4-178      |

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# Mahabal Enviro Engineers Pvt. Ltd.

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E-mail: mahabalranchi@gmail.com

Hindalco Industries : Environmental Monitoring Report

July – September 2016

## Continuation Sheet

| Report no: : MEEPL/ OCT0133/2016-17 |                     |             |        | Date: 31 <sup>st</sup> October, 2016 |  |
|-------------------------------------|---------------------|-------------|--------|--------------------------------------|--|
| S.No                                | Parameters          | Unit        | Result | Acceptable Limit (IS10500:2012)      | Method Reference                                       |
| <b>Microbiological Analysis</b>     |                     |             |        |                                      |  |
| 1.                                  | Total Colliforms    | MPN/ 100 mL | N.D    | <1.1                                 | APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69             |
| 2.                                  | E-Coli              | MPN/ 100 mL | N.D    | Absent                               | APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9-76 |
| <b>Pesticides Residues</b>          |                     |             |        |                                      |  |
| 3.                                  | p,p DDT             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 4.                                  | o,p DDT             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 5.                                  | p,p DDE             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 6.                                  | o,p DDE             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 7.                                  | p,p DDD             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 8.                                  | o,p DDD             | µg/L        | N.D    | 1                                    | US EPA 508-1995  |
| 9.                                  | γ-HCH (Lindane)     | µg/L        | <0.01  | 2                                    | US EPA 508-1995  |
| 10.                                 | α-HCH               | µg/L        | <0.01  | 0.02                                 | US EPA 508-1995  |
| 11.                                 | β-HCH               | µg/L        | N.D    | 0.03                                 | US EPA 508-1995  |
| 12.                                 | δ - HCH             | µg/L        | N.D    | 0.03                                 | US EPA 508-1995  |
| 13.                                 | Butachlor           | µg/L        | N.D    | 120                                  | US EPA 508-1995  |
| 14.                                 | Alachlor            | µg/L        | N.D    | 20                                   | US EPA 508-1995  |
| 15.                                 | Atrazine            | µg/L        | N.D    | 2.1                                  | 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    | 0.3                                  | US EPA 508-1995  |
| 19.                                 | Ethion              | µg/L        | N.D    | 3                                    | US EPA 8141A-1994                                      |
| 20.                                 | Malathion           | µg/L        | N.D    | 185                                  | US EPA 8141A -1994                                     |
| 21.                                 | Methyl Parathion    | µg/L        | N.D    | 0.4                                  | 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    | 26                                   | US EPA 8141A -1994                                     |
| 25.                                 | Aldrin              | µg/L        | N.D    | 0.03                                 | US EPA 508-1995  |
| 26.                                 | Dieldrin            | µg/L        | N.D    | 0.03                                 | US EPA 508-1995  |
| Remarks: N.D- Not Detected          |                     |             |        |                                      |  |

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

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey  
SENIOR EXECUTIVE







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**Hindalco Industries : Environmental Monitoring Report**

**July – September 2016**

| <b>Report no. : MEEPL/ OCT0134/2016-17</b>                    |                        |   | <b>Date: 31<sup>st</sup> October, 2016</b> |      |   |
|---|------------------------|---|--|------|---|
| Sample described by customer: <b>STP Outlet (Bagru Mines)</b> |                        |   |  |      |   |
| Client Name: <b>Hindalco Industries Limited</b>               |                        |   |  |      |   |
| Client Address: Lohardaga                                     |                        |   |  |      |   |
| Postal Code: 835203   |                        |   |  |      |   |
| State: Jharkhand  |                        |   |  |      |   |
| Country: India  |                        |   |  |      |   |
| Sample Type: <b>Effluent Water</b>                            |                        |   |  |      |   |
| Marks on Sample: Location: <b>STP Outlet (Bagru Mines)</b>    |                        |   |  |      |   |
| Sample collected on: 21.09.2016                               |                        |   |  |      |   |
| Quantity: 4 liters  |                        |   |  |      |   |
| Received: 21.09.2016  |                        |   |  |      |   |
| Registered: 22.09.2016  |                        |   |  |      |   |
| Test Start/End Date: 22.09.2016/25.09.2016                    |                        |   |  |      |   |
| Sl. No.   | Analysis               | Method  | Result                                     | Unit | Limits  |
| 1   | pH                     | APHA 22 <sup>nd</sup> Ed. 2012,<br>4500-H+-B,4-92 | 8.0  | mg/l | 5.5-9.0   |
| 2   | Total Suspended Solids | APHA 22 <sup>nd</sup> EDN: 2012-2540              | 32.5                                       | mg/l | 100   |
| 3   | BOD @ 27°C             | IS 3025 (Part 44): 1993,<br>RA2003, Amd.1         | 12.7                                       | mg/l | 30  |
| 4   | COD                    | IS 3025 (Part 58): 1993,<br>RA2006, Amd.1         | 37.3                                       | mg/l | 250   |
| 5   | Oil & Grease           | IS 3025(PART 39): 1991 RA<br>2003,Ed 2.1          | <5.0                                       | mg/l | 10  |
| 6   | Total Dissolved Solids | APHA 22 <sup>ND</sup> EDN 2012-2540               | 85.0                                       | mg/l | 2100  |
| 7   | Aluminum (as Al)       | APHA 22 <sup>nd</sup> EDN 2012-3120B              | 1.3  | mg/l | 3   |
| 8   | Calcium (as Ca)        | APHA 22 <sup>nd</sup> EDN 2012-3120B              | 7.01                                       | mg/l | 75  |
| 9   | Iron (as Fe)           | APHA 22 <sup>nd</sup> EDN 2012-3120B              | 2.1  | mg/l | 3   |
| 10  | Temperature            |   | 24.8                                       | °C   | Shall not exceed<br>5°C above the<br>receiving water<br>temperature |

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

Vijay Pandey  
SENIOR EXECUTIVE





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Hindalco Industries : Environmental Monitoring Report

July - September 2016

|  |                                      |
|--|--------------------------------------|
| Report no: : MEEPL/ OCT0135/2016-17                      | Date: 31 <sup>st</sup> October, 2016 |
| Sample described by customer : DRINKING WATER-POTABILITY |                                      |
| Client Name: Hindalco Industries Limited                 |                                      |
| Client Address: Lohardaga                                |                                      |
| Postal Code: 835203                                      |                                      |
| State: Jharkhand   |                                      |
| Country: India   |                                      |
| Sample Type: SURFACE WATER                               |                                      |
| Marks on Sample: Location: Bagru Plateau near office.    |                                      |
| Quantity: 5 L X 2 No. PVC Can                            |                                      |
| Sample collected on: 21.09.2016                          |                                      |
| Received: 21.09.2016                                     |                                      |
| Registered: 22.09.2016                                   |                                      |
| Test Start/End Date: 22.09.2016/25.09.2016.              |                                      |

| Sl. No. | Parameters                               | Unit  | Result    | Acceptable Limit (IS 10500:2012) | Method Reference                                  |
|---------|--|-------|-----------|----------------------------------|---|
| 1       | Colour                                   | Hazen | <2        | 5 Max                            | APHA 22 <sup>nd</sup> Ed. 2012, 2120-B, 2-6       |
| 2       | Odour                                    | --    | Agreeable | Agreeable                        | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 3       | Taste                                    | --    | Agreeable | Agreeable                        | IS 3025 (Part 7): 1983, Reaffirmed 2006           |
| 4       | Turbidity                                | NTU   | 0.31      | 1 Max                            | APHA 22 <sup>nd</sup> Ed. 2012, 2130-B, 2-13      |
| 5       | pH                                       | --    | 8.3       | 6.5-8.5                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-H+-B, 4-92   |
| 6       | Free Chlorides (Residual)                | mg/l  | <0.05     | 0.2 min                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-G, 4-69   |
| 7       | Total Dissolved Solids                   | mg/l  | 428       | 500 max                          | IS 3025 (Part 16): 1984, Reaffirmed 2006          |
| 8       | Total hardness (as CaCO <sub>3</sub> )   | mg/l  | 46        | 200 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-CIG, 4-69    |
| 9       | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 41        | 200 max                          | IS 3025 (Part 237): 1986, Reaffirmed 2009         |
| 10      | Chloride (as Cl)                         | mg/l  | 47        | 250 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-Cl-b, 4-72   |
| 11      | Sulphate (as SO <sub>4</sub> )           | mg/l  | 32.9      | 200 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-so4-e, 4-190 |
| 12      | Boron (as B)                             | mg/l  | 0.20      | 0.5 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 4500-BB, 4-25     |
| 13      | Magnesium (as Mg)                        | mg/l  | 6.1       | 30 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Mg-B, 3-84   |





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Hindalco Industries : Environmental Monitoring Report

July – September 2016

## Continuation Sheet

| Sl. No. | Parameters             | Unit | Result | Acceptable Limit (IS 10500:2012) | Method Reference  |
|---------|------------------------|------|--------|----------------------------------|---|
| 14      | Fluoride (as F)        | mg/l | 0.18   | 1 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 4500-FB & D, 4-84, 4-87 |
| 15      | Calcium (as Ca)        | mg/l | 12.9   | 75 max                           | APHA 22 <sup>nd</sup> Ed. 2012, 3500-Ca-B, 3-67         |
| 16      | Iron (as Fe)           | mg/l | 0.16   | 0.3 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 17      | Cadmium (as Cd)        | mg/l | N.D    | 0.003 max                        | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 18      | Chromium Total (as Cr) | mg/l | N.D    | 0.05 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 19      | Copper (as Cu)         | mg/l | N.D    | 0.05 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 20      | Lead (as Pb)           | mg/l | N.D    | 0.01 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 21      | Zinc (as Zn)           | mg/l | 0.03   | 5 max                            | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 22      | Arsenic (as As)        | mg/l | <0.01  | 0.01 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38            |
| 23      | Selenium (as Se)       | mg/l | N.D    | 0.001 max                        | APHA 22 <sup>nd</sup> Ed. 2012, 3112-B, 3-23            |
| 24      | Mercury (as hg)        | mg/l | N.D    | 0.01 max                         | APHA 22 <sup>nd</sup> Ed. 2012, 3114-B, 3-38            |
| 25      | Cyanide (as CN)        | mg/l | N.D    | 0.05 max                         | APHA 22 <sup>nd</sup> ED. 2012, 4500-CN.C & 4-39 & 4-44 |
| 26      | Manganese (as Mn)      | mg/l | N.D    | 0.1 max                          | APHA 22 <sup>nd</sup> Ed. 2012, 3111-B, 3-18            |
| 27      | Dissolved Oxygen       | mg/l | 7.2    | 7-8                              | APHA 20 <sup>th</sup> ED. Method 4500-o g.              |

For Mahabal Enviro Engineers Pvt. Ltd.

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**Hindalco Industries : Environmental Monitoring Report**

**July – September 2016**

| <b>Report no. : MEEPL/ OCT0136/2016-17</b>  |  | <b>Date: 31<sup>st</sup> October, 2016</b> |         |                                 |
|---|--|--|---------|---------------------------------|
| Sample described as: <b>FLUE GAS</b>  |  |  |         |                                 |
| Name of the Industry: <b>M/S HINDALCO INDUSTRIES LIMITED</b>  |  |  |         |                                 |
| Address: Mines Division, Lohardaga, Jharkhand, Pin-835302   |  |  |         |                                 |
| Date & time of Sampling: 21.09.2016   |  |  |         |                                 |
| Sampling Site: <b>Bagru Mines Office-Bagru Plateau</b>  |  |  |         |                                 |
| A. General Information about Stack  |  |  |         |                                 |
| <ul style="list-style-type: none"> <li>Stack connected to: DG-Set (250 KVA)</li> <li>Emission due to Burning of H.S.D</li> <li>Material OF construction: M.S</li> <li>Shape of Stack: Circular</li> <li>Whether stack is provided with permanent platform &amp; ladder: Yes</li> <li>Capacity. 250 KVA</li> </ul> |  |  |         |                                 |
| B. Physical characteristics of stack  |  |  |         |                                 |
| <ul style="list-style-type: none"> <li>Height of the stack (a) from ground level: 7.0 m</li> <li>Diameter of the Stack at Sampling point: 0.2030m</li> <li>Height of the sampling point from GL. 6.25m</li> </ul>   |  |  |         |                                 |
| C. Analysis/Characteristic of Stock   |  |  |         |                                 |
| <ul style="list-style-type: none"> <li>Fuel used: H.S.D</li> <li>Fuel Consumption: 30 lt/hr</li> </ul>  |  |  |         |                                 |
| D. Analysis Report  |  |  |         |                                 |
| Sl. No.   | PARAMETERS   | PROTOCOL                                   | RESULTS | Limits as per MoEF G.S.R.448(E) |
| 1   | Temperature of Emission (°C)                           | IS 11255 Part: 3 1985 (Realf 2008)         | 326     | ---                             |
| 2   | Barometric pressure (mm of Hg)                         | IS 11255 Part: 3 1985 (Realf 2008)         | 747     | ---                             |
| 3   | Velocity of Gas (m/Sec)                                | IS 11255 Part: 3 1985 (Realf 2008)         | 8.1     | ---                             |
| 4   | Quantity of Gas flow (Nm <sup>3</sup> /hr)             | IS 11255 Part: 3 1985 (Realf 2008)         | 461     | ---                             |
| 5   | Concentration of CO <sub>2</sub> (% v/v)               | IS 11255 Part: 3 1985 (Realf 2008)         | 4.1     | 5.0                             |
| 6   | Concentration of CO (gm/kw-h)                          | IS 11255 Part: 3 1985 (Realf 2008)         | 0.29    | --                              |
| 7   | Concentration of SO <sub>2</sub> (mg/Nm <sup>3</sup> ) | USEPA-6C                                   | 61.5    | --                              |
| 8   | Concentration of NO <sub>2</sub> (gm/kw-h)             | USEPA-7E                                   | 1.13    | 9.2                             |
| 9   | Concentration of Particulate Matters (gm/kw-h)         | IS 11255 Part: 3 1985 (Realf 2003)         | 0.22    | 0.3                             |
| E. Pollution Control Device   |  |  |         |                                 |
| Details of pollution control devices attached with the stack: Nil   |  |  |         |                                 |
| F. Remarks: Nil   |  |  |         |                                 |

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

Vijay Pandey  
SENIOR EXECUTIVE

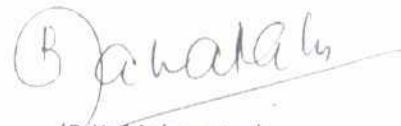


Date: 05.09.16

**Office Order**

Environmental Cell has been re-constituted at Hisri (new) Bauxite Mines (Area 14.55 Ha) comprising below mentioned team members. The team will ensure compliance of Environment Act, Regulation & Rule in respect of the said mines of Hindalco Industries Limited.

1. Mr. Ajay Pandey (Sr. Manager) (Coordinator)
2. Dr. Chitra Mandol –Medical Officer (Member)
3. Mr. B.G.Verma (Dy. Manager)
4. Mr. Sunil Kumar Chaudhary (Mines Forman)
5. Mr. Ashish kumar (Asst. Engineer)
6. Mr. Prakash Ranjan (GET)



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

**BREAK UP THE COST OF ENVIRONMENTAL MEASURES DURING THE YEAR 2016-17**

The composite cost during the year 2016-17 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).

| Sl No | Description   | Budget (in Rupees)<br>FY 2016-17 | Actual (in Rupees)<br>FY 2016-17<br>(from April'16 to Sep'2016) |
|-------|---|----------------------------------|---|
| 1     | Pollution Control & Environment monitoring          | 1540000.00                       | 574975.50   |
| 2     | Reclamation/ Back filing & Rehabilitation**         | 40000000.00                      | 33837173.00   |
| 3     | Green belt, Plantation & Water spraying arrangement | 2100000.00                       | 2051751.00  |
| 4     | Rural Development                                   | 20000000.00                      | 10244807.32   |

\*\*Part of OB removed cost.



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

PRODUCTION, MINED OUT, BACKFILLED, PRODUCTION AND OVERBURDEN REMOVAL FROM APR-16 to SEP-16

| NAME OF THE MINES                      | MINING LEASE AREA<br>(In HA) | MINED OUT AREA<br>(In HA) | BACK FILLED AREA<br>(in HA) | PRODUCTION<br>(In MT) | OVERBURDEN<br>(In Cu.M) |
|--|------------------------------|---------------------------|-----------------------------|-----------------------|-------------------------|
| Shrengdag Bauxite Mines                | 155.81                       | 2.90                      | 2.81                        | 137435.00             | 420085.00               |
| Gurdari Bauxite Mines                  | 584.19                       | 5.40                      | 5.10                        | 169330.00             | 279253.00               |
| Jalim & Sanai                          | 12.14                        | 0.51                      | 0.20                        | 24170.00              | 26587.00                |
| Serangdag                              | 140.06                       | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| Pakhar Buxite Mines                    | 115.13                       | 3.01                      | 3.57                        | 130110.00             | 166727.48               |
| Pakhar Buxite Mines                    | 8.09                         | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| Kujam-I                                | 80.87                        | 2.47                      | 2.47                        | 86870.00              | 101222.20               |
| Kujam-II                               | 157.38                       | 4.18                      | 4.33                        | 150150.00             | 197828.91               |
| Amtipani                               | 190.95                       | 4.99                      | 3.19                        | 114005.00             | 135519.46               |
| Chiro-Kukud                            | 152.57                       | 1.41                      | 1.21                        | 40415.00              | 94780.30                |
| Orsa Bauxite Mines                     | 196.36                       | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| Hisri New                              | 14.55                        | 0.73                      | 0.54                        | 36358.00              | 25610.00                |
| Bhusar                                 | 65.31                        | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| Bagru                                  | 75.41                        | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| <b>Minerals &amp; Minerals Limited</b> |                              |                           |                             |                       |                         |
| Pakhar Buxite Mines                    | 109.51                       | 3.45                      | 4.06                        | 154100.00             | 196818.79               |
| Pakhar Buxite Mines                    | 15.58                        | 0.00                      | 0.00                        | 0.00                  | 0.00                    |
| Bimarla Bauxite Mines                  | 134.37                       | 2.71                      | 1.25                        | 52675.00              | 63084.44                |

**Monitored water level (FY 2016-17)**

| Location (Mines)   | Elevation (Mtr) | Well type | Monsoon   |            | Post Monsoon |            |
|--|-----------------|-----------|-----------|------------|--------------|------------|
|  |                 |           | Inside ML | Outside ML | Inside ML    | Outside ML |
| Bagru Plateau (Hisri new, Bagru & Bhusar )   | 905             | Open Well |           | 21.32      |              | 22.70      |
|  | 910             | Open Well |           | 24.38      |              | 24.56      |
|  | 915             | Open Well |           | 29.00      |              | 28.43      |
|  | 903             | Open Well |           | 22.81      |              | 33.15      |
|  | 909             | Open Well |           | 20.15      |              | 28.72      |
|  | 1000            | Open Well |           | 24.93      |              | 22.65      |
| Pakhar Gr. Of Mines<br>(115.13,109.507,15.58,8.0                                       | 1083            | Hand Pump | 35.35     |            | 31.60        |            |
| Sherengdag Plateau<br>(Serangdag 155.81 ha,<br>Sherengdag 140.06 Ha,<br>Jalim & Sanai) | 1027            | Open Well |           | 25.80      |              | 28.40      |
|  | 1094            | Hand Pump | 41.74     |            | 39.55        |            |
|  | 1081            | Hand Pump | 39.60     |            | 31.30        |            |
|  | 1055            | Hand Pump | 33.00     |            | 27.50        |            |
|  | 1066            | Hand Pump | 27.75     |            | 26.25        |            |
| Gurdari  | 1045            | Hand Pump | 29.30     |            | 27.70        |            |
|  | 1061            | Hand Pump | 28.30     |            | 24.90        |            |
|  | 1059            | Hand Pump | 38.10     |            | 36.15        |            |
|  | 1075            | Hand Pump | 27.90     |            | 26.75        |            |
|  | 1075            | Hand Pump | 28.30     |            | 29.30        |            |
| Kujam I, Kujam II &<br>Amtipani Mines  | 1040            | Open Well |           | 33.90      |              | 21.85      |
|  | 1041            | Open Well |           | 33.65      |              | 24.80      |
|  | 1064            | Hand Pump | 31.50     |            | 28.60        |            |
|  | 1052            | Hand Pump | 22.35     |            |              | 21.05      |
| Chiro Kukud  | 1148            | Hand Pump | 33.40     |            | 28.30        |            |
|  | 1151            | Hand Pump | 37.60     |            | 31.80        |            |
|  | 1084            | Hand Pump | 34.20     |            | 33.15        |            |