



Ref No: HIL/LHD/JP (M)/MoEF/ 953

Date: 25.11.14

To,  
Joint Director(S)  
MoEF ,GOI, Eastern Regional Office  
A/3,Chandrashekharpur,  
Bhubaneshwar- 751023 (Orissa)

**Sub: Compliance Report of EC conditions for Amtipani Bauxite Mining project of M/s Hindalco Industries Limited located in Dist- Gumla, Jharkhand for the period April'14 to Sep'14.**

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


Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Amtipani** Bauxite Mining project of M/s Hindalco located in Gumla, Jharkhand for the period **April'14 to Sep'14**.

Hope you will find the same in order.

Thanking You

Yours Sincerely  
FOR HINDALCO INDUSTRIES LIMITED

  
(Bijesh Kumar Jha)  
Joint President (Mines)

Enclosure: - As Above

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

**AMTIPANI BAUXITE MINES (190.95 Ha)**

**Period : April'14 -Sep'14**

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

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

|    |   |  |
|----|---|--|
| 6  | <p>Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil and mineral dump. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted particularly after monsoon and maintained properly. Garland drain (size, gradient and length) shall be constructed for mine pit and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</p> | <p>Commensurate with the progress of mining activities over the period of time, construction of catch drains and siltation ponds/parapet walls is under implementation. Garland drains and sump pits have been planned to construct before rainy season.</p>   |
| 7  | <p>Plantation shall be raised in an area of 79.3 ha including a green belt of adequate width by planting the native species around the ML area, roads, etc. in consultation with the local DFO/Agriculture Department. The density of the trees should be around 1500 plants per ha.</p>  | <p>During 2014-15 around 1500 plantation carried out. Green belt development programme will keep place with progress of mining activities.</p>   |
| 8  | <p>The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</p>  | <p>Study on Water resource evaluation and their development potential has been carried by Center for Ground Water Studies, Kolkata during Nov-Dec '06. It has been planned to consult with CGWB and finalize the issue of implementation of suitable conservation measure. A water harvesting plan submitted at Ground water Board, Ranchi for approval.</p> |
| 9  | <p>Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year - pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director Central Ground Water Board.</p>   | <p>This is being monitored in all season. Report enclosed.</p>   |
| 10 | <p>Prior permission from the competent authority should be obtained for drawl of water from the surface water bodies.</p>   | <p>Rainwater harvested during rainy season is being used for sprinkling on haul roads and raising plantation. Spring water is</p>  |

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|    |  | drawn from the down the hill pockets ponds for drinking purposes. Hence, as per the terms and conditions in Mining lease deed, we have permission from the Deputy Commissioner for drawl of water from the surface water bodies. Water cess is being paid regularly to Jharkhand State Pollution Control Board. |
| 11 | The project proponent shall monitor the spring discharge on long term basis (at lease one major spring) both in terms of quantity and quality of water and records maintained. Six monthly report should be submitted to the Ministry of Environment and Forests and its Regional Office located at Bhubneshwar. | Is being monitored.   |
| 12 | Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be overloaded.   | Regular maintenance of vehicles are undertaken to minimize vehicular emission. All measures are being taken to control vehicular emission.  |
| 13 | Drills should either be operated with dust extractors or should be equipped with water injection system  | Wet drilling is done in the drill holes intermittently for dust suppression by pumping water.   |
| 14 | Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented   | Blasting time is fixed for Lunch Time i.e. 12.00 Noon -1.00 PM<br>All efforts are being taken to mitigate impact of blasting.   |
| 15 | Consent to operate should be obtained from SPCB prior to start of production of mine   | Consent to operate has been obtained prior to start of production.  |
| 16 | Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated from mining operations.   | There is no effluent discharge from Mine; hence ETP has not been installed. The sewage water from domestic uses is being collected through individual septic tanks & soak pits. Sullage is collected to an integrated soak pit.   |
| 17 | Land ouster and land loser/affected people should be compensated and rehabilitated as per the National Policy on Resettlement and Rehabilitation of project Affected Families (NPRR), 2003   | Land ouster and land loser/affected people are being compensated and rehabilitated as per the statute.  |
| 18 | The higher benches of the excavated void to be converted into water reservoir shall be terraced and afforested to stabilize the slopes. Peripheral fencing shall be done along the excavated area.   | Implementation process is in progress.  |

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|----|---|--|
| 19 | A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval. | Progressive mine Closure Plan along with mining scheme has been prepared and submitted to IBM timely for approval. |
|----|---|--|

### GENERAL CONDITIONS

| SI 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.   | Excavation of OB and Bauxite is being done as per the approved mining plan/scheme and obtained EC capacity. Quantum of mineral and OB excavated during the FY2014-15 is annexed. |
| 3     | Conservation measures for protection of flora and fauna in the core & buffer zone should be drawn up in consultation with the local forest and wildlife departments.  | A plan has been prepared and being implemented for conservation of flora and fauna.  |
| 4     | Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board. | Ambient air monitoring stations established and monitoring is being undertaken in consultation with State Pollution Control Board. Monitoring report annexed.                    |
| 5     | Data on ambient air quality (RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> ) should be regularly submitted to the Ministry including its Regional office located at Bhopal and the State Pollution Control Board / Central Pollution Control Board once in six months.  | Monitoring report annexed.   |
| 6     | Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.   | Mobile water tanker with sprinkling facility has been provided along haul roads, loading, unloading & at transfer points to arrest dust emission.                                |

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|----|--|---|
| 7  | Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.  | Complied.<br>PPEs are provided to workers.  |
| 8  | Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.                                       | Presently, there is no effluent discharge from Mine.  |
| 9  | Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. | PPE's provided.<br>Periodic training on safety & occupational health is being imparted to workers and health checks up conducted. |
| 10 | A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization  | A separate environmental management cell with suitable qualified personnel already formed and informed. <b>(Annexed)</b>          |
| 11 | The project authorities should inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.  | Progressive mine Closure Plan along with mining scheme has been prepared and submitted to IBM timely for approval.                |
| 12 | The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubneshwar.  | Separate budget has been prepared for the purpose. <b>(Annexed)</b>   |
| 13 | The project authorities should inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.  | Vide Point no. 11 above.  |
| 14 | The Regional Office of this Ministry located at Bhubneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the  | Agreed.   |

|    |  |   |
|----|--|---|
|    | requisite data / information / monitoring reports.   |   |
| 15 | A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom and suggestion / representation has been received while processing the proposal.   | Complied  |
| 16 | State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.   | Displayed.                                      |
| 17 | The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <b>http://envfor.nic.in</b> and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubneshwar. | Complied. <b>(Documents already submitted).</b> |



Date: 10.11.14

**OFFICE ORDER**

In connection with the earlier office order dated 30.10.2013 the re constituted team of Environment management cell to ensure compliance of various environmental Acts, regulations & rules at Mines Division, Hindalco, Lohardaga as follows:


The Environment Management Cell will consist of:

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

Members:

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

By order

  
Bijesh Kumar Jha  
Joint President (Mines)

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





**BREAK UP THE COST OF ENVIRONMENTAL MEASURES DURING THE YEAR 2014-15**

The composite cost during the year 2014-15 for environmental protection & pollution control by Jharkhand Mines division of M/s Hindalco Industries Ltd & M/s Minerals & Minerals Ltd for implementation of the suggested measures in EC at our all the operating mines in the state of Jharkhand-namely Pakhar (115.13 Ha), Pakhar (15.58 Ha), Pakhar (109.507 Ha), Pakhar (8.09 Ha), Pakhar (35.12Ha), Serengdag (140.06 Ha), Serengdag (155.81 Ha), Jalim & Sanai (12.14 Ha), Gurdari (584.19 Ha), Amtipani (190.95 Ha), Kujam I (80.97 Ha) Kujam II (157.38 Ha) and Bagru (75.41 Ha), Hisri New (14.55 Ha), Chiro kukud, Orsa pat(196.36 Ha), Bhusar (65.31 Ha)& Bimarla Bauxite Mines (134.52 Ha).

| Sl No | Description                                | Budget (in Lakh Rupees)<br>FY 2014-15 | Actual (in Lakh Rupees)<br>FY 2014-2015<br>(from April'14 to Sep'14) |
|-------|--|---------------------------------------|--|
| 1     | Pollution Control & Environment monitoring | <b>5.50</b>                           | <b>6.00</b>  |
| 2     | Reclamation/ Back filing & Rehabilitation  | <b>42.50</b>                          | <b>36.00</b>   |
| 3     | Green belt & Plantation                    | <b>60.03</b>                          | <b>54.46</b>   |
| 4     | Rural Development                          | <b>85.29</b>                          | <b>111.37</b>  |

\*\*Part of OB removed cost.

  
 Convener  
 Environment Management Cell  
 Hindalco Industries Limited

**PRODUCTION, MINED OUT, BACKFILLED, PRODUCTION AND OVERBURDEN REMOVAL FROM APR-14 TO SEP-14**

| Sl                                     | Name of Mines           | Mining lease area (Ha) | Mined Out area (in Acres) | Backfilled area (in Acres) | Production (in MT) | Overburden Removal (in Cub.M.) |
|--|-------------------------|------------------------|---------------------------|----------------------------|--------------------|--------------------------------|
| 1                                      | Shrengdag Bauxite Mines | 155.81                 | 7.80                      | 4.80                       | 105050             | 205180                         |
| 2                                      | Gurdari Bauxite Mines   | 584.19                 | 22.10                     | 11.80                      | 168585             | 4024704                        |
| 3                                      | Jalim & Sanai           | 12.14                  | 0.70                      | 0.30                       | 5311               | 12450                          |
| 4                                      | Serangdag               | 140.07                 | 2.00                      | 0.50                       | 31650              | 30600                          |
| 5                                      | Pakhar Buxite Mines     | 115.13                 | 3.69                      | 1.50                       | 137290             | 206568                         |
| 6                                      | Pakhar Buxite Mines     | 8.09                   | 0.00                      | 0.00                       | 0.00               | 0.00                           |
| 7                                      | Pakhar Buxite Mines     | 38.95                  | 0.00                      | 0.00                       | 0.00               | 0.00                           |
| 8                                      | Kujam-I                 | 80.87                  | 4.15                      | 3.46                       | 37960              | 51491                          |
| 9                                      | Kujam-II                | 157.38                 | 13.84                     | 12.75                      | 104325             | 121798                         |
| 10                                     | Amtipani                | 190.95                 | 4.03                      | 3.26                       | 93330              | 52493                          |
| 11                                     | Chiro-Kukud             | 152.57                 | 3.95                      | 6.42                       | 17584              | 18797                          |
| 12                                     | Orsa Bauxite Mines      | 196.36                 | 0.00                      | 0.00                       | 0.00               | 0.00                           |
| 13                                     | Hisri New               | 14.55                  | 1.29                      | 0.65                       | 54529              | 9471                           |
| 14                                     | Bagru                   | 75.41                  | 0.00                      | 0.00                       | 0.00               | 0.00                           |
| 15                                     | Bhusar                  | 65.31                  | 0.94                      | 1.50                       | 82032              | 82626                          |
| <b>Minerals &amp; Minerals Limited</b> |                         |                        |                           |                            |                    |                                |
| 16                                     | Pakhar Buxite Mines     | 109.507                | 4.21                      | 3.51                       | 183605             | 162580                         |
| 17                                     | Pakhar Buxite Mines     | 15.58                  | 0.30                      | 0.20                       | 31175              | 98966                          |
| 18                                     | Bimarla Bauxite Mines   | 134.526                | 0.00                      | 0.00                       | 0.00               | 0.00                           |

Monitored water level

Fig in meter

| Location (Mines) | Elevation (Mtr) | Well type | Monsoon 2014 |            | Post Monsoon 2014 |            |
|------------------|-----------------|-----------|--------------|------------|-------------------|------------|
|                  |                 |           | Inside ML    | Outside ML | Inside ML         | Outside ML |
| Bagru            | 905             | Open Well |              | 21.72      |                   | 24.15      |
|                  | 910             | Open Well |              | 24.30      |                   | 24.55      |
|                  | 915             | Open Well |              | 29.40      |                   | 28.44      |
|                  | 903             | Open Well |              | 22.85      |                   | 33.12      |
|                  | 909             | Open Well |              | 17.55      |                   | 28.75      |
| Pakhhar          | 1000            | Open Well |              | 24.90      |                   | 22.66      |
|                  | 1083            | Hand Pump | 35.35        |            | 31.65             |            |
|                  | 1027            | Open Well |              | 25.85      |                   | 28.35      |
| Sherengdag       | 1094            | Hand Pump | 41.75        |            | 39.54             |            |
|                  | 1081            | Hand Pump | 39.65        |            | 31.30             |            |
|                  | 1055            | Hand Pump | 33.05        |            | 27.55             |            |
|                  | 1066            | Hand Pump | 27.75        |            | 26.25             |            |
|                  | 1045            | Hand Pump | 29.30        |            | 27.84             |            |
| Gurdari          | 1061            | Hand Pump | 28.35        |            | 24.90             |            |
|                  | 1059            | Hand Pump | 38.15        |            | 36.63             |            |
|                  | 1075            | Hand Pump | 28.22        |            | 26.88             |            |
|                  | 1075            | Hand Pump | 28.36        |            | 29.30             |            |
| Kujam            | 1040            | Open Well |              | 33.95      |                   | 21.85      |
|                  | 1041            | Open Well |              | 33.65      |                   | 24.82      |
|                  | 1064            | Hand Pump | 31.58        |            | 28.65             |            |
|                  | 1052            | Hand Pump |              |            |                   | 21.12      |
| Chiro Kukud      | 1148            | Hand Pump | 33.45        |            | 28.40             |            |
|                  | 1151            | Hand Pump | 37.60        |            | 31.80             |            |
|                  | 1084            | Hand Pump | 34.35        |            | 36.86             |            |

B




# Eco Ventures Pvt. Ltd.

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**Mahabal Enviro Engineers Pvt. Ltd.**  
At Booty, Near PHED Colony, Behind Pump House, PO – RMCC,  
District – Ranchi 834009

## NETARHAT PLATEAU- ENVIRONMENTAL MONITORING REPORT

SEPTEMBER 2014

  
Vijay Pandey  
SENIOR EXECUTIVE

For Mahabal Enviro Eng. Pvt. Ltd.

  
Authorised Signatory





# Mahabal Enviro Engineers Pvt. Ltd.

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E-mail: mahabalranchi@gmail.com

**Hindalco Industries: Environmental Monitoring report**

**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15   | Date: 1 <sup>st</sup> October, 2014 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING               |                                     |
| Client Name: Hindalco Industries Limited                                   |                                     |
| Client Address: Lohardaga  |                                     |
| Postal Code: 835203  |                                     |
| State: Jharkhand   |                                     |
| Country: India   |                                     |
| Sample type: AMBIENT AIR QUALITY MONITORING                                |                                     |
| Received: 25.09.2014   |                                     |
| Registered: 25.09.2014   |                                     |
| Marks on Sample: Location: Netarhat Plateau- Gurdari Pit Hara Langra Quari |                                     |
| Sample collected on: 25.09.2014  |                                     |
| Test Start/End Date: 25.09.2014/27.09.2014                                 |                                     |

### LOCATION / IDENTIFICATION: Netarhat Plateau- Gurdari Pit Hara Langra Quari

| PARAMETERS                                 | UNIT                                | LIMIT | METHOD                             | 27/09/2014 |
|--|-------------------------------------|-------|------------------------------------|------------|
| Sulphur Dioxide                            | SO <sub>2</sub> µg/m <sup>3</sup>   | 80    | IS:5182 (Part-2):2001 (Reaff:2006) | 30.2       |
| Nitrogen Dioxide                           | NO <sub>2</sub> µg/m <sup>3</sup>   | 80    | IS:5182(Part-6):1975 (Reaff:2004)  | 45.2       |
| Particulate Matter (size less than 10 µm)  | PM <sub>10</sub> µg/m <sup>3</sup>  | 100   | IS:5182 (Part 23)                  | 90.1       |
| Particulate Matter (size less than 2.5 µm) | PM <sub>2.5</sub> µg/m <sup>3</sup> | 60    | USEPA CFR(40) Appendix-L           | 42.5       |
| Carbon Monoxide                            | CO mg/m <sup>3</sup>                | 2     | EPA 600/P-99/001F                  | 0.35       |

Vijay Pandey  
SENIOR EXECUTIVE

For Mahabal Enviro Eng. Pvt. Ltd.

Authorised Signatory



Head Office: Plot No. F-7, Road No. 21, Wagle Estate, Thane West - 400604, Maharashtra, India  
(600 m from Hotel Rukhmini Palace Turn Opp Toyota Show Room. Near J B Sawant Bus Stop)  
Phone: 2582 0658/ 3139/ 1663/ 3154 Fax: 91-22-25823543 thane@mahabal.com



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**Hindalco Industries: Environmental Monitoring report**

**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15                                     | Date: 1 <sup>st</sup> October, 2014 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING   |                                     |
| Client Name: Hindalco Industries Limited                       |                                     |
| Client Address: Lohardaga                                      |                                     |
| Postal Code: 835203  |                                     |
| State: Jharkhand   |                                     |
| Country: India   |                                     |
| Sample type: AMBIENT AIR QUALITY MONITORING                    |                                     |
| Received: 25.09.2014   |                                     |
| Registered: 25.09.2014   |                                     |
| Marks on Sample: Location: Netarhat Plateau- Amtipani Workshop |                                     |
| Sample collected on: 25.09.2014                                |                                     |
| Test Start/End Date: 25.09.2014/27.09.2014                     |                                     |

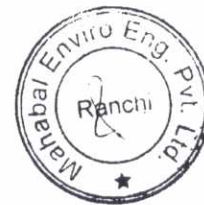
LOCATION / IDENTIFICATION: Netarhat Plateau- Amtipani Workshop

| PARAMETERS                                 | UNIT                                | LIMIT | METHOD                             | 27/09/2014 |
|--|-------------------------------------|-------|------------------------------------|------------|
| Sulphur Dioxide                            | SO <sub>2</sub> µg/m <sup>3</sup>   | 80    | IS:5182 (Part-2):2001 (Reaff:2006) | 65.2       |
| Nitrogen Dioxide                           | NO <sub>2</sub> µg/m <sup>3</sup>   | 80    | IS:5182(Part-6):1975 (Reaff:2004)  | 60.1       |
| Particulate Matter (size less than 10 µm)  | PM <sub>10</sub> µg/m <sup>3</sup>  | 100   | IS:5182 (Part 23)                  | 83.2       |
| Particulate Matter (size less than 2.5 µm) | PM <sub>2.5</sub> µg/m <sup>3</sup> | 60    | USEPA CFR(40) Appendix-L           | 49.1       |
| Carbon Monoxide                            | CO mg/m <sup>3</sup>                | 2     | EPA 600/P-99/001F                  | 0.43       |

Vijay Pandey  
SENIOR EXECUTIVE

For Mahabal Enviro Eng. Pvt. Ltd

Authorised Signatory



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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

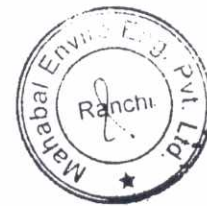
|   |                                    |
|---|------------------------------------|
| Report no: SEPT002/2014-15  | Date: 1 <sup>st</sup> October,2014 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING        |                                    |
| Client Name: Hindalco Industries Limited                            |                                    |
| Client Address: Lohardaga   |                                    |
| Postal Code: 835203   |                                    |
| State: Jharkhand  |                                    |
| Country: India  |                                    |
| Sample type: AMBIENT AIR QUALITY MONITORING                         |                                    |
| Received: 25.09.2014  |                                    |
| Registered: 25.09.2014  |                                    |
| Marks on Sample: Location: Netarhat Plateau- Kujam II Weight Bridge |                                    |
| Sample collected on: 25.09.2014                                     |                                    |
| Test Start/End Date: 25.09.2014/27.09.2014                          |                                    |

| LOCATION / IDENTIFICATION: Netarhat Plateau- Kujam II Weight Bridge |                   |                   |        |                                       |      |
|---|-------------------|-------------------|--------|---------------------------------------|------|
| PARAMETERS  | UNIT              | LIMIT             | METHOD | 27/09/2014                            |      |
| Sulphur Dioxide   | SO <sub>2</sub>   | µg/m <sup>3</sup> | 80     | IS:5182 (Part-2):2001<br>(Reaff:2006) | 22.5 |
| Nitrogen Dioxide  | NO <sub>2</sub>   | µg/m <sup>3</sup> | 80     | IS:5182(Part-6):1975<br>(Reaff:2004)  | 30.5 |
| Particulate Matter (size less than 10 µm)                           | PM <sub>10</sub>  | µg/m <sup>3</sup> | 100    | IS:5182 (Part 23)                     | 78.5 |
| Particulate Matter (size less than 2.5 µm)                          | PM <sub>2.5</sub> | µg/m <sup>3</sup> | 60     | USEPA CFR(40)<br>Appendix-L           | 29.8 |
| Carbon Monoxide   | CO                | mg/m <sup>3</sup> | 2      | EPA 600/P-99/001F                     | 0.6  |

Vijay Pandey  
SENIOR EXECUTIVE

For Mahabal Enviro Eng. Pvt. Ltd.

Authorised Signatory



Head Office: Plot No. F-7, Road No. 21, Wagle Estate, Thane West - 400604, Maharashtra, India  
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Phone: 2582 0658/ 3139/ 1663/ 3154 Fax: 91-22-25823543 thane@mahabal.com



# Mahabal Enviro Engineers Pvt. Ltd.

## Branch Office:

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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

|  |                                    |
|--|------------------------------------|
| Report no: SEPT002/2014-15                                   | Date: 1 <sup>st</sup> October,2014 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING |                                    |
| Client Name: Hindalco Industries Limited                     |                                    |
| Client Address: Lohardaga                                    |                                    |
| Postal Code: 835203  |                                    |
| State: Jharkhand   |                                    |
| Country: India   |                                    |
| Sample type: AMBIENT AIR QUALITY MONITORING                  |                                    |
| Received: 25.09.2014   |                                    |
| Registered: 25.09.2014                                       |                                    |
| Marks on Sample: Location: Netarhat Plateau- Kujam I         |                                    |
| Sample collected on: 25.09.2014                              |                                    |
| Test Start/End Date: 25.09.2014/27.09.2014                   |                                    |

### LOCATION / IDENTIFICATION: Netarhat Plateau- Kujam I

| PARAMETERS                                 | UNIT                                | LIMIT | METHOD                             | 27/09/2014 |
|--|-------------------------------------|-------|------------------------------------|------------|
| Sulphur Dioxide                            | SO <sub>2</sub> ug/m <sup>3</sup>   | 80    | IS:5182 (Part-2):2001 (Reaff:2006) | 25.2       |
| Nitrogen Dioxide                           | NO <sub>2</sub> ug/m <sup>3</sup>   | 80    | IS:5182(Part-6):1975 (Reaff:2004)  | 36.4       |
| Particulate Matter (size less than 10 µm)  | PM <sub>10</sub> ug/m <sup>3</sup>  | 100   | IS:5182 (Part 23)                  | 85.2       |
| Particulate Matter (size less than 2.5 µm) | PM <sub>2.5</sub> ug/m <sup>3</sup> | 60    | USEPA CFR(40) Appendix-L           | 45.8       |
| Carbon Monoxide                            | CO mg/m <sup>3</sup>                | 2     | EPA 600/P-99/001F                  | 0.50       |

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|  |                                    |
|--|------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October,2014 |
| <b>Sample Description: Measurement of Noise</b>        |                                    |
| Client Name: Hindalco Industries Limited               |                                    |
| Client Address: Lohardaga                              |                                    |
| Postal Code: 835203                                    |                                    |
| State: Jharkhand                                       |                                    |
| Country: India   |                                    |
| Sample Description: Measurement of Noise Level.        |                                    |
| Sampling Method: Instrumental, Using Sound level Meter |                                    |
| Sampling Done by: Mahabal Enviro.                      |                                    |
| Test Start: 22.09.2014                                 |                                    |
| End Date: 23.09.2014                                   |                                    |

| Location / Identification         | Unit           | Limit (day) | Result                                    | Limit (night) | Result                                    | Dates      |
|-----------------------------------|----------------|-------------|---|---------------|---|------------|
| Month                             |                |             | Average of 24 continuous hours in Sep- 14 |               | Average of 24 continuous hours in Sep- 14 |            |
| Netarhat Plateau Near Gurdari Pit | dB(A) $L_{eq}$ | 75          | 61.0                                      | 70            | 63.9                                      | 23/09/2014 |

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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

| Report no: SEPT002/2014-15                                   |                          |                                |                                    | Date: 1 <sup>st</sup> October,2014 |                    |
|--|--------------------------|--------------------------------|------------------------------------|------------------------------------|--------------------|
| Sample described by customer: SOIL                           |                          |                                |                                    |                                    |                    |
| Client Name: Hindalco Industries Limited                     |                          |                                |                                    |                                    |                    |
| Client Address: Lohardaga                                    |                          |                                |                                    |                                    |                    |
| Postal Code: 835203  |                          |                                |                                    |                                    |                    |
| State: Jharkhand   |                          |                                |                                    |                                    |                    |
| Country: India   |                          |                                |                                    |                                    |                    |
| Sample type: SOIL  |                          |                                |                                    |                                    |                    |
| Received:23.09.2014  |                          |                                |                                    |                                    |                    |
| Registered: 23.09.2014                                       |                          |                                |                                    |                                    |                    |
| Marks on Sample: Location: Netarhat Plateau Near Gurdari Pit |                          |                                |                                    |                                    |                    |
| Sample collected on: 17.09.2014                              |                          |                                |                                    |                                    |                    |
| Quantity: 2 kgs  |                          |                                |                                    |                                    |                    |
| Test Start/End Date: 23.09.2014/24.09.2014                   |                          |                                |                                    |                                    |                    |
| Sample collected by: Mahabal Enviro Engineers Pvt Limited    |                          |                                |                                    |                                    |                    |
| S.No   | Analysis                 |                                | Method                             | Result                             | Unit               |
| 1.   | Colour                   | --                             | --                                 | Gray                               | -                  |
| 2.   | Texture                  | --                             | F.A.U.N (2007)                     | Loamy Sand                         | -                  |
| 3.   | Bulk Density             | --                             | By Bulk density Apparatus          | 1.9                                | gm/cm <sup>3</sup> |
| 4.   | Water Holding Capacity   | --                             | F.A.U.N (2007)                     | 24.1                               | %                  |
| 5.   | pH                       | --                             | F.A.U.N (2007)                     | 7.2                                | -                  |
| 6.   | Electrical Conductivity  | --                             | F.A.U.N (2007)                     | 212                                | µs/cm              |
| 7.   | Organic Carbon           | --                             |                                    | 0.60                               | %                  |
| 8.   | Organic Matter           | --                             | Black & White Wet Digestion Method | 0.90                               | %                  |
| 9.   | Available Nitrogen       | --                             | Soil & Water Book by P.K Gupta     | 113.0                              | mg/kg              |
| 10.  | Available Phosphorus     | --                             | Soil & Water Book by P.K Gupta     | 14.2                               | mg/kg              |
| 11.  | Available Potassium      | --                             | Soil & Water Book by P.K Gupta     | 375                                | mg/kg              |
| 12.  | Exchangeable Calcium     | Ca                             | Soil & Water Book by P.K Gupta     | 24.5                               | meq/100gm          |
| 13.  | Exchangeable Magnesium   | Mg                             | Soil & Water Book by P.K Gupta     | 1.21                               | meq/100gm          |
| 14.  | Exchangeable Sodium      | Na                             | Soil & Water Book by P.K Gupta     | 2.26                               | meq/100gm          |
| 15.  | Exchangeable Potassium   | K                              | Soil & Water Book by P.K Gupta     | 1.50                               | meq/100gm          |
| 16.  | Total Exchangeable Bases |                                | Soil & Water Book by P.K Gupta     | 30.4                               | meq/100gm          |
| 17.  | Manganese                | Mn                             | USEPA 3052                         | 0.55                               | mg/kg              |
| 18.  | Arsenic                  | As                             | USEPA 3052                         | 2.00                               | mg/kg              |
| 19.  | Silica                   | SiO <sub>2</sub>               | USEPA 3052                         | 52.5                               | %                  |
| 20.  | Aluminum                 | Al <sub>2</sub> O <sub>3</sub> | USEPA 3052                         | 7.2                                | %                  |
| 21.  | Iron                     | Fe <sub>2</sub> O <sub>3</sub> | USEPA 3052                         | 5.0                                | %                  |
| 22.  | Calcium                  | CaO                            | USEPA 3052                         | 8.4                                | %                  |
| 23.  | Magnesium                | MgO                            | USEPA 3052                         | 1.95                               | %                  |
| 24.  | Sodium                   | Na <sub>2</sub> O              | USEPA 3052                         | 0.30                               | %                  |
| 25.  | Potassium                | K <sub>2</sub> O               | USEPA 3052                         | 0.28                               | %                  |
| 26.  | Sulphate                 | SO <sub>4</sub>                | USEPA 3052                         | 0.79                               | %                  |

For Mahabal Enviro Eng. Pvt. Ltd

Vijay Pandey  
SENIOR EXECUTIVE

Authorised Signatory



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**Hindalco Industries: Environmental Monitoring report**

**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15                               | Date: 1 <sup>st</sup> October, 2014 |
| Sample described by customer: DRINKING WATER             |                                     |
| Client Name: Hindalco Industries Limited                 |                                     |
| Client Address: Lohardaga                                |                                     |
| Postal Code: 835203                                      |                                     |
| State: Jharkhand   |                                     |
| Country: India   |                                     |
| Sample type: DRINKING WATER                              |                                     |
| Received: 19.09.2014                                     |                                     |
| Registered: 19.09.2014                                   |                                     |
| Marks on Sample: Location: Netarhat Plateau              |                                     |
| Sample collected on: 18.09.2014                          |                                     |
| Quantity: 5 L X 2 No. PVC Can                            |                                     |
| Test Start/End Date: 19.09.2014/22.09.2014               |                                     |
| Sample collected by: Mahabal EnviroEngineers Pvt Limited |                                     |

| S.No | Parameters                               | Unit  | Result    | Acceptable Limit (IS10500:2012) | Method Reference                       |
|------|--|-------|-----------|---------------------------------|--|
| 1.   | Colour                                   | Hazen | < 1       | 5 Max                           | APHA 22nd Ed. 2012, 2120-B, 2-6        |
| 2.   | Odour                                    | -     | Agreeable | Agreeable                       | IS 3025 (Part 5):1983, Reaffirmed 2006 |
| 3.   | Taste                                    | -     | Agreeable | Agreeable                       | IS 3025 (Part 7):1984, Reaffirmed 2006 |
| 4.   | Turbidity                                | NTU   | 0.7       | 1 Max                           | APHA 22nd Ed. 2012, 2130-B, 2-13       |
| 5.   | pH                                       | -     | 6.9       | 6.5-8.5                         | APHA 22nd Ed. 2012, 4500-H+B, 4-92     |
| 6.   | Free Chlorides( Residual)                | mg/l  | <0.05     | 0.2 min                         | APHA 22nd Ed. 2012, 4500-CI G, 4-69    |
| 7.   | Total Dissolved Solids                   | mg/l  | 89        | 500 Max                         | IS 3025 (Part 16):1984 Reaffirmed 2006 |
| 8.   | Monochloramines                          | mg/l  | <0.05     | -                               | APHA 22nd Ed. 2012, 4500-CIG, 4-69     |
| 9.   | Dichloramines                            | mg/l  | <0.05     | -                               | APHA 22nd Ed. 2012, 4500-CIG, 4-69     |
| 10.  | Total Hardness (as CaCO <sub>3</sub> )   | mg/l  | 59        | 200 Max                         | APHA 22nd Ed. 2012, 2340-C, 2-44,45    |
| 11.  | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 63        | 200 Max                         | IS 3025 (Part 23):1986 Reaffirmed 2009 |
| 12.  | Chloride (as Cl)                         | mg/l  | 7.9       | 250 Max                         | APHA 22nd Ed. 2012, 4500-CI-B, 4-72    |
| 13.  | Sulphate (as SO <sub>4</sub> )           | mg/l  | 4.3       | 200 Max                         | APHA 22nd Ed. 2012, 4500-SO4-E, 4-190  |



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**Hindalco Industries: Environmental Monitoring report**

**September 2014**

| S.No | Parameters   | Unit | Result | Acceptable Limit (IS 10500:2012) | Method Reference                                   |
|------|--|------|--------|----------------------------------|--|
| 14.  | Nitrate (as NO <sub>3</sub> )                            | mg/l | 1.14   | 45 Max                           | APHA 22nd Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125 |
| 15.  | Fluoride (as F)  | mg/l | 0.20   | 1 Max                            | APHA 22nd Ed. 2012, 4500-FB&D, 4-84, 4-87          |
| 16.  | Boron (as B)   | mg/l | 0.19   | 0.5 Max                          | APHA 22nd Ed. 2012, 4500-BB, 4-25                  |
| 17.  | Calcium (as Ca)  | mg/l | 18.0   | 75 Max                           | APHA 22nd Ed. 2012, 3500-Ca-B, 3-67                |
| 18.  | Magnesium (as Mg)  | mg/l | 3.2    | 30 Max                           | APHA 22nd Ed. 2012, 3500-Mg-B, 3-84                |
| 19.  | Ammonical Nitrogen/<br>Total Ammonia                     | mg/l | <0.1   | -                                | APHA 22nd Ed. 2012, 4500-NH <sub>3</sub> -F, 4-115 |
| 20.  | Iron (as Fe)   | mg/l | 0.18   | 0.3 Max                          | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 21.  | Manganese (as Mn)  | mg/l | N.D    | 0.1 Max                          | APHA 22nd Ed. 2012, 3111-B, 318                    |
| 22.  | Aluminium (as Al)  | mg/l | 0.09   | 0.03 Max                         | APHA 22nd Ed. 2012, 3500-Al-B, 3-61                |
| 23.  | Cadmium (as Cd)  | mg/l | N.D    | 0.003 Max.                       | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 24.  | Chromium Total (as Cr)                                   | mg/l | N.D    | 0.05 Max.                        | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 25.  | Copper (as Cu)   | mg/l | N.D    | 0.05 Max.                        | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 26.  | Lead (as Pb)   | mg/l | N.D    | 0.01 Max.                        | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 27.  | Zinc (as Zn)   | mg/l | 0.03   | 5 Max.                           | APHA 22nd Ed. 2012, 3111-B, 3-18                   |
| 28.  | Arsenic (as As)  | mg/l | <0.01  | 0.01 Max.                        | APHA 22nd Ed. 2012, 3114-C, 3-38                   |
| 29.  | Mercury (as Hg)  | mg/l | N.D.   | 0.001 Max.                       | APHA 22nd Ed. 2012, 3112-B, 3-23                   |
| 30.  | Selenium (as Se)   | mg/l | N.D.   | 0.01 Max.                        | APHA 22nd Ed. 2012, 3114-C, 3-38                   |
| 31.  | Nickel (as Ni)   | mg/l | <0.06  | 0.02 Max.                        | APHA 22nd Ed. 2012, 3111 B, 3-18                   |
| 32.  | Mineral Oil  | mg/l | N.D.   | 0.5 Max.                         | IS 3025 (Part 39): 1991, Reaffirmed 2003, Ed. 2.1  |
| 33.  | Cyanide (as CN)  | mg/l | N.D.   | 0.05 Max.                        | APHA 22nd Ed. 2012, 4500-CN, C & E, 4-39 & 4-44    |
| 34.  | Anionic detergents as MBAS                               | mg/l | <0.1   | 0.2 Max.                         | APHA 22nd Ed. 2012, 5540-C, 5-53                   |
| 35.  | Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) | mg/l | N.D    | 0.001 Max.                       | APHA 22nd Ed. 2012, 5530- B & C, 5-47              |
| 36.  | Polynuclear aromatic hydrocarbons (PAH)                  | µg/L | N.D    | 0.0001 mg/L Max.                 | APHA 22nd Ed. 2012, 6440, 6-93                     |
| 37.  | Polychlorinated Biphenyls (PCBs)                         | µg/L | N.D    | 0.0005 mg/l Max.                 | USEPA Method 8082                                  |
| 38.  | Sulphide (as S)  | mg/l | N.D    | -                                | APHA 22nd Ed. 2012, 4500- S2-C 4-175 & F 4-178     |



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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

| S.No                            | Parameters          | Unit       | Result | Acceptable Limit (IS 10500:2012) | Method Reference                                       |
|---------------------------------|---------------------|------------|--------|----------------------------------|--|
| <b>Microbiological Analysis</b> |                     |            |        |                                  |  |
| 1.                              | Total Coliforms     | MPN/100 mL | <1.1   | N.D                              | APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69             |
| 2.                              | E-Coli              | MPN/100 mL | Absent | N.D                              | APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9-76 |
| <b>Pesticides Residues</b>      |                     |            |        |                                  |  |
| 3.                              | p,p DDT             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 4.                              | o,p DDT             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 5.                              | p,p DDE             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 6.                              | o,p DDE             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 7.                              | p,p DDD             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 8.                              | o,p DDD             | µg/L       | N.D    | 1                                | US EPA 508-1995  |
| 9.                              | γ-HCH (Lindane)     | µg/L       | <0.01  | 2                                | US EPA 508-1995  |
| 10.                             | α-HCH               | µg/L       | <0.01  | 0.01                             | US EPA 508-1995  |
| 11.                             | β-HCH               | µg/L       | N.D    | 0.04                             | US EPA 508-1995  |
| 12.                             | δ - HCH             | µg/L       | N.D    | 0.04                             | US EPA 508-1995  |
| 13.                             | Butachlor           | µg/L       | N.D    | 125                              | US EPA 508-1995  |
| 14.                             | Alachlor            | µg/L       | N.D    | 20                               | US EPA 508-1995  |
| 15.                             | Atrazine            | µg/L       | N.D    | 2                                | US EPA 532-2000  |
| 16.                             | α Endosulfan        | µg/L       | N.D    | 0.4                              | US EPA 508-1995  |
| 17.                             | β Endosulfan        | µg/L       | N.D    | 0.4                              | US EPA 508-1995  |
| 18.                             | Endosulfan Sulphate | µg/L       | N.D    | 0.4                              | US EPA 508-1995  |
| 19.                             | Ethion              | µg/L       | N.D    | 3                                | US EPA 8141A-1994                                      |
| 20.                             | Malathion           | µg/L       | N.D    | 190                              | US EPA 8141A-1994                                      |
| 21.                             | Methyl Parathion    | µg/L       | N.D    | 0.3                              | US EPA 8141A-1994                                      |
| 22.                             | Monocrotophos       | µg/L       | N.D    | 1                                | US EPA 8141A-1994                                      |
| 23.                             | Phorate             | µg/L       | N.D    | 2                                | US EPA 8141A-1994                                      |
| 24.                             | Chlorpyrifos        | µg/L       | N.D    | 30                               | US EPA 8141A-1994                                      |
| 25.                             | Aldrin              | µg/L       | N.D    | 0.03                             | US EPA 508-1995  |
| 26.                             | Dieldrin            | µg/L       | N.D    | 0.03                             | US EPA 508-1995  |

Remarks: N.D- Not Detected

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**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15                                       | Date: 1 <sup>st</sup> October, 2014 |
| Sample described by customer: SURFACE WATER                      |                                     |
| Client Name: Hindalco Industries Limited                         |                                     |
| Client Address: Lohardaga  |                                     |
| Postal Code: 835203  |                                     |
| State: Jharkhand   |                                     |
| Country: India   |                                     |
| Sample type: SURFACE WATER                                       |                                     |
| Received: 19.09.2014   |                                     |
| Registered: 19.09.2014   |                                     |
| Marks on Sample: Location: Amtipani Mine - Water Harvesting Pond |                                     |
| Sample collected on: 18.09.2014                                  |                                     |
| Quantity: 5 L X 2 No. PVC Can                                    |                                     |
| Test Start/End Date: 19.09.2014/22.09.2014                       |                                     |
| Sample collected by: Mahabal EnviroEngineers Pvt Limited         |                                     |

| S.No | Parameters                               | Unit  | Result    | Acceptable Limit (IS10500:2012) | Method Reference                       |
|------|--|-------|-----------|---------------------------------|--|
| 1.   | Colour                                   | Hazen | < 1       | 5 Max                           | APHA 22nd Ed. 2012, 2120-B, 2-6        |
| 2.   | Odour                                    | -     | Agreeable | Agreeable                       | IS 3025 (Part 5):1983, Reaffirmed 2006 |
| 3.   | Taste                                    | -     | Agreeable | Agreeable                       | IS 3025 (Part 7):1984, Reaffirmed 2006 |
| 4.   | Turbidity                                | NTU   | 0.3       | 1 Max                           | APHA 22nd Ed. 2012, 2130-B, 2-13       |
| 5.   | pH                                       | -     | 6.9       | 6.5-8.5                         | APHA 22nd Ed. 2012, 4500-H+ -B, 4-92   |
| 6.   | Free Chlorides( Residual)                | mg/l  | <0.05     | 0.2 min                         | APHA 22nd Ed. 2012, 4500-Cl G, 4-69    |
| 7.   | Total Dissolved Solids                   | mg/l  | 98        | 500 Max                         | IS 3025 (Part 16):1984 Reaffirmed 2006 |
| 8.   | Monochloramines                          | mg/l  | <0.05     | -                               | APHA 22nd Ed. 2012, 4500-CIG, 4-69     |
| 9.   | Dichloramines                            | mg/l  | <0.05     | -                               | APHA 22nd Ed. 2012, 4500-CIG, 4-69     |
| 10.  | Total Hardness (as CaCO <sub>3</sub> )   | mg/l  | 46        | 200 Max                         | APHA 22nd Ed. 2012, 2340-C, 2-44,45    |
| 11.  | Alkalinity Total (as CaCO <sub>3</sub> ) | mg/l  | 61.4      | 200 Max                         | IS 3025 (Part 23):1986 Reaffirmed 2009 |
| 12.  | Chloride (as Cl)                         | mg/l  | 7.0       | 250 Max                         | APHA 22nd Ed. 2012, 4500-Cl-B, 4-72    |
| 13.  | Sulphate (as SO <sub>4</sub> )           | mg/l  | 3.9       | 200 Max                         | APHA 22nd Ed. 2012, 4500-SO4-E, 4-190  |



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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

| S.No | Parameters   | Unit  | Result | Acceptable Limit (IS 10500:2012) | Method Reference                                   |
|------|--|-------|--------|----------------------------------|--|
| 14.  | Nitrate (as NO <sub>3</sub> )                            | mg/l  | 1.1    | 45 Max                           | APHA 22nd Ed. 2012, 4500-NO <sub>3</sub> -E, 4-125 |
| 15.  | Fluoride (as F)  | mg/l  | 0.21   | 1 Max                            | APHA 22nd Ed. 2012, 4500-FB& D, 4-84, 4-87         |
| 16.  | Boron (as B)   | mg/l  | 0.19   | 0.5 Max                          | APHA 22nd Ed. 2012, 4500-BB, 4-25                  |
| 17.  | Calcium(as Ca)   | mg/l  | 15.3   | 75 Max                           | APHA 22nd Ed. 2012, 3500-Ca-B, 3-67                |
| 18.  | Magnesium (as Mg)  | mg/l  | 3.9    | 30 Max                           | APHA 22nd Ed. 2012, 3500-Mg- B, 3-84               |
| 19.  | Ammonical Nitrogen/<br>Total Ammonia                     | mg/l  | <0.1   | -                                | APHA 22nd Ed. 2012, 4500 NH <sub>3</sub> -F, 4-115 |
| 20.  | Iron (as Fe)   | mg/l  | 0.09   | 0.3 Max                          | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 21.  | Manganese (as Mn)  | mg/l  | N.D    | 0.1 Max                          | APHA 22nd Ed. 2012, 3111-B, 318                    |
| 22.  | Aluminium (as Al)  | mg/l  | 0.06   | 0.03 Max                         | APHA 22nd Ed. 2012, 3500- Al-B, 3-61               |
| 23.  | Cadmium (as Cd)  | mg/l  | N.D    | 0.003 Max.                       | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 24.  | Chromium Total (as Cr)                                   | mg/l  | N.D    | 0.05 Max.                        | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 25.  | Copper (as Cu)   | mg/l  | N.D    | 0.05 Max.                        | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 26.  | Lead (as Pb)   | mg/l  | N.D    | 0.01 Max.                        | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 27.  | Zinc (as Zn)   | mg/l  | 0.10   | 5 Max.                           | APHA 22nd Ed. 2012, 3111-B,3-18                    |
| 28.  | Arsenic (as As)  | mg/l  | <0.01  | 0.01 Max.                        | APHA 22nd Ed. 2012, 3114-C,3-38                    |
| 29.  | Mercury (as Hg)  | mg/l  | N.D.   | 0.001 Max.                       | APHA 22nd Ed. 2012, 3112-B,3-23                    |
| 30.  | Selenium (as Se)   | mg/l  | N.D.   | 0.01 Max.                        | APHA 22nd Ed. 2012, 3114-C, 3-38                   |
| 31.  | Nickel (as Ni)   | mg/l  | <0.06  | 0.02 Max.                        | APHA 22nd Ed. 2012, 3111 B,3-18                    |
| 32.  | Mineral Oil  | mg/l  | N.D.   | 0.5 Max.                         | IS 3025 (Part 39): 1991, Reaffirmed 2003, Ed. 2.1  |
| 33.  | Cyanide (as CN)  | mg/l  | N.D.   | 0.05 Max.                        | APHA 22nd Ed. 2012, 4500-CN, C & E, 4-39 & 4-44    |
| 34.  | Anionic detergents as MBAS                               | mg/l  | <0.1   | 0.2 Max.                         | APHA 22nd Ed. 2012, 5540-C, 5-53                   |
| 35.  | Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) | mg/l  | N.D    | 0.001 Max.                       | APHA 22nd Ed. 2012, 5530- B & C, 5-47              |
| 36.  | Polynuclear aromatic hydrocarbons (PAH)                  | µg/l. | N.D    | 0.0001 mg/L Max.                 | APHA 22nd Ed. 2012, 6440, 6-93                     |
| 37.  | Polychlorinated Biphenyls (PCBs)                         | µg/L  | N.D    | 0.0005 mg/l Max.                 | USEPA Method 8082                                  |
| 38.  | Sulphide (as S)  | mg/l  | N.D    | -                                | APHA 22nd Ed. 2012, 4500- S2-C-4-175 & F 4-178     |



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**Hindalco Industries: Environmental Monitoring report**

**September 2014**

| S.No                            | Parameters          | Unit           | Result | Acceptable Limit (IS 10500:2012) | Method Reference                                       |
|---------------------------------|---------------------|----------------|--------|----------------------------------|--|
| <b>Microbiological Analysis</b> |                     |                |        |                                  |  |
| 1.                              | Total Coliforms     | MPN/<br>100 mL | <1.1   | N.D                              | APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69             |
| 2.                              | E-Coli              | MPN/<br>100 mL | Absent | N.D                              | APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9-76 |
| <b>Pesticides Residues</b>      |                     |                |        |                                  |  |
| 3.                              | p,p DDT             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 4.                              | o,p DDT             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 5.                              | p,p DDE             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 6.                              | o,p DDE             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 7.                              | p,p DDD             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 8.                              | o,p DDD             | µg/L           | N.D    | 1                                | US EPA 508-1995  |
| 9.                              | γ-HCH (Lindane)     | µg/L           | <0.01  | 2                                | US EPA 508-1995  |
| 10.                             | α-HCH               | µg/L           | <0.01  | 0.01                             | US EPA 508-1995  |
| 11.                             | β-HCH               | µg/L           | N.D    | 0.04                             | US EPA 508-1995  |
| 12.                             | δ - HCH             | µg/L           | N.D    | 0.04                             | US EPA 508-1995  |
| 13.                             | Butachlor           | µg/L           | N.D    | 125                              | US EPA 508-1995  |
| 14.                             | Alachlor            | µg/L           | N.D    | 20                               | US EPA 508-1995  |
| 15.                             | Atrazine            | µg/L           | N.D    | 2                                | US EPA 532-2000  |
| 16.                             | α Endosulfan        | µg/L           | N.D    | 0.4                              | US EPA 508-1995  |
| 17.                             | β Endosulfan        | µg/L           | N.D    | 0.4                              | US EPA 508-1995  |
| 18.                             | Endosulfan Sulphate | µg/L           | N.D    | 0.4                              | US EPA 508-1995  |
| 19.                             | Ethion              | µg/L           | N.D    | 3                                | US EPA 8141A-1994                                      |
| 20.                             | Malathion           | µg/L           | N.D    | 190                              | US EPA 8141A -1994                                     |
| 21.                             | Methyl Parathion    | µg/L           | N.D    | 0.3                              | US EPA 8141A -1994                                     |
| 22.                             | Monocrotophos       | µg/L           | N.D    | 1                                | US EPA 8141A-1994                                      |
| 23.                             | Phorate             | µg/L           | N.D    | 2                                | US EPA 8141A -1994                                     |
| 24.                             | Chlorpyrifos        | µg/L           | N.D    | 30                               | US EPA 8141A -1994                                     |
| 25.                             | Aldrin              | µg/L           | N.D    | 0.03                             | US EPA 508-1995  |
| 26.                             | Dieldrin            | µg/L           | N.D    | 0.03                             | US EPA 508-1995  |
| Remarks: N.D- Not Detected      |                     |                |        |                                  |  |

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

Vijay Pandey  
SENIOR EXECUTIVE

For Mahabal Enviro Eng. Pvt. Ltd.

Authorised Signatory



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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

|  |                                    |
|--|------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October,2014 |
| <b>Sample Description: Measurement of Noise</b>        |                                    |
| Client Name: Hindalco Industries Limited               |                                    |
| Client Address: Lohardaga                              |                                    |
| Postal Code: 835203                                    |                                    |
| State: Jharkhand                                       |                                    |
| Country: India   |                                    |
| Sample Description: Measurement of Noise Level.        |                                    |
| Sampling Method: Instrumental, Using Sound level Meter |                                    |
| Sampling Done by: Mahabal Enviro.                      |                                    |
| Test Start: 17.09.2014                                 |                                    |
| End Date: 18.09.2014                                   |                                    |

| Location / Identification | Unit           | Limit (day) | Result                                    | Limit (night) | Result                                    | Dates      |
|---------------------------|----------------|-------------|---|---------------|---|------------|
| Month                     |                |             | Average of 24 continuous hours in Sep- 14 |               | Average of 24 continuous hours in Sep- 14 |            |
| Netarhat Plateau          | dB(A) $L_{eq}$ | 75          | 55.0                                      | 70            | 49.0                                      | 18/09/2014 |

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**Hindalco Industries:Environmental Monitoring report**

**September 2014**

|  |                                    |
|--|------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October,2014 |
| Sample Description: Measurement of Noise: Spot Noise   |                                    |
| Client Name: Hindalco Industries Limited               |                                    |
| Client Address: Lohardaga                              |                                    |
| Postal Code: 835203                                    |                                    |
| State: Jharkhand                                       |                                    |
| Country: India   |                                    |
| Sample Location: Netarhat Plateau- Gurdari Mine pit    |                                    |
| Sample Description: Measurement of Noise Level.        |                                    |
| Sampling Method: Instrumental, Using Sound level Meter |                                    |
| Sampling Done by: Mahabal Enviro.                      |                                    |
| Test Start: 18.09.2014                                 |                                    |
| End Date: 18.09.2014                                   |                                    |

| Location / Identification | Unit           | Limit (day) | Result | Dates      |
|---------------------------|----------------|-------------|--------|------------|
| POCKLAN                   | dB(A) $L_{eq}$ | 75          | 67.9   | 18/09/2014 |
| COMPRESSOR                | dB(A) $L_{eq}$ | 75          | 70.6   | 18/09/2014 |
| WAGAN DRILL               | dB(A) $L_{eq}$ | 75          | 73.4   | 18/09/2014 |

Note : (i) The value is the  $L_{eq}$  of twenty readings taken in location (Day time).

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**Hindalco Industries: Environmental Monitoring report**

**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October, 2014 |
| Sample Description: Measurement of Noise: Spot Noise   |                                     |
| Client Name: Hindalco Industries Limited               |                                     |
| Client Address: Lohardaga                              |                                     |
| Postal Code: 835203                                    |                                     |
| State: Jharkhand                                       |                                     |
| Country: India   |                                     |
| Sample Location: Netarhat Plateau- Kujam – I Mine pit  |                                     |
| Sample Description: Measurement of Noise Level.        |                                     |
| Sampling Method: Instrumental, Using Sound level Meter |                                     |
| Sampling Done by: Mahabal Enviro.                      |                                     |
| Test Start: 18.09.2014                                 |                                     |
| End Date: 18.09.2014                                   |                                     |

| Location / Identification | Unit      | Limit (day) | Result | Dates      |
|---------------------------|-----------|-------------|--------|------------|
| POCKLAN                   | dB(A) Leq | 75          | 68.2   | 18/09/2014 |
| COMPRESSOR                | dB(A) Leq | 75          | 70     | 18/09/2014 |
| WAGAN DRILL               | dB(A) Leq | 75          | 73     | 18/09/2014 |

Note : (i) The value is the Leq. of twenty readings taken in location (Day time).

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**September 2014**

|  |                                     |
|--|-------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October, 2014 |
| Sample Description: Measurement of Noise: Spot Noise   |                                     |
| Client Name: Hindalco Industries Limited               |                                     |
| Client Address: Lohardaga                              |                                     |
| Postal Code: 835203                                    |                                     |
| State: Jharkhand                                       |                                     |
| Country: India   |                                     |
| Sample Location: Netarhat Plateau- Kujam – II Mine pit |                                     |
| Sample Description: Measurement of Noise Level.        |                                     |
| Sampling Method: Instrumental, Using Sound Level Meter |                                     |
| Sampling Done by: Mahabal Enviro.                      |                                     |
| Test Start: 18.09.2014                                 |                                     |
| End Date: 18.09.2014                                   |                                     |

| Location / Identification | Unit                 | Limit (day) | Result | Dates      |
|---------------------------|----------------------|-------------|--------|------------|
| POCKLAN                   | dB(A) <sub>Leq</sub> | 75          | 69.7   | 18/09/2014 |
| COMPRESSOR                | dB(A) <sub>Leq</sub> | 75          | 73     | 18/09/2014 |
| WAGAN DRILL               | dB(A) <sub>Leq</sub> | 75          | 72.9   | 18/09/2014 |

Note : (i) The value is the <sub>Leq</sub> of twenty readings taken in location (Day time).

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**September 2014**

|  |                                    |
|--|------------------------------------|
| Report no: SEPT002/2014-15                             | Date: 1 <sup>st</sup> October,2014 |
| Sample Description: Measurement of Noise: Spot Noise   |                                    |
| Client Name: Hindalco Industries Limited               |                                    |
| Client Address: Lohardaga                              |                                    |
| Postal Code: 835203                                    |                                    |
| State: Jharkhand                                       |                                    |
| Country: India   |                                    |
| Sample: Location: Netarhat Plateau- Amtipani Mine pit  |                                    |
| Sample Description: Measurement of Noise Level.        |                                    |
| Sampling Method: Instrumental, Using Sound level Meter |                                    |
| Sampling Done by: Mahabal Enviro.                      |                                    |
| Test Start: 25.09.2014                                 |                                    |
| End Date: 25.09.2014                                   |                                    |

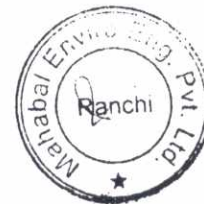
| Location / Identification | Unit           | Limit (day) | Result | Dates      |
|---------------------------|----------------|-------------|--------|------------|
| POCKLAN                   | dB(A) $L_{eq}$ | 75          | 67.8   | 18/09/2014 |
| COMPRESSOR                | dB(A) $L_{eq}$ | 75          | 71.1   | 18/09/2014 |
| WAGAN DRILL               | dB(A) $L_{eq}$ | 75          | 72.5   | 18/09/2014 |

Note : (i) The value is the  $L_{eq}$  of twenty readings taken in location (Day time).

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**September 2014**

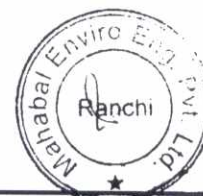
Report no: SEPT002/2014-15 Date: 1<sup>st</sup> October, 2014  
Sample described by customer: SOIL  
Client Name: Hindalco Industries Limited  
Client Address: Lohardaga  
Postal Code: 835203  
State: Jharkhand  
Country: India  
Sample type: SOIL  
Received: 23.09.2014  
Registered: 23.09.2014  
Marks on Sample: Location: Netarhat Plateau- Kujam & Amtipani  
Sample collected on: 17.09.2014  
Quantity: 2 kgs  
Test Start/End Date: 23.09.2014/24.09.2014  
Sample collected by: Mahabal Enviro Engineers Pvt Limited

| S.No | Analysis                 | Method                                       | Result     | Unit               |
|------|--------------------------|--|------------|--------------------|
| 1.   | Colour                   | --   | Gray       | -                  |
| 2.   | Texture                  | F.A.U.N (2007)                               | Loamy Sand | -                  |
| 3.   | Bulk Density             | By Bulk density Apparatus                    | 1.5        | gm/cm <sup>3</sup> |
| 4.   | Water Holding Capacity   | F.A.U.N (2007)                               | 21.1       | %                  |
| 5.   | pH                       | F.A.U.N (2007)                               | 7.0        | -                  |
| 6.   | Electrical Conductivity  | F.A.U.N (2007)                               | 200        | µs/cm              |
| 7.   | Organic Carbon           | --   | 0.35       | %                  |
| 8.   | Organic Matter           | Black & White Wet Digestion Method           | 0.85       | %                  |
| 9.   | Available Nitrogen       | Soil & Water Book by P.K Gupta               | 110.2      | mg/kg              |
| 10.  | Available Phosphorus     | Soil & Water Book by P.K Gupta               | 13.5       | mg/kg              |
| 11.  | Available Potassium      | Soil & Water Book by P.K Gupta               | 356        | mg/kg              |
| 12.  | Exchangeable Calcium     | Ca<br>Soil & Water Book by P.K Gupta         | 23.2       | meq/100gm          |
| 13.  | Exchangeable Magnesium   | Mg<br>Soil & Water Book by P.K Gupta         | 1.20       | meq/100gm          |
| 14.  | Exchangeable Sodium      | Na<br>Soil & Water Book by P.K Gupta         | 2.30       | meq/100gm          |
| 15.  | Exchangeable Potassium   | K<br>Soil & Water Book by P.K Gupta          | 1.51       | meq/100gm          |
| 16.  | Total Exchangeable Bases | Soil & Water Book by P.K Gupta               | 30.1       | meq/100gm          |
| 17.  | Manganese                | Mn<br>USEPA 3052                             | 0.53       | mg/kg              |
| 18.  | Arsenic                  | As<br>USEPA 3052                             | 2.01       | mg/kg              |
| 19.  | Silica                   | SiO <sub>2</sub><br>USEPA 3052               | 51.2       | %                  |
| 20.  | Aluminum                 | Al <sub>2</sub> O <sub>3</sub><br>USEPA 3052 | 7.0        | %                  |
| 21.  | Iron                     | Fe <sub>2</sub> O <sub>3</sub><br>USEPA 3052 | 5.2        | %                  |
| 22.  | Calcium                  | CaO<br>USEPA 3052                            | 8.3        | %                  |
| 23.  | Magnesium                | MgO<br>USEPA 3052                            | 1.45       | %                  |
| 24.  | Sodium                   | Na <sub>2</sub> O<br>USEPA 3052              | 0.20       | %                  |
| 25.  | Potassium                | K <sub>2</sub> O<br>USEPA 3052               | 0.18       | %                  |
| 26.  | Sulphate                 | SO <sub>4</sub><br>USEPA 3052                | 0.89       | %                  |

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SENIOR EXECUTIVE

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Authorised Signatory



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