

VLL/HSE/ENV/2018/1089

29th May, 2019

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 *October 2018 to March 2019* along with compliance status of the above environmental clearance conditions for your kind information.

Thanking you,

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



Sanjeev Kumar
(Head- Operations & Factory Manager)
Vedanta Limited, Lanjigarh
HeadHSE.VLL@vedanta.co.in

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

T +91-6677 247312 - 15, Fax +91-6677 247311, Website: www.vedantalimited.com

Registered Office: Vedanta Limited 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.

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 ^o 43' 01"
Long 83 ^o 24' 26" |
| 5 | Address for Correspondence | |
| | a) Address of concerned project Engineer (with pin code and telephone/telex/fax number) | Chief Head-Operations & Factory Manager, Vedanta Limited,Alumina Refinery Project,P.O.Lanjigarh, Dist.Kalahandi, Orissa-766027.Tel :06677-247312/13/14/15/16 Fax :06677-247311 |
| | b) Address of Executive engineer/Manager(with Pin Code& Telephone/ telex/ fax Nos. | Project Same as above |
| 6 | <u>Salient features</u> | |
| | 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 refinery 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 |



Splm

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

Sl.no	Type	Kinari	Borbhata	Bandhaguda	Kothduar	Sindhbahal	Bundel	Total
1	SC-Homestead	0	0	0	12	8	0	20
	SC-Land Ousteers	12	7	8	14	8	0	49
2	ST-Homestead	51	0	0	1	5	0	57
	ST-Land Ousteers	17	7	19	36	24	34	137
3	OBC-Homestead	0	28	0	0	0	0	28
	OBC-Land Ousteers	20	4	22	11	7	0	64
4	Others-Homestead	0	0	0	0	0	0	0
	Others-Land Ousteers	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 : Original Estimation =Rs. 4500Cr. (approx) as on 2002 subsequent revised Estimates and the years of price reference

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

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 : Not Applicable.
Return & the year of assessment

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

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

10 Forest land requirement:

- a) The status of approval for a diversion : No diversion of forest land is involved.
of forest land for non forest use
b) The status of compensatory : Not applicable.
c) The status of clear felling : Not applicable.
d) Comments on the viability & : Not applicable.
sustainability of compensatory
afforestation programme in the light of
actual filed experience so far

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

12 Status of construction:

- a) Date of commencement (actual and/or : 22nd September 2004
planned)
b) Date of completion (actual and/or : Plant commissioned on Aug 2007 & Commercial production started from Dec 2007
planned(1st phase)

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



Environmental Budget

Sl No	Activity	Expenditure incurred FY 2018-19
1	Green Belt Development & Land scaping	66.97
2	O&M of STP	20.2
3	Environmental monitoring – O&M	13.7
4	Water sprinkling system inside refinery	5.9
5	Miscellaneous	5.1
6	CAAQMS, RTDAS & Piezometer	115.2
7	Red mud filtration project	1258.9
8	Corporate Social Responsibility	1071.6
9	ESP Modification Cost	3650.0
10	Ash Disposal Cost	362.0
11	Ash Handling Plant & Coal Handling Plant Maintenance	516.0
12	ESP Maintenance	21.0
13	Purchase of Bag Filters	2.2
14	CWP dredging Cost	36.3
	Total	7145.1

Note : All the units are in Lakhs

Miscellaneous expenses include IMS surveillance audit & Environmental awareness programs



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**Compliance
To
Environmental Clearance Conditions
Of
M/s Vedanta Limited, Lanjigarh**

For the period: Oct'18 - Mar'19

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

**Compliance to Environmental Clearance Letter No. J-110111/53/2014-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 (<i>was submitted in the six monthly compliance report dated 28th May 2016 as Annexure-I</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.



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 HCS 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.	Roadmap is prepared for utilization of Redmud. Presently one cement company is associated with us for lifting Redmud. Work order get placed to cement companies based on the required quantity at each time.



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. MoU with MCL is attached as Annexure - I (A) and the imported coal procurement agreement and amendment copy are attached as Annexure - I (B). The coal procurement details from Oct'18 to Mar'19 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 2018-19 100.6 % 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 FY 2018-19) 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 28 th 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.



Sl no.	Specific Conditions	Compliance																									
16	All the recommendation made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	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.																									
17	The gaseous emissions (PM ₁₀ , PM _{2.5} , SO ₂ , NO _x) 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.	<p>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:</p> <table border="1" data-bbox="558 784 718 1008"> <thead> <tr> <th>In mg/m³</th> <th>Industrial</th> <th>Standard Norm</th> <th>Residential</th> <th>Standard Norm</th> </tr> </thead> <tbody> <tr> <td>PM10</td> <td>64.0 - 87.0</td> <td>100</td> <td>42.0 - 77.0</td> <td>100</td> </tr> <tr> <td>PM2.5</td> <td>38.63 - 56.29</td> <td>60</td> <td>29.79 - 50.21</td> <td>60</td> </tr> <tr> <td>SO₂</td> <td>11.39 - 16.4</td> <td>80</td> <td>6.26 - 15.32</td> <td>80</td> </tr> <tr> <td>NO₂</td> <td>22.47 - 32.11</td> <td>80</td> <td>13.13 - 27.08</td> <td>80</td> </tr> </tbody> </table>	In mg/m ³	Industrial	Standard Norm	Residential	Standard Norm	PM10	64.0 - 87.0	100	42.0 - 77.0	100	PM2.5	38.63 - 56.29	60	29.79 - 50.21	60	SO ₂	11.39 - 16.4	80	6.26 - 15.32	80	NO ₂	22.47 - 32.11	80	13.13 - 27.08	80
In mg/m ³	Industrial	Standard Norm	Residential	Standard Norm																							
PM10	64.0 - 87.0	100	42.0 - 77.0	100																							
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NO ₂	22.47 - 32.11	80	13.13 - 27.08	80																							
18	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.	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.																									
19	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.	Noted.																									
20	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.	Noted.																									



Sl no.	Specific Conditions	Compliance
21	<p>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%.</p>	<p>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.</p>
22	<p>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.</p>	<p>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.</p>
23	<p>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.</p>	<p>Green belt will be developed as mentioned in the condition once the total land acquisition has been completed.</p>
24	<p>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.</p>	<p>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).</p>
25	<p>The company shall comply with all the commitment made during public hearing/ public consultation.</p>	<p>Noted</p>



Specific Conditions		Compliance
SI no.		
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 28 th May 2016. The bauxite procurement details from Oct'18 to Mar'19 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 earmarked 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. The CSR expenditure for FY 2018-19 has been attached in Annexure-IV.

General Conditions		Compliance
SI no.		
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



Sl no.	General Conditions	Compliance									
3	<p>concentration of PM10, PM2.5, SO₂ 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.</p> <p>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.</p>	<p>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.</p> <p>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.</p>									
4	<p>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 viz. 75 dBA (daytime) and 70 dBA (nighttime).</p>	<p>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:</p> <table border="1" data-bbox="587 992 707 1160"> <thead> <tr> <th></th> <th>Daytime dB</th> <th>Nighttime-dB</th> </tr> </thead> <tbody> <tr> <td>Industrial</td> <td>68.5- 70.1</td> <td>63.0- 64.3</td> </tr> <tr> <td>Residential</td> <td>46.5 - 54.0</td> <td>32.6 - 33.0</td> </tr> </tbody> </table>		Daytime dB	Nighttime-dB	Industrial	68.5- 70.1	63.0- 64.3	Residential	46.5 - 54.0	32.6 - 33.0
	Daytime dB	Nighttime-dB									
Industrial	68.5- 70.1	63.0- 64.3									
Residential	46.5 - 54.0	32.6 - 33.0									
5	<p>Occupational health surveillance of the workers be done on a regular basis and records maintained as per the factories Act.</p>	<p>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.</p>									
6	<p>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.</p>	<p>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.</p>									
7	<p>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.</p>	<p>Noted</p>									



Sl no.	General Conditions	Compliance
8	<p>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.</p>	<p>All the conditions imposed by MOEF and SPCB have been completed and no fund has been diverted.</p>
9	<p>A Copy of clearance letter shall be sent by the proponent to concern panchayat, Zilla parishad/Municipal 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.</p>	<p>As there was no suggestion / representations from any such agencies, hence letter of clearance has not been sent.</p> <p>The clearance letter has been uploaded on the website of the company i.e. http://www.vedantaaluminium.com.</p>
10	<p>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.</p>	<p>Noted.</p> <p>The company has installed six CAAQMS where the parameters PM10, PM2.5, SO2, NO2, CO are being monitored and the same is being displayed near the main gate of the company.</p> <p>The same will be done on regular basis while submitting six monthly report.</p>
11	<p>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.</p>	<p>Noted</p>
12	<p>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</p>	<p>Noted</p>



Sl no.	General Conditions	Compliance
	<p>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.</p>	
13	<p>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.</p>	<p>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.</p>
14	<p>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.</p>	<p>Noted</p>





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MEMORANDUM OF UNDERSTANDING (MOU)

Between

MAHANADI COALFIELDS LTD. (MCL) - Seller

And

VEDANTA LIMITED- Purchaser

This Memorandum of Understanding is made on the 11 Day of May 2018 between Mahanadi Coalfields Limited, represented through its Director (Tech/Op), At/PO-Jagrati Vihar, District- Sambalpur, Odisha, Pin-768020, which expression unless repugnant to the subject or the context shall mean and include the successors, legal representatives and assigns of the party hereinafter referred to as SELLER.

And



M/s Vedanta Limited represented through its AGM-Commercial, Vill/Po- Lanjigarh, Dist- Kalahandi, Odisha 766027 which expression unless repugnant to the subject or the context shall mean and include the successors, legal representatives and assigns of the party hereinafter referred to as PURCHASER.

And

Whereas Fuel Supply Agreement dated 26th April 2008 & its subsequent Amendments were executed between Mahanadi Coalfields Ltd. (Seller) and M/s Vedanta Limited (Purchaser) for supply of coal for use at their Captive Power Plant of capacity 75 MW located at Vill/Po- Lanjigarh, Dist- Kalahandi, Odisha, 766027 for an ACQ of 5,28,840 TPA of GCV Grade G8 to G13.

And

Whereas, Ministry of Coal (MOC) vide letter no. 23011/51/2015-CPD (Pt-1) dtd. 15th February, 2016 issued the policy of allocation of coal linkage to non-regulated sector (NRS) through electronic auction and the policy, inter-alia, states that

***** there will be no renewal of existing FSAs of non-regulated sectors [except FSAs of CPSEs and Fertiliser (Urea)] which are maturing in 2015-16 onwards, after completion of their current agreement tenure. The extant coal supply arrangements may continue till commencement of coal supply under the auction process *****

Whereas, GM (M&S), CIL vide letter no. CIL/S&M/Linkage Auction/424, dtd.05.06.2017, advised subsidiary companies regarding continuation of coal supply to FSA holders in the non regulated sector in the manner as mentioned below:

Quote

(a) Irrespective of the date of conduct of actual linkage e-auction of a particular sub-sector, the cut-off date for that particular tranche of auction will be applicable to all sub-sectors under that tranche.

(b) For linkages which have expires by the cut-off date for a particular tranche, the following policy will be followed:

i. In the event a bidder has participated in the auction and emerges as successful bidder, the allocated quantity in the auction or linkage quantity as per the expiring FSA, whichever is lower, shall be supplied till the execution of new FSA.

ii. In the event bidder has either not participated or emerges as unsuccessful bidder, supply in terms of the expiring FSA shall continue till the last date of the month in which the linkage auction for that particular sub-sector is conducted and thereafter the expiring FSA/linkage shall be discontinued.

(c) Bidders who did not have any existing linkage and have won coal linkage under a particular tranche, shall be supplied coal only post execution of FSA.

(d) In line with para 1(iii) of the Policy i.e. the extant coal supply arrangements may continue till commencement of coal supply under the auction process, the extant of coal supply arrangements for linkages which are due to expire post the cut-off date of a particular Tranche may continue till the next Tranche of Linkage Auction.

Unquote

Whereas, the aforementioned letter dated 05.06.2017 of CIL has also been notified by CIL on its website followed by MCL vide notice reference no.CIL/M&S/Linkage Auction/134 dated 03/05.03.2018 for information of all.



Whereas, FSA dated 28th April 2008, read with its subsequent amendments, executed between MCL & M/s Vedanta Limited expires on 30.04.2018 and M/s Vedanta Limited has conveyed their willingness as against the directives of CIL alongwith requisite valid statutory documents such as Factory License, Pollution clearance certificate from SPCB, Boiler Fitness certificate, etc. to avail coal supplies to their aforementioned unit(s) as per the guidelines of CIL issued vide letter no. CIL/S&M/Linkage Auction/424, dtd.05.06.2017 through Memorandum of Understanding (MOU).

In pursuance of the aforementioned directives of MOC/CIL, both the Seller and the Purchaser agreed as under:-

- i. The Purchaser has already furnished Security Deposit of Rs. 5,85,10,858/- against the FSA dated 28th April 2008 and subsequent amendments executed between the Purchaser & MCL. The same Security Deposit shall remain valid till 90 days from the date of expiry of the term or Extended Term of this MoU, as the case may be. Further, the Security Deposit shall be returned or refunded to the Purchaser at the end of its validity, subject to successful completion of and complete settlement of all claims of the Seller arising out of the FSA dated 28th April 2008 and this MOU.
- ii. Coal quantity to be supplied under this MoU will be as per the FSA dated 28th April 2008 on monthly pro-rated basis, however, the quantity will be subject to modification as per para b (i) of the aforementioned guidelines of CIL issued vide letter no. CIL/S&M/Linkage Auction/424, dtd.05.06.2017.
- iii. It is expressly agreed by both the Seller and Purchaser that, although the FSA dated 28th April 2008 expires on 30th April 2018, both the parties shall abide by all the terms and conditions of the FSA including the provisions for payment of Performance Incentive/Compensation, unless it is specified otherwise in this MOU.
- iv. Coal shall be released by MCL after receipt of payment in advance along with applicable statutory charges, levies, taxes and other charges. In case of any revision in coal price or any statutory charges, after release of coal, the purchaser is liable to pay the differential price with effect from the date of such notification or directive(s).
- v. Supply of coal shall be between GCV grades of G-8 to G-14 from any mines/coalfields of MCL.
- vi. The MOU would be effective from 1st May, 2018.
- vii. The validity of this MOU will be in line with the provisions mentioned under para (a), (b), (c) & (d) of the guideline of CIL issued vide letter no. CIL/S&M/Linkage Auction/424, dtd.05.06.2017, as applicable and supply of coal will be made accordingly.
- viii. This MOU is subject to modification/discontinuation at any point of time in accordance with the directives of MOC/CIL and/or MCL Management.
- ix. The mode of transport of coal will remain the same as per FSA dated 28th April 2008.



x. In case of any disputes, disagreement or difference arising out of or in connection to this MOU, the same shall be dealt in accordance with clause no. 15 of the FSA dated 28th April 2008.

xi. The jurisdiction of the Court shall be the Court situated at Sambalpur, Odisha

In witnesses whereof the Seller and the Purchaser hereto have signed this Memorandum of Understanding on the date aforementioned in presence of the witnesses under named.

For Mahanadi Coalfields Limited

Signature

Name:

J. P. SINGH

Designation: Director (Tech./Operations)

Address: At./Po. Jagriti Vihar, Burla
District: Sambalpur-768020

Telephone: 0663-2542772

Fax: 0663-2542844

Email: dt-op.mcl@coalindia.in
dtopmcl@gmail.com

1. WITNESS

a) Signature

b) Name: Rajesh Mishra

c) Address: At./Po. Jagriti Vihar, Burla
District: Sambalpur-768020

d) Occupation: HOD (M&S)

2. WITNESS:

a) Signature

b) Name K. Yesupadam

c) Address At./Po. Jagriti Vihar, Burla
District: Sambalpur-768020

d) Occupation Sr. Manager (M&S)

For Vedanta Limited

Signature

Name:

AMIT GOEL

Designation: AGM-Commercial

Address: VIII/Po- Lanjigarh, Dist- Kalahandi,
Odisha- 766027

Telephone: 9777454066

Fax:

0667-247311

Email:

amit.goel@vedanta.co.in

1. WITNESS

a) Signature

b) Name Raghunath Pradhan

c) Address Lanjigarh, Kalahandi
Odisha - 766027

d) Occupation: Associate Officer, Vedanta Limited

2. WITNESS:

a) Signature

b) Name Ankit Agrawal

c) Address Jharsuguda, Odisha

d) Occupation: Service



MASTER COAL PROCUREMENT AGREEMENT

BETWEEN

VEDANTA LIMITED

AND

GANDHAR OIL REFINERY INDIA LIMITED

Vedanta Limited (Formerly known as Sesa Sterile Limited)
Registered Office: 1st Floor, C Wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andhari (East), Mumbai, Maharashtra 400055
CIN: L13208MH1985PLC281594



MASTER COAL PROCUREMENT AGREEMENT

This MASTER COAL PURCHASING/ PROCUREMENT AGREEMENT (MPA) (hereinafter the "Agreement") made at on this 22nd day of October, 2018.

BY AND BETWEEN

VEDANTA LIMITED, a company incorporated under the provisions of the Indian Companies Act, 1956 and having its registered office at 1st Floor, C Wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East), Mumbai, Maharashtra 400093 [CIN: L13209MH1965PLC291394] and its regional office at Vedanta Limited, PO: Lanjigarh, Dist: Kalahandi, Odisha, India-766027, Fax +91-6677 247311, hereinafter referred to as (the "Vedanta/Company/Purchaser") which expression shall, unless repugnant to or inconsistent with the context or meaning thereof, shall include its successors and assigns) of the ONE PART;

AND

GANDHAR OIL REFINERY INDIA LIMITED Flat No. 501, C Scape apartment Pandurangapuram, RK Beach Road, - (hereinafter referred to as "Supplier", which expression shall, unless repugnant to the context or meaning thereof, mean and include its successors and permitted assigns) of the OTHER PART.

The Vedanta/Company/Purchaser and the Supplier shall be individually referred to as the "Party" and collectively as the "Parties".

RECITALS

WHEREAS the Company is engaged, *inter alia*, in the business of manufacturing alumina for which uninterrupted and regular supply of power is essential and hence time is the essence of the contract.

AND WHEREAS Supplier is engaged, *inter alia*, in the business of supply of steam (non-coking) coal

AND WHEREAS the Supplier has approached the Company and offered to supply of Non Coking Steam Coal or any other material as specified in Annexure 1 or under the concerned Purchase Order (hereinafter for the sake of brevity referred to as the "Material"/"Coal") and has represented that it has the necessary expertise, infrastructure and experience to efficiently provide such Material to the Company;

AND WHEREAS based on the said representation, the Company has agreed to seek the Material from the Supplier on a non-exclusive basis as per the terms and conditions detailed herein.

NOW THEREFORE, IN CONSIDERATION OF THE PREMISES AND MUTUAL COVENANTS HEREIN CONTAINED, THE PARTIES HAVE AGREED AS FOLLOWS:

1. DEFINITIONS & INTERPRETATION
1. DEFINITIONS

Vedanta Limited (Formerly known as Sesa Sterlite Limited)
Registered Office: 1st Floor, C Wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East), Mumbai, Maharashtra 400093
CIN: L13209MH1965PLC291394



In this Agreement, except where the context otherwise requires, capitalised words and expressions set out in the background section above shall have the meanings set out in that section and the following words and expressions shall have the following meanings:

- 1.1.1 "Affiliate" shall mean with respect to any person, any other person that, directly or indirectly, controls, is controlled by or is under common control of such specified person. For the purposes of this definition, "control" means the direct or indirect beneficial ownership of more than fifty percent (50%) of the issued share capital, stock or other participating interest or the legal power to direct or cause the direction of the general management, of the company, partnership or other person in question, and "controlled" shall be construed accordingly;
- 1.1.2 "Agreement" means this Agreement entered into by and between the Parties hereto together with any and all Annexures, appendices, schedules, addendums and amendments hereto as well any Purchase Order(s) issued thereunder, signed by the authorized representative of the Parties shall be deemed to be read as an integral part of this Agreement.
- 1.1.3 "Claims" shall mean all claims, liabilities, costs, damages and expenses (including court costs and legal fees)
- 1.1.4 "Deleterious material" shall mean any element, compound present in the goods which is not part of standard Specification or a typical assay as per the purchase order or agreement and which is likely to cause or may in general probability cause harm or damage to the operations of the Purchaser and also restricts or affects performance of the goods as per the desired / industry / specified standards.
- 1.1.5 "Effective Date" shall mean _____;
- 1.1.6 "Fees" shall mean the prices and/or rates payable by the Company in respect of the Material as specified in this Agreement and/or the relevant Purchase Order.
- 1.1.7 "Governmental Authority" shall mean any governmental department, local authority, commission, board, bureau, agency, regulatory authority, instrumentality, court or other judicial or administrative body, central, state, provincial or local having jurisdiction over the matter or matters in question.
- 1.1.8 "Independent Inspection Agency (IIA)" means a qualified independent surveyor appointed by the Purchaser and acceptable to the Supplier to perform the inspection of the Material as provided under this agreement.
- 1.1.9 "Laytime" means time allowed to unload the cargo from the vessel.
- 1.1.10 "Load Port/Loading Port" means the port at which the Coal is to be loaded.
- 1.1.11 "Pratique" means permission to do business at a port by a ship that has complied with all applicable local health regulations.
- 1.1.12 "Purchase Order" shall mean (i) the written instruction by Purchaser issued to Supplier for the provision of Material under this Agreement, which shall include the specific requirements with respect to the scope of contract, applicable rates and charges and the location of the Site; and (ii) if applicable, the oral instruction under this Agreement which shall be reduced to writing as soon as practicably possible including the specific requirements described above.
- 1.1.13 "Purchaser Group" shall mean and include Purchaser and its Affiliates.
- 1.1.14 "Representative" in respect of the Purchaser and the Supplier to include the persons so identified on the Purchase Order as their representative or such other person(s) notified by the Purchaser or the Supplier in writing to the other from time to time, which will include amongst others consultants engaged by the Party or any Affiliate of the Supplier having commonality of interest with the Supplier.
- 1.1.15 "Site" shall mean the location where Purchaser wishes Supplier to supply the Material.
- 1.1.16 "Specification" includes but is not limited to assays whether typical or otherwise or the scope or technical parameters of the Material attached to or referred to in this Agreement and/or any Purchase Order. Further Specification shall, in case of Material, always include being free from Deleterious material.

Vedanta Limited (Formerly known as: Sesa Sterlite Limited)
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CIN: L19209MH1985PLC291394



- 1.1.17 "Statement of Facts" means a document that is drawn up covering the time, the breakdown that occurred and deviation commencing from the time the vessel returned to the point of deviation and the voyage was resumed.
- 1.1.18 "Supplier Group" shall mean and include Supplier, its Affiliates and its and their sub-suppliers and suppliers of any tier and its and their respective Affiliates.
- 1.1.19 "Term" the term of this Agreement is defined in Clause 2 of this Agreement.
- 1.1.20 "Time Sheet" means a document which records all daily particulars relating to the loading or discharging of cargo as well as the duration of and reason for any stoppage of work and is used as a basis for the calculation of demurrage.
- 1.1.21 "Trade Usage" refers to generally accepted practice or norms in relation to expected standards, permissible deviation, internationally accepted scientific data, foreseeable consequences attributable to deviation beyond permissible deviation established over a period of time in course of commercial dealing between the parties to this Agreement or their associates
- 1.1.22 "Turntime" means, with respect of each shipment, the period of time, quoted in hours, between the tendering of the first notice of readiness, no matter whether it is accepted and the commencement of laytime, which shall in no cases exceed 12 hours.
- 1.1.23 "Ton(s)", "Tonne(s)", and "MT" each mean metric tonne of 1,000 Kgs as defined in International System of Units.

1.2 INTERPRETATION

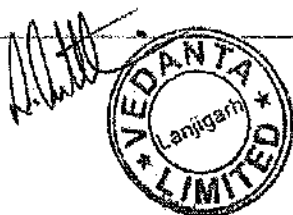
In this Agreement:

- 1.2.1 Headings are for convenience only and shall not govern or affect the interpretation of the Agreement;
- 1.2.2 Except where the context otherwise requires, references to one gender include all genders and the singular includes the plural and vice versa;
- 1.2.3 Except where the context otherwise requires, references to any enactment shall include references to such enactment as re-enacted, amended or extended and any sub-ordinate legislation made under it;
- 1.2.4 References to persons include companies, corporations, partnerships, associations, and other organizations whether or not having a separate legal personality;
- 1.2.5 Except where otherwise indicated, reference to clauses, sub-clauses, recitals and annexures shall be to the clauses, sub-clauses, recitals and Annexures of this Agreement;
- 1.2.6 "including" means "including without limitation";
- 1.2.7 The rule of construction, if any, that a contract should be interpreted against the Party responsible for the drafting and preparation thereof shall not apply;
- 1.2.8 If the day on which any act, matter or thing is to be done under or pursuant to this Agreement is not a business day as per Trade Usage, that act, matter or thing shall be done on the preceding business day.

2. SCOPE OF CONTRACT

- 2.1 The effective date of this Agreement shall be 08.06.2018 (hereinafter the "Effective Date") and this Agreement shall be valid from the Effective Date until delivery of and the payment for the Material (as specified in Annexure 1 of this Agreement) or any other obligations under this Agreement have been fully performed by the Parties, whichever is later ("Term").
- 2.2 The terms and conditions of the Agreement shall apply from the Effective Date and shall remain valid for the Term unless this Agreement is terminated earlier by the Company hereunder.
- 2.3 Nothing in this Agreement shall obligate the Purchaser or any of its Affiliates to order any Material

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 CIN: L13200MH1965PLC291394



from the Supplier.

3. DELIVERY/PERFORMANCE

3.1 Time shall be of the essence and any Materials delivered shall be in strict accordance with any time or schedule specified hereunder as per the Scope of Contract at ANNEXURE-I. Further, Materials so delivered shall be in strict accordance with the quality parameters and Specifications, specified in this Agreement and/or the Purchase Order or the relevant Trade Usage where no such parameters and Specifications are so specified.

4. CARRIAGE AND DELIVERY INSTRUCTIONS RELATING TO MATERIAL

4.1 Unless otherwise specified herein, the International Chambers of Commerce official rules for the interpretation of trade terms (Incoterms) are incorporated into the Agreement by reference.

4.2 The delivery instructions shall be governed by and construed in accordance with the provisions of Incoterms 2010 published by the International Chamber of Commerce as may be amended from time to time.

5. RISK AND PROPERTY

5.1 Unless otherwise stipulated in this Agreement and or any Purchase Order issued hereunder, title to and risk of loss for the Material shall remain with Supplier and shall only pass to Purchaser following full delivery and acknowledgement by possession of the Material to the delivery address by Purchaser or Purchaser duly authorized representative specified in the Purchase Order.

Whenever Purchaser is not the ultimate consumer of the Material, all rights, benefits and remedies conferred upon Purchaser by the provisions of this Agreement, including specifically the benefit of any warranties and transfer of title, shall accrue to and shall be for the express benefit of any third party customer and on whose behalf or for whose benefit the Purchaser has purchased the Material.

6. SHIPPING TERMS

The Supplier shall load the vessel at the Loading Port and the applicable shipping and loading terms shall be as per Annexure I

7. PAYMENT

7.1 Unless otherwise stated, payment will be made as per the details specified under this Agreement as per Annexure I.

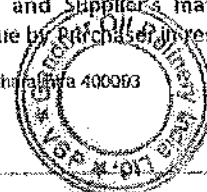
7.2 The Purchaser shall have a right (but not an obligation) to set-off / adjust any payment due from the Supplier against any amount due / payable to the Supplier from the Purchasing Group

8. SUSPENSION

8.1 Notwithstanding anything to the contrary in this Agreement, Purchaser may, at its sole discretion, suspend this Agreement / any Purchase Order, in whole or in part, upon a notice to the Supplier for any reason whatsoever. The Purchaser shall promptly notify the Supplier in writing of the same.

8.2 Supplier's failure to perform obligations under this Agreement or any Purchase Order issued hereunder, to the standards required by the Agreement/Purchase Order and Supplier's material breach of any of its obligations under the Agreement, no payment shall be due by Purchaser in respect

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CIN: L13309MH1969PLC291394



of such order/Purchaser order, or in the case of suspension, until the failure or breach has been remedied to the reasonable satisfaction of Purchaser.

- 8.3 Subject to clause above, in the event of suspension of the Agreement or any Purchase Order issued hereunder, the Material being supplied under such Agreement/Purchase Order shall, at Purchaser's discretion, either be delivered to the delivery address or shall be securely and separately stored at Supplier's premises, at Purchaser's sole cost and expense, and marked as the property of Purchaser until either such suspension is revoked or Purchaser terminates the Agreement/Purchase Order and instructs Supplier with regard to the disposal of the Material stored at Supplier's premises. The proceeds of the disposal shall be adjusted against any compensation payable hereunder.

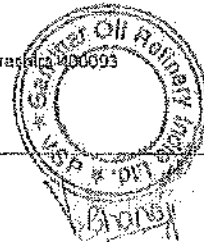
9. SUPPLIER OBLIGATIONS

9.1 The Supplier warrants that the Material shall

- a) conform to the Specifications (as provided in Annexure 1) which the Supplier warrants to be accurate and complete in all material respects and not misleading;
- b) comply with any applicable quality standards and/or other standards or Specifications as requested by the Purchaser and these standards/specifications shall not be changed without the prior written consent of the Purchaser.

9.2 The Supplier warrants that it shall at all times and at its own expense:

- (a) maintain all necessary licenses and consents and comply with all applicable law in performance of the Agreement;
- (b) adopt safe working practices and at the proper time supply and install such guards and safety devices as may be necessary to comply with the provisions of all health, safety and environment laws;
- (c) shall not endanger the safety of or unlawfully interfere with the convenience of any other person, including employees and/or other contractors of the Purchaser in the performance of the Agreement;
- (e) be accompanied by all appropriate information, warnings, instructions and documentation in relation to the safe use, handling, storing, operation, consuming, transportation and disposal of any Material or parts, to the Purchaser, wherever applicable;
- (f) ensure that, in performing its obligations under the Agreement, it does not cause any disturbance or damage to the industrial operations and property at the relevant site;
- (g) comply with the Purchaser's conditions (including but not limited to health and safety conditions, safety management systems, safety cases, hygiene policies and security policies) in relation to any relevant Site;
- (h) assist the Purchaser and its representative in the investigation of any accident or incident or the resolution of any dispute, which assistance shall include, but not be limited to, providing access to documents and records and providing information reasonably requested by the Purchaser;



(i) notify the Purchaser's representative promptly as soon as it becomes aware of any breach of laws or any health and safety or issue which arises in relation to the Material (which notification shall not release the Supplier from any liability and/or obligations in respect of such breach, hazard or issue);

(j) notify the Purchaser's representative promptly after it becomes aware that the Purchaser is not or may not be complying with any of the Purchaser's obligations, provided that the Supplier shall not be entitled to rely on such notice as relieving the Supplier's performance under the Agreement, save to the extent that it actually restricts or precludes performance of the Supplier's obligations.

9.3 The Supplier further warrants that the Material shall conform with all laws applicable to such Material, including as regards the , quality , transportation, delivery , health, safety and environmental standards and use of such Material which are in force at the time of supply;

9.4 The representations and warranties mentioned herein shall survive any inspection, test, performance, acceptance or payment pursuant to the Agreement and shall be extended to any replaced Material provided by the Supplier.

9.5 If the Supplier fails to rectify a breach in supply of the Material, which being capable of remedy is not remedied within fourteen (14) days of notice of such default, the Purchaser may at its discretion and without prejudice to other rights and remedies under this Agreement or otherwise, avail itself of any one or more of the remedies as hereunder:

(a) reject the Material (in whole or in part) and return them to the Supplier at the risk and cost of the Supplier on the basis that the Supplier shall immediately pay to the Purchaser a full refund for the Material so returned;

(b) give the Supplier the opportunity at the Supplier's expense either to remedy any defect in the Material or to supply replacement Material to ensure that the terms of the Agreement are fulfilled within a reasonable period specified by the Purchaser;

(c) refuse to accept any further deliveries of the Material which the Supplier attempts to make, in each case without any liability to the Purchaser;

(d) instruct the Supplier to suspend performance of its obligations under this Agreement with immediate effect and to take such steps as the Purchaser may direct in order to remedy such breach at the Supplier's expense;

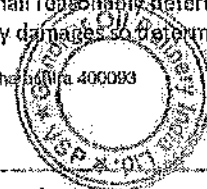
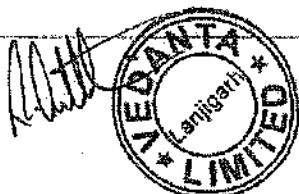
(e) claim such damages as may have been sustained in consequence of the Supplier's breach or breaches of this Agreement;

(f) opt to use or consume the Material in the event of non-availability of substitute goods or to maintain operations of the Purchaser's plant or to avoid plant shut down but without prejudice to its right to claim damages attributable to consequences arising due to off-Specification Material;

(g) procure the material from an alternate source at the Supplier's risk and cost, and the Supplier shall be liable to compensate the direct and reasonable loss incurred by Buyer in this process

9.6 Notwithstanding anything to the contrary in this Agreement, there shall be no obligation whatsoever on the Purchaser to accept any defective or sub-standard quality Material, delayed delivery and/or performance of the Agreement and it is expressly agreed by the Parties that acceptance of such defective or sub-standard quality Material, delayed delivery in its sole discretion, shall not prejudice any right / claim of the Purchaser to damages for supply of such defective or sub-standard quality Material, delayed delivery and / or for breach of the Agreement. In the foregoing, the Purchaser shall reasonably determine the amount of damages that shall be leviable upon / payable by the Supplier. Any damages so determined

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by the Purchaser shall be paid by the Supplier within fifteen (15) days. The levy of damages / acceptance of performance, as above, shall not prejudice any rights of the Purchaser as per other terms of this Agreement / Purchase order.

9.6 In the event of a breach by the Supplier of its obligations under this Agreement, the Purchaser shall have the right to terminate the Agreement and / or the Purchase Order issued thereunder in whole or in part or to rescind the Purchase Order, in each case without any liability to the Purchaser.

9.7 The Purchaser reserves the right to reject Material in case it is supplied prior to the scheduled delivery date until otherwise specifically waived-off in writing by an authorized Representative from the Purchaser's commercial department, prior to dispatch.

10. INSPECTION, SAMPLING AND ANALYSIS

10.1 The inspection, sampling and analysis of the Material shall be carried out as per the details provided under Annexure I.

11. SPECIFICATION VARIATION

Purchaser may, at any time, make changes within the general scope of the Agreement and/or Purchase Order by giving written notice to Supplier. Such changes may include changes to the technical Specification of the Material, quantities, method of shipping, inspection standards and place of delivery. Upon receipt of such variation request, if any such change affects the purchase price and/or delivery date, Purchaser and Supplier shall agree upon an adjustment to the price and/or delivery date. The change to the Specification and /or Purchase Order, together with any adjustment to price and/or delivery date, if any, shall be set forth in a revised Variation Order issued by Purchaser and acknowledged by Supplier in writing.

12. ASSIGNMENT AND SUBCONTRACTING

12.1 Supplier may not assign, sublet or subcontract its rights or obligations under any Purchase Order, in whole or in part, to any third party without the prior written consent of Purchaser, which the Purchaser may at its sole discretion accept or refuse. Supplier shall have a written contract in place for each approved sub-supplier prior to such sub-supplier supplying any Material. Supplier shall assume full responsibility for the acts or omissions of Supplier's sub-suppliers of any tier. All of Supplier's subcontracts, if any, for the supply of Material shall contain terms and conditions substantially similar to those contained in this Agreement and/or the applicable Purchase Order which protect and do not restrict Purchaser's rights as set forth in this Agreement and/or in the applicable Purchase Order.

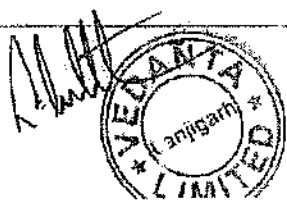
12.2 Purchaser shall have the right to assign the Agreement / Purchase Order to its Affiliate or any third party customer. This Agreement shall inure to and be binding upon the respective successors and assignees of the Parties.

13. RECOURSE OF THE PARTIES

13.1 Supplier shall look only to Purchaser for the due performance of the Purchase Order and nothing therein contained shall impose any liability upon, or entitle Supplier to commence any proceedings against any third party customer or any person not a party to the Agreement or the Purchase Order.

13.2 Purchaser shall be entitled to enforce any Purchase Order on behalf of any third party customer in connection with the Agreement / Purchase Order as well as for itself and for this purpose, only Purchaser may commence proceedings against Supplier. The obligations and liabilities of Purchasing Group issuing Purchase Orders are several and not joint.

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13.3 It is clarified that under no circumstances, by virtue of this Agreement, will the employee/workers of the Supplier be deemed to have any privity of contract with the Company nor would they or any of their heirs, assigns or successors would claim any benefit / privilege, whatsoever, from the Company.

14. NOTICE:

All Notices to Buyer under this Agreement shall be addressed to:

VEDANTA LIMITED,
PO: LANJIGARH, DIST: KALAHANDI,
ODISHA, INDIA-766027,
FAX +91-6677 247311
Email:
Anil.Raj@vedanta.co.in
Amit.Goel@vedanta.co.in
Santhana.Krishna@vedanta.co.in
Praveen.Shukla@vedanta.co.in
Raghunath.Pradhan@vedanta.co.in

All Notices to Seller under this Agreement shall be addressed to:

The address and / or phone/ email/ facsimile number as given above of respective Party may change. In such instances, notice of such change shall be given in writing and shall be effective when actually received by the addressees.

All notices by Buyer and Seller, as the case may be, as well as correspondence in connection with this Agreement shall be deemed to have been duly given by Buyer/Seller upon having been sent by telefax/ email, or four days after having been mailed by registered letter, to the addresses first set forth above.

15. PREVAILING EFFECT OF THIS AGREEMENT AND RELEVANT PURCHASE ORDER(S)

15.1 This Agreement shall comprise of the following documents:

This Agreement

Annexure I: Scope of Contract

Annexure II: Standard Terms and Conditions

Annexure III: Code of Conduct

Exhibit A: Corporate Policy Directive Possession of Contraband Items

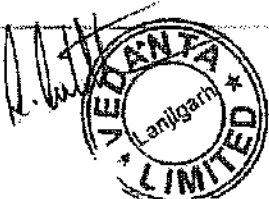
(all hereinafter the "Agreement").

15.2 This Agreement shall be governed solely as per the terms of this Agreement, to the entire exclusion of any terms/conditions that the Supplier may state/ mention in any quotation and/or any other correspondence made by the Supplier. Consequently, the terms of this Agreement shall apply and shall be incorporated by reference / deemed incorporated in any Purchase Order issued hereunder and shall prevail at all times between the Parties over any other terms and conditions (including any terms or

Vedanta Limited (Formerly known as Sesa Sterlite Limited)

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conditions which Supplier purports to apply to any purchase order, confirmation of order, Specification, Invoice or other document) with respect to the provision of Materials, except where the Parties, by its authorized signatories, have specifically agreed in writing to vary and override the terms of this Agreement or the Standard Terms and Conditions by Special Terms.

IN WITNESS WHEREOF the Parties hereto have executed and delivered this Agreement as of the date first above written.

Vedanta entity name:

Counterparty

Company: Vedanta Limited

Company: GANDHAR OIL REFINERY (INDIA) LIMITED

Signed: [Signature]

Signed: [Signature]

Name: Mr. Anil Raj

Name: Vaidhvi Bhanoti

Position: Chief Commercial Officer (CCO)

Position: Sr Vice President - Marketing

Date: _____

Date: _____

PLEASE TICK:

WE HAVE READ THE STANDARD TERMS AND CONDITIONS ENCLOSED WITH THIS AGREEMENT

Vedanta Limited (Formerly known as Essar Steel India Limited)
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ANNEXURE I

SCOPE OF CONTRACT

1. COMMODITY

This contract is for the sale of Coal, which shall mean, Steam (non-coking) coal of South African Origin in Bulk.

2. Contract Price

The Contracted Rate is USD 67.95 PMT.

3. Contract Quantity

The Contracted quantity is 125000 (+/-) 10% metric tonne.

4. DELIVERY

Delivery can start after 1st November 2018 and maximum by 28th February 2019.

5. PAYMENT

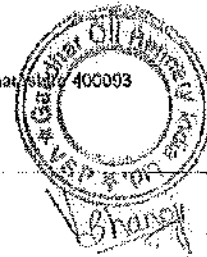
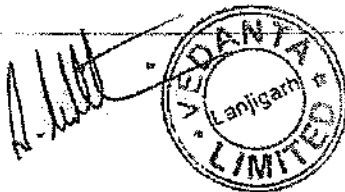
100% usance LC validity 180 days. Interest on Vedanta scope.

- a) Payment to be made against usance LC of 180 days, interest being in Vedanta's scope
 - b) Tax invoice to be raised for 100% amount (basis 5300 GCV) at the time of RR and payment to be done as under:
 - ✓ 100% payment LC to be paid within 7 working days from the date of submission of following documents: Original Tax Invoice & Copy of RR to the bank along with GRN & quality finalization as per Vedanta's lab. Vedanta will provide payment certificate to you and LC can be discounted basis scanned copy of payment certificate.
- The same shall be applicable on rake to rake basis.

***Scanned copy of payment advice from Vedanta- Payment Certificate should be issued by Vedanta Ltd within 3 days from date of receipt of Rake., Vedanta will issue a payment advice after adjustment of Dead freight Quality adjustment, the same can be presented to bank for payment purpose.

- ✓ Vedanta plant Lab Quality shall be final for payment purpose for both the parties.
- ✓ Dead freight beyond 150 MT in RR Quantity and RR Chargeable quantity shall be in Seller's account.

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✓ Punitive shall be on Seller's account.

Invoice pattern should be as follows

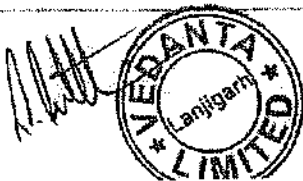
	Rate	Variable (Approx only) Rs.	Total(Rs.)
Basic	67.955	74	5028.3
BCD	As per B.E fix	148	148
Port	175 fix		175
Cess	400		400
GST	5%		267.5

6. SPECIFICATIONS

The Coal sold under this contract shall have the following specifications

S/N	Description	Basis	UOM	Value	Max	Min	REJECTION*
1	Total Moisture	ARB	%	6	8		ABOVE 10%
2	Ash	ADB	%	26	28		ABOVE 30%
3	Volatile Matter	ADB	%	24	28		Below 20%
4	Sulphur	ADB	%	1%	1%		NA
5	HGI	ARB		45 - 70			NA
6	GCV	ARB	Kcal / Kg	5300		5250	Below 4800 GCV ARB
7	Size	MM	MM	0 - 50			NA
8	IDT						NA
9	Iron Fe2O3		%				NA

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7. Price Adjustment

7.1 IF GCV ARB(5300-5000) :

Adjusted CIF Price PMT = $\frac{\text{Actual Gross Calorific Value (ARB)} \times \text{Base CIF Price}}{\text{Contractual Gross Calorific Value (ARB)}}$

7.2 IF CCV ARB(4999-4800) :

In this case double prorate shall be deducted.

For. Ex - If Quality found =4900 GCV (ARB), Calculation shall be as CIF (67.95\$)X4900/5300=62.82\$.

Penalty shall be double prorate i.e 67.95\$-62.82\$= 5.13 x2= 10.26\$. So total Payment shall be 67.95\$-10.26\$=57.69\$.

7.3 IF GCV ARB(Below 4800) :

Below 4800GCV (ARB) then material shall be fully rejected & supplier shall returned back the same.

Note:-

1. If material found rejection grade at discharge port then buyer has the rights to reject the same at discharge port only.
2. Seller has to ensure there should not be any blending/Contaminations of cargo during the lifting period. If found then the buyer shall have the rights to reject the same at discharge port.

All percentages used refer to percentage by weight, quality to be determined pursuant to Article 3.0.

8. USD EXCHANGE RATE

Exchange rate to be final on SBI- TT selling rate tax invoice date / RR date on rake to rake basis, Custom duty to be extra at actuals as Bill of entry-Invoice date should be RR date

9. DUTIES AND TAXES

This sale is made on Stock & Sale basis. The seller shall file the Bill of Entry in its name and shall arrange to clear the cargo. Buyer will pay all charges to clear the cargo including Custom duty, CESS, directly to Seller.

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Stevedoring, Port handling, clearing charges, plot rent, and any other charges, duties, levies etc. Limited to Rs 175 Per MT till 28th February 2019.

ANNEXURE II

STANDARD TERMS & CONDITIONS


Coal Procurement
STCs.pdf

Vedanta Limited (Formerly known as Essar Sterlite Limited)
Registered Office: 1st Floor, C Wing, Unit 103, Corporate Avenue Axis Projects, Chakala, Andheri (East), Mumbai, Maharashtra 400054
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This Supplier Code of Conduct is applicable to all 'Suppliers' globally. 'Supplier' here refers to suppliers/ service providers/ vendors/ traders/ agents/ consultants/ contractors/ joint venture partners/ third parties including their employees, agents and other representatives, who have a business relationship with and provide, sell, seek to sell, any kinds of goods or services to Vedanta Resources Plc or any of its subsidiaries, affiliates, divisions ("Vedanta").

This Code sets forth the basic requirements that we ask our Suppliers to respect and adhere to when conducting business with Vedanta. This Code embodies Vedanta's commitment to internationally recognized standards, including the Core Conventions of the International Labour Organization, United Nations' Universal Declaration of Human Rights as well as prevalent industry standards, and all other relevant and applicable statutory requirements concerning Environment Protection, Minimum Wages, Child Labour, Anti-Bribery, Anti-Corruption, Health and Safety, whichever requirements impose the highest standards of conduct.

▪ LABOUR & HUMAN RIGHTS

Adhering to all Labour Laws and Human Rights Laws, Suppliers shall:

- Comply with all applicable local, state and national laws regarding human rights.
- Comply with the Company's Human Rights Policy.
- Ensure that all their employees are hired on their own free will and guarantee that all their operations are free from forced, bonded, compulsory, indentured, prison labour or any other form of compulsory labour and child labour.
- Ensure that all its employees are provided equal employment opportunities, an environment conducive to their growth, free from any form of discrimination and harassment.
- Ensure compliance with minimum working hours and minimum wages prescribed by applicable laws and regulations.
- Comply with all slavery and human trafficking laws. Suppliers must ensure they have taken steps to ensure their business operations are free from slavery and human trafficking practices both internally and within their supply chains and other external business relationships.
- Ensure that employees are not be charged any fees or costs for recruitment, directly or indirectly;
- Not confiscating or withholding worker identity documents or other valuable items, including work permits and travel documentation of any of its workers/ employees.

▪ HEALTH, SAFETY & ENVIRONMENTAL SUSTAINABILITY

- The Supplier shall provide its employees with a safe and healthy working environment and comply with all applicable laws and regulations regarding working conditions.
- Supplier shall follow all Environmental, Health and Safety and other operational policies of the Company while executing any work or contract at the company site.
- Supplier shall follow all laws of the land including laws on Environment sustainability and protection while executing any work for the Company.

SSSSSS

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▪ BUSINESS INTEGRITY

Anti-Bribery: The Supplier shall not, directly or through intermediaries, take any recourse to any unethical behaviour (implicit or explicit), or offer or promise any personal or improper advantage in order to obtain or retain a business or other advantage from a third party, whether public or private, including with any employee of Vedanta. More specifically:

- Shall not offer or accept bribe or use other means of obtaining undue or improper advantage, offer or accept any kickbacks, and shall not take any actions to violate or cause its business partners to violate any applicable anti-bribery laws and regulations including the Foreign Corrupt Practices Act of USA (FCPA), Bribery Act of United Kingdom and Prevention of Corruption Act of India.

- Shall not take any advantage of any family/ social/ political connections to obtain favorable treatment or for the advancement of business or obtaining any favours. Merit shall be the sole attribute of association with Vedanta.

- Shall not enter into a financial or any other relationship with a Vedanta employee that creates any actual or potential conflict of interest for Vedanta. The Supplier is expected to report to Vedanta any situation where an employee or professional under contract with Vedanta may have an interest of any kind in the Supplier's business or any kind of economic ties with the Supplier.

- Shall not offer any gift, hospitality or entertainment for the purpose of obtaining any advantage, order or undue favor.

Unfair Trade Practices: Supplier shall desist from any unfair or anti-competitive trade practices.

REPORTING OF UNETHICAL PRACTICES AND GRIEVANCE ADDRESSAL MECHANISM

The Supplier shall ensure that an effective grievance procedure has been established to ensure that any worker/ employee, acting individually or with other workers, can submit a grievance without suffering any prejudice or retaliation of any kind.

Suppliers shall also forthwith report any unethical activity or discrimination if practiced by any Vedanta employee/other Suppliers as per Vedanta whistle-blower policy (uploaded on the company website). sgl.whistleblower@vedanta.co.in

▪ INTELLECTUAL PROPERTY

The Supplier shall take appropriate steps to safeguard and not infringe any Vedanta confidential and proprietary information/ intellectual property/ technology which come to its knowledge during the course of its business relationship/ dealings with Vedanta. In case of sub-contracting, sharing of confidential information should be made with the consent of Vedanta.

▪ THIRD PARTY REPRESENTATION

The Suppliers shall not be authorized to represent Vedanta or to use Vedanta's brands without the written permission of Vedanta. Third parties and their employees who are authorized to represent Vedanta are expected to abide by the Vedanta's Code of Conduct & Business Ethics Policy in their interaction with, and on behalf of Vedanta including the confidentiality of information shared with them and to sign a non-disclosure agreement to support confidentiality of information.

▪ PROHIBITION ON INSIDER TRADING

If the Supplier becomes aware of material, non-public information relating to Vedanta or its business, it may not buy or sell Vedanta securities or engage in any other action to take advantage of that information, including passing that information on to others. In addition, if the Supplier becomes aware



of material, non-public information about any other company, including Vedanta customers, suppliers, vendors or other business partners, that is obtained by virtue of the supplier's interaction with Vedanta, then the Supplier shall not buy or sell that company's securities or engage in any other action to take advantage of that information, including passing that information on to others.

SUPPLIER'S COMPLIANCE COMMITMENT

Vedanta expects the Supplier to adhere to all applicable laws and regulations and in particular comply with this Code in letter and spirit. It is the Supplier's responsibility to read and understand the contents of this Code and Vedanta's Code of Conduct & Business Ethics Policy. As a condition of doing business with Vedanta, the Supplier must comply with this Code and agree to uphold such values during its business association with Vedanta.

The Supplier shall maintain adequate documentation to demonstrate compliance with the principles of this Code, and allow access to Vedanta to check compliance upon request with reasonable notice.

The Supplier shall notify Vedanta regarding any known or suspected improper behaviour by the Supplier relating to its dealings with Vedanta, or any known or suspected improper behaviour by Vedanta employees.

Please contact the concerned Head commercial/ Company Secretary if you have any questions about this Code.

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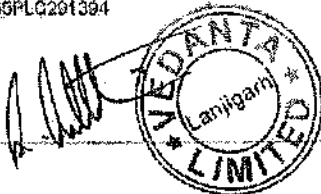


EXHIBIT A CORPORATE POLICY DIRECTIVE - POSSESSION CONTRABAND ITEMS

It is the policy of Vedanta to maintain a safe work environment for its employees. To this end, the possession of any illegal drug, drug paraphernalia, alcoholic beverage, explosive, weapon or any other similar item or substance which could cause or contribute to injury to Vedanta personnel or damage to its property ("contraband") is strictly prohibited at work locations or other business premises ("work areas") of Vedanta. This policy may be implemented by such reasonable means as may from time to time be determined appropriate, including searches of the person and personal effects of any person.

Compliance with this policy is a condition of employment of Vedanta and employees who decline to be searched or who are otherwise found in violation of this policy will be subject to immediate termination. Non-employees who decline to be searched or are otherwise found in violation of this policy or Vedanta's Substance Abuse Policy will be excluded from Vedanta work areas. Below is a Notice outlining Vedanta's Substance Abuse Policy.

DRUGS, ALCOHOL, FIREARMS, SEARCHES

Vedanta is concerned about the effects of the use of illegal drugs and the abuse of alcohol on the health and safety of its employees. We recognize that alcoholism and the illegal use of drugs leads to increased accidents and medical claims, and can lead to the destruction of an employee's health, and adversely affect his or her personal life. Employees who abuse drugs and alcohol are a danger not only to themselves, but also to their fellow employees. In addition, the medical costs incurred by employees with drug or alcohol problems are much higher than those of other employees, and the decreased productivity of these individuals can adversely affect a company's ability to operate competitively. To help prevent substance abuse among our employees, Vedanta has a policy and practice of testing applicants, employees, and others that may regularly work in or on Vedanta premises. Applicants for employment will be required to undergo a drug-screening test as part of consideration for employment. Employees and others will be required, under certain circumstances, to cooperate with drug testing procedures and drug searches.

The unauthorized possession or use of illegal, drugs, narcotics, alcohol and firearms is not permitted on any Vedanta property or job site that is not Vedanta property, and the use of, possession of, and/or distribution of such items by any person on any Vedanta installations, property, or facilities poses a serious threat to the safety of our employees, other personnel and operations.

SEARCHES, INSPECTIONS, AND ANALYSES

We reserve the right, at all times, to have authorized personnel conduct reasonable searches or inspections on Vedanta property of personal effects, lockers, baggage, vehicles, and quarters of employees and other personnel for the purpose of determining if any such persons are in possession of any illegal or unauthorized items. These searches will be conducted in cases where the Vedanta receives reliable information indicating that reasonable cause exists to conduct a search.

Any Vedanta employee who refuses to submit to a search, urine analysis, blood test, or who is found in possession of any such illegal or unauthorized items without an explanation satisfactory to us will be subject to disciplinary action up to and including immediate discharge.

When appropriate, such items discovered through these Vedanta searches may be taken into custody and may be turned over to the proper law enforcement authorities.

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STANDARD TERMS & CONDITIONS

1. TAXES AND DUTIES

1.1. Definition
For the purposes of this Clause (Taxation)

- (a) "Tax" or "Taxes" means taxes, levies, duties, fees, charges and contributions as demanded from time to time and any interest or penalties thereon;
- (b) "Government Authority" or "Government Authorities" means any local or national government or authority of any country, competent to levy any Tax;
- (c) "Goods & Services Tax" or "GST" shall include Central Goods & Services Tax ("CGST"), State Goods & Services Tax ("SGST"), Integrated Goods & Services Tax ("IGST"), Union Territory Goods & Services Tax ("UTGST") & GST Compensation Cess.

1.2. Person Responsible for payment of Taxes

1.2.1. Except as may be expressly set out in this Contract, the Supplier shall be responsible for:

- (a) the payment of all Taxes now or hereafter levied or imposed on the Supplier or its subcontractors or on the personnel of the Supplier or its subcontractors by any Government Authority in respect of any wages, salaries and other remuneration paid directly or indirectly to persons engaged or employed by the Supplier or its subcontractors (hereinafter referred to as "Personal Income Tax");
- (b) the payment of all Taxes now or hereafter levied or imposed by any Government Authority on the sales/realized profits and gains made by the Supplier or its subcontractors (hereinafter referred to as "Corporate Income Tax");
- (c) the payment of all GST now or hereafter levied or imposed by any Government Authority on the supply of goods or services, if any, provided to the Company by the Supplier or its subcontractors;
- (d) the payment of all Taxes now or hereafter levied or imposed by any Government Authority on the imported goods only, namely, petroleum crudes, IRD, Petrol, Natural Gas & ATF, if any, sold to the Company by the Supplier or its subcontractors (hereinafter referred to as "Sales Tax/VAT/Excise");
- (e) the payment of all Taxes now or hereafter levied or imposed by any Government Authority on the imported goods only, namely, petroleum crudes, IRD, Petrol, Natural Gas & ATF, if any, manufactured by the Supplier or its subcontractors for sale to the Company (hereinafter referred to as "Petroleum Duty/Levy");
- (f) the payment of any other Taxes now or

hereafter levied or imposed by any Government Authority on the Supplier or its subcontractors as a result of the performance of this Agreement.

1.2.2. Exception in General

Notwithstanding the above, the Supplier shall notify the Company whether or not it has filed a statement in India. If the Supplier notifies the Company that it does not have filed a statement in India, then, any Input GST chargeable on the services provided by the Supplier under this Agreement shall be paid by the Company directly to the relevant Government Authority.

1.2.3. Reimbursement of Taxes to the Supplier

It is acknowledged that responsibility for payment of Taxes to the Government Authority will be assumed by the Company and Taxes, the Supplier will be reimbursed for such Taxes which will be agreed to be reimbursed in the Compensation Schedule or any of the Purchase Orders issued under the Agreement.

1.2.4. Pricing

The Parties agree that details of Taxes included in, or excluded from, the Supplier's price and/or rates shall be as stated in the Compensation Schedule to the Agreement and nothing in this Clause shall be construed to affect or prejudice such details as stated in the Compensation Schedule.

1.3. Withholding taxes and Withholding certificates

1.3.1. The Company shall, at the time of its payments due to the Supplier, withhold the necessary taxes at such rate as is required by any Government Authority, in order and to the extent that the Supplier shall furnish to the Company any certificate issued by a Government Authority (during authority to issue such certificate) authorizing the Supplier to receive the payments under this Agreement for a prescribed period without deduction of any tax or deduction at a lower rate.

1.3.2. The Company shall provide the necessary withholding tax certificates to the Supplier within the time specified by the relevant law to enable the Supplier to file the same with the Government Authority as a proof of payment of such taxes.

1.4. Person Responsible for filing of returns / information to Government Authorities

1.4.1. The Supplier shall be responsible for filing all necessary Tax returns (including, without limitation, returns for Corporate Income tax, Personal Income tax, GST, Sales tax and Excise Duty) with the relevant Government Authorities in accordance with all applicable statutory requirements and shall be responsible for providing all information requested by such Government Authorities.

1.4.2. The Supplier shall also ensure that its subcontractors file such returns as stipulated by the



relevant Government Authorities and furnish such information as requested for by the relevant Government Authorities.

14.3 The Company, with respect to taxes withheld from the Supplier in accordance with Clause 1.1 (Withholding Tax and Withholding Tax Certificate), shall be responsible for filing the withholding tax returns with the relevant Government Authorities in accordance with applicable statutory requirements.

14.5. Company's rights, if treated as representative assessee by Government Authorities:

In certain situations, a Government authority may treat the Company as the representative assessee of the Supplier and/or its subcontractors and recover the Taxes due to the Government Authority by the Supplier or its subcontractors from the Company. In such situations, the Company shall have the following rights:

(a) The Company shall be entitled to recover from the Supplier, the Taxes paid on behalf of the Supplier or its subcontractors (together with any costs and expenses incurred by the Company in connection therewith) or to retain the same out of any amounts to be paid to the Supplier or its subcontractors that may be in its possession, custody and/or under this Agreement or otherwise and shall pay only the balance, if any, to the Supplier; and

(b) If the Company is required to furnish any details or documents in such capacity, the Company shall request the details or documents to be furnished to it by the Supplier and the Supplier shall immediately furnish the same to the Company. If the Supplier fails to comply with the foregoing, any penalties/interest levied on the Company for furnishing or late filing of details or documents in this regard shall be recoverable from the Supplier.

14.6. Indemnity

The Supplier shall defend, indemnify and hold the Company harmless from and against any and all claims, liabilities, costs, damages and expenses (including court costs and legal fees) in connection with any Taxes which may be levied or imposed on the Supplier or its subcontractors by any Government Authority arising out of or in connection with the performance of this Agreement.

14.7. Changes in Law

If after the date of execution of this Agreement, there is any change in law which results in a change in the rate of any Tax included in the Supplier's prices or rates or the introduction of a new Tax and such change results in an increase or decrease in the cost to the Supplier of performing this Agreement then the Parties shall agree to a variation in pricing to reflect such change provided that:

- (a) the Party requesting such revision shall promptly (and in any case prior to execution of the Supplier's final invoice under this Agreement) notify the other Party that such change in law has arisen; and
- (b) the Party requesting such revision shall provide the other Party with reasonable proof of such change in cost to the reasonable satisfaction of the other

Party; and

(c) the provisions of this Clause 1.7 shall not apply to changes in Personal Income Tax or Corporate Income Tax or to changes in non-Indian Taxes.

14.8. GST Compliances by Supplier

14.8.1. Notwithstanding anything contained hereinafter, the Supplier shall strictly and in a timely manner adhere to and maintain all acts, initiatives and compliances required under the applicable GST laws to ensure that the Company is able to avail the Input Tax Credit Act and/or benefits of the GST (along with credit and set-off, if relevant) as applicable on the Services or any supplies if applicable made by the Supplier under this Agreement to the fullest extent possible in law. In this regard, without limiting the generality of the foregoing obligation in any manner whatsoever, Contractor reserves the right to specify to the Supplier, particulars including but not limited to the following:

- (a) whether Supplier should charge IGST or CGST plus SGST;
- (b) GST registration number of the Company;
- (c) whether the Supplier should be responsible to generate the E-Way Bill;
- (d) the period of invoice validity and debit note/cancellation vouchers;
- (e) the requirements for maintenance of a GST compliance rating score above a specified threshold, etc. and
- (f) the relevant timelines for such compliances based on the applicable GST law.

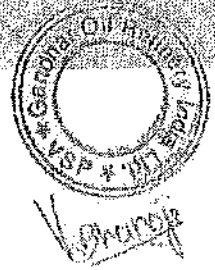
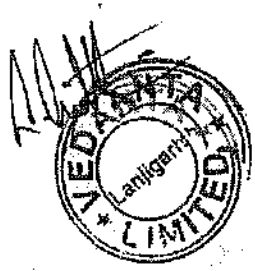
14.8.2. The Supplier acknowledges that any failure in the foregoing obligations (including maintaining the compliance records instructed by the Company if any) can cause significant losses to the Company in the form of loss of GST credit, statutory interest liability on such credit (under applicable GST laws) and adverse impact on the GST compliance rating score and thus, undertakes to carry out this foregoing obligation with sincerity, due diligence and without any delay or default.

14.8.3. The Parties agree that the Company reserves the right to reimburse the GST component on invoices received only when the corresponding credit has been availed in the electronic credit ledger of the relevant GST registration of Company.

14.8.4. Without prejudice to any other indemnification obligation under this Agreement, the Supplier agrees to, at all times, to hold harmless and indemnify Company from and against all claims, liabilities, expenses, proceedings, costs and losses that may be suffered or incurred by Company which may arise out of or in connection with any failure by the Supplier to adhere to its obligations including but not limited to its obligations under clause 1.4.7 above. In this regard, the Supplier also hereby indemnifies Company from any costs, claim or liability arising out of any claim for action or counterclaim by employee or consultant (agent or contractor) of or subcontractor of the Supplier.

2. STATUTORY COMPLIANCE/OBLIGATIONS

2.1. The Supplier shall be solely liable for statutory compliances in respect of all applicable laws of land



- 22 Purchaser is obligated to ensure that its suppliers meet the criteria for security mandated by the Customs-Traffic Protection Against Terrorism (CTPAT) program. In order to comply with these requirements, Purchaser requires Supplier to be a CTPAT certified participant where applicable, or satisfy comparable security program policies and procedures as follows:
- (i) If Supplier is CTPAT Certified, upon receipt and verification of the SVI's (Status Verification Indicator) Purchaser requests a copy of the official letter, a copy of the CTPAT Certificate to Supplier, and the Supplier RV letter for file and audit record.
 - (ii) If Supplier is not CTPAT certified or does not qualify under Customs terms to be CTPAT certified, Supplier must provide evidence its approach under a similar supply chain security program that is endorsed and sponsored by its local country (for e.g., PIP in Canada) OR must provide a statement from a company senior executive officer of its intent and plan to provide its supply chain security policy and procedure that describes its supply chain security systems that meet or exceed these requirements in US CTPAT. Upon written request, Supplier shall provide Purchaser with copies of its written tracking procedures to verify the Supplier's compliance with comparable supply chain security programs as required under CTPAT.
 - (iii) Supplier shall pass to Purchaser or its designated Representative the risk from this to this, upon later written notice to Supplier and as reasonable due and basic, to risk Supplier's liability to perform on said of Supplier compliance with its security obligations. Upon completion of any review by Purchaser, Supplier will be advised in writing if any corrective action is required to assure compliance with the CTPAT program. Based on the type of corrective action required, the parties will mutually establish a time period for implementation of the corrective measures required. If Supplier does not comply within a reasonable time period with the requirements for CTPAT compliance, Purchaser will be entitled to treat Supplier's failure to comply as a material breach of this MPA.
3. INSURANCE
- Insurances shall be arranged according to the applicable INCOTERMS as provided in the Scope of Contract.
4. WARRANTIES AND REPRESENTATION
- 4.1 The Supplier represents and warrants that:
- (i) It is a duly organized company/limited liability entity validly existing under the laws where it is incorporated/established, and has adequate, adequate, ability and assets as required to supply Materials as defined in the Scope of Contract above and as may be necessary to perform its obligations

- hereunder in a professional manner
- (ii) It has all the requisite power, authority and approvals required to enter into this Agreement and will have all the requisite power, authority to perform fully and every obligation under this Agreement.
 - (iii) This Agreement has been duly executed and delivered by its duly authorized representative and constitutes its legal, valid and binding obligation enforceable against it in accordance with its terms.
 - (iv) The execution, delivery and performance of this Agreement and all instruments or documents required hereunder by it does not constitute, violate or constitute a default of or require any consent under the provisions of any other agreement or instrument to which it is bound, including the constitutional documents thereof, or any order, judgment, decree or injunction of any court of law.
 - (v) No legal proceedings are pending or threatened against it before any court, tribunal or authority which do or may restrict or impede its performance or observance of the terms and conditions of this Agreement or which do or may in any other manner question the validity, binding effect or enforceability of this Agreement.
 - (vi) No order has been made or petition presented for the bankruptcy protection, winding up or dissolution thereof against it.
 - (vii) It shall maintain high professional standards to ensure performance of this Agreement as per best business practices and in full compliance with statutory obligations.
 - (viii) It has all necessary statutory and regulatory permissions, approvals and consents for the running and operation of its establishment for the conduct of its business.
 - (ix) It has full right, title and interest in and to all trade names, trademarks, service marks, logos, symbols and other proprietary marks (IPR) (including limited right of use of those owned by any of its vendors, affiliates or subcontractors) which it provides to the Company, for use related to the Material, and that any IPR provided by the Supplier shall not infringe the IPR of any third party.
 - (x) The Supplier represents that there is no inquiry, investigation pending by the Police against the Supplier or its employees. The Supplier undertakes that it will continue at his own cost and expense and shall comply in all respects with the provisions of Government Statutory applicable to the Supplier and to the Supplier's employees.
 - (xi) The Supplier shall be liable for all fines, penalties and the like of parking, traffic and other criminal offences arising out of or concerning the use of any vehicle for performing the agreement and any toll charges or entry Taxes payable locally and the Supplier's employees/subcontractors/Company agent all such liability.
 - (xii) The Supplier has sufficient resources available to respond to contingencies/ incidents, which may occur along established transportation routes. In



case of any accident resulting in loss or damage to property of the Supplier, the sole responsibility for any legal or financial implications would vest with the Supplier. Company shall have no liability whatsoever.

4.2 Each Party hereby warrants that it has not entered into this Agreement relying on any warranty, representation or undertaking except for any warranty, representation or undertaking expressly set out in this Agreement.

4.3 Supplier warrants and guarantees that:

(i) all Material shall be supplied in accordance with the provisions of the Agreement/Purchase Order and with generally accepted industry standards. Trade Usage will regard to quality, specification, quantity, measurement;

(ii) it is aware of the purpose and usage of the Material by the Purchaser including the technical parameters attributable to the usage of the Material; and

4.4 If Supplier is required to replace defective Material, the warranty period shall renew for the replaced Material.

3. BUSINESS ETHICS

5.1 The Supplier shall declare any conflicts of interest with the Company including relationship or financial interest of any nature whatsoever with employees, managers, other suppliers, vendors or stakeholders of the Company.

5.2 The Supplier shall not use the services of any of the employees of the Company, directly or indirectly or enter into any part of business transaction with the employees of the Company. The Supplier undertakes that he has not given, offered or promised to give directly or indirectly any bribe, commission, gift, consideration, reward, or inducement to any of the employees of the Company or their agent or relatives for showing or agreeing to show favor or disfavor to any person in relation to this Agreement or for failing to do or for having done or for failing to do any act in relation to the designing or execution of the aforesaid undertaking, by the Supplier, or his partners, agent or servant or any one authorized by him or acting on his behalf.

5.3 The Supplier agrees to comply with the provisions of the Company's Supplier Code of Conduct which includes Anti-Bribery and Corruption requirements (a copy of which is also available at http://www.volvoabraham.com/medias/116199/supplier_code_of_conduct_-_december_2016.pdf) and the Company's Human Rights Policy (a copy of which is available at http://www.volvoabraham.com/medias/116199/volvoabraham_human_rights_policy.pdf) including the Modern Slavery Act and in case of breach thereof, the same shall be treated as a breach of this Agreement.

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In the event that the Supplier fails to comply with the provisions of the Company's Supplier Code of Conduct which includes Anti-Bribery and Corruption requirements (a copy of which is also available at http://www.volvoabraham.com/medias/116199/supplier_code_of_conduct_-_december_2016.pdf) and the Company's Human Rights Policy (a copy of which is available at http://www.volvoabraham.com/medias/116199/volvoabraham_human_rights_policy.pdf), the same shall be treated as a breach of this Agreement.

10.17 Any void deemed null and void, the provisions of this Agreement, including the Modern Slavery Act and in case of breach thereof, the same shall be treated as a breach of this Agreement.

The Supplier hereby acknowledges and agrees that the Company is subject to the Modern Slavery Act 2015. In performing its obligations under this Agreement, the Supplier hereby represents and warrants that neither the Supplier nor its employees have been involved in the activities:

(a) ... have been involved in any activity involving slavery and human trafficking;

(b) ... have been or are the subject of any investigation, inquiry or enforcement proceedings, or any proceedings (adjudicative or regulatory) relating to any alleged offence or in connection with slavery and human trafficking;

(c) ... shall include in performance of any activities of slavery or human trafficking.

In the event of a breach of this Agreement, the Purchaser/Supplier shall promptly notify the Company in writing at its business address.

10.18 Each Party shall hold and retain Company being a party to this Agreement, or its material breach of the Modern Slavery Act 2015.

10.19 Any claim or demand under the Act of slavery or human trafficking in connection with this Agreement.

5.4 The Supplier shall maintain records and provide to the Company upon request such records and information, as the Company may reasonably require, confirming the Supplier's compliance with the obligations under this clause.

5.5 The Company shall have a right to initiate "audit proceedings" against the Supplier to verify compliance with the requirements under this clause. Such audit may be conducted by Company or by a named agency to be appointed by Company at the sole discretion of Company. The Supplier shall attend full cooperation for smooth completion of the said mentioned audit.

5.6 Notwithstanding anything in this agreement, Company shall have right to terminate this Agreement forthwith and recover from the Supplier, the amount of any loss arising from such termination in case, it is found that the Supplier has failed to comply with requirements under this clause including any corrupt practices. A decision of the Company or its nominee in this effect that a breach of the undertaking has been committed shall be final and binding on the Supplier.

5.7 If at any time during execution or performance of this Agreement the Supplier becomes aware of any unethical practices or is faced with any such demand, request for gratification or favor from any employee of the Company or a person connected with such employee, the Supplier must report the same immediately to the Group Head-Management because of the following address:

Group Head - Management Assurance,
Volvo, 25 Helios Road

Comments (All): The text is too small to read clearly. It appears to be a comment on the Modern Slavery Act 2015, but the details are illegible.



Vol. 101 (1), Mumbai 400 009

Complaints may also be sent to the designated e-mail id whistleblower@vedanta.in

6. DEFAULT AND TERMINATION

6.1 Either Party may unilaterally terminate all or part of this Agreement if the other Party is in breach of the terms of this Agreement.

(i) by a written notice to the other Party if the other Party has committed any material breach of the terms of this Agreement and has failed to remedy such breach within 30 days from receiving notice from the other Party.

(ii) if other Party (a) ceases, or threatens to cease, to function as a going concern or conduct its operations in the normal course of business, (b) commences, or becomes the subject of, any bankruptcy, insolvency, reorganization (other than in the course of a reorganization or to an affiliate), liquidation or similar proceedings, (c) makes, or plans to make, a general assignment for the benefit of its creditors, or (d) is the subject of or takes part in any other substantial part of a liquidation or similar proceedings.

(iii) The foregoing shall not apply to any action or proceeding which is (a) in the reasonable opinion of the Party, frivolous or vexatious, or (b) brought, raised or discussed in good faith by the Party.

(iv) If either Party is unable to comply with its obligations by reason of Force Majeure events and the Force Majeure continues for a period longer than 90 days, then either Party may, by giving notice in writing, terminate this Agreement with immediate effect. Any such termination shall be without prejudice to any of the rights of the Parties accrued prior to the date of such termination.

6.2 The Company may terminate all or part of this Agreement by one (1) month's written notice without assigning any reason whatsoever, or if the Supplier fails to obtain any approval required under the terms of this Agreement.

6.3 Upon termination of this Agreement, both Parties shall be relieved of their respective rights and obligations under this Agreement save such obligations and / or liabilities of the Parties set forth herein which (a) that the Parties have expressly agreed will survive any termination or (b) by their nature would be intended to be applicable following any such termination or termination, or (c) the Parties have agreed to be in operation or termination, as the case may be.

6.4 In the event of Supplier's breach of its obligations hereunder, its payment shall be due by Vendor in respect of such order/ purchase order, or in the case of suspension, until the failure or breach has been remedied to the reasonable satisfaction of the Vendor.

7. WAIVER OF LIABILITY

7.1 EXCEPT AS MAY BE OTHERWISE PROVIDED IN THIS AGREEMENT, IN NO EVENT SHALL EITHER PARTY BE LIABLE TO THE OTHER, WHETHER ARISING UNDER CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, FOR ANY INDIRECT, CONSEQUENTIAL, SPECIAL, PUNITIVE,

EXEMPLARY OR CONSEQUENTIAL DAMAGES OF ANY NATURE ARISING AT ANY TIME FROM ANY CAUSE WHATSOEVER.

7.2 The limitation of liability and exclusion of warranties as set out in this Agreement shall be to the maximum extent permitted by applicable law. Nothing in this agreement purports to exclude or limit liability for fraud, death or personal injury.

8. FORCE MAJEURE

8.1 Neither the Company nor the Supplier shall be responsible for any failure to fulfill any term or condition of the Agreement if and to the extent that failure has been delayed or temporarily prevented by a force majeure event such as (a) act of God, (b) fire, flood, earthquake, (c) war, riot, insurrection and civil commotion, insurrection or military, if they impede the performance of the Agreement or make performance substantially more onerous and which could not reasonably be foreseen after due and timely diligence and which, by the exercise of reasonable diligence, the said Party is unable to provide against ("Force Majeure Events"). For the avoidance of doubt, any strike or lockout by the Supplier for which it is the subject of a court order shall not be considered as a force majeure event.

8.2 The party, which is not able to perform its obligations under this Agreement on account of Force Majeure Event(s), shall without any delay, notify in writing the other party on the initiation and cessation of such Force Majeure Event(s) and shall use diligent efforts to end the failure to delay in performance to mitigate effects of such Force Majeure Event. In such a situation, the party, which is not able to perform its obligations under this Agreement on account of Force Majeure Event(s), shall not be liable to the other party for the default or breach of this Agreement for the period of failure or delay.

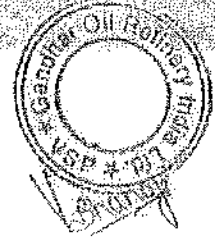
8.3 If the Force Majeure Event(s) continues beyond 90 days, the parties shall make efforts to find an amicable solution for future course of action agreeable to both parties in fair and equitable manner.

8.4 Both Parties agree to use their respective reasonable efforts to resolve any dispute of Force Majeure Event that it is reasonably possible to do so. The Parties understand that the settlement of all disputes, including any other financial disputes shall be treated to be within the sole discretion of the Party issuing Force Majeure. Upon the cessation of the event of Force Majeure, the party declaring Force Majeure shall immediately give notice thereof to the other party.

9. INDEMNITY

9.1 The Supplier shall defend, indemnify and hold the Company harmless from and against any and all claims in connection with any losses, taxes, costs and charges which may be levied or imposed on the Supplier or its subcontractors by any Government Authority arising out of or in connection with the performance of this Agreement, including claims in respect of pollution and contamination, which originated from Supplier's materials under the control of any member of the Supplier Group.

The Supplier shall be liable for and shall defend, indemnify and hold the Company harmless from and against and all



Claims in connection with any breach, performance (whether actual or alleged) of Confidentiality, and/or, liability, shall be deemed to be in connection with the performance of this Agreement by the Supplier.

9.2 This indemnity shall be without prejudice to any other rights or remedies, including injunctive or other equitable relief, which the Company may be entitled to.

9.3 Purchaser shall have the right to retain/withhold any sum payable to be made to the Supplier or amount sufficient to indemnify it completely against any such lien, claim, assessment, fine or levy exercised or made and all associated costs.

9.4 It is the express intention of the Parties hereto that the provisions of this Agreement / Purchase Order shall exclusively govern the allocation of risks and liabilities of these Parties, it being acknowledged that the Agreement reflected herein has been based upon such express undertakings. It is acknowledged that the compensation payable to Supplier as specified in this Agreement and/or purchase Order has been based upon the express understanding that risks and liabilities shall be determined in accordance with the provisions of this Agreement and/or applicable Purchase Order.

10. ARBITRATION

10.1 Any dispute or difference whatsoever arising between the parties out of or relating to the interpretation, meaning, scope, operation or effect of this Agreement or the existence, validity, breach or alleged breach thereof or determination and enforcement of respective rights, obligations and liabilities of the parties thereto shall be amicably settled by way of negotiation. If the dispute is not conclusively settled within a period of twenty-two (22) days from the date of commencement of mediation or such further period as the parties shall agree in writing, the dispute shall be referred to and finally resolved by arbitration under the (Arbitration and Conciliation Act, 1996) (as amended from time to time), which is deemed to be incorporated by reference into this clause. The arbitration shall be conducted as follows:

(i) A sole arbitrator shall be appointed by case the value of claim under dispute is less than 5,000,000 (Rupees Five Million Only) / \$ 100,000 (One Hundred Thousand United States Dollars) and in any other event by a forum of three arbitrators with one arbitrator nominated by each party and the presiding arbitrator selected by the concerned arbitrators.

(ii) The language of the mediation and arbitration proceedings shall be English. The seat of arbitration shall be New Delhi, India.

(iii) The award made in pursuance thereof shall be final and binding on the parties.

11. APPLICABLE LAW AND JURISDICTION

11.1 This agreement shall be governed by, construed and enforced in accordance with the laws of India.

11.2 The parties submit to the exclusive jurisdiction of the courts of New Delhi, India and any courts that may have appellate from these courts in respect of any proceedings in connection with this agreement.

12. CONFIDENTIALITY

12.1 Each party hereto shall, save as otherwise provided herein, maintain strict confidence, and not disclose or use for a purpose other than the purpose set out herein, any confidential and/or proprietary information ("Confidential Information") of any party including this Agreement and the terms and conditions hereof. The foregoing covenant shall not restrict a party from disclosing Confidential Information to the extent required in connection with any legal proceedings or required for filing with any legal proceedings, stock exchanges or other regulatory agencies under applicable laws and regulations. Each Party shall use its best efforts to ensure that the provisions of this Agreement and its subsidiaries, directed to it concerning the other Party and its assets and business which is not otherwise publicly available, shall be kept confidential, unless otherwise required by law, not to be disclosed without the consent of other Party to anyone other.

12.2 The parties shall restrict access to the Confidential Information only to its own employees or professional advisers who need to have such access for the purposes of performing the obligations or entering the rights under this Agreement and who have agreed with such party to abide by the obligations of confidentiality required to those contained herein with such party. The disclosing party shall remain ultimately liable for such disclosure.

12.3 Each Party agrees that it will not use the name or logo of the other party, without the prior written consent of the other party (as) herein.

12.4 All Confidential Information developed by Supplier Company as a result of supply of material shall be the property of Purchaser. All such Confidential Information shall be deemed to Purchaser within fifteen (15) days after completion of any applicable Purchase Order. Purchaser shall have the unrestricted right to use and disclose such information in any manner and for any purpose without payment of further compensation. Such Confidential Information is proprietary information of Purchaser and subject to the terms of this Clause 12.

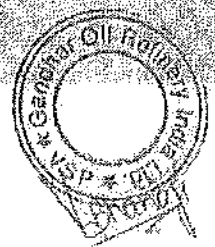
12.5 Obligations to protect Confidential Information as mentioned above under this clause shall continue to remain valid for the Term and further period of five (5) years from the date of expiry of this agreement.

12.6 No member of Supplier Group shall make use of the name or logo of Purchasing Group for publicity purposes, nor shall publicly or permit to be published any information or photographs in connection with this Agreement or any Purchase Order without the prior written consent of Purchaser.

13. MISCELLANEOUS PROVISIONS

13.1 Entire Agreement: This Agreement, along with all amendments and with all consents, if any constitute the entire agreement and understanding between the parties with respect to its subject matter and overrides all previous agreements, representations, written documents, correspondence and understanding of the parties, whether in writing or otherwise.

13.2 Severability: If any clause or provision of this Agreement is prohibited, invalid or unenforceable in any



jurisdiction, that provision will, as to that jurisdiction, be ineffective to the extent of its prohibition, invalidity or unenforceability without affecting or invalidating the remaining provisions of this Agreement or affecting the validity or enforceability of that provision in any other jurisdiction, unless it materially alters the nature or material terms of this Agreement.

13.3 Counterpart: This Agreement may be executed in one or more counterparts, each of which will be deemed to be an original Agreement and all of which, when taken together, will constitute one and the same instrument.

13.4 Relationship: This Agreement shall not be construed to have any purpose or intent other than for purposes and solely for the convenience of the Parties as a non-exclusive basis and nothing contained in this Agreement shall be deemed to create any association, partnership, joint-venture or relationship of principal and agent or master and servant between the parties or any affiliates or subsidiaries thereof.

13.5 Notice: Notification required to be given hereunder shall be given by sending the same by airmail, by mail, prepaid post or by hand delivery to the address of the addressee shown in this Agreement or to such other address as either party may notify in writing to the other for this purpose in writing. If (including airmail, airmail) shall be deemed to have been given upon successful transmission. If by hand upon at the time of deposit and if sending by post, notice shall be deemed to have been given on the 2nd day thereafter by post.

13.6 Non-Waiver/Effect of Right: A failure or delay in exercising any right, power or privilege in respect of this Agreement will not be deemed to operate as a waiver, and a single or partial exercise of any right, power or privilege will not be deemed to preclude any misapprehension or further exercise of that right, power or privilege or the exercise of any other right, power or privilege. All waivers under this Agreement must be made in writing.

13.7 Binding Effect: This Agreement shall be binding upon and upon to the benefit of the parties hereto and their respective successors and permitted assigns.

13.8 Assignment: Neither this Agreement nor any right, duty or obligation of any party hereunder may be assigned or delegated by any party (in whole or in part) without the prior written consent of the other party(ies) hereto.

13.9 Amendments: This Agreement may be amended, modified, revised or extended only by a written instrument signed by each of the parties hereto.

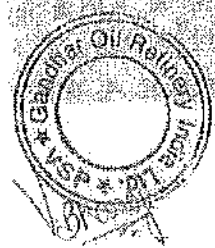
13.10 Validation: This Agreement shall come into effect when authorized representatives of both Company and Supplier execute and affix their signatures hereto in their due capacity, within a working day after confirmation of business by Company and Supplier, the entire agreement between the Parties relating to its subject matter. Any alteration, amendment or addition to any of the terms of this Agreement shall become binding only when such alteration, amendment or addition is evidenced in writing and is executed by the authorized representatives of the both parties in their due capacity.

13.11 Costs: Each Party shall bear its own legal, professional and advisory fees, connections and other costs and expenses incurred by it in connection with this Agreement.

13.12 Language of the Agreement: English shall be the language of the Agreement and all documents and correspondence relating to it. All of the parties to the Agreement shall engage in work relating to it in connection with this Agreement shall be done in English.

13.13 Remedies: Remedies available to the Parties for breach of this Agreement are cumulative and may be exercised concurrently or separately, and the exercise of any one remedy shall not be deemed an election of such remedy to the extent of other remedies.

13.14 THIS DOCUMENT (STANDARD TERMS & CONDITIONS) SHALL BE AN INTEGRAL PART OF ANY OF THE PURCHASE ORDERS, INVOICE OR ANY OTHER DOCUMENT WHATSOEVER ENTERED BETWEEN THE PARTIES AND SHALL SUPERSEDE ANY CONTRARY TERMS IN SUCH PURCHASE ORDER, INVOICE OR ANY OTHER DOCUMENT WHATSOEVER INCLUDING ANY ORDER ACKNOWLEDGEMENT BY THE SUPPLIER AND THIS DOCUMENT AND THE GENERAL TERMS AND CONDITIONS MENTIONED HEREBY SHALL APPLY FOR ALL PURPOSES.



Ref No: VLL/6500057006/GOR/MPA/01

Date: 28.02.2019

To,
The Gandhar Oil Refinery India Limited,
Flat No. 501, RK Beach Road,
Visakhapatnam- 530003.

Subject: - Amendment of MPA dated 22/10/2018

Ref: Master Coal Procurement Agreement dated 22nd Oct'19 (VLL-SAP PO – 6500057006)

Dear Sir,

As referred and agreed, we are hereby amending the MPA Annexure I - Clause 4 of validity to 30/04/19 from 28/02/19.

Rest all terms and condition to remain as per original.

Request to acknowledge the same.

Thanking You,
For Vedanta Limited, Lanjigarh


Anil Rai
Chief Commercial Officer



Vedanta Limited

PO: Lanjigarh, Dist: Kalahandi, Odisha, India – 766 027

T +91-6677 247312 - 15, Fax +91-6677 247311, Website: www.vedantalimited.com

Registered Office: Vedanta Limited 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.

CIN: L13209GA1965PLC000044



vedanta

transforming elements

Ref No: VLL/6500057006/GOR/MPA/02

Date: 28.04.2019

To,
The Gandhar Oil Refinery India Limited,
Flat No. 501, RK Beach Road,
Visakhapatnam- 530003.

Subject: - Amendment of MPA dated 22/10/2018

Reference:

1. Master Coal Procurement Agreement dated 22nd Oct'19 (VLL-SAP PO – 6500057006)
2. Amendment dated 28/02/2019

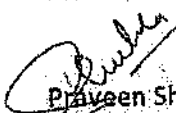
Dear Sir,

As referred and agreed, we are hereby amending the MPA Annexure 1 - Clause 4 of validity to 30/06/19 from 30/04/19.

Rest all terms and condition to remain as per original.

Request to acknowledge the same.

Thanking You,
For Vedanta Limited, Lanjigarh


Praveen Shukla
By. Manager, Coal



Vedanta Limited

PO: Lanjigarh, Dist: Kathahandi, Odisha, India – 766 027

T +91-6677 247312 - 15, Fax +91-6677 247311, Website: www.vedantalimited.com

Registered Office: Vedanta Limited 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.

CIN: L13209GA1965PLC000044

ANNEXURE - I

<i>DETAILS OF COAL PROCUREMENTS FOR FY 2018-19 (from Oct`18 to Mar`19)</i>		
MONTH	DOMESTIC (In MT.)	IMPORTED(In MT.)
Oct-18	0	32413
Nov-18	58895	23646
Dec-18	39230	31599
Jan-19	69043	11721
Feb-19	39098	23812
Mar-19	90467	11270



SR

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 31 st 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	1	2500	
Total		278.216	542922



ANNEXURE- III

<i>Sources</i>	<i>In MT</i>
Andru Minerals	248288
Alcoa World Alumina CBG	24525
POSSEHL ERZKONTOR HONG KONG LIMITED	3091
RIO TINTO ALCAN	244396
rusal trading international	9858
Alcoa World Alumina MRN	287451
Tricon Energy Limited	139095
Kawardha	221615
Mainpat	7851
OMC-Linkage	1030460
OMC-Balco	94177
Grand Total	2310807



ANNEXURE-IV

CSR EXPENDITURE FY 2018-19

A	Education & Nutrition	Budget	Cost in Lakhs
A1	Promoting education through Khushi Child Care Center	48	48.88
A2	Support to schools	11	10.82
A3	Pre Matric Tutorial Support-SHIKSHA SAMBAL	17	14.32
A4	Scholarship	3.5	3.64
B	Health & Sanitation		
B1	Promoting Preventive health through Vedanta Hospital	343	322.6
B2	Ambulance Services	17	24.55
B3	Maa Santoshi Jankalyan Hospital, Bankakundru	11	11.35
B4	Providing Safe Drinking Water	5	8.36
B5	Open Defecation Free	48	54
B6	Vedanta Baljyoti School Eye Health Program	21	21.56
C	LIVELIHOOD		
C1	SAKHI SHG strengthening & mobilization	29.99	24.11
C2	Tribal Art	11.15	8.52
C3	Dhokra Art	14	12.75
D	PRAGATI		
D1	Village Infrastructure & school Infra	159.61	191.4
D2	Tournaments	8	8.27
D3	Meetings	4	4.5
D4	Exposure Visit	0.25	0.21
D5	Programs & Competition	14	13.87
E	Program Management		
E1	Baseline Survey, Impact Assessment & Magazine	16.5	30.19
E2	Audit	14	13.86
E3	Award fees	3	3.34
E4	Travel	1	0.85
E5	Village Coordinator	10	10.25
H	Admin Expenses		
H1	Admin Salary		155.05
H2	Existing R & R		67.99
H3	CSR Non-Core		6.36
	Total Cost	810	1071.58



SAR

ENVIRONMENTAL SEASONAL REPORT

SEASONAL REPORT
October 2018 to December 2018



Address

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

January - 2019



MICRO-METEOROLOGICAL DATA AT SITE

Period: 1st October 2018 to 31st December 2018

Location: Plant Site

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Total
October`18	33.80	12.50	99.9	24.60	162.5
November`18	31.80	9.70	99.9	25.10	0.0
December`18	28.3	5.2	99.9	20.3	199.5
			Total rainfall		362

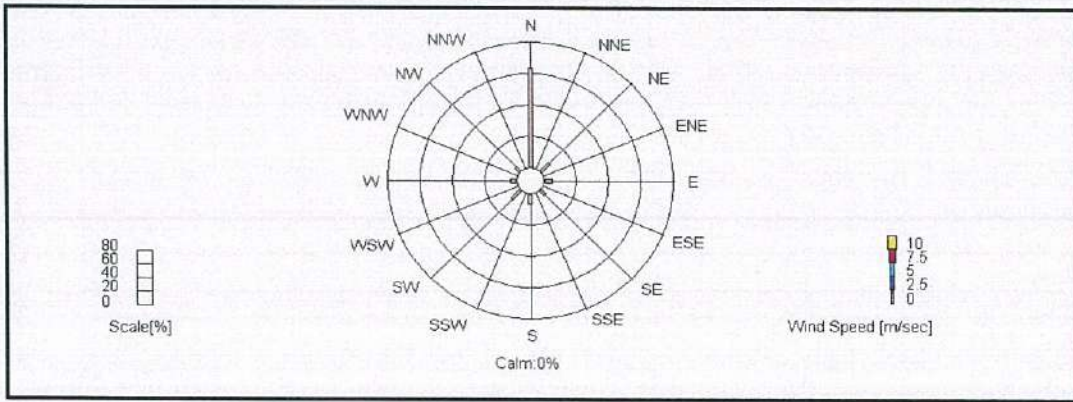
SUMMARY OF WIND PATTERN IN STUDY AREA

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Predominant Wind Speeds (m/sec)	Calm (%)
Oct` 18 to Dec` 18	N (63.31%)	NE (8.29%)	0 - 2.5	0.0

Wind Pattern during the Season

During the season the average winds from North (N) direction were observed for 63.31% of the total time, with wind speeds and the frequency in the range of 0-2.5 m/sec (63.30%), 2.5-5 m/sec (0.01%). In NE direction the winds were also observed for 8.29% of the total time, with wind speeds and the frequency in the range of 0-2.5 m/sec (8.29%). The other direction and percentage frequencies were observed from SW (8.0%), S (6.38%), E (4.63%), W (3.21%). The calm conditions were observed to be for 0.0% of the total time.





WINDROSE DIAGRAM FOR THE SEASON - (Oct'18 to Dec`18)



AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF OCTOBER 2018

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chhatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.66	9.32	7.23	10.31
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	17.4	19.49	15.78	16.75
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	49	51	54	58
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	30.31	34.19	33.34	38.14
	Ozone (O ₃)	µg/m ³	180	3.2	3.2	3.7	3.6
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.45	0.48	0.38	0.55
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	13.48	14.34	12.3	15.12
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	22.47	25.43	27.66	26.48
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	64	67	73	71
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.63	42.38	46.42	47.22
	Ozone (O ₃)	µg/m ³	180	12.1	12.8	12.8	13.5
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	1.5	2	1.9	2.5
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	5.8	6.3	6.1	6.4
Rehab colony -	Sulphur Dioxide (SO ₂)	µg/m ³	80	12.26	10.85	11.34	13.43
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	21.27	22.48	20.69	20.78

Seasonal Report (Oct` 18 to Dec` 18)

Residential	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	51	55	59	63
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	34.34	36.21	38.3	42.38
	Ozone (O ₃)	µg/m ³	180	4	5.2	5.4	4.4
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.57	0.62	0.68	0.63
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Belamba Village (Switchyard)	Sulphur Dioxide (SO ₂)	µg/m ³	80	7.29	9.64	7.17	8.51
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	16.71	20.12	16.43	15.52
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	47	51	54	57
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	29.79	32.27	34.49	37.66
	Ozone (O ₃)	µg/m ³	180	2.9	3.3	2.7	3.2
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.35	0.36	0.69	0.38
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	10.4	11.44	8.47	9.48
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	20.43	22.47	17.83	20.64
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	56	54	55	62
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	35.25	35.48	35.56	38.47
	Ozone (O ₃)	µg/m ³	180	2.4	2.1	2.5	3.2
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.52	0.47	0.49	0.37
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0

Seasonal Report (Oct` 18 to Dec` 18)

	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.54	8.44	12.26	10.67
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	18.21	19.72	18.46	14.1
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	52	50	60	62
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	30.31	31.54	37.5	43.11
	Ozone (O ₃)	µg/m ³	180	5.6	5.6	5.9	6
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.42	0.45	0.44	0.54
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0

AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF NOVEMBER 2018

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chhatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.1	9.24	7.42	10.4
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	16.31	18.15	17.4	19.25
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	55	57	60	58
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	34.19	37.5	38.3	39.31
	Ozone (O ₃)	µg/m ³	180	3.3	3.4	3.65	3.72
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.44	0.51	0.56	0.58
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0



Seasonal Report (Oct`18 to Dec`18)

	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	14.2	15.12	16.4	15.14
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	26.24	28.49	29.46	27.38
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	66	69	71	74
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	43.49	47.22	46.22	43.3
	Ozone (O ₃)	µg/m ³	180	12.3	12.9	12.6	12.45
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	1.55	2.2	1.72	1.69
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	5.9	6.5	6.1	5.9
	Rehab colony - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	13.54	10.49	12.05
Nitrogen Dioxide (NO ₂)		µg/m ³	80	22.57	23.47	24.46	20.15
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	56	59	56	61
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	35.25	39.48	36.21	38.14
Ozone (O ₃)		µg/m ³	180	4.2	5.3	5.5	4.1
Lead (Pb)		µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
Carbon Monoxide(CO)		mg/m ³	4	0.59	0.64	0.69	0.61
Ammonia (NH ₃)		µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)		µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
Benzo (a) Pyrene (BaP) Particulate phase only		ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (As)		ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
Nickel (Ni)		ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Belamba Village (Switchyard)		Sulphur Dioxide (SO ₂)	µg/m ³	80	10.3	8.17	9.32
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	19.43	21.27	20.29	18.3
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	42	54	51	55
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	30.31	34.34	33.48	35.25
	Ozone (O ₃)	µg/m ³	180	3.1	3.4	2.65	3
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02



Seasonal Report (Oct` 18 to Dec` 18)

	Carbon Monoxide(CO)	mg/m ³	4	0.38	0.38	0.67	0.35
	Ammonia (NH3)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C6H6)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	12.1	10.44	11.34	12.51
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	21.21	19.33	22.28	21.6
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	59	61	63	65
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	36.21	42.2	41.67	43.11
	Ozone (O ₃)	µg/m ³	180	2.5	2.7	2.65	2.7
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.54	0.53	0.58	0.62
	Ammonia (NH3)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C6H6)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	9.32	11.03	10.3	8.51
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	20.60	23.27	24.28	20.29
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	58	55	56	60
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.3	35.41	37.66	39.48
	Ozone (O ₃)	µg/m ³	180	5.6	5.7	5.7	5.85
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.41	0.40	0.51	0.53
	Ammonia (NH3)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C6H6)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0

AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF DECEMBER 2018

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chhatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	7.42	9.48	11.44	10.31
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	18.21	20.31	23.27	21.42
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	56	54	60	62
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	36.21	34.19	38.47	40.19
	Ozone (O ₃)	µg/m ³	180	3.4	3.3	3.68	3.75
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.46	0.5	0.57	0.59
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
	Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	13.43	14.34	16.14
Nitrogen Dioxide (NO ₂)		µg/m ³	80	27.57	29.34	30.5	32.11
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	68	71	76	78
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	42.2	46.22	50.21	52.18
Ozone (O ₃)		µg/m ³	180	12.2	13	12.8	13.12
Lead (Pb)		µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
Carbon Monoxide(CO)		mg/m ³	4	1.51	2.3	1.75	1.76
Ammonia (NH ₃)		µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)		µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
Benzo (a) Pyrene (BaP) Particulate phase only		ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (As)		ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
Nickel (Ni)		ng/m ³	20	5.8	6.6	6.3	6.3
Rehab colony - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	13.36	12.49	15.32	14.18
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	25.42	27.08	26.42	25.46



Seasonal Report (Oct`18 to Dec`18)

	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	61	63	65	68
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	39.48	37.5	43.49	42.38
	Ozone (O ₃)	µg/m ³	180	4.4	5.8	4.5	5.5
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.61	0.72	0.65	0.66
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Belamba Village (Switchyard)	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.14	10.13	9.48	11.23
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	20.38	21.48	18.21	19.19
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	51	55	56	61
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	31.68	34.05	35.25	33.48
	Ozone (O ₃)	µg/m ³	180	3.2	3.5	2.7	3.1
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.41	0.39	0.68	0.36
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
	Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.25	10.17	12.4
Nitrogen Dioxide (NO ₂)		µg/m ³	80	21.3	22.37	24.35	25.57
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	63	64	67	68
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	40.19	41.67	42.2	43.3
Ozone (O ₃)		µg/m ³	180	2.6	2.5	2.69	2.75
Lead (Pb)		µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
Carbon Monoxide(CO)		mg/m ³	4	0.58	0.51	0.62	0.63
Ammonia (NH ₃)		µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0	



Seasonal Report (Oct` 18 to Dec` 18)

	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	12.1	11.27	13.66	12.42
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	24.1	25.42	23.27	24.39
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	59	61	63	65
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.14	39.48	37.5	39.14
	Ozone (O ₃)	µg/m ³	180	5.8	5.9	5.8	5.9
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.44	0.45	0.52	0.55
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0



ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE MONTH OF OCTOBER 2018

Date of sampling	Calciner 1			Calciner 2			CFB Stack		
Parameter	SO2	NOx	PM	SO2	NOx	PM	SO2	NOx	PM
Unit	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3
01-Oct-18	301.57	398.54	30	652.40	327.39	21	2108.07	974.86	74.31
02-Oct-18	319.24	397.48	36	618.30	314.78	25	2169.41	974.37	77.92
03-Oct-18	0.00	0.00	0	0.00	0.00	0	2276.43	976.44	78.83
04-Oct-18	0.00	0.00	0	0.00	0.00	0	2252.05	976.41	71.91
05-Oct-18	228.06	397.01	32	0.00	0.00	0	2152.42	976.43	70.75
06-Oct-18	323.48	398.68	33	585.71	319.76	40	2219.61	976.13	68.88
07-Oct-18	356.02	400.74	34	634.93	323.19	32	2099.07	975.78	69.19
08-Oct-18	373.14	400.97	31	642.74	326.02	30	2054.71	975.86	69.86
09-Oct-18	382.16	407.32	32	379.11	328.17	29	2085.95	975.98	69.98
10-Oct-18	373.27	408.36	37	234.56	351.81	30	915.15	392.27	69.35
11-Oct-18	371.40	407.89	38	253.28	378.62	37	9.050	2.74	66.86
12-Oct-18	380.33	404.67	30	318.25	325.04	26	803.47	229.34	72.34
13-Oct-18	384.18	404.60	33	264.61	315.13	28	2071.08	504.12	69.57
14-Oct-18	387.20	404.14	40	251.14	327.18	27	2071.52	519.81	75.53
15-Oct-18	398.03	405.71	40	214.73	337.49	26	2071.71	519.89	78.62
16-Oct-18	383.08	406.66	36	220.68	360.66	27	2071.50	577.40	69.18
17-Oct-18	384.37	408.93	33	264.95	388.16	27	2071.47	571.29	70.71
18-Oct-18	351.95	406.92	30	94.67	388.82	24	2072.91	524.57	70.28
19-Oct-18	361.17	407.17	37	170.67	390.09	24	2138.52	515.48	75.12
20-Oct-18	374.67	407.02	31	168.99	373.62	24	2158.64	443.06	72.66
21-Oct-18	364.41	406.25	28	175.21	387.31	25	2085.46	443.52	99.97
22-Oct-18	371.71	406.61	27	192.14	388.69	26	2097.05	416.51	79.38
23-Oct-18	364.25	403.08	29	238.44	342.40	28	2082.11	417.01	80.13
24-Oct-18	381.14	402.55	29	235.42	322.50	27	2072.18	432.09	80.39
25-Oct-18	366.49	403.00	28	153.26	329.62	33	2072.09	412.66	75.43
26-Oct-18	353.34	402.43	31	79.72	329.30	30	2162.52	417.94	70.23
27-Oct-18	362.78	402.51	34	76.72	319.59	36	2242.03	541.80	74.18
28-Oct-18	371.49	403.25	32	78.21	325.55	31	2030.87	538.53	69.25
29-Oct-18	371.40	403.75	42	80.87	325.00	32	1956.67	518.59	68.05
30-Oct-18	393.37	404.40	37	81.35	327.05	28	1934.15	483.28	73.07
31-Oct-18	394.73	404.26	38	84.00	326.40	27	1946.92	532.42	79.96



Seasonal Report (Oct`18 to Dec`18)

ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE MONTH OF NOVEMBER 2018

Date of sampling	Calciner 1			Calciner 2			CFB Stack		
	SO2	NOx	PM	SO2	NOx	PM	SO2	NOx	PM
	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3
01-Nov-18	333.70	402.47	29	85.25	324.77	23	1971.97	585.38	72.59
02-Nov-18	375.17	407.08	30	85.78	362.21	29	1878.34	649.96	67.69
03-Nov-18	373.58	404.78	27	86.87	344.03	29	1771.67	552.57	66.38
04-Nov-18	390.00	404.62	28	88.99	329.45	24	1832.29	583.65	75.11
05-Nov-18	351.37	403.84	24	87.93	328.24	24	1877.87	590.52	74.20
06-Nov-18	354.95	403.28	25	88.25	332.56	24	1938.01	543.49	68.39
07-Nov-18	394.71	404.86	31	90.09	329.92	26	1957.65	580.58	67.90
08-Nov-18	379.84	404.42	37	91.27	330.51	27	1927.66	458.49	74.14
09-Nov-18	376.84	404.11	25	92.00	327.36	26	1924.89	490.14	67.56
10-Nov-18	373.45	405.07	26	88.71	332.33	30	1905.37	561.73	68.21
11-Nov-18	375.60	404.90	26	89.09	325.72	25	1977.81	504.97	73.37
12-Nov-18	401.58	405.54	28	191.60	325.50	30	1988.74	489.49	74.01
13-Nov-18	405.33	405.72	28	295.96	314.67	27	1979.62	527.02	76.04
14-Nov-18	383.56	405.67	27	190.43	326.95	24	1887.72	464.91	74.41
15-Nov-18	391.80	404.98	27	141.25	326.70	24	1938.01	502.47	71.66
16-Nov-18	390.71	406.32	28	125.37	327.48	30	1970.90	502.36	68.85
17-Nov-18	427.01	408.77	28	162.47	324.68	26	1974.28	562.56	69.49
18-Nov-18	427.14	408.58	28	199.19	327.59	26	1910.33	524.77	76.30
19-Nov-18	425.83	408.47	28	287.73	328.47	26	1879.09	528.13	79.79
20-Nov-18	436.85	408.31	28	225.28	324.29	27	1963.48	566.40	77.23
21-Nov-18	446.81	408.33	29	241.80	325.68	30	1897.66	450.54	82.54
22-Nov-18	425.93	407.90	34	262.40	327.83	27	1944.97	425.87	79.13
23-Nov-18	396.56	406.47	31	231.12	324.45	25	1968.63	561.95	71.25
24-Nov-18	394.00	405.62	28	253.34	322.23	30	1963.63	483.61	72.16
25-Nov-18	375.53	405.48	28	187.40	323.00	27	1972.19	494.69	77.49
26-Nov-18	0.00	0.00	0	209.00	320.12	26	1922.99	550.42	71.12
27-Nov-18	0.00	0.00	0	190.84	322.16	26	1954.06	502.99	71.16
28-Nov-18	0.00	0.00	0	200.10	324.19	26	1945.90	465.93	74.72
29-Nov-18	0.00	0.00	0	195.96	324.33	26	1989.31	452.99	73.95
30-Nov-18	0.00	0.00	0	207.02	318.68	27	1877.83	477.94	74.54

Seasonal Report (Oct`18 to Dec`18)

ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE MONTH OF DECEMBER 2018

Date of sampling	Calciner 1			Calciner 2			CFB Stack		
Parameter	SO2	NOx	PM	SO2	NOx	PM	SO2	NOx	PM
Unit	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3
01-Dec-18	0.00	0.00	0	227.16	321.40	29	1726.85	453.93	73.38
02-Dec-18	0.00	0.00	0	143.25	320.81	33	1667.54	414.36	70.94
03-Dec-18	0.00	0.00	0	114.73	325.12	28	1645.67	392.36	69.28
04-Dec-18	0.00	0.00	0	115.14	317.71	30	1820.84	464.15	67.08
05-Dec-18	0.00	0.00	0	116.67	330.30	26	1965.93	465.73	69.93
06-Dec-18	0.00	0.00	0	120.76	329.55	27	1939.92	471.12	73.78
07-Dec-18	0.00	0.00	0	122.65	329.04	28	1986.35	485.65	77.40
08-Dec-18	0.00	0.00	0	125.95	329.57	28	1940.92	465.49	74.59
09-Dec-18	0.00	0.00	0	129.53	328.84	49	1855.68	423.65	72.83
10-Dec-18	0.00	0.00	0	185.66	326.49	43	1951.17	418.03	70.77
11-Dec-18	0.00	0.00	0	217.24	327.10	42	1821.86	426.96	72.27
12-Dec-18	0.00	0.00	0	249.83	327.83	36	1819.66	453.51	76.01
13-Dec-18	0.00	0.00	0	226.67	330.66	32	1774.94	546.94	72.78
14-Dec-18	401.64	413.97	32	237.26	361.40	32	1806.27	498.57	68.68
15-Dec-18	437.83	413.64	42	240.80	339.82	31	1901.22	469.21	68.43
16-Dec-18	448.16	412.56	26	246.20	322.53	34	1828.86	449.56	74.16
17-Dec-18	450.15	413.62	26	248.47	323.37	37	1940.58	468.57	73.61
18-Dec-18	463.96	416.25	34	231.68	324.42	46	1910.76	507.36	68.42
19-Dec-18	462.85	415.18	40	233.98	328.24	34	1878.00	560.26	67.82
20-Dec-18	474.41	415.98	35	423.19	339.19	34	1842.38	512.68	69.11
21-Dec-18	464.32	415.37	27	568.83	320.02	31	1856.75	469.99	73.13
22-Dec-18	463.11	416.72	27	516.44	320.34	32	1929.36	483.18	70.51
23-Dec-18	446.39	419.50	28	481.35	319.74	30	1933.18	467.60	71.60
24-Dec-18	430.12	421.12	36	521.34	310.68	28	1853.12	499.83	71.41
25-Dec-18	454.32	421.80	31	509.40	315.18	28	1941.52	486.63	73.46
26-Dec-18	459.94	424.89	48	492.69	317.79	29	1919.45	455.08	73.50
27-Dec-18	466.86	425.99	28	523.51	321.04	29	1841.69	484.34	74.95
28-Dec-18	464.55	425.82	28	614.56	319.12	28	1847.10	485.80	70.21
29-Dec-18	495.66	426.33	30	618.77	305.96	30	1832.30	509.19	68.49
30-Dec-18	490.92	426.66	29	615.27	299.69	34	1853.95	455.15	66.83
31-Dec-18	478.31	424.44	29	588.57	303.06	33	1954.05	495.03	77.77

Note: Calciner 1 was not under operation from dt: 01-12-2018 to dt: 13-12-2018.



Seasonal Report (Oct`18 to Dec`18)

SURFACE WATER QUALITY (OCT`18 to DEC`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	pH	IS 3025 (Part 11):1983 RA 2012	--	6.7	7.2	7.1	7.6	7.5	7.4
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	0.061	0.041	0.048	0.187	0.212	0.203
6	Temperature	--	Deg. C.	24	24	24	24	24	24
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU	1.4	8.0	2.5	6.7	7.4	6.9
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, Max	46	28	38	120	130	116
9	Chemical Oxygen Demand	APHA-22 nd Edition (5220 B)	mg/l	14	25	21	14	28	18
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l	4.8	3.2	8.0	20.8	19.2	20.8
11	Biochemical Oxygen Demand @ 27 ^o c for 3 days	APHA-22 nd Edition -2012 (5210 B)	mg/l, Max	3	6	4	3	5	4
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l	1.94	2.92	0.97	2.92	0.97	4.86
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	5.7	7.6	3.8	7.6	11.4	9.4
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



Seasonal Report (Oct`18 to Dec`18)

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	0.11	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, Max	0.08	0.19	0.6	1.5	0.09	0.07
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	0.1	0.06	0.12	0.8	0.6	0.9
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l	3.0	2.0	2.0	17.0	24	40
22	Phosphate as PO ₄	APHA-22 nd Edition (4500-P-D)	mg/l	< 0.1	< 0.1	< 0.1	0.2	0.4	0.6
23	Total alkalinity (as CaCO ₃)	IS 3025 (Part 23):1986 RA 2009	mg/l	40	23	20	98	85	98
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l	20	20	24	64	52	72
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-22 nd Edition (4500-O-C)	mg/l, Min	6.2	6.4	6.3	7.6	7.8	6.5
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	0.1	0.25	0.28	0.32	0.22	0.33
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



Seasonal Report (Oct`18 to Dec`18)

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



Seasonal Report (Oct`18 to Dec`18)

GROUND WATER QUALITY (OCT`18 to DEC`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	pH	IS 3025 (Part 11):1983 RA 2012	--	7	6.9	6.8	7.1	6.5
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	438	860	221	658	195
6	Temperature	--	Deg. C.	24	24	24	24	24
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.1	0.9	0.1	0.1	0.9
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	204	404	130	320	126
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	35.2	44.8	12.8	27.2	17.6
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	1.94	16.52	2.92	25.27	5.83
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	7.6	34	5.7	13.2	15.1
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
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	0.15	0.12	0.07	0.41	< 0.05
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.79	0.11	< 0.05	< 0.05	0.75



Seasonal Report (Oct`18 to Dec`18)

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	1.9	7.2	0.9	4	1.3
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	6.5	9	< 1.0	6	< 1.0
22	Phosphate as PO ₄	APHA-22 nd Edition (4500-P-D)	mg/l	0.11	0.13	0.1	< 0.1	0.15
23	Total alkalinity (as CaCO ₃)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	163	183	80	175	73
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l, Max	96	180	44	172	68
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 hydrocarbons (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	0.2	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



Seasonal Report (Oct` 18 to Dec` 18)

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	pH	IS 3025 (Part 11):1983 RA 2012	--	6.5	6.5	6.5	6.6	6.9
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	1390	177	132	505	445
6	Temperature	--	Deg. C.	24	24	24	24	24
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.9	0.8	0.8	0.4	0.8
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	460	116	100	310	250
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	52.8	11.2	11.2	56	25.6
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	15.55	4.86	3.89	9.72	26.24
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	18.9	3.8	3.8	18.9	13.2
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
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	0.25	< 0.05	< 0.05	0.5	0.26



Seasonal Report (Oct` 18 to Dec` 18)

18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.95	< 0.05	0.92	0.8	< 0.05
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	2.2	0.8	2.5	7.5	3.5
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	85	< 1.0	11.0	30	12.5
22	Phosphate as PO ₄	APHA-22 nd Edition (4500-P-D)	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	0.12
23	Total alkalinity (as CaCO ₃)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	193	70	53	153	178
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l, Max	196	48	44	180	172
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 hydrocarbons (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/10 0 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/10 0 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

NOISE LEVELS [dB] IN THE SURROUNDING AREA

Sr. No.	Location	Day dB(A)	Night dB(A)
1	Plant Site	68.5	63.0
2	Lanjigarh	53.0	42.8
3	Niyamgiri Vedanta Nagar	51.3	39.4
4	Balabadrapur	52.0	37.2
5	Harikrishnapur	50.4	36.5
6	Kasibarhi	48.0	35.0
7	Chhatrapur	46.5	34.2
8	Basantapada	47.2	33.0
9	Maskapadar	48.6	39.0
10	Rengopalli	51.0	34.5



ENVIRONMENTAL SEASONAL REPORT

SEASONAL REPORT
January 2019 to March 2019



Address

Via: Biswanathpur, P.O.Lanjigarh-766027
Dist. Kalahandi,ORISSA
Tel: + 91 6677 247312/13/14/15/16
Fax: +91 6677 247311
April - 2019



MICRO-METEOROLOGICAL DATA AT SITE

Period: 1st January 2019 to 31st March 2019

Location: Plant Site

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	Max	Min	Max	Min	Total
January'19	30.1	6.2	99.9	20.2	2.2
February'19	35.7	11.3	94.5	25.5	4.5
March'19	37.80	16.80	95.40	22.90	43.4
			Total rainfall		50.1

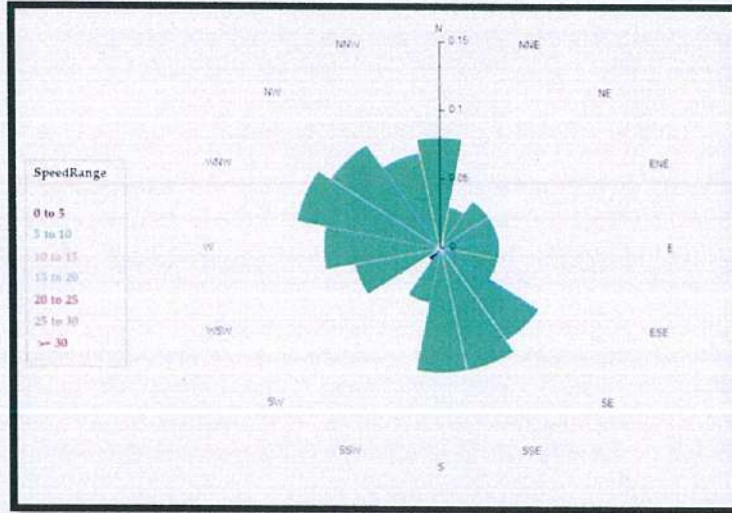
SUMMARY OF WIND PATTERN IN STUDY AREA

Season	First Predominant Wind Direction	Second Predominant Wind Direction	Predominant Wind Speeds (m/sec)	Calm (%)
Jan'19 to Mar'19	SSE (9.75%)	WNW (9.16%)	0-1.3	0.0

Wind Pattern during the season

During the period the average winds from SSE direction were observed for 9.75 % of the total time. In WNW direction the winds were also observed for 9.16 % of the total time. The other direction and percentage frequencies were observed from S (9.03%), NW (8.82%), N (8.07%), and SE (7.96 %). The calm conditions were observed to be for 0.0 % of the total time.





WINDROSE DIAGRAM FOR THE SEASON - (Jan` 19 to Mar` 19)



AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF JANUARY 2019

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chhatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.33	9.44	8.47	9.15
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	18.31	17.33	16.24	17.56
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	58	60	59	61
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.14	39.31	37.5	40.19
	Ozone (O ₃)	µg/m ³	180	3.6	3.5	3.58	3.79
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.48	0.58	0.55	0.61
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	13.19	14.18	15.38	16.14
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	26.31	27.45	29.4	31.3
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	69	72	74	76
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	47.22	48.26	50.21	51.29
	Ozone (O ₃)	µg/m ³	180	12.4	13.1	12.5	13.22
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	1.55	2.4	1.71	1.82
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	5.9	6.7	6.2	6.5
Rehab colony - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	10.76	11.2	9.36	10.3
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	22.36	20.43	19.58	20.24
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	65	67	68	69

Seasonal Report (Jan'19 to Mar'19)

	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	43.39	44.26	46.2	45.26
	Ozone (O ₃)	µg/m ³	180	4.5	6	4.7	5.7
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.63	0.75	0.68	0.71
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Belamba Village (Switchyard)	Sulphur Dioxide (SO ₂)	µg/m ³	80	7.7	9.39	8.21	10.44
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	14.32	13.42	15.31	16.4
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	55	58	60	61
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	34.39	38.3	40.19	39.48
	Ozone (O ₃)	µg/m ³	180	3.3	3.6	3	3.5
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.43	0.4	0.35	0.46
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
	Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	10.4	11.39	9.69
Nitrogen Dioxide (NO ₂)		µg/m ³	80	19.64	20.38	18.2	19.11
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	63	64	66	65
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	41.67	42.38	44.26	43.49
Ozone (O ₃)		µg/m ³	180	2.7	2.6	2.72	2.78
Lead (Pb)		µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
Carbon Monoxide(CO)		mg/m ³	4	0.62	0.56	0.64	0.65
Ammonia (NH ₃)		µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)		µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
Benzo (a) Pyrene (BaP) Particulate phase only		ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0	

Seasonal Report (Jan'19 to Mar'19)

	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.49	12.44	10.17	11.2
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	21.36	22.32	20.38	21.21
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	60	63	64	67
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	39.31	41.3	42.38	43.3
	Ozone (O ₃)	µg/m ³	180	5.9	6	5.9	6.1
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.46	0.48	0.55	0.59
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0

AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF FEBRUARY 2019

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chhatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	7.29	8.47	6.26	7.39
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	13.13	16.24	14.35	15.31
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	55	59	61	60
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.3	39.14	40.19	43.11
	Ozone (O ₃)	µg/m ³	180	3.5	3.3	3.75	3.62
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.46	0.56	0.6	0.58
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	12.15	14.36	16.27	15.45
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	24.27	26.19	28.37	31.17



Seasonal Report (Jan'19 to Mar'19)

	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	85	86	81	83
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	55.33	56.29	50.68	53.11
	Ozone (O ₃)	µg/m ³	180	12.6	13.5	12.6	13.32
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	1.59	2.7	1.72	1.85
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	6.1	6.9	6	6.6
Rehab colony - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	9.32	10.26	11.13	10.49
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	19.1	20.15	18.21	21.39
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	68	73	69	72
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	42.38	44.26	43.3	46.42
	Ozone (O ₃)	µg/m ³	180	4.4	6.2	5.6	4.9
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.61	0.78	0.7	0.69
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Belamba Village (Switchyard)	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.21	9.05	7.1	9.36
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	15.31	17.35	17.22	18.38
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	60	63	61	64
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	38.47	40.19	39.48	42.38
	Ozone (O ₃)	µg/m ³	180	3.5	3.7	2.9	3.7
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.46	0.42	0.33	0.49
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0	

Seasonal Report (Jan'19 to Mar'19)

	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	10.17	12.22	11.25	13.19
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	21.18	22.34	20.12	23.47
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	64	66	63	69
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	42.2	44.26	42.3	44.26
	Ozone (O ₃)	µg/m ³	180	2.8	2.7	2.75	2.75
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
	Carbon Monoxide(CO)	mg/m ³	4	0.63	0.57	0.64	0.68
	Ammonia (NH ₃)	µg/m ³	400	< 10	< 10	< 10	< 10
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
	Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.39	13.2	12.36
Nitrogen Dioxide (NO ₂)		µg/m ³	80	22.37	24.35	26.31	25.2
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	68	67	69	65
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	47.02	42.2	43.3	41.67
Ozone (O ₃)		µg/m ³	180	6.1	6	6.2	6.1
Lead (Pb)		µg/m ³	1	< 0.02	< 0.02	< 0.02	< 0.02
Carbon Monoxide(CO)		mg/m ³	4	0.49	0.56	0.57	0.49
Ammonia (NH ₃)		µg/m ³	400	< 10	< 10	< 10	< 10
Benzene (C ₆ H ₆)		µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
Benzo (a) Pyrene (BaP) Particulate phase only		ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (As)		ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
Nickel (Ni)		ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0

AMBIENT AIR QUALITY RESULTS FOR THE MONTH OF MARCH 2019

Sampling Location	Parameter	Unit	Norm	1st week	2nd week	3rd week	4th week
Chatrapur - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	6.35	8.03	-	7.26
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	14.13	16.17	-	15.05
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	62.0	59	-	55
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	40.19	36.21	-	38.14
	Carbon Monoxide(CO)	mg/m ³	4	0.47	0.44	-	0.43
	Ozone (O ₃)	µg/m ³	1	3.6	3.4	-	3.3
	Lead (Pb)	µg/m ³	1	< 0.02	< 0.02	-	< 0.02
	Ammonia (NH ₃)	µg/m ³	400	< 10.0	< 10.0	-	< 10.0
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	-	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	-	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	-	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	-	< 4.0
Plant site	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.39	13.36	-	14.14
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	23.17	25.42	-	27.35
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	81	83	-	87
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	51.29	54.31	-	52.41
	Carbon Monoxide(CO)	mg/m ³	180	1.56	1.6	-	1.63
	Ozone (O ₃)	µg/m ³	1	12.4	12.8	-	12.9
	Lead (Pb)	µg/m ³	4	< 0.02	< 0.02	-	< 0.02
	Ammonia (NH ₃)	µg/m ³	400	< 10.0	< 10.0	-	< 10.0
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	-	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	-	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	-	< 1.0
	Nickel (Ni)	ng/m ³	20	5.9	6	-	6.1
Rehab colony - Residential	Sulphur Dioxide (SO ₂)	µg/m ³	80	10.11	9.4	11.49	12.35
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	20.27	21.27	21.36	22.3
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	75	77	73	75

Seasonal Report (Jan'19 to Mar'19)

	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	48.47	49.34	47.42	50.21
	Carbon Monoxide(CO)	mg/m ³	180	0.65	0.8	0.79	0.82
	Ozone (O3)	µg/m ³	1	4.7	6.3	6.2	6.4
	Lead (Pb)	µg/m ³	4	< 0.02	< 0.02	< 0.02	< 0.02
	Ammonia (NH3)	µg/m ³	400	< 10.0	< 10.0	< 10.0	< 10.0
	Benzene (C6H6)	µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
	Belamba Village (Switchyard)	Sulphur Dioxide (SO ₂)	µg/m ³	80	8.14	7.2	8.43
Nitrogen Dioxide (NO ₂)		µg/m ³	80	16.38	17.28	15.31	18.07
Particulate Matter (Size less than 10µm) PM10		µg/m ³	100	64	63	66	67
Particulate Matter (Size less than 2.5µm) PM2.5		µg/m ³	60	43.3	42.2	40.19	42.2
Carbon Monoxide(CO)		mg/m ³	180	0.48	0.45	0.47	0.49
Ozone (O3)		µg/m ³	1	3.7	3.4	3.5	3.8
Lead (Pb)		µg/m ³	4	< 0.02	< 0.02	< 0.02	< 0.02
Ammonia (NH3)		µg/m ³	400	< 10.0	< 10.0	< 10.0	< 10.0
Benzene (C6H6)		µg/m ³	5	< 1.0	< 1.0	< 1.0	< 1.0
Benzo (a) Pyrene (BaP) Particulate phase only		ng/m ³	1	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (As)		ng/m ³	6	< 1.0	< 1.0	< 1.0	< 1.0
Nickel (Ni)		ng/m ³	20	< 4.0	< 4.0	< 4.0	< 4.0
Mid-Day Meal (Building)	Sulphur Dioxide (SO ₂)	µg/m ³	80	11.49	12.36	-	10.36
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	22.16	21.27	-	19.17
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	73	72	-	71
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	47.42	43.3	-	46.22
	Carbon Monoxide(CO)	mg/m ³	180	0.65	0.64	-	0.63
	Ozone (O3)	µg/m ³	1	3	2.9	-	2.7
	Lead (Pb)	µg/m ³	4	< 0.02	< 0.02	-	< 0.02
	Ammonia (NH3)	µg/m ³	400	< 10.0	< 10.0	-	< 10.0
	Benzene (C6H6)	µg/m ³	5	< 1.0	< 1.0	-	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	-	< 1.0
Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	-	< 1.0	

SR

Seasonal Report (Jan'19 to Mar'19)

	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	-	< 4.0
Lanjigarh Village	Sulphur Dioxide (SO ₂)	µg/m ³	80	12.36	14.13	-	13.19
	Nitrogen Dioxide (NO ₂)	µg/m ³	80	24.28	26.3	-	25.09
	Particulate Matter (Size less than 10µm) PM10	µg/m ³	100	69	71	-	69
	Particulate Matter (Size less than 2.5µm) PM2.5	µg/m ³	60	46.22	44.26	-	45.84
	Carbon Monoxide(CO)	mg/m ³	180	0.5	0.51	-	0.50
	Ozone (O3)	µg/m ³	1	6.2	6.3	-	6.0
	Lead (Pb)	µg/m ³	4	< 0.02	< 0.02	-	< 0.02
	Ammonia (NH ₃)	µg/m ³	400	< 10.0	< 10.0	-	< 10.0
	Benzene (C ₆ H ₆)	µg/m ³	5	< 1.0	< 1.0	-	< 1.0
	Benzo (a) Pyrene (BaP) Particulate phase only	ng/m ³	1	< 1.0	< 1.0	-	< 1.0
	Arsenic (As)	ng/m ³	6	< 1.0	< 1.0	-	< 1.0
	Nickel (Ni)	ng/m ³	20	< 4.0	< 4.0	-	< 4.0

Note: Due to unavoidable circumstances ambient air quality monitoring was not carried out.



**ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE
MONTH OF JANUARY 2019**

Date of sampling	Calciner 1			Calciner 2			CFB Stack		
Parameter	SO2	NOx	PM	SO2	NOx	PM	SO2	NOx	PM
Unit	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3	ppm	ppm	mg/NM3
01-Jan-19	419.61	421.78	24.00	489.81	305.35	23.00	1918.60	497.80	74.65
02-Jan-19	448.32	421.26	25.00	421.39	310.41	23.00	1842.99	479.90	75.68
03-Jan-19	461.25	423.10	28.00	386.15	309.59	25.00	1848.86	466.67	73.38
04-Jan-19	421.74	422.81	23.00	375.82	314.60	22.00	1880.62	424.21	76.15
05-Jan-19	435.97	423.06	23.00	422.43	301.70	23.00	1838.86	476.47	70.79
06-Jan-19	452.07	424.04	24.00	427.92	317.99	24.00	1836.68	494.99	64.81
07-Jan-19	463.41	425.30	26.00	410.58	321.93	26.00	1835.62	502.40	64.33
08-Jan-19	455.22	424.58	24.00	397.33	342.48	31.00	1834.48	505.96	72.01
09-Jan-19	468.48	424.35	25.00	280.78	315.42	25.00	1833.31	574.90	70.48
10-Jan-19	474.82	425.38	25.00	285.45	300.94	24.00	1847.38	524.37	77.96
11-Jan-19	468.13	425.91	25.00	299.01	302.52	28.00	1886.07	490.42	78.71
12-Jan-19	472.48	427.14	25.00	300.72	306.40	31.00	1838.45	518.08	74.47
13-Jan-19	420.21	428.00	26.00	296.95	312.61	30.00	1838.33	517.43	71.96
14-Jan-19	0.00	0.00	0	0.00	0.00	0	1837.63	529.07	57.65
15-Jan-19	0.00	0.00	0	0.00	0.00	0	1829.32	1093.90	23.49
16-Jan-19	0.00	0.00	0	0.00	0.00	0	1085.15	534.01	18.30
17-Jan-19	315.76	420.30	24.00	278.45	286.22	34.00	1659.02	344.76	52.94
18-Jan-19	390.99	425.31	23.00	276.48	308.10	24.00	1838.57	454.82	78.47
19-Jan-19	406.10	425.13	23.00	468.34	306.47	26.00	1838.38	557.04	66.21
20-Jan-19	432.61	427.33	26.00	370.71	303.92	31.00	1837.93	531.08	82.92
21-Jan-19	435.26	428.26	30.00	267.01	309.97	32.00	1838.94	562.67	80.25
22-Jan-19	436.70	428.44	26.00	269.90	310.57	26.00	1837.18	619.79	74.97
23-Jan-19	353.02	427.64	23.00	265.83	315.41	21.00	1837.29	631.93	64.26
24-Jan-19	385.48	427.48	24.00	333.47	314.66	23.00	1839.76	555.83	71.72
25-Jan-19	391.00	428.61	24.00	460.69	315.77	24.00	1879.31	557.83	73.57
26-Jan-19	371.88	428.71	22.00	537.85	318.47	21.00	1843.60	561.92	69.79
27-Jan-19	357.25	428.69	22.00	473.58	315.98	21.00	1837.65	546.98	77.08
28-Jan-19	369.89	429.46	22.00	428.09	315.80	22.00	1837.96	612.09	79.51
29-Jan-19	368.46	428.41	22.00	414.68	309.26	22.00	1836.54	746.20	78.42
30-Jan-19	355.70	426.51	22.00	380.01	299.36	27.00	1836.94	695.11	76.09
31-Jan-19	364.48	428.39	22.00	367.00	306.11	20.00	1841.81	695.41	73.95

Note: Calciner 1 & 2 was not under operation from dt: 14-01-2019 to dt: 16-01-2019.

**ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE
MONTH OF FEBRUARY 2019**

Date of sampling	Calciner 1			Calciner 2					CFB Stack			
Parameter	SO2	NOx	CO	PM	SO2	NOx	CO	PM	SO2	NOx	CO	PM
Unit	ppm	ppm	%	mg/Nm ³	ppm	ppm	%	mg/Nm ³	mg/Nm ³	mg/Nm ³	mg/Nm ³	mg/Nm ³
01-Feb-19	376.03	428.56	0.06	24	378.98	310.79	0.00	29	1800.71	632.87	8.02	67.23
02-Feb-19	388.40	428.88	0.07	23	371.33	315.49	0.00	25	1734.61	502.77	8.76	70.82
03-Feb-19	410.87	430.10	0.08	25	398.57	311.28	0.00	23	1937.11	534.45	6.43	76.97
04-Feb-19	439.32	430.41	0.08	29	410.11	310.11	0.01	27	1934.36	588.51	29.81	80.23
05-Feb-19	438.83	430.77	0.08	27	381.35	320.69	0.00	29	1904.97	624.68	7.52	76.67
06-Feb-19	435.53	430.43	0.08	27	385.64	353.70	0.00	27	1837.46	690.53	7.00	71.05
07-Feb-19	448.41	334.42	0.08	28	399.00	339.24	0.00	27	1837.39	677.74	8.87	75.12
08-Feb-19	441.18	343.62	0.08	28	422.59	330.71	0.00	27	1836.78	735.74	4.50	75.69
09-Feb-19	453.83	345.25	0.07	30	410.32	329.95	0.00	27	1836.09	845.13	10.84	77.97
10-Feb-19	468.90	380.21	0.08	29	380.91	342.50	0.00	27	1837.61	810.71	12.07	77.17
11-Feb-19	475.05	390.63	0.08	30	393.18	349.70	0.00	27	1836.33	835.92	14.51	76.13
12-Feb-19	448.41	403.28	0.08	27	394.55	348.63	0.00	25	1836.40	856.67	12.45	74.38
13-Feb-19	455.56	394.64	0.08	26	369.25	325.05	0.00	32	1837.04	772.74	12.84	71.32
14-Feb-19	470.35	424.09	0.10	26	411.23	355.58	0.00	27	1836.95	745.80	10.86	75.87
15-Feb-19	450.22	422.36	0.12	27	377.48	401.62	0.00	23	1836.78	707.69	9.31	75.91
16-Feb-19	379.61	391.26	0.13	25	372.45	409.60	0.00	22	1778.91	703.57	10.92	81.27
17-Feb-19	384.42	370.77	0.12	41	383.54	410.96	0.00	23	1840.02	744.73	14.48	67.80
18-Feb-19	432.28	414.41	0.10	24	378.05	384.40	0.00	22	1838.41	635.32	19.86	72.83
19-Feb-19	442.47	457.54	0.08	24	342.89	364.02	0.00	23	1838.10	740.40	15.05	76.31
20-Feb-19	427.60	433.84	0.08	23	387.74	343.56	0.00	26	1835.07	832.45	8.57	74.99
21-Feb-19	329.61	318.38	0.09	24	315.35	70.08	0.02	28	1838.84	826.68	14.10	72.70
22-Feb-19	401.93	375.74	0.10	28	509.81	6.03	0.02	29	1839.43	827.52	9.19	74.24
23-Feb-19	379.82	442.35	0.08	29	604.99	325.84	0.01	28	1837.65	717.14	13.71	74.77
24-Feb-19	417.57	446.37	0.07	26	578.96	346.25	0.00	28	1878.40	645.23	16.09	74.73
25-Feb-19	426.73	479.95	0.07	30	600.52	350.33	0.02	26	1921.95	598.67	11.97	75.53
26-Feb-19	430.76	483.70	0.07	24	575.85	350.88	0.04	25	1862.54	656.57	6.98	66.85
27-Feb-19	435.14	491.54	0.07	24	527.82	348.27	0.05	26	1921.79	643.19	8.44	70.63
28-Feb-19	426.43	0.00	0.07	23	508.32	342.77	0.03	27	1937.82	609.58	11.21	70.59

ONLINE STACK MONITORING TEST RESULT OF CALCINER AND CF BOILER FOR THE MONTH OF MARCH 2019

Date of sampling	Calciner 1				Calciner 2				CFB Stack			
	SO2	NOx	CO	PM	SO2	NOx	CO	PM	SO2	NOx	CO	PM
Unit	ppm	ppm	%	mg/Nm ³	ppm	ppm	%	mg/Nm ³	mg/Nm ³	mg/Nm ³	mg/Nm ³	mg/Nm ³
01-Mar-19	390.32	11.49	0.07	26	456.94	341.14	0.01	23	1930.18	566.28	10.44	70.68
02-Mar-19	410.49	171.84	0.07	23	475.73	340.92	0.01	38	1944.71	561.50	12.82	68.50
03-Mar-19	430.72	149.46	0.08	24	467.02	340.17	0.01	34	1931.79	582.32	10.30	76.84
04-Mar-19	449.42	257.25	0.08	30	457.13	342.58	0.01	25	1936.56	536.27	10.03	78.61
05-Mar-19	412.15	255.21	0.08	29	501.25	344.52	0.03	24	1941.65	541.29	9.94	78.72
06-Mar-19	533.72	272.05	0.07	26	516.29	337.33	0.04	25	1936.18	553.88	11.14	72.38
07-Mar-19	553.04	352.61	0.07	27	529.19	330.95	0.04	26	1906.28	522.94	35.63	74.36
08-Mar-19	521.80	255.91	0.06	25	524.05	328.53	0.06	31	1897.43	516.80	11.69	75.10
09-Mar-19	482.22	39.41	0.07	27	624.24	326.32	0.07	35	1946.58	543.87	10.22	75.98
10-Mar-19	478.38	15.11	0.07	29	658.37	320.92	0.08	33	1854.10	617.08	12.31	70.00
11-Mar-19	499.71	213.32	0.07	25	598.40	330.34	0.09	32	1806.47	642.13	13.21	66.28
12-Mar-19	478.96	346.33	0.07	25	564.20	331.59	0.08	28	1875.08	629.93	10.30	73.15
13-Mar-19	507.43	388.86	0.05	26	558.00	303.30	0.09	37	1861.54	597.73	11.63	75.67
14-Mar-19	510.93	261.00	0.03	27	531.18	287.48	0.08	35	1840.12	620.58	7.12	71.95
15-Mar-19	454.83	195.76	0.01	37	506.82	277.45	0.07	28	1864.80	691.56	9.72	77.86
16-Mar-19	436.58	203.09	0.00	48	526.04	267.25	0.07	28	1915.83	612.08	34.98	80.38
17-Mar-19	449.64	253.60	0.02	25	526.59	263.87	0.04	28	1955.76	589.60	7.45	73.19
18-Mar-19	413.96	261.64	0.01	25	540.41	265.55	0.04	31	1969.97	535.14	14.18	68.75
19-Mar-19	417.99	270.88	0.02	44	299.07	265.42	0.05	37	1822.61	495.46	52.79	40.54
20-Mar-19	426.92	278.85	0.03	42	447.70	295.02	0.06	38	1871.78	667.48	47.40	68.44
21-Mar-19	453.42	293.28	0.05	33	474.20	293.10	0.07	27	1793.41	599.92	36.25	83.17
22-Mar-19	449.97	317.34	0.04	34	411.58	285.49	0.07	25	1945.47	532.23	14.20	70.83
23-Mar-19	472.49	365.23	0.03	39	431.65	282.35	0.07	27	1994.85	624.13	10.87	72.78
24-Mar-19	508.45	408.11	0.03	27	446.94	274.13	0.07	46	1979.06	534.61	9.01	67.35
25-Mar-19	509.96	416.09	0.03	26	492.04	260.23	0.07	27	1870.04	559.37	9.93	72.41
26-Mar-19	582.59	477.55	0.04	26	434.57	286.50	0.08	31	1986.30	620.28	7.45	75.27
27-Mar-19	555.20	475.06	0.07	29	383.71	291.64	0.09	29	1964.69	578.00	9.79	69.17
28-Mar-19	575.80	478.58	0.09	25	361.01	323.94	0.08	34	1782.41	521.33	9.32	68.98
29-Mar-19	588.71	478.36	0.07	25	350.39	297.27	0.07	35	1787.88	451.58	8.42	79.32
30-Mar-19	595.47	0.00	0.05	26	348.27	285.32	0.07	35	1875.99	543.77	6.05	80.76
31-Mar-19	527.59	0.00	0.05	31	348.64	287.12	0.08	35	1987.95	536.30	7.17	73.97



SURFACE WATER QUALITY (JAN'19 to MAR'19)

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	pH	IS 3025 (Part 11):1983 RA 2012	--	7.3	7.2	7.7	7.3	7.7	7.7
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	0.039	0.026	0.033	0.138	0.195	0.151
6	Temperature	--	Deg. C.	27	27	27	27	27	27
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU	1.0	7.0	2.5	6.0	6.2	6.0
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, Max	32	24	28	90	112	102
9	Chemical Oxygen Demand	APHA-22 nd Edition (5220 B)	mg/l	6	42	14	31	20	36
10	Calcium (as Ca)	IS 3025 (Part 40):1991 RA 2009	mg/l	3.5	3.5	3.5	17.6	19.4	19.4
11	Biochemical Oxygen Demand @ 27 ^o c for 3 days	APHA-22 nd Edition -2012 (5210 B)	mg/l, Max	1	7	3	5	4	6
12	Magnesium (as Mg)	IS 3025 (Part 46):1994 RA 2003	mg/l	3.16	2.18	2.18	5.35	8.7	5.35
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	7.2	3.6	3.6	8.9	14.3	7.2
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

Seasonal Report (Jan'19 to Mar'19)

17	Fluoride (as F)	IS 3025 (Part 60):2008	mg/l, Max	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, Max	0.06	0.14	0.5	1.3	0.11	0.06
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	0.08	0.04	0.1	0.7	0.4	0.7
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l	1.0	1.0	1.0	11.0	16	34
22	Phosphate as PO ₄	APHA-22 nd Edition (4500-P-D)	mg/l	< 0.1	< 0.1	< 0.1	0.15	0.3	0.4
23	Total alkalinity (as CaCO ₃)	IS 3025 (Part 23):1986 RA 2009	mg/l	18	20	23	68	83	80
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l	22	18	18	66	84	70
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-22 nd Edition (4500-O-C)	mg/l, Min	6.8	6.1	6.5	7.0	7.6	6.3
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	0.06	0.22	0.25	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

GROUND WATER QUALITY (JAN'19 to MAR'19)

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	pH	IS 3025 (Part 11):1983 RA 2012	--	7.2	7.4	7.7	7.3	7.5
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	0.209	0.701	0.145	0.570	0.124
6	Temperature	--	Deg. C.	27	27	27	27	27
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.3	0.7	0.2	0.2	0.7
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	130	350	90	280	86
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	24.6	58.1	15.8	26.4	12.3
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	8.51	12.88	6.32	21.38	6.32
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	8.9	32.2	7.2	8.9	14.3
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
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	0.12	0.10	0.06	0.35	< 0.05
18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.75	0.10	< 0.05	< 0.05	0.7
19	Manganese (as Mn)	IS 3025 (Part 59):2006 RA 2012	mg/l, max	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Seasonal Report (Jan'19 to Mar'19)

20	Nitrate (as NO ₃)	IS 3025 (Part 34):1988 RA 2009	mg/l, max	1.1	5.5	0.7	3.2	1.0
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	4.0	7.0	< 1.0	5.0	< 1.0
22	Phosphate as PO ₄	APHA-22 nd Edition (4500-P-D)	mg/l	0.08	0.11	0.08	< 0.1	0.13
23	Total alkalinity (as CaCO ₃)	IS 3025 (Part 23):1986 RA 2009	mg/l, Max	113	190	80	163	48
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l, Max	97	198	66	154	57
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	0.25	0.22	0.25	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/1 00 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/1 00 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

Seasonal Report (Jan'19 to Mar'19)

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	--	Agreeabl e	Agreeabl e	Agreea ble	Agreea ble	Agreea ble
3	Odour	IS 3025 (Part 5):1983 RA 2012	--	Agreeabl e	Agreeabl e	Agreea ble	Agreea ble	Agreea ble
4	pH	IS 3025 (Part 11):1983 RA 2012	--	6.8	7.0	6.5	6.9	6.9
5	Electrical Conductivity	APHA-22 nd Edition (2510 A)	ms/cm	1.21	0.152	0.082	0.369	0.269
6	Temperature	--	Deg. C.	27	27	27	27	27
7	Turbidity	IS 3025 (Part 10):1984 RA 2006	NTU, Max	0.8	0.6	0.6	0.2	0.6
8	Total dissolved solids	IS 3025 (Part 16):1984 RA 2006	mg/l, max	380	106	80	260	160
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	66.9	19.4	10.6	54.6	29.9
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	6.56	6.56	7.53	7.53	14.82
13	Selenium (as Se)	IS 3025 (Part 56):2003 RA 2009	mg/l, Max	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
14	Chloride (as Cl)	IS 3025 (Part 32):1988 RA 2009	mg/l, max	21.5	7.2	7.2	23.3	14.3
15	Aluminium (as Al)	IS 3025 (Part 55):2003 RA 2009	mg/l, Max	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
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	0.22	< 0.05	< 0.05	0.4	0.23

Seasonal Report (Jan'19 to Mar'19)

18	Iron (as Fe)	IS 3025 (Part 53):2003 RA 2009	mg/l, max	0.9	< 0.05	0.9	0.7	< 0.05
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	2.0	0.5	2.3	6.5	3.0
21	Sulphate (as SO ₄)	IS 3025 (Part 24):1986 RA 2009	mg/l, max	75	< 1.0	8.0	22	10.0
22	Phosphate as PO ₄	APHA-22 nd 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	195	75	45	133	108
24	Total hardness (as CaCO ₃),	IS 3025 (Part 21):2009	mg/l, Max	194	75	57	167	136
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	0.24	0.18	0.2	0.25	0.15
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/1 00 ml	Absent	Absent	Absent	Absent	Absent
33	Total Coliform	IS 1622:1981 RA 2009	MPN/1 00 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

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

Sr. No.	Location	Day dB(A)	Night dB(A)
1	Plant Site	70.1	64.3
2	Lanjigarh	54.0	43.8
3	Niyamgiri Vedanta Nagar	52.7	40.6
4	Balabadrapur	53.2	38.8
5	Harikrishnapur	51.7	37.9
6	Kasibarhi	49.5	36.3
7	Chhatrapur	47.8	35.7
8	Basantapada	49.2	34.6
9	Maskapadar	49.9	40.1
10	Rengopalli	52.4	34.2