vedanta
transforming elements

VLL/HSE/ENV/2021/1343 18th September 2021

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 2021 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 2020-21 (ending the 31st March 2021) in the prescribed format, **Form V**.

This is for your kind information and record.

Thanking you.

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

Pande
18/09/21
Harshvardhan Pande
(Head – HSE & S)

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 2021
PART-A

1	Name and address of the owner/occupier of the industry, operation or process	Anurag Tiwari Chief Operating Officer Vedanta Limited, Lanjigarh, Kalahandi, Odisha.
2	Industry Category Primary – (STC Code) Secondary –(SIC Code)	Primary
3 4	Production Capacity Year of Establishment	2 MMTPA (Calcined Alumina), 75 MW CPP 2004
5	Date of the last environmental Statement submitted	22nd September, 2020

Part-B
Water and Raw material Consumption

1. Water consumption M^3/day

Process	5679.5
Boiler feed	1934
Domestic	1657

Name of the Products	Process water consumption (Process + Industrial drinking water) per unit of product output (M^3/T)	
	During the previous financial year (2019-20)	During the current financial year (2020-21)
Calcined Alumina	1.53	1.48

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 (19-20)	During the current financial year (20-21)
Bauxite (T/T)	Calcined Alumina	2.92	2.96
Caustic Soda (Kg/T)		71.50	57.96
Lime (Kg/T)		27.47	37.21
Fuel Oil (Kg/T)		70.41	63.88
LDO (kg/T)		0.11	0.079
HSD (KL/T)		0.00067	0.00104
Energy (Hydrate), (KWh/T)		185.63	184.4
Energy (Calcined) (KWh/T)		31.38	31.3
Steam (T/T)		1.73	1.72

*Specific Consumptions are reported per MT of Hydrate as Al_2O_3 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	
(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	7.92	6.5 – 9.0	Variation: 0
		TSS (mg/l)	5.3	20	
		BOD (mg/l)	2.93	10	
		COD (mg/l)	14.7	50	
		Oil & Grease (mg/l)	<0.4	10	
		NH4-N (mg/l)	< 0.3	5	
		N-total (mg/l)	1.07	10	
		Fecal Coliform (MPN/100ml)	23.65	100	

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	0.179 MTPD	Calciner : 26.15 mg/ Nm^3	100	Variation: 0
Flue gas from Boiler Stack	0.747 MTPD	CPP: 31.68 mg/ Nm^3	50	Variation -0*

*As per our CTO, the PM emission standard for boiler stack is 100 mg/ Nm^3, but we have taken 50 mg/ Nm^3 as per the revised TPP emission standard according to the notification of MoEF& CC for thermal Power plant.

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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- 19-20	During the current financial year – 20 -21
A. Generation From Process: 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. 50.0 MT 2. 3 MT 3. 703 nos. 4. 1 KL 5. 5.99 MT 6. 1 MT 7. 34.11 MT	1. 73.97 MT 2. 3 MT 3. 2313 nos. 4. 0 KL 5. 0 MT 6. 0 MT 7. 26.69 MT
B. Recycled/Sold quantity 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. 73.6 MT 2. 0 MT 3. 0 MT. 4. 0 MT 5. 0 MT 6. 0 MT 7. 354.88 MT	1. 64.72 MT 2. 0 MT 3. 6.18 MT (2751 nos. -Disposed to Facility- 1269 nos. -Disposed to recycler- 1482 nos.) 4. 0 KL 5. 0 MT 6. 0.84 MT 7. 0 MT
B. From pollution control facilities	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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PART-E
Solid Wastes

	Total quantity (MT)	
	During the previous financial year 19-20	During the current financial year 20-21
A. Generation from Process 1. Red Mud (dry) 2. Fly ash 3. Lime grit	1. 2,112,688 2. 303,178 3. 7,254	1. 2,272,953 2. 443,883 3. 12,220
B. From pollution control facilities (Effluent Sludge)	0	0
C. 1. Quantity recycled or re-utilized 2. Sold 3. Disposed	1. Fly Ash : 315,882 Red Mud : 138,644 2. Lime Grit : 7,136 Red Mud : 0 3. 0	1. Fly Ash : 4,43,883 Red Mud : 1,17,573 2. Lime Grit : 10,751 Red Mud : 11,400 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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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

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Name of Wastes	Characterization	Disposal Practices
b. Solid Waste Red Mud	Al_2O_3- 17-19 % Fe_2O_3- 47-53 % SiO_2- 5-9 % TiO_2- 6-7 % CaO- 1-2 % Na_2O- 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 Red mud pond . Utilised for Dyke strengthening, & sale to cement industry through rail.
Fly ash	SiO_2- 54 % Al_2O_3- 35 % Fe_2O_3- 6 % Traces of other compounds such as CaO, TiO_2, MgO, P_2O_5, Na_2O, K_2O 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.
- 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.

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- 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 2020 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 planting a total of 840 nos. of saplings in and around BRDA, Ash pond and Vedanta Township. Different competitions e.g quizzes, poster competition, slogan competitions were organized in between the Vedanta employees and associate partners. Drawing competition for school kids was also conducted. Photos are attached for reference.
- The site was awarded by CII for Noteworthy Water Efficient Unit- 14th National Award for Excellence in Water Management 2020 .

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/Nm3.
- 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.
- Truck mounted Vacuum cleaning system has been provided at Bauxite handling area for reduction in dust emission.
- For this year 2020-21, 11360 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 303051 no`s of saplings as gap filling 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.
- 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 2020-21, 130 % of generated ash has been utilized. Where 248559 MT of ash utilized for brick manufacturing, 192112 MT dyke height raising, 3213 MT for land filling .
- 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.

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- 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 had 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 Red mud pond.
- Audit of all the tailing dams had 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 had carried out for both Red Mud Pond & 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 had done to prevent soil erosion and as well for dust suppression.
- Soil blanketing is being done on the Red mud stacking areas for dust suppression.
- Wick drain technology which is one of the first of its kind in india designed by M/s Golder Associates for evacuation of water present in the existing slurry area of Red Mud Pond. This improved the consolidation of wet slurry present from earlier years & benefitted in storage of dry red mud in that area. Pilot area of 23000 sqm in existing BRDA East cell was taken up.
- Gabion wall was installed at the East Cell to utilize the space effectively without compromising the structural stability of the Red mud Pond.
- Monsoon Risk assessment done, preparedness plan prepared & actions are tracked.

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

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- 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.
- 106 no's numbers of fly ash units in the nearby villages of our refinery 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 & Calciner are hooked to SPCB & CPCB server through Real Time Data Acquisition System (RTDAS).
- To manage & improve the biodiversity of lanjigarh, a baseline study regarding the diversity of habitat, flora & fauna had conducted by engaging a third party. A complete biodiversity management plan has been prepared keeping in view of the ecological sustenance of the area.
- Solar plant of 480 KW is installed in the site & Township.

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