



ADITYA BIRLA GROUP

HINDALCO INDUSTRIES LTD.MURI, RANCHI

A photograph of the Hindalco Muri Works industrial facility, showing various structures, pipes, and a tall chimney, set against a backdrop of green hills.

Environment Statement Report

April 2015 to March 2016

HINDALCO-INDUSTRIES LIMITED

(UNIT: MURI WORKS)

**VILLAGE - CHOTTA MURI, TEHSIL- SILLI,
DISTRICT - RANCHI - 835101 (JHARKHAND)**

FORM – V

(See Rule 14)

Environmental Statement for the financial year ending the 31st March 2016

Part – A

- | | | |
|------|--|---|
| i) | Name and address of the owner / occupier of the industry, operation or process | Mr. N.N Roy Joint President – Works Hindalco Industries Limited Post – Chotamuri – 835101 Dist – Ranchi – (Jharkhand) |
| ii) | Industry category Primary – (STC Code) Secondary – (SIC Code) | PRIMARY |
| iii) | Production capacity – Units | 575 KTPA |
| iv) | Year of Establishment | Operation started from 1948 |
| v) | Date of the last environmental Statement submitted | 21.09.2015 |

Part – B

Water and Raw Material Consumption

(1) Water consumption m³/day

| | |
|----------|--------|
| Process | : 4574 |
| Cooling | : 1560 |
| Domestic | : 1415 |

| Name of Products | | Process water consumption per day (m ³ /day) | |
|------------------|---------|--|---|
| | | During the previous financial year 2014-15) | During the current financial year (2015-16) |
| 1 | Alumina | 5652 | 5569 |

2. Raw Material consumption (2015-16) :

| Name of Raw Materials* | | Name of Product | Consumption of raw material per unit of output | |
|------------------------|-------------------------------------|---------------------------------|--|---|
| | | | During the previous financial year (2014 – 15) | During the current financial year (2015 – 16) |
| A | Bauxite (as is t/t) | Alumina / Alumina Tri – hydrate | 3.17 | 3.150 |
| B | Caustic Soda (kg/t) (as NaOH) | | 155.5 | 155.7 |
| C | Coal @3500 GCV) (t / t) | | 1.09 | 1.050 |
| D | Diesel (Lit / t) | | 0.47 | 0.540 |
| E | Furnace Oil (lit / t) | | 75.3 | 75.62 |
| F | Lime (Kg / t) | | 60.02 | 50.07 |
| G | Filter Cloth (m ² / t) | | 0.015 | 0.012 |
| H | Synfloc (Kg / t) | | 1.044 | 1.144 |
| I | Crystal Growth Modifier (Kg / t) | | 0.008 | 0.003 |
| J | Defoamer (Kg / t) | | 0.062 | 0.061 |
| K | Tray Flocculent (Kg / t) | | 0.000 | 0.000 |

- Industry may use codes if disclosing details of raw material would violate contractual obligations, otherwise all industries have to name the raw materials used.

Part – C

Pollution discharged to environment / unit of output (2015 – 2016)

(Parameter as specified in the consent issued)

| Pollutants | | Concentrations of pollutants in discharges (mass / volume) | Percentage of variation from prescribed standards with reasons |
|------------|-------------------------------|--|--|
| (a) Water | | Mg / litre | Within stipulated limit |
| i. | Suspended Solids | 24.2 | Within prescribed standards |
| ii. | COD | 155.2 | Within prescribed standards |
| iii. | Fluorides (as F) | 1.70 | Within prescribed standards |
| iv. | Aluminium (as Al) | 0.09 | -- |
| v. | Iron (as Fe) | 0.76 | Within prescribed standards |
| vi. | Mercury (as Hg) | <0.001 | Within prescribed standards |
| vii. | Silica (as SiO ₂) | 22.9 | -- |
| viii. | Vanadium (as V) | <0.1 | Within prescribed standards |
| ix. | Lead (as Pb) | <0.05 | Within prescribed standards |
| x | BOD | 6.4 | Within prescribed standards |

| Pollutants | | Quantity of Pollutants discharged (mass/day) | Concentration of Pollutants discharge (mass / volume) | Percentage of variation from prescribed standards with reasons |
|---------------------------|--------------------------|--|---|--|
| (a) Air | | Kg / day | Mg / Nm ³ | Within stipulated limit |
| Particulate Matter | | | | |
| i. | Alumina Calciner # 1 | Not in operation | Not in operation | - |
| ii. | Alumina Calciner # 2 | Dismantled | Dismantled | - |
| iii. | New Alumina Calciner # 3 | 105.00 | 32.3 | Within prescribed standards |
| iv. | CFBC Boiler # 1 | 250.40 | 76.3 | Within prescribed standards |
| v. | CFBC Boiler # 2 | 280.00 | 84.5 | Within prescribed standards |
| vi. | CFBC Boiler # 3 | 246.00 | 75.4 | Within prescribed standards |

Part - D

Hazardous Wastes

(as specified under Hazardous Wastes (Management & Handling & Trans boundary Movement Rules 1989 / 2008)

Hazard waste is not generated either from process or from pollution control facilities. However, the following miscellaneous items unrelated to manufacturing process are recycled / sent to authorized recyclers / re-processors.

| Hazardous Wastes Miscellaneous | Total Quantity (Kg) | |
|---|--|---|
| | During the previous financial year (2014-15) | During the current financial year (2015-16) |
| 1. Lead acid battery | Nil | Nil |
| 2. Used oil/ Spent oil /waste oils | 3.690 KI | 0.180 KI |
| 3. Waste containing oils (lubricant drum) | 18Nos | 2 No's |
| 4. Discarded Asbestos | 507 kg | Nil |
| 5. Discarded containers | Nil | Nil |
| 6. Lead Acid Battery | 318 | Nil |

Part - E

Solid Wastes

| Solid Wastes | Total Quantity (ton) | |
|---|--|---|
| | During the previous financial year (2014-15) | During the current financial year (2015-16) |
| a. From Process *** Fly ash from Power Plant | 519320 | 92377 |
| b. From Pollution control facilities Red Mud | 119381 | 525496 |
| c. 1. Quantity re-cycled or reutilized with the unit. 2. Sold. 3. Disposed. | Nil | Nil |

Fly ash generated is being given to brick manufacturing industries & entrepreneurs. Further, excess flyash generated is being backfilled in abandoned coal mines at CCL Rajrappa colliery.

Part - F

Please specify the characteristics (in terms of composition and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.

Solid Waste :

Residue left after digestion of Bauxite, called "Red Mud" is filtered under vacuum by Drum Filters up to a mud consistency of around 60 – 75 % solids. The Red Mud is transported by dumpers / trucks in batches to red mud pond by a process called DMS (Dry Mud Stacking). We have established Filter press project – Reduce caustic consumption with mud and foot print with increased solids. We have taken imitate to utilization of Red Mud in Cement application. We have dispatched aprox. **29599.0** MT Red Mud dispatch to ACC cement Chaibasa in year 2015-16.

Characteristics of Red Mud (2015-16)

| | | |
|----------------------------------|---|-------|
| % SiO ₂ | - | 9.30 |
| % Fe ₂ O ₃ | - | 39.82 |
| % TiO ₂ | - | 14.51 |
| % Al ₂ O ₃ | - | 17.17 |
| % Na ₂ O | - | 6.55 |

- a) Fly ash generated is being given to brick manufacturing industries & entrepreneurs. Further, excess fly ash generated is being backfilled in abandoned coal mines at CCL Rajrappa colliery.

Part – G

Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.

- a) New Technology of Gabion wall around the Red Mud pond has been adopted to enhance the life of the existing Red Mud pond with safe and environment friendly manner. The Gabion wall project work around the Red Mud pond is going on to enhance the life of the existing Red Mud Pond and which also helped for protection of soil erosion & reducing fugitive dust emission and protect the seepage during the monsoon season.
- b) We have installed Online Effluent Water Quality Monitoring Systems at our ETP and SSTP area which connected to CPCB Sever through our reputed vendor.
- c) Augmentation of SSTP (Sludge & Sewage Treatment Plant) has been completed for better water quality. The treated water utilize in horticulture purposes to replacement of fresh water
- d) Second pressure filter technology adopted for Red Mud filtration which has helped in reducing soda content in red mud and improving the life of Red Mud Pond. Safe Environment eco-friendly by reducing fugitive dust emission during transportation and at storage area.
- e) Established of new environment lab within the plant for strengthening in house testing facility and conducting lab test reduction of amount by stopping third party monitoring.
- f) We have installed continuous emission monitoring system (CEMS) at CFBC stack and Boiler stack (CGPP) and connectivity provided to JSPCB as well as CPCB through recommended vendor M/S Forbes Marshall Pvt Ltd.
- g) Canteen effluent treatment plant at an expenditure of Rs.7.74 Lac in 2015-16. The unit is in regular service. Quality of treated water is within the stipulated limits. Treated water is used in horticulture and sprinkling on all connecting roads for dust suppression through mobile tankers. The unit is functioning smoothly and quality of treated water obtained is within the stipulated limits. Using the treated sewage in horticulture and in dust suppression has eliminated the consumption of fresh water and also reduced the amount of cess payment.
- h) Resource conservation in each area of plant operation viz. water conservation, electrical energy conservation, reduction in specific consumption of various raw materials used in process is a key focus in day-to-day operations.
- i) Conservation of Top Solid & Rehabilitation of abandoned mines, The fly ash generated by the CFBC boilers is being utilized to make bricks and do civil construction job. The private agencies and local entrepreneurs are taking the ash generated for use in road construction, brick making and land filling etc. which is being supplied free of cost as per the guidelines issued by MoEF. Seeing the present need and demand for fly ash bricks we have installed our own brick making unit. The ash generated is also being backfilled in de-coaled mine pit at CCL,

Rajarappa. Total 11000 trees sapling were planted by Hindalco, Muri, Jharkhand dumping site near Rajrappa in 2015-16, total investment. The sapling of trees as bamboo, Sheesam, Mango, Guava, Gambhar and Neem Planted.

- j) We have started to dispatch Red Mud to ACC Cement Plant in cement application plant through Railway Rake. We have supplied Red Mud to Krishana Udyog Pvt Ltd in brick making application that conservation of natural resources.
- k) Utilization of Red Mud Pond water in plant process as replacement of fresh water.

Part - H

Additional measures / investment proposal for environmental protection including abatement of pollution, prevention of pollution.

- a) Plant has undergone expansion of Alumina Refinery capacity from nominal 125000 MT to nominal 57500 MT annual production capacity. Latest energy efficient technologies were adopted both for process and pollution control. This year 2015-16 around Rs.8.5 Crore has been invested for Pollution Control measures.
- b) The plantation programme and green belt in company's premises linked with brown field expansion of Muri Alumina Refinery has been undertaken and being carried out in phase. Greenery development includes red mud pond dyke and factory boundaries / peripheries. Plantation in and around plant and colony as well as stretches of roadside and old abandoned panel is carried out in full swing. We have planted approximately 65000 number of trees like Neem, Sisham, Jatropha, Babool along with herbs and shrubs in our plant premises which covered approx.62.5 hectare of total area and ensuring good survival rate for ensuring quality of ambient air. To further strengthen greenery, we have identified various areas as Red Mud Pond, Colony & inside the plant. Total estimated around 21.3 lacs in this year 2015-16 for gardens cleaning, maintenance and plantation.
- c) TERI (a reputed agency in the filed in plantation & sustainable development) was engaged to do plantation over the abandoned Red Mud Pond. TERI has completed the entire plantation work of 5 acres. Balance 25 acres of the abandoned red mud pond have also been covered with plantation in the year 2008-09. Total investment in the TERI project – Rs.35 Lacs + Balance for 25 acres almost 15 lacs = 50 lacs.
- d) The electro static precipitator in New CFBC boilers are commissioned along with online continuous emission monitoring system (supplied by Teledyne Instruments U.S.A) in the month of July 07. The electro static precipitator in New Alumina (CFBC) calciner are commissioned along with online continuous emission monitoring system (supplied by Forbes Marshall) in the month of Mar. 08. Total expenditure cost for the project is Rs.20 crores.
- e) A process ETP has been installed and commissioned at an expenditure cost of Rs.5 crores in Jan. 2009 to treat the effluent water. The water after being treated is being reused in our plant process as per norms stipulated by the Board. A new scheme to re-use the treated water in process is installed and commissioned at an expenditure cost of Rs.40 lacks in the month of Oct. 09. This is a major steps towards water conservation which saves almost fresh water intake by 120 M³ / hr

and the revenue saving of Rs.10.3 lacs. This year 2015-16 total cost for ETP /SSTP Maint. & Operation aprox. 25.4 lacs.

- f) Geo coir grass matt covering is being applied to the slopes / dykes of Red Mud Pond No.2 to protect the slopes / dyke from soil erosion and to arrest any seepage from the ponds at an expenditure of Rs.30 lacs.
- g) Second pressure filter technology adopted for Red Mud filtration which has helped in reducing soda content in red mud and improving the life of Red Mud Pond. Safe Environment eco-friendly by reducing fugitive dust emission during transportation and at storage area. The total estimated cost around 5.50 lacs.
- h) The slopes / dykes of Red Mud Pond No.3 are given a slope of 1:2.5 by earth filling to protect the slopes / dykes from erosion and to give stability to the slope / dykes. We have planned to execute a new technology called controlled modular column (CMC) in RMP area which will increase its life and will eliminate the requirement of new Red Mud pond for next 10 years. This technology is recommended by CBRI, Roorkee after a series of studies and soil analysis of the existing area in last one year considering all environment aspects. As explained above about the new CMC technology, in addition to that CBRI had also suggested to build a **Gabion and Reinforce soil wall** all around the existing embankment to increase the width of the embankment and hence the strength in a environment friendly manner done with an expenditure cost of Rs.50 crores.
- i) Seeing the acute shortage / crisis of water in the river in our area we have planned to initiate a lot of water saving projects for conservation of water and reduction of fresh water intake from river source for our process needs.
 - i. Use of treated waste water from SSTP for plantation in abandoned Red Mud Pond No.2 replacing fresh water at an expenditure of Rs.72 lacs
 - ii. Use of Boiler blow down as replacement of fresh water for Cooling Tower make up at an expenditure of Rs.12 lacs.
 - iii. Condensate polishing unit for input of condensate from process for cooling tower make up by replacing fresh water at an expenditure of Rs.63 lacs.
 - iv. Used of treated waste water on the road by mobile tanker & in the plant for gardening purposes total cost is around .Rs 12.5 lacs in 2015-16.
- j) Expenditure of Rs 63 lacs for condensate management and utilization of condensate as a replacement to fresh water.
- k) The total cost of the strengthening of dust suppression system in Bauxite and Coal yard around Rs. 8.0 lacs (2015-16).
- l) The total cost of the strengthening of dust suppression at RMP side area around Rs. 8.0 lacs (2015-16).
- m) This yea 2015-16 the total estimate cost for fly ash moistening is around Rs. 5.8 lacs.

- n) The total estimated cost for of both ESP maintenance as well as Calciner & Boiler stack around Rs. 6.8 lacs.
- o) Total estimated cost in this year for periodic audit as EMS ISO, 14001, 2004 Rs. 2.40 lacs.
- p) This year we completed augmentation of SSTP for better water quality the total estimated cost around 10 lacs.
- q) Expenditure of Rs 1.60 Crores for recovery of garland drain water to minin pond at Red Mud 3 # 4 use for replacement of fresh water

Part - I

Any other particulars for improving the quality of the environment.

- a) Local villagers are being trained on various methods of farming, vermicompost manufacture and other activities to develop greenery.
- b) We have setup separate Environment cell in this year 2013-14 total expenditure Rs.19 lacs & reduction of expenditure for Environment monitoring approximately Rs2.0 lacs. Total expenditure Rs. 2.30 lack for Environment monitoring and Hydrological study in 2015-16.
- c) We have STP capacity 400 m3/ day & ETP with capacity 200 M3 / hr. The treated water of SSTP is being used for gardening, plantation and dust suppression purposes. The treated water of ETP is being reused in plant process to replacement of fresh water for both. The total incurred for SSTP & ETP for Operation & Maintenance in this year 2015-16 Rs.25.50 lacs.
- d) The total estimate cost for online stack emission connectivity to CPCB sever is around 2.0 lacs in this year 2015-16.
- e) Various community development programmes on water conservation / rain water harvesting to keep water clean and use it by construction of wells, tube wells and small dams for agriculture purpose are being imparted. Doctors visit the nearby villages and give medical treatment and train persons on the safe use of water. People are being made aware day by day and are being educated on different water conservation steps.
- f) Villagers are being made aware of the different kind of environmental developments and protection knows how.
- g) Tree plantation within the company premises is being carried out regularly. Greenery exists all around. Total no of plants surviving as on date is 61500 (approx.) During the year 2007 more than 12000 saplings have been planted around the dyke of red mud pond and over the abandoned red mud pond. Till Aug. 2008 more than 30000 plants and different variety of plant species have been planted all along the periphery of plant, colony and abandoned red mud pond. In the year 2011-12 we have planted approx 3000.

In this 2016 total cost total investment Rs. 21.3 Lacs for Greenery maintenance & development inside & outside of plant approximately. This year we have planted approximately 2500. trees Ashok, Neem, Sisham, survival rate is 90% as measured.

- h) Dust Suppression System in abandoned Red Mud Pond has been revamped during the year 2002 to control dusting from the abandoned pond. Additional dust suppression arrangement has been installed at the expenditure of Rs.10 lacs. Additional measures are being taken to make the system more effective. This year 2013-14 total expenditure of Rs.2.5 lacs. for maintenance of Dust Suppression System in abandoned Red Mud Pond.
The Estimate Expenditure for implementation of the scheme to control air pollution-DSS System Rs.16 lacs approx in 2015-16.
- i) Dust Suppression System in Fly Ash duping area sprinkling at Rajruppa site- Rs. 4.40 Lacs. Plantation over ash dumping site- Rs. 8.70 Lacs in year 2015-16
- j) Effective 3rd May 01 the unit has been certified for Environment Management System ISO 14001 by internationally reputed certifying organization Det Norske Veritas (DNV- Gel Pvt Ltd). Total estimated cost for periodic audit approximately 2.0 lacs
- k) Hydrology studies has been done by ISM , Dhanbad team the total cost estimate for this studies is around Rs. 2.3 lacs in this year 2015-16.
- l) To strengthen the presently adopted preventive measures by the company, considering the proximity of the RMP to the river Subarnarekha a study was constituted through IIT, Kharagpur to evaluate the present dyke strength and recommended the measures if any to reinforce the dyke facing riverside. IIT Kharagpur has opined that the dykes can withstand the Red Mud dump height up to 20 mtrs. From the Dyke level.
- m) S.K. Mitra and Associates, Kolkata a reputed civil and structural engineering consultant was awarded the job for carrying out the study of Red Mud Pond Dykes towards the river side. Field job and soil investigation has been completed and report has been submitted. The investigation reveals there is no threat to the dyke on the river side.
- n) Dust Suppression System in the New Bauxite Handling area has been commissioned during the Project Expansion Activities to improve the entire work place and ambient air quality.