



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

Date: 28.05.2016

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

Sub: Compliance Report of EC conditions for Bhusar (65.31 ha) Bauxite Mining project of M/s Hindalco Industries Limited located in Lohardaga, Jharkhand for the period Oct'15 to March'16.

Ref: Environmental Clearance No-J-11015/184/2011-IA.II (M) dated 17th June 2013.

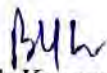
Sir,

With reference to the above, we are submitting herewith the Compliance status report of EC conditions for **Bhusar (65.31 ha) Bauxite** Mining project of M/s Hindalco located in Lohardaga, Jharkhand for the period Oct'15 to March'16.

Hope you will find the same in order.

Thanking You

Yours Sincerely
FOR HINDALCO INDUSTRIES LIMITED


(Bijesh Kumar Jha)
Joint President (Mines)

Enclosure: - As Above

Copy to: Member Secretary, JSPCB, Ranchi
RO, JSPCB, Ranchi
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Email hindalco@adityabirla.com

Corporate Identity No. L27020MH1958PLC011238

Bhusar Bauxite Mines of M/s Hindalco Industries Limited

Area 65.31 Ha

Period: Oct'15-March'16

Environmental Clearance No-J-11015/184/2011-IA.II (M) dated 17th June 2013.

| Sl No | Specific Condition | Compliance |
|--------------|---|---|
| (i) | All the conditions stipulated by the State Pollution Control Board in their NOC shall be effectively implemented. | Implementations of the stipulated conditions are fulfilled. Mines is discontinued since Sep'2014 due to second renewal case as per directive by DMO. |
| (ii) | Environmental clearance is subject to obtaining clearance under the wildlife (Protection) Act, 1972 from the competent authority, as may be applicable to this project. | Not applicable to this project. |
| (iii) | The mining operations shall be restricted to above ground water table and it should not intersect groundwater table. Prior approval of the Ministry of Environment & Forests and Central Ground Water Authority shall be obtained for mining below water table. | Shallow depth mining is being done in the Bagru Plateau. The ground water table is much below the working depth. Hence, ground water not intersected due to mining activities. |
| (iv) | The project proponent shall ensure that no natural watercourse shall be obstructed due to any mining operations. | Agreed. No natural water course will be obstructed due to mining activities. |
| (v) | Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mined out areas. | Top soil is being stored temporarily and spread over the back filled area in the process of reclamation. |
| (vi) | The entire waste generated shall be backfilled and there shall be no external over burden dump left at the end of the mine life. The entire backfilled area shall be reclaimed by plantation. The back filling 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 over burden generated during the mining operation temporarily stacked at earmarked dump site (s) only for the purpose of backfilling, Backfilling area will be reclaimed by suitable plantation. Monitoring and management of rehabilitated area will continue until the vegetation becomes self-sustaining. Compliance status will be submitted to MoEF on six monthly basis. Mines is discontinued since Sep'2014 due to second renewal case as per directive by DMO. |

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| | the Ministry of Environment as Forests and its Regional Office, Bhubaneswar on six monthly basis. | |
| (vii) | <p>Catch drains and siltation ponds of appropriate size should be constructed for the working pit, temporary OB dumps, if any and mineral dumps to arrest flow of silt and sediment. 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 of appropriate size, gradient and length shall be constructed for both mine pit and temporary dumps 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>No run-off is generated from mining activities. However to collect & manage rain water during monsoon, part of mined out area is used as settling tank for the runoff. Rain water is being used for watering the mine area, roads, green belt development, sprinkling on haul roads etc.</p> <p>Garland drain of suitable size will be provided as & when required.</p> |
| (viii) | Dimension of the retaining wall at the toe of temporary dumps and OB benches within the mine to check run-off and siltation should be based on the rain fall data. | The dimensions of the retaining wall of OB dumps are based on the average rain fall. |
| (ix) | Plantation shall be raised in an area of 52.50 ha including a 7.5m wide green belt in the safety zone around the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, roads etc. in consultation with the local DFO/Agriculture Department at the end of life of mine. The density of the trees should be around 2500 plants per ha. | It is already in practice. Phase wise plantation of native species in consultation with forest department will be carried out within the safety zone and mined out/reclaimed pits. Around 4500 saplings have been planted during FY 2015-16 within the Bagru plateau. |

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| (x) | Regular water sprinkling should be carried out in critical areas prone to air pollution and having high levels of SPM and RSPM such as haul road, loading and unloading point and transfer points. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. | Mobile water tankers have been provided for sprinkling of water on road to contain dust. AAQ parameters are monitored on regular basis. |
| (xi) | 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. | A plan has been prepared to implement suitable conservation measures to augment ground water resources in the area (Bagru Plateau). |
| (xii) | Regular monitoring of ground water level and quality should be carried out in and around the mine lease 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 i.e. January, April-May, August, November and the data thus collected may be sent regularly to Ministry of Environment and Forests, its Regional Office, Bhubaneswar; Central Ground Water Authority and Central Ground Water Board. | Being complied. Water quality monitoring report is enclosed. |
| (xiii) | The project authorities should obtain prior approval of the competent authority for drawl of groundwater if any, required for the project. | Water is collected from Rain water harvesting pond and necessary water cess is being paid regularly to Jharkhand State Pollution Control Board for Bagru group of Mines. As per the terms and conditions in Mining lease deed, we have the liberty to use water. |
| (xiv) | Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for | For our all operating mines regular maintenance of vehicles are undertaken to minimize vehicular emission. All the |

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| | <p>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..</p> | <p>transporters have been instructed to obtain PUC for their vehicles from the concerned authority and submit to the concerned Officer for verification. Now a days all the vehicles have obtained such PUC .Bauxite are transported through tarpaulin cover trucks or ropeway from Bagru Hill to Lohardaga siding.</p> |
| (xv) | <p>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</p> | <p>Blasting at Mines is done at fixed blasting period i.e 12.00 Noon to 1.00 PM on working days. Mobile mining activities are not being practiced during blasting. All the precautionary and mitigative measures to control ground vibration and to arrest fly rocks are implemented.</p> |
| (xvi) | <p>Drills shall either be operated with dust extractors or equipped with water injection system.</p> | <p>Wet drilling is done in the drill holes by pumping water intermittently for dust suppression.</p> |
| (xvii) | <p>Consent to operate should be obtained from SPCB before starting/ enhanced production from the mine.</p> | <p>Mines is discontinued since Sep'14 due to second renewal case as per directive by DMO. All procedure for getting the lease renewal has been done & very shortly mine will be operative.</p> |
| (xviii) | <p>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.</p> | <p>Progressive mine Closure Plan along with mining scheme has been approved by IBM. Final Mine closure plan will be prepared in due time.</p> |

| Sl No | General Condition | Compliance |
|--------------|--|---|
| (i) | <p>No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.</p> | <p>Being adhered to.</p> |
| (ii) | <p>No change in the calendar plan including excavation, quantum of</p> | <p>Excavation of OB and Bauxite is being done as per the approved mining plan/scheme and obtained</p> |

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| | mineral bauxite and waste should be made. | EC capacity. Quantum of mineral and OB excavated during the FY2015-16 is annexed. Mines is discontinued since Sep'2014 due to second renewal case as per directive by DMO. |
| (iii) | Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for PM10, SO2 as NOx 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. | The system is already in place. Air quality monitoring report is being submitted regularly at JSPCB and MoEF. |
| (iv) | 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. | Suitable water spraying system is already available for Bagru group of mines. To arrest fugitive dust proper water sprinkling will be carried out on haul roads, loading and unloading and at transfer points. |
| (v) | 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. | Measures are being taken for control of noise levels below 85 dBA in the work environment PPEs are provided to workers. |
| (vi) | Industrial wastewater (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 03 or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop. | Is being complied as per statute. |
| (vii) | 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. | PPE's provided. Periodic training on safety & occupational health is being imparted to workers and health checks up conducted. |

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| (viii) | Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. | Being carried out. |
| (ix) | 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. |
| (x) | The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar | 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 Bhubaneswar. Copy Annexed. |
| (xi) | The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional Office by furnishing requisite data/information/monitoring reports. | Agreed. |
| (xii) | The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board. | Six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well as by e mail) are being submitted to the Ministry of Environment and Forests, its Regional office Ranchi, the respective Zonal office of Central Pollution Control Board the State Pollution Control Board and uploaded in company's website. |
| (xiii) | A copy of the clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom suggestions/representation has been received while processing the proposal. | A copy of clearance letter has been sent to concerned Panchayat, Zila Parisad / Municipal corporation, urban local body and the local NGO. |
| (xiv) | The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities | Complied. Yearly date of financial closure is 31 st March. |

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| | and the date of start of land development work. | |
| (xv) | State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's/Tehsildar's Office for 30 days. | Displayed. |
| (xvi) | 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 http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar. | Complied. Copies of relevant paper cutting are enclosed for information and records. |



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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

JANUARY TO MARCH QUATER-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

Jan - Mar 2016

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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

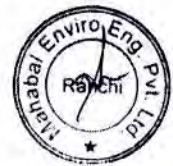
| | |
|---|--|
| Report No: MEEPL/MAR 140//2015-16 | Date: 31 st March 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau- Office (Near Colony) | |
| Sample collected on: 09.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/12.02.2016 | |

| LOCATION / IDENTIFICATION: Bagru Plateau- Office (Near Colony) | | | | | |
|--|-------------------|-------------------|-------|-----------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part2):2001 (Reaff:2006) | 17.0 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part 6):1975 (Reaff:2004) | 24.5 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 69.5 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 41.6 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.09 |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey

SENIOR EXECUTIVE



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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|---|
| Report No: MEEPL/MAR 141/2015-16 | Date: 31st March 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Hisri Mines Bagru Plateau | |
| Sample collected on: 09.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/12.02.2016 | |

| LOCATION/IDENTIFICATION: Hisri Mines Bagru Plateau | | | | | |
|--|-------------------|-------------------|-------|------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 15.2 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 18.2 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 63.5 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 38.4 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.20 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|---|
| Report No: MEEPL/MAR 142/2015-16 | Date: 31st March 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bhusar Mines Pit Bagru Plateau | |
| Sample collected on: 09.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/12.02.2016 | |

| LOCATION/IDENTIFICATION: Bhusar Mines Pit Bagru Plateau | | | | | |
|---|-------------------|-------------------|-------|---------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 15.0 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 16.2 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 70.1 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 35.6 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.22 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|---|
| Report No: MEEPL/MAR 143/2015-16 | Date: 31st March 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample Location: Entrance Gate Bagru Mines | |
| Sample collected on: 09.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/12.02.2016 | |

| LOCATION/IDENTIFICATION: Entrance Gate Bagru Mines | | | | | |
|--|-------------------|-------------------|-------|---------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 14.2 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 17.00 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 72.5 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 45.2 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.11 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Jan - Mar 2016

| | |
|--|---|
| Report No: MEEPL/MAR 144/2015-16 | Date: 31st March 2016 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau- Bagru Crushing Site | |
| Sample collected on: 09.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/12.02.2016 | |

| LOCATION/IDENTIFICATION: Bagru Plateau- Bagru Crushing Site | | | | | |
|---|-------------------|-------------------|-------|---------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 [Reaff:2006] | 16.1 |
| Nitrogen Dioxide | NO _x | µg/m ³ | 80 | IS:5182 (Part-6):1975(Reaff:2004) | 17.5 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part-23) | 81.5 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR (40) Appendix-L | 49.8 |
| Carbon Monoxide | CO | µg/m ³ | 2 | EPA 600/P-99/001F | 0.13 |

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Mahabal Enviro Engineers Pvt. Ltd.

Branch Office:

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Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail: mahabalranchi@gmail.com

Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|---|
| Report No: MEEPL/MAR 145/2015-16 | Date: 31st March 2016 |
| Sample described by customer: Measurement of Noise | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Description: Measurement of Noise | |
| Sampling Method: Instrumental, using Sound level Meter | |
| Data Collection Date: 09.02.2016 | |
| Analyse Date: 09.02.2016 | |

| Location/Identification | Unit | Limit (day) | Result | Limit (night) | Result | Dates |
|---|------------|-------------|--------|---------------|--------|------------|
| Bagru Plateau Near Office & Workshop | dB (A) Leq | 75 | 49.9 | 70 | 38.1 | 09/02/2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



Head Office: Plot No. F-7, Road No. 21, Wagle Estate, Thane West - 400604, Maharashtra, India
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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|---|
| Report No: MEEPL/MAR 146/2015-16 | Date: 31st March 2016 |
| Sample described by customer: Measurement of Noise | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Description: Measurement of Noise | |
| Sampling Method: Instrumental, using Sound level Metter | |
| Data Collection Date: 09.02.2016 | |
| Analyse Date: 09.02.2016 | |

| Location/Identification | Unit | Limit (day) | Result | Limit (night) | Result) | Dates |
|-------------------------------------|-----------------|-------------|--------|---------------|---------|------------|
| Bagru Plateau Bagru Crusher site | dB (A) L_{eq} | 75 | 56.9 | 70 | 43.6 | 09/02/2016 |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| | |
|---|-----------------------------------|
| Report No: MEEPL/MAR 147/2015-16 | Date: 31 st March 2016 |
| Sample described by customer : DRINKING WATER-POTABILITY | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Type: DRINKING WATER-POTABILITY | |
| Marks on Sample: Location: Tap Water-Bagru Plateau near office. | |
| Quantity: 5 L X 2 No. PVC Can | |
| Sample collected on: 06.02.2016 | |
| Received: 10.02.2016 | |
| Registered: 10.02.2016 | |
| Test Start/End Date: 11.02.2016/14.02.2016. | |

| Sl. No. | Parameters | Unit | Result | Acceptable Limit (IS10500:2012) | Method reference |
|---------|--|-------|-----------|---------------------------------|---|
| 1 | Colour | Hazen | <1 | 5 Max | APHA 22 nd Ed. 2012, 2120-B, 2-6 |
| 2 | Odour | -- | Agreeable | Agreeable | IS 3025 (Part 7): 1983, Reaffirmed 2006 |
| 3 | Taste | -- | Agreeable | Agreeable | IS 3025 (Part 7): 1983, Reaffirmed 2006 |
| 4 | Turbidity | NTU | 0.3 | 1 Max | APHA 22 nd Ed. 2012, 2130-B, 2-13 |
| 5 | pH | -- | 7.1 | 6.5-8.5 | APHA 22 nd Ed. 2012, 4500-H+-B, 4-92 |
| 6 | Free Chlorides (Residual) | mg/l | <0.05 | 0.2 min | APHA 22 nd Ed. 2012, 4500-Cl-G, 4-69 |
| 7 | Total Dissolved Solids | mg/l | 80 | 500 max | IS 3025 (Part 16): 1984, Reaffirmed 2006 |
| 8 | Monochloramines | mg/l | <0.05 | -- | APHA 22 nd Ed. 2012, 4500-CIG, 4-69 |
| 9 | Dichloramines | mg/l | <0.05 | -- | APHA 22 nd Ed. 2012, 4500-CIG, 4-69 |
| 10 | Total hardness (as CaCO ₃) | mg/l | 51 | 200 max | APHA 22 nd Ed. 2012, 4500-CIG, 4-69 |
| 11 | Alkalinity Total (as CaCO ₃) | mg/l | 59 | 200 max | IS 3025 (Part 237): 1986, Reaffirmed 2009 |
| 12 | Chloride (as Cl) | mg/l | 7.9 | 250 max | APHA 22 nd Ed. 2012, 4500-Cl-b, 4-72 |
| 13 | Sulphate (as SO ₄) | mg/l | 4.1 | 200 max | APHA 22 nd Ed. 2012, 4500-so4-e, 4-190 |



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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

Continuation Sheet

| Sl. No. | Parameters | Unit | Result | Acceptable Limit (IS10500:2012) | Method reference |
|---------|--|------|--------|---------------------------------|--|
| 14 | Nitrate (as NO ₃) | mg/l | 1.0 | 45 max | APHA 22 nd Ed. 2012, 4500-NO ₃ -E, 4-125 |
| 15 | Fluoride (as F) | mg/l | 0.22 | 1 max | APHA 22 nd Ed. 2012, 4500-FB & D, 4-84, 4-87 |
| 16 | Boron (as B) | mg/l | 0.14 | 0.5 max | APHA 22 nd Ed. 2012, 4500-BB, 4-25 |
| 17 | Calcium (as Ca) | mg/l | 26 | 75 max | APHA 22 nd Ed. 2012, 3500-Ca-B, 3-67 |
| 18 | Magnesium (as Mg) | mg/l | 4.5 | 30 max | APHA 22 nd Ed. 2012, 3500-Mg-B, 3-84 |
| 19 | Ammonical Nitrogen/Total Ammonia | mg/l | <0.1 | -- | APHA 22 nd Ed. 2012, 4500-NH ₃ -F, 4-115 |
| 20 | Iron (as Fe) | mg/l | 0.16 | 0.3 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 21 | Manganese (as Mn) | mg/l | N.D | 0.1 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 22 | Aluminium (as Al) | mg/l | 0.08 | 0.03 max | APHA 22 nd Ed. 2012, 3500-Al-B, 3-61 |
| 23 | Cadmium (as Cd) | mg/l | N.D | 0.003 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 24 | Chromium Total (as Cr) | mg/l | N.D | 0.05 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 25 | Copper (as Cu) | mg/l | N.D | 0.05 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 26 | Lead (as Pb) | mg/l | N.D | 0.01 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 27 | Zinc (as Zn) | mg/l | 0.03 | 5 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 28 | Arsenic (as As) | mg/l | <0.01 | 0.01 max | APHA 22 nd Ed. 2012, 3114-B, 3-18 |
| 29 | Selenium (as Se) | mg/l | N.D | 0.001 max | APHA 22 nd Ed. 2012, 3112-B, 3-18 |
| 30 | Mercury (as hg) | mg/l | N.D | 0.01 max | APHA 22 nd Ed. 2012, 3114-B, 3-18 |
| 31 | Nickel (as Ni) | mg/l | <0.06 | 0.02 max | APHA 22 nd Ed. 2012, 3111-B, 3-18 |
| 32 | Mineral Oil | mg/l | N.D | 0.5 max | IS 3025 (Part 39): 1991, Reaffirmed 2003: ed. 2.1 |
| 33 | Cyanide (as CN) | mg/l | N.D | 0.05 max | APHA 22 nd ED. 2012, 4500-CN.C & 4-39 & 4-44 |
| 34 | Anionic detergents as MBAS | mg/l | <0.1 | 0.2 max | APHA 22 nd ED. 2012, 5540-C.C & 5-53 |
| 35 | Phenolic compounds (as C ₆ H ₅ OH) | mg/l | N.D | 0.001 max | APHA 22 nd ED. 2012, 5530-B & C 5-4753 |
| 36 | Polynuclear aromatic hydrocarbons (PAH) | mg/l | N.D | 0.0001 max | APHA 22 nd ED. 2012, 6440, 6-93 |
| 37 | Polychlorinated Biphenyls (PCBs) | mg/l | N.D | 0.0005 max | USEPA Method 8082 |
| 38 | Sulphide (as S) | mg/l | N.D | 0.05 max | APHA 22 nd ED. 2012, 4500-S2-C 4-175 & F 4-178 |

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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

Continuation Sheet

| S.No | Parameters | Unit | Result | Acceptable Limit (IS10500:2012) | Method Reference |
|-----------------------------------|---------------------|------------|--------|---------------------------------|---|
| Microbiological Analysis | | | | | |
| 1. | Total Coliforms | MPN/100 mL | <1.1 | N.D | APHA 22nd Ed. 2012, 9221-B & C, 9-66, 9-69 |
| 2. | E-Coli | MPN/100 mL | Absent | N.D | APHA 22nd Ed. 2012, 9221-B, C & G, 9-66, 9-69 and 9- 76 |
| Pesticides Residues | | | | | |
| 3. | p,p DDT | µg/L | N.D | 1 | US EPA 508-1995 |
| 4. | o,p DDT | µg/L | N.D | 1 | US EPA 508-1995 |
| 5. | p,p DDE | µg/L | N.D | 1 | US EPA 508-1995 |
| 6. | o,p DDE | µg/L | N.D | 1 | US EPA 508-1995 |
| 7. | p,p DDD | µg/L | N.D | 1 | US EPA 508-1995 |
| 8. | o,p DDD | µg/L | N.D | 1 | US EPA 508-1995 |
| 9. | γ-HCH (Lindane) | µg/L | <0.01 | 2 | US EPA 508-1995 |
| 10. | α-HCH | µg/L | <0.01 | 0.02 | 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

Jan - Mar 2016

| Report No: MEEPL/MAR 148/2015-16 | | | Date: 31st March 2016 | | |
|---|------------------------|--|---|------|--|
| Sample described by customer: STP Outlet (Bagru Mines) | | | | | |
| Client Name: Hindalco Industries Limited | | | | | |
| Client Address: Lohardaga | | | | | |
| Postal Code: 835203 | | | | | |
| State: Jharkhand | | | | | |
| Country: India | | | | | |
| Sample Type: Effluent Water | | | | | |
| Marks on Sample: Location: STP Outlet (Bagru Mines) | | | | | |
| Sample collected on: 09.02.2016 | | | | | |
| Quantity: 4 liters | | | | | |
| Received: 10.02.2016 | | | | | |
| Registered: 10.02.2016 | | | | | |
| Test Start/End Date: 11.02.2016/14.02.2016 | | | | | |
| Sl. No. | Analysis | Method | Result | Unit | Limits |
| 1 | pH | APHA 22 nd Ed. 2012, 4500-H+-B,4-92 | 7.9 | mg/l | 5.5-9.0 |
| 2 | Total Suspended Solids | APHA 22 nd EDN: 2012-2540 | 22.0 | mg/l | 100 |
| 3 | BOD @ 27°C | IS 3025 (Part 44): 1993, RA2003, Amd.1 | 12.0 | mg/l | 30 |
| 4 | COD | IS 3025 (Part 58): 1993, RA2006, Amd.1 | 35.0 | 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 ND EDN 2012-2540 | 85.0 | mg/l | 2100 |
| 7 | Aluminum (as Al) | APHA 22 nd EDN 2012-3120B | 1.6 | mg/l | 3 |
| 8 | Calcium (as Ca) | APHA 22 nd EDN 2012-3120B | 8.0 | mg/l | 75 |
| 9 | Iron (as Fe) | APHA 22 nd EDN 2012-3120B | 2.0 | mg/l | 3 |
| 10 | Temperature | | 13.0 | °C | Shall not exceed 5°C above the receiving water temperature |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey

SENIOR EXECUTIVE



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Hindalco Industries : Environmental Monitoring report

Jan - Mar 2016

| Report No: MEEPL/MAR 149/2015-16 | | Date: 31st March 2016 | | |
|--|--|---|---------|---------------------------------|
| Sample described as: FLUE GAS | | | | |
| Name of the Industry: M/S HINDALCO INDUSTRIES LIMITED | | | | |
| Address: Mines Division, Lohardaga, Jharkhand, Pin-835302 | | | | |
| Date & time of Sampling: 09.02.2016 (13.00-13.30 Hrs) | | | | |
| Sampling Site: Bagru Mines Office-Bagru Plateau | | | | |
| A. General Information about Stack <ul style="list-style-type: none"> Stack connected to: DG-Set (250 KVA) Emission due to Burning of H.S.D Material OF construction: M.S Shape of Stack: Circular Whether stack is provided with permanent platform & ladder: Yes Capacity. 250 KVA | | | | |
| B. Physical characteristics of stack <ul style="list-style-type: none"> Height of the stack (a) from ground level: 7.0 Diameter of the Stack at Sampling point: 0.2030 Height of the sampling point from GL. 6.25 | | | | |
| C. Analysis/Characteristic of Stock <ul style="list-style-type: none"> Fuel used: H.S.D Fuel Consumption: 30 lt/hr | | | | |
| 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) | 303 | --- |
| 2 | Barometric pressure (mm of Hg) | IS 11255 Part: 3 1985 (Realf 2008) | 650 | --- |
| 3 | Velocity of Gas (m/Sec) | IS 11255 Part: 3 1985 (Realf 2008) | 9.2 | --- |
| 4 | Quantity of Gas flow (Nm ³ /hr) | IS 11255 Part: 3 1985 (Realf 2008) | 550 | --- |
| 5 | Concentration of CO ₂ (% v/v) | IS 11255 Part: 3 1985 (Realf 2008) | 4.2 | 5.0 |
| 6 | Concentration of CO (gm/kw-h) | IS 11255 Part: 3 1985 (Realf 2008) | 0.32 | -- |
| 7 | Concentration of SO ₂ (mg/Nm ³) | USEPA-6C | 60.0 | -- |
| 8 | Concentration of NO ₂ (gm/kw-h) | USEPA-7E | 0.80 | 9.2 |
| 9 | Concentration of Particulate Matters (gm/kw-h) | IS 11255 Part: 3 1985 (Realf 2003) | 0.20 | 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





Eco Ventures Pvt. Ltd.

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Corporate Office: 7/8 Bhaveshwar Bhuvan, Opp Portugese Church, Near Dindayal Upadhyay Garden,
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E: ecoventures.mumbai@gmail.com / ecoventures@eco-ventures.in

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BAGRU PLATEAU- ENVIRONMENTAL MONITORING REPORT

OCTOBER - DECEMBER 2015

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE





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Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|---|---------------------------------------|
| Report no : MEEPL/DEC011/2015-16 | Date: 12 th December, 2015 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau-Bagru Office (Near Colony) | |
| Sample collected on: 20.11.2015 | |
| Received: 21.11.2015 | |
| Registered: 21.11.2015 | |
| Test Start/End Date: 21.11.2015/24.11.2015 | |

| LOCATION / IDENTIFICATION: Bagru Plateau- Bagru Office (Near Colony) | | | | | |
|--|-------------------|-------------------|-------|------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 18.9 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 24.2 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 75.31 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 40.12 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.18 |

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Hindalco Industries:Environmental Monitoring report

December 2015

| | |
|---|--|
| Report no. : MEEPL/DEC012/2015-16 | Date: 12 th December, 2015 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau- Hisri (New) Mines | |
| Sample collected on: 20.11.2015 | |
| Received: 21.11.2015 | |
| Registered: 21.11.2015 | |
| Test Start/End Date: 21.11.2015/24.11.2015 | |

| LOCATION / IDENTIFICATION: Bagru Plateau- Hisri (New) Mines | | | | | |
|---|-------------------|-------------------|-------|---------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 15.1 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 17.9 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 67.8 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 47.4 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.17 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|---|--|
| Report no : MEEPL/DEC013/2015-16 | Date: 12 th December, 2015 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau - Bhusar Mines | |
| Sample collected on: 21.11.2015 | |
| Received: 21.11.2015 | |
| Registered: 21.11.2015 | |
| Test Start/End Date: 21.11.2015/24.11.2015 | |

| LOCATION / IDENTIFICATION: Bagru Plateau- Bhusar Mines | | | | | |
|--|-------------------|-------------------|-------|------------------------------------|---------------|
| PARAMETERS | | UNIT | LIMIT | METHOD | Concentration |
| Sulphur Dioxide | SO ₂ | µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 16.3 |
| Nitrogen Dioxide | NO ₂ | µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 22.9 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ | µg/m ³ | 100 | IS:5182 (Part 23) | 71.6 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} | µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 43.7 |
| Carbon Monoxide | CO | mg/m ³ | 2 | EPA 600/P-99/001F | 0.31 |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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Mahabal Enviro Engineers Pvt. Ltd.

Branch Office:

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

Mobile No: +91 9431.102.102 / +91 9955.358.262,

E-mail: mahabalranchi@gmail.com

Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|--|--|
| Report no : MEEPL/DEC014/2015-16 | Date: 12 th December, 2015 |
| Sample described by customer: AMBIENT AIR QUALITY MONITORING | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: AMBIENT AIR QUALITY MONITORING | |
| Marks on Sample: Location: Bagru Plateau- Entrance Gate Bagru Mines | |
| Sample collected on: 21.11.2015 | |
| Received: 21.11.2015 | |
| Registered: 21.11.2015 | |
| Test Start/End Date: 21.11.2015/24.11.2015 | |

LOCATION / IDENTIFICATION: Bagru Plateau- Entrance Gate Bagru Mines

| PARAMETERS | UNIT | LIMIT | METHOD | Concentration |
|--|-------------------------------------|-------|------------------------------------|---------------|
| Sulphur Dioxide | SO ₂ µg/m ³ | 80 | IS:5182 (Part-2):2001 (Reaff:2006) | 16.3 |
| Nitrogen Dioxide | NO ₂ µg/m ³ | 80 | IS:5182(Part-6):1975 (Reaff:2004) | 22.1 |
| Particulate Matter (size less than 10 µm) | PM ₁₀ µg/m ³ | 100 | IS:5182 (Part 23) | 79.4 |
| Particulate Matter (size less than 2.5 µm) | PM _{2.5} µg/m ³ | 60 | USEPA CFR(40) Appendix-L | 43.1 |
| Carbon Monoxide | CO mg/m ³ | 2 | EPA 600/P-99/001F | 0.36 |

For Mahabal Enviro Engineers Pvt. Ltd.

Vijay Pandey
SENIOR EXECUTIVE



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Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|---|--|
| Report no: MEEPL/DEC015/2015-16 | Date: 12 th December, 2015 |
| Sample described by customer : DRINKING WATER | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample type: DRINKING WATER | |
| Marks on Sample: Location: Bagru Office | |
| Sample collected on: 21.11.2015 | |
| Quantity: 5 L X 2 No. PVC Can | |
| Sample collected by: Mahabal EnviroEngineers Pvt Limited | |
| Received: 21.11.2015 | |
| Registered: 21.11.2015 | |
| Test Start/End Date: 21.11.2015/29.11.2015 | |

| S.No | Parameters | Unit | Result | Acceptable Limit (IS10500:2012) | Method Reference |
|------|--|-------|-----------|---------------------------------|--|
| 1. | Colour | Hazen | < 1 | 5 Max | APHA 22nd Ed. 2012, 2120-B, 2-6 |
| 2. | Odour | - | Agreeable | Agreeable | IS 3025 (Part 5):1983, Reaffirmed 2006 |
| 3. | Taste | - | Agreeable | Agreeable | IS 3025 (Part 7):1984, Reaffirmed 2006 |
| 4. | Turbidity | NTU | 0.3 | 1 Max | APHA 22nd Ed. 2012, 2130-B, 2-13 |
| 5. | pH | - | 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 | 128 | 500 Max | IS 3025 (Part 16):1984 Reaffirmed 2006 |
| 8. | Monochloramines | mg/l | <0.05 | - | APHA 22nd Ed. 2012, 4500-ClG, 4-69 |
| 9. | Dichloramines | mg/l | <0.05 | - | APHA 22nd Ed. 2012, 4500-ClG, 4-69 |
| 10. | Total Hardness (as CaCO ₃) | mg/l | 53 | 200 Max | APHA 22nd Ed. 2012, 2340-C, 2-44,45 |
| 11. | Alkalinity Total (as CaCO ₃) | mg/l | 62 | 200 Max | IS 3025 (Part 23):1986 Reaffirmed 2009 |
| 12. | Chloride (as Cl) | mg/l | 7.8 | 250 Max | APHA 22nd Ed. 2012, 4500-Cl-B, 4-72 |
| 13. | Sulphate (as SO ₄) | mg/l | 4.2 | 200 Max | APHA 22nd Ed. 2012, 4500-SO4-E, 4-190 |



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Hindalco Industries: Environmental Monitoring report

December 2015

Continuation Sheet

| S.No | Parameters | Unit | Result | Acceptable Limit (IS 10500:2012) | Method Reference |
|------|--|------|--------|----------------------------------|--|
| 14. | Nitrate (as NO ₃) | mg/l | 1.14 | 45 Max | APHA 22nd Ed. 2012, 4500-NO ₃ -E, 4-125 |
| 15. | Fluoride (as F) | mg/l | 0.19 | 1 Max | APHA 22nd Ed. 2012, 4500-FB& D, 4-84, 4-87 |
| 16. | Boron (as B) | mg/l | 0.15 | 0.5 Max | APHA 22nd Ed. 2012, 4500-BB, 4-25 |
| 17. | Calcium(as Ca) | mg/l | 16.5 | 75 Max | APHA 22nd Ed. 2012, 3500-Ca-B, 3-67 |
| 18. | Magnesium (as Mg) | mg/l | 3.3 | 30 Max | APHA 22nd Ed. 2012, 3500- Mg- B, 3-84 |
| 19. | Ammonical Nitrogen/ Total Ammonia | mg/l | <0.1 | - | APHA 22nd Ed. 2012, 4500 NH ₃ -F, 4-115 |
| 20. | Iron (as Fe) | mg/l | 0.11 | 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 | 0.08 | 5 Max. | APHA 22nd Ed. 2012, 3111-B,3-18 |
| 28. | Arsenic (as As) | mg/l | <0.01 | 0.01 Max. | APHA 22nd Ed. 2012, 3114-C,3-38 |
| 29. | Mercury (as Hg) | mg/l | N.D. | 0.001 Max. | APHA 22nd Ed. 2012, 3112-B,3-23 |
| 30. | Selenium (as Se) | mg/l | N.D. | 0.01 Max. | APHA 22nd Ed. 2012, 3114-C, 3-38 |
| 31. | Nickel (as Ni) | mg/l | <0.06 | 0.02 Max. | APHA 22nd Ed. 2012, 3111 B,3-18 |
| 32. | Mineral Oil | mg/l | N.D. | 0.5 Max. | IS 3025 (Part 39): 1991, Reaffirmed 2003, Ed. 2.1 |
| 33. | Cyanide (as CN) | mg/l | N.D. | 0.05 Max. | APHA 22nd Ed. 2012, 4500-CN, C & E, 4-39 & 4-44 |
| 34. | Anionic detergents as MBAS | mg/l | <0.1 | 0.2 Max. | APHA 22nd Ed. 2012, 5540-C, 5-53 |
| 35. | Phenolic compounds (as C ₆ H ₅ OH) | mg/l | N.D | 0.001 Max. | APHA 22nd Ed. 2012, 5530- B & C, 5-47 |
| 36. | Polynuclear aromatic hydrocarbons (PAH) | µg/L | N.D | 0.0001 mg/L Max. | APHA 22nd Ed. 2012, 6440, 6-93 |
| 37. | Polychlorinated Biphenyls (PCBs) | µg/L | N.D | 0.0005 mg/l Max. | USEPA Method 8082 |
| 38. | Sulphide (as S) | mg/l | N.D | - | APHA 22nd Ed. 2012, 4500- S2-C 4-175 & F 4-178 |



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Hindalco Industries: Environmental Monitoring report

December 2015

Continuation Sheet

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

Conclusion: The Physical & Chemical Analysis report indicates that water is safe for drinking.

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|--|---------------------------------------|
| Report no: MEEPL/DEC016/2015-16 | Date: 12 th December, 2015 |
| Sample Description: Measurement of Noise | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Description: Measurement of Noise Level. | |
| Sampling Method: Instrumental, Using Sound level Meter | |
| Sampling Done by: Mahabal Enviro Engineers Pvt. Ltd. | |
| Sample Collected on: 21.11.2015 | |

| Location / Identification | Unit | Limit (day) | Result | Limit (night) | Result | Dates |
|---------------------------|----------------|-------------|--------|---------------|--------|------------|
| Hisri (New) Mines | dB(A) L_{eq} | 75 | 61.8 | 70 | 57.2 | 21.11.2015 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries: Environmental Monitoring report

December 2015

| | |
|--|---------------------------------------|
| Report no: MEEPL/DEC017/2015-16 | Date: 12 th December, 2015 |
| Sample Description: Measurement of Noise | |
| Client Name: Hindalco Industries Limited | |
| Client Address: Lohardaga | |
| Postal Code: 835203 | |
| State: Jharkhand | |
| Country: India | |
| Sample Description: Measurement of Spot Noise. | |
| Sampling Method: Instrumental, Using Sound level Meter | |
| Sampling Done by: Mahabal Enviro Engineers Pvt. Ltd. | |
| Sample Collected on: 21.11.2015 | |

| Location / Identification Spot Noise | Unit | Limit (day) | Result | Dates |
|---|----------------|-------------|--------|------------|
| Near Poclairn at at Hisri (New) Mines | dB(A) L_{eq} | 75 | 72.1 | 21.11.2015 |

For Mahabal Enviro Engineers Pvt. Ltd.

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Hindalco Industries:Environmental Monitoring report

December 2015

| Report no: : MEEPL/DEC018/2015-16 | | | Date: 12 th December, 2015 | | |
|--|--------------------------|--------------------------------|---------------------------------------|------------|--------------------|
| Sample described by customer: SOIL | | | | | |
| Client Name: Hindalco Industries Limited | | | | | |
| Client Address: Lohardaga | | | | | |
| Postal Code: 835203 | | | | | |
| State: Jharkhand | | | | | |
| Country: India | | | | | |
| Sample type: SOIL | | | | | |
| Marks on Sample: Location: BAGRU PLATEAU – HISRI (NEW) MINES | | | | | |
| Sample collected on: 21.11.2015 | | | | | |
| Quantity: 2 kgs | | | | | |
| Sample collected by: Mahabal Enviro Engineers Pvt Limited | | | | | |
| Received: 21.11.2015 | | | | | |
| Registered: 21.11.2015 | | | | | |
| Test Start/End Date: 21.11.2015/30.11.2015 | | | | | |
| S.No | Analysis | | Method | Result | Unit |
| 1. | Colour | -- | -- | Gray | - |
| 2. | Texture | -- | F.A.U.N (2007) | Loamy Sand | - |
| 3. | Bulk Density | -- | By Bulk density Apparatus | 1.00 | gm/cm ³ |
| 4. | Water Holding Capacity | -- | F.A.U.N (2007) | 31 | % |
| 5. | pH | -- | F.A.U.N (2007) | 6.7 | - |
| 6. | Electrical Conductivity | -- | F.A.U.N (2007) | 2120 | µs/cm |
| 7. | Organic Carbon | -- | | 0.57 | % |
| 8. | Organic Matter | -- | Black & White Wet Digestion Method | 0.78 | % |
| 9. | Available Nitrogen | -- | Soil & Water Book by P.K Gupta | 112.8 | mg/kg |
| 10. | Available Phosphorus | -- | Soil & Water Book by P.K Gupta | 16.6 | mg/kg |
| 11. | Available Potassium | -- | Soil & Water Book by P.K Gupta | 385 | mg/kg |
| 12. | Exchangeable Calcium | Ca | Soil & Water Book by P.K Gupta | 27.27 | meq/100gm |
| 13. | Exchangeable Magnesium | Mg | Soil & Water Book by P.K Gupta | 1.39 | meq/100gm |
| 14. | Exchangeable Sodium | Na | Soil & Water Book by P.K Gupta | 2.20 | meq/100gm |
| 15. | Exchangeable Potassium | K | Soil & Water Book by P.K Gupta | 1.40 | meq/100gm |
| 16. | Total Exchangeable Bases | | Soil & Water Book by P.K Gupta | 31.53 | meq/100gm |
| 17. | Manganese | Mn | USEPA 3052 | 0.40 | mg/kg |
| 18. | Arsenic | As | USEPA 3052 | 2.0 | mg/kg |
| 19. | Silica | SiO ₂ | USEPA 3052 | 54.6 | % |
| 20. | Aluminum | Al ₂ O ₃ | USEPA 3052 | 8.6 | % |
| 21. | Iron | Fe ₂ O ₃ | USEPA 3052 | 5.00 | % |
| 22. | Calcium | CaO | USEPA 3052 | 8.90 | % |
| 23. | Magnesium | MgO | USEPA 3052 | 1.83 | % |
| 24. | Sodium | Na ₂ O | USEPA 3052 | 0.272 | % |
| 25. | Potassium | K ₂ O | USEPA 3052 | 0.234 | % |
| 26. | Sulphate | SO ₄ | USEPA 3052 | 0.68 | % |

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29.04.2016

Office Order

Environmental Cell has been re-constituted at Bhusar Bauxite Mines (Area 65.31 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. Syed Abdul Mannan –Geologist (Coordinator)
2. Mr. Rupak Kumar Dubey (Dy.Engineer)
3. Mr. Anil Kumar singh (Mining Engineer)
4. Mr. Shashank kumar Singh (Junior Engineer)
5. Mr. U.K Veram (Mining Mate)



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



28.05.2016

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

The composite cost during the year 2015-16 for environmental protection & pollution control by Jharkhand Mines division of M/s Hindalco Industries Ltd & M/s Minerals & Minerals Ltd for implementation of the suggested measures in EC at our all the operating mines in the state of Jharkhand-namely Pakhar (115.13 Ha), Pakhar (15.58 Ha), Pakhar (109.507 Ha), Pakhar (8.09 Ha), Pakhar (35.12Ha), Serengdag (140.06 Ha), Serengdag (155.81 Ha), Jalim & Sanai (12.14 Ha), Gurdari (584.19 Ha), Amtipani (190.95 Ha), Kujam I (80.97 Ha) Kujam II (157.38 Ha) and Bagru (75.41 Ha), Hisri New (14.55 Ha), Chiro kukud, Orsa pat(196.36 Ha), Bhusar (65.31 Ha)& Bimarla Bauxite Mines (134.52 Ha).

| SI No | Description | Budget (in Rupees) FY 2015-16 | Actual (in Rupees) FY 2015-16 (from April'15 to Sep'2015) | Actual (in Rupees) FY 2015-16 (from April'15 to March'2016) |
|-------|---|----------------------------------|--|--|
| 1 | Pollution Control & Environment monitoring | 15,40,000.00 | 2,62,293.00 | 5,53,564.00 |
| 2 | Reclamation/ Back filing & Rehabilitation** | 3,89,90,000.00 | 1,45,51,281.00 | 2,67,43,576.00 |
| 3 | Green belt, Plantation & Water spraying arrangement | 60,00,000.00 | 28,68,213.00 | 1,08,03,917.00 |
| 4 | Rural Development | 2,33,00,000.00 | 1,04,36,128.00 | 2,19,06,062.00 |

**Part of OB removed cost.

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

PRODUCTION, MINED OUT, BACKFILLED, PRODUCTION AND OVERBURDEN REMOVAL FROM APR-15 TO MAR-16

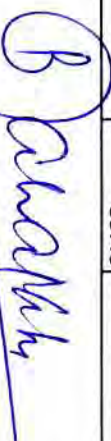
| Name of Mines | Mining lease area (Ha) | Mined Out area (in Ha) | Backfilled area (in Ha) | Production (in MT) | Overburden Removal (in Cub.M.) |
|--|------------------------|------------------------|-------------------------|--------------------|--------------------------------|
| Shrengdag Bauxite Mines | 155.81 | 6.20 | 10.40 | 259113 | 542332 |
| Gurdari Bauxite Mines | 584.19 | 13.40 | 10.60 | 324590 | 360223 |
| Jalim & Sanai | 12.14 | 0.85 | 0.52 | 45589 | 45147 |
| Serangdag | 140.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pakhar Buxite Mines | 115.13 | 3.14 | 4.03 | 297265 | 447110 |
| Pakhar Buxite Mines | 8.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pakhar Buxite Mines | 38.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| Kujam-I | 80.87 | 3.78 | 2.17 | 149590 | 215034 |
| Kujam-II | 157.38 | 6.79 | 4.54 | 223025 | 500720 |
| Amtipani | 190.95 | 4.63 | 3.53 | 149880 | 361325 |
| Chiro-Kukud | 152.57 | 2.32 | 4.63 | 94290 | 120248 |
| Orsa Bauxite Mines | 196.36 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hisri New | 14.55 | 0.29 | 0.00 | 64488 | 14237 |
| Bagru | 75.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bhusar | 65.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| Minerals & Minerals Limited | | | | | |
| Pakhar Buxite Mines | 109.507 | 3.02 | 3.57 | 277350 | 394970 |
| Pakhar Buxite Mines | 15.58 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bimarla | 134.37 | 2.38 | 1.29 | 43455 | 95056 |



Monitored water level (FY 2015-16)

Fig: in meter

| Location (Mines) | Elevation (Mtr) | Well type | Monsoon (July-Sep) | | Post Monsoon (November) | | Winter (January) | | Pre Monsoon (April-May) | |
|--|-----------------|-----------|--------------------|------------|-------------------------|------------|------------------|------------|-------------------------|------------|
| | | | Inside ML | Outside ML | Inside ML | Outside ML | Inside ML | Outside ML | Inside ML | Outside ML |
| Bagru Plateau (Hisri new, Bagru & Bhusar) | 905 | Open Well | | 21.74 | | 24.13 | | 27.35 | | 29.15 |
| | 910 | Open Well | | 24.32 | | 24.55 | | 26.50 | | 27.40 |
| | 915 | Open Well | | 29.41 | | 28.43 | | 29.95 | | 31.30 |
| | 903 | Open Well | | 22.83 | | 33.11 | | 35.10 | | 35.70 |
| | 909 | Open Well | | 17.54 | | 28.74 | | 30.15 | | 30.20 |
| 1000 | Open Well | | 24.95 | | 22.69 | | 25.16 | | 25.80 | |
| Pakhar Gr. Of Mines (115.13,109.507,15.58,8. | 1083 | Hand Pump | 35.36 | | 31.63 | | 34.25 | | 35.40 | |
| | 1027 | Open Well | | 25.84 | | 28.36 | | 30.15 | | 31.35 |
| Sherengdag Plateau (Serangdag 155.81 ha, Sherengdag 140.06 Ha, Jalim & Sanai) | 1094 | Hand Pump | 41.74 | | 39.55 | | 42.65 | | 42.80 | |
| | 1081 | Hand Pump | 39.65 | | 31.30 | | 41.12 | | 42.10 | |
| | 1055 | Hand Pump | 33.07 | | 27.53 | | 35.55 | | 35.60 | |
| | 1066 | Hand Pump | 27.76 | | 26.27 | | 30.15 | | 30.10 | |
| | 1045 | Hand Pump | 29.32 | | 27.85 | | 29.95 | | 29.90 | |
| Gurdari | 1061 | Hand Pump | 28.36 | | 24.93 | | 25.25 | | 25.90 | |
| | 1059 | Hand Pump | 38.11 | | 36.20 | | 35.15 | | 36.25 | |
| | 1075 | Hand Pump | 27.98 | | 26.82 | | 28.4 | | 29.65 | |
| | 1075 | Hand Pump | 28.37 | | 29.33 | | 30.25 | | 30.15 | |
| | 1040 | Open Well | | 33.97 | | 21.88 | | 35.15 | | 36.70 |
| Kujam I, Kujam II & Amtipani Mines | 1041 | Open Well | | 33.66 | | 24.85 | | 36.25 | | 39.40 |
| | 1064 | Hand Pump | 31.55 | | 28.68 | | 36.15 | | 42.05 | |
| | 1052 | Hand Pump | 22.39 | | | 21.12 | | 24.55 | | 23.60 |
| Chiro Kukud | 1148 | Hand Pump | 33.40 | | 28.39 | | 34.25 | | 37.40 | |
| | 1151 | Hand Pump | 37.62 | | 31.85 | | 36.25 | | 36.05 | |
| | 1084 | Hand Pump | 34.25 | | 33.11 | | 35.65 | | 39.40 | |



(B.K. Mahapatra) -

Convenor (Quality & Environment)