

VLL/HSE/ENV/2020/1222

22<sup>nd</sup> Sept, 2020

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

**Sub: Submission of Environmental Statement for the year ending 31<sup>st</sup> March 2020 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 2019-20 (ending the 31<sup>st</sup> March 2020) in the prescribed format, **Form V**.

This is for your kind information and record.

Thanking you.

Yours faithfully,  
*For Vedanta Limited, Lanjigarh*



**Rakesh Mohan**  
**(Chief Operating Officer)**

Encl: As above (Form V)

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

**[FORM-V]**

(See rule 14)

**Environmental Statement for the financial year ending the 31<sup>st</sup> March 2020****PART-A**

1	Name and address of the owner/occupier of the industry, operation or process	Rakesh Mohan Chief Operating Officer 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	16 <sup>th</sup> Aug, 2019

**Part-B****Water and Raw material Consumption**1. Water consumption M<sup>3</sup>/day

Process	5948
Boiler feed	2123
Domestic	1701

Name of the Products	Process water consumption (Process + Industrial drinking water) per unit of product output (M <sup>3</sup> /T)	
	During the previous financial year (2018-19)	During the current financial year (2019-20)
Calcined Alumina	1.83	1.53

## 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 (18-19)	During the current financial year (19-20)
Bauxite (T/T)	Calcined Alumina	2.89	2.92
Caustic Soda (Kg/T)		87.39	71.50
Lime (Kg/T)		27.87	27.47
Fuel Oil (Kg/T)		66.52	70.41
LDO (kg/T)		0.20	0.11
HSD (KL/T)		0.000013	0.00067
Energy (Hydrate), (KWh/T)		204.0	185.63
Energy (Calcined) (KWh/T)		32.0	31.38
Steam (T/T)		1.85	1.73

\*Specific Consumptions are reported per MT of Hydrate as Al<sub>2</sub>O<sub>3</sub> produced.



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**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	
<b>(A)Water:</b>					
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					
<b>Domestic Effluent from Plant STP</b>	NIL	pH	7.89	6.5 – 9.0	Variation: 0
		TSS (mg/l)	4.75	20	
		BOD (mg/l)	3.41	10	
		COD (mg/l)	18.5	50	
		Oil & Grease (mg/l)	0.58	10	
		NH4-N (mg/l)	< 0.3	5	
		N-total (mg/l)	1.64	10	
		Fecal Coliform (MPN/100ml)	35.96	100	

Pollutants	Quantity of pollutants discharged (mass/day)	Concentrations of pollutants discharges (Mass/volume)	Standard mg/ Nm <sup>3</sup>	Percentage of variation from prescribed standards with reasons
<b>B. Air Particulate Matter (PM)</b>				
Flue gas from Calciner Stack	0.1911 MTPD	Calciner : 29.25 mg/ Nm <sup>3</sup>	100	Variation: 0
Flue gas from Boiler Stack	0.7480 MTPD	CPP: 47.71 mg/ Nm <sup>3</sup>	50	Variation -0*

\*As per our CTO, the PM emission standard for boiler stack is 100 mg/ Nm<sup>3</sup>, but we have taken 50 mg/ Nm<sup>3</sup> as per the revised TPP emission standard according to the notification of MoEF& CC for thermal Power plant which is applicable from Jan'2019.



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**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- 18-19	During the current financial year – 19-20
<b>A. Generation From Process:</b> 1. Used / Spent Oil 2. Waste / Residues Containing Oil 3. Empty barrels/ Containers/ Liners/ Contaminated with hazardous chemicals/ wastes 4. Spent Ion Exchange Resin Containing Toxic Metals 5. Sludge contaminated with oil 6. Mercury/ Mercury Compounds 7. Vanadium sludge/ Compounds	1. 34.28 MT 2. NIL 3. NIL 4. NIL 5. NIL 6. NIL 7. 328.1 MT	1. 50.0 MT 2. 3 MT 3. 1000 Ltrs- 515 nos. 200 Ltrs- 21 nos. 50 Ltrs- 29 nos. 35 Ltrs- 40 nos. 20 Ltrs- 98 nos. * 4. 1 KL 5. 5.99 MT 6. 1 MT 7. 34.11 MT
<b>B. Recycled/Sold quantity</b> 1. Used / Spent Oil 2. Waste / Residues Containing Oil 3. Empty barrels/ Containers/ Liners/ Contaminated with hazardous chemicals/ wastes 4. Spent Ion Exchange Resin Containing Toxic Metals 5. Sludge contaminated with oil 6. Mercury/ Mercury Compounds 7. Vanadium sludge/ Compounds	1. 24.86 MT 2. NIL 3. NIL 4. NIL 5. NIL 6. NIL 7. NIL	1. 73.6 MT 2. 0 MT 3. 0 nos. 4. 0 MT 5. 0 MT 6. 0 MT 7. 354.88 MT
<b>B. From pollution control facilities</b>	0	0

\* Discarded containers quantity in numbers shall be converted to MT at the time of disposal and to be reported accordingly.



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3

**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)	1. 1758462	1. 2,112,688
2. Fly ash	2. 290277	2. 303,178
3. Lime grit	3. 5768	3. 7,254
B. From pollution control facilities (Effluent Sludge)	0	0
C. 1. Quantity recycled or re-utilized with the unit	1. Fly Ash : 291882 Red Mud : 48244.4	1. Fly Ash : 315,882 Red Mud : 138,644
2. Sold	2. Lime Grit : 5609.72 Red Mud : 30597.8	2. Lime Grit : 7,136 Red Mud : 0
3. Disposed	3. 0	3. 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 104 % for the year 2019-20.
- 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 Bauxite Residue Disposal Area -BRDA (RMP) dyke wall height raising & strengthening.



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4

## 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)

The table outlines the details pertaining to the characterization and disposal practices adopted at our site for hazardous waste as well as solid wastes.

Name of Wastes	Characterization	Disposal Practices
a. Hazardous waste Used Oil	Combustible liquid, Carcinogenic, Eco-toxic	Storage in containers on impervious floor under well ventilated covered shed followed by sale to actual users having valid authorization from SPCB, Odisha
Wastes / Residues Containing Oil	Combustible solid, Eco-toxic	Storage in impervious pits/ containers on impervious floor under well ventilated covered shed followed disposal in the Authorized HW incinerator/ Common Hazardous Waste Treatment Storage Disposal Facility (CHWTSDF)
Empty barrels/ Containers/ Liners/ Contaminated with hazardous chemicals/ wastes	Eco-toxic	Storage on impervious floor under well ventilated covered shed followed by captive use / disposal through original supplier / actual users authorized by SPCB, Odisha
Spent Ion Exchange Resin Containing Toxic Metals	Flammable solid, Eco-toxic	Storage on impervious floor under well ventilated covered shed followed by co-incineration in CPP / cement kilns after obtaining authorization from SPCB / disposal in CHWTSDF
Sludge contaminated with oil	Flammable semi- solid, Eco-toxic	Storage in impervious pits/ containers on impervious floor under well ventilated covered shed followed disposal in the Authorized HW incinerator/ CHWTSDF
Mercury/ Mercury Compounds	Carcinogenic, Eco-toxic	Storage in containers on impervious floor under well ventilated covered shed followed by sale to actual users having valid authorization from SPCB, Odisha / disposal in CHWTSDF
Vanadium Sludge	Carcinogenic, Eco-toxic	Storage in containers on impervious floor under well ventilated covered shed followed by sale to actual users having valid authorization from SPCB, Odisha / disposal in CHWTSDF



5  
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Name of Wastes	Characterization	Disposal Practices
<b>b. Solid Waste</b> Red Mud	Al <sub>2</sub> O <sub>3</sub> - 17-19 % Fe <sub>2</sub> O <sub>3</sub> - 47-53 % SiO <sub>2</sub> - 5-9 % TiO <sub>2</sub> - 6-7 % CaO- 1-2 % Na <sub>2</sub> O- 4-5 % L.O.I (Loss On Ignition)- 9-11 % *Test Report No- JNARDDC/BXT/18-19/24	After processing through Red mud filtration unit, dry red mud cake is stacked in Bauxite Residue Disposal Area BRDA (RMP) from where it is transported through rail to cement industry.
Fly ash	SiO <sub>2</sub> - 54 % Al <sub>2</sub> O <sub>3</sub> - 35 % Fe <sub>2</sub> O <sub>3</sub> - 6 % Traces of other compounds such as CaO, TiO <sub>2</sub> , MgO, P <sub>2</sub> O <sub>5</sub> , Na <sub>2</sub> O, K <sub>2</sub> O etc.	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 %	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 Bauxite Residue Disposal Area -BRDA (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 West cell of Bauxite Residue Disposal Area -BRDA (RMP) & Fly Ash Pond is in done.
- Rain water harvesting project has been implemented in the township near executive hostel for the purpose to recharge the ground water.
- To utilize the full volume of Process Water Lake & Storm Water Pond desilting was carried-out as a part of monsoon management.
- Cross functional water management team has been formed to look after the water management inside the refinery, focusing on reduction in water consumption, to



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6

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 people from departments to identify & lead Energy Saving projects.
- Water committee is formed in the Refinery by involvement of different senior & junior people from departments to identify & lead Water Saving projects.
- World Environment Day 2019 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 Chanalima, Banigaon, Jamuchan villages, 36 child care centres & nearby community temples. This year the World Environment Day was celebrated with week-long activities.
- World Ozone Day 2019 was celebrated in Lanjigarh for a week from 16th Sept along with various awareness sessions, quiz and site interactions including DAV International School.
- The site had applied for CII ER Excellence Award in Safety, Health & Environment and has awarded with the prestigious CII Eastern Region Excellence Award for Safety, Health & Environment.

#### **Part-H**

(Additional measures/investment proposal for environmental protection including abatement of Pollution)

- All the Electro Static Precipitators (ESP) attached to all the Coal fired boilers are being operated continuously for emission reduction. Fabric filters installed in ESPs of three boilers to achieve the PM emission limit below 50mg/Nm<sup>3</sup>.
- 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 2019-20, 25900 nos. of saplings have been planted as a part of gap filling activity for density make-up. The total area covered under green belt development is 278.216 Ha with plantation of 542922 no's of saplings and replacement with 291691 no's of saplings as gap filling under green belt



7  
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development as per MoEF guidelines. To sensitize the employees & local stakeholders World Environment Day was celebrated in & around the surrounding areas of the refinery.

- 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 2019-20, 104 % of generated ash has been utilized. Where 287121 MT of ash utilized for brick manufacturing, 16455 MT dyke height raising, 11273 MT for land filling, 1033 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.
- 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, Bauxite Residue Disposal Area -BRDA (RMP), Process Water Lake, Caustic Pond and Raw water reservoir is done by IIT, Bhubaneswar.
- Installation of piezometer and survey monument at Bauxite Residue Disposal Area -BRDA (RMP) and Ash pond dykes to observe the dyke stability.
- Dust suppression through sprinkling is being operated regularly at Bauxite Residue Disposal Area -BRDA (RMP).
- 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 Bauxite Residue Disposal Area -BRDA (RMP) & Process Water Lake by M/s Golder Associates.
- Two nos. of truck mounted mist cannons 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 Bauxite Residue Disposal Area -BRDA (RMP) is done for increasing the dyke stability. North dyke of East Bauxite Residue Disposal Area -BRDA (RMP) height increased by 2 meters to have adequate free board. Spill way strengthening done by AQUA block as a part of seepage protection.
- Construction of Gabion Wall is in progress on East Side of existing dry Bauxite Residue Disposal Area -BRDA (RMP) in order to increase the holding volume of the pond.
- Installation of wick drain as a pilot project in an area of 23000 sqm in existing BRDA East cell, which will enable to increase Red mud storage life of Bauxite Residue Disposal Area -BRDA (RMP) to utilize Red mud of 5.5 Lakh MT.
- Monsoon Risk assessment done, preparedness plan prepared & actions are tracked.



8  
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## Part-I

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

The following measures were taken for environmental protection and abatement of pollution.

- 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. Two no's of fixed mist cannons have been installed in bauxite stockpile areas for dust suppression.
- 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 Bauxite Residue Disposal Area -BRDA (RMP), 2 at process water Lake and 1 at dirty water pond.
- 87 no's numbers of fly ash brick manufacturing units are developed to supply fly ash for 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 & Calcliner are hooked to SPCB & CPCB server through Real Time Data Acquisition System (RTDAS).
- 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.
- New Solar plant of 100 KW is installed in the site
- Water management audit is conducted by M/s. NALCO (Eco Labs)
- Strategic & Advocacy intervention started to explore opportunity for Red Mud disposal with NITI Aayog (04 project proposal put forward during meeting with NITI Aayog on 8th Jan'20 on PPP model.
- Joint Committee formed by Ministry of Mines (MOM) including JNRDC, CPCB, IBM and industries for disposal of Red mud in mines backfilling.

