

29<sup>th</sup> May 2018

To

The Director (S)  
Eastern Regional Office,  
Ministry of Environment and Forests & CC,  
Government of India,  
A/3, Chandrasekharpur,  
**Bhubaneswar - 751023**

Sub: **Compliance of Environment Clearance (EC) conditions for the period October'17 to March'18**

Ref.: EC No.: J-11011/400/2006-IA II (I), dated 6<sup>th</sup> February 2008 &  
J-11011/144/2006-IA II (I), dated 19 October 2009

Dear Sir,

With referene to the above stated Environment Clearance (EC), accorded for expansion of our Smelter Plant from 100 KTPA to 360 KTPA and Captive Power Plant from 267.5 MW to 967.5 MW at Hirakud, please find enclosed herewith the six monthly compliances of the conditions laid down in the EC for the period of October'17 to March'18, along with data on environment quality of both the plants.

The same has been sent through mail id: [mef@ori.nic.in](mailto:mef@ori.nic.in). The soft copy in CD is enclosed herewith for reference.

Thanking you.

Yours truly

**R.K.Gupta**  
**Head- Sambalpur Cluster**

Encl: As above

**Hindalco Industries Limited**

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# **COMPLIANCE TO EC CONDITIONS**

## **MINISTRY OF ENVIRONMENT & FORESTS ENVIRONMENTAL CLEARANCE FOR EXPANSION OF SMELTER PLANT FROM 100 KTPA TO 360 KTPA AND CAPTIVE POWER PLANT FROM 267.5 MW TO 967.5 MW AT HIRAKUD BY M/s HINDALCO INDUSTRIES LIMITED**

**EC No. - J 11011/400/2006-IA II (I), dated: 6 February 2008 & Amendment Letter: J - 11011/144/2006-IA II (I), dated 19 October 2009.**

<b>Sl. No</b>	<b>CONDITIONS</b>	<b>STATUS AS ON 31<sup>st</sup> March 2018</b>
2	<p>The Ministry of Environment and Forests has examined the proposal. It is noted that the proposal is for expansion of smelting capacity of Aluminium metal from the existing 1, 00,000 MTA (including 35,000 TPA capacity under trial) to 3, 60,000 TPA and Captive Power Plant capacity from 267.5 MW (including 100 MW under trial) to 967.5 MW at the Smelter Plant at Hirakud, Sambalpur, Orissa. The project cost is Rs.5195 Crores, out of which Rs.369 Crores has been earmarked for pollution control measures. This expansion will be undertaken in two phases. In Phase I, 46,000 MTA capacity will be added and in Phase II, the addition shall be of 2,14,000 MTA. Presently, HIL has 468 pots of Soderberge Technology and 164 of Pre-baked Anode Technology (632 pots of 1,00,000 MTA). During Phase-I, the capacity shall be increased to 1,46,000 MTA by changing all (468) Soderberg pots to Pre-Baked ones. Additional 14 pots will be shifted from Belgaum unit and shall also be converted into Pre-Baked. This will result in total of 646 pots of Pre-Baked technology having a capacity of 1,46,000 MTA. During phase II, 232 new Pre-Baked pots with 2,14,000 TPA capacity will be added. The unit has Captive Power Plant of 267.5 MW. 100 MW will be added in phase-I and 600 MW in phase-II, thereby making the final capacity as 967.5 MW. The power plant will be based on CFBC/PFC Boiler. Coal for CPP shall be procured from coal fields 20 km away and transported in covered Volvo trucks which will be later shifted to railway. Most of the other materials will also be transported by railways.</p>	<p>: Being Complied</p> <p>Unit - IV (100 MW) and Unit - V (100 MW) has been added to Captive Power Plant in Phase - I &amp; Phase - II expansion respectively, thereby making the the plant capacity 467.5 MW. All the boilers of the plant are CFBC in nature. Coal is procured from own coal mine at Gare Palma in the district of Chhatishgarh and other coal mines inside the state of Odisha. Coal is transported from captive mine at Garepalma in the state of Chhatishgarh and various other sources through railways as well as tarpaulin covered trucks. A railway siding has been established in the premise of Power Plant for transporting of coal through railway.</p>

- 3 The Phase-I units will be accommodated within the existing 163.95 ha of land. For Phase-II units, additional 91 ha of land will be acquired. No R&R is involved in the project and no forest land is involved in the project. The site is about 8.5 km away from Sambalpur town. Hirakud reservoir on Mahanadi river is located 1.2 km away from the plant. Small size reserve forests (Laxmi dungri, Ram dungri and Jamraha) are located within 10 km radius of the plant. No ecologically sensitive zone exists within 10 km periphery of the project. The proposed Sambalpur Elephant Reserve falls outside 10 km radius of the plant site and the site does not fall in the elephant movement corridor.
- 4 The raw water requirement shall increase from 31,955 to 1, 01,555 KLD, thereby increase for the expansion project will be 69,600 KLD which will be sourced from the Hirakud reservoir. 14,250 KLD of wastewater will be generated from the expansion project. Wastewater generation shall increase from 8278 KLD to 22,528 KLD thereby increase in waste water generation for the expansion project will be 14,250 KLD .This will be treated in Rotating Biological Contactor and reused with in the plant. Cooling water blow down from the power plant will be treated to meet the discharge standards and discharged into Kharjhor nalla. 7650 TPA of solid waste generated from smelter will be disposed off as per CPCB guidelines, in secured landfill site inside the premises. 2.55 million TPA of coal ash generated from power plant will be disposed as dry ash mounds. Coal ash disposal as backfill material in abandoned coal mines has been explored.
- : Both Smelter (from 1,00,000 TPA to 1,46,000 TPA) and Power Plant (from 267.5 MW to 367.5 MW) expansion under Phase-I.
- In Phase – II of Smelter Plant has added 80 pots having capacity 70 KTPA and total capacity of the unit is 216 KTPA and CPP added 100MW(Unit - V) with total capacity of the Power is 467.5MW.
- Both phases of expansion have been accommodated within the existing 163.95 ha of land. No R&R and forest land is involved in the project.
- : The raw water requirement is sourced from the Hirakud Reservoir. During the period, a total of 4188189 KL @ 23012 KLD of water has been drawn from the reservoir.
- For treatment of Smelter Plant effluent, three RO based ETPs (two of 250 KLD capacity and one of 50 KLD capacity) have been installed.
- Four STPs (500 KLD, 100 KLD, 400 KLD, 300 KLD capacities) have been provided for treatment of sewage water from canteen, toilets & colony.
- Solid waste generated from the Smelter Plant is disposed off in the Secured Landfill site as per the CPCB guideline.
- Cooling tower blowdown from the power plant is treated in RO plant of capacity 120 m<sup>3</sup>/hr for reuse in process and cooling. Other effluents from the plant is treated to meet the standards for discharge, stored in the common monitoring basin and entirely reused in cooling towers and other in-house activities with no discharge to outside.
- Coal ash generated from the Power Plant is utilized in cement plants, brick manufacturing units, road making, low lying area filling etc. Balance ash, if any, is disposed dry at ash mound. 485174 MT of ash was generated with utilization of 372586 MT, during the period.

## A. SPECIFIC CONDITIONS :

- (i) As stated in the Public Hearing, the new expansion site shall be on the opposite side of the village. : The expansion site is on the opposite side of the village.
- (ii) The expansion shall be based only on Pre-baked Anode Technology and all Soderberge Technology based pots shall be converted to Pre-baked Anode Technology, as per the schedule submitted to the Ministry. The Captive Power Plant shall be based on CFBC/PFC Boiler. : Only prebake anode technology is being adopted. All the soderberg pots have already been converted to prebake one.  
All the boilers of 467.5 MW Power Plant (including Unit # 4 (100 MW) under Phase-I expansion and Unit # 5 (100 MW) under Phase - II expansion) are CFBC in nature.
- (iii) The gaseous emissions (SO<sub>2</sub>, NO<sub>x</sub>, CO, HC and Fluoride) and Particulate matter along with RSPM levels from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The State Board may specify more stringent standards for the relevant parameters keeping in view of the nature of the industry and its size and location. At no time the emission level shall go beyond the prescribed standards. On-line continuous monitoring system for particulate emissions, SO<sub>2</sub> and NO<sub>x</sub> shall be provided and shall make necessary arrangements for submission of on-line real time emission data to CPCB website. Interlocking facility shall be provided between pollution control equipment and the process operation so that in the event of the pollution control equipment not working, the respective unit (s) is shut down automatically. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency. Low NO<sub>x</sub> burners shall be installed to control the NO<sub>x</sub> emissions. : The emission/discharge confirm to the standards prescribed by OSPCB from time to time.  
In Power Plant, environment friendly CFBC boilers have been provided to each unit, which are low SO<sub>2</sub> & NO<sub>x</sub> producing in nature. ESPs, of efficiency 99.9%, have been attached to each boiler of the CPP to maintain the Particulate Matter standard.  
Particulate Matter and Fluoride from the smelter at FTP (Dry scrubbers) out let and fugitive fluoride from smelter pot rooms is being monitored regularly. Online real-time fluoride and dust monitoring analyzers installed at all FTP Stack of Smelter and the real time monitoring data connected to OSPCB Server.  
Online Forbes Marshall-Codel make Opacity Monitor (Model No: DCEM-2100) has already been installed and commissioned in stacks of Unit # 4 & 5 along with similar online monitoring facilities in all other units of CPP. Further, online Continuous Flue gas Analyzers of SO<sub>2</sub>, NO<sub>x</sub> (Model No: GCEM 4000 of Codel make) have also been installed in the Stacks.

Real time stack data from the online monitors of Smelter and Power plant are connected to SPCB/CPCB server and data transmitted continuously.

- (iv) Only 10 new stacks shall be installed for the expansion project - 4 in smelter plant, 4 in anode plant and 2 in casting unit. The scrubbed alumina from Alumina based dry scrubbing system shall be reused in process. Minimum stack height shall be 50 m. The minimum height of other stacks of anode plant and casting plant shall be 35 m, which shall base on Sulphur content of fuel. 3 new stacks in power plant shall be provided with ESP.
- : Stacks of height 50m have been provided to all FTP stacks & height 35 m and above have been provided to casting unit. Fume Treatment Plants (FTPs) have been installed and the alumina from the FTPs is being reused in the process.
- Stacks of height 130 m have been provided to each unit of CPP including Unit # 4 & 5 (both 100 MW), which are under Phase – I & II expansion respectively. ESPs of efficiency 99.9% has been provided to individual boilers of each unit including Unit # 4 & 5. ESPs of the CPP are designed to meet SPM emission level less than those prescribed by SPCB (100 mg/Nm<sup>3</sup> for Unit # 1 to 4 and 50 mg/Nm<sup>3</sup> for Unit # 5). The results of monitoring at the outlets of ESPs are enclosed.
- (v) Total Fluoride emissions and pitch fumes from smelter and anode-baking unit shall be controlled using alumina based dry scrubbing system to limit Fluorides emissions within 0.8 kg/ton Aluminium produced and SPM within 50 mg/Nm<sup>3</sup>. SPM emissions from Captive Power Plant shall be less than 100 mg/NM<sup>3</sup>. Forage Fluoride levels of less than 80 ppm for one month, less than 60 ppm for two months and less than 40 ppm for 12 months shall be complied with. Further the pot emissions through fume treatment plant shall not exceed 0.30 kg/ton of Aluminium produced.
- : Alumina based dry scrubbers are existing for the phase-I expansion and the same is already in operation for phase-II expansion for control of fluoride.
- The particulate matter, fluoride emissions and forage fluoride are being regularly monitored for the existing line and reported to Board and Ministry in half yearly report. The same will be complied.
- (vi) Regular monitoring of fluoride content in ambient air, forage fluoride and in ground water shall be carried out and data shall be submitted to State pollution Control Board.
- : We are regularly monitoring forage fluoride as an indicator of ambient air fluoride and also fluoride in surface and ground water and the data is submitted to State Pollution Control Board through monthly progress reports. Annexure-XIV
- (vii) Raw material shall be stored in covered yards. Water sprinkling arrangement shall be made in the raw material stock yard to control fugitive emissions. Coal and other raw material shall be transported in covered trucks, containers etc., which shall later be shifted to covered rail wagons.
- : The coal for Power Plant is transported from various sources through railways, covered trucks and stored under sheds in the coal yard of Power Plant. Sprinkling is done through fixed sprinklers to prevent the fugitive emission. Fugitive dust in the area is also suppressed by water sprinkling through mobile water tankers. Transportation of coal through railways have been started from Feb 2018.

- (viii) In plant control measures for checking fugitive emissions from all the vulnerable sources like spillage/raw materials/coal handlings etc. shall be provided. Further, specific measures like provision of dust extraction and suppression system consisting of water sprinkling, suction hoods, fans, cyclones, bag filters, ventury scrubber etc. shall be installed at material transfer points and other enclosed raw material handling areas. Centralized de-dusting system i.e. collection of fugitive emissions through suction hood shall be provided and subsequent treatment through bag filter or any other device and finally emitted through a stack of appropriately designed height, as prescribed above.
- : Fume Treatment Plant (FTPs), dust collector and bag filters have been provided in Smelter.
- For control of fugitive emission in CPP, central dedusting system with suction hoods has been provided to the crusher houses of CHP. Dust suppression systems have also been provided in the coal yard, ash silo area, ash transporting road and all other vulnerable areas of fugitive dust emission. Bag filter houses have been provided to crusher houses of CHP & ash silos. Ash is undloaded from the silos after moisturisation and frequent sprinkling is carried out on the coal and ash transportation road.
- (ix) Fugitive Fluoride emissions from the Pot room shall not exceed 0.4 Kg/Ton of Aluminium produced. Fugitive emissions, especially in the work zone area, product and raw materials storage area etc. shall be regularly monitored and records be maintained. The emissions shall conform to the limits imposed by the State Pollution Control Boards / Central Pollution Control Board.
- : The fugitive fluoride emission is within 0.4 Kg/Mt. Al.
- Regular monitoring of fugitive emission through smelter roofs is being carried out and reporting these to State Pollution Control Board. The same will continued. Annexure-XIV
- (x) Windbreakers shall be installed to restrict fugitive dust
- : Boundary wall of sufficient height provided to Smelter, Power to restrict the fugitive dust. Extensive sprinkling, at potential source of generation, is being carried out through fixed and mobile sprinklers to contain the fugitive dust.
- (xi) The water requirement for the expansion project shall not exceed 69,600 KLD and shall be sourced from the Hirakud reservoir
- : The raw water for the all the three plants, i.e Smelter, Power and Flat Rolled Plant is being sourced from Hirakud reservoir.Total raw water withdrawl from the reservoir for the period is 4188189 KL @ 23012 KLD.
- (xii) Waste water generation shall not exceed 14,250 KLD for the expansion project. Waste water generated from smelter shall be treated in Rotating Biological Contactor and shall be reused in the plant. Cooling water blowdown from the power plant shall be treated up to discharge standards and discharged into Kharjhor nalla.
- : The present waste water generated from Smelter is being treated in three effluent treatment plants (ETP) of capacity 250KLD, 250KLD and 50KLD capacity. The domestic waste water is treated in STPs of capacities 500KLD, 400KLD, 300KLD &100KLD.The treated water is reused.

The cooling tower blow-down water is being treated through RO Plant for reuse in process. Other effluents are being treated to meet the standards after reuse in various in-house activities and cooling towers. No waste water is discharged to outside.

Monitoring of water quality is being carried out and the same is enclosed for the period Oct'17 to Mar'18.

- (xiii) 7650 TPA of solid waste generated, mainly the spent pot lining from smelter shall be disposed off in a secured landfill site inside the premises. The SLF shall be as per CPCB guidelines. 2.55 million TPA of coal ash generated from power plant shall be disposed as dry ash mounds. However, it shall be ultimately disposed off as backfill material in abandoned coal mines or shall be utilized as per the Fly Ash Notification 5.0.763 (E) dated 14.9.1999 of this Ministry. The proposed Amendment / revision to this Notification shall be applicable for compliance from the Project Authority
- : In addition to disposal of solid waste from Smelter Plant in our own Secured Landfill site is used for emergency purpose, some waste is also disposed off at TSDF center developed by Ramky Enviro Engineers Ltd. Coal ash, the solid waste generated from the process of CPP, after utilization in different applications (supply to manufacturers of Cement, ash bricks and low lying area filling, road making etc), is disposed off dry in ash mound.

During the period October 2017 to March 2018, about 4, 85,174 MT of ash (from all the units of Power Plant) have been generated and about 2,72,586 MT of ash utilized with an average utilization figure of 77.1%. The ash generation and utilization is enclosed.

After de-allocation of captive mine at Talabira of Sambalpur district in Odisha, disposal in the other coal mines is being explored.

- (xiv) Minimum Cycle of Concentration (COC) for the CPP shall be 5.0
- : To minimize the fresh water use, COC is being maintained more than 5.0 in all the operating units of CPP. For the period Oct-2017 to March-2018 the average COC, for all units, was 5.2.
- (xv) Minimum of 33 % of total land area shall be developed as green belt with local species in consultation and as per the CPCB's guidelines
- : 33% of total land area, including solid waste disposal site, has been green covered. The detail of plantation is enclosed.
- (xvi) All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium Sector shall be strictly implemented.
- : All the recommendations of Charter of Corporate Responsibility for Environment for aluminium sector are being strictly implemented.

- (xvii) The project authorities shall earmark Rs.369 crores to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purpose. : Being complied.

## **B. GENERAL CONDITIONS :**

- (i) The project authorities shall strictly adhere to the stipulations made by the State Pollution Control Board : We are adhering to the directions of State Pollution Control Board.
- (ii) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any. : No further expansion or modifications in the plant shall be carried out without prior approval of the ministry.
- (iii) Regular monitoring of ambient air for SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, CO, HC and Fluoride shall be carried out as per CPCB guidelines. The locations of ambient air quality monitoring stations shall be reviewed in consultation with the State Pollution Control Board (SPCB) and additional stations shall be installed, if required, in the downwind direction as well as where maximum ground level concentrations are anticipated : Presently, the ambient air quality is being monitored at seven locations for Smelter and eight locations for Power Plant regularly. Annexure enclosed I to XIV. Ambient air quality is also being monitored through online monitoring systems and the real time data is being sent to SPCB & CPCB.
- (iv) Data on ambient air quality, fugitive emissions and stack emissions should be regularly submitted to the concerned Regional Office of this Ministry and SPCB/CPCB every six months and posted on the Website of the Project Authority : Data on ambient air quality, fugitive emissions, stack emissions and water effluent quality is being regularly submitted to Eastern Regional Office through six monthly compliance reports. The data for the period October 2017 to March 2018 are enclosed annexure.
- (v) Industrial waste water shall be properly collected and treated so as to conform to the standards prescribed under GSR422 (E) dated 19<sup>th</sup> May 1993 and 3<sup>rd</sup> December, 1993 or as amended from time to time : Waste water is properly collected, treated to conform to the standards and entirely reused in various processes. Data on water effluent quality is being submitted to the office regularly.
- (vi) The project authorities shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended in October, 1994 and : Authorization for Management and Handling of Hazardous Waste has been obtained from State Pollution Control Board for both Smelter and CPP.



January, 2000 and Hazardous Waste (Management and Handling) Rules, 1989, as amended from time to time. Authorization from the SPCB shall be obtained for collection, treatment, storage, and disposal of hazardous wastes. All Transportation of Hazardous Chemicals shall be as per the MVA, 1989

Conditions stipulated in the authorizations are being strictly followed as per Hazardous Waste (Management, Handling and Transboundary Movement) Rule 2016 and its amendments time to time.

- (vii) The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time) : Noise quality in and around the plants is being monitored regularly. These are confirming to the standards prescribed under Environment (Protection) Act, 1986.
- The noise level data for the period Oct 2017 to Mar 2018 is enclosed Annexure-XIII & XIV.
- (viii) Occupational health surveillance of the workers shall be carried out on a regular basis and records shall be maintained as per the Factories Act. : Occupational health surveillance of all the employees is being carried out on a regular basis and records are maintained.
- For the period the health surveillance statistics are as follows:
- Pre-employment health surveillance against new recruitment- 01  
Periodic medical health surveillance for permanent employees- 1755  
Periodic medical health surveillance for contractual employees- 3736  
Annexure Enclosed.
- (ix) Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis : Regular training is being imparted to all the employees on various safety, health and environmental issues.
- Pre-employment and routine periodical medical examinations for all employees are being undertaken on regular basis, as provided in (viii) above.
- (x) Usage of PPEs by all employees/ workers shall be ensured : Use of PPEs by all the employees and workers are being strictly ensured in unit.
- (xi) The Company shall harvest surface as well as rainwater from the rooftops of the buildings proposed in the expansion project and storm water drains to recharge the ground water and use the same water for the various activities of the project to conserve fresh water : Studies by the Dept. of Civil Engineering, A.U College of Engineering, Andhra University, Visakhapatnam in 2007 and M/s Visiontek Consultancy Services Pvt. Ltd, Bhubaneswar in 2012, recommend not

to adopt Rain Water Harvesting in Hirakud area for:

- i) Presence of shallow water table,
- ii) Hard rock at shallow depth,
- iii) Water logging in the area, and
- iv) Rising trend of the water table in the area

- (xii) The project proponent shall also comply with all the environmental protection measures and safeguards proposed in the EIA/EMP report. All the recommendations made in respect of environmental management and risk mitigation measures relating to the project shall be implemented. : Being Complied.
- (xiii) The company will undertake all relevant measures, as indicated during the Public Hearing for improving the Socio-economic conditions of the surrounding area. CSR activities will be undertaken by involving local villages and administration : The company is undertaking various socio-economic development projects in the surrounding areas involving local SHGs. The CSR activities for the period April-2017 to March-2018 is enclosed. Annexure-XIV
- (xiv) The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment. The eco-development plan should be submitted to the SPCB within three months of receipt of this letter for approval : The company is undertaking various community development programmes in and around Hirakud involving local SHGs. During April-2017 to March-2018 about Rs. 136.33 lakh has been spent towards community development projects including rural periphery development at Hirakud Complex. Annexure-XIV enclosed.
- (xv) A separate Environmental Management Cell equipped with full fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions. : A separate Environmental Management Cell with adequate laboratory facility has been set up at Hirakud Complex, to carry out environmental management and monitoring functions.
- (xvi) The implementation of the project vis-a-vis environmental action plans shall be monitored by the concerned Regional Office of the Ministry/ SPCB / CPCB. A six monthly compliance status report shall be submitted to monitoring agencies and shall be posted on the Website of the Company. : Strictly followed.

- (xvii) The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/ Committee and may also be seen at Website of the Ministry at <http://envfor.nic.in>. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry. : Public was informed through advertisements in three widely circulated regional newspapers namely :  
 (1) The Dharitri, Dated 12<sup>th</sup> February, 2008  
 (2) The Agnisikha, Dated 12<sup>th</sup> February, 2008 &  
 (3) The Sambad, Dated 14<sup>th</sup> February, 2008,  
 This was also communicated to the Regional Office of MOEF, Bhubaneswar vide our letter of 14<sup>th</sup> February, 2008 along with copies of the news letters.
- (xviii) The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project. : Will be complied.
- (xix) The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory. : Agreed
- (xx) The Ministry reserves the right to stipulate additional conditions, if found necessary. The company in a time bound manner will implement these conditions. : Agreed

**Amendment Letter: J - 11011/144/2006-IA II (I), dated 19 October, 2009**

<b>Sl. No</b>	<b>CONDITIONS</b>	<b>STATUS AS ON 31<sup>st</sup> March- 2018</b>
3.0.1	All the specific and general conditions shall remain unchanged and have to be complied in toto and pari passu.	: Being complied
2	There shall be no change or modification in the ultimate capacity of the Smelter Plant (1,00,000 to 3,60,000 TPA) and Captive Power Plant (267.5 MW to 967.5 MW).	: There will be no change or modification of the ultimate capacity of Smelter Plant as well as Captive Power Plant.
3	All the emissions (ambient air, stack, fugitive and fluoride emissions) shall be within the permissible limit as prescribed in the Environmental Clearance dated 6 <sup>th</sup> February, 2008.	: All the emissions are within the prescribed limit. Monitoring reports are enclosed.
4	No additional land shall be acquired.	: No additional land will be acquired for expansion.
5	No additional water shall be used.	: No additional water, other than the quantity mentioned in the EC, will be used.
6	A copy of clearance letter shall be sent by the proponent to concerned Panchayat Zilla Parishad / Municipal Cooperation, Urban local body and the local NGO, if any, from whom suggestions / representations if any were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	: Copy of the clearance letter was submitted to local Urban Local Body after receiving the same.
7	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their web site and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF at Bhubaneswar, the respective Zonal office of CPCB and the OPCB. The criteria pollutant levels namely; SPM, RSPM, SO <sub>2</sub> , NO <sub>x</sub> (ambient levels as well as Stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public	: The six monthly report of compliance of conditions of the Environment Clearance is submitted to Regional Office of Ministry of Environment & Forests (MoEF), Bhubaneswar regularly in form of both soft and hard copies. The same is also uploaded in the website of the company. Critical sectoral environmental parameters are displayed in the main gates of both Smelter and Power Plant.

domain.

- 8 The project proponent shall also submit six monthly reports on the status of compliance of the stipulated environment clearance conditions, including results of monitored data (both in hard copies as well as by e-mail) to the regional office of MOEF at Bhubaneswar, the respective Zonal office of CPCB and the OPCB. The Regional Office of this Ministry at Bhubaneswar / CPCB/ OPCB shall monitor the stipulated conditions. : Six monthly compliance of Environment Clearance is submitted to the Regional Office of Ministry of Environment Forests & climate change (MoEF&CC), Bhubaneswar regularly in form of both soft and hard copies.
- 9 The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986 as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MOEF by e-mail. : Being complied.
- 4.0 This letter is issued with prior approval from the Competent Authority. : -
- 5.0 This letter shall be kept with the environment clearance issued by the Ministry vide letter No.:J-11011/100/2006-IA.II(I), dated 6<sup>th</sup> February, 2008. : Complied.

## ENVIRONMENTAL QUALITY PARAMETERS (OCTOBER-2017 TO MARCH-2018)

Annexure-XIV

### STACK EMISSION FUME TREATMENT PLANT (DRY SCRUBBERS)

Particulate Matter: Standard: 100 mg/Nm<sup>3</sup> Total Fluoride: Standard: 0.3 Kg/MT. Al.

Location of sampling	Unit	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
<b>FTP I - Stack I</b>							
Particulate Matter	mg/Nm <sup>3</sup>	11.30	12.10	10.41	13.68	12.08	12.48
Total Fluoride	Kg/t. Al.	0.21	0.23	0.21	0.23	0.22	0.24
<b>FTP - I - Stack II</b>							
Particulate Matter	mg/Nm <sup>3</sup>	9.19	8.15	8.17	9.19	10.85	10.49
Total Fluoride	Kg/t. Al.	0.23	0.20	0.18	0.20	0.21	0.22
<b>FTP - II - Stack - III</b>							
Particulate Matter	mg/Nm <sup>3</sup>	9.89	10.16	9.68	11.63	9.25	9.30
Total Fluoride	Kg/t. Al.	0.20	0.22	0.20	0.21	0.19	0.20
<b>FTP - III- Stack - IV</b>							
Particulate Matter	mg/Nm <sup>3</sup>	8.80	8.62	10.75	9.08	9.69	9.55
Total Fluoride	Kg/t. Al.	0.22	0.21	0.19	0.18	0.18	0.21
<b>FTP - IV- Stack - V</b>							
Particulate Matter	mg/Nm <sup>3</sup>	13.04	10.32	8.16	10.84	10.76	9.19
Total Fluoride	Kg/t. Al.	0.19	0.16	0.17	0.19	0.20	0.19

STACK EMISSION Particulate Matter: Unit: mg/Nm<sup>3</sup>

Standard: 100 mg/Nm<sup>3</sup>

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
<b>CAST HOUSE - I :</b>						
Stack-5 (Furnace -A)	63.7	62.9	63.6	62.4	63.7	62.5
Stack-6 (Furnace -B)	61.1	60.4	62.8	60.3	61.2	61.8
Stack-7 (Furnace -C)	Shut down	Shut down	Shut down	Shut down	Shut down	Shut down
<b>CAST HOUSE - II</b>						
Stack - 8 (Furnace-1&2)	64.0	65.4	64.7	63.8	64.2	63.7
<b>CAST HOUSE - III</b>						
Stack - 9 (Furnace-A&B)	66.1	67.3	65.6	66.1	65.8	63.1

FUGITIVE EMISSION Total Fluoride: Unit: Kg/MT. Al.

Standard: 0.4 kg/MT.Al.

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
PR-I, Section XII	Shut down	0.33	0.32	0.29	0.31	0.33
PR-II, Section IV	0.33	0.31	0.29	0.30	0.28	0.31
PR-III, Section V	0.31	0.30	0.30	0.28	0.31	0.29
PR-IV, Section VIII	0.30	0.34	0.31	0.31	0.30	0.32
PR-V, Section IX&X	Shut down	Shut down	Shut down	Shut down	Shut down	Shut down
PR-VI,RS End	Shut down	Shut down	Shut down	Shut down	Shut down	Shut down
PR-VII,RS End	0.32	0.32	0.34	0.32	0.33	0.30
PR -VIII,RS End	0.31	0.34	0.33	0.34	0.32	0.33
PR- IX ,RS End	0.34	0.36	0.34	0.33	0.34	0.35
PR -X , RS End	0.36	0.35	0.35	0.34	0.35	0.36
PR -XI, RS End	Shut down	Shut down	Shut down	Shut down	Shut down	Shut down
80-POT Area (Middle)	0.35	0.33	0.32	0.31	0.32	0.34

**AMBIENT AIR SAMPLING****PARTICULATE MATTER (PM<sub>10</sub>): Unit: µg/Nm<sup>3</sup>****Standard: 100 µg/Nm<sup>3</sup>**

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Pump House Near Adm. Building	53.06	50.98	52.82	43.37	42.72	52.92
R/S Cooling Tower MCC Room	58.44	57.62	57.23	57.78	57.6	57.14
R&D Building	45.32	42.57	45.3	43.70	41.65	45.86
Near caster Security Kiosk	58.15	57.83	57.93	58.10	58.06	56.58
Near New Security watch tower	52.7	50.28	52.35	52.11	50.78	48.93
Project office near Old Rectifier	55.18	53.55	53.81	55.13	52.37	52.51
Hindalco club	42.30	40.05	42.10	42.14	42.7	39.52

**PARTICULATE MATTER (PM<sub>2.5</sub>): Unit: µg/Nm<sup>3</sup>****Standard: 60 µg/Nm<sup>3</sup>**

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Pump House Near Adm. Building	32.14	29.0	31.13	29.81	27.41	31.50
R/S Cooling Tower MCC Room	34.73	34.92	33.09	33.28	33.78	33.11
R&D Building	27.54	26.02	26.62	27.81	26.0	27.78
Near caster Security Kiosk	34.85	35.45	33.83	33.66	34.16	34.15
Near New Security watch tower	32.7	30.62	31.82	31.64	31.63	29.45
Project office near Old Rectifier	33.38	32.03	31.73	32.03	30.87	31.77
Hindalco club	26.43	24.17	26.23	27.36	26.6	24.48

**SULPHUR DI-OXIDE (SO<sub>2</sub>): Unit: µg/Nm<sup>3</sup>****Standard: 80 µg/Nm<sup>3</sup>**

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Pump House Near Adm. Building	8.26	7.44	8.11	7.38	6.62	7.50
R/S Cooling Tower MCC Room	8.41	8.02	9.35	11.27	8.45	8.57
R&D Building	7.34	7.28	6.91	7.43	7.23	6.67
Near caster Security Kiosk	9.04	9.1	7.93	11.84	7.53	7.53
Near New Security watch tower	7.36	7.58	7.32	8.05	6.96	6.58
Project office near Old Rectifier	7.67	7.23	7.41	8.86	7.43	8.21
Hindalco club	6.53	6.17	5.97	6.17	6.03	6.22

**NITROGEN OXIDE (NO<sub>x</sub>): Unit: µg/Nm<sup>3</sup>****Standard: 80 µg/Nm<sup>3</sup>**

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Pump House Near Adm. Building	8.64	8.40	9.12	8.50	8.27	8.72
R/S Cooling Tower MCC Room	9.52	9.54	10.37	12.57	9.38	10.38
R&D Building	7.91	8.34	7.85	8.60	8.41	8.0
Near caster Security Kiosk	9.83	10.25	9.37	13.70	8.61	8.61
Near New Security watch tower	8.33	7.74	8.20	9.88	7.76	8.26
Project office near Old Rectifier	7.98	9.12	8.68	10.34	8.31	9.76
Hindalco club	7.51	7.82	7.66	8.01	7.86	8.66

**CARBON MONOXIDE (CO):** Unit:  $\mu\text{g}/\text{Nm}^3$ Standard:  $<1000 \mu\text{g}/\text{Nm}^3$ 

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Pump House Near Adm. Building	114.46	112.32	112.17	112.23	113.87	113.2
R/S Cooling Tower MCC Room	117.74	115.71	117.75	120.94	117.47	117.95
R&D Building	111.6	110.8	110.45	112.68	111.26	109.98
Near caster Security Kiosk	117.54	118.6	120.18	121.8	116.7	118.1
Near New Security watch tower	110.68	110.6	110.82	110.52	110.5	112.73
Project office near Old Rectifier	115.97	112.64	111.66	111.70	117.25	116.03
Hindalco club	76.16	79.9	69.3	75.16	68.27	76.87

**Note:** Hydro-Carbon (HC) and Lead in all seven locations are Not Detectable (ND).

**FORAGE FLUORIDE:** Unit: ppm

Monthly Average Standard: 80 ppm

Sl. No.	Location	Data					
		Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
1	0.5 km NE	34.65	34.15	34.55	34.45	34.00	33.00
2	1.0 km NE	23.65	23.45	23.85	23.75	23.45	23.30
3	2.0 km NE	18.85	18.35	18.75	18.65	18.90	18.75
4	3.0 km NE	16.90	16.25	16.65	16.55	16.60	16.45
5	0.5 km SE	32.15	33.15	33.55	33.45	33.25	34.35
6	1.0 km SE	31.15	31.65	32.05	31.95	31.30	31.15
7	2.0 km SE	21.35	22.35	22.75	22.65	22.50	22.35
8	3.0 km SE	19.40	19.35	19.75	19.65	19.50	19.35
9	5.0 km SE	7.20	7.75	8.15	8.05	7.90	7.75
10	0.5 km NW	21.45	21.80	22.20	22.10	22.70	22.55
11	1.0 km NW	18.90	18.80	19.20	19.10	19.60	19.45
12	0.5 km SW	28.65	29.40	29.80	29.70	29.60	30.55
	Average Month	<b>22.86</b>	<b>23.04</b>	<b>23.44</b>	<b>23.34</b>	<b>23.28</b>	<b>23.25</b>

**GROUND WATER ANALYSIS:** Parameter: F-

Unit: mg/l

Location of sampling	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Sludge pit test well (E)	0.45	0.44	0.45	0.46	0.44	0.43
Sludge pit test well(W)	0.61	0.59	0.57	0.59	0.55	0.57
Sludge pit test well (N)	0.43	0.42	0.41	0.42	0.42	0.41
Sludge pit test well (S)	0.44	0.45	0.43	0.44	0.43	0.44
Open well near sludge pit	0.40	0.39	0.38	0.39	0.39	0.40
Tube well near sludge pit	0.29	0.30	0.29	0.28	0.30	0.29



**AMBIENT NOISE QUALITY DATA:**

Unit: dB (A) Leq

Sl.	Location	Category	Standard* Day / Night	Distance / Direction wrt Plant	Day Time; dB(A) Leq	Night Time; dB(A) Leq
1.	Plant Gate	Industrial	75/70	Plant Site	50.0	35.1
2.	Hindalco Colony	Residential	55/45	0.6 km / SW	39.4	33.6
3.	Tarasingpara	Residential	55/45	0.5 km / S	43.9	36.7
4.	Christianpara	Residential	55/45	0.7 km / S	51.6	41.0
5.	Alind Colony	Residential	55/45	1.3 km / NE	30.3	25.0

\* Day Time : 0600 to 2200 Hrs

\* Night Time : 2200 to 0600 Hrs

## Socio- Economic Programmes

### Period - OCTOBER - DECEMBER 2017 ( 3rd Quarter)

Strengthening Anganwadi Centre-Govt. supported

Celebration of Children's Day among school children

Skills based Individual training program - Mobile repairing training

Immunisation programmes to babies

Health & Hygiene awareness programmes - Swatcha Bharat - dustbin distribution

General Health camps for the inmates of Kalpataru Ashram

Specialised Health Camps - OPD at Govt. hospital

Adoloscent Health care programmes for girls with their mothers

Support to family planning /camps

Drinking water new sources (Handpump/RO/Water Tank/well) - tube well

Agriculture & Horticulture training programme/ Farmers group - preparatory meeting for Farmer's Club

Capacity Building Program-Tailoring Centers

Cvonsruaction of Roads at R.P.Lines, Sambalpur & construction of Bridge at Dengimacha

village temple maintenance - Coloring of Tarasinghpara mahaswari temple & Store Chowk Samaleswari Mandir.

Road Cleaning programme under Swatcha Bharat programme

Support to Ravan Dahan programme & Rangoli Competition on the eve of Dipawali

## Socio- Economic Programmes

### Period - JANUARAY - MARCH 2018 ( 4th Quarter)

Repairing Of Anganbadi Centres,

Drinking Water Facility At Dengimacha Adivasi School

Desk bench support to schools, computers donated to Aroubinda school.

Immunisation programmes to babies

Free Specialist OPD Clinic at Govt Hospital Hirakud:

Eye Screening & Ctaract operation camp

Adoloscent Health care programmes for girls with their mothers

Support to family planning /camps

Detection Camp for Differently Able

Construction Of Town Hall At Hirakud

Lord Jagannath Temple Renovation work at Hirakud,Senior Citizens Community Hall at Hirakud Earth filling

Construction of community toilets

Cold Drinking Water Unit Near Santoshi Maa Mandir, Hirakud

Capacity Building Program-Tailoring Centers

Women enterprenureship development programme

Marketing support to SHG to participate in Lokmahtosav

Cvonsruaction of Roads at R.P.Lines, Sambalpur & construction of Bridge at Dengimacha

Coloring of Lariapara Hanuaman Temple

Road Cleaning programme under Swatcha Bharat programme

Republic Day & International Women's day celebrated

Blankets distributed through Dan Utsava

Support for volley ball tournament at Hirakud,FINANCIAL ASSISTANCE FOR ORGANISING FOOTBALL TOURNAMENT FOR 2018,Sports Material Distribution to village youths

**Deatals of Sector wise Quarterly CSR Expenses - Smelter/ Power ( 2017-18)**

		1st Qtr.			2nd Qtr			3rd Qtr			4th Qtr.			Annual Total
		Smelter	Power	1st. Qtr. Total	Smelter	Power	2nd. Qtr. Total	Smelter	Power	3rd. Qtr. Total	Smelter	Power	4th Qtr. Total	
10001	Preventive Health Care	2182	16600	18782		1633	1633		0	0		0	0	20415
10002	Curative Health care Programme		49103	49103		64993	64993		47218	47218		25374	25374	186688
10003	Reproductive & Child Health		300	300		17420	17420		26877	26877		24127	24127	68724
10004	Quality/Support Programme		15691	15691		1741	1741		0	0			0	17432
10005	Health infrastructure		45000	45000	55733	417137	472870		612421	612421	27628	608	28236	1158527
10201	Pre School education	842133	30309	872442	7290	0	7290		0	0	47117		47117	926849
10202	School Education Programme		0	0		120000	120000		0	0			0	120000
10203	Education Support Progrmme		8000	8000		25000	25000		14799	14799			0	47799
10204	Vocational & technical Education			0			0		180000	180000			0	180000
10205	school Infrastructure	432714		432714	25000	7500	32500			0	90768	51778	142546	607760
10305	Social Event & minmise causes of poverty	0	112880	112880	0		0	4500	15272	19772	29531	75560	105091	237743
10601	Agriculture & farm based			0		3500	3500			0			0	3500
10602	Animal Husbandry			0		9500	9500			0			0	9500
10603	Non-farm & skill based income generation programme		5827	5827		70210	70210		11748	11748		9538	9538	97323
10605	Livelihood Infrastructure	0		0	58800	170000	228800		390	390	7056	30000	37056	266246
10901	Promotion of heritage/ arts/ culture	0		0	0		0	244122		244122	0		0	244122
11001	Other Administrative Expenses		11905	11905		9254	9254		18017	18017		30859	30859	70035
11201	Promotion of Sports		39870	39870			0			0		335190	335190	375060
11501	Rural Infrastructure	1560229	39800	1600029	820072	333471	1153543	1705660	103945	1809605	1809217	2623653	4432870	8996047
	<b>T O T A L</b>	<b>2837258</b>	<b>375285</b>	<b>3212543</b>	<b>966895</b>	<b>1251359</b>	<b>2218254</b>	<b>1954282</b>	<b>1030687</b>	<b>2984969</b>	<b>2011317</b>	<b>3206687</b>	<b>5218004</b>	<b>13633770</b>

PRE EMPLOYMENT			PERIODICAL MEDICAL CHECKUP OF PERMANANT EMPLOYEE			PERIODICAL MEDICAL CHECKUP OF CONTRACTOR EMPLOYEE		
MONTH	SMELTER	POWER	MONTH	SMELTER	POWER	MONTH	SMELTER	POWER
Oct-17	1	NIL	Oct-17	151	92	Oct-17	271	88
Nov-17	NIL	NIL	Nov-17	283	56	Nov-17	291	205
Dec-17	NIL	NIL	Dec-17	677	72	Dec-17	1467	98
Jan-18	NIL	NIL	Jan-18	7	1	Jan-18	618	239
Feb-18	NIL	NIL	Feb-18	171	3	Feb-18	88	138
Mar-18	NIL	NIL	Mar-18	205	37	Mar-18	152	81
TOTAL	1	0	TOTAL	1494	261	TOTAL	2887	849

**PLANTATION-SMELTER**

Year	No. of Trees Planted	Survival	% of survival	Area planted(Hect)	Area of Smelter
2007-08	10250	9900	95.58	4.1	Total area 110 Acre.(44Hect.)33% greenbelt development (36.3 acr(14.52 hect.) needs to be plant @ 2500/hect is 36,300 for green belt development compliance.
2008-09	5200	4850	93.26	2.08	
2009-10	7830	7200	91.26	3.13	
2010-11	11500	11200	97.39	4.6	
2011-12	12500	12300	98.4	5	
2012-13	5800	5200	89.65	2.32	
2013-14	8000	7850	98.12	3.2	
2014-15	20000	19888	99.44	8	
2015-16	8000	7888	98.6	3.2	
2016-17	5000	4800	96	2	
2017-18	7500	7300	97.4	2	
	101580	98376		39.63	

FY 2017-18 Smelter plant Planted 7500 saplings and HIL -Hirakud Complex nursery developed 50,000 saplings in this year. Planted SPL Area 2000 saplings, 80 Pot area 2000 saplings , Boundary wall side 500 saplings, Smelter inside 500 saplings, Colony side 300 saplings. Outside 1000, donate 700 and SLF area 500 saplings planted.



**HIRAKUD POWER**

**ANNEXURE - I**

**STACK EMISSION**  
(October' 2017 to March' 2018)

**Unit # I**

Parameters Measured : Suspended Particulate Matter (SPM)

Unit of Measurement : mg / NM<sup>3</sup>

Limit : 100.00

Sl. No.	Month / Year	Unit	Results
01.	October	mg / NM <sup>3</sup>	SD
02.	November	mg / NM <sup>3</sup>	SD
03.	December	mg / NM <sup>3</sup>	SD
04.	January	mg / NM <sup>3</sup>	SD
05.	February	mg / NM <sup>3</sup>	SD
06.	March	mg / NM <sup>3</sup>	SD
	Average	mg / NM <sup>3</sup>	SD

SD: under shut-down



**HIRAKUD POWER**

**ANNEXURE - II**

**STACK EMISSION**  
(October' 2017 to March' 2018)

**Unit # II**

Parameters Measured : Suspended Particulate Matter (SPM)  
Unit of Measurement : mg / NM<sup>3</sup>  
Limit : 100.00

Sl. No.	Month / Year	Unit	Results
01.	October	mg / NM <sup>3</sup>	77.65
02.	November	mg / NM <sup>3</sup>	53.33
03.	December	mg / NM <sup>3</sup>	74.20
04.	January	mg / NM <sup>3</sup>	76.13
05.	February	mg / NM <sup>3</sup>	74.20
06.	March	mg / NM <sup>3</sup>	34.77
	Average	mg / NM <sup>3</sup>	65.05



**HIRAKUD POWER**

**ANNEXURE - III**

**STACK EMISSION**  
(October' 2017 to March' 2018)

**Unit # III**

Parameters Measured : Suspended Particulate Matter (SPM)  
Unit of Measurement : mg / NM<sup>3</sup>  
Limit : 100.00

Sl. No.	Month / Year	Unit	Results
01.	October	mg / NM <sup>3</sup>	53.65
02.	November	mg / NM <sup>3</sup>	45.17
03.	December	mg / NM <sup>3</sup>	54.50
04.	January	mg / NM <sup>3</sup>	53.05
05.	February	mg / NM <sup>3</sup>	54.88
06.	March	mg / NM <sup>3</sup>	41.50
	Average	mg / NM <sup>3</sup>	50.46





**HIRAKUD POWER**

**ANNEXURE - IV**

**STACK EMISSION**  
(October' 2017 to March' 2018)

**Unit # IV**

Parameters Measured : Suspended Particulate Matter (SPM)

Unit of Measurement : mg / NM<sup>3</sup>

Limit : 100.00

Sl. No.	Month / Year	Unit	Results
01.	October	mg / NM <sup>3</sup>	51.15
02.	November	mg / NM <sup>3</sup>	57.50
03.	December	mg / NM <sup>3</sup>	46.90
04.	January	mg / NM <sup>3</sup>	48.55
05.	February	mg / NM <sup>3</sup>	49.65
06.	March	mg / NM <sup>3</sup>	41.83
	Average	mg / NM <sup>3</sup>	49.26



**HIRAKUD POWER**

**ANNEXURE - V**

**STACK EMISSION**  
(October' 2017 to March' 2018)

**Unit # V**

Parameters Measured : Suspended Particulate Matter (SPM)

Unit of Measurement : mg / NM<sup>3</sup>

Limit : 50.00

Sl. No.	Month / Year	Unit	Results
01.	October	mg / NM <sup>3</sup>	44.08
02.	November	mg / NM <sup>3</sup>	36.50
03.	December	mg / NM <sup>3</sup>	42.45
04.	January	mg / NM <sup>3</sup>	42.23
05.	February	mg / NM <sup>3</sup>	43.90
06.	March	mg / NM <sup>3</sup>	41.50
	Average	mg / NM <sup>3</sup>	41.78



**HIRAKUD POWER**

**ANNEXURE - VI**

**FUGITIVE EMISSIONS AT COAL HANDLING PLANT (CHP) AREA**  
**(October' 2017 to March' 2018)**

Parameters Measured : Suspended Particulate Matter (SPM)  
Unit of Measurement :  $\mu\text{g} / \text{m}^3$  (microgram /  $\text{m}^3$ )  
Limit : 500.00

Sl. No.	Month / Year	Unit	Results
01.	October	$\mu\text{g} / \text{m}^3$	205.3
02.	November	$\mu\text{g} / \text{m}^3$	195.1
03.	December	$\mu\text{g} / \text{m}^3$	214.3
04.	January	$\mu\text{g} / \text{m}^3$	203.8
05.	February	$\mu\text{g} / \text{m}^3$	206.4
06.	March	$\mu\text{g} / \text{m}^3$	223.8
Average		$\mu\text{g} / \text{m}^3$	208.1





**HIRAKUD POWER**

**ANNEXURE - VIII**

**AVERAGE CYCLE OF CONCENTRATION (COC)**

(October' 2017 to March' 2018)

<b>Sl. No.</b>	<b>Month</b>	<b>Unit</b>	<b>Results</b>
01.	October	-	5.4
02.	November	-	5.4
03.	December	-	5.0
04.	January	-	5.0
05.	February	-	5.1
06.	March	-	5.2
	<b>Average</b>	-	<b>5.2</b>



HIRAKUD POWER

ANNEXURE - IX

**AMBIENT AIR MONITORING, (CPP)**

(October' 2017 to March' 2018)

PARTICULATE MATTER 10 (PM<sub>10</sub>) : Limit : 100.00 µg / m<sup>3</sup>

Location	OCT - 2017	NOV - 2017	DEC - 2017	JAN- 2018	FEB - 2018	MAR - 2018
FHP Control Room Top	84.7	78.0	82.7	83.1	84.7	86.2
120° NNE (Near Hindalco Admn. Building)	55.2	52.6	53.1	48.7	52.3	48.5
240° SSE (Rajapada village)	41.6	35.2	36.0	35.3	39.0	36.0
360° W (Hindalco Club)	47.5	38.8	50.4	42.0	40.6	39.7
Jyoti Vihar, Burla	42.9	48.1	41.9	38.6	44.8	41.6
Ash Mound Road	83.4	82.6	85.5	86.8	87.1	88.4
Ash Mound area	76.2	80.3	58.9	88.3	86.7	84.2

SULPHUR DI-OXIDE (SO<sub>2</sub>) : Limit : 80.00 µg / m<sup>3</sup>

Location	OCT - 2017	NOV - 2017	DEC - 2017	JAN- 2018	FEB - 2018	MAR - 2018
FHP Control Room Top	16.0	14.6	15.9	14.2	15.3	14.9
120° NNE (Near Hindalco Admn. Building)	10.6	7.5	11.5	8.6	7.7	8.0
240° SSE (Rajapada village)	6.5	5.8	6.3	5.8	5.1	5.7
360° W (Hindalco Club)	6.1	6.0	5.7	5.4	6.4	7.1
Jyoti Vihar, Burla	7.4	7.3	7.1	6.5	7.4	6.9
Ash Mound Road	16.2	12.8	15.8	15.1	15.8	14.6
Ash Mound area	15.1	11.2	17.5	17.0	16.3	13.8



**HIRAKUD POWER**

**NITROGEN OXIDE (NO<sub>x</sub>)** : Limit : 80.00 µg / m<sup>3</sup>

Location	OCT - 2017	NOV - 2017	DEC - 2017	JAN- 2018	FEB - 2018	MAR - 2018
FHP Control Room Top	18.5	17.2	19.0	16.6	18.0	17.6
120° NNE (Near Hindalco Admn. Building)	12.1	8.8	9.4	10.4	9.3	11.5
240° SSE (Rajapada village)	8.3	8.5	8.8	8.2	7.6	8.9
360° W (Hindalco Club)	9.0	8.3	8.0	9.0	10.5	12.0
Jyoti Vihar, Burla	9.8	10.1	10.3	9.8	11.2	10.7
Ash Mound Road	15.4	15.4	20.0	17.5	20.6	19.1
Ash Mound area	16.2	14.0	22.2	20.1	19.8	17.4

**PARTICULATE MATTER 2.5 (PM<sub>2.5</sub>)** : Limit : 60.00 µg / m<sup>3</sup>

Location	OCT - 2017	NOV - 2017	DEC - 2017	JAN- 2018	FEB - 2018	MAR - 2018
FHP Control Room Top	53.4	54.3	52.1	54.5	53.1	55.6
120° NNE (Near Hindalco Admn. Building)	33.6	32.3	34.8	27.0	31.5	30.7
240° SSE (Rajapada village)	24.0	24.6	27.6	24.1	26.9	25.1
360° W (Hindalco Club)	26.3	27.6	30.3	29.5	27.4	26.8
Jyoti Vihar, Burla	27.5	28.0	28.5	25.2	30.0	25.2
Ash Mound Road	56.6	56.4	57.1	56.0	55.3	54.1
Ash Mound area	52.9	52.7	46.7	59.9	55.4	53.0



**HIRAKUD POWER**

**ANNEXURE - X**

**STATUS OF UTILISATION OF FLY ASH AND BOTTOM ASH**  
**(October' 2017 to March' 2018)**

Sl. No	Description	Quantity
1	Quantity of fly ash generated (MT)	436656
2	Quantity of bottom ash generated (MT)	48518
	<b>Total ash generated (MT)</b>	<b>485174</b>
3	Supply to Brick Manufacturing Units (MT)	49849
4	Supply to Cement Plants (MT)	194065
5	Land Filling (MT)	98133
6	Utilization in Embankment / Dyke Raising (MT)	1300
7	Utilization in other purposes (MT) (road making etc)	29239
	<b>Total Ash Utilized (MT)</b>	<b>372586</b>
8	% of total ash utilization	77.1





**HIRAKUD POWER**

**ANNEXURE – XI**

**PLANTATION DETAILS**

YEAR	NO. OF SAPLINGS PLANTED	AREA COVERED (ACRE)	SPECIES PLANTED
Up to 2006 – 07	419865	250.12	
2007 – 08	33,000	12.0	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2008 – 09	25,200	16.0	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2009 – 10	31,000	10.0	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2010 – 11	30,000	10.0	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2011 – 12	25,200	10.0	Chakunda, Gambhari, Sisam, Krushna Chuda, Radha Chuda, Jammun & Neam
2012 – 13	25000	10.0	Neam, Karanja, Sisam, Krushna Chuda, Radha Chuda, Cassia Fistula, Alstonia & Kadamba
2013 – 14	30000	13.0	Neem, Karanja, Sisam, Cassia Fistula, Alstonia, Kadamba, Mango, Jamun etc
2014 – 15	12000	6.0	Neem, Karanja, Sisam, Cassia Fistula, Alstonia, Kadamba, Mango, Jamun etc
2015 - 16	10000	5.0	Bamboo, Sisoo, Karanja, Alstonia, Chhatiana, Mango, Jamun etc
2016 - 17	21175	10.6	Bamboo, Ficus, Alstonia, Champa, Plumeria Alva etc
2017 - 18	13500	6.75	Krushnachuda, Radhachuda, Acassia, Ficus, Jamun, Arjun, Ashok etc
Total	675940	359.47*	

\* Including replenished area



**HIRAKUD POWER**

**ANNEXURE - XII**

**SULPHUR CONTENT IN FED COAL**

(October' 2017 to March' 2018)

<b>Sl. No.</b>	<b>Month</b>	<b>Unit</b>	<b>Results</b>
01.	October	%	0.47
02.	November	%	0.42
03.	December	%	0.47
04.	January	%	0.42
05.	February	%	0.44
06.	March	%	0.45
<b>Average</b>		%	<b>0.45</b>



**HIRAKUD POWER**

**ANNEXURE – XIII**

**AMBIENT NOISE QUALITY DATA (CPP)**

(October' 2017 to March' 2018)

Sl. No.	Location	Category	Standard* Day / Night	Distance / Direction w.r.t Plant	Noise Level (Day/Night) in dB(A)					
					OCT - 2017	NOV - 2017	DEC - 2017	JAN- 2018	FEB - 2018	MAR - 2018
1.	Riverside Colony	Residential	55/45	0.8 km / SW	37.4/32.6	38.9/32.7	39.9/34.7	42.1/35.2	39.1/33.4	39.3/33.1
2.	Tarasinghpada	Residential	55/45	0.2 km / S	42.9/36.3	43.5/35.3	45.8/37.1	43.8/37.9	43.0/35.7	44.5/37.7
3.	Christianpada	Residential	55/45	0.1 km / S	54.9/48.7	51.9/45.1	50.7/40.4	50.2/42.1	53.7/40.5	50.9/40.0
4.	Power Plant Security Gate	Industrial	75/70	Plant Site	56.1/43.2	51.4/42.5	65.4/53.5	67.4/54.4	58.3/43.0	56.7/42.3
5.	Power Colony	Residential	55/45	0.4 km / NW	37.1/30.2	37.8/31.8	40.0/34.4	47.6/33.5	39.0/32.8	39.0/30.9

\* Day Time : 0600 to 2200 Hrs

\* Night Time : 2200 to 0600 Hrs.