

VLL/HSE/ENV/2019/1114

16th Aug, 2019

To,
The Member Secretary,
Paribesh Bhawan, A/118,
Nilakanthanagar, Unit-VIII,
Bhubaneswar –751012,
Odisha.

**Sub: Submission of Environmental Statement for the year ending 31st March 2019 of
Vedanta Limited, Lanjigarh, Kalahandi.**

Dear Sir,

We are herewith furnishing the **Environmental Statement** as per Environment (Protection) Act, 1986 (Rule 14), for the financial year 2018-19 (ending the 31st March 2019) in the prescribed format, **Form V**.

This is for your kind information and record.

Thanking you.

Yours faithfully,
For Vedanta Limited, Lanjigarh


Sanjeev Kumar
(Head O&M and Factory Manager)
Vedanta Limited-Lanjigarh



Encl: As above (Form V)

CC: The Regional Officer, SPC Board, 1st Lane, Kasturi Nagar, Rayagada - 765001, Odisha

Vedanta Limited

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CIN: L13209MH1965PLC291394

[FORM-V]**(See rule 14)****Environmental Statement for the financial year ending the 31st March 2019****PART-A**

1	Name and address of the owner/occupier of the industry, operation or process	Sanjeev Kumar Head O&M and Factory Manager Vedanta Limited, Lanjigarh, Kalahandi, Odisha.
2	Industry Category Primary – (STC Code) Secondary –(SIC Code)	Primary
3	Production Capacity	2 MMTPA (Calcined Alumina), 75 MW CPP
4	Year of Establishment	2004
5	Date of the last environmental Statement submitted	30 th May, 2018

Part-B**Water and Raw material Consumption**1. Water consumption M³/day

Process	5774
Boiler feed	1781
Domestic	1866

Name of the Products	Process water consumption (Process + Industrial drinking water) per unit of product output (M ³ /T)	
	During the previous financial year (2017-18)	During the current financial year (2018-19)
Calcined Alumina	2.22	1.83

2. Raw material Consumption

Name of the raw material	Name of the Products	(Consumption of raw material per unit of output*)	
		During the previous financial year (17-18)	During the current financial year (18-19)
Bauxite (T/T)	Calcined Alumina	3.097	2.89
Caustic Soda (Kg/T)		115.83	87.39
Lime (Kg/T)		39.18	27.87
Fuel Oil (Kg/T)		69.93	66.52
LDO (kg/T)		0.34	0.20
HSD (KL/T)		0.0000253	0.000013
Energy (Hydrate), (KWh/T)		241	204.0
Energy (Calcined) (KWh/T)		32.08	32.0
Steam (T/T)		2.09	1.85

*Specific Consumptions are reported per MT of Hydrate as Al₂O₃ produced.

PART-C

**Pollution discharged to environment/unit of output
(Parameter as specified in the consent issued)**

Pollutants	Quantity of Pollutants discharged (mass/day)	Concentration of Pollutants in discharges (Mass/volume)			Percentage of variation from prescribed standards with reasons
		Parameters	Average Results (monthly)	Max. permissible Norms of SPC Board	
(A)Water: Sewage Treatment Plant (STP): Installed and being operated STP of capacity 360 KLD for plant. The STP is being operated under strict supervision and the treated water is being used for horticulture, gardening & for sprinkling purposes					
Domestic Effluent from Plant STP	NIL	pH TSS (mg/l) BOD (mg/l) COD (mg/l) Oil & Grease (mg/l) NH4-N (mg/l) N-total (mg/l) Fecal Coliform (MPN/100ml)	8.00 8.27 4.50 18.07 1.24 < 0.3 2.35 28.21	6.5 – 9.0 20 10 50 10 5 10 100	Variation: 0

Pollutants	Quantity of pollutants discharged (mass/day)	Concentrations of pollutants discharges (Mass/volume)	Standard mg/ Nm ³	Percentage of variation from prescribed standards with reasons
B. Air Particulate Matter (PM)				
Flue gas from Calciner Stack	0.1591 MTPD	Calciner : 28.6358 mg/ Nm ³	100	Variation: 0
Flue gas from Boiler Stack	1.0252 MTPD	CPP: 75.0275 mg/ Nm ³	50	Variation -46.99% *

*As per our CTO, the PM emission standard for boiler stack is 100 mg/ Nm³, but we have taken 50 mg/ Nm³ as per the revised TPP emission standard according to the notification of MoEF& CC for thermal Power plant which is applicable from Jan'2019.

The installation of bag filters in the ESP is completed for two boilers and is in progress for third boiler.



PART-D
HAZARDOUS WASTES
(As specified under Hazardous and Other Wastes [Management and Transboundary Movement] rules, 2016)

Hazardous wastes		Total quantity	
		During the previous financial year	During the current financial year
A.	Generation From Process:		
1	Used oil	24.48 MT	34.28 MT
2	Waste/residue containing oil	NIL	NIL
3	Filter & filter materials containing oil during maintenance of vehicle	NIL	NIL
4	Discarded containers use for hazardous waste	NIL	NIL
5	Spent Resin	NIL	NIL
6	Oily waste during cleaning oil storage tanks (once in five year)	NIL	NIL
7	Vanadium sludge/ Vanadium compound	638 MT	328.1 MT
B.	Recycled/Sold quantity		
1	Used oil	11.7 MT	24.86 MT
2	Waste/residue containing oil	NIL	NIL
3	Filter & filter materials containing oil during maintenance of vehicle	NIL	NIL
4	Discarded containers use for hazardous waste	NIL	NIL
5	Spent Resin	NIL	NIL
6	Oily waste during cleaning oil storage tanks (once in five year)	NIL	NIL
7	Vanadium sludge/ Vanadium compound	2226.306 MT	NIL
C.	From pollution control facilities	0	0



PART-E
Solid Wastes

	Total quantity (MT)	
	During the previous financial year	During the current financial year
A. Generation from Process		
1. Red Mud (dry)	1694693	1758462
2. Fly ash	262255	290277
3. Lime grit	5992.21	5768
B. From pollution control facilities (Effluent Sludge)	0	0
C. 1. Quantity recycled or re-utilized with the unit	1. Fly Ash : 262400 Red Mud : 206574	1. Fly Ash : 291882 Red Mud : 48244.4
2. Sold	2. Lime Grit : 5778.98 Red Mud : 34607.6	2. Lime Grit : 5609.72 Red Mud : 30597.8
3. Disposed	3. 0	0

- Fly ash is being disposed off using High Concentration Slurry Disposal (HCSD) technology to Ash pond.
- Fly Ash is being utilized in brick manufacturing, dyke height raising, pavement making & land development.
- Total ash utilization recorded as 101 % for the year 2018-19.
- Lime grits are being used in brick manufacturing.
- Sludge generated from sewage treatment plant is being used as manure for development of landscaping area.
- As a waste management initiative, red mud is being utilized in RMP dyke wall height raising & strengthening & also to cement industries around the refinery.



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PART-F

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

As per the Hazardous Waste Authorization granted, only two wastes are generated out of seven of wastes listed.

The practice of collection & disposal of these wastes as said above & process wastes are mentioned here below:

Name of solid wastes	Characteristics	Method of collection	Method of disposal
a. Hazardous waste Used Oil	Oil Emulsion	Collected in leak proof containers and stored in specially designed Hazardous waste storage shed	Sold to authorized recyclers registered with OSPCB
Vanadium Sludge	Vanadium Pentoxide (V ₂ O ₅)	Collected in the Jumbo Bags and stored in Vanadium storage shed.	Sold to authorized recyclers registered with OSPCB
Other Solid Wastes	Characteristics	Method of collection	Method of disposal
Red Mud	Fe ₂ O ₃ - 35 % SiO ₂ -10% TiO ₂ - 13% CaO-3.21% Na ₂ O-4.2%	Red mud slurry from washer 5 underflow through Geho pumps sent to red mud filtration unit to produce red mud cake.	Dry red mud cake is stacked in Red mud pond by conveyors from where it is transported through rail to cement industry.
Fly ash	SiO ₂ - 45-50 % R ₂ O ₃ - 27 %	Disposed directly through a pipeline via High Concentration Slurry Disposal Technology.	Stored in Fly ash pond. Dry ash is collected by brick manufacturers from Ash silos inside the plant and ash pond.
Lime grit	CaO > 70 %	From the slacker outlet chute.	Sold to brick manufacturers.

Part-G

(Impact of pollution abatement measures taken for conservation of Natural resources and on the cost of production)

- Various improvement projects like Zero Discharge except during heavy monsoon are being implemented for reduction of water and energy consumption to achieve world bench mark figures and also to reduce cost of production.
- The Red Mud Filtration unit is under operation eliminating the wet disposal of red mud & generating dry red mud cake which is being utilized in for RMP dyke height raising & strengthening & in cement industries. Caustic present in the red mud slurry is being recovered in this unit leading to overall caustic consumption reduction, ultimately resulting in low cost of production.



- Environment risk mitigation by dyke strengthening of Red Mud Pond and Fly Ash Pond is going on.
- Rain water harvesting project has been implemented in the township near executive hostel for the purpose to recharge the ground water.
- Cross functional water management team has been formed to look after the water management inside the refinery, focusing on reduction in water consumption, to explore water conservation projects and to minimize the water losses with regard to process.
- Energy committee is formed in the Refinery by involvement of different senior & junior from departments to identify & lead Energy Saving projects.
- Water committee is formed in the Refinery by involvement of different senior & junior from departments to identify & lead Water Saving projects.
- World Environment Day 2018 on 5th June was celebrated with great enthusiasm and pertinent participation from Vedanta employee, associate partner employee, family members in Vedanta Township, and by involving community at Baterlima, Asurpada, Parbatipur, Sindhbahali & Goipeta villages.
- India Green Manufacturing Challenge Award was applied to International Research Institute of Manufacturing (IRIM) & a panel of experts visits the site & assessed the Sustainability Practices. The site has awarded with the highest rating Gold Award by the assessors.

➤ **Part-H**

- (Additional measures/investment proposal for environmental protection including abatement of Pollution)
- Mobile water tankers have been provisioned & being operated to minimize dust generation because of vehicular movement.
- 6 numbers of Continuous Ambient Air Quality monitoring Station (CAAQMS) has been installed for ambient air quality monitoring and is connected to OSPCB server through RTDAS.
- One additional Weather Monitoring system has also installed on RMF control room.
- New electronic panel display for online weather monitoring data and real time Air Quality data display from CAAQMS has been installed for public view.
- Truck mounted Vacuum cleaning system has been provided at Bauxite handling area for reduction in dust emission.
- For this year 2018-19, 2500 nos. of saplings have been planted covering an area of 1 Ha and gap filling is done with 32440 nos. of saplings to maintain the density. The total area covered under green belt development is 278.216 Ha of 540422 no's



of saplings under green belt development as per MoEF guidelines. To sensitize the employees & local stakeholders World Environment Day was celebrated in & around the surrounding areas of the refinery.

- Replacement of six numbers of Acidification Reactors of Biogas Plant was completed.
- All the permanent internal roads inside the refinery have been converted to RCC.
- An initiative towards waste utilization has been taken up by utilizing fly ash in making of concrete road. Around 1450 meters of concrete road in the peripheral villages has been made by utilizing the fly ash.
- Total lime grit which is being generated inside the refinery is being supplied to brick manufacturing units.
- Numbers of initiatives have been taken to comply the fly ash notification. For the year 2018-19, 101 % of generated ash has been utilized. Where 154263 MT of ash utilized for brick manufacturing, 93773 MT dyke height raising, 35309 MT for land filling, 8537 MT for road making.
- Dust suppression by sprinkling water by tanker is being carried out in and around the ash pond.
- Plantation drive has been initiated to reduce the fugitive emission of fly ash in the peripheral area of ash pond.
- Plantation of Amari plant inside the ash pond is done to reduce the fugitive emission from the ash pond.
- Replacement of 1100 meter ash pipe line is completed to reduce the ash leakages.
- Construction of concrete road near by ash pond to minimize the dust emission during transportation of ash.
- Vanadium is being recovered from the process & packed in 1 MT jumbo bags and stored in covered storage shed.
- Stability study of all the tailing dams and water bodies like Ash Pond, Red mud Pond, Process Water Lake, Caustic Pond and Raw water reservoir is done by IIT, Bhubaneswar.
- Installation of piezometer and survey monument at RMP and Ash pond dykes to observe the dyke stability.
- Dust suppression through sprinkling system has been installed and being operated regularly at Red mud pond.
- Annual audit of all the tailing dams are carried out for its stability and sustainable operation by M/s Golder Associates from South Africa, which is internationally renowned in tailings dam management.
- Dam break analysis has been carried out for both Red Mud Pond & Process Water Lake by M/s Golder Associates.
- Two nos. of truck mounted mist canons are being used apart from 3 nos. of water tanker sprinklers for Dust Suppression.
- Installation of 25000 SQM of coir mattress to prevent soil erosion and as well for dust suppression.
- Soil blanketing is being done every year (around 1 lac SQM) for dust suppression.



- Additional buttressing of West and north dyke of West cell of RMP is done for increasing the dyke stability. North dyke of East RMP height increased by 2 meters to have adequate free board. Spill way strengthening done by AQUA block as a part of seepage protection.

➤ **Part-I**

- (Any other particulars for improving the quality of the environment)

- The following measures were taken for environmental protection and abatement of pollution.
- All the Electro Static Precipitators (ESP) attached to all the Coal fired boilers are being operated continuously for emission reduction. Further installation of bag filters in the ESP is going on to reduce the PM emission below 50mg/Nm³.
- Dry Fog system is being operated continuously to control dust emissions at the crushers & at different transfer points at Bauxite Handling area. Water spraying arrangement at stock piles has been provided and being operated. All conveyer belts have been provided with Hood covering.
- At Coal Handling plant, Dry Fog system on the conveyer system and sprinkling system are being operated continuously for dust suppression.
- Wet scrubber system is being operated to control lime dust in lime handling area.
- Dust extraction systems with bag filter are being operated to control fugitive emissions from transfer points, conveyers and silo of alumina handling area
- Several initiatives have been taken for energy and water conservation as mentioned previously resulting in the recertification of ISO - 14001 (Environmental Management System) & ISO - 50001 (Energy Management System).
- Regular ground water quality monitoring is being done from 10 no's of observation wells including 3 around ash pond, 4 at red mud pond, 2 at process water Lake and 1 at dirty water pond.
- Total 78 no's of brick making units identified around lanjigarh where ash is being provided free of cost.
- Drinking water monitoring of nearby areas is being carried out on quarterly basis.
- As a part of disclosure of environmental parameters to all the stakeholders and to keep up the transparency, the emissions from stacks of Power plant & Calciner are hooked to SPCB & CPCB server through Real Time Data Acquisition System (RTDAS).



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- Implementation of provision for online remote calibration of gaseous emission parameters of CPP was done as per CPCB guidelines.
- To manage & improve the biodiversity of lanjigarh, a baseline study regarding the diversity of habitat, flora & fauna has been conducted by engaging a third party. A complete biodiversity management plan has been prepared keeping in view of the ecological sustenance of the area.



SNM