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VLL/HSE/ENV/2018/1047 26th November, 2018

To
Additional Director,
Ministry of Environment Forest & Climate Change,
Eastern Region Office, A/3,
Chandrasekharpur,
Bhubaneswar -751023.

Sub: Six monthly compliance reports of 1 MTPA to 4 MTPA Alumina Refinery and 75 MW to 285 MW Captive Power Plant of **M/s Vedanta Limited** at Lanjigarh, Dist. Kalahandi, Odisha.

Ref: Environmental Clearance No. J-11011/53/2014-IA-II (I) dated 20th November 2015

Dear Sir,

We are herewith submitting the monitoring report of *April 2018 to September 2018* along with compliance status of the above environmental clearance conditions for your kind information.

Thanking you,

Yours faithfully,
*For **Vedanta Limited., Lanjigarh***

VEDANTA LIMITED Lanjigarh

Sanjeev Kumar
(Director & Factory Manager)
Vedanta Limited, Lanjigarh

Encl: As above

Copy to:

1. Additional Director, Ministry of Environment Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi - 110 003
2. Member Secretary, Central Pollution Control Board, Paribesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110032
3. Member Secretary, State Pollution Control Board, A-118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
4. Regional Office, State Pollution Control Board, 1st Lane, Kasturinagar, Rayagada.

Vedanta Limited
PO: Lanjigarh, Dist.: Kalahandi, Odisha, India – 766 027
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CIN: L13209MH1965PLC291394

Ministry of Environment & Forest
Regional Office
Monitoring Report
Part-I

DATA SHEET		
1	Project Type	Alumina Refinery with Captive Power Plant
2	Name of the Project	Vedanta Limited, Lanjigarh
3	Clearance/Approval letter(S) , No data	J-11011/53/2014-IA-II(I) dated 20th November,2015.
4	Locations	
	a) District(s)	Kalahandi
	b) State(s)	Orissa
	c) Lattitude/longtude	Lat $19^0$43' 01"
		Long 83^0 24' 26"
5	Address for Correspondence	
	a) Address of concerned project Chief Engineer (with pin code and telephone/telex/fax number)	Director & Factory Manager, Vedanta Limted,Alumina Refinery Project,P.O.Lanjigarh, Dist.Kalahandi, Orissa-766027.Tel :06677-247312/13/14/15/16 Fax :06677-247311
	b) Address of Executive Project engineer/Manager(with Pin Code& Telephone/ telex/ fax Nos.	Same as above
6	Salient features	
	a) Of the project	Production of 2.0MT Alumina per annum using Bayer's process & Coal fired steam and power plant.
	b) Of the Environmental Management plans	As given in chapter 3 (Environmental Management plan) of the Environmental Impact Assesment report for 6 MT alumina refinary and 285 MW captive power plant, Lanjigarh, Kalahandi, Orissa
7	Break up of the project area (in Ha)	
	Forest area	Nil
	Non- Forest area	833.31 Hectares
	Total	833.31 Hectares

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8 **Break up of project affected population** : Village-wise details along with R&R package to be given Number of ousters:

Sl.no	Type	Kinari	Borbhata	Bandhaguda	Kothduar	Sindhbahal	Bundel	Total
1	SC-Homestead	0	0	0	12	8	0	20
	SC-Land Oustees	12	7	8	14	8	0	49
2	ST-Homestead	51	0	0	1	5	0	57
	ST-Land Oustees	17	7	19	36	24	34	137
3	OBC-Homestead	0	28	0	0	0	0	28
	OBC-Land Oustees	20	4	22	11	7	0	64
4	Others-Homestead	0	0	0	0	0	0	0
	Others-Land Oustees	0	0	5	4	0	0	9
	Total	**100**	**46**	**54**	**78**	**52**	**34**	**364**

9 **Financial Details**

a) Project cost as originally Planned and subsequent revised Estimates and the years of price reference : Original Estimation =Rs. 4500Cr. (approx) as on 2002

b) Allocation made for environmental management plans, with item wise & yearwise break up (in Lakh) : Construction completed

Sl.No.	Items	2004-05	2005-06	2006-07	2007-08
1	Environmental Monitoring and Appraisal Cost	12.00	15.00	120.00	15.12
2	Pollution control equipment and system	0.00	200.00	12836.00	50.00
3	Plantation and Green Belt Developmet	0.00	12.00	25.00	100.00
4	Corporate social responsibility	393.00	709.00	194.35	530.00
5	Pollution Control equipment and System Maintenance				1280.80
6	Red mud,fly ash and other solid waste handling				1000.00
	Total	405.00	936.00	13175.35	2975.92

c) Benefit cost ratio/internal rate of Return & the year of assessment : Not Applicable.

d) Whether includes the cost of environmental management as shown in (b) above : Not Applicable.

e) Actual expenditure incurred on the project so far (Upto 30th Nov 2013) : 4357.54 Crore (The same is Gross Block of Fixed assets as per SAP.)

10 Forest land requirement:

a) The status of approval for a diversion of forest land for non forest use : No diversion of forest land is involved.

b) The status of compensatory : Not applicable.

c) The status of clear felling : Not applicable.

d) Comments on the viability & sustainability of compensatory afforestation programme in the light of actual filed experience so far : Not applicable.

11 The status of clear felling in non-forest areas (such as sub-mergence area of reservoir,approach roads), if any, with quantitative information : Nil.

12 Status of construction:

a) Date of commencement (actual and/or planned) : 22nd September 2004

b) Date of completion (actual and/or planned(1st phase) : Plant commissioned on Aug 2007 & Commercial production started from Dec 2007

13 Reason for the delay if the project is yet to start (Please attach a separate sheet if required) : Not applicable.

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Environmental Budget

Sl No	Activity	Expenditure incurred FY 2017-18
1	Green Belt Development & Land scaping	74.6
2	O&M of STP	27.0
3	Environmental monitoring – O&M	11.8
4	Water sprinkling system inside refinery	7.6
5	Miscellaneous	31.5
6	AMC of Lab eqipments, CAAQMS & RTDAS	97.2
7	Red mud filtration project	1168.7
8	Corporate Social Responsibility	1038.0
	Total	**2456.4**

Note : All the units are in Lakhs

Miscellaneous expenses include purchase of STP spares, Biogas spares, IMS surveillance audit, Environmental awareness programs, Flowmeter & IP camera.

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Compliance

To

Environmental Clearance Conditions

Of

M/s Vedanta Limited, Lanjigarh

For the period: Apr'18 - Sept'18

(MoEF & CC Letter Ref No: J-11011/53/2014-IA-II (I), dated 20.11.2015)

Compliance to Environmental Clearance Letter No. J-11011/53/2014-IA-II (I) dated 20.11.2015 for expansion of Alumina Refinery (1 MTPA to 4 MTPA) and Captive Power Plant (from 75 MW to 285 MW) of M/s Vedanta Limited, Lanjigarh

Sl no.	Specific Conditions	Compliance
1	The project proponent should install 24*7 air and water monitoring devices to monitor air emission and effluent discharge, as provided by CPCB and submit report to Ministry and its Regional Office.	Six Continuous Ambient Air Quality Monitoring Station (CAAQMS) has been installed inside the Refinery to monitor PM10, PM2.5, SO2, NOx & CO. The Real Time Data is being transmitted through Real Time Data Acquisition System (RTDAS) to OSPCB server continuously. Our refinery has been designed as per Zero Discharge Concept. Hence no effluent is being generated & no discharge. The monitoring reports of the above are submitted to Ministry and its Regional Office through half-yearly compliance reports.
2	The environmental clearance is for Phase – I (2MTPA) and Phase – II (4MTPA) of the project only. No expansion or modification shall be carried out without prior approval of the Ministry of Environment and Forests.	Noted
3	The complete details of land acquisition for 883 ha required for Phase – I and Phase – II shall be furnished to MOEF & CC and RO, Bhubaneswar as part of the Compliance report.	No additional land required for Phase-I. For Phase-II, 53.4 ha of additional land required for which Section 4(1) & Section 6(1) Notification under the Land Acquisition Act has been initiated. The same will be submitted after acquisition of land required for Phase-II & Phase-III.
4	The land acquisition of 53.4 ha required for Phase – II shall be completed and details furnished to MOEF & CC, its RO at Bhubaneswar and to Odisha SPCB for grant of CTO before commissioning the 4 MTPA expansion project.	The process of acquiring 53.4 ha has been initiated through Section 4(1) & Section 6(1) Notification under the Land Acquisition Act ***(was submitted in the six monthly compliance report dated 28th May 2016 as Annexure-I).*** The details of the same will be furnished to MOEFCC, its regional office, OSPCB for grant of CTO for 4 MTPA, once the process is completed.
5	For Phase – III (6MTPA), the proponent shall obtain amendment of EC after completion of land acquisition of the balance area of 666.03 ha details of which will be furnished to MOEF & CC.	The same will be done after complete acquisition of land.

VEDANTA LIMITED Lanjigarh

Sl no.	Specific Conditions	Compliance
6	Electrostatic Precipitator(s) shall be provided to Kiln and boiler stacks to control gaseous emissions within 50 mg/NM^3. The height of the stacks shall be as per the CPCB guidelines. Gaseous emissions should be regularly monitored and records maintained and reports submitted to this Ministry including its Regional Office as part of the compliance report.	The Calciners and Boilers have been provided with ESPs having 99.5 % efficiency. The heights of the stacks are designed as per the CPCB guidelines. The monitoring report is being submitted to SPCB on monthly basis & to regional office MOEF vide half-yearly compliance report. In addition to the above, CEMS of all the stacks are connected to the RTDAS of the Board.
7	The estimated 4.8 MTPA of red mud generated in Phase – I and II shall be stored in the red mud pond only designed as per the guidelines with proper leachate collection system and ground water all around the red mud disposal area shall be monitored regularly and report submitted to the Odisha PCB/CPCB and Regional Office of the Ministry at Bhubaneswar. Proper care shall be taken to ensure no run off or seepage from the red mud disposal site to natural drainage. Sewage sludge shall be used as manure within the premises.	The red mud generated in Phase-I & Phase-II will be stored in red mud yard only through dry stacking of red mud. Observation bore wells have been installed around RMP for monitoring of ground water quality & reports of the same are being submitted to SPCB on monthly basis & to regional office MOEF vide half-yearly compliance report. RMP is designed and provided with HDPE liners to prevent any seepage. In addition garland drains are constructed along the periphery of RMP and connected to collection pits with pumping facility to recycle back the seepage water if any.
8	The red mud generated will have moisture and will not be in powder form but in cake form. The red mud form the storage area shall not be let off along with the rain water particularly during rainy season and an effective drainage plan has to be prepared to ensure that rainwater entering the project area is not contaminated with red mud.	To divert the rain water from red mud cake storage area, suitable garland drains are provided which are connected to the collection pits with pumping facility to recycle back the water to process.
9	The red mud slurry shall be converted into red mud powder using a high pressure filtration system by which, the red mud shall not be in a slurry form but in cake form and thereafter sold for use by cement manufactures, The stock piles shall be stored in areas which shall be lined.	Red mud slurry is being discharged through HCSD technology & as a step forward the red mud slurry is further processed with High Pressure Membrane Filtration Technology by Red Mud Filtration unit for dry stacking of red mud having 80% solids which eliminates completely the wet storage of red mud. This new system is first of its kind across the country.
10	A plan for utilization of red mud generated shall be implemented. Under the plan, the entire amount of red mud generated from the project would be sold to cement industry. MoU shall be signed with potential buyers including cement companies for long term supply of red mud.	Noted.

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Sl no.	Specific Conditions	Compliance
11	Coal linkage shall be firmed up and furnished as part of the Compliance report. The details of coal linkage (source and quantity)/procurement details for Phase – I and Phase – II of the project shall be furnished as part of the compliance report to MOEFCC and to RO, Bhubaneswar. Details of Coal Characteristics also shall be furnished along with specific quantity from domestic market/linkage/imports.	Coal for the expanded refinery will be sourced from linkage with the CIL and imports. Present coal linkage documents i.e. FSA with MCL as **Annexure – II** and the imported coal sale and purchase agreement as **Annexure – III with the coal characteristic** were already been submitted in the six monthly compliance report dated 28th May 2016.The coal procurement details from Apr`18 to Sept`18 of domestic & imported coal are attached herewith **Annexure – I.**
12	All the fly ash generated from the Alumina Refinery shall be properly stored in ash storage pond and provided to cement and brick manufacturers for further utilization. Ash pond created for the existing project shall be used for storage of ash for the expansion project. Ash shall be evacuated through High Concentration Slurry Disposal (HCSD).	Ash is being disposed through High Concentration Slurry Disposal (HCSD) technology. Ash generated from refinery is being properly stored in ash pond and further the ash is also being used for the purpose of brick manufacturing, land development, dyke height raising & road making. For the year 2018-19 till Sept'18 99.0 % of generated ash has been utilized as mentioned above.
13	Green belt shall be developed in 33% area to mitigate the effects of fugitive emissions as per the CPCB guidelines. Plant species form local area shall be selected in consultation with DFO for green belt development.	Green belt has been developed in & around the refinery, township, rehabilitation colony, RMP, PWL and Ash pond, covering an area of 278.216 Ha (till Sept'18) as per the CPCB guidelines. All the Plant species selected for green belt development are of local varieties and has been planted in consultation with DFO. The year wise plantation details are given in **Annexure-II.**
14	Rehabilitation and Resettlement plan for the project affected population including tribal population should be implemented as per the policy of the Govt. of Odisha.	The same will be implemented as per the R & R policy of the Govt. of Odisha.
15	For undertaking Phase – I and Phase – II of the project, the project proponent shall finalize the MOUs/ Agreements for firm availability of bauxite of 5.2 MTPA for phase – I and 10.4 MTPA for Phase – II and details furnished to MOEFCC and its RO at Bhubaneswar.	We have been granted the Consent to Operate for capacity of 2MTPA (Phase-I) for which we require 5.2MTPA of bauxite. The details regarding procurement of bauxite from different sources has already been submitted as **Annexure-V** in the six monthly compliance report dated 28th May 2016. However, the focus lies in procuring Bauxite from mines in Odisha, for which we are having agreement with Government of Odisha through OMC for supply of 150 Million tons of Bauxite through mines of Odisha. As Odisha is having abundant reserve, hence we look forward for adequate supply to meet our requirement.

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<table>
<tr><th>Sl no.</th><th>Specific Conditions</th><th>Compliance</th></tr>
<tr><td>16</td><td>All the recommendation made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.</td><td>Under Corporate Responsibility for Environmental Protection (CREP) for the aluminium sector, Red mud is being disposed through HCSD technology into Red Mud Filtration unit where red mud powder is being formed through high pressure filtration technology.</td></tr>
<tr><td>17</td><td>The gaseous emissions (PM_{10}, $PM_{2.5}$, SO_2, NOx) from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The OSPCB may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. The particulate emissions from the plant shall not exceed 50mg/NM^3. At no time the emissions level should go beyond the prescribed standards. 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.</td><td>All the emission levels are well within the standards. All the pollution control systems are working with desired efficiency. 6 number of AAQ monitoring stations have been installed in consultation with SPCB. The AAQ monitoring is being carried out regularly and records also maintained. The summary of the monitoring AAQ data is as follows:
<table>
<tr><th>In mg/m^3</th><th>Industrial</th><th>Standard Norm</th><th>Residential</th><th>Standard Norm</th></tr>
<tr><td>PM10</td><td>55.0 – 91.0</td><td>100</td><td>37.0 – 84.0</td><td>100</td></tr>
<tr><td>PM2.5</td><td>34.2 – 59.1</td><td>60</td><td>23.4 – 56.0</td><td>60</td></tr>
<tr><td>SO_2</td><td>11.1 – 22.4</td><td>80</td><td>6.6 – 19.4</td><td>80</td></tr>
<tr><td>NO_2</td><td>22.3 – 34.3</td><td>80</td><td>13.3 – 29.3</td><td>80</td></tr>
</table></td></tr>
<tr><td>18</td><td>In-plant control measures for checking fugitive emissions from spillage/raw materials handling etc. should be provided and particulate matter from Bauxite transport and crushing shall be provided with highly efficient bag filters and covered conveyers and adequate water sprinkling shall be done.</td><td>In-plant control measures have been provided to control the fugitive emissions. (Dust Suppression System & Dry fog system at Bauxite Handling Area & Coal Handling Plant, Wet Scrubbers at Lime Plant, Bag Filter for Alumina Handling Plant, Sprinklers at Bauxite Stockpiles & Coal Yard). To reduce the fugitive emissions through vehicular movement, in plant concrete roads have been laid and water sprinkling is done through mobile water tankers. All the raw material movement into the plant including bauxite is being done through rail. Stockpiles of bauxite are provisioned with permanent water sprinkling system and conveyed through closed conveyor system.</td></tr>
<tr><td>19</td><td>The additional water requirement to be met from River Tel for Phase – I and Phase – II shall not exceed the quantity sanctioned by the State Government from River Tel.</td><td>Noted.</td></tr>
<tr><td>20</td><td>The requirement of make-up water at present is 0.20 cumecs and shall not exceed 0.40 cumecs for the Phase – II expansion. The total make-up water requirement for the 6 MTPA project shall not exceed 0.6 cumecs.</td><td>Noted.</td></tr>
</table>

VEDANTA Lanjigarh LIMITED

Sl no.	Specific Conditions	Compliance
21	The existing raw water reservoir (2.1 lakh m3 capacity), storm water pond (75.000 m3 capacity) caustic water pond (94,350 m3 capacity), red mud pond (7.2 lakh m3 capacity) totaling 39 lakh m3 shall be utilized as rain water harvesting ponds. In addition, about 1 lakh m3 of rainwater shall be harvested from township which will be recharged to groundwater to meet the domestic requirement of an estimated 2300 people for a complete year. With this water harvesting measures the PP shall reduce fresh water consumption to an extent of about 40%.	Rain water collection is being practiced through raw water reservoir, storm water pond, caustic water pond, and red mud pond. Rain water harvesting project through ground water recharge has been implemented at township
22	The plant will operate on a zero-discharge concept and all treated water shall be recycled and reused. No effluents shall be discharged outside the premises during the non-monsoon period and during the monsoon period water should be discharged only after proper treatment and meeting the norms of the OPCB/CPCB. There shall be separate drain for storm water/rainwater. The company shall construct separate RCC drains for carrying storm water inside the plant. Decanted water from red mud pond is collected in the Process Water Lake during the monsoon and the same water recycled back to the process through pumping arrangements. The concrete drains shall be de-silted and regular supervision of the areas shall be carried out so that blocking of drains may be avoided for quick discharge of rainwater.	The plant is operating with zero discharge concepts by 100% recycle of waste water as well as other sources of effluents. No discharge is being made to outside water bodies from any of the facilities of the plant. Separate drains have been constructed in the entire plant area for collection of storm water (Storm water drain) and process water (Caustic drain). Storm water drains are connected to Clear water pond and caustic drains to caustic pond At present, the process water lake is used only for storing rain runoff water from the red mud pond. This stored water is fully recycled and used in the process. Regular activities like de-siltation & cleaning have been carried out prior to monsoon to avoid blocking of drains.
23	Of the total area of 1552.65 ha., an area of 512.37 ha (33%) shall be developed into green belt. Of this, a total of 215.20 ha green belt have been developed and the balance area of 297.17 ha shall also be brought under plantation, which includes plantation in a width of 15-20m along the remaining boundary wall of 3km of the 8km.	Green belt will be developed as mentioned in the condition once the total land acquisition has been completed.
24	Material transportation shall be by rail for which a dedicated railway line for transportation of both raw materials and product shall be established. Material handling areas shall have DFS.	All the material movement including raw materials and final product are being done through a dedicated railway management system. All the material handling areas i.e. coal handling area, bauxite handling area are provisioned with Dry Fog System (DFS).
25	The company shall comply with all the commitment made during public hearing/public consultation.	Noted

VEDANTA LIMITED Lanjigarh

Sl no.	Specific Conditions	Compliance
26	The details of quantity and source of bauxite procured shall be submitted as part of the six-monthly compliance report.	The details regarding procurement of bauxite from different sources has already been submitted as **Annexure-V** in the six monthly compliance report dated 28th May 2016. The bauxite procurement details from Apr`18 to Sept`18 are attached herewith **Annexure – III.**
27	Provisions shall be made for the housing of construction Labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Noted
28	At least 2.5% of the total cost of the project (Rs 10,000 crores) shall be e-marked towards the Enterprise Social Commitment (ESC) based on local needs. The proponent shall prepare a detailed CSR plan for every next five years for the existing-cum-expansion project, which includes village-wise, sector-wise (Health, Education, Sanitation, Health, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc.) activities in consultation with the local communities and administration. The CSR plan will include the amount of 2% retain annual profits as provided for in clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 year towards CSR activities for life of the project. A separate budget head shall be created and the annual capital and revenue expenditure on various activities of the Plan shall be submitted as part of the Compliance Report to RO, Bhubaneswar. The details of the CSR Plan shall also be uploaded on the company website and shall also be provided in the Annual report of the Company.	Keeping in view of the social development, LPADF is formed under the chairmanship of RDC, Berhampur as per the guidance of Hon. Supreme court of India. AS per the decision of the LPADF, various sector-wise development activities are being taken up at both the district level.

Sl no.	General Conditions	Compliance
1	No further expansion or modification in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	Noted
2	At least four ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level	Six AAQ monitoring stations have been installed in consultation with SPCB at various locations in & around the refinery. The AAQ monitoring

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<table>
<tr><th>Sl no.</th><th>General Conditions</th><th>Compliance</th></tr>
<tr><td></td><td>concentration of PM10, PM2.5, SO_2 and NO_x are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional office at Bhubaneswar and the SPCB/CPCB once in six months.</td><td>is being carried out as per the guidelines of National Ambient Air Quality Standards. The monitoring reports for ambient air quality and stack emissions are being submitted to SPCB on monthly basis & to regional office MOEF vide half-yearly compliance report.</td></tr>
<tr><td>3</td><td>Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.</td><td>The plant is operating with zero discharge concept by 100% recycle of industrial waste water. Hence, no discharge is being made to outside water bodies or used for any other purposes.</td></tr>
<tr><td>4</td><td>The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 v;z. 75 dBA (daytime) and 70 dBA (nighttime).</td><td>During detailed engineering stage, care has been taken by providing suitable acoustic measures to contain noise level up to 85 dB(A) in frequented areas and to contain plant overall noise level of 75dB(A) during daytime and 70dB(A) during night time. The noise monitored data is as follows:
<table>
<tr><td></td><td>Daytime dB</td><td>Nighttime-dB</td></tr>
<tr><td>Industrial</td><td>65.1 – 69.2</td><td>60.2 – 63.6</td></tr>
<tr><td>Residential</td><td>46.8 – 53.6</td><td>32.6 – 43.2</td></tr>
</table></td></tr>
<tr><td>5</td><td>Occupational health surveillance of the workers be done on a regular basis and records maintained as per the factories Act.</td><td>Occupational health surveillance of the workers is being done on regular basis as mandatory by The Factories Act, 1948 & Odisha Factory rules 1950. The records are being maintained and are being submitted to The Director, Factories & Boilers.</td></tr>
<tr><td>6</td><td>The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.</td><td>Rain water collection is being practiced through rain water harvesting structures like raw water reservoir, storm water pond, caustic water pond, and red mud pond. In addition to this, rain water harvesting project has been implemented at township to recharge the ground water table.</td></tr>
<tr><td>7</td><td>The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socioeconomic development activities in the surrounding village like community development programs, educational programs, drinking water supply and health care etc.</td><td>Noted</td></tr>
</table>

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Sl no.	General Conditions	Compliance
8	Requisite funds shall be e-marked towards capital cost and recurring cost and recurring cost/annum for environmental pollution control measures to implement the conditions stipulated by the Ministry as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Bhubaneswar. The funds so provided shall not be diverted for any other purpose.	All the conditions imposed by MOEF and SPCB have been completed and no fund has been diverted.
9	A Copy of clearance letter shall be sent by the proponent to concern panchayat, Zilla parishad/Muncipal corporation, urban local body and the local Ngo, if any from whom suggestion/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.	As there was no suggestion / representations from any such agencies, hence letter of clearance has not been sent. The clearance letter has been uploaded on the website of the company i.e. http://www.vedantaaluminium.com.
10	The project proponent shall upload the status of the compliance of the stipulated environment clearance conditions, including result of monitoring data on their website and shall update the same periodically, it shall simultaneously be sent to the Regional Office of the MOEF & CC at Bhubaneswar, the respective Zonal Office of CPCB and SPCB. The criteria pollutant levels namely: PM10, SO2, NOx (Ambient level as well as Stack Emissions) or critical sectoral parameter indicated for the project shall be monitored and displayed at convenient location near the main gate of the company in the public domain.	Noted. The company has installed six CAAQMS where the parameters PM10, PM2.5, SO_2, NO_2, CO are being monitored and the same is being displayed near the main gate of the company.
11	The project proponent shall also submit six monthly report on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by email) to the regional office of MOEFCC, the respective Zonal office of the CPCB & SPCB. The regional office of this ministry at Bhubaneswar/CPCB/SBCB shall monitor the stipulated conditions.	The same will be done on regular basis while submitting six monthly report.
12	The environment statement for each financial year ending 31st 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	Noted

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Sl no.	General Conditions	Compliance
	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 at Bhubaneswar by email.	
13	The project proponent shall inform the public the project has been accorded Environmental Clearance by the Ministry and copies of the clearance letter are the available with the SPCB and may also be seen at the website of the Ministry of the Environment and Forests at http./envfor.nic.in. This shall be advertised within 7 days from the date of the issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be vernacular language of the locality concerned and the copy of the same should be forwarded to the regional office at Bhubaneswar.	The granted environmental clearance has been uploaded in the company website for the information to the public. The same has been advertised in two local newspapers 'The Odisha Bhaskar' and 'The Darshan' in both English & vernacular language (Odia) on 27th November 2015. And the copy of the same was submitted as annexure-VI in the Half yearly compliance report submitted on 28th May 2016.
14	Project authorities shall inform the Regional Office as well as the Ministry, the date of the financial closure and final approval of the project by the concerned authorities and the commencing the land development work.	Noted

VEDANTA LIMITED Lanjigarh

ANNEXURE - I

DETAILS OF COAL PROCUREMENTS FOR FY 2018-19 (from Apr`18 to Sept`18)		
MONTH	**DOMESTIC (In MT.)**	**IMPORTED(In MT.)**
Apr-18	35454	0
May-18	26718	8117
Jun-18	45244	38577
Jul-18	55600	19738
Aug-18	25618	29101
Sep-18	45436	19443

ANNEXURE-II

PLANTATION IN AND AROUND VEDANTA LTD, LANJIGARH

Name of the Industry	Year	Area in Ha	No of Plantation
VEDANTA LIMITED Lanjigarh, Kalahandi	Till 31st March 2006	32.3	79200
	2006-07	14	37800
	2007-08	34	57300
	2008-09	37	64535
	2009-10	0	0
	2010-11	13.866	19409
	2011-12	37.2	53459
	2012 -13	7.2	17100
	2013-14	14.6	24089
	2014-15	36	73930
	2015-16	10	20000
	2016-17	25	58600
	2017-18	16	35000
	2018-19 (Till Sept'18)	1	2500
Total		**278.216**	**542922**

VEDANTA Lanjigarh LIMITED

ANNEXURE- III

Sources	*In MT*
Alcoa World Alumina LLC	614008
Andru Minerals	456008
Associated Aluminium Industries	3698
Bagmar Bauxite Industries	3789
Bharat Aluminium Co. Ltd	157660
Bintan Mining Corporation	38987
C.R. Mittal & Company	11662
GIMPEX PVT LTD.	103384
GUJARAT CREDO	68
MAA KUDARGARHI STEEL PVT LTD	3767
New Day Aluminum(Jamaica) limited	201
POSSEHL ERZKONTOR HONG KONG LIMITED	111264
RIO TINTO ALCAN	191182
rusal trading international	31164
Bharat Aluminium Co. Ltd-Mainpat	31245
OMC	235615
Grand Total	**1993702**

VEDANTA LIMITED Lanjigarh

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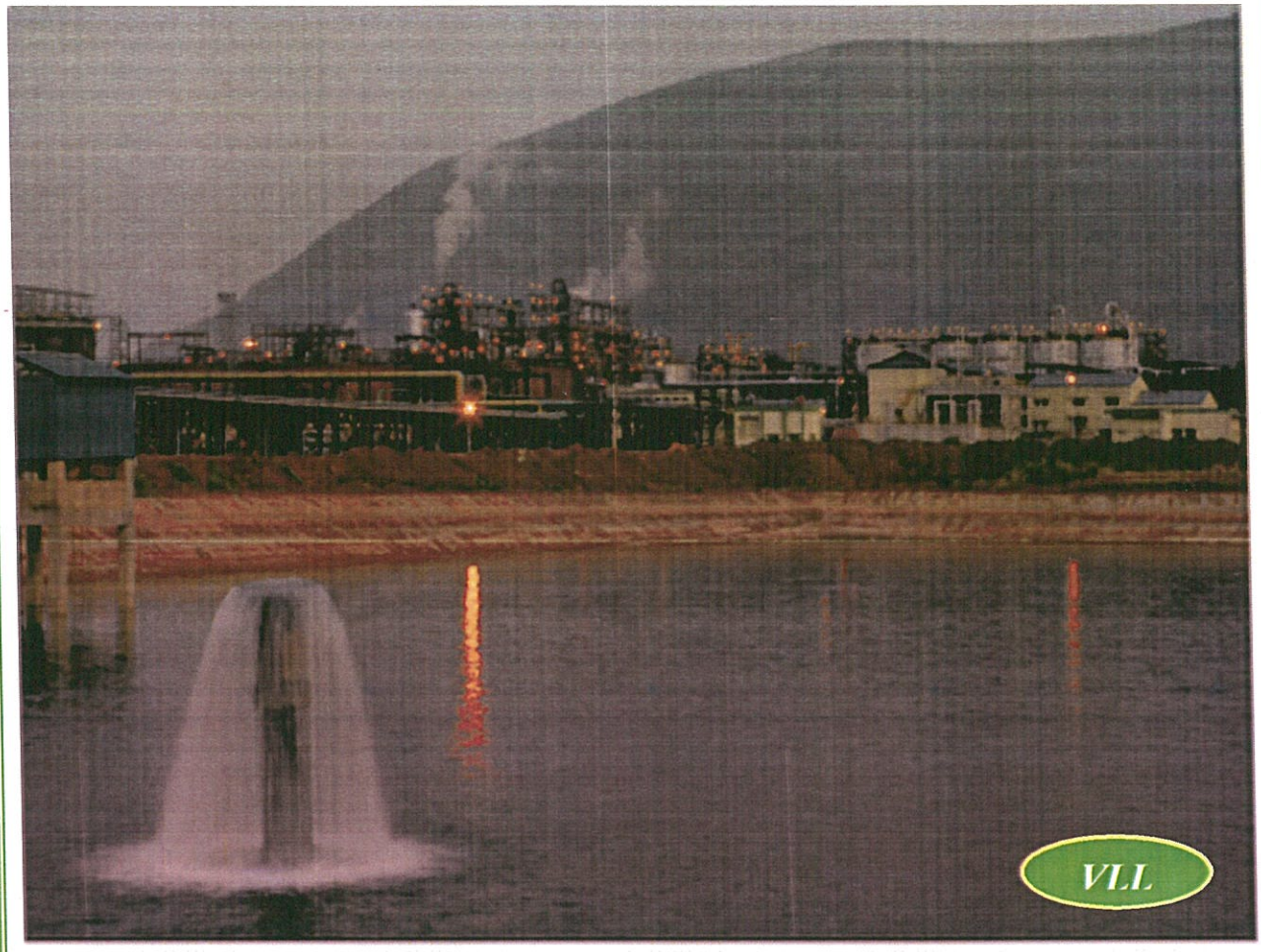
ENVIRONMENTAL SEASONAL REPORT

SEASONAL REPORT

April 2018 to June 2018



Address
Via: Viswanathpur, P.O.Lanjigarh-766027
Dist. Kalahandi,ORISSA
Tel: + 91 6677 247312/13/14/15/16
Fax: +91 6677 247311

July - 2018

MICRO-METEOROLOGICAL DATA AT SITE

Period: 1st April 2018 to 30th June 2018 Location: Plant Site

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Total
Apr'18	40.2	19.0	95.7	11.4	39.5
May'18	40.1	19.8	96.3	25.8	56.0
Jun'18	39.2	21.6	98.3	30.9	104
			Total rainfall		**199.5**

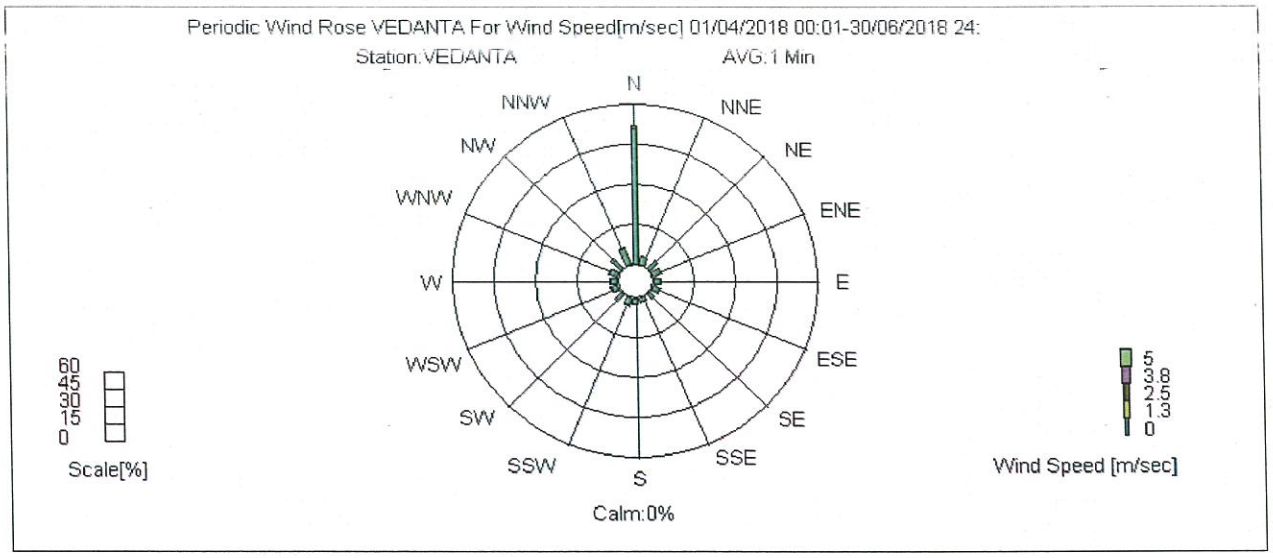
SUMMARY OF WIND PATTERN IN STUDY AREA

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Predominant Wind Speeds (m/sec)	Calm (%)
Apr'18 to Jun'18	N (52.29%)	NNW (7.15%)	0-1.3	0.0

Wind Pattern during the Season

During the season the average winds from North (N) direction were observed for 52.29% of the total time, with wind speeds and the frequency in the range of 0-1.3 m/sec (51.05%), 1.3-2.5 m/sec (1.13%). In NNW direction the winds were also observed for 7.15% of the total time, with wind speeds and the frequency in the range of 0-1.3 m/sec (6.34%), 1.3-2.5 m/sec (0.72 %).The other direction and percentage frequencies were observed from NE (4.58%), NW (4.31%), ENE (3.84%), SSW (2.99%).The calm conditions were observed to be for 0.0% of the total time.

VEDANTA LIMITED Lanjigarh



WINDROSE DIAGRAM FOR THE SEASON – (Apr'18 to Jun'18)

VEDANTA LIMITED Lanjigarh

SUMMARY OF AMBIENT AIR QUALITY RESULTS

Concentrations are expressed in $\mu g/m^3$

Location	PM_{10}			$PM_{2.5}$			SO_2			NOx		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Plant Site	91.0	80.0	87.1	59.1	51.5	56.3	22.4	17.8	19.6	34.3	28.4	31.1
Lanjigarh	76.0	67.0	71.8	50.9	43.1	47.3	16.4	10.2	13.5	24.5	21.4	23.1
Belamba	68.0	59.0	63.1	42.7	37.8	40.3	12.2	7.4	10.4	18.9	14.3	16.5
Niyamgiri Vedanta Nagar	81.0	72.0	75.8	52.2	46.6	50.0	17.7	10.9	14.4	28.5	24.2	26.2
Mid-Day Meal	84.0	72.0	78.7	56.0	47.6	52.6	19.4	12.2	16.2	29.3	24.3	27.1
Chhatrapur	71.0	63.0	66.4	47.6	41.7	43.7	12.6	8.5	10.7	21.6	16.3	18.8
	91.0 – 59.0			**59.1 – 37.8**			**22.4 – 7.4**			**34.3 – 14.3**		

VEDANTA Lanjigarh LIMITED

MANUAL STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER

	PM (mg/NM3)		
Month	**Calciner stack I**	**Calciner stack II**	**CFB Stack**
April			
1st week		22.1	82.0
2nd week	46.4		85.0
3rd week		37.2	88.0
4th week	32.3		79.0
May			
1st week		35.5	98.2
2nd week	40.9		89.6
3rd week	30.5		92.5
4th week		27.6	85.6
June			
1st week	39.2		69.5
2nd week	31.5		78.6
3rd week	28.6		89.8
4th week		34.5	81.0
Max.	**46.4**	**37.2**	**98.2**
Min.	**28.6**	**22.1**	**69.5**
Avg.	**35.6**	**31.4**	**84.9**

VEDANTA LIMITED Lanjigarh

SURFACE WATER QUALITY (APR`18 to JUN`18)

Sl.No	Test Parameters	Protocol	Unit	Results					
				SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen, Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	7.1	7.2	7.4	7.2	7.6	7.1
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	0.09	0.04	0.07	0.29	0.39	0.35
6	Temperature	--	Deg. C.	25	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU	1.4	13	6.4	7.4	1.8	4.6
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, Max	70	50	72	164	220	200
9	Chemical Oxygen Demand	APHA-22nd Edition (5220 B)	mg/l	15	10	38	30	46	19
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l	8.0	4.8	6.4	25.6	28.8	27.2
11	Biochemical Oxygen Demand @ 27^{0}c for 3 days	APHA-22nd Edition -2012 (5210 B)	mg/l, Max	5	3	9	7	10	4
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l	4.9	0.97	3.89	4.86	6.8	6.8
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l	6.2	6.2	8.2	10.3	16.5	10.3
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, Max	0.25	0.31	< 0.05	0.4	0.52	0.48

VEDANTA LIMITED Lanjigarh

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18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, Max	0.3	1.48	0.74	0.67	0.15	1.6
19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l	< 0.1	< 0.1	< 0.1	< 0.1 -	< 0.1	< 0.1
20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, Max	1.2	0.1	0.11	0.8	1.5	1.5
21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l	3.0	2.0	6.0	3.0	5.0	6.0
22	Phosphate as PO_4	APHA-22nd Edition (4500-P-D)	mg/l	< 0.1	0.12	< 0.1	< 0.1	< 0.1	< 0.1
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l	30	18	66	70	110	90
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l	40	16	32	84	100	96
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
27	Dissolved Oxygen	APHA-22nd Edition (4500-O-C)	mg/l, Min	6.4	6.3	6.6	6.7	6.9	6.8
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
29	Polynuclear aromatic hydro- carbons (as PAH)	APHA 6440	mg/l	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l	0.2	0.3	0.3	0.3	0.2	0.3
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/ 100 ml	Absent	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/ 100 ml	Absent	Absent	Absent	Absent	Absent	Absent

SW1: Stream near Tentulipadar

SW2: Stream near Kendubadi

SW3: Stream near Rengopalli

SW4: Vamsadhara River near Lanjigarh

SW5: Vamsadhara River near Chhatrapur

SW6: Vamsadhara River near Balabhadrapur

VEDANTA LIMITED Lanjigarh

GROUND WATER QUALITY (APR`18 to JUN`18)

Sl.No	Test Parameters	Protocol	Unit	Results				
				GW-1	GW-2	GW-3	GW-4	GW-5
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen, Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	6.6	7.2	6.7	7.1	6.5
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	0.38	1.27	0.26	0.95	0.19
6	Temperature	--	Deg. C.	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.9	0.8	0.2	0.1	0.9
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	280	496	170	490	140
9	Anionic detergents (as MBAS)	Annex K of IS 13428:2005	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l, Max	32	68.8	19.2	64	16
11	Boron (as B)	IS 3025 (Part 57):2005 RA 2010	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l, Max	3.89	5.83	7.8	8.75	4.86
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.003
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	10.3	30.9	8.2	12.4	12.4
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, max	0.35	0.32	0.5	0.89	0.65
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.88	0.17	< 0.05	0.95	0.75
19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l, max	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, max	1.6	7.4	1.3	6.8	1.6

VEDANTA Lanjigarh

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21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	7.0	9.0	6.0	29	3.0
22	Phosphate as PO_4	APHA 22nd Edition (4500-P-D)	mg/l	0.15	0.14	0.19	< 0.1	0.24
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	110	189	88	192	62
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l, Max	96	196	80	196	60
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l, Max	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
27	Total Pesticide	USEPA	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
29	Polynuclear aromatic hydro-carbons (as PAH)	APHA 6440	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l, Min	0.3	0.3	0.3	0.2	0.3
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent

GW-1: Plant Site

GW-2: Borewell-Lanjigarh

GW-3: Borewell-Rengopalli

GW-4: Borewell-Chhatrapur

GW-5: Borewell-Chanalima

VEDANTA LIMITED Lanjigarh

Sl.No	Test Parameters	Protocol	Unit	Results				
				GW-6	GW-7	GW-8	GW-9	GW-10
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen, Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	6.6	7.2	6.5	6.5	6.6
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	1.41	0.21	0.15	0.68	0.47
6	Temperature	--	Deg. C.	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.9	0.8	0.7	0.6	0.8
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	440	140	116	380	260
9	Anionic detergents (as MBAS)	Annex K of IS 13428:2005	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l, Max	62.4	14.4	16	44.8	35.2
11	Boron (as B)	IS 3025 (Part 57):2005 RA 2010	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l, Max	7.78	3.9	1.94	20.4	12.6
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.003	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	12.4	6.2	6.2	32.9	20.6
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, max	0.49	0.42	< 0.05	0.65	0.75
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.52	0.58	0.24	0.9	0.2

VEDANTA Lanjigarh LIMITED

19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l, max	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, max	2.8	1.1	3.5	6.5	4.2
21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	35	6.0	12.0	11.0	14.0
22	Phosphate as PO_4	APHA-22nd Edition (4500-P-D)	mg/l	< 0.1	0.12	< 0.1	< 0.1	0.13
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	191	66	57	162	119
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l, Max	188	52	48	196	140
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l, Max	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
27	Total Pesticide	USEPA	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
29	Polynuclear aromatic hydro-carbons (as PAH)	APHA 6440	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l, Min	0.2	0.2	0.3	0.3	0.2
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent

GW-6: Borewell- Red Mud Pond

GW-7: Borewell- Ash Pond

GW-8: Borewell- Process Water Lake

GW-9: Borewell- Baterlima

GW-10: Borewell- Bandhaguda

VEDANTA LIMITED Lanjigarh

NOISE LEVELS [dB] IN THE SURROUNDING AREA

Sr. No.	Location	Day dB(A)	Night dB(A)
1	Plant Site	65.1	60.2
2	Lanjigarh	52.5	41.4
3	Niyamgiri Vedanta Nagar	50.6	38.2
4	Balabadrapur	51.3	37.1
5	Harikrishnapur	50.5	36.2
6	Kasibarhi	49.2	35.5
7	Chhatrapur	46.8	34.9
8	Basantapada	48.9	33.4
9	Maskapadar	47.2	37.8
10	Rengopalli	52.1	32.6

VEDANTA LIMITED Lanjigarh

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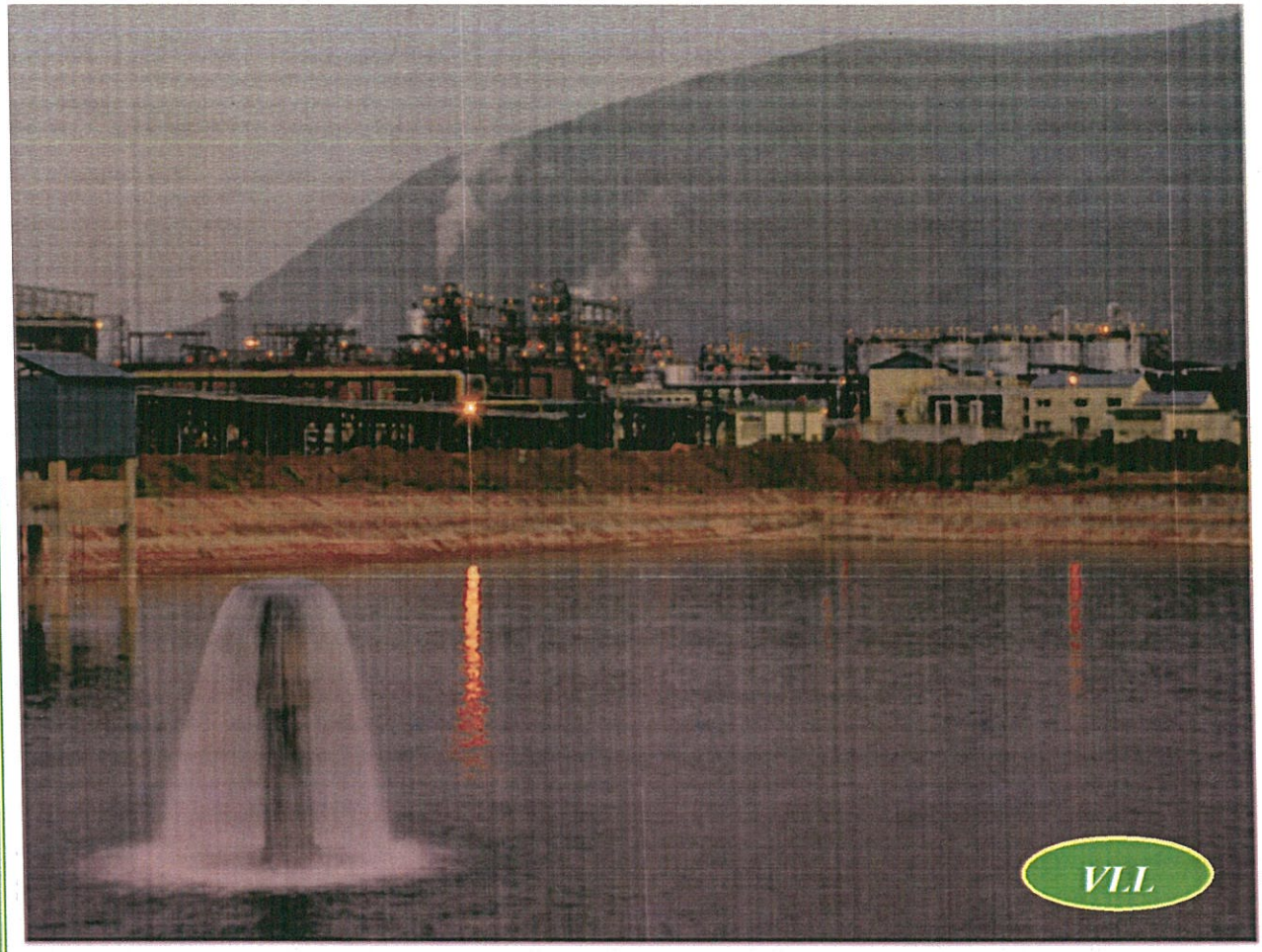
ENVIRONMENTAL SEASONAL REPORT

SEASONAL REPORT

July 2018 to September 2018



Address

Via: Viswanathpur, P.O.Lanjigarh-766027
Dist. Kalahandi,ORISSA
Tel: + 91 6677 247312/13/14/15/16
Fax: +91 6677 247311

October - 2018

MICRO-METEOROLOGICAL DATA AT SITE

Period: 1st July 2018 to 30th September 2018 Location: Plant Site

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Total
July'18	32.5	21.8	99.9	51.5	562.5
Aug'18	32.8	20.0	99.9	55.7	813.0
Sept'18	33.0	19.5	99.9	48.7	332.5
			Total rainfall		**1708.0**

SUMMARY OF WIND PATTERN IN STUDY AREA

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Predominant Wind Speeds (m/sec)	Calm (%)
July`18 to Sept`18	N (51.63%)	NE (6.13%)	0-1.3	0.0

Wind Pattern during the season

During the period the average winds from N direction were observed for 51.63 % of the total time, with wind speeds and the frequency in the range of 0-1.3 m/sec (51.47 %), 1.3-2.5 m/sec (0.15%). In NE direction the winds were also observed for 6.13 % of the total time; with all wind speeds and the frequency in the range of 0-1.3 m/sec (5.96 %). The other direction and percentage frequencies were observed from E (5.60%), NEE (4.84%), ESE (4.34%), and SSW (4.26 %).The calm conditions were observed to be for 0.0 % of the total time.

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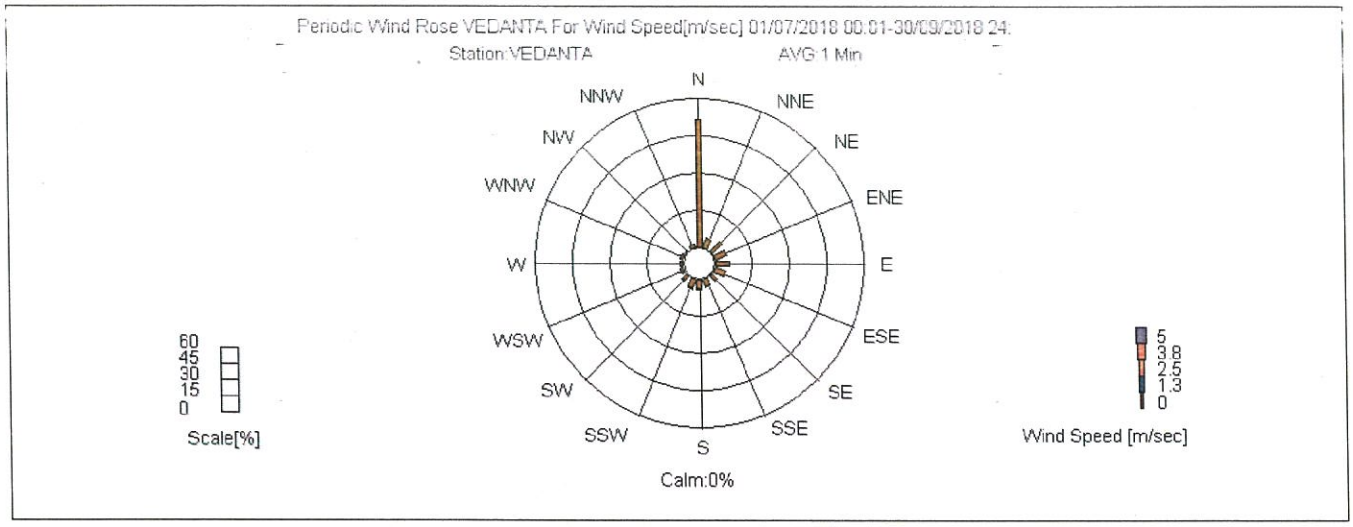

WINDROSE DIAGRAM– (July`18 to Sept`18)

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SUMMARY OF AMBIENT AIR QUALITY RESULTS

Concentrations are expressed in $\mu g/m^3$

Location	PM_{10}			$PM_{2.5}$			SO_2			NOx		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Plant Site	77.0	55.0	63.4	51.5	34.2	41.0	16.3	11.1	14.0	28.5	22.3	25.2
Lanjigarh	60.0	50.0	54.1	39.3	29.4	34.9	12.6	8.7	10.4	19.6	14.6	17.8
Belamba	50.0	37.0	42.9	33.3	25.1	28.4	9.2	6.6	8.0	16.6	13.3	15.0
Niyamgiri Vedanta Nagar	64.0	51.0	56.8	42.2	33.3	37.1	14.4	9.3	11.9	24.3	17.5	20.5
Mid-Day Meal	63.0	41.0	55.3	43.3	23.4	35.0	14.4	8.3	11.1	22.3	15.4	19.3
Chhatrapur	53.0	39.0	45.3	35.3	23.7	29.30	11.5	7.6	9.4	18.2	13.6	16.1
	77.0 – 37.0			**51.5 – 23.4**			**16.3 – 6.6**			**28.5 – 13.3**		

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MANUAL STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER

	PM (mg/NM3)		
Month	**Calciner stack I**	**Calciner stack II**	**CFB Stack**
July			
1st week		40.2	91.8
2nd week		35.4	72.6
3rd week	37.6		87.4
4th week	44.7		76.0
August			
1st week		35.2	74.5
2nd week	39.4		67.0
3rd week		32.9	83.2
4th week	42.6		78.1
September			
1st week	30.9		77.4
2nd week		40.0	74.2
3rd week	36.2		87.9
4th week		42.6	93.2
Max.	**44.7**	**42.6**	**93.2**
Min.	**30.9**	**32.9**	**67.0**
Avg.	**38.6**	**37.7**	**80.3**

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SURFACE WATER QUALITY (JULY`18 to SEPT`18)

Sl.No	Test Parameters	Protocol	Unit	Results					
				SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen , Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	7.6	7.6	7.8	7.4	7.6	8.1
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	0.14	0.05	0.08	0.20	0.22	0.23
6	Temperature	--	Deg. C.	25	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU	25	24	3.6	115	120	146
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, Max	90	36	60	130	140	120
9	Chemical Oxygen Demand	APHA-22nd Edition (5220 B)	mg/l	25	21	9	21	25	21
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l	12.8	3.2	3.2	19.2	17.6	22.4
11	Biochemical Oxygen Demand @ 27^{0}c for 3 days	APHA-22nd Edition -2012 (5210 B)	mg/l, Max	6	5	3	5	6	5
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l	3.89	1.94	5.83	4.86	4.86	5.83
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l	6.0	4.0	4.0	8.0	8.0	4.0
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, Max	0.16	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

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18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, Max	0.12	0.21	0.66	1.6	0.1	0.08
19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, Max	0.4	0.05	0.15	0.9	0.7	1.0
21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l	5.5	2.3	2.5	18.5	26.5	42.5
22	Phosphate as PO_4	APHA-22nd Edition (4500-P-D)	mg/l	< 0.1	< 0.1	< 0.1	0.24	0.41	0.71
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l	48	15	24	57	62	79
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l	48	16	32	68	64	80
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
27	Dissolved Oxygen	APHA-22nd Edition (4500-O-C)	mg/l, Min	6.6	7.0	8.1	7.5	6.5	6.9
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
29	Polynuclear aromatic hydro- carbons (as PAH)	APHA 6440	mg/l	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l	0.2	0.3	0.3	0.3	0.2	0.3
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/ 100 ml	Absent	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/ 100 ml	Absent	Absent	Absent	Absent	Absent	Absent

SW1: Stream near Tentulipadar

SW2: Stream near Kendubadi

SW3: Stream near Rengopalli

SW4: Vamsadhara River near Lanjigarh

SW5: Vamsadhara River near Chhatrapur

SW6: Vamsadhara River near Balabhadrapur

VEDANTA LIMITED Lanjigarh

GROUND WATER QUALITY (JULY`18 to SEPT`18)

Sl.No	Test Parameters	Protocol	Unit	Results				
				GW-1	GW-2	GW-3	GW-4	GW-5
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen, Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	6.5	7.0	6.6	7.3	6.5
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	0.30	1.02	0.21	0.76	0.19
6	Temperature	--	Deg. C.	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.9	0.7	0.3	0.1	0.9
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	160	440	120	430	120
9	Anionic detergents (as MBAS)	Annex K of IS 13428:2005	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l, Max	24.0	56	12.8	52.8	14.4
11	Boron (as B)	IS 3025 (Part 57):2005 RA 2010	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l, Max	7.78	13.61	5.83	14.58	4.86
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.003
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	8.0	34.0	4.0	14.0	12.0
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, max	0.13	0.15	0.06	0.46	< 0.05
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.85	0.13	< 0.05	< 0.05	0.8
19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l, max	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, max	1.3	8.0	0.8	4.9	1.4
21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l max	3.8	10.5	< 1.0	2.3	< 1.0
22	Phosphate as PO_4	APHA-22nd Edition (4500-P-D)	mg/l	0.1	0.12	0.14	< 0.1	0.18
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	106	187	66	196	55
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l, Max	92	196	56	192	56
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l, Max	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
27	Total Pesticide	USEPA	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
29	Polynuclear aromatic hydro-carbons (as PAH)	APHA 6440	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l, Min	0.3	0.3	0.3	0.2	0.3
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent

GW-1: Plant Site

GW-2: Borewell-Lanjigarh

GW-3: Borewell-Rengopalli

GW-4: Borewell-Chhatrapur

GW-5: Borewell-Chanalima

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Sl.No	Test Parameters	Protocol	Unit	Results				
				GW-6	GW-7	GW-8	GW-9	GW-10
1	Colour	IS 3025 (Part 4:1983 RA 2012	Hazen, Max	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2	Taste	IS 3025 (Parts 8):1984 RA 2006	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	*p*H	IS 3025 (Part 11):1983 RA 2012	--	6.5	6.6	6.5	6.6	6.7
5	Electrical Conductivity	APHA-22nd Edition (2510 A)	ms/cm	1.16	0.23	0.12	0.81	0.38
6	Temperature	--	Deg. C.	25	25	25	25	25
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.9	0.9	0.9	0.9	0.6
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	422	130	90	390	230
9	Anionic detergents (as MBAS)	Annex K of IS 13428:2005	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l, Max	60.8	16.0	8.0	67.2	28.8
11	Boron (as B)	IS 3025 (Part 57):2005 RA 2010	mg/l, Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l, Max	10.69	4.86	6.80	5.83	9.72
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.003	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	8.0	10.0	6.0	40	18.0
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16	Copper (as Cu)	IS 3025 (Part 42):1992 RA 2009	mg/l, max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, max	0.24	< 0.05	< 0.05	0.53	0.31
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.92	< 0.05	0.95	0.85	< 0.05

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19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l, max	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
20	Nitrate (as NO_3)	IS 3025 (Part 34):1988 RA 2009	mg/l, max	1.8	1.0	2.6	8.2	3.4
21	Sulphate (as SO_4)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	81	< 1.0	11.8	36.3	11.8
22	Phosphate as PO_4	APHA-22nd Edition (4500-P-D)	mg/l	< 0.1	0.1	< 0.1	< 0.1	0.11
23	Total alkalinity (as $CaCO_3$)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	194	66	42	136	101
24	Total hardness (as $CaCO_3$),	IS 3025 (Part 21):2009	mg/l, Max	196	60	48	192	112
25	Lead (as Pb)	IS 3025 (Part 47):1994 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
26	Mercury (as Hg)	IS 3025 (Part 48):1994 RA 2009	mg/l, Max	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
27	Total Pesticide	USEPA	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
28	Total arsenic (as As)	IS 3025 (Part 37): 1988 RA 2009	mg/l, Max	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
29	Polynuclear aromatic hydro-carbons (as PAH)	APHA 6440	mg/l, Max	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
30	Residual Free chlorine	IS 3025 (Part 26):1986 RA 2009	mg/l, Min	0.2	0.2	0.3	0.3	0.2
31	Total chromium (as Cr)	IS 3025 (Part 52): 2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
32	Faecal Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/100 ml	Absent	Absent	Absent	Absent	Absent

GW-6: Borewell- Red Mud Pond

GW-7: Borewell- Ash Pond

GW-8: Borewell- Process Water Lake

GW-9: Borewell- Baterlima

GW-10: Borewell- Bandhaguda

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NOISE LEVELS [dB (A)] IN THE SURROUNDING AREA

Sr. No.	Location	Day dB(A)	Night dB(A)
1	Plant Site	69.2	63.6
2	Lanjigarh	53.6	43.2
3	Niyamgiri Vedanta Nagar	52.0	40.0
4	Balabadrapur	52.8	38.0
5	Harikrishnapur	51.0	37.3
6	Kasibarhi	48.6	35.6
7	Chhatrapur	47.1	35.1
8	Basantapada	48.0	33.7
9	Maskapadar	49.4	39.4
10	Rengopalli	51.8	33.5

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